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**An exploration of the social factors that may have contributed in  
the UK to perceptions of work-relevant upper limb disorders in  
keyboard users**

by

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## **Abstract**

The outputs that form the basis of this PhD submission include a web site that summarises a unique collection of over 200 Court Judgments in personal injury claims for work-related upper limb disorders heard in the UK, together with a number of more conventional publications. Individually, these outputs all address upper limb disorders associated with work although they each had slightly different objectives and the audiences for which they were produced significantly influenced the type of publication in which they appeared. Together, they help illustrate when, how and, to some extent, why upper limb disorders associated with keyboard use became the issue it did in the UK in the late 1980s and 1990s. While many might now regard keyboard or computer use as an innocuous task, in the late 1980s and 1990s upper limb disorders associated with keyboard use, particularly computer use, became the subject of litigation, legislation, industrial disputes and widespread publicity. The outputs on which this submission is based, together, suggest that following the importation of the concept of repetitive strain injuries (RSI) from Australia in the later 1980s, the activities of trades unions and journalists in the UK promoted work-relevant upper limb symptoms and disorders associated with keyboard use as work-induced injuries. Subsequently, a small number of successful, union-backed, personal injury claims, which involved contentious medical evidence and perhaps an element of iatrogenesis, were widely promoted as proof that computer use causes injury. Around the same time, the government chose to implement flawed Regulations relating to the design and use of computer workstations, which failed to distinguish between that which might give rise to discomfort, fatigue and frustration and that which might give rise to injury. The existence of these Regulations, which among other things require regular, individual risk assessments of computer users, unlike any other type of work, could be interpreted as further 'proof' that computer use causes injury. The approach to the prevention and management of musculoskeletal disorders advocated in current HSE guidance, including the risk assessment strategy, remain capable of generating distorted perceptions of the risks arising from keyboard and computer use.

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# 1 Introduction

The outputs that form the basis of this PhD submission include a web site that summarises a unique collection of over 200 Court Judgments in personal injury claims for work-related upper limb disorders heard in the UK, together with a number of more conventional publications. Individually, these outputs all address upper limb disorders associated with work although they each had slightly different objectives and the audiences for which they were produced significantly influenced the type of publication in which they appeared.

Together, they help illustrate when, how and, to some extent, why upper limb disorders associated with keyboard use became the issue it did in the UK in the late 1980s and 1990s. While many might now regard keyboard use as an innocuous task, in the late 1980s and 1990s upper limb disorders associated with keyboard use, particularly computer use, became the subject of litigation, legislation, industrial disputes and widespread publicity.

Together, the outputs that form the basis of this submission also facilitate an exploration of the 'social' components of a biopsychosocial approach to upper limb disorders. Compared with the traditional biomedical paradigm, the biopsychosocial approach to illness and disease is a relatively new phenomenon and there appear to be very few examples of attempts to step beyond the arguments in the biomedical literature to examine the 'social factors' that may have contributed in the UK to perceptions of work-relevant disorders. The term 'work-relevant disorder' does not presume or stimulate assumptions about causal relationships.

The commentary starts by describing the origins of this submission, the outputs on which it is based and the research methods used in some of the outputs. This leads on to a consideration of explanatory models provided by the wider literature. The ways in which some 'social factors' may have influenced perceptions of upper limb disorders in the UK in recent decades are then briefly described. This commentary concludes by considering the implications and limitations of this submission and the further work that is needed.

## **2 The origins of this submission**

The origins of this submission can be traced back to a series of events and observations that occurred over several decades. In the early 1980s, I organised a series of three scientific meetings at Loughborough University on the alleged adverse health effects of using computer terminals. The contributions to these meetings were edited into a book (Pearce, 1984) that was subsequently translated into Japanese. Despite the fact that this book made no reference to what in Australia in the 1980s were referred to as repetitive strain injuries (RSI), perhaps because it didn't, I was invited to speak at a number of conferences in Australia. I was subsequently invited, in legal terminology instructed, by the Australian Government Solicitor to act as an expert witness in ergonomics in the Australian Government's RSI 'test case', *Susan Marie Cooper -v- Commonwealth of Australia*, which was heard in the Supreme Court in Melbourne in 1987.

Between 1984 and 1992, I organised a further series of scientific meetings in London, with invited speakers from North America, Australia, Scandinavia and Europe. For example: meetings in 1984 and 1986 examined the allegations of reproductive hazards from VDUs; while in 1990 and 1992, the meetings addressed the causes, prevention and management of upper limb disorders among keyboard users. Around this time I was invited to join the International Scientific Committee of the International Scientific Conference: Work With Display Units, which had been initially held in Stockholm in 1986 and subsequently in Montreal in 1989, Berlin in 1992 and Milan in 1994.

It became clear to me that health concerns associated with computer use had arisen in many countries, however, the focus of concern appeared to vary from country to country and in any one country the focus of concern appeared to vary over time. This phenomenon did not appear to have been explained and appeared worthy of investigation, however, it was unclear to me at the time how this could be achieved, given the disparate nature of the health concerns and their geographic distribution.

Some years later it became clear, with the benefit of hindsight, that upper limb disorders were the most enduring and the most far reaching of the health concerns associated with computer use, e.g. inspiring litigation on three

continents. However, when, why and how upper limb disorders became manifest varied from country to country in ways the biomechanical model of 'injury' did not appear to fully explain. It occurred to me that upper limb disorders associated with computer use were, perhaps, a manageable part of the phenomenon I had previously observed as being worthy of investigation.

When and how work related upper limb disorders became manifest and sometimes resulted in personal injury claims in the UK did not appear to be adequately explained by the biomedical or ergonomics literature. These observations were reinforced by my subsequent involvement in investigating clusters of upper limb disorders in several large organisations in which there appeared to be no obviously hazardous activity and by my involvement as an expert witness in ergonomics in personal injury claims in the UK.

It became apparent that the press reporting of claims for work related upper limb disorders was very selective and often inaccurate. The Courts' interpretations of health & safety Regulations were not entirely consistent with what might reasonably be expected, by a lay person, reading the guidance published by the Health and Safety Executive (HSE). Moreover, the Courts' interpretations of what constituted an 'injury' in a legal sense also appeared to be inconsistent with the emerging epidemiological evidence.

These events and observations over a period of several decades resulted directly or indirectly in the outputs upon which this submission is based. These events and observations also resulted in a recognition of the need to examine more closely when and how and, in particular, why upper limb disorders associated with computer use became the issue it did in the UK in recent decades. This was not a damascene conversion but more a slow realisation that a variety of factors, such as the inaccurate reporting of Court Judgments and the existence of health and safety Regulations specifically relating to the design and use of computer workstations, may have contributed to upper limb symptoms and disorders experienced while using a computer at work being inaccurately perceived as injuries caused by computer use.

### **3 The outputs on which this submission is based**

The outputs on which this submission is based are referred to by the letters **A** to **K**, in the chronological order in which they came about. Specific passages in individual outputs are referred to by the page, paragraph number or sub-heading in the original output. Copies of the outputs on which this submission is based are provided in Appendix B.

Some of the outputs (**A, C, F & G**) on which this submission is based are essentially commentaries published in the professional and specialist press rather than learned articles in academic journals. These commentaries are included as they help illustrate when and how upper limb disorders associated with keyboard use became the issue it did in the UK. Trying to understand why the issue became manifest requires some understanding of when and how it did.

In 1990, prior to the first known Court hearing in the UK of a claim by a keyboard user for an upper limb 'injury', I wrote an article aimed at Occupational Health practitioners (**A**) entitled *Upper Limb Disorders of Keyboard Users*. This referred to reports in the national press suggesting the UK was about to witness a rash of personal injury claims for upper limb disorders allegedly caused by keyboard use and reviewed the state of knowledge and events in Australia. I suggested, at that time, that some of the key elements of the culture which allowed the RSI concept to flourish among keyboard users in Australia, such as the attitudes of the medical profession and liberal state compensation, were not present in the UK.

In 1994, I was invited to review the media coverage of upper limb disorders in the UK for a proposed book entitled *Work-Related Upper Limb Disorders: A Multidisciplinary Approach* that was to be published by Taylor & Francis. For reasons that are unclear this book never came to fruition. However, my analysis of how upper limb disorders were portrayed in five, national, daily broadsheets over a period of 10 years was eventually published in a journal aimed at Occupational Health practitioners (**B**). The editor's introduction refers to this analysis as being the first ever comprehensive review of press reports of so-called "repetitive strain injuries" and appears from literature searches to be the only review of its kind ever published.

In 1998, I was invited to contribute a chapter entitled *An Ergonomist's Perspective on Claims for WRULDs (C)* to a multi-authored legal text on industrial diseases litigation (McDonald & Georges, 1998). This appears to be the first published commentary on the issues and evidence dealt with by ergonomists when acting as an expert witness in personal injury claims for upper limb disorders in the UK. Among other things, this provided a comprehensive review of the guidance on upper limb disorders published by the HSE up to 1998, an explanation of the origins of the Health and Safety (Display Screen Equipment) Regulations and observations on the concept of 'injury'.

By far the largest of the academic outputs, in terms of the effort involved in their production, is the web site (D), which was originally developed as part of a research contract for the HSE that examined how the Courts were interpreting HSE guidance documents and health and safety Regulations by analysing transcripts of Judgments. This web site can currently be found at: <http://www.humanetechnology.co.uk/wruldii/intro.php>. Subsequent funding by the HSE allowed the web site to be turned into a resource for health and safety practitioners. This website is referred to in the HSE's latest guidance on WRULDs *Upper limb disorders in the workplace* (HSE, 2002) as a source of further information and (currently) has reciprocal links with the HSE's web site, for example at: <http://www.hse.gov.uk/msd/links.htm>.

HSE funding totaling just over £200,000, in a series of discontinuous contracts over a period of 13 years starting in October 1998, resulted in: the first version of the web site being made publicly available in July 2000; the addition of a visitor registration system and Lawtel's case summaries in November 2005; a survey of registered users in July 2008, seeking their views on how the site could be made more useful and more usable; and in response to the results of the survey, the addition in November 2009 of a much wider range of search facilities, case summaries and commentaries. Throughout this period new cases were added to the web site as they became available. New cases continue to be uploaded to the web site as and when information and resources are available. The search for pertinent Court Judgments, like the search for pertinent press reports, continues though relatively few of either have come to light in recent years.

The final report (E) on the initial research contract confirmed that the Courts' interpretations of certain health and safety Regulations and what constitutes an 'injury' in a legal sense were not entirely consistent with what might reasonably be expected, by a lay person, reading HSE guidance. The final report on the study (E) concluded by suggesting: that the web site should be maintained and efforts made to improve its effectiveness; that consideration should be given to using the web site to promote awareness of the possible consequences of failing to follow guidance on WRULDs and health and safety Regulations; and that consideration should be given to applying a similar approach to other risks e.g. work-related stress. The first two of these recommendations were accepted by the HSE and further funding was provided to maintain the web site and to turn it into a resource for health and safety practitioners.

Searches of the literature and the internet around the turn of the millennium, and more recently, failed to identify any other research project or a web site that had similar aims and objectives. I was solely responsible for the conception and design of the initial study and for the specification of the web site, in its various forms, and for the content of the web pages. The final report (E page iii) acknowledged the contributions made by others to the practical implementation of the web site, for example, to the development of the bespoke database used to generate the web pages and to the 'look and feel' of the web pages.

Some of the themes and issues addressed in articles I had prepared for the professional and specialist press in the UK, for example: an article (F) that critically reviewed the revised guidance issued by the HSE that was intended, among other things, to reduce the incidence of work-related musculoskeletal disorders; and an article (G) that questioned the role of ergonomics and regulations in the prevention of musculoskeletal disorders, were brought together and expanded upon when I was invited to be the only non-American contributor to *Occupational Injuries and Diseases of the Upper Extremity* (Derebury et al, 2006).

Preparing this contribution (H) for a non-UK readership caused me to question why upper limb disorders associated with computer use became the issue it did in the UK and to tentatively suggest an explanatory model that drew attention

to the range of 'contextual factors' that might influence perceptions of work-related disorders. I illustrated some of the contextual factors by recounting experiences in the UK of upper limb disorders associated with computer use. This contribution (H) included a brief update on the review of the media coverage of upper limb disorders (B) referred to above.

The remaining publications on which this submission is based arose from a HSE-funded research contract, which involved a multi-disciplinary team, that reviewed the literature on upper limb disorders and examined whether the biopsychosocial model was applicable to their management. I was one of three involved in the conception and design of the study and in reviewing the literature and synthesizing the evidence, and took the lead in identifying and summarising the 'Conceptual reviews, texts and guidance' that appear in Table A3 in the final report.

My participation in the study gave me a greater understanding of the biopsychosocial approach and caused me to appreciate the potential significance of the high background prevalence of upper limb symptoms in the general population and the doubts that now exist about the relevance of some of the 'risk factors' that have been postulated as contributing to upper limb disorders. This study, which also marked the first known use of the term 'work relevant upper limb disorders', crystallised my views about why upper limb disorders associated with keyboard and computer use perhaps became the issue it did in the UK.

An abridged version of the final report on the research contract for the HSE (I) was published in *Occupational Medicine* (J), with the following introduction:

Eight years ago, Occupational Medicine published Waddell and Burton's evidence-based occupational health guidelines for the management of low back pain at work[1]. This work remains one of the most frequently cited and accessed papers we have published. In this issue, Kim Burton and colleagues publish their evidence-based review of the management of work-relevant upper limb disorders and it will be interesting to see if it has a similar impact [2]. Occupational physicians will welcome the evidence-based findings and the clarity brought to bear on a problem we encounter on a daily basis even if the main findings have a familiar ring to them: upper limb disorder is very common but hard to diagnose and classify; workplace psychosocial factors and individual psychological factors are important and may be



as important as physical exposure factors in causation and determining outcome; there is strong evidence that programmes using cognitive–behavioural approaches are effective whereas the evidence for ergonomic interventions is not as strong. In 2001, the back pain guidelines represented a major watershed in occupational health practice and in 2017 we may be writing the same thing about the upper limb disorder guidelines.

This study was awarded the BUPA Foundation's Health at Work Award 2008, the proceeds of which were subsequently used by the same multi-disciplinary team to develop *The Arm Book* (K). I contributed to and critically reviewed the wording of *The Arm Book*. One of the objectives of *The Arm Book* is to try to help people experiencing WRULDs to continue to work, and is similar in style and approach to *The Back Book* (Roland et al, 2002), *The Whiplash Book* (Waddell et al, 2002) and *The Hip & Knee Book* (Williams et al, 2009). While the idea of providing educational booklets for those experiencing musculoskeletal problems is not new, *The Arm Book* is believed to be the first such booklet that addresses common upper limb problems from a biopsychosocial perspective, and is both evidence-informed and end-user evaluated.

## 4 Research methods employed

The commentaries (**A, C, F & G**) published in the professional and specialist press did not require any detailed research, given that they reviewed material with which I was, or needed to be familiar, when preparing expert evidence to assist the Court. However, as will no doubt be apparent from my observations in previous sections of this commentary, my views about why upper limb disorders were attributed to keyboard and computer use, i.e. my explanatory model, changed over time and this is reflected in the commentaries.

When I embarked on my review of the press coverage of work related upper limb disorders, I cannot claim that I had any broader objective in mind than to examine how they were portrayed in the press, which from my experiences of being misquoted, e.g. (**B** page 16 column 2) appeared questionable. Having researched and taken advice on the methods that can be used to analyze the media coverage of a topic, the review of the media coverage in the UK was based on a content analysis of the headlines and the text of pertinent press reports and a comparison of the press reports of awards made by Courts with the official Judgments. Comparing the press reports with the Court Judgments was a particular strength and novel feature of the review.

Identifying pertinent press reports presented a challenge given that there was no central archive or database of such reports in the UK. A variety of techniques were used including setting up internet tools, such as FT Profile which captured press reports that referred to terms such as RSI, repetitive strain injury and all the common upper limb disorders such as tenosynovitis and exploiting the informal networks that provided information on Court Judgments. It transpired that some of those who had provided information on Court Judgments, notably several employers' liability insurers, also collected 'clippings' of references in the press to work related upper limb disorders. These techniques resulted in a wealth of examples of pertinent reports in the national and regional press and magazines. However, the published review of the media coverage of upper limb disorders in the UK (**B**) was confined to the reports in five, national, daily broadsheets, from the beginning of 1985 until the end of 1994.

The final report on the initial research contract for the HSE explains the problems encountered in obtaining transcripts of Court Judgments in personal injury claims for upper limb disorders (**E** chapter 3) and why a novel medium was developed, the web site, to encourage the exchange of information on such Judgments (**E** chapter 2). The study demonstrated that the web site had been successful in generating information on a small number of previously unknown Judgments and in providing additional information on some known cases, but that its most important role, from a research perspective, had been to provide a focus, a purpose, which encouraged those who had knowledge of pertinent Judgments to contribute information.

Given the novel features of this study, at its outset it was unclear whether the analyses originally proposed would be likely to produce findings of any practical use. An initial analysis of a sample of Judgments was undertaken to explore the issues that might be of most interest and practical use and the ways in which the Judgments should be analysed and the results presented. The sample of Judgments chosen for this initial analysis were claims for upper limb disorders arising from what might broadly be described as office work (**E** chapter 4). For the reasons I explained (**E** 4.5.1), essentially floating numerator issues, I intentionally refrained from presenting any summary statistics on the outcome of claims or on the damages awarded and suggested that where summary statistics were presented they should always be interpreted only as indicative of features of the sample of Judgments analysed and not necessarily representative of all such Judgments or of all such claims.

Subsequent analyses of the Judgments in 97 cases that were available at that time focused on the nature of the injuries for which damages were claimed (**E** chapter 5) and how the Courts had interpreted health and safety Regulations (**E** chapter 6). Analyses of how the Courts have interpreted the Health and Safety (Display Screen Equipment) Regulations and the Manual Handling Operations Regulations in personal injury claims for WRULDs continue, as and when pertinent Judgments come to light. These analyses are presented in two commentaries that can be accessed from the home page of the web site (**D** 3rd drop down menu). A third commentary on *Reducing the risk of an organisation experiencing personal injury claims for WRULDs* is also updated as and when pertinent Judgments come to light.

I referred in **H** (page 254) to Sauter and Swanson's ecological model of possible linkages between upper limb disorders and computer use, which appeared in a book published in the USA in 1996 entitled *Beyond Biomechanics: Psychosocial Aspects Of Musculoskeletal Disorders In Office Work* (Moon & Sauter, 1996), but suggested that their ecological model failed to explain what happened in Australia. It can be argued that it failed, in part because the term psychosocial factors is most commonly used to describe factors intrinsic to work and/or factors intrinsic to the individual. There were no 'social' components, i.e. societal influences, in their psychosocial approach.

I suggested in **H** (page 256) that no satisfactory explanatory model can afford to ignore the possibility that some upper limb disorders are (directly) induced by the (physical) demands of work, the possibility that some upper limb disorders are a function of domestic and leisure activities, the probability that some upper limb disorders are intrinsic to the individual, the clear evidence that upper limb disorders are multifactorial in origin and that factors extrinsic to work can shape ideas and beliefs about upper limb disorders. The contextual model that I proposed in **H** (pages 256-258) drew attention to factors extrinsic to work that might influence perceptions of work-related disorders but I did not refer to them as 'social factors' or presume to redefine psychosocial.

The final report (**I**) on the HSE funded study that reviewed the literature on upper limb disorders and examined whether the biopsychosocial model was applicable to their management describes the approach adopted as a 'best evidence synthesis' and explains the methods used (**I** chapter 2). Attention was primarily focussed on systematic reviews and extensive narrative reviews, but individual studies were selected where they added additional or more detailed information.

Prior to preparing this submission, I undertook extensive searches of the literature and the internet, including citation searches of two obviously relevant studies (Dembe, 1986 & Arksey, 1998), to see if anyone had examined why upper limb disorders associated with keyboard use became the issue it did in the UK or had attempted to apply a biopsychosocial approach to upper limb disorders other than at the level of the individual.

The study by Dembe (1986) entitled *Occupation and Disease How Social Factors Affect the Conception of Work-Related Disorders*, examined how what Dembe called 'Key Social Factors' in the USA influenced the conception and recognition of cumulative trauma disorders, back pain and noise-induced hearing loss as work-related conditions. The study by Arksey (1998) entitled *RSI and the experts The construction of medical knowledge*, which the author described as "bringing ideas from the sociology of scientific knowledge to bear on the issue of RSI", was the only scholarly work of which I was aware that provided an element of social commentary on upper limb disorders in the UK in the late 1980s and 1990s.

My searches revealed numerous studies that appeared to have some similarities to this submission, for example: the investigation of medically unexplained symptoms and environmental exposures; the examination of the media coverage of various conditions; the origins of health scares; and the investigation of the spread of ideas, to name but a few. However, there appears to have been no previous attempt to examine why upper limb disorders associated with computer use became the issue it did in the UK.

My searches also revealed numerous studies that had attempted to apply a biopsychosocial approach to various ailments, but almost without exception biopsychosocial had been interpreted as a combination of 'bio' and 'psychosocial' components, with the 'bio' component permitting consideration of biological, biochemical or biomechanical factors, while the 'psychosocial' component permitted consideration of psychological factors intrinsic to work and/or intrinsic to the individual. One study entitled *Chronic Upper Limb Pain: An Exploration of the Biopsychosocial Model* (Henderson et al, 2005) considered whether 'litigation against an employer' and 'claiming state benefits' were correlated with symptoms, but at the level of the individual.

## 5 Explanatory models

Commentaries on the RSI epidemic in Australia in the 1980s that were published after the epidemic had started to wane, to which I refer in **H** (pages 255-256), might be expected to be a fruitful source of explanatory models. However, many of these commentators were intimately involved in the debate and held trenchant views. Arksey (1998) referred to these commentaries as "explanations made by RSI partisans" and drew a distinction between explanations at the level of the individual and more general explanations of the rise of RSI as a social problem in Australia in the 1980s. Arksey (1998) went on to observe that (Australian) social scientists added another layer of explanations, but that these used frameworks compatible with their professional field and personal commitments. It appears to me that when social scientists including Arksey have addressed upper limb disorders associated with work, their frameworks and language have often obfuscated rather than clarified matters and usually excluded any consideration of a biomechanical component.

I cannot recall precisely when I first became aware of Dembe's study, but I referred to it briefly in 2006 (in **H** page 256). While Dembe wrote from a North American perspective and was primarily concerned with how and why medical practitioners initially came to regard certain medical disorders as work-related, his thesis that this was not merely a matter of gathering and interpreting empirical evidence but rather a complex social phenomenon appeared to be consistent with my observations on upper limb disorders associated with keyboard and computer use.

In the introduction to his study, Dembe (1996) examines the social context of occupational disease and suggests that what has been missing is an underlying theory of the determinates of occupational disease and an analysis of how social factors exert their influence within the overall theoretical framework. Dembe goes on to outline a number of potential approaches to answering the fundamental question of what gives rise to an occupational disorder that can be represented by explanatory models reflecting the perspectives of economics, Marxism, medicine, epidemiology, the individual worker, sociology and workers' compensation, but suggests that many of these explanatory models start with the presumption that there either is or is not a

discrete causal connection between specific workplace factors and an individual's ailment.

Dembe argues that while many traditional types of injury and illness support this presumption and that a simple model of causality serves well enough in the case of occupational diseases with a specific aetiology that can be traced definitively to the working environment, for many disorders the analysis of causation is much more difficult and complex, particularly for disorders that potentially stem from a multiplicity of factors both on and off the job, e.g. upper limb disorders. Causal models for such disorders are further complicated by considerations of personal susceptibility and genetic disposition, repeated exposure to low levels of the suspected causal agent(s), and long latency periods.

Dembe goes on to argue that the complexity of the causal model determines the extent to which the recognition of disease is affected by external social factors which can promote and inhibit recognition, but that such social factors are often inextricably entwined and that most previous scholarly work in the social analysis of occupational disease has failed to address the complexity of this process. It can be argued that while Dembe made no explicit reference to the biopsychosocial model in his study, if the terms psychosocial and biopsychosocial are used in the ways described in I (at pages 43 & 46), what Dembe's study effectively did was to focus on the 'social' components of a biopsychosocial approach to the three disorders he examined from a North American perspective.

Similarly, it can be argued that my contextual model was an early attempt at a biopsychosocial approach to work related upper limb disorders. If, as suggested by I, J & K, the biopsychosocial approach can be used to manage individual upper limb disorders, and if the terms psychosocial and biopsychosocial are used in the ways described in I, it seems reasonable to suggest that a biopsychosocial perspective might be a useful way of looking at clusters of upper limb disorders in organisations and at a national level.

There follows a brief summary of how 'social factors' may have influenced perceptions of upper limb disorders associated with keyboard use in the UK. Of necessity, this is an overview of what appear to have been the most

significant factors. A more detailed commentary, which refers to the outputs on which this submission is based and includes some examples of the press coverage cited, is provided in Appendix A.



## **6 Overview of 'social factors' contributing to perceptions of work-relevant upper limb disorders in keyboard users in the UK**

The outputs on which this submission is based, together, suggest that following the importation of the concept of repetitive strain injuries (RSI) from Australia in the later 1980s, the activities of trades unions and journalists in the UK promoted work-relevant upper limb symptoms and disorders associated with keyboard use as work-induced injuries. Subsequently, a small number of successful, union-backed, personal injury claims, which involved contentious medical evidence and perhaps an element of iatrogenesis, were widely promoted as proof that computer use causes injury.

Around the same time, the government chose to implement flawed Regulations relating to the design and use of computer workstations, which failed to distinguish between that which might give rise to discomfort, fatigue and frustration and that which might give rise to injury. The existence of these Regulations, which among other things require regular, individual risk assessments of computer users, unlike any other type of work, could be interpreted as further 'proof' that computer use causes injury.

The initial guidance on upper limb disorders published by the HSE could not be said to have promoted keyboard use as a cause of work-induced injuries. However, subsequent guidance gave the impression that virtually all upper limb disorders, including non-specific pain syndromes, are associated with work and that by applying the 'ergonomics approach' suggested in the guidance they would be eliminated.

Neither simplistic ergonomics interventions nor Regulations, which can be viewed as part of the problem not the solution, can eliminate naturally occurring symptoms and disorders. It can be argued that the approach to the prevention and management of musculoskeletal disorders advocated in current HSE guidance, including the risk assessment strategy, remain capable of generating distorted perceptions of the risks arising from keyboard and computer use.

## **7 Limitations and implications of this submission and the need for further work**

This submission has the modest objectives of illustrating and inviting further exploration of what appears to be a neglected area: the possible influences of 'social factors' on how work-relevant symptoms and disorders are viewed.

It is important to note that questioning whether factors extrinsic to work might have caused or contributed to upper limb symptoms and disorders in computer users being perceived as work-induced injuries does not deny the reality of the symptoms or the impact they can have on working comfortably or being able to work at all. Nor does it suggest that clusters of work-relevant upper limb disorders could not be a function of a hazardous working environment or that upper limb disorders associated with keyboard use became the issue it did in the UK in the late 1980s and 1990s solely because of factors extrinsic to work.

This submission essentially suggests, with the benefit of hindsight, that too little attention has been focussed on how factors extrinsic to work might have influenced perceptions of work-relevant upper limb disorders. Looking forward, it seems reasonable to suggest that this submission has implications both for further research and for future policy development.

While this submission has focussed on work-relevant upper limb disorders in the UK in the late 1980s and 1990s, further research is needed to examine which factors are most influential now. Some factors that appear to have been significant then, clearly no longer have any influence, e.g. the press coverage of personal injury claims for upper limb disorders has effectively ceased.

Further research work is also needed to gain a greater understanding of the extent to which and how 'social factors' might influence work-relevant health outcomes and of what could or should be done to moderate or accommodate such influences. Questions arise about the extent to which different 'social factors' might influence different work-relevant health outcomes. For example, what may have driven, and what may now be driving or attenuating, perceptions of work-related stress? Why do some work-relevant health outcomes appear to become an 'issue' in some countries but not others, at different times?

This submission suggests that, at a policy level, a factor that continues to be influential in the UK to the perception of work-relevant upper limb disorders is the approach to the prevention and management of musculoskeletal disorders advocated in current HSE guidance. The reason why this is particularly worthy of further consideration now is that since 2009 the European Commission has been considering a new Directive addressing all significant risk factors for work-related musculoskeletal disorders and repealing the Directives on Manual Handling and on the use of Display Screen Equipment. The current position is reported on the HSE's web site at

(<http://www.hse.gov.uk/aboutus/europe/euronews/dossiers/msd.htm>):

Since late 2012, the Commission have been considering how to take forward the work on the Ergonomics Dossier, including a suggestion of using a non-binding Recommendation. However, there is no consensus in the ACSH for this option. The Commission has also confirmed - through its REFIT programme - that there will be no legislative proposals on Ergonomics/MSDs during its present mandate.

HSE does not expect any proposals on this dossier until late 2014 or early 2015, following the elections to the European Parliament and appointment of a new College of Commissioners in 2014.

If, as this submission suggests, the approach to the prevention and management of musculoskeletal disorders advocated in HSE guidance is fundamentally flawed, questions arise about what would be a better strategy. This submission suggests that a biopsychosocial approach may prove useful in seeking to understand how best to manage work-relevant disorders. This has implications both for practitioners and for the development of appropriate policies that clearly distinguish between desirable welfare provisions and essential health and safety requirements.

Any new strategy will need to prevent work-induced disorders, which the emerging epidemiology would appear to suggest only arise with the more extreme exposures, and accommodate those with work-relevant disorders. The latter might require Line Managers and practitioners in Health and Safety, Occupational Health and Human Resources to work together (more) closely and with (more) clear responsibilities, utilizing, for example: *Tackling musculoskeletal problems: a guide for the clinic and workplace – identifying obstacles using the psychosocial flags framework* (Kendall et al, 2009); and *The Arm Book* (Kendall et al, 2011).

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## **Appendix A - 'Social factors' contributing to perceptions of work-relevant upper limb disorders in keyboard users in the UK**

What few official statistics there are suggest that the upsurge in interest in the UK in upper limb disorders associated with work, and with keyboard use in particular, was not driven by any dramatic increase in those seeking state funded compensation (see **A** page 9), as seen in the USA and Australia. The fact that the 1990 Labour Force Survey estimated there were 50,000 cases of self-reported "repetitive strain injury" (see **B** page 14) perhaps says more about the method used to collect the data and the media coverage of the issue than about the prevalence of work-induced upper limb disorders in the UK at that time or the diagnoses provided by medical practitioners.

The term 'repetitive strain injury' was being used in the UK press only a few years after it had been created in Australia. For example, trades unions such as the GMB and APEX were reported in *The Times* on the 10<sup>th</sup> September 1985 as campaigning to get repetitive strain injuries classified as "prescribed industrial illnesses", while on the 30<sup>th</sup> October 1985 the *Financial Times* reported the launch of a VDU Workers' Rights campaign that urged "all VDU users who experience such problems as eye strain, repetitive strain injuries, headache, backache and problems during pregnancy to contact MPs asking them to support calls for legislation".

Prior to the extensive reporting in December 1991 of the Judgment in the first claims involving keyboard users to be fought through the Courts (see **B** page 16) there had been numerous reports that various trades unions anticipated personal injury claims for upper limb disorders by keyboard/computer users and that insurers were expecting an increasing number of claims. For example: **White collar unions expect rise in VDU injury claims** in the *Daily Telegraph* on the 15<sup>th</sup> February 1988; **Union to Claim For VDU-Based Injuries** in the *Financial Times* on the 6<sup>th</sup> December 1988; **Airline may face claim against computer use injury** in the *Financial Times* on the 8<sup>th</sup> February 1989 (attached); **Former Employees Pursue Claims For Keyboard Injuries** in the *Financial Times* on the 17<sup>th</sup> August 1989; **FT injury test case looms** in the *The Guardian* on the 7<sup>th</sup> December 1989; and **New technology strains alarm insurers** in *The Guardian* on the 28<sup>th</sup> December 1989 (attached). However, up to December 1991 the only known press reports of the outcome

of a personal injury claim for an upper limb disorder concerned an unsuccessful claim in April 1987 arising from handling a teapot (see **B** page 15) and an out-of-court settlement in May 1989 of a claim arising from using an electric typewriter (see attached).

Thus, in the UK, up until the 1990s the upsurge in interest in upper limb disorders associated with work appears to have been driven primarily by the trades unions and pressure groups such as the VDU Workers' Rights campaign, the RSI Association and the London Hazards Centre. They successfully employed the media to promote their agenda(s), resulting in frequent references to "repetitive strain injury" and to anticipated litigation particularly by keyboard and computer users. It can be argued that all these activities promoted upper limb disorders associated with keyboard and computer use as work-induced injuries. However, other factors such as the availability of state compensation, the activities of government and related bodies and the views of medical practitioners that appear to have been influential in the USA and/or in Australia in the 1980s do not appear to have significantly influenced what happened in the UK at that time.

For example, the guidance published by the HSE (reviewed in **C** up to 1998) could not be said to have promoted keyboard use as a cause of work-induced injuries. The term work-related upper limb disorders (WRULD) only came into use after 1990, following the publication by the HSE of a guidance document entitled *Work related upper limb disorders A guide to prevention*. The text of this document made no explicit reference to computer or keyboard use and dismissed the term 'RSI' in one sentence in a footnote: "Although in recent years the term 'Repetitive Strain Injury' (RSI) has been commonly used it is medically imprecise and not sufficiently accurate to cover the conditions observed".

If judged in terms of the coverage in some the most widely-read UK medical journals, e.g. *The Lancet* and the *British Medical Journal*, upper limb disorders never received the level of attention they did in *The Medical Journal of Australia*. Nevertheless, it was not long before there were references to the problems in Australia and, perhaps inevitably, the debate about RSI spilled over into the UK journals. However, Arksey (1998) suggests that the "potentially infectious ideas, generally speaking, did not translate to this

country", possibly because those who had witnessed Australia's RSI epidemic advised their overseas counterparts to learn from them, quoting Brooks et al (1987): "Other countries should look very carefully at Australia's experience and try not to repeat it".

An article in the *BMJ* entitled **Repetitive strain disorder - Often misdiagnosed and often not work related** (Barton 1989) suggests that some medical practitioners had not only looked carefully at Australia's experience, but also read the newspapers. The opening sentence of the article noted that: "The recent settlement of £45,000 for "a disease caused by typing" has highlighted the rewards available to those who can convince the authorities that they have a disorder caused by their work".

Barton was undoubtedly referring to the settlement of the claim by Pauline Burnard who worked as a secretary in the West Bridgford branch of the Midland Bank. This out-of-court settlement received significant press coverage in May 1989 under the headlines: **Secretary wins £45,000 for life ruined by typing disease** in the *Daily Mail* (attached); **Tenosynovitis: Secretary Pauline Burnard wins £45,00 damages after suffering repetitive strain injury from electronic typewriter** in *Today*; **£45,000 for a girl crippled by typing** in *The Sun* (attached); and **Compensation of £45,000 for repetitive strain victim** in the *Financial Times* (attached).

However, events rapidly unfolded in the UK as other factors came into play in the 1990s with the introduction of legislation covering the design and use of computer workstations and Court Judgments in claims for upper limb injuries caused by computer use.

The reason for focussing attention on such Court Judgments is that a Judgment in favour of a claimant apparently presents, and can understandably be perceived as, strong evidence that computer use causes upper limb injuries. That is certainly how the press have reported such claims (**B**). Despite the fact that the vast majority of the millions of keyboard users in the UK have never made claims, that the vast majority of claims that were made never reached Court, that less than half of the 70 or so claims that are known to have reached Court were successful and that only a handful of successful claims received any publicity, a lay person might reasonably ask what stronger 'proof' could

there be that computer use causes injury than a Judge awarding a computer user substantial damages for an upper limb disorder.

To understand why a Court Judgment in favour of a claimant may not be strong evidence that computer use causes upper limb injury, it is necessary to examine more closely what happens in such claims. In a personal injury claim a claimant has to show, among other things, that he/she has, on the balance of probabilities, suffered an injury. This may appear to be a statement of the obvious, but it contains several important concepts that are widely misunderstood. Firstly, there is the issue of what constitutes an 'injury' in a legal sense. Secondly, while the burden of proof is on the claimant, the level of proof in a civil claim is only on the 'balance of probabilities', rather than 'beyond reasonable doubt' as is required in criminal cases.

In claims for work related upper limb disorders, a claimant can, and often does, successfully claim damages for the acceleration or aggravation or exacerbation of a (universally agreed to be) pre-existing or constitutional upper limb disorder, the primary cause of which was (universally agreed to be) entirely unrelated to the claimant's work. See **D**, for example: *Sharp -v- Yorkshire Bank plc*; and *Campbell-Weller -v- Omnicom Europe Ltd*. There is no 'science' relating to what constitutes or quantifies the acceleration or aggravation or exacerbation of a pre-existing or constitutional upper limb disorder: it is a matter of medical opinion. It comes down to which medical expert a Judge prefers.

It is perhaps stating the obvious to note that the level of proof required in a personal injury claim, i.e.  $p = \text{marginally} > 0.5$ , is far less than that which would be considered statistically significant in a scientific study of a possible association between work and an upper limb disorder. A good example of the benefit of the doubt being given to the claimant is provided by the Judgment in *Conaty -v- Barclays Bank plc* in the Central London County Court in April 2000 (see **D & H** page 263) in which the Claimant was awarded damages of £243,792 for De Quervain's Tenosynovitis caused by the non-use of her thumb when performing numeric data entry.

In the recent County Court Judgment in *Warner -v- Boots PLC*, in which the Claimant was awarded damages for Carpal Tunnel Syndrome caused by 'picking' cosmetics in a warehouse, the Judge said: " There is .... a difference of



approach between that of the courts and a medical practitioner. For a medical practitioner it may be vital to determine the precise cause of a medical condition. For the court it suffices to prove that on the balance of probabilities a Claimant can identify a cause of the medical condition. The law treats that which is probable as certain".

The fact that a personal injury claim can, and often does, come down to which medical expert a Judge prefers draws attention to the, often disputed, expert medical evidence in claims for work related upper limb disorders. As shown in the quantitative analysis of the Judgments available at the time (**E** 5.2), in just over half of the claims the diagnoses were disputed and the relationship between the alleged injury or injuries and work was disputed in the vast majority of cases.

The fact that diagnoses are frequently disputed, in part, merely reflects the existence of a range of reasonable expert opinion and the lack (at the time) of consensus on the diagnostic criteria for these disorders (see **H** page 250 & **I** 3.2). It is clear from the Judgments (**D**) that those acting on behalf of claimants tend to instruct Rheumatologists, while those acting on behalf of defendants tend to instruct Surgeons. However, what emerges from the Judgments, somewhat surprisingly, is the lack of competence demonstrated by some of those who put themselves forward as medical experts.

Dr Richard Pearson, who at the time was affiliated to The Musicians' and Keyboard Clinic at St Barts Hospital and could be described as one of the UK's foremost 'apostles' of RSI, acted as a medical expert on behalf of the unsuccessful claimants in: *Brelsford -v- South Glamorgan Probation Department* in Cardiff High Court in June 1993 (see **D**); and in *Mughal -v- Reuter* in the Royal Courts of Justice in October 1993 (see **B** & **D**). However, it was the criticisms made of Dr Pearson in the Judgment in *Moran -v- South Wales Argus* in Cardiff High Court in November 1994 that appears to have effectively marked his demise as a medical expert witness.

Among other things, the Judge, Mr John Griffith Williams QC observed that: "Dr Pearson is a member of the Royal College of Physicians and a consultant physician whose experience has been in clinical pharmacology. He has no training, apart from his student education, in upper limb disorders"; "his

knowledge of anatomy is very suspect indeed"; and "His diagnostic techniques, when subjected to close scrutiny are clearly not in line with accepted medical practice".

A similar fate befell Dr P V A MacLoughlin, who acted as a medical expert on behalf of the unsuccessful claimant in *Nicholson -v- Link House Magazines Ltd*. In his Judgment in the Central London County in January 2001, Mr Recorder Gallagher observed that: "Dr MacLoughlin is not a specialist - indeed, his medical qualifications are of the most basic kind"; "He has been in private practice effectively all his professional life, and it is clear, no matter how he describes himself, that he is more in the nature of a G.P. than anything else"; and that "I have to say that I found him a singularly unimpressive witness, and I have considerable reservations as to whether he should properly be described as an expert in work-related upper limb disorders".

While there are numerous examples in the accumulated Judgments of what could be described as controversial diagnoses, the more contentious issue was usually the relationship between the alleged injury and the claimant's work, which often resulted in the Court being presented with conflicting epidemiological studies on which the respective medical experts relied. In the early days of the litigation of claims for work related upper limb disorders, which preceded the emergence of systematic reviews, the epidemiological evidence was equivocal.

Given the background prevalence of upper limb symptoms in the general population (I 3.3), it can be argued that any employer might expected to have among its workforce some employees who were experiencing work-relevant upper limb symptoms. Given the high prevalence of upper limb symptoms in the general population, the binomial theorem predicts that a surprisingly large number of clusters of work-relevant upper limb symptoms will occur by chance. I allude to investigating such 'expected unexpected clusters', in which there appeared to be no obviously hazardous activities, earlier in this commentary and in **H** (page 253). Such clusters rarely get publicised or reported in academic journals, due it would seem to the organisations affected fearing negative publicity. However, the Judgments summarized on the web site (**D**) include several such clusters, which were well publicised.

For example, it is clear from the opening paragraph of the Judgment in *McSherry & Lodge -v- British Telecommunications plc* in the Mayor's & City of London County Court in December 1991, the earliest known Judgment that deals with claims for upper limb disorders associated with computer use, that at the outset of the hearing there were 11 claims in which "the issues of fact and law were similar in each case". In another high profile case, that of *Alexander & Others -v- Midland Bank plc*, which was initially heard in the Mayor's & City of London County Court in May 1998 and in the Court of Appeal in July 1999, five claimants sought damages for ill-defined upper limb injuries allegedly caused by encoding cheques at the same site. The largest known cluster of work-relevant upper limb disorders, at the *Financial Times*, (B page 18) is well documented in the Judgment in *Amosu & others -v- Financial Times* in the Royal Courts of Justice in July 1998 and, unusually, also reported in Buckle (1991).

Clusters of work relevant upper limb disorders apparently present and can understandably be perceived as strong evidence of a hazardous working environment. The fact that all the claims against the *Financial Times*, i.e. those by Ellis, Amosu, Hannon, Little and Stiles, were dismissed, with none of the claimants proving even on the balance of probabilities that they had suffered any injury, shows that too much can be read into the occurrence of a cluster of work-relevant upper limb disorders. It is perhaps no coincidence that this cluster of 'uninjured' journalists occurred in an organisation that had referred some of them to Dr Richard Pearson for treatment. The Judgment in *Amosu & others -v- The Financial Times* shows that it was the paper's medical adviser who had referred some of the journalists to Dr Pearson several years prior to Dr Pearson being so roundly criticized in the Judgment in *Moran -v- South Wales Argus*. This raises the question of the extent to which iatrogenesis might have contributed to how work-relevant symptoms were viewed and to the initiation of personal injury claims.

As I have already noted, in the early days of the litigation of claims for work related upper limb disorders the actions of government and related bodies such as the HSE could not be said to have promoted the idea that computer use caused upper limb injuries. However, it can be argued that subsequent actions surely did, though perhaps unwittingly.

In explaining the origins of the Health and Safety (Display Screen Equipment) Regulations (in **C** 8-095) I suggested that the fundamental problem with the Directive on which the Regulations are based was the failure to distinguish between welfare provisions and health and safety matters, i.e. failing to distinguish between that which might give rise to discomfort, fatigue and frustration and that which might give rise to injury.

In my analysis of Court Judgments (**E** chapter 5) I noted that the Courts frequently considered issues relating to the nature and causes of upper limb symptoms and the circumstances in which they arise which HSE guidance (available at that time) rarely addressed explicitly. In particular I noted that a significant proportion of claimants sought damages for what I referred to as a Chronic Regional Pain Syndrome of some sort. However, I suggested that encompassing Chronic Regional Pain Syndromes in any guidance document could have profound consequences with respect to civil claims. The HSE finally recognised non-specific pain syndromes in its revised guidance on upper limb disorders published in 2002, but failed to emphasise that these are very common, naturally occurring health problems.

When reviewing the HSE's revised guidance that was intended to reduce the incidence of work-related musculoskeletal disorders, I noted (**F** page 39) the differing approaches to back and upper limb disorders. I also noted that the revised guidance entitled *Upper limb disorders in the workplace* gave the impression that virtually all upper limb disorders, including non-specific pain syndromes, are associated with work and that by applying the 'ergonomics approach' suggested in the guidance they would be eliminated.

When reviewing (in **G**) the HSE's the revised guidance on the Health and Safety (Display Screen Equipment) Regulations I questioned whether there was any evidence that these Regulations had actually reduced the incidence of work related ill health. I returned (in **H**) to these themes that neither simplistic ergonomics interventions that focused on the physical aspects of work nor elaborate ergonomics regulations would eliminate symptoms and disorders that had been mistakenly attributed to work and suggested that the Regulations might be part of the problem not the solution. While the HSE's guidance on the Health and Safety (Display Screen Equipment) Regulations has consistently suggested that the risk to individual users from typical display screen work is

low, a lay person might reasonably view the existence of such regulations, which require regular, individual risk assessments of computer users, unlike any other type of work, as further 'proof' that computer use can cause injury.

I also noted in **H** (page 260) that the press coverage of Court hearings and Judgments in claims for upper limb disorders associated with computer use effectively ceased from part way through 2000 and suggested that it was perhaps no coincidence that by then all known claims by journalists had been thrown out by the Courts and that trades union backing for such claims appeared to have ceased. Arksey (1998) suggests that trades unions could not sustain the costs of losing claims, citing *Mughal -v- Reuter* as costing the National Union of Journalists over £220,000 and *Moran -v- South Wales Argus* as costing the Graphical, Paper and Media Union over £200,000.

While the distorted press coverage had effectively ceased by the turn of the millennium, the Health and Safety (Display Screen Equipment) Regulations remained in force. As I noted in **G** (page 4), the revision of the HSE's guidance in 2003 did nothing to reduce the distorted perception of risk that the Regulations and guidance were capable of generating. While the Health and Safety (Display Screen Equipment) Regulations can perhaps be credited with eliminating the 'new technology sweatshops' that were all too common when the Regulations came into force, if as suggested in **I** (page 10), the approach to the prevention and management of musculoskeletal disorders advocated in HSE guidance, including the risk assessment strategy, is fundamentally flawed, it can be argued that the Regulations did (see **F**, page 40), and are still doing, more harm than good.

## Examples of the press coverage

## Airline may face claim against computer use injury

From the *Financial Times* on the 8<sup>th</sup> February 1989

FINANCIAL TIMES WEDNESDAY FEBRUARY 8 1989

1989

### Airline may face claim against computer use injury

By Jimmy Burns,  
Labour Staff

BRITISH Airways could become the first UK employer to face High Court action by a person who claims to have suffered industrial injury from computer work while employed by the company.

The legal action could prove a test case of the application of health and safety legislation to the use of visual display units (VDUs).

London solicitors Seifert, Sedley & Williams confirmed yesterday that they were pursuing a claim on behalf of three members of Apex, the white collar union, who have been employed by British Airways.

One of the cases is almost ready to be drafted in the form of a formal claim after being the subject of an exhaustive union investigation covering more than two years.

It involves 51-year-old Ms Urmilla Joshi, a data preparation operator, who terminated her employment after 12 years with British Airways early last year, taking premature retirement due to ill health.

Mr David Rice, the Apex area official for London and Home Counties, said yesterday that Ms Joshi was no longer able to do any domestic duty involving the repetitive use of her right arm.

The solicitors believe that unless there is a substantial out of court settlement, they would expect to receive a date for a High Court trial within the next 18 months.

In 1983, Thorn Consumer Electronics had to pay a woman assembly line employee £11,000 because it failed to warn her about the risk of contracting tenosynovitis, otherwise known as repetitive strain injury (RSI). However, this could become the first case to reach the High Court involving a computer-related injury.

Apex is among a number of mainly white-collar unions which have reported an increase in computer-related injuries over the last year.

Mr Rice said: "We would like to set a legal precedent. People need to realise that this is a serious problem and that measures need to be taken to prevent it."

# New technology strains alarm insurers

From *The Guardian* on the 28<sup>th</sup> December 1989

THE GUARDIAN  
Thursday December 28 1989

## Employers likely to be forced into radical changes in working practices to avert RSI epidemic

# New technology strains alarm insurers

Lisa Buckingham  
and Simon Beavis

**R**ADICAL changes in working practices are likely to be forced on employers whose staff are considered at risk from repetitive strain injury (RSI) by insurance companies, which are preparing for a huge increase in claims in the 1990s. Employees using computer keyboards are particularly susceptible through the repeated hand movements involved. Although insurers are coy about revealing details of RSI claims, they consider the problem so severe that they are sending accident surveyors to alert employers. In some cases, the insurers are recommending changes in the working envi-

ronment to reduce the risk. It is estimated that RSI accounts for 1 per cent of the £370 million a year paid by employers and their insurers for industrial injuries, and nearly 2 per cent of all cases. However, it is clear that RSI is becoming much more costly. Claims for this form of industrial injury have been averaging well under £10,000. But a recent Midland Bank case involved a £65,000 compensation award for a keyboard operator. Unions are trying to improve the level of awards. The National Union of Journalists is considering a "representative" action centred on an individual case at the *Financial Times*, which has been particularly severely affected. Insurers are concerned that RSI may follow the claims expe-

rienced for other industrial injuries such as deafness. Traditionally, the level of compensation starts low but accelerates rapidly once a condition is widely recognised. One of the reasons that claims are so low is that only two forms of RSI are recognised by the Government as "prescribed" workplace injuries — meaning only some sufferers can claim disability benefit. Efforts are expected to widen the recognised categories of RSI. Employees in Britain, unlike those in Australia, which like Japan has suffered an RSI epidemic, are forced to prove they are suffering from a work-related injury and that effectively their employer realised the risk and was negligent. Australian law allows for no-

fault compensation whereby an employee can be compensated without lengthy proceedings to prove negligence. Renewed demands for no-fault compensation are likely in Britain. At present, most RSI sufferers are women — they tend to do the jobs which are most vulnerable to the injury and least protected by employment rights. They have also tended to be the least vocal. However, with the fall in young workers, more older women are likely to be required to fill jobs, particularly in high-risk areas such as keyboard operation and check-out work. The Health and Safety Executive is understood to be planning a large research project into RSI and an ageing workforce in the coming year. Two studies have just been

completed for the executive by the universities of Birmingham and Edinburgh. The first, looking into workplaces which was hampered by a lack of co-operation from employers — and the second, looking at sufferers being treated for the condition. Executive guidelines to be published next month are likely to recommend steps employers can take to prevent RSI, followed by further advice for specific industries. The emphasis is that companies can avoid RSI if the right preventative steps are taken, saving them money and increasing productivity. For example, there were nearly 4,000 reported cases of RSI at Telecom Australia between 1981 and 1986. This cost the company A\$15 million in lost time and

medical costs alone. Susceptibility to RSI varies, but key elements in the growth of the condition are thought to be the increased speed at which some people are forced to work, the design of equipment, job stress, and working patterns. RSI has been around for years — familiar in the weaving, printing and poultry industries, for instance — but the introduction of new technology into more "middle-class" environments (not least in journalism) has raised its profile and provoked more claims. Traditionally, people suffered in silence. As with the emergence of any industrial injury, sufferers are confronted with the vested interest of the Government, employers or insurance companies not to recognise the problem in its broadest terms.



# Secretary wins £45,000 for life ruined by typing disease

From the *Daily Mail* on the 5<sup>th</sup> May 1989

## Secretary wins £45,000 for life ruined by typing disease



Delighted: Pauline Burnard

A BANK secretary whose life has been ruined by typing made legal history yesterday by winning £45,000 damages from her former bosses.

Now, Mrs Pauline Burnard, 30, who can no longer lift her young daughter or do simple household chores, could have opened the floodgates for thousands of other victims of tenosynovitis — repetitive strain injuries.

Although awards are common in Australia, it is thought to be the first time a British judge has recognised the existence of 'teno' — known as the disease of the micro-chip age, as more and more offices use high-tech keyboards.

### Scars

Last night the Banking and Finance Union, which fought the High Court case and has others waiting to go, hailed it as a 'milestone victory'.

Leader Terry Molloy said: 'Our members have been concerned about it for years but no-one would accept it as an industrial injury.'

Midland Bank for whom Mrs Burnard worked in the West Bridgford, Nottingham, branch as an £8,000 a year secretary, denied negligence. But it agreed to pay costs and damages. It would not comment last night.

But Mrs Burnard of Beeston, said: 'I'm delighted. I fought hard to persuade people my symptoms were real.' She said the pain began in 1984 when her normal low desk was swapped for a higher one. 'I started getting pains in my wrist, shooting pains up my

By JAMES GOLDEN and JENNY HOPE

arms and it got so bad I couldn't sleep.'

Her doctor soon diagnosed it as De Quervain's disease. 'But getting it recognised has been the problem,' she said.

'You cannot see it. People were not ready to believe me. Even simple household chores like cutting food or cleaning are impossible. My quality of life has suffered.'

Her desk was finally replaced but by then the damage was done, she said.

Two operations to loosen the tendons left her with ugly wrist scars. She was unable to type for more than a few minutes and now cannot bathe her daughter Stephanie, two.

### Hazard

'I spent longer and longer off work as the pain got worse. Eventually the bank retired me on health grounds in January. I hadn't worked since 1985 and am now registered as 10 per cent disabled.'

'I used to swim, play squash and cycle and knit, but not any more. I don't know what I'll do in future,' said Mrs Burnard, who used a modern electric typewriter.

Did 'teno' is not only suffered by high-tech office workers. For years it has been accepted as an occupational hazard in industries like engineering where people are forced to make repeated or awkward upper limb movements. It has been estimated that up to 2 million workers could be victims.

Inflammation of the wrist, hand or arm tendon sheaths usually starts with a tingling in the fingers and rapidly progresses to where the hands become useless because of pain. Physiotherapy can help but prevention by job rotation, breaks, slowing down keystroke rates and re-designing equipment are recommended.

## Investors' anger at secret Clowes case

SOME of the 18,000 investors who lost money in the Barlow Clowes crash have criticised a judge's decision to ban reporting of a High Court case.

Mr Justice Gibson granted an application by the Serious Fraud Squad on Wednesday to ban reporting of the civil action aimed at untangling the funds because it might prejudice the trial of Peter Clowes, former head of the investment firm.

Mr Charles Larkinson, who lost £20,000 when the firm

collapsed last year, said: 'There has been so much discussion about the case in the newspapers already that no further discussion can make any difference.'

The civil hearing will decide whether £15.2 million should be credited to the Gibraltar-based Barlow Clowes International rather than the British fund, Barlow Clowes Gilt Managers.

Peter Clowes, 46, is on £300,000 bail, charged with false accounting, conspiracy to steal and theft.

# £45,000 FOR A GIRL CRIPPLED BY TYPING



Pauline... agonising injuries where Pauline worked until January, agreed to pay damages and costs in a secret High Court settlement in London. They had denied negligence. Pauline claimed she had to do too much typing at the bank's branch in West Bridgeford, Nottingham. Her desk was the wrong height. Both claims were denied.

By SUN REPORTER  
**SECRETARY Pauline Burnard won £45,000 damages from her old bosses yesterday — for agonising injuries caused by TYPING.**

She is believed to be the first British typist to make a court claim for tenosynovitis, also called repetitive strain injury. The 30-year-old mum damaged tendons in her fingers and arms through too much tapping at the keyboard. Operations on her wrists have left ugly scars.

After the case, delighted Pauline said the injury's crippling effects and her fight to prove her symptoms were real.

She can no longer lift her two-year-old daughter Stephanie and cannot manage even simple chores at their home in Beeston, Nottingham.

Pauline said: "If I type for a few minutes, the pain comes back. I can't knit."

"I used to swim and play squash but I can't do that any more. I can't go cycling because I can't push on the handlebars."

## Secretary's court win

### Hope

She added: "People weren't ready to believe in you can't see the injury for other secondaries to claim."

## **Compensation of £45,000 for repetitive strain victim**

From the *Financial Times* on the 6<sup>th</sup> May 1989

# **Compensation of £45,000 for repetitive strain victim**

By John Gapper, Labour Correspondent

6/5/89

MIDLAND BANK'S agreement to pay £45,000 to a former secretary who was disabled by repetitive strain injury after the bank refused to change the desk on which she typed, will lead to a sharp rise in such claims, trade unions said yesterday.

The out-of-court settlement was made by the bank's insurers on Thursday. Although the bank denied negligence, it paid compensation for loss of earnings and injury to Mrs Pauline Burnard, who retired due to ill health in January.

Unions said yesterday that the settlement would open the way for compensation claims across a range of industries in which repetitive manual jobs are performed. RSI has affected food processing, retail, clerical and secretarial workers.

The Banking, Insurance and Finance Union, which backed Mrs Burnard's case, said it had another four claims outstanding against financial services companies. The MSF general technical union is backing about 12 claims.

Mrs Burnard received com-

ensation after contracting tenosynovitis - under which tendons in the forearms become inflamed - while working as a secretary at the bank's branch in West Bridgford, Nottingham.

She had to undergo an operation on her arms after the bank delayed changing the height of her desk when she first started getting pains from typing. She is now registered as 10 per cent disabled and cannot type.

Mr Alan Chewings, Bifu's East Midlands area organiser, said Mrs Burnard had first asked for a desk which was several inches lower in the summer of 1984 after her doctor had advised her that she was suffering from the condition.

Incorrect posture is thought to contribute to repetitive strain injury.

Midland said that it had not admitted negligence in the case, and the decision to make a payment had been made by its insurance company. It would not comment on whether it would be altering its health and safety policies.

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## Appendix B - Copies of the outputs on which this submission is based

- A** Pearce B G. (1990). *Upper Limb Disorders of Keyboard Users*. Occupational Health Review February/March: 8-10.
- B** Pearce B G. (1995). *"RSI" and the Media*. Occupational Health Review November/ December: 14-18.
- C** Pearce B G. (1998). *An Ergonomist's Perspective on Claims for WRULDs*. Industrial Diseases Litigation. A. McDonald and A. Georges. London, Sweet & Maxwell: 442 - 466.
- D** The website that summarises Court Judgments in personal injury claims for work-related upper limb disorders heard in the UK can be found at: <http://www.humanetechnology.co.uk/wruldii/intro.php>
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**A**

# UPPER LIMB DISORDERS OF KEYBOARD USERS

*Developments relating to compensation and liability.*

*There are many reports in the scientific literature about keyboard users experiencing discomfort, and occasionally pain, in the upper limbs. The question of whether such work may also be associated with permanent injury for which the employer should be liable may, in the future, be considered by the courts. This article reviews the current state of knowledge about complaints which are now usually referred to generically as upper limb disorders.*

Over the last year, reports in the national press have suggested that the UK is about to witness a rash of common law claims for compensation for upper limb disorders allegedly caused by keyboard work.

These may have been inspired to some extent by the large sums paid by the state under workers' compensation schemes in Australia, where the concept of "repetitive strain injury" first came into general use. An out-of-court settlement of £45,000, agreed between a major bank and an employee afflicted by "a disease caused by typing", has added to the uncertainty about employers' potential liability for such complaints in the UK.

## The "RSI" phenomenon

The term "repetitive strain injury" has only been used in Europe in the last two years and was not even widely used in Australia until 1982. However, since then many, mostly Australian, authors have retrospectively re-labelled, as RSI, various upper limb disorders which have been described in the medical and scientific journals for the last two centuries. This appears to have been an attempt to prove that RSI was not a new or uniquely "Australian disease". Most commonly quoted as evidence for RSI's long and international history are Ramazzini's observations on scribes:

"Furthermore, incessant driving the pen over paper causes intense fatigue of the hand and the whole arm because of the continuous and almost tonic strain on the muscles and tendons, which in course of time results in failure of power of the right hand." (Ramazzini, 1713).

The zeal to re-label symptoms of fatigue with terms such as RSI

that imply damage and task-related causality has undoubtedly proved counter-productive in Australia.

Along with the introduction of the new label, the focus of upper limb disorders in Australia shifted from the blue-collar to the white-collar sector. The term "RSI" began to be used for a wide range of conditions. These included not only (more specific) clinical conditions, such as tenosynovitis, but also a plethora of complaints such as diffuse pain, cramp or indeed any discomfort of the upper limbs.

The RSI concept was at first endorsed by the medical profession in Australia (Stone, 1983; Brown et al, 1984). A pain or discomfort in the arm was suggested to be the first stage in a three (or five) stage disease process that was very likely to lead to a crippling injury. With no distinction between fatigue and injury, no requirement for clinical objective signs of abnormality and a liberal compensation system, the "disease" reached epidemic proportions. Indeed, it appeared to spread like an epidemic, particularly among keyboard operators in the public service. The taxation department in Melbourne appeared to be the centre of the epidemic.

A nationwide journalists' dispute in 1980, over the introduction of technology, has (retrospectively) been suggested to have influenced the significant level of publicity the subject received in the Australian popular press. After massive amounts had been paid out in workers' compensation and many common law compensation claims had been lodged, the concept of "RSI" was finally challenged in the law courts in Australia in 1986. After one of the longest trials of its type in Australian legal history the jury found, within half an hour, that the plaintiff was not injured.

The Australian RSI epidemic has declined significantly over the last few years (Hocking, 1987). The vast majority of common law claims have been withdrawn. Workers' compensation payments made for "RSI" have considerably reduced. Australian doctors have recanted their endorsement of the "RSI" concept. The rise and fall of the phenomenon in Australia has itself become the subject of investigation (Willis,



1986; Spillane and Deves, 1987; Kiesler and Finholt, 1988).

However, despite the growing realisation in Australia that RSI is an unscientific and unhelpful concept, the phenomenon has been imported into the UK and the USA. A number of pressure groups in the UK have adopted the approach to the subject which was projected in Australia around 1984, taking little, if any, account of the developments and scientific findings over the last few years.

RSI has been promoted in the UK, as in Australia, predominantly as a white-collar injury, particularly affecting keyboard users. Traditional blue-collar injuries, eg tenosynovitis, have been subsumed within the label despite the lack of evidence of similar symptoms or causal mechanisms. However, some of the key elements of the culture which allowed the RSI concept to flourish among keyboard users in Australia are not present in the UK.

### The attitude of the medical profession

It is clear that one of the most pressing needs is to ensure that those who experience upper limb disorders obtain an accurate diagnosis of their condition and appropriate treatment. However, finding an independent and suitably qualified physician with a full understanding of these complaints is difficult. There is evidence that doctors in the UK, particularly GPs, are using the term RSI when diagnosing upper limb disorders among keyboard operators, or at least using that label when explaining the causes of a variety of disorders presented by their keyboard-using patients. However, a recent article in the *BMJ*, *Repetitive strain disorders – often misdiagnosed and often not work-related* (Barton, 1989), expresses a healthy scepticism for the RSI concept.

### Compensation for industrial injury

The list of prescribed industrial diseases has changed relatively little over the last decade and is currently described in the DHSS Leaflet NI 2 *Industrial injuries disablement benefit* (HMSO, 1987). The UK has a very small number of prescribed industrial diseases of the musculo-skeletal system for which compensation can be paid. These include disease number A8: "Traumatic inflammation of the tendons of the hand or forearm, or of the associated tendon sheaths, *tenosynovitis*", described as being associated with: "Manual labour, or frequent or repeated movements of the hand or wrist, eg *routine assembly workers*". It could be argued that "frequent or repeated movements of the hand or wrist" could describe the use of a keyboard; however, there is no mention of typing or the use of keyboards in the reference to A8, *tenosynovitis*.

There is, however, a prescribed industrial injury listed in the DHSS leaflet which does specifically refer to typing. Prescribed injury A4 is described as: "Cramp of the hand or forearm due to repetitive movements, eg *writer's cramp*". The description goes on to suggest that the condition could arise in any occupation involving: "Prolonged periods of handwriting, typing or other repetitive movements of the fingers, hand or arm, eg *typists, clerks and routine assemblers*." It would appear that the scribes described by Ramazzini might well have successfully claimed benefit for A4.

According to section 10 of *Health & Safety Statistics* (HMSO, 1976 and HMSO, 1980) the number of spells of certified

incapacity resulting from fresh developments of prescribed disease number A4 (previously no. 28) during any one of the statistical years between 1971/2 and 1979/80 never exceeded 39. For the same period, the figures for A8 (previously no. 34), *tenosynovitis*, averaged 3,000 each year. Unfortunately no statistics are available which give the type of job undertaken by claimants of A4 or A8. It should also be noted that the list of prescribed diseases in the DHSS booklet is preceded by the caveat: "This information should not be taken as an authoritative description of the disease or of the jobs involved." (To claim benefit for a prescribed industrial disease claimants must prove: (a) that they suffer from a disease listed in the schedule of prescribed diseases, and (b) that the disease is prescribed in relation to their occupation. It is not necessary for the claimant to show that the disease was caused by work, merely that the disease is related to exposure to a harmful agent and that such exposure to that agent took place at the workplace.) Reports of successful claims for A8 by keyboard users suggest that, in some circles at least, *tenosynovitis* is prescribed in relation to typing. However, it should be noted that under the present system of industrial injury benefits in the UK a diagnosis of RSI would not qualify for compensation. This has prompted calls for changes in the list of prescribed industrial diseases.

### Common law claims

A successful claim for a prescribed industrial disease often signals the initiation of a common law claim, but prescription is not proof of the work-related causality required for a common law action.

In order to succeed in a common law action it first has to be proved that the plaintiff is injured. This may sound obvious, but it was precisely because of the plaintiff's failure to convince the jury that she was injured in *Susan Marie Cooper v Commonwealth of Australia* that the tide of common law claims turned in Australia. Clearly, a keyboard user bringing a common law claim has to demonstrate that they are suffering from a clinical condition with clear objective signs of injury.

A plaintiff with a well recognised clinical condition then has to prove that the cause of their injury was their work at a keyboard. This is by no means an easy task. Most cases of this type take several years to reach the courts. In many cases the workstations which are alleged to have contributed to the injuries may no longer exist and few facts are likely to be available about the equipment used or the nature of the work required of the plaintiff.

Courts also take account of expert opinion. Prior to the publicity given to the Australian RSI phenomenon, the vast majority of ergonomists and other professionals involved in occupational health and safety would probably have considered the risk of a permanent, musculo-skeletal injury arising from the use of a keyboard as far-fetched. Even now, most would consider the risk of permanent injury as extremely unlikely. However, the opinion of qualified practitioners that there was a causal connection between a particular injury and certain keyboard tasks might convince a court of such a connection.

Assuming that the plaintiff has sufficient evidence to prove that their well-recognised clinical condition has been caused by their work at a keyboard, they then have to prove the most



difficult step of all: that their employer was negligent in not supplying them with an appropriate workstation or safe system of work. The deficiencies cited might be associated with an unergonomic chair or a lack of training or the requirement for excessive work. The plaintiff has to show that the consequences of the employer's actions or inactions were foreseeable and that the employer was therefore negligent in failing to foresee them.

To suggest that a risk of injury is "foreseeable" is not to make any explicit statement as to the probability or improbability of its occurrence, other than to assert implicitly that the risk is not one that is fanciful or far-fetched. A risk of injury which is remote, in the sense that it is extremely unlikely to occur, may nevertheless constitute a foreseeable risk. And foreseeability is, or can be seen as, cumulative as opinion gathers into a consensus.

In this context, significant markers of foreseeability are: widespread scientific publication and consensus of view concerning the risk of injury; trade or industry association guidance concerning the avoidance of injury; and most significant, HSE publications or guidance on the topic. In practical terms, a declaration or consensus view that there is a causal connection requires finite time for dissemination. The views of judges and the practicalities of real life are often at variance on how long this should be.

To date, there is no consensus view in the scientific literature on the risk of a permanent, musculo-skeletal injury arising from the use of a keyboard. For example, the third edition of the International Labour Office's *Encyclopaedia of Occupational Health and Safety*, published in 1983, includes an entry on "Business machine operators" which states: "Considering the very large number of persons who use business machines and the fact that machine operators such as typists, photocopying clerks, computer attendants, etc are, in the majority of cases, largely ignorant of the technical functioning of the machines they use, the low incidence of occupational accidents and diseases in business machine operation indicates that these machines must be classed low on the list of occupational hazards."

The Health and Safety Executive has issued a guidance document on VDTs entitled *VDUs* (HSE, 1983) and a leaflet for VDT users entitled *Working with VDUs* (HSE, 1986). While these do not have the force of a Guidance Note or Approved Code of Practice, they can be described as a statement of good working practice. As such, it is important that the relevant personnel in an organisation are familiar with the content of these documents. These HSE documents contain valuable advice on the desirable ergonomic features of terminals, workstations and workplaces. However, there is no explicit reference in either of them to the possibility of permanent injuries arising from the use of a keyboard.

The Health and Safety Executive's Guidance Note MS10, *Beat conditions and tenosynovitis* (HMSO 1977), refers to tenosynovitis as "the second commonest prescribed disease in the United Kingdom". It goes on to list the industries and types of work in which tenosynovitis occurs: "It occurs in many industries, but especially in those where rapid, repetitive, twisting and gripping movements are common, eg pottery, glaze dipping, brick making, assembly line work and belt conveyor sorting for food canning, press operations and the

visceration and trussing of chickens." While it could be argued that "rapid, repetitive movements" are common with the use of a keyboard, at no point in this publication is there any reference to typing or the use of keyboards. This Guidance Note is currently being revised.

At the beginning of 1990, therefore, an employer consulting the publications of the HSE would have no reason to believe that the use of a keyboard would be likely to lead to any permanent musculo-skeletal injury or serious upper limb disorder. At present, the advice and the scientific material available would not cause the employer to foresee any significant risk.

There are, however, still a number of grey areas, that could pose problems for the employer of keyboard users, which now must surely include the majority of employers in the UK. There is the possibility that further research may show that sustained keyboard operation using an inappropriate workstation or system of work can lead to permanent injury. Research on this topic continues in many countries. Employers who fail to respond appropriately to complaints from keyboard users about upper limb disorders may therefore be laying themselves open to common law claims in the future.

More importantly, there are other factors to be taken into account. These include, in particular, the benefits, in terms of a more efficient workforce, to be gained through the application of ergonomics principles and the implications of the draft EC directive on VDTs which places considerable emphasis on the application of ergonomics to the prevention of keyboard-related complaints.

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**B**

# “RSI” and the media

Brian Pearce has carried out the first ever comprehensive review of press reports and so-called “repetitive strain injuries”. He explains why news coverage of work-related upper limb disorders should be treated with some caution.

Writing in the *Spectator* on 15 November 1986, Auberon Waugh concluded his article entitled “Introducing ‘Kangaroo’s Paw’, a wonderful new disease from Australia” thus: “I prophesy a tremendous future for this wankers’ disease in Britain, as soon as a few more people learn about it. It will go through the country like a dose of salts.” “It”, the so-called disease to which Waugh was referring was “repetitive strain injury” (“RSI”).

Clearly, a few more people did learn about “it”, if the results from a trailer questionnaire on the 1990 Labour Force Survey<sup>1</sup> are to be believed: “Self-reports of musculoskeletal conditions far exceeded those of any other disease category. The estimated number of prevalent cases ‘caused’ by work is 593,000 of which 50,000 fall into the ‘repetitive strain injury’ category, the majority of the remainder (300,000) being related to back problems.” Precisely what those self-reporting “RSI” were suffering from, and how they came by their “diagnoses”, remains open to question. However, it is plausible to suggest that many people will have learnt about so-called “RSI” from the wealth of coverage bestowed upon it by the media.

This review attempts to provide a flavour of this coverage by examining the treatment which work-related upper limb disorders (WRULDs) have received, over the past 10 years, in five daily broadsheets: the *Guardian*, the *Financial Times*, the *Times*, the *Daily Telegraph* and the *Independent*. WRULDs is the terminology used in Health and Safety Executive (HSE)<sup>2</sup> and Trades Union Congress (TUC)<sup>3</sup> guidance in referring to upper limb disorders which are caused by, or in some way influenced by, work.

## The sample of press cuttings

A comprehensive survey of the references to WRULDs from the five national daily newspapers was carried out for the 10 years from the beginning of 1985 until the end of 1994. The study

included a systematic search of newspaper coverage using the *FT Profile* on-line database. The review is based upon an analysis of 371 press cuttings (see table below).

The press cuttings were categorised in terms of their type and the extent to which they referred to WRULDs (see table opposite). Inevitably, this involved an element of subjective judgment. Those news items and features in which a substantial part of the text was devoted to WRULDs are referred to as “WRULD-dominant”. Those in which WRULDs was not the main theme are referred to as “WRULD-mention”.

The “news pegs” – the issues or events which appear to have inspired the 228 WRULD-dominant news items and features – are shown in the right-hand table opposite.

## Coverage of compensation claims

Compensation claims for WRULDs inspired 99 of the press cuttings and were mentioned in a further 82. Thus, compensation claims inspired 43% of the WRULD-dominant news items and features, and were cited in 49% of the press cuttings analysed. Coverage of compensation claims in the five newspapers, though extensive, was found to give a distorted picture in at least four important respects: the “success” rate of claims; the size of awards; the significance of the reported judgments and settlements; and the type of WRULDs compensated. The following general points should be borne in mind in press reports for WRULDs.

■ The vast majority of WRULD personal injury claims which are initiated do not reach the courts. Some are discontinued but many are settled out of court for less than £2,500, the figure above which the Compensation Recovery Unit (CRU) reclaims unemployment and social security benefits received by successful plaintiffs.

**The origins of the 371 press cuttings analysed**

	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	Total
The Guardian	3	3	1	4	13	10	19	14	34	13	114
The Financial Times	1	2	0	3	14	13	11	8	19	16	87
The Times	4	0	3	1	2	5	9	8	20	7	59
The Daily Telegraph	0	0	2	5	2	7	7	14	13	8	58
The Independent	0	1	0	0	4	4	9	7	16	12	53
Total	8	6	6	13	35	39	55	51	102	56	371

### Categories of article carried by the five daily broadsheets

	No.	%
News items	240	64.7%
WRULD-dominant	182	49.1%
WRULD-mention	58	15.6%
Features	95	25.6%
WRULD-dominant	46	12.4%
WRULD-mention	49	13.2%
Letters to the editor	24	6.5%
Book/booklet reviews	10	2.7%
Law reports	2	0.5%
<b>Total</b>	<b>371</b>	<b>100%</b>

- Many settlements carry "no-publicity" clauses.
- The reports of substantial awards rarely make clear that the general damages for pain and suffering are often less than £4,000. The largest components of the more substantial awards are usually for the loss of past earnings and compensation for the loss of future earnings.
- Any compensation payments made by a defendant to a plaintiff are generally subject to CRU clawback.

The claims which are fought through the courts are rarely reported on the news pages if the plaintiff is unsuccessful. Only two unsuccessful claims were reported in the sample of press cuttings analysed. The first, by a "tea lady", Winnie Pollard, against British Petroleum, provided the admirable headline "Strain for tea lady" in the *Times* (9 April 1987). The second, in 1993, by Rafiq Mughal against Reuters news agency, provoked by far the largest coverage of any court case and is considered in more depth later in this review.

It is not known how many claims which have been successfully defended in the courts have gone unreported on the news pages of the five daily broadsheets over the past 10 years. It is known, however, that in 1994 alone a number of decided cases, which were arguably as newsworthy, and as important in legal terms, as any which were reported, went unreported.

On 20 September 1994, the *Daily Telegraph* briefly reported that: "Three women phone operators took BT to court yesterday claiming they suffered repetitive strain injury." The judgment on 10 October 1994<sup>4</sup>, which dismissed all three of these claims, was not reported in any of the newspapers. In 1994, at least three other successfully defended court cases involving alleged WRULDs in keyboard users were not reported in any of the five daily broadsheets analysed<sup>5, 6, 7</sup>. Two of these cases were heard in the High Court and one is subject to appeal. There appears to be a distinct unwillingness to report decided cases which do not support the image of WRULDs which has been built up by the press. However, the selective coverage of the outcome of WRULD court cases cannot be attributed solely to journalistic bias.

When substantial awards are reported, the coverage often includes a quote from the successful plaintiff or the plaintiff's solicitor or trade union. The defendant's representatives are rarely quoted. The notably similar wording used in different

### The "news pegs" which appear to have inspired the 228 "WRULD-dominant" news items and features\*

	No.	%
Compensation claim	99	26.7%
Court case	76	20.5%
Out-of-court settlement	17	4.6%
Industrial tribunal	6	1.6%
WRULDs at the FT	33	8.9%
WRULDs	23	6.2%
Research into WRULDs	17	4.6%
TUC campaign/publications	11	3.0%
Products, eg keyboards	9	2.4%
Individual WRULD sufferer	9	2.4%
HSE guidance/publications	8	2.2%
Display Screen Equipment Regulations	7	1.9%
Conferences	4	1.1%
Warning labels on keyboards	4	1.1%
Musicians	4	1.1%

\* Expressed as percentage of 371 press cuttings.

newspapers on the same day suggests the coverage might well have been inspired by a press release or a news conference arranged by the plaintiff's representatives. Many claiming compensation appear more than willing to pose for the cameras, often with their arms in splints. However, a report in the *Daily Telegraph* (5 February 1994), headlined "Print firm pays out £64,000 to RSI victim" stated: "Last night Miss Sketchley [the plaintiff] attacked the union's disclosure of the amount of her award." It appears that it is the representatives of successful plaintiffs who often seek the publicity, whereas successful defendants apparently do not.

Without access to the original documents relating to a claim it is not possible to assess the accuracy with which an out-of-court settlement is reported. However, the press reports of awards made by courts can be compared with the written judgments. This comparison was made for each of the court cases reported in the five daily broadsheets. The most significant finding was that in every case the press reports referred to "repetitive strain injury" or "RSI" despite the fact that the vast majority of the upper limb disorders for which damages were awarded were clearly defined clinical conditions such as tenosynovitis. This occurred even in the reporting of *Inskip v Vauxhall Motors Ltd* in which the judgment<sup>8</sup> made no reference whatsoever to "repetitive strain injury" or "RSI".

A further illustration of journalistic obsession with the use of the term "RSI" is the report in the *Daily Telegraph*, on 3 September 1994, of *Hunter v Clyde Shaw plc*<sup>9</sup>. This report was headlined "£72,000 damages in 'RSI' test case" despite the inclusion of the sentence: "Although the judge heard evidence from an RSI expert called on behalf of Mr Hunter, he did not describe the damages as being awarded for RSI." The judgment notes that the condition for which damages were awarded "was spoken to by all the medical witnesses as a lateral epicondylitis (tennis elbow)".

The willingness of journalists to re-label clearly defined clinical conditions such as tenosynovitis as "RSI" would perhaps be of little consequence were it not for the fact that the term "RSI" is also used to refer to a diffuse condition with no objective clinical signs of abnormality.

### The Mughal case

The obfuscation generated by this duality of meaning is nowhere more apparent than in the reporting of the case of *Mughal v Reuters Ltd*<sup>10</sup>. However, it is first necessary to explain the chronological and precedential position of this case to appreciate fully the anomalies which arose in the extensive press coverage of this unsuccessful claim.

The hearing, in June 1993, of the claim by Mughal against Reuters was reported as a "test case". Although not the first by a keyboard user to reach court, it was the first such claim to be heard in the High Court. However, perhaps of more significance in terms of the amount of press coverage it received, Mughal's claim was the first by a journalist to reach court. It can be regarded as the first occasion on which the High Court considered the existence of a diffuse condition with no objective clinical signs of abnormality, known as "RSI", in isolation from the more clearly defined clinical entities.

The first claims involving keyboard users to be fought through the courts were made by Angela McSherry and Denise Lodge against British Telecommunications plc in October 1991<sup>11</sup>. The judgment was extensively reported in the national press on 17 December 1991 as a watershed for WRULD claims, inspiring headlines such as: "RSI victory threatens flood of cases", in the *Times* and "Keyboard injury awards may lead to thousands of claims", in the *Daily Telegraph*. It is clear from the judgment that the judge used the term "RSI" in its generic sense, as a synonym for WRULD, when he stated: "In both cases, I have found that each plaintiff suffered RSI as a result of her work." However, given that the defendants conceded that "the injuries of both Mrs McSherry and Mrs Lodge were caused in the course of and as a result of their work for the defendants" it is suggested that these, admittedly successful, claims cannot be considered a significant court victory for "RSI" or a substantive court finding of keyboard use causing "injury". With hindsight, it appears that this confusing (confused?) county court judgment set few precedents, apart from influencing how the defendants dealt with other similar claims.

It could be argued that the hearing of nine claims by poultry workers against Bernard Matthews plc, in March 1993, considered the existence of a condition with no objective clinical signs of abnormality<sup>12</sup>. However, many of these claimants were alleged to have clearly defined WRULDs. The judgment was reported in all five daily broadsheets on 10 July 1993. All these reports described the variety of conditions for which some of the claimants were awarded damages as "RSI" or "repetitive strain injury".

In part, the use of the term "RSI" (as opposed to the more specific clinical conditions in the press reports) might be attributed to the second paragraph of the 100-page judgment which opens: "The whole field of RSI or WRULD is an area of medical controversy, the intensity of which, as demonstrated by the five days of medical evidence I heard, would be worthy of medieval theology." However, it concludes: "Although the term 'repetitive strain injury' was subjected to a semantic and logical

demolition by the defendant's experts, which I found wholly convincing, it appears to me to have reached that point at which a term acquires a life of its own (indeed there are RSI conferences) and I shall continue to use it – but I shall bear in mind that the full extent of its proper definition and connotations are in dispute."

A second passage of the same judgment, in which the judge considered the existence of what is termed "diffuse RSI", neatly summarises the significance which should be attached to any one judgment, and aptly prefaces a review of the press coverage of the judgment in *Mughal v Reuters Ltd*: "In some senses it can be regarded as absurd that I as a judge lacking in medical training or knowledge should choose to appear to say which of two sets of honestly held but totally opposed medical beliefs is correct. I am conscious of the absurdity of appearing to deny the existence of that which subsequent scientific advances may prove to exist, or of exerting the existence of something that turns out to have all the substance of a will-o'-the-wisp. It is, however, necessary that I should do so at least in the limited sense of making a finding as to what if anything has been proved before me to be more likely than not."

The press coverage of the judgment in *Mughal* inspired front-page headlines on 29 October 1993. These included: "Keyboard injury does not exist, judge rules" in the *Guardian* and "High Court judge rules that RSI does not exist" in the *Daily Telegraph*. At no point in the judgment did John Prosser QC (sitting as a Deputy High Court Judge) state that "RSI does not exist", whereas this was the dominant theme of the press reports inspired by the judgment. The simple and most important fact omitted from the press reports was that the judge found, on the evidence presented during the trial, that: "He fails to convince me that he has suffered a (or any) injury which he has alleged in this case, both pleaded or in evidence." The crucial point, however, with respect to the subsequent press coverage, is that the press reports failed to distinguish between the "diffuse pathological condition reflected by pain" (RSI) which Mughal failed to convince the judge he had suffered, and the clearly defined WRULDs, popularly described as "RSI".

The press coverage of the judgment in *Mughal* was littered with quotes attributed to the judge. He was most frequently alleged to have said that RSI was "meaningless" and had "no place in the medical books". In passing, it is interesting to note that these quotes appear in the opening sentences of the story which was carried on the Reuters Newswire. However, careful reading of the judgment shows that the judge was summarising the views of the defendant's medical experts when he used the phrases "RSI is in reality meaningless" and "RSI has no place in the medical books". It also transpires that another quote: "eggshell personalities who needed to get a grip on themselves", attributed to the judge in the *Guardian*, and a number of subsequent press cuttings, is not a direct or accurate quote from the judgment. It arises from the judge quoting an article by Bammer and Martin<sup>13</sup>, who are in turn quoting an Australian psychiatrist, Dr Yolande Lucire<sup>14</sup>.

Further evidence of inaccurate coverage is to be found in one of the articles published in the *Guardian* the day after the judgment in *Mughal*. Under the headline "RSI ruling may only delay claims avalanche", I was reported as suggesting that most workers who complain are "malingerers, fakes and fraudsters".



The journalists responsible for the story had not, in fact, sought my views on the judgment.

Certain features of the article clearly suggested that this "quote" had been lifted, inaccurately, from an article which had appeared three years earlier in the *Times* (25 October 1990), in which I was, more or less accurately, quoted as saying "I don't think that office workers who complain of RSI are frauds or malingerers." Following representations, the *Guardian* published an apology and correction the following day (30 October 1993).

The claim made by Mughal against Reuters was the dominant theme of 44 press cuttings and was mentioned in a further 28 of the cuttings analysed. This one case was referred to in 53% of the press cuttings arising from the five daily broadsheets after June 1993, when the hearing commenced. The overall impression given by many of these press cuttings is of a concerted attempt to rubbish the judgment, with quotes from RSI "apostles" expressing disbelief and references to the judge's previous controversial ruling in a rape case.

Fifteen out of the 18 subsequent press reports relating to awards for WRULDs, three out-of-court settlements and two court cases which appeared in the five daily broadsheets up to the end of 1994 made reference to the judgment in *Mughal*. None of these awards were for a diffuse condition with no objective clinical signs of abnormality (RSI). However, having created the impression that Judge Prosser had ruled that RSI "does not exist" and by failing to distinguish between RSI, a diffuse condition, and more clearly defined WRULDs which the press have consistently also called "RSI", many of the subsequent press reports could insist that the successful claimants showed that Judge Prosser was wrong and that RSI did exist. In reality, the much misquoted judge made no ruling concerning more clearly defined WRULDs, simply because these matters did not arise for his decision.

It can be argued that in a newspaper, where stories compete for space and must be understandable to a wide readership, it is justifiable to use short, simple terms, such as "RSI", particularly in headlines, rather than (more) precise medical terminology. However, the pervasive use of the term "RSI" to describe both clearly defined WRULDs and the more contentious diffuse pain syndrome, and the contexts in which this occurs, suggests more than simply journalistic expediency. Two further themes emerge from this analysis: the preoccupation of journalists to write about RSI among journalists; and, possibly linked to this, the portrayal of WRULDs as predominantly a keyboard-induced or "white-collar" problem.

### WRULDs in keyboard users

An analysis of those most frequently reported as suffering WRULDs shows that 62% of the 371 press cuttings analysed refer primarily to keyboard users. Throughout the 10 years analysed there is reference to a variety of occupations and activities which allegedly give rise to "RSI". However, from 1989 there is a significant growth in the number and the proportion of press cuttings in each year which primarily refer to keyboard users. In part, this merely reflects the increase in the number of awards to keyboard users and the consequent increase in news reports of these awards. However, the majority of features on WRULDs also emphasise RSI among keyboard users. Two-thirds of the WRULD-dominant news items and features refer primarily to keyboard

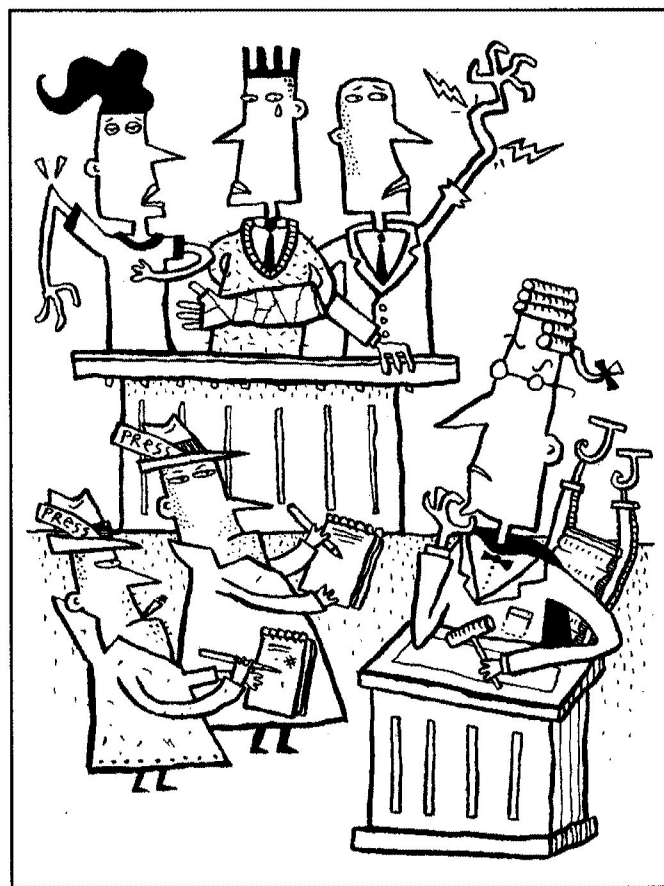


Illustration: Spike Gerrell

users, whereas only about half the reported awards were to keyboard users.

My own, as yet unpublished, research suggests that there were more than four times as many "blue-collar" WRULD claims than "white-collar" claims fought through the courts, during the 10 years covered by this review of press coverage. The vast majority of these "blue-collar" WRULD court actions received no press coverage whatsoever.

An analysis of the headlines of the 148 press cuttings which contained descriptors of WRULDs shows that the majority included the term "RSI" (56%) or "repetitive strain injury" or variations thereof (74%), including one example of the tautologous "RSI injury" in the *Financial Times* (13 April 1994). However, 12% of the headlines included terms which implied that WRULDs were computer- or keyboard-related, for example, "keyboard injuries", "VDU strain injury" and "computer use injury".

Journalists' preoccupation with RSI among keyboard users is typified by the opening sentence of a news report in the *Daily Telegraph* of 5 February 1994: "A woman has won more than £64,000 compensation from a printing firm after developing repetitive strain injury although she did not work at a keyboard". Another example is the headline of an article in the *Independent* (31 March 1994) about *The TUC guide to assessing WRULDs risks*: "Repetitive strain injuries rise to 'epidemic' levels: TUC aims to raise awareness of illness which affects keyboard users." The TUC's guidance covers far more than merely an "illness which affects keyboard users". It is also



Illustration: Knife

worth noting that the term "RSI" is used throughout this article in the *Independent* despite the fact that the TUC had chosen not to use it in the title of its guide or in its national campaign "Don't suffer in silence: help stamp out upper limb disorders at work."

It can be argued that the journalists' apparent preoccupation to write about RSI among keyboard users merely reflects the fact that millions of people use keyboards. However, journalists are themselves keyboard users and possibly have a personal as well as a professional interest in these matters.

### WRULDs among journalists

Given the extensive coverage conferred upon the *Mughal* case and the emphasis given to WRULDs among keyboard users, it is perhaps not surprising that 38% of the 371 press cuttings analysed refer to RSI among journalists. One of the longest-running stories to be found in the five daily broadsheets concerns an apparent "epidemic" of WRULDs among journalists at the *Financial Times*. From when it was first reported in January 1989, it inspired 33 reports and was mentioned in a further 23 press cuttings from the five daily broadsheets. While not disputing that such an event and its subsequent industrial relations and legal ramifications were newsworthy, it is questionable whether a similar situation in an organisation not associated with the media would have been afforded such extensive coverage.

It is perhaps somewhat ironic that one of the longest articles concerning WRULDs to be found in the five daily broadsheets is by a journalist at the *Guardian* (27 April 1990), writing, presumably at a keyboard, about her own experiences of "RSI".

Two similar articles, with a strong "human interest" component, one by the same journalist, appeared in the *Guardian* on 23 December 1991 and 9 August 1994.

If journalists perceive that they themselves are potentially exposed to "injury" when composing their stories at a keyboard, it would not be surprising if their objectivity in reporting on WRULDs is sometimes compromised.

### Conclusions

Stories about RSI, even those unencumbered by the facts, are apparently thought to make "good copy". Reading between the lines of the 371 press cuttings analysed for the purposes of this review suggests that the coverage of WRULDs in the five daily broadsheets has been strongly influenced by vested interests, not least those of journalists. There is evidence of selective, inaccurate and highly subjective reporting.

An anonymous prediction in the magazine of the now defunct *Sunday Correspondent* (31 December 1989) suggested that: "The increasing legal acknowledgement of RSI (repetitive strain injury) will bring several multinational corporations close to bankruptcy." It is to be hoped that this prediction will not prove as accurate as that made by Auberon Waugh writing in the *Spectator* on 15 November 1986.

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### 3. AN ERGONOMIST'S PERSPECTIVE ON CLAIMS FOR WRULDS

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#### Introduction

8-068 This section examines the issues and evidence dealt with by the non-medical experts most usually instructed in claims for WRULDs. Traditionally, these matters have been handled by consulting engineers and health and safety consultants, but increasingly ergonomists have been called upon to fulfil this rôle. Before WRULDs became fashionable, a small number of ergonomists were involved in back injury claims. With the growth in claims for WRULDs, particularly those arising from "white collar" work, the use of ergonomists has increased significantly. In multi-plaintiff claims, particularly those arising from "blue collar" work, both a consulting engineer and an ergonomist are sometimes instructed.

It can be argued that virtually all claims for WRULDs raise ergonomic issues, while only some require the expertise of a consulting engineer. In a recent (unreported) County Court hearing<sup>66</sup> of a claim by a computer typesetter, an experienced consulting engineer, called by the plaintiff, was not considered qualified to give evidence on ergonomic matters or on whether there was a perceptible risk of injury, whereas the ergonomist called by the defendant was permitted to comment on all the pertinent issues. Legal awareness of ergonomics has grown, or at least should have grown, with the introduction of a series of new health and safety regulations,<sup>67</sup> implementing European Directives, which make implicit, and in some cases explicit, reference to ergonomic matters.

#### What is ergonomics?

8-069 Ergonomics is concerned with human capabilities and limitations, both physical and mental. In essence, ergonomics acknowledges that people come in different shapes and sizes with different skills and mental attributes and a limited tolerance to adverse environments. Ergonomics draws upon a wide variety of long established, applied sciences including anatomy, physiology, biomechanics, epidemiology, engineering, psychology, social psychology and statistics. In addition, ergonomics utilises techniques from a number of disciplines to measure and assess work, working conditions and an individual's capacity for work.

<sup>66</sup> *Colin Walsh v. G & A N Scott Ltd*, Oldham County Court, Mr Recorder Lyon, June 24, 1997.

<sup>67</sup> Health and Safety (Display Screen Equipment) Regulations 1992; Manual Handling Operations Regulations 1992; Personal Protective Equipment at Work Regulations 1992; Provision and Use of Work Equipment Regulations 1992; Workplace (Health, Safety and Welfare) Regulations 1992.

Ergonomists are concerned with the application of this knowledge to the design and use of products, systems and environments. Ergonomists seek to ensure that the interface between the person and the task is optimised to avoid excessive fatigue, discomfort, stress or injury and to promote human efficiency and productivity. Ergonomists consider the physical and mental capabilities and limitations of individuals, the tasks they have to perform, the equipment they have to use and the context in which this occurs, as complementary parts of a complex system involving interaction between human, social and technological components. System performance is not optimised if the human part of the system is excessively bored, fatigued, dissatisfied, stressed or, indeed, injured.

Ergonomists are required to have a "working knowledge" of the way in which the musculo-skeletal system works. However, their training does not usually include the dissection of cadavers or the "hands on" experience of examining individuals to which medical practitioners are exposed. Thus, while the precise nature of the medical condition suffered by a particular plaintiff is essentially a medical matter, an ergonomist can comment on whether certain activities utilise certain soft tissues or joints and can offer an opinion on whether such use is likely to give rise to the type of injury allegedly suffered by a plaintiff. Thus, whereas health and safety consultants and consulting engineers are usually reluctant to trespass into matters which have traditionally been considered to be the realm of the medical experts, ergonomists are qualified to provide, and are increasingly asked to provide, opinions on certain aspects of causation.

In an ideal world all equipment, workstations and working environments would be designed to meet optimum ergonomic criteria. In practice, the degree to which ergonomic principles are applied, or should be applied, is a function of the duration and intensity of the task being performed and the anticipated adverse consequences on those performing the task. Inevitably, ergonomic criteria are not absolute. There is a cost-benefit equation which must be considered. Ergonomic principles are clearly not inconsistent with the duty on employers to protect "so far as is reasonably practicable" the health and safety of employees, but ergonomists seek to provide not only a safe but also a satisfying and efficient system of work. The corollary of this is that to describe a system of work as not meeting optimum ergonomic criteria does not necessarily imply that it is unsafe or potentially injurious.

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### **The evidence dealt with by ergonomists**

The evidence which is available to the ergonomist depends in part upon the stage in the claim at which the instructions are issued and who issues them. While many would argue that the earlier they receive instructions the better, there are economic and practical constraints which differ depending upon the source of the instructions. Early instructions from those acting on behalf of the plaintiff to inspect and provide a report can assist in shaping the claim. However, requests for such early inspections are often seen by those acting on behalf of defendants as "fishing expeditions" and

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are resisted. Inspecting on behalf of a defendant prior to the receipt of full particulars of a claim can result in the need to re-inspect. While in the fullness of time both experts have access to the same documentation, in the early stages of a claim, they are differently advantaged. The expert acting on behalf of the plaintiff has access to the plaintiff while the defendant's expert usually has earlier access to contemporaneous records, which are essential to the preparation of an accurate and detailed chronology.

In some cases it is inevitable that a report has to be prepared on the basis of documentation alone, for example, if the system of work no longer exists. However, an expert who has failed to inspect is usually at, and more importantly is usually seen by Courts to be at, a distinct disadvantage, if the report by the other party's expert was prepared following an inspection. In general, most ergonomists would prefer to attend a joint inspection at which the plaintiff is available to confirm that that which is being inspected is that referred to in the pleadings. Measurements can be agreed and misunderstandings about the use and naming of components of the workstation avoided.

8-072 If the workstation has had to be reconstructed or differs in some way from how it was at the material times, the fact that one of the parties considers that there are differences needs to be recorded, though the nature of the differences might be matters of evidence. The extent to which such issues can or should be explored at a joint inspection depends in part on whether instructing solicitors are present and the attitudes of the attending parties.

While the vast majority of joint inspections are conducted in a civilised manner and achieve the objectives desired by both parties, without a Court order, anyone who has been involved in an acrimonious joint inspection will appreciate the importance of agreeing the "ground rules" by which an inspection will be conducted before it commences. For example, there should be agreement on precisely what can be examined, whether or not photographs or video will be permitted and, if so, precisely what will be disclosed and when. A defendant's concerns about security or confidentiality can usually be overcome by having the defendant's security personnel process the film or take the video.

8-073 Whether or not a plaintiff is requested or permitted to simulate or demonstrate the allegedly injurious task appears to be an issue about which instructing solicitors are often divided, and not simply on party lines. Clearly, it is inappropriate to ask a plaintiff to do anything which would cause or aggravate the symptoms of an alleged injury, but to refuse to allow an asymptomatic plaintiff to demonstrate or even to explain, to both experts, how a workstation was arranged or how a task was performed somewhat defeats the objectives of a joint inspection.

### What are WRULDs?

The term WRULD only came into popular use after 1990, with the publication by the Health and Safety Executive (HSE) of a guidance document entitled *Work related upper limb disorders — A guide to prevention*.<sup>68</sup> This publication dismisses the term “RSI” in one sentence in a footnote:

“Although in recent years the term ‘Repetitive Strain Injury’ (RSI) has been commonly used it is medically imprecise and not sufficiently accurate to cover the conditions observed”.

The use of the term WRULD was further endorsed by the TUC’s campaign which ran under the slogans *Don’t Suffer in Silence* and *Help Stamp Out Upper Limb Disorders at Work*. The *TUC Guide to Assessing WRULDs Risks*<sup>69</sup> explains the adoption of the term WRULD in the following way:

“There is some disagreement concerning which conditions and symptoms should be included under this heading as many conditions are still poorly understood. This is reflected by the fact that several names exist for these conditions, including Repetitive Strain Injury (RSI), Occupational Overuse Syndrome (OOS) and Cumulative Trauma Disorders (CTD). These terms can be misleading as they all imply the cause of the conditions without any firm evidence to support this; for example RSI implies repetitive movements as the most important cause, and this may not be the case.

To avoid confusion the term Work-Related Upper Limb Disorder (WRULD) has been adopted”.

While there is no doubt that the term WRULD has the major advantage of clearly being solely a generic label for the range of upper limb disorders which can be associated with work and cannot have the duality of meaning<sup>70</sup> afforded “RSI”, it is arguable that the adoption of the term WRULD has actually added to rather than avoided confusion. The confusion arises primarily from two sources: the range of conditions which the HSE has chosen to classify as upper limb disorders; and the meaning of the prefix “work-related”.

### The HSE’s classification of upper limb disorders

Unlike the vast majority of writings which purport to provide information on WRULDS, the HSE’s most comprehensive guidance document on the subject, *Work related upper limb disorders — A guide to prevention* is notable for *not* including a long list of upper limb conditions as examples

<sup>68</sup> HS(G) 60.

<sup>69</sup> Buckle, & Hoffman, March 1994.

<sup>70</sup> The term “RSI” is commonly used both as a generic label for upper limb injuries popularly understood to be caused by repetitive work *and* as the name of a discrete condition, with no objective clinical signs of abnormality, characterised by pain in the upper limbs.

of WRULDs. In fact, very few of the (more) clearly defined upper limb injuries popularly understood to be caused by repetitive work, are explicitly mentioned in this document and none are either explicitly or implicitly endorsed as being primarily caused by work activities. Instead of a list of discrete conditions paragraphs 16 and 17 of this document provide what is termed "a classification":

"No generally agreed framework exists to classify adequately the range of ULDs. They vary enormously in what causes them, what the underlying disease mechanisms are, their severity and outcome as far as the individual is concerned. As they mostly concern disorder or dysfunction of the soft tissues, however, it is convenient to group them as follows:

- (a) inflammation or trauma of the tendon, muscle-tendon junction or surrounding tissue, particularly the tendon sheath. Such inflammatory conditions in and around the tendon are for the most part of a temporary nature but in some individuals may become chronic;
- (b) inflammation of the tissue of the hand caused by constant bruising or friction of the palm (a similar condition may occur in the elbow or knee). Collectively these are known as "beat conditions";
- (c) compression of peripheral nerves serving the upper limb, particularly the hand. Many of these conditions, such as carpal tunnel syndrome, may also arise spontaneously in the general population and may be aggravated by work conditions;
- (d) temporary fatigue, stiffness or soreness of the muscles comparable to that following unaccustomed exertion but where no permanent pathological condition results. Full recovery occurs after appropriate rest.

This is not a definitive or precise list. The conditions are not mutually exclusive and some individuals exhibit several variants simultaneously."

8-076 Notwithstanding the caveat that this is not a definitive or precise list, it is interesting to compare this "classification" with the lists of upper limb conditions which are cited in other publications as examples of WRULDs. For example, the *TUC Guide to Assessing WRULDs Risks* provides "a list of some common WRULDs" in the form of a table reproduced below. However, it is important to preface this comparative analysis by emphasising that it is not intended to be unduly critical of either the HSE's classification of upper limb disorders or the choice of conditions which appear in the "list of common WRULDs" in the *TUC Guide to Assessing WRULDs Risks*. The intention is merely to illustrate that the term WRULD is not as homogeneous as many might think.



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<i>Tendon Disorders</i>	<i>Nerve Disorders</i>	<i>Muscle Disorders</i>	<i>Other</i>
Tendinitis	Carpal Tunnel Syndrome	Myalgia	Vibration-Induced White Finger
Tenosynovitis	Reflex Sympathetic Dystrophy	Myofascial Pain Syndrome	
De Quervain's Disease	Cubital Tunnel Syndrome	Writer's Cramp	
Peritendinitis	Guyon's Canal Syndrome		
Trigger Finger			
Lateral Epicondylitis ( <i>Tennis Elbow</i> )			
Medial Epicondylitis ( <i>Golfer's Elbow</i> )			
Game Keeper's Thumb			
Hypothenar Hammer Syndrome			

Perhaps, the most notable omissions from the list of examples of WRULDs in the *TUC Guide to Assessing WRULDs Risks* are shoulder disorders, though these are referred to briefly later in the text. The *TUC Guide to Assessing WRULDs Risks* also omits the "beat conditions". The HSE's classification excludes "vibration white finger". This is, in part, explained by paragraph 4 of *Work related upper limb disorders — A guide to prevention* which states:

"This guidance is the first of several new publications devoted to ULDs which will replace HSE Guidance Note MS 10 (*Beat conditions and tenosynovitis*). The content has been updated and the scope widened to include more information on prevention by introducing good ergonomic practice into engineering design and the design of jobs and systems of work. It does not for example deal with the condition vibration-induced white finger (VWF) or problems involved with the manual handling of loads. These are dealt with in separate publications, which should, depending on the nature of the risks, be read in conjunction with the present document."

The inclusion of the "beat conditions" in the HSE's classification of upper limb disorders no doubt reflects the fact that they still appear in the list of prescribed diseases (A5, A6 & A7), while their omission from the list of WRULDs in the *TUC Guide to Assessing WRULDs Risks* is justifiable, given the relatively low incidence of these conditions, following the dramatic reduction in heavy manual labour in certain industries, e.g. mining.

Broadly speaking, the categories *Tendon Disorders*, *Nerve Disorders* and *Muscle Disorders* in the *TUC Guide to Assessing WRULDs Risks* are consistent with groups (a), (c) and (d) in the HSE's classification. Closer examination of the conditions included under the heading *Tendon Disorders* in the *TUC Guide to Assessing WRULDs Risks* shows that

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most are consistent with the description given in group (a) of the HSE's classification, the exception being Hypothenar Hammer Syndrome. There are a number of other nerve compression syndromes which fit the description given in group (c) of the HSE's classification which it could be argued should be included under the heading *Nerve Disorders* in the *TUC Guide to Assessing WRULDs Risks* if relatively rare conditions such as Cubital Tunnel Syndrome and Guyon's Canal Syndrome merit inclusion. However, it is the conditions referred to in group (d) of the HSE's classification and under the heading *Muscle Disorders* in the *TUC Guide to Assessing WRULDs Risks* which merit most attention at this point.

8-078 While the symptoms described in group (d) of the HSE's classification might conceivably be (mis) diagnosed as Myalgia or Myofascial Pain Syndrome, it is difficult to see how they could be mistaken for Writer's Cramp or be interpreted as an "injury" in the legal sense. The HSE's guidance document *Work related upper limb disorders — A guide to prevention* acknowledges the existence of prescribed disease A4, "Cramp of the hand or forearm", in paragraph 10, but it is not catered for in the HSE's classification of upper limb disorders.

As long ago as 1888 Gowers observed that "Writer's cramp is a disease that is readily imagined". A recent survey<sup>71</sup> of 72 medical practitioners in the Northern Region Health Authority who provide medico-legal reports on upper limb problems showed that a substantial number felt that "professional cramp" (prescribed disease A4) was not a definite disease entity, while others acknowledged that they had never seen it. The available statistics<sup>72</sup> suggest that it is rare though perhaps coming "back into fashion". No case of "Writer's Cramp" was identified in the HSE's £0.5m programme of research,<sup>73</sup> undertaken in the late 1980s, into the prevalence and causes of work-related upper limb disorders.

8-079 With respect to prescribed disease A4, the *Notes on the Diagnosis of Prescribed Diseases*<sup>74</sup> state, among other things, that "The condition is known as writer's cramp, telegraphist's cramp, twister's cramp, occupational cramp or craft palsy", but that "It is now usually diagnosed in professional musicians who practise long hours in pursuit of that excellence which is necessary for them to earn a living". The "Symptoms" are listed as "Spasm, tremor and pain in the hand or forearm brought about by attempts to perform a familiar act involving a frequently repeated muscular action", but "there are no physical signs and no detectable abnormalities on investigation". Are spasm and tremor not signs? The "Causative Agent" is suggested to be "Prolonged and/or repeated movements" but the "Harmful Effects" are "Not precisely

<sup>71</sup> Diwaker, & Stothard, (1995)45 "What do doctors mean by tenosynovitis and repetitive strain injury?" *Occupational Medicine* pp. 97-104.

<sup>72</sup> *Health and Safety Statistics 1995/96* October 1996.

<sup>73</sup> Thompson, Bacon, Harrington, & Nayak, *Occurrence and Mechanism of Occupational Repetition Strain Injuries*. (1990) HSE Contract No. IMS/126/584/85, University of Birmingham and English, Maclaren, Court-Brown, Hughes, Porter, Wallace, Graves, Pethick, and Soutar, *Clinical epidemiological study of relations between upper limb soft tissue disorders and repetitive movements at work*. Report No. TM/88/19. (1989). Institute of Occupational Medicine, Edinburgh.

<sup>74</sup> Department of Social Security. (1991).

known. The condition is *probably* due to a combination of physical fatigue of muscles and an underlying psychoneurosis" [my emphasis].

It is difficult to believe that such an ill-defined condition is maintained in the list of prescribed diseases. However, a glance at the available statistics on prescribed diseases shows that there are a number of esoteric and defunct diseases, like A4, for which very few people have ever received awards, but which remain in the list of Prescribed Diseases. For example, C16 – Poisoning by gonioma kamassi (African Boxwood) arising from:

"The manipulation of gonioma kamassi or any process in or incidental to the manufacture of articles therefrom. For example, weaving shuttle makers".

It appears that there is no mechanism for removing diseases from the list.<sup>75</sup> Thus, the Industrial Injuries Advisory Council's review of work related upper limb disorders, in 1992,<sup>76</sup> did not consider whether or not "Cramp of the hand or forearm" should be maintained in the list of prescribed diseases. It is difficult to believe that such an ill-defined condition would now get into the list of prescribed diseases.

### The concept of work-relatedness

Just because a musculo-skeletal sensation or condition is described as a "work-related upper limb disorder", it does not necessarily follow that the sensation or condition has been caused, aggravated or accelerated by work activities. The term "work-related" can imply no more than that work activities make an employee aware of some musculo-skeletal sensation or condition. Whether the mere highlighting of a musculo-skeletal sensation or condition constitutes an "injury" is for the Courts to decide.

8-080

It can be argued that it should not matter to the prudent employer that the primary cause of some upper limb disorder was wholly unrelated to work activities. If an upper limb disorder influences an employee's ability to work efficiently, irrespective of any health and safety considerations, it is an issue which the employer needs to be aware of and manage. However, it is clear from talking to a large number of employers, in the context of the prevention and management of WRULDs, that the vast majority interpret the term "work-related" to mean "caused by work".

Many employers appear to be unaware that a wide variety of upper limb disorders can occur quite naturally and that there are, potentially, many non work-related causes of musculo-skeletal "injuries" to the upper limbs. It is also important to bear in mind that musculo-skeletal aches and pains are endemic in the population. According to Hadler,<sup>77</sup> at least 5 per cent of

<sup>75</sup> O'Kelly, "Prescribing disease: the Industrial Injuries Advisory Council," in Smith, and Wynne, (eds), *Expert Evidence: Interpreting Science in the Law* (1989).

<sup>76</sup> *Work Related Upper Limb Disorders. Report by the Industrial Injuries Advisory Council in accordance with Section 141 of the Social Security Act 1975 on the question whether further work related upper limb disorders should be prescribed.* Cm 1936. May 1992.

<sup>77</sup> Hadler, "Coping with Arm Pain in the Workplace," in *Occupational Musculoskeletal Disorders* (1993).

us will experience discomfort in our neck and upper extremities every six weeks. Nearly 5 per cent of us have experienced an episode of upper extremity morbidity distinctive in that it persisted for one month of the past year and was memorable.

- 8-081 The opening paragraphs of the HSE's guidance document *Work related upper limb disorders — A guide to prevention* make clear that musculo-skeletal problems affecting the upper limbs are common in the general population and that they can arise spontaneously and without any link to work. Paragraph 2 acknowledges that reliable statistics on the incidence and prevalence of work-related upper limb disorders are not available but suggests that they account for "a considerable amount of ill-health". Paragraph 2 then states:

"Recent research has indicated that in a series of patients attending orthopaedic clinics, and for whom a reliable clinical diagnosis was available, an occupational association could be discovered in about 13% of cases."

The study<sup>78</sup> cited to support this argument was part of the HSE's £0.5m programme of research, undertaken in the late 1980s, into the prevalence and causes of work-related upper limb disorders. However, it is most unclear from an examination of this report and a subsequent version of the study published in a refereed journal<sup>79</sup> how this figure of 13 per cent has been derived. It would appear that it could equally well be argued that recent research has indicated that in a series of patients attending orthopaedic clinics, and for whom a reliable clinical diagnosis was available, an occupational association could not be discovered in about 87 per cent of cases. However these reports are interpreted, it would appear that the majority of those suffering from upper limb disorders have what might be termed a constitutional problem.

- 8-082 There is anecdotal evidence that some of those who have a constitutional upper limb disorder "develop" what might be described as an iatrogenic injury<sup>80</sup> and go on to become litigants, though this was not the intention at the time of the initial consultation. The medical practitioner, usually a G.P., unintentionally induces the perception of injury. For example, "I'm afraid you will keep on having this neck [shoulder, arm, hand] problem so long as you keep your current job" might be quite accurate advice, but is interpreted as implying a causal relationship between the work and the disorder. Some medical practitioners, particularly G.P.s, appear willing to make categorical statements concerning the occupational nature of often vague signs and symptoms without giving due consideration to other possible causes.

Thus, the individual with a musculoskeletal sensation becomes a patient

<sup>78</sup> English *et al*, 1989, *op cit*.

<sup>79</sup> English, Maclaren, Court-Brown, Hughes, Porter, Wallace, Graves, Pethick, & Soutar, "Relations between upper limb soft tissue disorders and repetitive movements at work" (1995) 27 *American Journal of Industrial Medicine* pp. 75-90.

<sup>80</sup> Iatrogenic = caused or induced by the actions or words of a medical practitioner.

upon visiting the G.P., can leave the surgery as an employee with a WRULD, and becomes a litigant with an injury upon visiting a solicitor. This is part of what is termed the "social construction of injury" in which iatrogenic and (by analogy) mediagenic and jurisgenic factors, among other things, induce in employees the perception that they have suffered work-related injuries for which their employers are liable. This is in no way intended to suggest that such individuals are, themselves, constructing their injuries. It merely suggests that how we, *i.e.* individuals, doctors, lawyers and ergonomists, perceive WRULDs can be strongly influenced by external factors and the circumstances in which we find ourselves placed.<sup>81</sup>

### Constructive knowledge

The issue of constructive knowledge in claims for WRULDs is usually not a simple matter, given the wide range of conditions which are encompassed by the term "WRULD" and that the causes and underlying disease mechanisms of upper limb disorders vary enormously. There is no single source of constructive knowledge or any single document which establishes the "date of knowledge" for all WRULDs. It can also be argued that the issue of constructive knowledge with respect to "blue collar" and "white collar" work needs to be considered separately and that even within these broad categories careful consideration needs to be given to the wide variety of risk factors which are suggested to contribute to these disorders. However, before reviewing what might be described, from an ergonomics perspective, as the most significant knowledge documents relating to "blue collar" and "white collar" work, it is perhaps worth noting some general observations on the sources of constructive knowledge and the concept of the "date of knowledge".

8-083

### Sources of constructive knowledge

There is a large amount of literature, some of it dating back many years, which has suggested a link between manual work and musculo-skeletal symptoms. However, it can be argued that much of this literature cannot be considered a source of constructive knowledge for the typical employer. The vast majority of the literature in scientific journals is inaccessible, both physically and intellectually, to most employers. An employer might reasonably be expected to be aware of the considerable publicity given to "RSI" in the trade, technical and popular press from about 1987. However, it is questionable whether an employer should be deemed to

8-084

<sup>81</sup> Cioffi, "Somatic Interpretation in Cumulative Trauma Disorders: A Social Cognitive Analysis" in *Beyond Biomechanics: Psychosocial Aspects of Musculoskeletal Disorders in Office Work* (Moon, & Sauter, eds 1996); Dembe, *Occupation and Disease: How Social Factors Affect the Conception of Work-Related Disorders*. (1996); Pearce, "An Alternative Perspective on the VDT Health Hazards Debate: Folk Hazards and Health Panics" in *Work With Display Units 94* (Grieco, Molteni, Piccoli, and Occhipinti, eds 1995); Spurgeon, Gompertz, & Harrington, "Modifiers of non-specific symptoms in occupational and environmental syndromes" (1996)53 *Occupational and Environmental Medicine*, pp. 361-366.

have “knowledge” of WRULDs on the basis of press reports, which have been shown to be subject to systematic bias and inaccuracies.<sup>82</sup> This would amount to the social construction of constructive knowledge.

Undoubtedly, the most authoritative source of health and safety advice for employers in the United Kingdom is the Health and Safety Executive. Thus, it can be argued that what matters is what guidance the HSE was actually giving to employers, at the material times. Since 1994, HSE guidance documents have included wording which suggests that following the guidance is not compulsory, but that doing so will normally be enough to comply with the law. However, anyone who has attended hearings of claims for WRULDs will be aware that HSE guidance documents are often examined in minute detail in Court. Sometimes inferences are drawn which those responsible for the guidance arguably never envisaged. For example, in the context of WRULDs, advice and recommendations which are intended to promote a satisfying and efficient system of work and reduce the likelihood of discomfort and fatigue, i.e. welfare provisions, are often interpreted as essential health and safety requirements which, if not followed, materially contribute to a risk of injury.

8-085 Thus, while it is understandable that Courts should rely heavily on HSE guidance documents, the context in which they were written and the purpose for which they were written needs to be given careful consideration. For example, for a brief period in the late 1980s the HSE publication *Essentials of Health and Safety at Work*,<sup>83</sup> which was apparently written by those who were not technical specialists and aimed at small firms, effectively endorsed the concept of “RSI”. It is difficult to see how other HSE guidance available at the time could be said to do so. Inevitably, in a subject as broad and as controversial as WRULDs, guidance can be ambiguous. In fairness to the authors of HSE guidance documents it should be noted that most of this ambiguity arises from our lack of scientific knowledge and the true nature of many of these disorders and their causal factors.

#### The concept of the “date of knowledge”

8-086 The “date of knowledge” appears to be a legal creation which establishes, for the purposes of litigation, when a reasonably informed and prudent employer ought to have known about a risk of some type of injury arising from some type of work. Inevitably, there is some delay between the initial reports of some possible hazard and establishing scientifically that a particular agent or activity is hazardous. In practical terms, a declaration or consensus view that there is a causal connection also requires finite time for dissemination. The views of Courts and the practicalities of real life are sometimes at variance on how long this should be and on what constitutes a consensus view.

In the normal course of events, that which was not considered foreseeable can become foreseeable, as our understanding of disease

<sup>82</sup> Pearce, “RSI and the media.” (1995)57 *Occupational Health Review* pp. 14-18.

<sup>83</sup> See the 1988 version.

processes increases. However, it can also be argued that we have now reached the stage at which some soft tissue disorders which for years have been popularly understood to be work-related "injuries" are no longer considered by those familiar with the most recent studies to be primarily caused by work. A good example of this is "Cramp of the hand or forearm due to repetitive movements". Thus, that which was considered foreseeable can become non foreseeable, as our understanding of disease processes and causal factors increases. However, a declaration or consensus view that there is *no* causal connection between some type of injury and some type of work also requires finite time for dissemination and there appears to be considerable inertia in the system.

### Significant knowledge documents

The HSE's most comprehensive, current guidance on WRULDs is *Work related upper limb disorders — A guide to prevention*. This was first published in October 1990 and many would argue that it is in urgent need of updating. As has already been mentioned, this document was intended to replace in part Guidance Note MS 10,<sup>84</sup> which was published by the HSE in 1977. 8-087

#### Guidance note MS 10

Guidance Note MS 10 refers to tenosynovitis in its title, but the text draws the distinction between "peri-tendinitis crepitans" and "true tenosynovitis". It makes no explicit reference to any other WRULDs, such as carpal tunnel syndrome or lateral epicondylitis, and it is difficult to see how it could be interpreted as encompassing chronic pain conditions such as "RSI".

Guidance Note MS 10 suggested that tenosynovitis can occur especially in industries

"... where rapid, repetitive, twisting and gripping movements are common, e.g. pottery glaze dipping, brick making, assembly line work and belt conveyor sorting for food canning, press operations and the evisceration and trussing of chickens".

It can be argued that it was not the intention of Guidance Note MS 10 to draw attention to the risk of injury in any or all tasks which involve an element of rapid or repetitive or twisting or gripping movements. Unfortunately, there was no definition of what is meant by the terms: "rapid", "repetitive", "twisting", "gripping" or "common". All the examples given are of "blue collar" work and most imply a significant degree of force. From an ergonomics perspective, it would appear that Guidance Note MS 10 has little or no relevance to "white collar" work.

<sup>84</sup> *Bad conditions, tenosynovitis* (1977).

**Work related upper limb disorders – A guide to prevention**

8-088 Compared with Guidance Note MS 10, *Work related upper limb disorders – A guide to prevention* clearly covers a wider range of upper limb disorders, a wider range of types of work and a wider range of industries. However, as paragraph 3 makes clear, the guidance “does not specifically address particular jobs or occupations where ULDs are known to occur”. It also fails to quantify the level of any particular activity which might bring about “injury” and, as has already been mentioned, leaves open to interpretation which WRULDs it covers and what constitutes an “injury”.

Paragraph 20 of *Work Related Upper Limb Disorders — A guide to prevention* suggests that:

“The majority of occupational factors associated with the increased risk of ULDs can be grouped into three general areas:

**force** – the application of undesirable manual force;  
**frequency and duration** of movement – including unsuitable rates of working or repetition of a single element;  
**awkward posture** of the hand, wrist, arm or shoulder.

In some jobs only one of these factors is responsible for increased risk but more often an interaction between two, or all three, is to blame. For example, the need to maintain a stressful or tiring grip may be seen as a combination of force requirements, awkward posture and duration. Understanding of how these factors combine is however not sufficiently well advanced to enable precise quantitative limits to be given”.

Similarly, paragraph 51 acknowledges that:

“the precise combinations of what represent acceptable levels of force, frequency, grip etc are not yet established”.

While *Work related upper limb disorders — A guide to prevention* may be applicable to certain types of “white collar”, it primarily focuses on “blue collar” work. The main body of the text contains no explicit reference to “white collar” work and all the examples illustrate “blue collar” work.

**Upper Limb Disorders Assessing the Risks**

8-089 This leaflet,<sup>85</sup> which was first published in September 1994, purports to provide advice to employers on assessing the possible risk of upper limb disorders. It is a triumph of graphic design over technical content and contains a simplistic and less than helpful checklist for assessing upper limb disorders.

<sup>85</sup> IND(G) 171(L).



**Knowledge documents relating to particular types of work**

Notable publications under this heading are:

Guidance prepared by the Printing Industry Advisory Committee entitled *Work related upper limb disorders in the printing industry*<sup>86</sup> which was first published in March 1994.<sup>88a</sup>

Guidance prepared by the Ceramics Industry Advisory Committee entitled *Picking up the pieces Prevention of musculoskeletal disorders in the ceramics industry*<sup>87</sup> which was first published in September 1996.

An HSE guidance document entitled *Apain in your workplace? Ergonomic problems and solutions*<sup>88</sup> which was first published in October 1994.<sup>88a</sup>

**Knowledge documents specifically relating to "white collar" work**

It can be argued that there is no HSE guidance which specifically addresses the risk of WRULDs in "white collar" work, however, the HSE has published guidance on the use of computer terminals, which is now by far the most common type of "white collar" work. 8-090

*Visual Display Units*

The HSE's 1983 publication *Visual Display Units*<sup>89</sup> was the first guidance aimed at employers which considered the health and safety issues associated with the design and use of computer terminals. This publication clearly suggested that the use of VDUs, and by analogy keyboards, could give rise to bodily fatigue and discomfort, but makes no mention of any specific, inherent or significant risk of upper limb injury.

*Working with VDUs*

The only other HSE guidance document on health and safety issues associated with VDU use which was widely available in the 1980s and early 1990s was the leaflet *Working with VDUs*.<sup>90</sup> This leaflet, which was first published in 1986, was intended as "a guide for people who work with VDUs" and presents the issues as a series of questions and answers. Between April 1986 when it was first printed and April 1991 when an edited and revised version appeared, *Working with VDUs* was reprinted, in February 1989, and reformatted and reprinted, in March 1990. In all the versions of this leaflet, up to and including that published in April 1991, there is a reference to musculoskeletal symptoms: 8-091

"Sometimes, particularly when I have spent long periods at the VDU keyboard, I get pains and discomfort in my arms, shoulders and neck."

<sup>86</sup> IAC/1.91.

<sup>87</sup> HSE Books.

<sup>88</sup> HS(G) 121.

<sup>88a</sup> See also *Checkouts and Musculoskeletal Disorders* (NI) (G) 269 05/98. *Musculoskeletal Disorders in Supermarket Cashiers*, MacKay et.al, 05/98.

<sup>89</sup> HMSO.

<sup>90</sup> IND(G) 36(I) 4/86.

The response states:

“These symptoms are usually the product of a badly designed workplace or job at which you have to work continuously. Either may cause you to sit in a fixed position for long periods or make awkward or rapid repetitive movements of the head, body or arms. Most people find that the symptoms quickly disappear when they stop work, but in some cases the effects may be more serious. It is very important that both job and workplace should be designed to minimise such movements.”

8-092 Helpfully, all the versions of this leaflet which contain the question and answer noted above provide a reference to further guidance. This further guidance is the 1983 publication *Visual Display Units* – a document which goes into great detail about the health and safety issues associated with the use of computer terminals, but which conspicuously does not draw attention to any risk of any upper limb or musculo-skeletal injury.

In November 1992, a new version of *Working with VDUs* was produced<sup>91</sup> to take account of the Health and Safety (Display Screen Equipment) Regulations 1992, which came into force on January 1, 1993. The wording of the question referring to musculo-skeletal symptoms was changed to:

“Are aches and pains caused by using a VDU?”

The response was changed to:

“Some VDU users may experience aches and pains in their hands, wrists, arms, neck shoulders or back (that is to their musculoskeletal system), especially after long periods of uninterrupted VDU work. If this happens you should alert your supervisor or line manager. Usually these aches and pains do not last, but in a few cases they may become more persistent or even disabling. Most problems of this nature can be prevented by good workplace design and good working practices”.

Versions of *Working with VDUs* published in and after 1992 suggest that more information is available in *Display Screen Equipment Work. Health and Safety (Display Screen Equipment) Regulations 1992 Guidance on Regulations L26*. In early versions of both these documents it is stated that the HSE will be publishing “supplementary practical advice which will be available in 1993”. Unfortunately, it was not until July 1994 that the HSE published *VDUs an Easy Guide to the Regulations*,<sup>92</sup> which contained a “VDU workstation checklist for risk assessment and complying with the schedule to the regulations”.

<sup>91</sup> Further versions of IND(G) 36(L) published in May 1993, March 1996 and February 1998.

<sup>92</sup> HS(G) 90.

**Guidance on the Health and Safety (Display Screen Equipment) Regulations 1992**

The Health and Safety (Display Screen Equipment) Regulations 1992 came into force on January 1, 1993. Guidance for employers on these Regulations was published by the HSE in November 1992.<sup>93</sup> Paragraph 19 of the guidance states:

“Possible risks which have been associated with display screen equipment work are summarised at Annex B. The principal risks relate to physical (musculoskeletal) problems, visual fatigue and mental stress. These are not unique to display screen work nor an inevitable consequence of it, and indeed research shows that the risk to the individual user from typical display screen work is low. However, in display screen work as in other types of work, ill health can result from poor work organisation, working environment, job design and posture, and from inappropriate working methods. As discussed in Annex B, some types of display screen work have been associated with chronic musculoskeletal disorders. While surveys indicate that only a very small proportion of display screen workers are likely to be involved, the number of cases may still be significant as display screen workers are so numerous. All the known health problems that may be associated with display screen work can be prevented altogether by good design of the workplace and the job, and by worker training and consultation”.

Annex B of the HSE's guidance is entitled “Display screen equipment: possible effects on health”. Under the heading “Upper limb pains and discomfort” the following two paragraphs appear:

“A range of conditions of the arm, hand and shoulder areas linked to work activities are now described as work related upper limb disorders. These range from temporary fatigue or soreness in the limb to chronic soft tissue disorders like peritendinitis or carpal tunnel syndrome. Some keyboard operators have suffered occupational cramp.

The contribution to the onset of any disorder of individual risk factors (eg keying rates) is not clear. It is likely that a combination of factors are concerned. Prolonged static postures of the back, neck and head are known to cause musculoskeletal problems. Awkward positioning of the hands and wrist (eg as a result of poor working technique or inappropriate work height) are further likely factors. Outbreaks of soft tissue disorders among keyboard workers have often been associated with high workloads combined with tight

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<sup>93</sup> *Guidance on Regulations L26.*

deadlines. This variety of factors contributing to display screen work risk requires a risk reduction strategy which embraces proper equipment, furniture, training, job design, and work planning”.

8-094

It will be noted that the only injury, if indeed it can be called an injury, which Annex B specifically suggests keyboard operators have suffered is “occupational cramp”. The guidance is equivocal in identifying the nature and causes of specific disorders, referring instead to a variety of factors in display screen work which may be associated with musculo-skeletal problems. Contrary to popular belief, there is still no “scientific” evidence that the use of a keyboard or VDU gives rise to any specific, inherent or significant risk of upper limb injury.

It can be argued that an employer reading the HSE’s guidance, particularly the references in paragraph 19 to *research shows that the risk to the individual user from typical display screen work is low and surveys indicate that only a very small proportion of display screen workers are likely to be involved* might reasonably conclude that typical VDU use does not give rise to a specific, inherent or significant risk of upper limb injury. However, this argument begs the question of why we have the Health & Safety (Display Screen Equipment) Regulations 1992.

#### **The origins of the Health and Safety (Display Screen Equipment) Regulations 1992**

8-095

The United Kingdom government did not look favourably upon Directive 90/270/EEC when the original proposal<sup>94</sup> was presented by the Commission to the Council, in March 1988. A Select Committee of the House of Lords conducted an inquiry into the Directive and, in November 1988, published a report which was debated in the House of Lords in February 1989.<sup>95</sup> Their Lordships suggested that the scientific evidence that VDUs caused major health hazards was weak and that public concern was not itself a sufficient reason for having a Directive. The Committee concluded that there was inadequate justification for a Directive on VDUs. The United Kingdom was the only Member State not to vote in favour of the VDU Directive at the Council of Ministers meeting in Brussels in October 1989. The U.K. abstained.

Despite the U.K. government’s clear lack of enthusiasm for specific legislation on working with VDUs, it was decided to implement the Directive in the U.K. as new regulations under the Health and Safety at Work etc Act 1974. A consultative document<sup>96</sup> was published by the Health and Safety Commission in January 1992. Following the consulta-

<sup>94</sup> *Proposal for a Council Directive concerning the minimum safety and health requirements for work with visual display units*. C113, [1988] O.J. pp. 7–9.

<sup>95</sup> *The Parliamentary Debates*. House of Lords Official Report. Fifth Series, Vol. 503, pp. 1054–1159.

<sup>96</sup> *Work with Display Screen Equipment Proposals for Regulations and guidance. Consultative Document*. Health and Safety Executive, London.

tive process, significant changes were made to the draft wording of the regulations. The final wording<sup>97</sup> was Laid before Parliament on November 16, 1992. Thus, the purpose and content of the Health & Safety (Display Screen Equipment) Regulations 1992 were never debated in the House of Commons by elected Members of Parliament. The method by which "the laws, regulations and administrative provisions" necessary to comply with the Directive were introduced in the U.K. prompted some to argue that these regulations were another example of unnecessary, European-inspired legislation being imposed "via the back door".

The fundamental problem with the Directive (and therefore with the Health & Safety (Display Screen Equipment) Regulations 1992) is the confusion which exists between ergonomic issues and health and safety matters. They are not the same. Many relatively trivial ergonomic recommendations which were originally intended to reduce discomfort and fatigue have been turned into a motley collection of very badly expressed, minimum ergonomic requirements, which are somehow supposed to ensure the health and safety of VDU users. The validity and utility of many of these ergonomic recommendations are open to question. With the exception of the reference to "Radiation", it can be argued that all the requirements in the Schedule, indeed the Health and Safety (Display Screen Equipment) Regulations 1992 in general, amount to no more than welfare provisions.

8-096

#### WRULDs arising from manual handling

We are now increasingly seeing claims for WRULDs which are pleaded as a breach of the Manual Handling Operations Regulations 1992. It is interesting to note that the European Directive 90/269 which inspired these regulations refers in its title and throughout the text to "a risk particularly of back injury to workers". However, the opening sentence of paragraph 12 of the HSE's guidance on these Regulations<sup>98</sup> states:

8-097

"These Regulations seek to prevent injury not only to the back but to any part of the body".

Paragraph 14 of the HSE's guidance on these regulations makes clear that:

"A load in this context must be a discrete movable object. This includes, for example, a human patient receiving medical attention or an animal during husbandry or undergoing veterinary treatment, and material supported on a shovel or fork. An implement, tool or machine – such as a chainsaw – is not considered to constitute a load while in use for its intended purpose".

<sup>97</sup> S.I. (1992) No. 2792.

<sup>98</sup> *Guidance on Regulations L23.*

Unlike the HSE guidance on WRULDs, the HSE's guidance document on manual handling provides some quantitative guidelines on the movement of loads and by how much the weights should be reduced for frequent lifting and lowering. Even so, there is ample scope for the (mis) interpretation of these regulations. An illustration of the lack of understanding of these regulations and their relevance to WRULDs is a recent claim by a telephonist for an upper limb injury, allegedly caused by repeatedly lifting a telephone handset, which was pleaded as a breach of the Manual Handling Operations Regulations 1992.

Also to be noted in this context is an HSE guidance document entitled *Manual handling Solutions you can handle*<sup>99</sup> which was first published in April 1994.

### Observations on expert medical evidence

- 8-098 Without wishing to trespass too far into medical matters, it can be observed that some disorders and dysfunctions of the upper limbs are more clearly defined than others. Some present with clear, objective, clinical signs of abnormality, while others are diagnosed on the basis of the patient's response to examination or merely the patient's report of a certain pattern of musculo-skeletal sensations. While it would be nice to think that all medical practitioners used common diagnostic criteria and were equally skilled in the diagnosis of upper limb disorders, it is manifestly clear that they do not.<sup>101</sup>

From an ergonomics perspective, it is important to have some understanding of the site and nature of an alleged injury and when it occurred, when considering whether or not certain symptoms or medical conditions are consistent with the type of work a plaintiff performed. Thus, when examining a claim for a work-related upper limb disorder, many ergonomists start by considering whether there were plausible temporal and biomechanical links between the "injury" for which the plaintiff claims damages and the allegedly injurious work.

- 8-099 It is surprising how often a claim is launched on the basis of a plausible medical report, only to discover at some later date that the plaintiff has a history of pertinent upper limb symptoms which pre-date the allegedly injurious work. Unfortunately, a review of all the contemporaneous medical records, which can provide important evidence relating to temporal issues which can influence opinions on causation and negligence, is rarely available at an early stage in the proceedings.

While some upper limb disorders which are primarily degenerative conditions may develop over a long period, many of the (more) clearly defined upper limb disorders are not slowly developing diseases. They occur a matter of hours or days or possibly weeks, not months or years, after exposure to some activity. In these cases there needs to be a cogent

<sup>99</sup> HS(G) 115.

<sup>1</sup> Diwaker & Stothard, *op cit*.

temporal relationship between the onset of symptoms and some significant change in the system of work.

If the plaintiff has been performing much the same type of work for a considerable number of years, there appears to be a tendency for the pleadings to implicate all this work, implying some sort of cumulative trauma. However, in most cases, this extension of "the material times" back in time can actually diminish the credibility of a claim, if the plaintiff has been performing the allegedly injurious work for a long period without any symptoms. The question which needs to be addressed from an ergonomics perspective, in virtually all cases, is "why did the initial symptoms of the alleged injury arise when they did?"

It is also surprising how often a claim is launched which is based upon the medical expert's misconceptions concerning the load imposed upon various parts of the upper limbs by the type of work. For example, most medical experts will have observed the task of typing, but it appears that some have not considered the task sufficiently closely, to put it charitably, to appreciate that while there may be repetitive movements of the fingers and some static loading of the upper limbs, the forces and movements required by the task of typing are minimal. As the opening sentence of paragraph 11 of the HSE's guidance document *Work related upper limb disorders A guide to prevention* makes clear: "The musculoskeletal system is well suited to produce repeated motions at low force levels". Thus, from an ergonomics perspective, claims for one of the more clearly defined upper limb disorders allegedly arising from typical keyboard use need to be based on more than the simple assertion that the plaintiff was using a keyboard. 8-100

A more specific example of some medical experts' misconceptions concerning the load imposed upon various parts of the upper limbs are those claims in which a diagnosis of bilateral De Quervain's Disease is attributed to the task of typing. The force and movements required of the thumb by the task of typing are not only minimal, but the thumb is also the strongest digit. Of more significance, however, is the fact that the majority of experienced touch-typists usually use only one thumb on the keyboard, to operate the "space bar". The other thumb is usually redundant. Thus, from an ergonomics perspective, claims for bilateral De Quervain's Disease allegedly arising from typical keyboard work lack a plausible biomechanical link.

From an ergonomics perspective, it appears that some medical experts are too willing to state categorically whether or not a plaintiff has suffered a work-related injury without a detailed understanding of the occupational tasks and without ever having seen the work place.

#### **Interpreting the scientific and medical literature**

The medical literature is littered with anecdotal comments by long-dead doctors which suggest causal relationships for which there is no "scientific" evidence. For example, the early editions of Hunter's *Diseases of* 8-101

Occupations mentioned, without any supporting reference, that Tenosynovitis can occur in typists. Even a publication such as *Cumulative trauma disorders: A Manual for musculoskeletal diseases of the upper limbs*,<sup>102</sup> which is recommended as a source of further information in the HSE's guidance document *Work related upper limb disorders A guide to prevention*, should be treated with caution. While it contains some excellent illustrations of the sites of the most common upper limb disorders and useful descriptions of the terminology used to describe limb positions and movements, detailed examination reveals that some of the factual statements and prescriptive recommendations contained within this publication are not supported by the references cited.

Those numerous articles in the medical literature which describe the clinical characteristics of a series of patients with a particular upper limb disorder often note the patients' occupations. However, such reports do not constitute evidence of work-related causation or foreseeability. Cross sectional studies, which examine the presence or absence of both exposure and disease in individuals at a particular point in time, may demonstrate statistically significant associations, but are prone to numerous forms of bias and by definition cannot establish causality. Nevertheless, it appears that Courts can be (unduly) influenced by such studies. The more powerful (and more expensive) case-control and cohort studies are needed to assist in establishing whether or not there are causal links between particular types of work and particular upper limb injuries. Unfortunately, there is a distinct lack of high quality epidemiological studies of most of the upper limb disorders which are popularly understood to be work-induced.

8-102 While the "absence of evidence" should not be confused with the "evidence of absence", it should be noted that "positive" findings appear more likely to be published in the scientific literature than "negative" findings. Thus, the weight of the references on which an expert relies should not be confused with the weight of the evidence contained within the references. However, even the "evidence" which does exist appears to be open to widely different "expert", let alone lay, interpretation.<sup>103</sup> It is remarkable how recent reviews of the "scientific" literature have arrived at very different conclusions concerning the relationship between upper limb disorders and work activities.

Using admittedly extremely rigorous criteria, Vender *et al*<sup>104</sup> concluded

<sup>2</sup> Putz-Anderson, ed 1988.

<sup>3</sup> For assistance in interpreting epidemiological studies see: Hagberg, Silverstein, Wells, Smith, Hendrick, Carayon, and Pérusse, *Work Related Musculoskeletal Disorders (WMSDs): A Reference Book for Prevention*; (1995) Sorock and Courtney, "Epidemiologic concerns for ergonomists: Illustrations from the musculoskeletal disorder literature" (1996) 39, *Ergonomics*. No. 4, pp. 562-578.

<sup>4</sup> Vender, Kasdan, and Truppa, "Upper Extremity Disorders: A Literature Review to Determine Work-Relatedness," (1995) 20A, *The Journal of Hand Surgery*. No. 4, pp. 534-541.



that none of the 2,054 studies reviewed established a causal relationship between distinct medical entities and work activities. In contrast, while acknowledging that current epidemiological evidence is often based on studies with weak designs, Buckle<sup>105</sup> suggests that the consistency in the results strongly supports a relation with factors arising from work. It would appear that when it comes to the interpretation of the evidence, "belief" can be stronger than the rigour of the "scientific method", such that "supportive" evidence is preferentially recruited and the "inconvenient" down-played or suppressed.

#### WRULDs and the concept of "injury"

It follows from the arguments noted above that not all WRULDs can necessarily be considered "injuries" in the legal sense. While many of the (more) clearly defined upper limb disorders are widely perceived to be "injuries" and are sometimes found by Courts to be work-related injuries, the less well-defined disorders and dysfunctions of the upper limbs appear to pose particular problems for the Courts.

8-103

From an ergonomics perspective, musculo-skeletal sensations of discomfort or aches and pains in the neck, back or upper limbs are not necessarily injuries or even the early symptoms of injury. The body is built to move and these sensations can be the natural and, usually, harmless consequence of maintaining a static, constrained posture for excessive periods of time. There is no doubt that these types of WRULD exist, but they should not persist.

When musculo-skeletal sensations in the neck, back or upper limbs persist in the absence of any objective evidence of permanent damage to tissue, there are those who too readily presume that the sensations are exaggerated or faked or that those reporting them are malingering. Equally, there are those who too readily presume that such sensations are attributable to working practices. It is understandable that such sensations, when manifest in the work place, can be perceived as WRULDs by sufferers and be labelled as such by well-meaning medical practitioners. However, whether these types of WRULD are "the heart-ache and the thousand natural shocks that flesh is heir to" or "injuries", in the legal sense, is for the Court to decide on the basis of the (medical) evidence presented in each case.

One of the consequences of the adoption of the term WRULDs is that we are now seeing claims in which the alleged injury is pleaded to be, and "diagnosed" by the plaintiff's medical expert to be, a "work related upper limb disorder". This is not a medical diagnosis and certainly cannot support any meaningful prognosis. We are also seeing claims in which continuing symptoms, years after the cessation of the allegedly injurious work, are explained by theories which have rarely, if ever, appeared in refereed journals but which are presented as though they were undisputed

8-104

<sup>105</sup> Buckle, "Work factors and upper limb disorders" (1997) 315, *British Medical Journal*, pp. 1360-1363.

fact. From an ergonomics perspective, there appears to be an element of “junk science” creeping into the Court rooms with respect to claims for some types of WRULDs.

#### WRULDs and the concept of “the type of injuries”

8-105 While it is understandable that a plaintiff claiming damages for, say, falling down a hole does not have to show that the specific injuries suffered were foreseeable, merely that “the type of injuries” suffered were foreseeable, it appears from an ergonomics perspective that the concept of “the type of injuries” can be stretched to its limits in some claims for WRULDs. The inclusion of “temporary fatigue, stiffness or soreness of the muscles comparable to that following unaccustomed exertion” in the HSE’s classification of upper limb disorders means that those acting on behalf of plaintiffs can argue that virtually any type of work can give rise to a foreseeable risk of WRULDs.

On the other hand, as paragraph 16 of *Work related upper limb disorders A guide to prevention* makes clear, the causes and underlying disease mechanisms of upper limb disorders vary enormously. Thus, it can be argued that, while they are all prescribed diseases, Cramp of the hand or forearm cannot be considered to be the same “type of injury” as Tenosynovitis or Carpal Tunnel Syndrome. It can also be argued that the circumstances which might bring about, say, a Trigger Finger are markedly different from those which might bring about a Rotator Cuff injury. Thus, it is open to those acting on behalf of defendants to argue that while a particular type of work may give rise to a foreseeable risk of some type of WRULD, the type of injury actually suffered by a plaintiff was not foreseeable.

#### The “duty to warn”

8-106 The “duty to warn” appears to be essentially a legal creation and is often presented as the first and obvious step which an employer should take to prevent or to minimise the risk of injury, whereas, from an ergonomics perspective, a “warning” would usually be considered a last resort, to be used only where there is an inherent, specific and not insignificant risk of injury and only when all reasonable methods of reducing the potential for injury, if it exists, have been considered. However, it should be noted that, when WRULD claims occur, an employer who cannot show that the risk has even been considered appears to be in a far weaker position than an employer who has considered the (same) risk and concluded that it was so remote that nothing needed to be done.<sup>5a</sup>

What appears to have happened is that the need for warnings in some types of strenuous manual work has been extrapolated to work in which there is no inherent, specific or significant risk of upper limb injury. Included in warnings applicable to strenuous manual work there is usually the requirement for the early reporting of symptoms. This, too, is now often extrapolated to all types of work, apparently in the (mistaken) belief

<sup>5a</sup> *Pickford v. I.C.L.*, *The Times* June 30, 1998, HL; *Coley v. Securicor Group plc*, unreported February 30, 1998, CA; *Tindale v. Barbour & Sons Ltd* unreported May 16, 1997, CA.

that any ache or pain in the upper limb is the first stage of a potentially crippling disease process. It can be argued that this has led to excessive emphasis being placed upon the early reporting of even minor symptoms. Few would argue with the idea of encouraging the early identification of a genuine disease process. However, if there is in fact no disease process, merely sensations of "the heart-ache and the thousand natural shocks that flesh is heir to", excessive emphasis on the early reporting of minor symptoms can be counter-productive in giving the impression that virtually any musculo-skeletal sensation, including fatigue, is a work-related "injury".

There is considerable anecdotal evidence which suggests that localised epidemics of chronic pain syndromes, some of which have given rise to litigation, have been "caused" by employers acting in what a Court might consider to be a reasonable and prudent way.<sup>106</sup> It can be argued that by encouraging the early reporting of minor symptoms, referring symptom sufferers to (the "wrong") medical specialists and calling in consultants to "correct" the perceived physical problem, an employer can unwittingly be involved in the social construction of upper limb injuries. While this argument clearly cannot be used by employers to avoid the statutory duty imposed by the Management of Health and Safety at Work Regulations 1992<sup>107</sup> to provide information to employees about the health and safety risks to which they are exposed, the precise wording of any information relating to WRULDs needs to be considered very carefully.

Clearly, a balance needs to be struck between the potential benefits and costs: between identifying any genuine disease process arising from work activities by encouraging the early reporting of symptoms and alarming employees by suggesting that naturally occurring sensations of fatigue or symptoms of a constitutional disorder are the first stage of some potentially crippling disease.

### Conclusions

It is acknowledged that many of the arguments outlined above have focused on the uncertainties surrounding the nature, causes and foreseeability of the upper limb "injuries", which are popularly understood to be caused by repetitive work, and the common misconceptions concerning ergonomics, particularly with respect to keyboard use. This should not be taken to imply that serious ergonomic deficiencies do not cause or contribute to injuries to the upper limbs. There is no doubt that systems of

<sup>106</sup> Epidemics of chronic pain syndromes are discussed in: Ireland, "Repetition Strain Injury: The Australian Experience - 1992 Update," (1995) 20A *The Journal of Hand Surgery* No. 3, Part 2, pp. S53-S56; Reilly, "Repetition Strain Injury: From Australia to the UK." *Journal of Psychosomatic Research* (1995) 39, pp. 783-788; Hadler, *Occupational Musculoskeletal Disorders* (1993) Hocking, "Some Social and Cultural Anthropologic Aspects of Musculoskeletal Disorders as Exemplified by the Telecom Australia RSI Epidemic" on *Beyond Biomechanics: Psychosocial Aspects of Musculoskeletal Disorders in Office Work* (Moon, and Sauter, eds, 1996).

<sup>107</sup> *Approved Code of Practice. Management of Health and Safety at Work Regulations 1992*, HSE Books.

work which require forceful, highly repetitive movements, in awkward postures, can cause injury. However, it will be apparent from this examination of the issues that many "grey areas" can be encountered when WRULDs meet the law and when ergonomists meet the lawyers. On the other hand, if the issues were black and white, lawyers would have less need for ergonomists and claims for WRULDs would not employ so many lawyers.

# D

**The website can be found at:**

<http://www.humanetechnology.co.uk/wruldii/intro.php>

**Or by entering 'WRULD Court Judgments' into a search engine**

**Access to the site is free, but visitors are required to register**

**E**



# **How the Courts are interpreting HSE guidance and health and safety regulations**

An exploratory study of Court Judgments  
in personal injury claims for WRULDs

Prepared by **Loughborough University**  
for the Health and Safety Executive 2002

## **RESEARCH REPORT 010**



# **How the Courts are interpreting HSE guidance and health and safety regulations**

**An exploratory study of Court Judgments  
in personal injury claims for WRULDs**

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This report presents the findings of an exploratory study of how the Courts have interpreted health & safety Regulations and Health and Safety Executive (HSE) guidance by procuring and analysing the transcripts of relevant Court Judgments in personal injury claims for WRULDs. A web site which was intended to encourage the exchange of information on relevant cases and assist in the procurement of Court Judgments was developed and evaluated. Analysis of the Judgments suggests the Courts frequently considered issues which HSE guidance on WRULDs had rarely addressed explicitly and that a lay person reading HSE guidance might not appreciate some of the issues which Courts consider important with respect to an employer's duty of care in personal injury claims for WRULDs. Analysis of the Judgments which dealt with cases in which the alleged injuries had occurred after the 'six pack' of health and safety Regulations came into force suggests that the County Courts are inconsistent in their interpretations of the Health and Safety (Display Screen Equipment) Regulations and the Manual Handling Operations Regulations and that, as yet, there is no definitive interpretation of any of these Regulations by a higher Court. The report concludes that the approach adopted in the exploratory study can be of practical use and recommends ways in which it might be developed and exploited.

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## EXECUTIVE SUMMARY

Recent HSE guidance has suggested that following the guidance is not compulsory, but that doing so will normally be enough to comply with the law. While failure to comply with health and safety Regulations can result in the criminal prosecution of an employer by the enforcement authority, Regulations and HSE guidance can also be used to assist an employee bringing civil proceedings against an employer for a personal injury arising from work. The available evidence would appear to suggest that some Regulations and guidance have probably been examined more often in the civil than in the criminal Courts but that in some cases the Courts' findings might not be entirely consistent with what might reasonably be expected by a lay person reading the guidance.

This exploratory study examined how the Courts have interpreted health & safety Regulations and HSE guidance in the context of personal injury claims for WRULDs by analysing the transcripts of relevant Court Judgments. However, given that there is no central archive or index of such Judgments, a web site was developed which encouraged the exchange of information on relevant cases, such that the transcripts of the Judgments could be obtained, if necessary by paying for Judgments to be transcribed. Although the web site did not generate information on many new cases directly, it provided a focus for the reporting of information via other routes and a readily accessible and efficient means of disseminating information on Judgments in personal injury claims for WRULDs. The web site can be viewed at <http://www.lboro.ac.uk/wruld-db>

Content analysis of 104 Judgments in personal injury claims for WRULDs available by the 30th June 2001 suggests the Courts frequently considered issues relating to the nature and causes of upper limb symptoms and the circumstances in which they arise which HSE guidance on WRULDs had rarely addressed explicitly and that a lay person reading HSE guidance might not appreciate some of the issues which Courts consider important with respect to an employer's duty of care in personal injury claims for WRULDs. Judgment was given on average about six years after the alleged injury had occurred, thus none of the Judgments accumulated by the 30th June 2001 dealt with cases in which the alleged injuries had occurred after the industry specific guidance on WRULDs produced by or in association with the HSE had been published and relatively few of the Judgments dealt with cases in which the alleged injuries had occurred after the 'six pack' of health and safety Regulations came into force.

The relatively few County Court Judgments in personal injury claims for WRULDs which shed some light on how the Courts are interpreting these Regulations suggest inconsistencies in the interpretation of certain parts of the Health and Safety (Display Screen Equipment) Regulations and some confusion about the type of work which the Courts appear to consider is covered by the Manual Handling Operations Regulations. There is no definitive interpretation of any of these Regulations by a higher Court in the Judgments in personal injury claims for WRULDs which have been accumulated so far.

This exploratory study suggests that in some circumstances following HSE guidance might be doing more than enough to comply with the law but that if the guidance does not adequately address the common law duties or if it is not being uniformly interpreted, following HSE guidance might not be doing enough to comply with the law.

This exploratory study demonstrated that a web site can assist in generating and disseminating information on Judgments in personal injury claims and that the analysis of such Judgments can produce findings on a range of issues which might be of interest and practical use to those who

draft guidance. It is recommended that the web site should be maintained and efforts made to improve its effectiveness such that the procurement and analysis of Judgments in personal injury claims for WRULDs can be continued and that consideration should be given to exploiting the web site to promote awareness of the possible consequences of failing to follow guidance and comply with health and safety Regulations. Consideration might also be given to applying a similar approach to other risks, e.g. work-related stress.

# 1 INTRODUCTION

## 1.1 BACKGROUND

Recent HSE guidance has included an introductory paragraph which states:

*This guidance is issued by the Health and Safety Executive. Following the guidance is not compulsory and you are free to take other action. But if you do follow the guidance you will normally be doing enough to comply with the law. Health and safety inspectors seek to secure compliance with the law and may refer to this guidance as illustrating good practice.*

However, employers' duties to employees are to be found in both the criminal and common law. Failure to comply with health and safety Regulations can result in the criminal prosecution of an employer by the enforcement authority. However, health and safety Regulations can also be used to assist an employee bringing civil proceedings against an employer for a personal injury arising from work. The available evidence would appear to suggest that some of the health and safety Regulations which might be considered most pertinent to the prevention of Work Related Upper Limb Disorders (WRULDs), e.g. the Health and Safety (Display Screen Equipment) Regulations and the Manual Handling Operations Regulations, have probably been examined more often and in more depth in the civil Courts than in the criminal Courts.

HSE Statistics suggest that, so far, there has been no criminal prosecution of an employer for breaches of the Health and Safety (Display Screen Equipment) Regulations and that only a relatively small number of employers have been prosecuted for breaches of the Manual Handling Operations Regulations. The Prosecutions Area of the HSE's web site provides information on 7 successful prosecutions for breaches of the Manual Handling Operations Regulations, but none prior to September 1999.

HSE guidance documents are sometimes examined in minute detail when personal injury claims for WRULDs reach trial and considerable time has been spent in some cases examining precisely what was meant by certain parts of the Health and Safety (Display Screen Equipment) Regulations and the Manual Handling Operations Regulations. Courts sometimes rely heavily on HSE guidance documents to assist in determining what a prudent employer should have known, but jealously guard the right to determine how Regulations should be interpreted and what constitutes an 'injury' in a legal sense. Anecdotal evidence suggests that, in the context of personal injury claims for WRULDs, in some cases the Courts' interpretations of certain health and safety Regulations and what constitutes an 'injury' in a legal sense might not be entirely consistent with what might reasonably be expected, by a lay person, reading HSE guidance.

While personal injury claims for upper limb disorders allegedly arising from work are not receiving as much publicity as they did several years ago, it is clear that the Courts are still dealing with many such cases. However, when such claims have attracted publicity, the press reports give an extremely limited and partial view of what is happening in the Courts with respect to WRULDs<sup>1</sup>. The vast majority of claims for WRULDs never reach Court and those which do are usually heard in the County Courts. Very few County Court Judgments appear on legal databases. It appears that most County Court Judgments are not even transcribed by official Court reporters, unless one of the parties has a particular reason to request a transcript, e.g. to consider an appeal. Thus, in the majority of WRULD claims which do reach Court, little

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<sup>1</sup> Pearce, B. G. "RSI" and the media Occupational Health Review. 1995, Issue 57



is currently known about how the Court reached its verdict, other than by those who actually attended the hearing.

## **1.2 AIMS & OBJECTIVES**

The primary aim of the study was to examine how the Courts have interpreted health & safety Regulations and HSE guidance in the context of personal injury claims for WRULDs by analysing the transcripts of relevant Court Judgments. However, given that there is no central archive or index of such Judgments and the limited coverage of the legal databases, the first requirement was to set up a system which encouraged the reporting of such cases and captured information on any relevant Judgments, such that the transcripts of these Judgments could be obtained, if necessary by paying for Judgments to be transcribed.

## **1.3 APPROACH ADOPTED**

There already exist a number of networks for the exchange of information on such Judgments, however, these tend to be very informal and clearly do not record the information in a consistent or rigorous way. A novel medium which encouraged the exchange of information on such Judgments was developed, a web site, which summarised known Judgments and invited lawyers, expert witnesses, and litigation specialists in insurance companies and trades unions to supply details of decided cases. It was envisaged that it would be the lawyers and their clients and expert witnesses on the 'winning side' who would be most willing to volunteer information on previously unreported cases which had been decided on the basis of evidence heard in Court.

Prior to the commencement of this exploratory study, information on over 100 claims for WRULDs, dating back to 1977, had already been obtained by tapping into the informal networks. To record this information and new information about previously unreported cases in a consistent or rigorous way and to keep track of the sometimes complex process of obtaining a transcript of a Court Judgment a bespoke database was developed. This database was also used to generate and update the web pages. It was originally envisaged that the content analysis would be based upon data entered into the database. However, after a pilot analysis of a small sample of the Judgments to refine the categories and criteria to be used in the content analysis, it was decided to enter the data obtained from analysing the content of Judgments into an Excel spreadsheet which allowed a more flexible approach to data analysis.

It should be noted that while the materials analysed arise from legal proceedings and at times address complex legal matters, the analysis does not adopt a legal perspective or attempt to interpret the legal arguments or the law. Rather the approach adopted attempts to address the issues from a lay perspective and in particular attempts to examine whether, in the context of personal injury claims for WRULDs, the Courts' views on health & safety Regulations and HSE guidance are consistent with what might reasonably be expected, by a lay person, reading HSE guidance.

## **1.4 TERMS USED**

It is perhaps useful at this early point to note that up until April 1999 an individual bringing a personal injury claim in England and Wales was known as a Plaintiff. A programme of reforms to the civil justice system implemented in April 1999, based upon a report by Lord Woolf and known as the Woolf reforms, among others things, caused an individual bringing a claim to be known as a Claimant.

The term WRULD encompasses all the conditions of the upper limbs, shoulders and neck which are popularly referred to as "repetitive strain injuries". While in a literal sense there is no reason why the term WRULD should not encompass Hand Arm Vibration Syndromes (HAVS), for

some reason HAVS have often been treated as distinct entities, e.g. in HSE guidance. This exploratory study excluded consideration of claims for HAVS, though a similar approach could clearly be applied to such claims.



## 2 WEB SITE DEVELOPMENT AND EVALUATION

### 2.1 DEVELOPMENT

Given that the web site was a research tool to assist in gathering information, it needed to attract those who had the information and be of use to them and easy to use. Thus, the web site needed not only to provide facilities to collect information but also to provide information to encourage lawyers and their clients and expert witnesses to visit the site and contribute their information. It was decided at an early stage that the web site could not display the full text of the Judgments. This was due to: issues associated with copyright; the size of some such Judgments and the effort required to scan them in; and the fact that the web site was not intended to be, and could not be seen to be, in competition with the commercially available legal databases. It was decided that, where available, a reference for the full text of a Judgment or where it had been officially reported could be displayed, but it was known that few such Judgments had been officially reported. Searches of the literature and the world wide web failed to identify any other research project or a web site which had similar aims and objectives. Thus, apart from generic guidelines on the formatting of web pages and the general principle of software ergonomics, there was little to guide the choice of the content or the 'look and feel' of the web pages.

Following discussions with those who had provided information on Judgments in claims for WRULDs via the informal networks, a 'wish list' of the desirable features of the proposed web site was drawn up. This identified the data set which would be required for each case summary and the basic functionality of the site, e.g. the rules for navigating through the site. However, it was clear from experiences of following up 'leads' on unreported cases and trying to track down Judgments that the database from which the web pages were to be generated and updated needed to record far more information about a case than would actually be presented on the web site and that a rigorous information and document control system was required. For example, experience had shown that one of the most successful ways of obtaining a transcript of a Judgment was to make contact with the instructing solicitor on the 'winning' side. However, this requires not only the name of the firm of solicitors, but also the name of the individual who dealt with the case and their contact details.

The 'wish list' of the desirable features of the proposed web site and the data set which would be required for each case on the database was provided to the team responsible for developing the database and the web site.

The bespoke database was developed using Microsoft Access software. The database was designed not only to store the information about cases but also to allow reports and summaries to be produced to keep track of the process of obtaining transcripts of Judgments. The database includes the facility to generate all of the HTML code that makes up the web pages, which are transferred directly to the server which hosts the web site.

The development of the web pages utilised the standard tools available at the time and attempted to accommodate a wide range of browser/platform configurations and browsing contexts. Cascading style sheets were used to ensure consistency in the 'look and feel' of the pages and particular attention was paid to the navigation facilities to allow users to keep in control of their interaction with the data and to avoid them getting lost. The use of colour and graphics were deliberately kept to a minimum in an attempt to ensure that the design acted foremost as a vehicle for the presentation of the data, structuring the information for accessibility and legibility. Where colour and graphics were deployed, they were chosen and

designed for web-compatibility and speed. Free text searching of the pages is provided by the Excite search engine of the system which hosts the web site.

It was originally planned that an initial version of the web site would be made available to a limited audience in February 2000, to evaluate the utility and usability of the web pages, and that unrestricted public access would begin in March 2000. However, it was agreed with the HSE's officer responsible for technical liaison that the web site should not be made publicly available until after certain contractual matters had been finalised, which did not happen until late May 2000. Letters were sent out in June 2000 to over 100 individuals who had contributed information on WRULD claims via the informal networks inviting them to examine the web site, which was password protected, and to comment on the utility and usability of the web pages. A number of problems relating to some of the less common browser/platform configurations were reported and corrected. A number of suggestions for improvements to the layout and functionality of the web site were also received. Where resources permitted some of these suggested changes were implemented, while others were added to a list for further evaluation and possible future implementation. The password restriction was removed towards the end of June 2000.

Details of the web site were submitted to the search engines in the usual way even though 'surfing the net' was not considered the most likely route by which those who potentially had some useful information to contribute might learn of the web site.

The HSE's press office issued a press release<sup>2</sup> on the 10th July 2000, which explained the purpose of the study and the existence of the web site.

## **2.2 IMPLEMENTATION**

The web site can be viewed at: <http://www.lboro.ac.uk/wruld-db>

The web site provides brief reports on nearly 200 Judgments in WRULD claims which have been decided on the basis of the evidence heard in Courts in England and Wales. These date from as far back as 1977, though the coverage prior to 1990 is limited. The exploratory study, and thus the web site, is confined to claims which had been decided on the basis of evidence heard in Court, which excludes Out-of-Court settlements and Agreed Awards. The information currently available on the site is limited to a brief summary of each case which includes, where known: the name of Claimant and the Defendant; a brief description of the allegedly injurious work and the alleged injury; the names of the lawyers and experts involved; and the outcome of the case.

The cases summarised on the web site can be listed by date of Judgment or by name of Claimant or by name of Defendant. A search facility is provided, which allows all the information held on all the cases to be searched for a particular name, word or phrase. However, because some upper limb disorders have a variety of names and spellings the terms used for the most commonly encountered conditions have been standardised in a glossary of search terms. The different types of allegedly injurious work have also been standardised in a glossary of search terms.

Visitors to the web site are invited to send in details of cases which were decided on the basis of the evidence heard in Court by completing a Case Report Form, which can be downloaded or completed on-line. The information currently available on the web site has been gathered from a wide variety of sources and verified where possible against a transcript of the Judgment.

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<sup>2</sup> E123:00 *Court judgments at the click of a button as new health and safety website is launched*

However, in some cases it has not been possible to obtain a transcript of the Judgment. Transcripts often contain errors in the spelling of names and sometimes omit information which ideally should be included in a case summary. A facility has therefore been provided which allows visitors to the web site to submit further details about a case already mentioned on the web site.

### 2.3 RESPONSES TO THE WEB SITE

The number of reports of previously unknown cases and the number of reports of additional information on known cases received via the web site compared with the numbers received via the informal networks during the first year in which the web site has been publicly available is shown in Table 1.

**Table 1** Number of reports received during year ending 30th June 2001

<i>Type of report</i>	<i>Via web site</i>	<i>Via informal networks</i>	<i>Totals</i>
Previously unknown case	4	22	26
Additional information on known case	9	38	47
Totals	13	60	73

Reports of previously unknown cases contributed directly via the on-line Case Report Form provided on the web site accounted for 15% of the new cases reported during the year ending 30th June 2001. No reports were received on downloaded Case Report Forms. Reports of additional information on known cases contributed directly via the Amend Case Report Form provided on the web site accounted for 19% of such reports. No reports were received on downloaded Amend Case Report Forms. It is impossible to say whether or not the information reported via the web site would eventually have been captured via the informal networks. Virtually all these reports were from individuals who had not previously reported information via the informal networks, though some of them could be described as known potential sources of information.

In addition to the information received on new and known cases there were 9 comments/enquiries received via the facilities provided on the web site. This was considerably less than expected given that compensation for 'RSI' and related matters has been such a popular topic in the media and that the web site is available to the general public. This lack of popular comment and enquiries suggests a lack of awareness and perhaps reflects the disappointing response in the media to the HSE's press release which explained the purpose of the study and the existence of the web site. The lack of response to the press release in the professional and specialist press was particularly surprising.

### 2.4 EVALUATION OF THE WEB SITE

Given that no other web site has been identified which has been developed for a similar purpose there are no obvious benchmarks against which it can be compared. At an early stage in the development of the web site consideration was given to how to assess its effectiveness as a research tool. It was known that the system which was to host the web site recorded, among other things, the number of 'hits' which particular pages receive. However, the advice received at the time was that these statistics were virtually meaningless. For example, the 'hit rate' for particular pages did not distinguish between ten people each visiting a page once and one person visiting the same page ten times. Moreover, it can be argued that what matters in the context of the web site as a research tool is not how many people visit the site but how many of those who visit the site potentially have some useful information to contribute and how many of those who potentially have some useful information to contribute actually contribute when they do visit the site. To use 'hit rate' statistics to judge the success of the web site is to fall into the

trap of assuming that that which is readily available measures something useful, whereas in this context, that which ideally should be measured is much more difficult to measure accurately.

It was recognised at an early stage in this exploratory study that the only other readily available statistics, the number of responses of various types received directly via the facilities provided by the web site, would also be of limited use in assessing the effectiveness of the web site for several reasons. Firstly, there were no detailed year-on-year statistics on the number of reports received via the informal networks prior to the commencement of the study. Secondly, the process of canvassing those who had provided information via the informal networks to develop the 'wish list' of the desirable features of the proposed web site inevitably drew attention to the overall aims of the exploratory study and the need to report cases prior to the facilities to make such reports becoming available via the web site. Thirdly, the effectiveness of the web site is, in part, dependant upon those who potentially have some useful information to contribute actually being aware of the site. Fourthly, the web site was never intended to replace the informal networks or expected to be a prolific source of new cases. It was envisaged that the web site would augment the informal networks but capture information more quickly and in a more consistent and rigorous way. However, in the absence of any web site which had similar aims and objectives no meaningful target or even guesstimate for the number of responses the web site might generate could be made. When it was launched, it was known that the web site provided information on a much larger number of Judgments in claims for WRULDs than any other known source, e.g. the commercially available legal databases. However, there was no way of knowing how many Judgments of this type were yet to be identified.

A telephone survey of a sample of those who had reported information via the informal networks, but who were known to be aware of the study and the facilities for submitting reports via the web site, suggested that some felt 'more comfortable' picking up the telephone or dictating a letter or even sending an email than completing an on-line report form. Their response to the web site was generally extremely positive, but it was suggested that the Case Report Form requested a "formidable" amount of information and that even if the case papers were readily to hand, which often they were not, it was easier just to dictate a quick letter with the basic facts. Some also appeared to believe, erroneously, that any information they submitted via the facilities provided on the web site would actually update the web site immediately which inhibited them contributing.

The overall impression gained from talking to those who had submitted information either via the informal networks or via the web site was that the majority of those who had information to contribute, usually solicitors and expert witnesses, are more used to dictating letters than completing on-line report forms. However, what appears to have happened is that even though most did not use the facilities provided on the web site to submit information, the existence of the web site had stimulated them to put pen to paper, or more often mouth to dictating machine, to contribute information. While there are no detailed year-on-year statistics on the number of different types of report received via the informal networks prior to the commencement of the study, it is clear that the total number of reports from all sources has increased significantly since the web site has become available. There is also no doubt that the web site has captured and presented the information in a more consistent and rigorous way.

While it was hoped that the web site would assist in capturing information on any relevant Judgments as or very soon after they occur, there is no evidence that it has done so more quickly than the informal networks. What the web site has done is to demonstrate to those who contribute information that their efforts are valued and that the information is used to provide a readily accessible and searchable resource which they can use for their own purposes. Thus, while the web site cannot be said to have generated much new information directly it appears to have encouraged reporting of useful information via other routes and has certainly assisted by

providing a readily accessible and efficient means of providing information on personal injury claims for WRULDs.

One of the most sophisticated web search engines, Google, has recently made the web site the first item on the found list when 'WRULD' is used as the search term. Google describes its PageRank software in the following way:

*PageRank relies on the uniquely democratic nature of the web by using its vast link structure as an indicator of an individual page's value. In essence, Google interprets a link from page A to page B as a vote, by page A, for page B. But, Google looks at more than the sheer volume of votes, or links a page receives; it also analyzes the page that casts the vote. Votes cast by pages that are themselves "important" weigh more heavily and help to make other pages "important".*

*Important, high-quality sites receive a higher PageRank, which Google remembers each time it conducts a search. Of course, important pages mean nothing to you if they don't match your query. So, Google combines PageRank with sophisticated text-matching techniques to find pages that are both important and relevant to your search. Google goes far beyond the number of times a term appears on a page and examines all aspects of the page's content (and the content of the pages linking to it) to determine if it's a good match for your query.*

In other words, the web site has grown in stature and is currently regarded as an important, high quality site. However, it will only remain so if it is regularly updated.

## **2.5 CONCLUSIONS AND RECOMMENDATIONS**

This exploratory study has demonstrated that a web site can assist in generating and disseminating information on Judgments in personal injury claims. The study did not embark with any predetermined target for the reporting of new cases or criteria for 'success'. The web site has clearly been successful in generating information on some previously unknown Judgments, albeit a small number of such cases, and in providing additional information on some known cases. However, perhaps its most important role, from a research perspective, has been to provide a focus, a purpose, which encourages those who have information to contribute actually to contribute. The overall response to the web site, which has been publicly available for only about a year, has been very positive. However, there is clearly scope for improving the effectiveness of such a web site.

Given that others may wish to use a similar approach and that one of the recommendations arising from this exploratory study (see Chapter 7) is that the procurement and analysis of Judgments in personal injury claims for WRULDs should continue, i.e. that the web site should be maintained, there follows a number of recommendations for how the effectiveness of such a web site might be improved and the web site exploited.

### **2.5.1 Promote awareness of the web site**

It is perhaps stating the obvious to note that unless those who potentially have some useful information to contribute via the web site are somehow made aware of its existence, they will not contribute. While there is no hard evidence to suggest that the effectiveness of the web site has been seriously undermined by a lack of awareness, the frequent discussions with those in the informal networks continue to identify some who are unaware of its existence. It is unclear why the HSE's press release which explained the purpose of the study and the existence of the web site produced only a very limited response in the media. It is acknowledged that the web



site would probably not be considered sufficiently newsworthy on its own to merit coverage in other than the professional and specialist press. However, the trade and popular press have regularly carried stories about large awards for "RSI" and might reasonably have been expected to have added a reference to the web site at the end of such a story. It so happened that the public launch of the web site was delayed. Had it gone ahead as originally planned, it might well have coincided with the considerable coverage given to the £243,792 damages awarded to Fiona Conaty in her "RSI" claim against Barclays Bank in April 2000. With the benefit of hindsight, it can be suggested that perhaps more emphasis should have been placed on promoting awareness of the web site. Suggestions for promoting awareness of the web site include:

### ***Further press releases***

While the trade and popular press should probably not be considered the primary target for any further press releases, it can be argued that many of those who potentially have some useful information to contribute to the web site will read the trade and popular press and that in this context any publicity is good publicity. A further press release should perhaps focus particular attention on the professional and specialist press read by those who potentially have information to contribute.

### ***Articles in professional and specialist press***

Now that there are some results available from the analysis of Judgments it should be possible to 'place' articles in the professional and specialist press read by those who potentially have information to contribute.

### ***Talks at seminars and conferences***

The web site was demonstrated at a number of seminars and conferences attended by lawyers and health and safety specialists. Further opportunities to present the results of the analysis and demonstrate the web site to appropriate audiences should be sought out.

### ***Develop on-line links to related sites***

Discussions have taken place with a number of organisations which run (not for profit) web sites with which it might be appropriate to arrange reciprocal links. However, one of the inhibitors to actually setting up any such links has been the uncertainty surrounding the future of the web site developed by this exploratory study.

## **2.5.2 Explore ways of improving the utility of the web site**

From the perspective of those at whom the web site is primarily targeted, i.e. users who potentially have some useful information to contribute, the web site can be viewed as having costs and benefits. The costs are the time and effort required to contribute information, the benefits are the uses they can make of the system. Increasing the benefits and/or reducing the costs to the users, albeit at a cost to the provider of the web site, should increase the benefits to the provider, i.e. produce more and better quality reports. However, at present, there is no link between the costs and benefits to the user. Users can extract information without contributing anything. Moreover, at present, there is no way of knowing: who is visiting the site; how many of those who visit the site potentially have some useful information to contribute; or why they do not contribute. It is suggested that a more structured analysis should be made of the users' perceptions of the costs and benefits and the reasons for non use. Thus, areas for further investigation include:

### ***Introducing a visitor registration system***

Visitor registration screens are usually associated with e-commerce and subscription based services, but there appears to be no reason why similar techniques should not be used by a free

service to capture information about its 'customers' and their email addresses. This should provide an indication of who is visiting the web site and a route by which a dialogue can be established with those who potentially have some useful information to contribute.

### ***Reducing the effort required to contribute information***

The considerable amount of information requested in the Case Report Form should be reviewed and potential contributors made aware that not all the fields have to be completed. Consideration might also be given to the introduction of a 'Quick Case Report Form', to reduce the burden of reporting, and a 'Recent Trial Report Form', to encourage reporting of cases as they occur.

### ***Increasing the benefits to users***

While it was decided for the reasons outlined above that the web site would not display the full text of the Judgments, it is clear from discussions that many would like more detailed case summaries. Consideration should be given to what users would like to see in a more detailed case summary and the possibility of incorporating links to organisations which can provide at no cost the full text of (the few) Judgments which are available on-line. Consideration might also be given to providing some sort of reward or incentive to those who contribute new information. For example, by providing them with an email alert announcing that the web site has been updated.

## **2.5.3 Improve the usability of the web site**

While the design of the web site placed considerable emphasis on ensuring that it was easy-to-use a number of suggestions have been made by respondents about how the interface might be improved. It should also be noted that web site design tools are developing very rapidly and that these may also offer ways of improving the interface. However, no amount of tweaking of the interface will improve the effectiveness of the web site if those who potentially have some useful information to contribute are unaware of its existence or do not perceive the benefits it offers.

## **2.5.4 Exploiting the web site**

While the web site was primarily developed as a research tool, a mechanism for generating information on previously unknown cases and disseminating information on known cases, it could also be used to promote awareness of the possible consequences of failing to follow guidance on WRULDs. In this context, it is noted that a recent evaluation of the Manual Handling Operations Regulations and guidance<sup>3</sup> identified 'Fear of compensation claims' as one of the greatest motivators for both large organisations and SMEs to implement the Regulations. It would seem reasonable to suggest that promoting awareness of the possible consequences of failing to follow guidance on WRULDs and Health and safety Regulations should encourage both large organisations and SMEs to comply with HSE guidance and Regulations.

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<sup>3</sup> *Second Evaluation of the Manual Handling Operations Regulations (1992) and Guidance*. Contract Research Report 346/2001. HSE Books.



## 3 IDENTIFYING AND PROCURING JUDGMENTS

### 3.1 SOURCES OF INFORMATION ON JUDGMENTS

Information about the outcome of a trial of a claim for a WRULD can arise from a wide variety of sources. Reference has already been made to the informal networks of lawyers, expert witnesses, and litigation specialists in insurance companies and trades unions who have provided much of the information and in many cases copies of Judgments referred to on the web site. A number of the expert witnesses who were aware of this exploratory study have regularly volunteered information on cases in which they have been involved either by telephone or in writing and occasionally via the facilities provided on the web site. However, the majority of the contributions from the informal networks have arisen from soliciting information from personal contacts gained from the experiences of the author of this report as an expert witness in such claims.

Another source of information has been reports in the popular and trade press. However, experience has shown that no reliance can be placed on the accuracy of such press reports. One of the best illustrations of this is to be found in the press coverage in October 1999 of the compensation awarded to a factory worker for an injury caused by putting the toppings on pizzas. In the *Daily Mail* on the 20th October 1999, under the headline **Pizza-topper who got RSI wins payout of £191,000**, it was suggested that "Maria Wilson, 52, was last night celebrating what is believed to be the highest ever RSI compensation payout in Britain" and that "Mrs Wilson developed the condition while employed in the special products division of the Pork Farms factory in Beeston, Nottingham, putting toppings on pizzas." On the basis of the reports in the *Daily Mail* and other national papers it would not be unreasonable to assume that: the Claimant was Maria Wilson; the Defendant was Pork Farms; the Claimant had some condition affecting her upper limbs; and that Judgment was given some time in October 1999.

Extensive enquiries subsequently tracked down the Judgment in this case which showed that: the Claimant was Maria Mility; the Defendant was F W Farnsworth Limited; and that the Claimant had symptoms in her neck and had been diagnosed as suffering from Cervical Spondylosis. A letter from the Defendant's solicitor stated: "I can confirm that Judgment was given in this case on 22 December 1998 wherein His Honour Judge Orrell indicated the various amounts he would award in respect of the head of damages. Judge Orrell was not able to hand down the Judgment on that day and accordingly there was a stay of execution on the damages. There then followed a 8 month delay before the parties received the written Judgment and after the appropriate length of time had elapsed signifying the Judgment would not be appealed, this case was then extensively publicised by both the Claimant's Solicitors and the Union."

One of the medical experts in this case had in fact submitted a brief report in December 1998 which identified the Claimant as Maria Mility and the Defendant as F W Farnsworth Limited and helpfully provided the name of the Defendant's solicitor. This information had been entered into the database and efforts made to track down the Judgment. The Defendant's solicitor was contacted and indicated in a letter in February 1999 that the written Judgment was not yet available. Following the press reports in October 1999 a letter was sent to the Claimant's solicitor requesting a copy of the Judgment, which was received in December 1999. It only became clear on receipt of the Judgment in December 1999 that the case which had been reported in December 1998 by one of the medical experts and the case which had been reported in the press in October 1999 were one and the same.

The providers of the commercially-run legal databases have assisted by providing limited periods of free access for research purposes. Searches of these databases identified some new

information on a few known cases but confirmed that the web site provided information on many more Judgments in claims for WRULDs than any of the databases. The web sites of the Court Service, the House of Lords and Smith Bernal which provide on-line access to House of Lords, Court of Appeal and some High Court Judgments have also been searched on a regular basis for relevant cases.

### **3.2 PROCURING A COPY OF A JUDGMENT**

The case of *Maria Mility -v- F W Farnsworth Limited* illustrates that tracking down a copy of a Judgment can be a long and complicated process. In that case the Judge eventually handed down a written copy of the Judgment. Such long delays are uncommon but it is also unusual for Judgment to be given immediately following closing submissions. The trial of claims for WRULDs are often long and complex and Judges understandably need time to prepare their usually extensive and carefully worded Judgments. Thus, Judgment is normally Reserved, which means that the Judgment is delayed for days, weeks or even months. In some cases the Judge then hands down a written copy of the Judgment, which usually has been word-processed but can contain hand-written corrections. Sometimes they are signed and dated, sometimes not.

When Judgment has not been Reserved and when no written Judgment has been handed down, Counsel and/or solicitors usually attempt to take notes as the Judgment is read out and may subsequently produce an 'Attendance Note' or a 'Note of Judgment', but this is not a verbatim record. If the Judge has not handed down a written copy of the Judgment and for some reason one of the parties wishes to examine the Judgment in detail, for example to consider whether or not to appeal, the tape recording of the oral delivery by the Judge has to be transcribed by an official transcriber. Thus, a request to a solicitor for a copy of a Judgment can result in an 'Attendance Note' or a 'Note of Judgment', a written copy of the Judgment prepared by the Judge or an official transcript of the Judgment. However, it often transpires that no official record of a Judgment exists. This is typically the case in County Court hearings.

The process of trying to obtain an official transcript of a Judgment some considerable time after the event can be fraught with difficulties. The request has to be made to the Court on a special form which requires, among other things: the names of the parties involved; the location of the Court in which Judgment was given; the date Judgment was given; and the case number. Obtaining the correct names of the parties involved is usually not a problem. However, the location and precise date on which Judgment was given can be elusive, particularly if Judgment was Reserved. The situation can arise in which the hearing of a case starts off in one Court and gets adjourned part heard, then resumes some weeks later with the same Judge but in a different location. It is also not unknown for a Reserved Judgment to be given in a different Court to that in which the case was heard. However, it is the lack of the case number which is the most common stumbling block. Each Court seems to have its own system of case numbering, some are two alpha followed by a string of numerics, others include a year. The case number appears on the pleadings, but it is neither memorable nor of any significance to most of those involved in a case. The only time the case number is of relevance, and then it is vital, is when applying for an official transcript of a Judgment.

By the time it is known that an attempt needs to be made to have a Judgment transcribed most of the information required by the form by which the request is made to the Court is usually to hand and contact has usually been made with the solicitors acting for at least one of the parties, who will usually provide any missing information. However, if the solicitor who handled the case has left the firm or the case papers have been archived, it may prove impossible to obtain all the information necessary for the Court to locate the tapes which need to be transcribed. Experience has shown that Court offices vary greatly in their efficiency and willingness to retrieve the tapes of old cases and appear to have different policies about the number of years

for which they retain tapes. In some cases, correctly completed requests have been returned with a note to the effect that the tapes cannot be located, in others it transpires that the Judgment has already been transcribed and a copy is provided on payment of the photocopying costs.

If the tapes can be located by the Court they are sent to the official transcriber who has been nominated on the form by which the request is made to the Court. The official transcriber transcribes the Judgment and sends the draft transcript and tapes back to the Court for the transcript to be approved by the Judge. Once approved, the transcript is returned to the transcriber who sends it to the party making the request together with an invoice. In one case in which a request had been made for a Judgment to be transcribed, the Judge, on receiving the draft transcript for his approval, asked why the transcript had been requested. A copy of the HSE's press release explaining the purpose of the study was sent to the Court. The Judge declined to approve the transcript and thus the Judgment was not provided.

In summary, there are sometimes lengthy delays: between the end of the hearing of evidence and Judgment being given; between Judgment being given and knowing the Judgment has been given; and between knowing the Judgment has been given and actually obtaining a copy of the Judgment.

### **3.3 QUANTIFYING THE ACCUMULATING JUDGMENTS**

In preparing their Judgments, Judges vary greatly in the style which they adopt, the extent to which they rehearse the evidence and Counsels' arguments and the extent to which they explain their findings on injury, causation, liability and quantum. Most cases involving one Claimant result in a Judgment of usually about 5,000 to 7,000 words, but some reach over 10,000 words. Judgments in appealed cases usually rehearse the pertinent findings but rarely address all the issues considered at first instance. Nevertheless, Judgments in appealed cases often exceed 10,000 words. In the minority of cases in which there is more than one Claimant Judgments can run to 25,000 words or more.

The size and content of Judgments are also influenced by the extent to which the parties dispute injury, causation, liability and quantum. It is important to note that claims evolve over time, most rapidly and most significantly during a trial. Perceptions of the relevance and significance of the statements of the lay witnesses and the opinions of the expert witnesses can be changed in the adversarial atmosphere of the Court. Issues which appeared significant at the start of the trial are discarded and concessions made in closing submissions. The extent to which the parties dispute injury or causation or liability or quantum can change significantly. Judgments often allude to such changes which can result in evidence and arguments which took up hours or even days of Court time being covered in a Judgment in one paragraph.

The Judgments which have been accumulated, so far, date back to 1977 and occupy in excess of one metre of shelving and are estimated to contain a total of around one million words. No attempt has been made to count the total number of words accurately.

Identifying and procuring copies of Judgments in claims for WRULDs can be viewed as a continuous process for which it is impossible to determine performance criteria, given that there is no way of knowing at any particular point in time how many Judgments of this type are 'out there' and yet to be identified. It follows, that there is no way of knowing whether the 'sample' of Judgments which is accumulating is representative of all such Judgments. All that can be said is that, at a particular point in time X cases have been identified in which it is known or believed that Judgment has been given and that it is hoped that Y of these Judgments might be obtained and that Z of them have been. Experience has shown that X, Y and Z change weekly, some times daily. It will be noted that such statements implicitly acknowledge that it is difficult,

sometimes impossible, to obtain copies of some Judgments, particularly County Court Judgments in cases which are more than about two or three years old.

## 4 WHICH ISSUES AND JUDGMENTS TO EXAMINE?

### 4.1 INTRODUCTION

Given the novel features of this research, it was perhaps inevitable that as the study progressed questions would arise about which issues should be examined and what might be achieved. The opening paragraphs of the County Court Judgment in the case of *Lee -v- Vauxhall Motors Ltd* in September 1994 provide a fitting introduction to a discussion of the issues which might be examined and what might be achieved by analysing Judgments. The Claimant in this case alleged that she had suffered Trigger Finger from using an air-operated cone sander, however, the opening paragraphs of this Judgment are indicative of the range of issues addressed in the Judgments in claims for WRULDs.

*The claim involves an injury which is said to come within the category of repetitive strain injury (RSI), or Work Related Upper Limb Disorders (WRULD). The simple elegance of the first letters and the sheer ugliness of the second do not appear to prevent the increasing use of WRULD. Despite efforts by Counsel to prevent the emergence of evidence of the general controversy it was perhaps inevitable that the Doctors were unable entirely to avoid it.*

*The essence of this is whether the area of RSI/WRULD is restricted to specific conditions about which there is sufficient evidence to show they are caused by or related to work, or, whether there is any overall type of condition or group capable of bearing a distinct diagnosis as RSI or WRULD. Having looked no doubt at a tiny part of the literature on the subject I suspect that increasing use of the phrase WRULD points to the way the controversy will in the end be resolved. So fast has progress been certainly over the last five years in identifying disorders as work related, so rapid the growth of formal guidance and regulation that in the end I imagine the controversy in its pure form will wither on the vine. For the moment however there is some life in it and in an adversarial system its continued existence plainly influences the approaches of experts concentrating their gaze on novel problems involving either the symptoms or the work done, or the matching of the one to the other. When you relate this to areas of industrial work outside existing experience it is inevitable that one runs into significant problems of causation and foreseeability.*

*The gathering pace of information and concern can be seen from a direct comparison of the HSE MS10 document in 1977 and the HSE Guide of 1990. The one is tiny, the other substantial. In January 1993 six sets of Health & Safety Regulations were brought into operation all of which bear to some extent on RSI/WRULD. Last year the HSE published a major study as part of its survey of the labour force. On the 30th March this year the TUC published a Guide for assessing WRULD risks. There is much more.*

*It seems to me that whatever criticisms there may be over the methodology this area of industrial and workplace disorders has acquired a significant momentum of its own, and, spurred on by the European Commission, the Government has by the 1992 Regulations imposed considerable changes in the way that employers will henceforth be obliged to manage the organization of work.*

### 4.2 DETERMINING THE SCOPE AND SCALE OF THE ANALYSES

Reference has already been made to the fact that Judgments vary in size and content and the extent to which they consider injury, causation, liability and quantum. The Judgments can be viewed as a series of case studies, rich in data. However, unlike many such series the data sets are not homogeneous and have numerous missing fields. All of the Judgments might raise interesting issues, but for different reasons. It was originally proposed that the analysis would consider: the nature of the injuries for which damages were claimed; the circumstances in which



the alleged injuries occurred; and the references to HSE guidance and health & safety Regulations. However, given the novel features of this study, at its outset it was unclear what might prove to be of interest and whether the analyses originally proposed would be likely to produce findings of any practical use. It was therefore agreed with the HSE's officer responsible for technical liaison that an initial analysis of a sample of Judgments should be undertaken to explore the issues which might be of most interest and practical use and the ways in which the Judgments should be analysed and the results presented.

### 4.3 INITIAL ANALYSIS OF A SAMPLE OF JUDGMENTS

The sample of Judgments chosen for this initial analysis were claims for WRULDs arising from what might broadly be described as office work. Claims of this type were chosen for several reasons. Firstly, the 35 cases of claims associated with office work were a distinct group which offered an appropriately sized sample of Judgments dating back to the early '90s. At the time, they represented about a quarter of all the Judgments that had been obtained, some of which dated back to the late '70s. Secondly, the allegedly injurious work, mostly DSE use, had been the subject of HSE guidance for some considerable time. Thirdly, the allegedly injurious work in most of the cases was potentially subject to specific statutory duties, the Health and Safety (Display Screen Equipment) Regulations. Thus, this sample of Judgments seemed likely to contain references to all the issues which it was originally proposed the analysis would consider.

One of the most significant findings to emerge from the initial analysis was that the minimum time between the alleged onset of injury and Judgment being given in the claims associated with office work was about four years, the average was over six years. This finding clearly had implications for what subsequent analyses might achieve. For example, with respect to analysing how the Courts have interpreted health and safety Regulations, it appeared unlikely that Judgments prior to 1997 would contain anything of relevance. With respect to HSE guidance, for example HS(G)60 which was published in late 1990, it appeared unlikely that any significant references would be found in Judgments prior to 1995.

Similarly, it appeared unlikely that any of the Judgments would make significant references to most of the industry specific guidance produced by the HSE or in association with the HSE, e.g. *Checkouts and musculoskeletal disorders*<sup>4</sup>, *Work related upper limb disorders in the printing industry*<sup>5</sup>, *Picking up the pieces Prevention of musculoskeletal disorders in the ceramics industry*<sup>6</sup>, given their date of publication. It was originally envisaged that the Judgments might be analysed by industry sector, at least for those sectors for which industry specific guidance had been produced, but there seemed no point in so doing, if the Courts were only just considering cases in which the industry specific guidance might possibly be cited.

Moreover, the initial analysis of the Judgments in claims associated with office work painted a complex picture with respect to the issue of how the Courts are interpreting HSE guidance. Even though much of the allegedly injurious work had been the subject of specific HSE guidance for some considerable time, e.g. *Visual Display Units*<sup>7</sup>, *Working with VDUs*<sup>8</sup> and *Display Screen Equipment Work*<sup>9</sup> arguably less relevant guidance, e.g. *Guidance Note MS 10*<sup>10</sup> and *Work*

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<sup>4</sup> IAC/L91. May 1998

<sup>5</sup> Printing Industry Advisory Committee March 1994

<sup>6</sup> Ceramics Industry Advisory Committee September 1996

<sup>7</sup> HSE. *Visual Display Units*. 1983.

<sup>8</sup> HSE. *Working with VDUs*. 1986. IND(G) 36(L)

<sup>9</sup> *Display Screen Equipment Work*, Health and Safety (Display Screen Equipment) Regulations 1992, Guidance on Regulations L26. November 1992.

<sup>10</sup> *Beat conditions, tenosynovitis*. 1977.

*related upper limb disorders - A guide to prevention*<sup>11</sup> was frequently cited. In addition, what emerged from a detailed consideration of the pertinent passages of the Judgments was that HSE guidance documents were cited most frequently in the context of the foreseeability of injury and that the Courts' interpretation of HSE guidance documents in this context might, at best, be described as subject to significant variation.

Variations in interpretation appeared to arise when the type of injury allegedly suffered was not referred to explicitly in the pertinent HSE guidance documents or when there was some dispute about whether or not the condition allegedly suffered constituted an 'injury' in a legal sense. It can be argued that each case turns on its own facts and that whether or not injury could be said to be reasonably foreseeable depends, among other things, upon the nature of the injury for which damages are claimed, the employer's 'actual knowledge', the precise nature of the allegedly injurious work and when it was being performed and the state of 'constructive knowledge' at the time. It must also be acknowledged that 'constructive knowledge' is not solely based upon the interpretation of HSE guidance documents. In short, it became clear that the Courts' interpretation of HSE guidance documents was inextricably linked to the much wider issue of the Courts' interpretation of an employer's duty of care.

Thus, the initial analysis of a sample of Judgments suggested that, with respect to analysing how the Courts have interpreted health & safety Regulations and HSE guidance, it was only the more recent, and future, Judgments which were likely to produce findings of any practical use. Moreover, while it was originally envisaged that the analysis of Judgments would examine how the Courts have interpreted HSE guidance, the initial analysis added a new dimension by suggesting that the Courts' interpretation of an employer's duty of care raised issues which might not be entirely consistent with, or even covered by, HSE guidance. It was originally envisaged that the analysis of Judgments would examine the references to HSE guidance, whereas it emerged that what was often of greater significance was the much wider issue of the Courts' interpretation of an employer's duty of care and perhaps what HSE guidance does not say about an employer's duty of care.

The initial analysis of a sample of Judgments also suggested that while an analysis of the nature of the alleged injuries for which Claimants have sought damages was potentially very fruitful, the effort required to analyse these aspects of the Judgments fully had been underestimated. In choosing claims associated with office work to explore the ways in which the Judgments should be analysed and the issues which might be of interest, it was recognised that the sample probably had more than its fair share of what might be termed 'controversial diagnoses'. However, the sheer number of words devoted to injury and causation and the number of ways of referring to diffuse symptoms and Chronic Pain Syndromes without actually using the terms were not appreciated. Substantial parts of most Judgments in the sample were devoted to the medical issues. Many of the Judgments provided a detailed review of the medical evidence and the contemporaneous medical records. This material not only raised interesting questions about what constitutes an injury and the risk factors postulated for the less well-defined disorders but also raised a number of issues relating to the Courts' interpretation of an employer's duty of care in managing employees who have reported upper limb disorders and when someone who has suffered from an upper limb disorder returns to work.

Finally, the initial analysis suggested that the circumstances in which the alleged injuries occurred was also inextricably linked to the much wider issue of the Courts' interpretation of an employer's duty of care. While the relationship between the alleged injury or injuries and work was disputed in virtually all the cases and in many cases the issue of causation was a central theme of the Judgment, this issue was not examined in detail in all of them. In some cases, it

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<sup>11</sup> *Work related upper limb disorders - A guide to prevention*. 1990. HS(G)60.

appeared that the issues of causation and injury were closely entwined and if the Judge found that the burden of proving the Claimant had suffered an injury in a legal sense had not been discharged, the issue of causation was not addressed in the Judgment. In others cases, it was unclear from the Judgment precisely how the findings of negligence and/or breaches of statutory duty caused or materially contributed to the injury or injuries the Claimant was found to have suffered. However, it was clear that claims arising from the same type of work did not necessarily implicate the same risk factors and that a wide variety of injuries were alleged to have arisen from similar types of work.

In summary, the initial analysis of a sample of Judgments suggested that some of the analyses originally envisaged were premature and should be abandoned or at least postponed while others were more complex or potentially less fruitful than anticipated when this exploratory study was originally proposed. This initial analysis also suggested that a lay person reading existing HSE guidance might not appreciate some of the issues which Courts have traditionally considered important with respect to an employer's duty of care in this type of case, the analysis of which had not been originally envisaged or budgeted for.

#### **4.4 ISSUES AND JUDGMENTS EXAMINED IN SUBSEQUENT ANALYSES**

It was decided that the limited resources available for further analyses should be concentrated on issues which would be likely to produce findings of practical use. What this meant in practice was that attention was focussed on the nature of the injuries for which damages were claimed and how the Courts have interpreted the 'six-pack' of Regulations. It was recognised that only the more recent Judgments were likely to contain references to the 'six-pack' of Regulations and required a case study approach to provide the context in which the statutory duties had been interpreted, while the examination of the nature of the injuries for which damages were claimed required a systematic analysis of a larger number of Judgments to provide a representative sample of the alleged injuries.

It was originally proposed that the analysis would consider Judgments given between the 1st January 1993 and the 31st December 2000. The 1st January 1993 being the date the 'six-pack' came into force. The 31st December 2000 being the date the contract was originally scheduled to end. These appeared, at the time, to be appropriate cut off points. However, it was subsequently agreed, given among other things the delay in the public launch of the web site, that the length of the contract should be extended by 6 months, to the 30th June 2001. This extension to the contract was funded by utilising an under-spend on the original contract which had arisen from not having to pay as much as expected to have Judgments transcribed. This extension of the contract by 6 months not only allowed information to be gathered on more cases but also more time to actually procure copies of Judgments. Thus, the extension of the contract allowed more of the more recent Judgments to be obtained, several of which contain interesting references to health & safety Regulations.

While this exploratory study did not embark with any predetermined target for the number of Judgments which would be available for analysis, and despite not having to transcribe as many Judgments as expected, the number of Judgments accumulated by the end of the contract period was in excess of the number expected when the study was proposed in November 1999. At that time, 155 cases had been identified in which it was known or believed that Judgment has been given since 1977. A written record of the Judgment had been obtained in 109 of these cases. However, with respect to Judgments given after the 1st January 1993, by November 1999, only 107 cases had been identified and a written record of the Judgment had been obtained in only 72 of these cases. Given that these cases had been identified and the Judgments obtained over a period of at least eight or nine years, albeit on an ad hoc basis, it was considered likely that a further 15, at best perhaps 20, Judgments might be obtained during the year in which the study

was originally scheduled to run. Thus, the original proposal implicitly assumed that the analyses of the nature of the injuries for which damages were claimed would be based upon about 90 Judgments dating from the 1st January 1993.

By the 30th June 2001, 151 cases had been identified in which it was known or believed that Judgment has been given after the 1st January 1993 and a written record of the Judgment had been obtained in 97 of these cases. These Judgments were considered a sufficiently large and representative sample for the systematic analysis of the alleged injuries.

#### 4.4.1 Characteristics of the Judgments analysed

The majority of the 97 cases were heard in the County Courts and resulted in one Judgment. Thirteen of the 97 cases were initially heard in the High Court. Seven of the 97 cases went to the Court of Appeal, with one going on to the House of Lords, resulting in 104 Judgments available for analysis, all but 11 of which were full transcripts. The Judgment at first instance in one of the cases which went to the Court of Appeal was not available and its date is unknown but is assumed to be prior to the 1st January 1993.

**Table 2** Judgments given after 1st January 1993 and available by 30th June 2001

<i>Location</i>	<i>1993</i>	<i>1994</i>	<i>1995</i>	<i>1996</i>	<i>1997</i>	<i>1998</i>	<i>1999</i>	<i>2000</i>	<i>2001</i>
Judgments at first instance	4	16	8	12	16	14	12	8	6
County Court	1	9	7	12	15	13	12	8	6
High Court	3	7	1		1	1			
Judgments in Appeals									
Court of Appeal			1	1	2	1	2		
House of Lords						1			

The 97 cases involved a total of 125 Claimants. While the majority of cases involved only one Claimant, 11 cases dealt with multiple claims.

**Table 3** Number of Claimants per case

<i>Number of Claimants</i>	<i>1</i>	<i>2</i>	<i>3</i>	<i>4</i>	<i>5</i>	<i>6</i>	<i>7</i>	<i>8</i>	<i>9</i>
Number of Cases	86	4	3	2	1				1

The age of about a third of the 125 Claimants is unknown. Only about a quarter of the Claimants were male.

**Table 4** Approximate age of the Claimants at around alleged onset of injury

<i>Approximate Age</i>	<i>&lt;20</i>	<i>20s</i>	<i>30s</i>	<i>40s</i>	<i>50s</i>	<i>60s</i>	<i>Unknown</i>	<i>Total</i>
Male		7	7	3	2		11	30
Female	2	15	27	14	6	1	30	95
Total	2	22	34	17	8	1	41	125

#### 4.4.2 Judgments examined for interpretations of statutory duties

The initial analysis of the Judgments in claims associated with office work identified most of the Judgments which made reference to the DSE Regulations. All the remaining Judgments which were likely to make reference to the 'six-pack' of Regulations were included in the

analysis which examined the nature of the alleged injuries for which Claimants had sought damages.

#### **4.5 PRESENTING THE RESULTS OF THE ANALYSES**

While the avowed intention of this exploratory study was to address the issues from a lay perspective and not attempt to interpret the legal arguments or the law, in presenting the results of the analyses it is necessary and appropriate at various points to comment on the apparent differences between the legal and lay perspectives. These comments rely heavily on a recently published legal text entitled *Health and Safety - The Modern Legal Framework*<sup>12</sup> to which readers requiring a comprehensive review of the legal issues and arguments are unreservedly referred.

##### **4.5.1 Note on statistics**

Where summary statistics are presented in this report they should always be interpreted only as indicative of features of the sample of Judgments analysed and not necessarily representative of all Judgments in personal injury claims for WRULDs and certainly not representative of personal injury claims for WRULDs in general.

While the presentation of the results of the analyses, in places, makes reference to the outcome of claims and the damages awarded in particular cases, it intentionally refrains from presenting any summary statistics on these matters. While it is understandable that many, particularly it seems journalists, wish to know what proportion of personal injury claims for WRULDs which have been decided in Court are successful or whether the Claimants' success rate has changed over time, these are questions to which there are no, and never will be, accurate answers. Even though the web site provides information on a much larger number of Judgments in personal injury claims for WRULDs than any other known source, there is no way of knowing how many Judgments of this type are 'out there' and yet to be identified. Moreover, even if all the Judgments of this type were identified, the statistics would be fairly meaningless, given that an unknown proportion of Judgments are 'test cases' in which the outcome effectively determines the outcome of a number, usually an unknown number, of similar claims.

For example, the opening paragraph of the Judgment of H H Judge Byrt QC in December 1991 in the case of *McSherry & Lodge -v- British Telecommunications plc* states:

*At the outset of this hearing, there were listed claims by 11 plaintiffs, for damages for personal injuries alleged to have been caused by the negligence and breach of statutory duty of the defendants, their employer. Since the issues of fact and law were similar in each case, counsel for the parties sought to simplify and shorten the proceedings by inviting the court to give judgment in only two cases, namely those of Mrs McSherry and Mrs Lodge. The explanation is that, once the court's findings in those two cases are known, the remaining claims will probably be settled on terms agreed between the parties. This way of proceeding seemed eminently sensible, and as such was approved by the court. The hearing, accordingly, has been conducted on this basis, and I now give judgment in those cases only.*

##### **4.5.2 References to Judgments**

Given that the vast majority of Judgments in personal injury claims for WRULDs have not been officially reported, in most cases it is not possible to provide a reference to the 'source material'. Thus, in presenting the results of the analyses it is necessary and appropriate at various points to paraphrase or quote passages of the Judgments. However, in some cases in which the arguments

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<sup>12</sup> Smith I., Goddard C., Killalea S. & Randall N. *Health and Safety - The Modern Legal Framework*. 2nd Edition. Butterworths 2000

are particularly complex or the context or precise wording used is important to an understanding of the issues, lengthy passages of the Judgment are quoted in full.



## 5 INJURIES FOR WHICH DAMAGES HAVE BEEN CLAIMED

### 5.1 INTRODUCTION

The opening paragraphs of the County Court Judgment in the case of *Lee -v- Vauxhall Motors Ltd* in September 1994 refer to the "general controversy" surrounding RSI and WRULDs. At the heart of this controversy was, and is, the duality of meaning afforded the term 'RSI'. It is used both as a generic label to describe the range of injuries popularly understood to be caused by repetitive work, i.e. as a synonym for WRULDs, and as the name of a discrete condition of, as yet, unknown pathology and aetiology, characterised by chronic diffuse pain. It can be argued that this general controversy was, at least in part, attributable to the way in which the press had reported some of the earlier Judgments in personal injury claims for WRULDs.

The earliest Judgment which has been identified which explicitly refers to "RSI" was in December 1991, in the case of *McSherry & Lodge -v- British Telecommunications plc*. It is perhaps no coincidence that this is also the earliest Judgment which has been identified which deals with claims associated with keyboard use. This Judgment was extensively reported in the national press on the 17th December 1991 as a watershed for WRULD claims, inspiring headlines such as: **RSI victory threatens flood of cases**, in *The Times* and **Keyboard injury awards may lead to thousands of claims**, in *The Daily Telegraph*. With hindsight, it appears that this County Court Judgment set few precedents, save for the way it was reported. In the Judgment, H H Judge John QC states: "In both cases, I have found that each Plaintiff suffered RSI as a result of her work". However, given that the Defendants conceded that "the injuries of both Mrs McSherry and Mrs Lodge were caused in the course of and as a result of their work for the Defendants" these, admittedly successful, claims cannot be considered a significant Court victory for "RSI", or a substantive court finding of keyboard use causing "injury".

The next Judgment to receive significant publicity was *Inskip -v- Vauxhall Motors Ltd* in April 1992. The Claimant successfully claimed damages for De Quervain's Syndrome, but was widely reported in the press as having suffered a "strain injury". For example, the headline in the *Financial Times* on the 28th April 1992 was **Vauxhall found to be negligent in RSI case**.

The Judgment in the case of *Moutenay (Hazzard) -v- Bernard Matthews plc*, which involved claims by nine poultry workers, was reported in all five, daily broadsheets on the 10th July 1993. All these reports referred to "RSI" and "repetitive strain injury" but did not describe the specific clinical conditions for which six of the claimants were awarded damages. In part, the use of the term 'RSI' as opposed to the more specific clinical conditions might be attributed to the second paragraph of the 100-page Judgment which opens:

*The whole field of R.S.I. or W.R.U.L.D. is an area of medical controversy the intensity of which as demonstrated by the five days of medical evidence I heard would be worthy of medieval theology.*

but closes:

*Although the term Repetitive Strain Injury was subjected to a semantic and logical demolition by the Defendant's experts which I found wholly convincing it appears to me to have reached that point at which a term acquires a life of its own (indeed there are R.S.I. conferences) and I shall continue to use it - but I shall bear in mind that the full extent of its proper definition and connotations are in dispute.*

A second passage of Judgment, in which the H H Judge David Mellor considered the existence of what is termed "diffuse RSI" states:



*In some senses it can be regarded as absurd that I as a Judge lacking in medical training or knowledge should choose to appear to say which of two sets of honestly held but totally opposed medical beliefs is correct. I am conscious of the absurdity of appearing to deny the existence of that which subsequent scientific advances may prove to exist or of exerting the existence of something that turns out to have all the substance of a will of the wisp. It is however necessary that I should do so at least in the limited sense of making a finding as to what if anything has been proved before me to be more likely than not.*

The press coverage of the Judgment in *Rafiq Mughal -v- Reuters Ltd* inspired front page headlines on the 29th October 1993 which included: **Keyboard injury does not exist, judge rules** in *The Guardian* and **High Court judge rules that RSI does not exist** in *The Daily Telegraph*. At no point in the Judgment does H H Judge Prosser state that "RSI does not exist", whereas, this is the dominant theme of the press reports inspired by the Judgment which were littered with quotes attributed to H H Judge Prosser. He was most frequently alleged to have said that RSI was "meaningless" and had "no place in the medical books". In passing, it is interesting to note that these quotes appear in the opening sentences of the story which was carried on the Reuters Newswire. However, careful reading of the Judgment shows that the Judge was summarising the views of the Defendant's Medical Experts when he used the phrases 'RSI is in reality meaningless' and 'RSI has no place in the medical books'. It also transpires that another quote: "eggshell personalities who needed to get a grip on themselves", attributed to the Judge in *The Guardian*, and a number of subsequent press cuttings, is not a direct or accurate quote from the Judgment. It arises from the Judge quoting an article by Bammer and Martin, who are in turn quoting an Australian psychiatrist Dr Yolande Lucire.

The simple and most important fact omitted from the press reports was that H H Judge John Prosser found, on the evidence presented during the trial, that: "He fails to convince me that he has suffered a (or any) injury which he has alleged in this case, both pleaded or in evidence". The crucial point, however, with respect to the subsequent press coverage and the perception of a "general controversy", is that the press reports failed to distinguish between the "diffuse pathological condition reflected by pain" which Rafiq Mughal failed to convince the learned Judge he had suffered and the (more) well-defined clinical conditions popularly understood to be caused by repetitive work.

For over a decade prior to these Judgments, the Courts had been considering claims for upper limb disorders allegedly caused by repetitive work. It would appear that the 'general controversy' only arose, at least publicly, when the Courts started to consider claims by keyboard users and claims for what would now probably be described in a non-legal context as Chronic Pain Syndromes.

## **5.2 THE ALLEGEDLY WORK-RELATED INJURIES IN THE JUDGMENTS ANALYSED**

While many of the Judgments provide a detailed review of the medical evidence and the contemporaneous medical records, no attempt has been made to analyse all this material systematically, primarily due to its sheer volume. Rather, attention is focused on the nature of the alleged injuries and whether they are encompassed by the descriptions of upper limb disorders in HSE publications.

It will be recalled that the 97 cases in which Judgment was given after the 1st January 1993 resulted in 104 Judgments and involved a total of 125 Claimants. The first point which emerges from a consideration of the pertinent passages of the Judgments is that in just over half of the

claims the diagnoses were disputed and the relationship between the alleged injury or injuries and work was disputed in the vast majority of cases.

**Table 5** Frequency of clearly disputed diagnosis and causation

<i>Number of Injuries Claimed</i>	<i>1</i>	<i>2</i>	<i>3 or more</i>
Claimants	98	17	10
Diagnosis clearly disputed	49	13	7
Causation clearly disputed	87	17	9

In 11 cases there is little discussion of the medical issues in the Judgments and the precise nature of the injury and whether or not injury and/or causation was disputed at trial is unclear.

### **5.2.1 Diagnostic labels given to the Claimants**

While most of the 125 Claimants had been diagnosed as having one upper limb disorder, 27 of the 125 can be described as claiming multiple injuries. In terms of the types of injuries for which Claimants sought damages: 40 claimed for some sort of Tenosynovitis; 30 for some sort of Chronic Pain Syndrome; 21 for De Quervain's Syndrome; 16 for Lateral Epicondylitis; 14 for Medial Epicondylitis; 13 for Carpal Tunnel Syndrome; five for some sort of Rotator Cuff injury; five for Osteo-Arthritis of the hand; four for Cervical Spondylosis; four for some sort of Occupational Cramp; four for Trigger Finger, four for Radial Tunnel Syndrome; two for Reflex Sympathetic Dystrophy; one for a Ganglion; one for an Ulnar Neuritis; and one for Shoulder Capsulitis. In addition, several claimed for unspecified injuries to the hand, elbow, shoulder and back. In the majority of cases the site of the alleged injury or injuries was the lower part of the upper limbs, with relatively few shoulder injuries.

The accuracy of the diagnostic labels given to 69 of the 125 Claimants was disputed at trial. Of the 27 Claimants who claimed damages for more than one upper limb disorder, the accuracy of at least one of the diagnostic labels given to 20 of the 27 was disputed. The accuracy of the diagnostic labels given to half of the Claimants who had been diagnosed as having one upper limb disorder was disputed at trial.

In a few cases the difference in the opinions of the Medical Experts, with respect to diagnosis, appears to have been only marginal and can be attributed to the Medical Experts examining months or even years apart, resulting in different findings on examination. However, in many cases the dispute between the Medical Experts appears to have been more fundamental, possibly reflecting a clash of cultures<sup>13</sup>. This dispute usually focused on whether or not the signs and symptoms described by the Claimant or reported in the contemporaneous medical records or in the reports of the Medical Experts were consistent with or sufficient to warrant a diagnosis of the condition or conditions allegedly suffered. In other words, in many of the cases in which the accuracy of the diagnostic labels given to the Claimants was disputed at trial, there was a dispute over diagnostic criteria and/or technique, which was often confounded by evidential issues relating to the Claimant's credibility and/or the Claimant's accuracy as a historian.

In many of the cases in which the accuracy of the diagnostic labels given to the Claimants was disputed at trial, particularly those in which the Claimant sought damages for more than one upper limb disorder, the Judgments could be interpreted as suggesting that most of these Claimants probably had what might well now be described in a non-legal context as a Chronic Regional Pain Syndrome. Reading between the lines of these Judgments gives the impression that it is the legal process and in particular the perceived need to describe a Claimant's alleged

<sup>13</sup> Diwaker, H. N. & Stothard, J. *What do doctors mean by tenosynovitis and repetitive strain injury?* Occupational Medicine. 1995. Vol. 45, No. 2, pp. 97-104.

injury in terms of recognised clinical conditions, rather than findings of objective clinical signs, which caused many of these Claimants to be given the diagnostic labels they were given.

In 41 of the 45 claims in which the accuracy of the diagnostic label given to the Claimant does not appear to have been disputed at trial, the Claimant sought damages for one, and only one, upper limb disorder. Of these 41 Claimants: nine had De Quervain's Syndrome; five had Lateral Epicondylitis, one bilaterally; five had Carpal Tunnel Syndrome, three bilaterally; five had Regional Fibromyalgia; three had Tenosynovitis; two had Trigger Finger; two had Peritendinitis; one was described as having Peritendinitis or Tenosynovitis; one had Cervical Spondylosis; one had Cervical nerve root irritation; one had Medial Epicondylitis; one had Rotator Cuff injury; one had Radial Tunnel Syndrome; one had Diffuse symptoms in forearms and hands; one had Repetitive Strain Injury; one had Cramp of the hand; and one had Reflex Sympathetic Dystrophy.

### **5.2.2 Comparison with descriptions of ULDs in HSE publications**

If the diagnostic labels given to the 98 Claimants who claimed damages for a single upper limb disorder, irrespective of whether or not they were disputed, are classified broadly in terms of the classification of upper limbs disorders contained in *Work related upper limb disorders - A guide to prevention*: 54 Claimants could be said to have claimed they had a disorder related to tendons or surrounding tissues; and eight could be said to have claimed they had a compression neuropathy. The remaining 36 do not clearly fit this classification. Of the 27 Claimants who sought damages for more than one upper limb disorder: 10 could be said to have claimed they had more than one disorder related to tendons or surrounding tissues; and six a combination of disorders related to tendons or surrounding tissues and a compression neuropathy. The remaining 11 could be said to have claimed they had either a disorder related to tendons or a compression neuropathy together with one or more disorders which do not clearly fit this classification.

Thus, about two thirds of the 125 Claimants could be said to have claimed they had one or more disorders encompassed by the classification of upper limbs disorders contained in *Work related upper limb disorders - A guide to prevention* with just over half of the Claimants claiming they had one or more disorders related to tendons or surrounding tissues. However, perhaps of most significance is the fact that about a quarter of the 125 Claimants sought damages for disorders which might be classified as some sort of Chronic Regional Pain Syndrome. Moreover, if as suggested earlier, in many of the cases in which the accuracy of the diagnostic labels was disputed at trial most of the Claimants, particularly many of those claiming multiple injuries, might in a non-legal context now not be given the diagnostic labels they were given, it appears that just under a half of the Claimants could probably be said to have had a Chronic Regional Pain Syndrome of some sort, which are not encompassed by the classification of upper limbs disorders contained in *Work related upper limb disorders - A guide to prevention*.

Turning now to consider the "diagnosis options" developed for the Diagnostic Support Aid for Upper Limb Disorders reported in Contract Research Report 280/2000. The list of "Diagnosis options covered by Aid and alternative labels" are listed in Appendix A of Contract Research Report 280/2000. For convenience this list is reproduced as Appendix A to this report. How well do the diagnosis options and alternative labels listed in Appendix A encompass the injuries allegedly suffered by the 125 Claimants referred to in the Judgments analysed?

Perhaps the first point to note is that the Diagnostic Support Aid for Upper Limb Disorders does not appear to address the issue of patients possibly presenting with more than one upper limb disorder. The temporal aspects of multiple upper limb disorders and how frequently multiple upper limb disorders co-occur outside of a medico-legal context do not appear to be well

documented in the literature. If, as has been suggested earlier, it is the legal process and in particular the perceived need to describe a Claimant's alleged injury in terms of recognised clinical conditions which caused many of these Claimants to be given the multiple diagnostic labels they were given, multiple upper limb disorders may, in reality, not have co-occurred that often.

Of the 27 Claimants who alleged multiple injuries, the accuracy of the diagnostic labels given to the Claimant does not appear to have been disputed at trial in only four cases: one was described as having Osteoarthritis of the thumbs and De Quervain's Syndrome; one had Lateral and Medial Epicondylitis; a third had De Quervain's Syndrome and Cervical Spondylosis; while the fourth had Subacromial Bursitis, Ulnar Neuritis and Carpal Tunnel Syndrome. The only condition not explicitly referred to in Appendix A is Ulnar Neuritis.

Of the 98 Claimants who sought damages for a single upper limb disorder, 67 claimed an injury which had clearly been given one, but only one, of the diagnostic labels listed in Appendix A. This is not to say that the alleged injury met the diagnostic criteria used in the Diagnostic Support Aid, merely that the single diagnostic label used to describe the Claimant's condition was one of 20 conditions and alternative labels listed in Appendix A. The diagnostic label used to describe the condition was not disputed in 32 of these 67 Claimants. Thus, only 32 of the 98 Claimants who sought damages for a single upper limb disorder could clearly be said to have an undisputed diagnosis of one of the conditions listed in Appendix A, however, it cannot be guaranteed that even these 32 undisputed diagnoses met the diagnostic criteria used in the Diagnostic Support Aid.

Of the nine Claimants who apparently had an undisputed diagnosis, but not clearly one of the conditions listed in Appendix A, it was agreed that: five had Regional Fibromyalgia; one had Repetitive Strain Injury; one had Radial Tunnel Syndrome; one had Reflex Sympathetic Dystrophy; and one had Cramp of the hand, PD A4. It could be argued that Regional Fibromyalgia and Repetitive Strain Injury might possibly be synonyms for Non-specific diffuse forearm pain. However, the difficulty is that Appendix A appears to suggest that 'Non-specific diffuse forearm pain' is an alternative label for 'Impossible to make a specific diagnosis', whereas there are those who would argue, particularly some Rheumatologists and those who might be described as the medical apostles of "RSI" that it is possible to make a specific diagnosis of both Regional Fibromyalgia and Repetitive Strain Injury. The other difficulty with this 'classification' is that those who had an agreed diagnosis of Regional Fibromyalgia had symptoms in the neck, arms and hands. Thus, neither 'Non-specific diffuse forearm pain' nor 'Diffuse shoulder or neck pain' would accurately describe these Claimants' conditions.

Those who claimed damages for a single upper limb injury whose diagnosis was disputed and not clearly given one of the diagnostic labels listed in Appendix A, included Claimants who had been 'diagnosed' as suffering from: RSI/Neuroplasticity; Over-use syndrome; WRULD; Chronic strains to the soft tissues of both thumbs; Diffuse work related upper limb disorder; Aches & pains well beyond the normal aches and pains caused by fatiguing work; Occupational Overstrain Syndrome; Fibromyalgia; Repetitive Strain Injury; Repetitive Strain Syndrome; Occupational Dystonia; and Occupational Cramp. It could be argued that many of these terms are synonyms for Chronic Regional Pain Syndromes. However, there are those who would argue that many of these terms are legitimate diagnoses. As has been noted by many others many times before, terms such as Repetitive Strain Injury, Repetitive Strain Syndrome, Occupational Dystonia and Occupational Cramp all presume or imply a relationship to work, which is widely considered to be unhelpful. Such terms are particularly inappropriate, but understandably widely used, in a medico-legal context where the relationship between an alleged injury and work is often the primary issue in dispute.

While not presuming to suggest that any significant 'diagnosis options' have been omitted from the list developed for the Diagnostic Support Aid for Upper Limb Disorders, it should be noted that Claimants have successfully claimed damages for Radial Tunnel Syndrome, Reflex Sympathetic Dystrophy, Repetitive Strain Injury and Regional Fibromyalgia, which are not included in the list.

It should be noted that the corollary of the argument that in many of these cases the Claimants might have had a Chronic Regional Pain Syndrome of some sort, rather than discrete upper limbs disorders, is that any classification or listing of WRULDs should probably encompass these pain syndromes. However, if as the recent study by Macfarlane et al<sup>14</sup> suggests, forearm pain commonly co-occurs with other regional musculoskeletal pain syndromes, how these pain syndromes should be catered for requires careful consideration. Moreover, if as the study by Macfarlane et al also suggests, forearm pain is common and is associated not only with work related repetitive movements, but is predicted by high levels of psychological distress and aspects of illness behaviour, encompassing Chronic Regional Pain Syndromes in any guidance document could have profound consequences with respect to civil claims.

### **5.2.3 Co-morbidity, alternative diagnoses and other factors**

It should also be noted that while no systematic analysis was undertaken of references in the Judgments to musculo-skeletal problems for which damages were **not** claimed, about a quarter of the Claimants are suggested to have some sort of musculo-skeletal morbidity in addition to their alleged injuries, e.g. ganglion, cervical spondylosis and osteo-arthritis.

Finally, it should be noted that in many of the cases in which there was clearly a disputed diagnosis the Defendant's Medical Expert(s) provided an alternative explanation, some times an alternative diagnosis, for the Claimant's reported problems. While no systematic analysis was undertaken of these references they included: Osteoarthritis of the hands; Osteoarthritis at the base of both thumbs; Pain referred from the neck; Degenerative changes in the cervical spine; Muscle fatigue; Arm pain of unknown origin; No physical cause; No known disorder; Psychosocial pressures; Somatisation; Psychosocial pressures elevating fatigue to pain; Psychogenic symptoms; Psychosomatic symptoms; Depression; Occupational neurosis; Disability behaviour; Lying or gross exaggeration; and Malingering.

There are allusions to iatrogenic and/or psychological factors in the Judgments in about a quarter of the 125 claims. It is clear from the Judgments in these cases that Courts frequently address issues relating to the nature, causes and interpretation of upper limb symptoms, which HSE publications have so far rarely addressed explicitly.

## **5.3 EXAMPLES OF ALLEGEDLY WORK-RELATED INJURIES AND ASSOCIATED RISK FACTORS**

The claims associated with office work which were examined in the initial analysis referred to in Chapter 4 illustrate the circumstances in which some of these alleged injuries occurred and the complex issues surrounding the employer's duty of care which the Courts have to resolve. It will be recalled that the initial analysis suggested that claims arising from the same type of work did not necessarily implicate the same risk factors and that a wide variety of injuries were alleged to have arisen from similar types of work

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<sup>14</sup> Macfarlane, G. J., Hunt, I. M., & Silman, A. J. *Role of mechanical and psychosocial factors in the onset of forearm pain: prospective population based study*. British Medical Journal. 2000, Vol.321: 676.

### 5.3.1 Risk factors and alleged injuries associated with office work

With respect to the risk factors referred to in paragraphs 19 & 20 of *Work related upper limb disorders - A guide to prevention*<sup>11</sup>, given the type of work these Claimants performed, it might be expected that the risk factors most commonly cited would be frequency and duration of movements alone or possibly in combination with an awkward posture of the hand, wrist or arm. However, in those Judgments in which the issue of causation is discussed, there appears to be no clear pattern to whether or not the injury was alleged to be solely due to the intensity of the work or some combination of the intensity of work and some inappropriate posture, or solely due to some inappropriate posture. Moreover, there appears to be no clear pattern to whether or not an injury was found to have been caused by the work.

### 5.3.2 Posture as a risk factor

Two cases in which Claimants successfully claimed damages for an injury which was found to be primarily due to the posture in which the work was performed are particularly worthy of note.

The Judgment in the case of *Gould -v- Shell (UK) Ltd* in September 1999 is the only known Judgment relating to the use of a mouse which meets the criteria for inclusion in this study<sup>15</sup>. This case started at trial on the basis that the Claimant was performing her secretarial duties in a perfectly normal manner, but was doing so for too long, under too much pressure, with too little in the way of breaks and adopting a posture which was unsuitable, which allegedly caused her to suffer "RSI". However, during the course of her evidence the Claimant demonstrated, for the first time, how she was sitting at her desk and operating the keyboard and, in passing, how she used the mouse with her hand on the mouse but her wrist, forearm and upper arm wholly unsupported. The Judge referred to this as "a quite bizarre use of the mouse" and "a potential source of her pain and suffering", which "recast the entire case". However, the Judge also noted that the Claimant said in her evidence that she found this posture "comfortable".

The Defendant's evidence was to the effect that the Claimant was never seen to have used the mouse in the way she demonstrated in Court and that "if it had been going on" her supervisor "would have done something about it". The Judge accepted the Claimant's evidence about how she used a mouse, even though he rejected completely the Claimant's attempt "to paint" the Defendant as "an uncaring slave-driving employer" and thought she was "given to exaggeration" and in several instances "misleading" and overall that he had "hesitation in accepting her as a complete witness of truth".

The Judge went on to find that the posture in which the Claimant used the mouse was causative of her pain and suffering and that her employers should have identified that she was misusing the mouse "almost immediately" and that in failing to do so her employers failed to use ordinary common sense and, hence, failed to take reasonable care for her safety.

It can be argued, without implying any criticism of the Judge, that this Judgment is of no particular consequence in that it somewhat glosses over the precise nature of the injury and the issue of causation and that in any event the case turned primarily upon the Judge's interpretation of the lay evidence. Nevertheless, it raises a number of interesting issues about: posture as a discrete risk factor; whether an injury can occur when working in an inappropriate, but perceived comfortable, posture; whether, in 1991 and 1992, a mouse should have been regarded as "a rather innocent looking creature, incapable of causing injury" or "a new piece of machinery ... which was manifestly likely to cause injury"; and whether an employee new to

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<sup>15</sup> The only other known Judgment relating to the use of a mouse is a case which was heard in the Channel Islands, which has somewhat different legal procedures.

using a mouse needs training in how best to operate it, even though common sense might suggest the "natural way" to use a mouse.

In the case of *Conaty -v- Barclays Bank plc* in which Judgment was given in April 2000, it was common ground that the Claimant had suffered right De Quervain's Syndrome in 1994. However, it was also common ground that the Claimant did not use her right thumb to enter data. Both Medical Experts agreed that the Claimant's suffering from right De Quervain's Syndrome at her age (22) without either a traumatic or a hormonal cause was "a misfortune such as had not been identified in cases discussed in the literature or paralleled in the direct experience" of either Medical Expert. Nevertheless, the Judge found that the Claimant's De Quervain's Syndrome arose from the poor posture adopted by the Claimant which itself was caused by the Defendant's breaches of statutory duty, both in the layout of the work station and lack of training and the concentration of keyboarding.

Once again, without implying any criticism of the Judge, it can be argued that this Judgment is of no particular consequence and that the case turned on its own evidence. Nevertheless, this case raises a number of interesting questions. For example: Even if the Claimant "habitually .. adopted what is agreed to be a bad posture whereby her wrist was flexed and whilst using the numeric keys subject to ulnar deviation instead of being kept straight, as is recommended" was there a cogent biomechanical link between the "bad posture" of the wrist and the injury to the tendons associated with the thumb? Is it reasonable to expect an employer who observed an employee entering numeric data to consider that there was a risk of an injury to the thumb which was "stuck out to the side of her right hand" and not being used? Would a reasonable and prudent employer who had undertaken a risk assessment of the work described have rearranged the workstation or advised or trained the employee to work in a way which would have made any material difference? It is by no means clear from the Judgment precisely how the Defendant's admitted breaches of the DSE Regulations caused or materially contributed to the Claimant's injury.

In contrast to the above two cases, a number of Judgments relating to slightly earlier times provide a somewhat different perspective on posture as a risk factor and the extent to which employers should influence employees' working postures. In the Judgment in *Asprey -v- The Post Office* in July 1994, in which the Claimant was found to have suffered Occupational Cramp from entering post codes in 1989, the Judge said: "I would not regard it as reasonable to expect the defendants to supervise posture". Similarly, in the Judgment in *Clarke -v- The Post Office* in March 2000, which dealt with Fibromyalgia allegedly caused by the repetitive use of a bar-code reading pen in 1989, the Judge suggested that having to tell someone to sit up straight at a desk "was quite an unnecessary thing to do".

In the Judgment in *Summers -v- Justica Cas Ltd* in September 1997, in which the Claimant was alleged to have suffered Carpal Tunnel Syndrome and Writer's Cramp in 1989 from using an adding machine, the Judge said: "I am not satisfied that there was any defect to the chair and I do not accept that the defendants have a further duty to design or enforce a lay-out of an office desk indicating where an adding machine should be put, or how far in a chair should be pulled up, or whether an operator should sit up straight or lean forward. In my judgment, it is excessive to impose a duty of that kind on an employer, and an office worker can reasonably be expected to make her own judgment on that". The comments about journalists' working conditions in late 1989 in the High Court Judgment in *Mughal -v- Reuters Ltd* in October 1993 also appear to imply that the Court did not consider working posture to be a significant risk factor or something which an employer needed to supervise or control.

It may be simply a coincidence that the Judgments in claims associated with office work which attach particular significance to the posture in which the work was performed are mostly concerned with DSE use, whereas those which do not appear to regard posture as a significant risk factor are mostly concerned with other types of office work or DSE use prior to the DSE Regulations coming into force. However, it might possibly signal a subtle change in the Courts' perception of the significance of posture and in the Courts' perception of an employer's duty of care. It can be argued that this may have been brought about by the emphasis, some might argue undue emphasis, on the physical ergonomics of workstations in the HSE's guidance on the DSE Regulations and the lack of clarity in HSE guidance on what constitutes an awkward or poor working posture. It can be argued that a poor working posture can only be considered a possible contributory factor to a musculo-skeletal disorder if there is a cogent biomechanical link between the poor working posture and the type of disorder allegedly suffered. Moreover, deficiencies in a workstation can only be considered a possible contributory factor to a poor working posture if there is a cogent biomechanical link between the poor working posture and the deficiencies in a workstation.





## 6 INTERPRETATION OF STATUTORY DUTIES

### 6.1 EUROPEAN DIRECTIVES AND THE 'SIX-PACK' OF REGULATIONS

The opening paragraphs of the County Court Judgment in the case of *Lee -v- Vauxhall Motors Ltd* in September 1994 suggest that all of the six sets of Health & Safety Regulations brought into operation in January 1993 "bear to some extent on RSI/WRULD" and that "the Government has by the 1992 Regulations imposed considerable changes in the way that employers will henceforth be obliged to manage the organization of work".

In their legal text, Smith et al<sup>12</sup>, refer to the 'six-pack' of Regulations as "a revolutionary change in the structure of health and safety law in this country" and to their implementation as directly resulting in a substantial body of the pre-existing law being repealed or revoked and much of what was left being amended or qualified. They suggest that these changes had a substantial impact on the way in which personal injury litigation was conducted and heralded a new approach from practitioners, employers, workers and unions:

*The Regulations represented a major shift away from the old system of looking to the type of workplace or premises in which the accident occurred in order to establish which, if any, statutory provisions applied. This is because, as their titles suggest, the 1992 Regulations and their successors concentrate on combating specific categories of risk as opposed to looking to the premises in which that risk has occurred. The Regulations were important for introducing universality of coverage and this change represented a substantial extension of health and safety protection for large numbers of workers who were previously unprotected.*

#### 6.1.1 Interpretation of the 'six-pack' of Regulations

Smith et al<sup>12</sup> suggest that:

*It is well established that when considering the impact and coverage of the Regulations it is necessary to look first at the wording and overall scheme of the Directives from which they are taken.*

Expanding on this argument, these legal authors appear to place considerable emphasis on the value of Directives:

*When considering the practical application of the new Regulations the practitioner will be primarily concerned with the following issues:*

- (a) To what extent should the court look to the relevant provisions of the Directive when interpreting the Regulations?*
- (b) What is the position if the standards required by the Regulations appear to fall below those set in the Directive?*
- (c) What is the position if the standards required by the Regulations go beyond those set in the Directive?*
- (d) What if the Regulations fail to implement the relevant article of the Directive at all?*

The listing of these issues is followed by complex legal arguments concerning, among other things, the circumstances in which private individuals can obtain directly enforceable rights from Directives and the interpretation of Directives when there are differences in the wording of a Regulation and the equivalent article in the Directive. At the conclusion of these arguments Smith et al<sup>12</sup> note:

*It is also important to bear in mind that any question of the interpretation of Community law is a matter for the ECJ and not the domestic court. It is therefore only in the most simple of cases that the domestic court can interpret the meaning of a provision of Community law. If such a question is in doubt, it should be referred to the ECJ.*

The issues of interpretation referred to by Smith et al<sup>2</sup> from a legal perspective, are far more sophisticated than those encountered in the accumulated Judgments. Anecdotal evidence suggests that County Court hearings of claims for WRULDs rarely, if ever, consider the wording of Directives. It would appear from the various evaluations of the Regulations which have so far been conducted<sup>3, 16, 17</sup> that many employers still remain ignorant of the requirements of the Regulations. It seems highly unlikely that many employers would be aware of the differences in wording between the Regulations and the Directives from which they are derived, let alone their possible implications. A lay person, relying on current HSE publications could be forgiven for focussing on the wording of the Approved Code of Practice or the guidance rather than the wording of the Regulation and for being blissfully unaware of the wording of the Directive from which the Regulation was derived.

### **6.1.2 Breach of Statutory Duty**

Smith et al<sup>2</sup> suggest that the 'six-pack' of Regulations have extended the scope of the action for breach of statutory duty:

*The action for breach of statutory duty is usually a more precise and focused action in an industrial accident than common law negligence, and has often also had the advantage of imposing a stricter duty on the employer. The first question, therefore, is whether the Regulations themselves support civil liability. The Health and Safety at Work etc Act 1974 (HSWA 1974), s 47(2) provides:*

*'Breach of duty imposed by health and safety Regulations shall, so far as it causes damage, be actionable except in so far as the Regulations provide otherwise.'*

*The five subsidiary sets of Regulations do not have any such exclusion of civil liability and so can be relied on as the basis for actions for breach of statutory duty. However, the head Regulations of the Management of Health and Safety at Work Regulations, do provide in reg 22(1) as follows:*

*'Breach of a duty imposed by these Regulations shall not confer a right of action in any civil proceedings.'*

*Thus, a breach of one of the very general duties in these Regulations (in particular, the obligation under reg 3 to undertake risk assessments, which is arguably central to the whole scheme of the present regulatory system, with its emphasis on risk) will not give rise directly to an action for breach of duty.*

The authors of this legal text then consider issues relating to whether a defendant is in breach of the statutory duty:

*The Approved Codes of Practice (ACOPs) and Guidance Notes may well give very useful material on this point, given their extensive nature and, in some cases, very detailed suggestions. They are admissible generally in civil actions as evidence. One potentially*

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<sup>16</sup> *Evaluation of the Manual Handling Operations Regulations 1992 and Guidance Volumes 1 and 2.* Contract Research Report 152/1997. HSE Books.

<sup>17</sup> *Evaluation of the Display Screen Equipment Regulations 1992.* Contract Research Report 130/1997. HSE Books.

*significant point relates to the burden of proof. By virtue of the HSWA 1974, s 17(2), where in any criminal proceedings it is proved that there was a failure to observe a provision of an ACOP covering the allegation of breach in question, then that allegation is to be taken as proved 'unless the court is satisfied that the requirement or prohibition was in respect of that matter complied with otherwise than by way of observance of that provision of the code', ie there is a statutory reversal of the burden of proof. This does not apply in civil proceedings. However, it has long been held under the old factory legislation that, where a duty is imposed to do or provide something 'as far as reasonably practicable' the onus is generally on the defendant employer to satisfy the court as to any question of reasonable practicability. From the claimant's point of view, it is to be hoped that this approach will now also be applied to the many new Regulations that adopt standards, not of reasonable practicability, but of the new terminology of suitability, sufficiency, adequacy, etc.*

## **6.2 HEALTH AND SAFETY (DISPLAY SCREEN EQUIPMENT) REGULATIONS**

Thirty four of the cases in which Judgments had been obtained by the 30th June 2001 were associated with DSE use. These cases involved a total of 40 Claimants. These Judgments date from December 1991 up to April 2001 and include one case which went to the Court of Appeal and then to the House of Lords, resulting in 36 Judgments being available for analysis. At least one other of these cases is known to have been appealed, but the appeal had not been heard by the 30th June 2001. Judgment is known to have been given in several other claims associated with DSE use, but these Judgments had not been obtained by the 30th June 2001.

The 20 Judgments in 18 of the 34 cases associated with DSE use make no reference whatsoever to the DSE Regulations. In part, this can be explained by the fact that the average time between the alleged onset of injury and Judgment being given in these 40 claims is six and a half years. Thus, the alleged injuries occurred in many of these cases prior to the DSE Regulations coming into force: in the 34 cases involving DSE use, only 13 of the 40 Claimants had alleged injuries which clearly post-dated the DSE Regulations coming into force.

In only two cases associated with DSE use in which the Claimants' alleged injuries clearly post-dated the DSE Regulations coming into force is there no explicit reference to the DSE Regulations in the Judgments. However, there are three cases in which the Judgments do make explicit reference to the DSE Regulations even though the onset of the Claimants' alleged injuries appear to pre-date the DSE Regulations coming into force. There are also four cases in which there are implicit references in the Judgments to the DSE Regulations or to the Directive from which they are derived, EEC/90/270.

In one case associated with DSE use in which there is no explicit reference in the Judgment to the DSE Regulations, there is an explicit reference to the Workplace (Health, Safety and Welfare) Regulations. Another Judgment makes reference to both the Provision and Use of Work Equipment Regulations and the DSE Regulations.

Thus, of the 34 cases associated with DSE use in which Judgments had been obtained by the 30th June 2001, there is implicit or explicit reference to the DSE Regulations in only 16 Judgments. All these Judgments are at County Court level. In other words, no Judgment in a claim for a WRULD has been identified in which a High Court, the Court of Appeal or the House of Lords has made reference to the DSE Regulations, let alone addressed the issue of how these Regulations should be interpreted.

Of the 16 County Court Judgments which have been identified which make either implicit or explicit reference to the DSE Regulations, only 13 refer to issues arising from the Regulations in sufficient detail to be worthy of further comment.

### **6.2.1 Cases which make implicit or passing reference to the DSE Regulations**

#### ***Rich & Others -v- British Telecommunications plc Newport, Isle of Wight County Court, October 1994***

In this case three night telephonists alleged they had suffered the onset of upper limb injuries between October 1988 and February 1990. As might be expected given the date of onset of the alleged injuries, there is no reference in the Judgment to alleged breaches of the DSE Regulations. However, even though the Judgment acknowledges that the DSE Regulations did not come into effect until the 1st January 1993 and that they "were not available in 1990", the HSE's guidance on the Regulations is referred to in the Judgment as "not specific about the risk of upper limb disorders".

#### ***Carney -v- Trafalgar House Interiors Ltd Croydon County Court, May 1997***

In contrast to the case of *Rich & Others -v- British Telecommunications plc*, it is clear from the Judgment in *Carney -v- Trafalgar House Interiors Ltd* that even though the Judge acknowledged that the DSE Regulations were not formally introduced until the autumn of 1992, "and therefore as such did not apply at the time", he accepted the evidence of the Claimant's Ergonomics Expert that by 1991 the risks arising from a person working for very long hours at a computer station were well known and that the substance of those Regulations and the guidelines going with them "were very well known to employers at the time, particularly to major companies and groups of companies like the defendants". The Judgment also suggests that there were EC regulations already in existence and applicable in this country and those "were known to employers".

#### ***Millard -v- Murray Lawrence and Partners Ltd Colchester County Court, May 2000***

This is another case in which the Judgment makes implicit reference to the DSE Regulations. The Claimant, an audio typist, sought damages for "diffuse pain in her upper limbs. H H Judge Brandt states:

*Summarised her case is that her condition has been caused by the failure on the part of the Defendants to carry out the duties imposed upon them to take reasonable care for her as their employee, such duty being imposed initially by Common Law and from 1 January 1993 by Statute additionally.*

*Her clear and unequivocal evidence to me was that she reached her present unhappy state of health by mid 1993 since when there has been little change and certainly no improvement. She complains that from January 1991 onwards she and the other audio typists were the victims of a regime comprised of pressure, neglect and lack of sympathy.*

H H Judge Brandt goes on to say:

*Putting the matter very shortly, if in my judgment the Claimant succeeds in convincing me that by mid 1993 or thereabouts she was suffering from diffuse pain in her upper limbs as accepted by the medical experts in 1997 and 1998 then her claim succeeds.*

*If this premise were established she would have no difficulty in persuading me that the upper limb disorder was work related so that I would be looking at a classic case of WRULD.*

*Moreover she would have no difficulty in persuading me that the WRULD was caused more or less by all the failings on the part of her employers of which she makes complaints.*

- (a) The absence of any risk assessment.*
- (b) The failure to train her to report symptoms.*
- (c) The failure to ensure proper rest breaks.*
- (d) The failure to provide work rotation.*
- (e) The intensity of typing. I have reservations about this particular complaint.*

Having explained his reservations about complaint (e) and dismissed two other complaints concerning poor posture and inadequate or unsafe equipment, H H Judge Brandt states:

*It is of course sufficient for the Claimant to establish one or more of complaints (a) to (e) and I agree with the ergonomists that if the Claimant suffered injury by reason of these failures on the part of her employers to take care for her safety, then these injuries were in 1991 and onwards entirely foreseeable.*

After reviewing the medical evidence and evidence relating to the Claimant's work load, H H Judge Brandt states:

*All of this material satisfies me that any upper limb disorder dates from no earlier than 9 May 1994. I am satisfied that I can safely reject the Claimant's case in relation to anything that happened before then.*

*That of course does not end the matter. The Claimant will still succeed if she can persuade me that the symptoms which she developed from May 1994 onwards are attributable to negligence and/or breach of statutory duty on the part of these employers. True it is that no risk assessment was carried out until December 1994. However largely by chance the Defendants were in fact doing all the right things. The typing work load was very far from excessive. There were numerous breaks away from the desk whilst she performs the various "office junior" type tasks which she disliked. The work may not have been strictly rotated but it was highly varied and not in the least repetitive. The volume of actual keyboarding was a long way below anything that would bother either of the ergonomists.*

*There may have been no set tea or coffee breaks but all the staff took tea or coffee and took what are euphemistically called "comfort" breaks. From the end of 1993 I have no doubt that far from being pressurised the typing department was actively being run down. There is no evidence that either her equipment or her posture were causative of any injury.*

### **King -v- Coopers and Lybrand Ltd Leeds County Court, April 2001**

In this case the Claimant, a secretary, sought damages for a "non specific" upper limb disorder. The Judgment refers to "EEC Regulations", but it is clear from the context that the Judge was referring to the DSE Regulations:

*As far as equipment is concerned I accept [the evidence of the Defendant's National Health & Safety Co-ordinator] that the "work stations" complied with EEC Regulations, however, I find the procedures prior to 1994 for assessing risk and making secretaries aware of the same and available equipment were lax. In the event, I am not satisfied on the evidence that such laxity materially caused or contributed to the Claimant's condition.*

**Sharp -v- Yorkshire Bank  
Manchester County Court, April 2001**

The Judgment in this case is interesting in that while it makes no explicit reference to the DSE Regulations and is arguably not a Judgment in a claim for a WRULD, the Defendant appears to have been found negligent in not complying with the requirements of the DSE Regulations. The Claimant, a part-time cashier, claimed damages for the acceleration of degenerative changes in her back. The reason this 'back injury' case was included in the analysis of Judgments in claims for WRULDs was that the Claimant's injury manifested itself as neck and arm pain.

The Judgment refers to the Claimant completing "self assessment forms" in June 1993. It is known from other sources that these self assessment forms were in fact the Defendant's approach to the requirements of Regulation 2 of the DSE Regulations, i.e. risk assessments. The Judge, Mr Recorder Hull, states:

*It is apparent from those forms that the Claimant was pressing her request for a footstool and indicating that she was experiencing pain in the course of her work. She also indicated that she did not know how to adjust the seats to make them comfortable. Those forms were apparently sent onto to Head Office but they seemed to have lain unheeded. The clear evidence is that the Defendants failed to respond to those self assessment forms.*

The Judge subsequently states:

*Upon the evidence I have described thus far, I have come to the conclusion that there was negligence upon the part of the Defendants from June 1996 or shortly thereafter, and continuing, until the Claimant departed their employment in January 1996 in that they:*

- a) Failed to heed the Claimant's complaints about her work situation which as I find it dated from at the latest June 1993 when she completed the assessment form.*
- b) Failed to provide her with a suitable footstool until one provided in April 1995.*
- c) Failed to provide her with suitable chair which was capable of adjustment.*

*In addition to those breaches at common law both Counsel accepted before me that breach of statutory duty would add little if anything to the Claimant's claim. .... Accordingly I make no finding in relation to any breach of statutory duty.*

## **6.2.2 Cases involving a concession relating to a breach of the DSE Regulations**

**Donnellan -v- Halifax Building Society  
Manchester County Court, November 1999**

In this case the issue of whether or not the Claimant was a "user" within the meaning of the DSE Regulations was potentially a matter for the Court to decide. However, at trial, it was conceded by Counsel for the Claimant that the Claimant was not a "user" within the meaning of the DSE Regulations, due to the limited use she made of DSE while working as a mortgage adviser.

**Conaty -v- Barclays Bank plc  
Central London County Court, April 2000**

In this case, to which reference has already been made in Chapter 5, a concession at trial by Counsel for the Defendant concerning breaches of the DSE Regulations effectively determined the outcome. This is a case in which in order to understand fully what some may consider to be

the Judge's controversial findings and their implications it is necessary to quote certain passages of the Judgment in full.

The Judge states:

*In his final speech [Counsel] for the Bank accepted that they had indeed been in breach of statutory duty. The statutory regulations which apply to the Claimant's work in the accounts section included the Health and Safety Display Screen Equipment Regulations 1992, which obliged the Bank to analyse the Claimant's work station for the purpose of assessing the health and safety risks to her, so to plan her activities so that her work at the screen was periodically interrupted by breaks and changes in activities and to train and advise her about health and safety. The Claimant worked at whatever desk was appropriate for the particular task she was undertaking, whether for example opening or closing accounts. There were adjustable chairs but she tells me, and I find, keyboards with limited scope for movement, which in any event she was not instructed to position suitably, and no foot rest, She is only five foot tall. She was not instructed either as to the correct posture for use of a keyboard or as to the importance of assuming a correct posture. She habitually therefore adopted what is agreed to be a bad posture whereby her wrist was flexed and whilst using the numeric keys subject to ulnar deviation instead of being kept straight, as is recommended. The keyboarding on which she was employed was largely on the numeric keys as opposed to the alphabetic keys, She used only her right hand and made no use of her thumb in keyboarding, which accordingly she stuck out to the side of her right hand. The absence of training and even appropriate posture were not seriously challenged in evidence, although denied in the pleadings. It is said that she had only to ask for a foot rest for it to be supplied, but even if that were a defence to the breach of the Regulations I am satisfied that that is not so as a matter of fact.*

It should be noted that it was common ground that the Claimant had suffered right De Quervain's Syndrome but that she did not use her right thumb to enter data. The Judge goes on to say:

*The Claimant adopted an approach to her work which no doubt explains in part her exemplary speed of work. She prepared her work load so as, so far as possible, to perform all sorting and handwriting for a number of accounts together and then to concentrate on the keyboarding. This she thought more efficient than taking each account separately and interrupting keyboarding with other tasks, although it transgresses advice to interrupt the keyboarding with other activity. The Bank, I am satisfied, made no attempt to plan her work otherwise. I am therefore satisfied that the concession that the Bank was in breach of its statutory duty was rightly made.*

*The real issue in this case however is whether such breach caused the injury from which the Claimant undoubtedly suffers.*

Both Medical Experts agreed that the Claimant's suffering from De Quervain's Syndrome at her age (22) without either a traumatic or a hormonal cause was a misfortune such as had not been identified in cases discussed in the literature or paralleled in the direct experience of either Medical Expert. After reviewing the medical and ergonomics evidence, the Judge states:

*[Counsel for the Claimant] relies on the fact that the regulations which the Defendant now admits to have breached are intended to protect the employee against upper limb disorders. He therefore invites me to conclude that the breach is probative of the causation. If he had reduced his submission to syllogistic form as follows: (1) the regulations are to protect*



*against upper limb disorder; (2) this is an upper limb disorder; therefore, (3) the breach of the regulations caused the disorder, the logical fallacy would be obvious. He also relied, however, on the coincidence of time between the onset of the pain and the concentrated work which the Claimant says she undertook immediately before it.*

After reviewing the factual evidence, the Judge states:

*In such circumstances I do conclude that the temporal relationship between the activity up to Friday, 11th November 1994 associated, as I find, with pain during the working day on Friday and acute pain that night does make it more probable than not that the disorder is work related. As such I have no difficulty in holding that it arises from the poor posture adopted by the Claimant which itself was caused by the Defendant's breaches of statutory duty, both in the layout of the work station and lack of training and concentration of keyboarding which I have identified.*

*I therefore award the Claimant £235,000 damages.*

It is by no means clear from the Judgment precisely how the Defendant's admitted breaches of the DSE Regulations caused or materially contributed to the Claimant's right De Quervain's Syndrome.

### **6.2.3 Cases involving a finding relating to a breach of the DSE Regulations**

Turning now to the cases in which there was a significant finding, as opposed to a concession, with respect to alleged breaches of the DSE Regulations.

#### ***Westray -v- Midland Bank plc Manchester County Court, June 1997***

In this case the Claimant, a secretary, alleged she had suffered Radial Tunnel Syndrome prior to the Regulations coming into force. However, she worked for a short period after January 1993. The Judgment states:

*However, from January, 1993, the Display Screen Equipment Regulations came into force. Regulation 4 of the Regulations reads:*

*“Every employer shall so plan the activities of users at work in his undertaking that their daily work on display screen equipment is periodically interrupted by such breaks or changes of activity as reduced their workload at that equipment.”*

*The guidance also appears on the same page at 45(c):*

*“Short frequent breaks are more satisfactory than occasional longer breaks, eg, a 5 to 10 minute break after 50 to 60 minutes continuous screen, hand or keyboard work is likely to be better than a 15 minute break every 2 hours.”*

*The defendants argue that the guidance is simply a guidance and imposes no duty on employers to give breaks of any particular frequency or interval. I agree with their interpretation of the Regulations.*

#### ***Simpson -v- Dunham Bush Ltd Southampton County Court, June 1999***

In this case it was common ground that the Claimant had suffered bilateral Carpal Tunnel Syndrome which required decompression, the central issue was whether or not this was caused

by the Claimant's use of DSE in 1995. The reference in the Judgment to the DSE Regulations arises from the evidence of the Claimant's Ergonomics Expert:

*Dealing with paragraph 4.2.1 of [his] report, it reads thus: "If the defendant provided Mrs Simpson with a keyboard that met the relevant standards there cannot be a foreseeability of her condition developing as a result of that change alone. However, I would argue the defendants were under a duty to assess Mrs Simpson's work station and system of work. Had they done so, I have no doubt that they would have classified Mrs Simpson as a user within the definition of the regulations. They should have decided that several risk factors were present and seen to it she was instructed suitably with guidance on arranging her equipment, keying posture, work schedules and the need to report difficulties."*

*Then he sets out how, on his inspection of the premises and work place, he considered the defendants had failed in their statutory duty. It was that, "Mrs Simpson should have been classed as a user and her system of work should have been assessed under Regulation 2.1. The risks identified during such an assessment should have been reduced to the lowest level reasonably practicable, Regulation 2.3. Her work station should have been reviewed in line with Regulation 2.2 when her work load changed significantly and whenever there was a significant change in the hardware. The employers failed to meet the minimum equipment requirement imposed by Regulation 3."*

*Paragraph 5 at the bottom of that page reads: "The defendants failed in their duty to plan Mrs Simpson's daily work routine regarding breaks in accordance with Regulation 4." He again refers to the Health and Safety's guidance in the regulations regarding that.*

When dealing with the issue of liability, the Judge states:

*I do not propose to spend very much time on this because the answer is so obvious that they clearly were in breach of statutory duties, and also negligence. Neither of those in fact were, as I have already indicated, very seriously challenged or disputed. I am satisfied that most of the breaches which have been alleged have been proved.*

*It also seems to me quite incredible that the person responsible for implementing these regulations, Mr C, was in total ignorance of the Health and Safety Display Screen Regulations of 1992. In those circumstances, it is not surprising that he failed to put them into practice.*

The Court's interpretation of the Defendant's statutory duties in this case does not appear to raise any significant issues about how a reasonable employer might be expected to have implemented the DSE Regulations. It is clear from the Judgment that the opinions of the Claimant's Ergonomics Expert were not seriously challenged and that the Judge effectively adopted those opinions in his Judgment.

### ***Sanders -v- University of Hull Kingston upon Hull County Court, November 1999***

In contrast to the case of *Simpson -v- Dunham Bush Ltd* in which the Judge referred to the Defendant's "total ignorance" of the DSE Regulations, in the case of *Sanders -v- University of Hull* the Judge refers to the Defendant as being "acutely aware" of the DSE Regulations and their approach "faultless".

The passage of the Judgment which makes reference to the DSE Regulations states:

*The University, as I find, was astute to comply with the Regulations and its obligations at common law. Indeed my assessment of the staff who were called to give evidence on behalf of the University was that they were profoundly conscientious to a degree that I have not*

*ever previously encountered before in many years of trying this sort of case. They were both acutely aware of the Regulations and aware of the risk that the law is designed to minimise and avoid by the imposition of these Regulations. That being the case however as a general observation if it appears that they have fallen short of those standards required in this particular case then that general approach would not excuse them.*

*I find that the Defendants did instruct the Claimant and others in her position about the Regulations and the risks that they were intended to avoid. In about November of 1993 there was a class training course involving information and watching the video which gave the staff, and the Claimant in particular, general guidance on the Regulations and the methods by which potential sources of stress could be recognised and avoided.*

*It is necessary here I think to deal with the question of the work station which she was required to work at after the time that the Applemac was installed because it seems to me that issue is very much at the heart of this case.*

*I have been provided with some photographs taken in 1998. Photograph 4 shows the VDU and keyboard installed on in effect two tables placed together to make one larger surface. If the work station was like this from the time of its inception it would have been satisfactory to the ergonomists immediately after installation. But the Claimant contends that it was only in that condition from about a month or so before the onset of this acute pain. There is little doubt that had the Applemac and its peripherals been installed on the table which had been previously provided for the smaller Compu-graphic machine then that would have been a clear breach of the Regulations. It would undoubtedly have caused the potential difficulties which together over a long period of typing would lead to the risk of exactly this type of upper limb disorder injury.*

Towards the end of the Judgment there is a further reference to the Defendant's implementation of the DSE Regulations:

*I acquit the University of any negligence or breach of the Regulations. It seems to me that what they did was adequate and proper within the Rules and Regulations and that their approach to them was faultless.*

The references to the Defendant being "acutely aware" of the DSE Regulations and their approach "faultless" is perhaps somewhat surprising, given that it would appear from the Judgment that the Claimant did not receive the information and training required by the DSE Regulations until November 1993 and that no risk assessment of the Claimant's workstation was carried out until January 1994.

### ***McPherson -v- London Borough of Camden Clerkenwell County Court, May 1999***

It is interesting to compare the employer's approach to the implementation of the DSE Regulations in *Sanders -v- University of Hull*, which some might consider tardy but which the Judgment refers to as "faultless", with the case of *McPherson -v- London Borough of Camden*. The Judgment in this case is long and complex and in order to understand fully the circumstances in which this claim arose and what some may consider to be the Judge's controversial findings concerning an employer's duties in such circumstances, it is again necessary to précis substantial parts of the Judgment and to quote certain passages at length.

Mrs McPherson, who is dominantly right-handed, alleged that her left sided De Quervain's syndrome arose from her keyboard operations undertaken as part of her employment as a Senior Administration and Accommodation Officer in Camden's Housing Department between June 1993 and January 1994. She claimed that the condition was caused by her excessive use of her left thumb whilst operating her keyboard, as a result of both the excessive overall use of that

keyboard and of the excessive periods of its uninterrupted use. This usage was allegedly caused by the Defendant's failure to assess her keyboard usage and to give consequential advice to her as to safe working periods and overall working time that she could devote to such usage. Mrs McPherson further alleged that had the Defendant undertaken its statutory duty in these matters, her usage would have been modified such that the condition would not have occurred at all or, at the very least, the risk of the condition occurring would have been substantially reduced.

Mrs McPherson worked in the Homeless Persons Section of Camden's Housing Department for nine and half years up to her retirement. By 1993, she had become a Senior Temporary Accommodation Officer. In that year, the Homeless Persons Section was significantly re-organised. Until the 1993 reorganisation, she had not been involved in any significant use of a keyboard. The reason for the significant increase in the use of a keyboard by Mrs McPherson in June 1993 was three-fold. Firstly, the Homeless Persons Section was computerised following its re-organisation and a personal computer was placed on each desk. Previously, there had only been two computers used communally by the whole Section. Secondly, the role of Senior Administration Officer involved significant keyboard usage. Thirdly, the new joint Section required many new procedures and reports to be prepared for use in the running of the section. A further change was that Mrs McPherson was required, for the first time, to prepare and receive much email.

Mrs McPherson worked in that post until the beginning of January 1994 when she and her line manager were swapped round and she became Senior Accommodation Officer. It would appear that this occurred soon after the resumption of work following the Christmas and New Year break. Within a few days of that change, in early to mid-January 1994, Mrs McPherson began to experience intense pain in her left thumb and shooting pains up her left arm towards her elbow and neck. The pains had first been noticed in late 1993. As a result, she was required to stop all keyboard use on 1 February 1994, following a visit to, and advice from, Camden's Occupational Health Adviser on 31 January 1994. When she changed posts with her line manager in January 1994, she had similar duties albeit that the amount of keyboard work was reduced.

After quoting Regulation 2 (1) (b) and Regulation 4 of the DSE Regulations in full in the Judgment, the Judge says:

*No assessment or workplan of any kind was undertaken by Camden in June 1993 when the H.P.S. was set up, even though each employee in the H.P.S. was provided with a new computer for his or her own exclusive use. It is instructive to observe what happened when Mrs McPherson reported her thumb complaint to Camden's Occupational Health Adviser in February 1994. The locum adviser in question was Ms S. She worked in the Occupational Health Unit and it is clear that unit, amongst other duties, carried out the type of assessment and advice-giving to Camden's computer staff that is envisaged and required by the Regulations. Indeed, instructions should have been given by Ms W and Mr G that such assessments should be carried out for the staff located at the workstations at which the new computers were installed in June 1994 [1993]. Had these instructions been given, one of Camden's Occupational Health Advisers would have undertaken an exercise similar to that performed by Ms S in February 1994 and would have given Mrs McPherson similar advice to that she received from Ms S seven months later.*

*Ms S recorded the steps she took in advising Mrs McPherson and the advice that she gave her in a memorandum sent to the officer in charge of the Personnel Unit of the Housing Department, Ms I dated 18 February 1994. The relevant part of this memorandum reads as follows:*

*"As another part of this department's intervention, I undertook a detailed work station assessment on 17 February 1994 and, as a result, would like to make these recommendations for when Ms McPherson returns to her current job:*

*1. Ms McPherson was advised to rest her keyboard flat on the desk, as it was tilted up at an angle of approximately 10 degrees.*

*2. Due to the depth of her keyboard, Ms McPherson should be provided with a wrist rest to enable her to occasionally rest her wrists and hands during typing and prevent hyperflexion (exaggerated upward bending) of her wrists.*

*I have also given her occupational health advice regarding her posture etc, and in total these recommendations should help prevent a recurrence of this problem."*

*Mrs McPherson was also given advice by the physiotherapist who saw and treated her thumb and wrist after the onset of De Quervain's. This was to the effect that she should not use the keyboard for more than 50% of the working day and should take regular short breaks from the keyboard. The advice of the physiotherapist confirms that Mrs McPherson was not taking such breaks on a regular basis. Mrs McPherson must have told the physiotherapist that this was not happening since the advice proffered Mrs McPherson was to the effect that she should "alter her work so that she can take regular short breaks" from the keyboard. Clearly the advice would not have been phrased in that way had Mrs McPherson not confirmed at that time that she was not taking regular breaks. I find that that contemporaneous statement about her working pattern corroborates and confirms Mrs McPherson's evidence that such regular breaks were not being taken.*

*It is clear to me that had a statutory assessment been made in June 1993, Mrs McPherson would have been advised as follows:*

*1. She should be provided with, and use, a wrist rest and a flat keyboard.*

*2. She should resort to an appropriate posture, which would have been demonstrated, whilst using the keyboard.*

*3. She should take regular breaks from the keyboard, of an uninterrupted length of at least 10 minutes every hour.*

*4. She should not use the keyboard for a total of not more than 50% of the working day.*

*There is no reason to doubt that, had Mrs McPherson been proffered this advice, she would have followed it. She was a conscientious worker. She worked to her job description and fulfilled the duties prescribed for her particular post. She was concerned to preserve her health and was clearly particular in looking after her health. The advice would have been given in the form of an instruction from her line manager which she would have been expected to follow and which could have resulted in disciplinary sanctions if she did not follow it. In those circumstances, I am satisfied that had appropriate advice been given, it would have been followed with the result that Mrs McPherson would have used her keyboard in both posts, in administration up to January 1994 and in accommodation thereafter, to a significantly less extent overall, with appreciably more breaks of much greater regularity so that she never worked for stretches of more than 50 minutes in any 60 minutes and with the use of a wrist rest, flat keyboard and better posture. As it was, her unassessed working methods were at variance with these recommendations in a way which, in each case, was to her disadvantage.*

*Camden's case was that Mrs McPherson did not adduce any evidence as to what advice would have been given to her following the required assessment. In particular, it was suggested that she did not adduce evidence as to the advice she would have got as to the*

*maximum proportion of the working day she should spend at the keyboard and as to the length and pattern of her breaks away from the keyboard. Camden pointed out that the suggested maximum proportion of 50% to be devoted to keyboard usage was given to Mrs McPherson after she had suffered from De Quervain's and when, in consequence, there would be an obvious tendency to limit keyboard usage to a greater extent than would have been the case for someone who had not shown any signs of RSI or of a specific complaint related to keyboard usage. In other words, if Mrs McPherson had received any advice at all as to the maximum proportion of her working day to be spent on keyboard usage at an assessment in June 1993, the advice would have been that the limit would have been significantly greater than 50% of her working day and would have been equal to or less than the proportion of time she actually spent in such work.*

*I do not accept Camden's submissions on this aspect of the case. Firstly, Camden's own pleaded case is that Mrs McPherson contributed to her own loss by falling "to take her allotted breaks of 10 minute away from the keyboard every hour. If Camden's case is that Mrs McPherson had allotted breaks of this type, it must follow that Camden's case involves an admission that it both did advise her to take breaks of this type and, furthermore, would have so advised her had an appropriate assessment of her keyboard activities been carried out. Otherwise, one asks rhetorically, why would Camden assert that it had allotted such breaks to Mrs McPherson? In fact, as I find, no such allotment of breaks occurred but, clearly, Camden believed both that such an allotment had occurred and that it should have occurred. Camden was required by Regulation 4 to provide for regular breaks and, had anyone in Camden turned their mind to the impact of this Regulation to Mrs McPherson, the answer would have been that she should take regular breaks of 10 uninterrupted minutes every hour.*

*Secondly, it is likely that some overall limitation would have been placed on her keyboard activities as part of the assessment required by Regulation 2. Mrs McPherson was advised by her own physiotherapist on 11 May 1994 as follows:*

*"I feel that ultimately she should be able to work at the keyboard for about 50% of her working day because her condition has been treated early and most successfully."*

*Since the 50% advice was given on the basis that Mrs McPherson had been treated successfully, it was given on the basis that she should now be being regarded as being fully fit. It is reasonable to suppose that a competently performed assessment in June 1993 would have reached a similar conclusion that the limit should be 50% of the working day, given that Mrs McPherson was a middle-aged female who had never used a keyboard previously, save for very occasional one-off usage in the immediately preceding period.*

*Camden suggests that Mrs McPherson was contributorily negligent in not taking regular breaks of 10 minutes; in not wearing her wrist brace; and in not requesting an appropriate seat and footrest. Camden also suggest that she failed to follow the instructions of Mr G to stop keyboard usage completely when he gave her those instructions in 1994. However, Camden never provided, nor recommended the use of, a wrist rest; never advised that regular rest breaks of at least 10 minutes duration should be taken; and never considered more suitable furniture. Moreover, Mr G's instruction to stop keyboard use was, once it had been given, followed to the full and Mrs McPherson stopped using her keyboard, save for a limited maximum use of 10% of the working day, a usage which conformed to the advice actually given her by the Occupational Health Unit in early February 1994. Given that Mrs McPherson had never used a keyboard nor a typewriter on a regular basis in any previous job, I do not accept that she should, by using her own initiative without the advice of others, have been expected to take any of the steps suggested by Camden as ones she should have taken without advice. I, therefore, reject the allegations of contributory negligence and find that Camden was in breach of its statutory duties owed to Mrs McPherson.*

Having found the Defendant to have been in breach of its statutory duties, the Judge then went on to consider the cause of the De Quervain's Syndrome in the Claimant's left wrist, which it was common ground that the Claimant had developed. The Judge concluded that Mrs McPherson had satisfied the burden of proving that her condition was caused by, or was materially contributed to by, or that the risk of its onset was significantly increased by, keyboard usage resulting from Camden's breach of statutory duty. Paragraph 41 of the Judgment states:

*In this case, I have found that Mrs McPherson's De Quervain's condition was linked to her keyboard usage. However, the De Quervain's might also have been linked to an underlying predisposition to that condition. There is no way that the possible contribution of such a predisposition, if any, can be ascertained. However, it is clear that limiting the use of both Mrs McPherson's wrist and thumb to the usage that should have been recommended would have significantly reduced the risk of contracting De Quervain's. Equally, usage which significantly exceeds the parameters which should have been recommended, even for short periods, would materially increase the risk of De Quervain's. It follows that, on this ground alone, Mrs McPherson has established the necessary link between breach of duty and damage on the balance of probabilities. On my findings, she has proved that she should have been advised to limit her keyboard usage in defined ways; that she would have followed that advice had it been provided to her; that her actual usage was significantly in excess of that usage; that she was not negligent in adopting that usage; and that her De Quervain's can be linked medically and on the facts of this case to that usage. Mrs McPherson succeeds as to liability.*

The Court's interpretation of the Defendant's statutory duty in this case begs a number of questions about how an employer might reasonably be expected to implement the DSE Regulations. For example: whether a limitation on work at a keyboard to about 50% of the working day is necessary or reasonably practicable for DSE work in general, or for the type of work referred in this case; whether some overall limitation should be placed on keyboard activities as part of the assessment required by Regulation 2, and; whether Regulation 4 requires an employer to provide regular rest breaks of 10 minutes every hour for the type of work referred to in this case.

In their legal text, Smith et al<sup>2</sup>, refer to this case simply by saying:

*In the unreported case of McPherson v London Borough of Camden (1999) it was held that if there had been a risk assessment there would have been changes to the layout of the workstation and rest breaks and periods of alternative work would have been provided; those changes would have prevented the injury sustained.*

***Binns -v- Speechly Bircham***  
***Central London County Court, July 1997***

The best example of a Court, albeit a County Court, explicitly addressing the issue of how the DSE Regulations should be interpreted is to be found in the Judgment in the case of ***Binns -v- Speechly Bircham***. In the passage of the Judgment which refers to the DSE Regulations, the Judge states:

*It does not, however, follow from the fact that the Plaintiff suffered her injury as a result of her employment that the Defendants are liable in negligence, or that they are liable because of any breach in the regulations which have governed the health and safety of users of VDU equipment since the beginning of 1993. Those regulations are the Health & Safety Display Screen Equipment Regulations 1992. They have been made in conformity with a directive of*

*the European Commission made on 29 May, 1990. It is submitted by [Counsel for the Claimant] that having regard to their derivation they ought to be construed in a specific way. Certainly, it must be my duty to construe them so that they do have meaning and effect in serving the purpose which they are clearly directed to - namely, safeguarding the health and safety at work of those who use VDUs. Nevertheless, regulations of this kind impose upon employers obligations (and I suspect maybe even criminal sanctions if they are not complied with). It seems to me that the Court must take some care to derive their effect from their actual language rather than adopting an approach which might be in danger of construing them merely on the basis that it must have been the intention of the regulation that the employer should be required to do everything which would prevent that outcome which I have actually found already did follow from the employment of this particular Plaintiff.*

*[Counsel for the Claimant] relies firstly on Regulation 4. That requires that:*

*“Every employer shall so plan the activities of users at work in his undertaking that their daily work on display screen equipment is periodically interrupted by such breaks, or changes of activity, as reduce their workload at that equipment”.*

*He invites me to construe that regulation as obliging the employer to devise an arrangement which ensures that the employee takes a sufficient number of breaks and/or sufficiently long breaks so as to reduce the employee's workload at the equipment as compared with what it would be if the plan was not devised. I cannot think that that is the requirement of this regulation. The regulation is to apply to all those who engage in work using display screen equipment as a significant part of their normal work. If such significant use places the employee in no danger of injury to health or safety, it cannot be a proper construction of Regulation 4 that nonetheless the employer is obliged to reduce the workload.*

*I think that the regulation means no more than a plan must be produced such that the work at the equipment is periodically interrupted either by such breaks, or by such changes of activity as reduce the employees workload at the equipment. I think that that understanding is in conformity with the guidance which was issued by the Health and Safety Executive in advance of the regulations which is, of course, of no force at all in the construction of the regulation, but is of considerable assistance in explaining the context of the circumstances of employment with which the regulation is concerned to deal. That guidance notes that in most tasks natural breaks or pauses occur as a consequence of an inherent organisation of the work. Therefore, whenever possible, jobs at the display screen should be designed to consist of a mix of screen based and non-screen based work to prevent fatigue and to vary visual and mental demands.*

*The guidance goes on to deal with the circumstances where it is inevitable that the work should contain intensive displays of screen work which are not interrupted. The ordinary course of the Plaintiff's work, in spite of the fact that the majority of her time was in front of the VDU, did not involve uninterrupted periods of work exclusively at the screen. There were therefore changes of activity which reduced her workload at the equipment.*

*The employers in this case, the Defendants, did not directly and specifically plan her work or those of any of the other secretaries employed by them. They did, however, note that the situation which I have described was a normal situation for the majority of their employees and they so recorded it in the guidance which they provided to their employees as part of the documentary support material provided following a training course to which I must refer shortly.*

*It is noted at paragraph 4F of that document that most jobs "incorporate tasks which require the job holder to move away from the keyboard and screen. These should be used as an*



*opportunity to take a break from working at the screen and keyboard and provide a change of posture and a rest for both eyes and hands."*

*I think it is worth noting at this stage that the particular guidance from which I have been reciting went on to say:*

*"Mini breaks of, say, thirty seconds used to stretch and move around are helpful".*

*I think that on the evidence which I have heard I am able to comment that that advice would be misleading, save insofar as it might be relevant to changes in posture as opposed to relief of muscles or tendons which are stretched by the particular exercise of intensive operation of the keyboard.*

*I am not, however, prepared to find that the Defendants were in breach of Regulation 4 of the regulations, having regard to the "plan" expressed in paragraph 4F of the Plaintiff's document. Regulation 6 provides in regard to the provision of training:*

*"Where a person is already a user on the date of coming into force of these regulations, his employer should ensure that he is provided with adequate health and safety training in the use of any work station upon which he may be required to work".*

*The Defendants, on the coming into force of the regulations, immediately organised short courses of training for all their existing VDU operators. The Plaintiff, indeed, attended the first such course early in 1993. Each party had proposed to call expert ergonomists who would have given evidence as to appropriate training in these circumstances. They, however, were able to agree that the training appeared satisfactory in the environment. They observed, however, that it remains possible that an individual may not appreciate the implications of all that they are told.*

*I think that the duty to provide adequate training must be satisfied if adequate training is provided which a person of the intelligence and knowledge of the trainee may reasonably be expected to have followed. If the trainee is inattentive, providing that reasonable efforts are made to obtain her attention and to draw the relevant matters to her attention, I think that there is compliance with the obligation of the regulation.*

*The training which was offered consisted of a half hour or forty minute description of the requirements of safe and healthy operation of the equipment. It was, as I find, almost entirely directed to an analysis of what is called 'the work station', i.e. the physical equipment, the relationship of the operator to the machine, the correct posture, and the like. In those circumstances, as I find, the reference to the necessity for breaks in the course of the use of the machine was incidental rather than a primary matter. Insofar as Mrs W, who conducted the training, sought to assert more, when she came to give oral evidence, than she had recorded in the written statement which she had first prepared, I do not accept her evidence. The way she puts it was that she explained the need, for example, to avoid resting the wrists on the work surface, and to use wrist pads if that was required. Then she went on,*

*"I mentioned the need to take regular breaks away from the keyboard and screen". I think it may be on the verge of consideration whether training so described was adequate in respect of the need for the provision of breaks. I am, however, persuaded by the agreement made between the experts who have got experience of such training, to feel that I should not find, on the balance of probabilities, that there was in fact a breach of Regulation 6. There is, however, reliance also on Regulation 7(2) which requires the provision of information. The regulation reads:*

*"Every employer shall ensure that users at work in his undertaking are provided with adequate information about such measures taken by him in accordance with his duties under..."*

*and then there is cited Regulation 4 which is the regulation with regard to the planning of activities to which I have already made reference. I do not think that that regulation can possibly be complied with by providing no information. The only possibility of alleging that information was provided is the passage in the guidance contained as part of the training course to which I have already made reference. However, it is not expressed in terms of being a provision of information as to the planning of the daily work routine of the users.*

*I conclude, therefore, that Regulation 7(2) was not complied with. That, of course, is not the end of the question. Before that finding becomes of any materiality it is necessary to consider whether the breach of the regulation has had at least a significant causative effect upon the injury of which the Plaintiff complains. The Plaintiff tells me, and I accept, that she did not appreciate the significance and purpose of the taking of breaks, and the making of changes of activity. That she was told of this in the course of her training, that she knew that her training was concerned with health and safety, I do not doubt. For the reasons which I have already given, however, I think it is perfectly reasonable to assume that she did not, indeed, understand the context of the training in relation to possible damage to her upper limbs as opposed to the desirability of relieving her posture or resting her eyes.*

*I do think that if the obligation under Regulation 7(2) had been complied with so that the Plaintiff had been informed that the employee both had a duty to plan her activities so as to ensure interruptions in her workload at the equipment, and had been told that the plan of the employer was that she should use the changes of activities which were inevitable in order to ensure a proper pattern of interruption, her approach to her work would have been different. I do not find as a fact that the periods of intensive work when she was working for Ms S were themselves the cause of her injury. However, I do note that she obtained relief in regard to her pain by so arranging her work that she increased the number of interruptions which she made in frequency, if not in length. That is an approach to her work which she could, and I think would, have made if she had been informed that that was the basis of her employer's plan for appropriate relief of the daily routine at the visual display equipment.*

*Accordingly, I do find not only that there was a breach of Regulation 7(2), but also that the breach was sufficiently causative of the injury which the Plaintiff suffered as to render the Defendant liable in damages.*

### **Gallagher -v- Bond Pearce Bournemouth County Court, February 2001**

Another more recent example of a Court addressing the issue of how the DSE Regulations should be interpreted is to be found in the County Court Judgment in the case of **Gallagher -v- Bond Pearce**. The Claimant, a secretary in a firm of solicitors, claimed damages for diffuse pain in her wrists and arms allegedly caused by typing. It is understood that this Judgment is the subject of an appeal. In the Judgment at first instance, H H Judge Tyzack states:

*On 14th December 1992 an audit was carried out by Mr. O of the Defendants. This was a Health and Safety audit, which the Defendants felt was required in anticipation of the coming into force of the Health and Safety (Display Screen Equipment) Regulations 1992. (For the sake of simplicity I shall refer to them hereafter as the DSE Regulations.) They came into force on 1st January 1993. The Claimant told me that Mr. O was with her for about ten minutes. She understood that this was nothing more than an equipment check. I have not heard Mr. O give evidence about this audit.*

*Mr. O went through a prepared checklist with her which identified certain matters that needed attention: namely, that she required a document holder, a footrest, her chair needed replacing, and blinds were to be fitted to the window or windows of the office where she worked.*

*I have been referred to the detail of the DSE Regulations by [Counsel for the Claimant], and I am quite satisfied, especially having heard the Claimant's engineering expert and the Defendants' expert, that this audit by Mr. O was manifestly inadequate. In particular, the Defendants failed to ensure that prior to this audit the Claimant was given any training, a specific requirement of Regulation 6 of the DSE Regulations, and which in my judgment was an absolutely essential prerequisite to the completion of any checklist. I am quite satisfied that the Claimant herself had no idea at all that this audit was purporting to be a risk assessment carried out pursuant to the DSE Regulations. The guidance notes to the DSE Regulations at page 446 provide as follows - and I set out in my judgment paragraphs 19 and 21 in full, including (a) to (d).*

*I also find that there was no adequate regard to urgency so far as the identified action was concerned. I accept the Claimant's evidence that the document holder was not provided until about November 1993 - nearly 12 months later - and the footrest was provided sometime after that. That was hardly consistent, in my judgment, with paragraph 42 of the guidance notes to the DSE Regulations. I quote from paragraph 42(a)*

*"If assessment of an existing work station shows there is a risk to users or operators, the employer should take immediate steps to reduce the risk."*

*So far as the provision of document holders was concerned, Mr. S said that the reason for the delay was that the Defendants wanted to try out several first, and that this took time. I am afraid I do not accept that explanation as a valid reason for nearly 12 months' delay. It is common ground that no audit or assessment was ever carried out by the Defendants into the overtime work station which the Claimant used from August 1994.*

*I am also quite satisfied that the Defendants were in breach of regulation 4 of the DSE Regulations. The text of this is set out on page 434 of the document before me, and reads as follows:*

*"Every employer shall so plan the activities of users at work in his undertaking, that their daily work on display screen equipment is periodically interrupted by such breaks or changes of activity as reduce their workload on that equipment."*

*The notes to this regulation are set out at page 453, paragraphs 43, which I set out in full in this judgment, and paragraphs 46 and 47.*

*However, after the audit was completed in December 1992, I find that the Claimant's daily working routine continued in exactly the same way as it had before. This is consistent with my overall finding that the Claimant was working in a very busy commercial department for a successful and hard-working partner. The work which the Claimant was required to type was, as I find, very often urgent, and Mr. W was an exacting boss, often requiring work to be retyped after changes or amendments had been made. He for his part valued the Claimant's work, as he told me, and indeed as the Claimant herself told me, and I accept that he did not like his work being typed by anybody else. He said in evidence, in terms, that he rated the Claimant highly, and assessed her as "very good". He never felt that she did not pull her weight. For her part, she liked working for him. She liked being part of a team with him and was quite happy to work hard for him.*

*In that climate I find that the Defendants did not apply their minds adequately to the necessity for rest breaks. It must follow that I find them to be in breach of regulation 4. They only tried to comply with that regulation much later, namely in about March 1995. Of course, the fact that I find the Defendants to be in breach of regulations 2, 4 and 6 of the DSE Regulations, as I do, does not inescapably lead to the conclusion that they are liable to the Claimant in this action.*

*I return to the history. In August 1993 the Claimant was off work about a month, suffering from stress and anxiety. This related to problems she was having at home, in that her husband had been made redundant and their home was in the throes of being repossessed.*

*On or about 16th November 1993, the Defendants assert that they provided the Claimant with a memo and an information pack relating to the DSE Regulations. For her part, she has no recollection of receiving this information. Mr. S told me that he was responsible for sending it out. However, he was unsure as to exactly what he did. He said it may have gone out by hand, or it may have been placed in the department's pigeon hole for distribution by the post room staff.*

*Having heard all the evidence on this issue, whilst I accept that the Defendants intended to distribute it to all relevant members of their staff, I am not satisfied that the Claimant did receive hers. These were, after all, very important documents, which the Defendants well knew, or ought to have known, purported to show that they had complied with regulation 7 of the DSE Regulations. That provides as follows:*

*"(1) Every employer shall ensure that operators and users at work in his undertaking are provided with adequate information about (a) all aspects of health and safety relating to their work stations, and (b) such measures taken by him in compliance with his duties under regulations (2) and (3) as relate to them and their work.*

*(2) Every employer shall ensure that users at work in his undertaking are provided with adequate information about such measures taken by him in compliance with his duties under regulation (4) and (6)(ii) as relate to them and their work.*

*(3) Every employer shall ensure that users employed by him are provided with adequate information about such measures taken by him in compliance with his duties under regulations (5) and (6)(i) as relate to them and their work."*

*This document was not simply an ordinary memo to all employees. Bearing in mind its importance, a degree of formality as to its circulation would in my judgment have been expected of the prudent employer. For example, handed individually to each relevant employee with a short verbal explanation as to what it was, and that it was important for its contents to be read and understood, and for any questions about it to be directed to a particular person. I could envisage the prudent employer requiring those who had received the pack to indicate by signature or initials that each had done so. I am also quite satisfied that had the Claimant seen it, she would probably have remembered seeing it.*

Towards the end of his Judgment, H H Judge Tyzack states:

*As to foreseeability, I am quite satisfied that it was reasonably foreseeable that the Claimant would suffer an injury of some kind to her upper limbs if insufficient attention was paid to such factors as her work station, the volume and intensity of her work, the provision of proper rest breaks, and the existence of a varied working routine. The Defendants, in my judgment, knew or ought to have known that there were health risks to their secretarial staff from keyboard work if inadequate attention was paid to such factors. I accept the submission of [Counsel for the Claimant] that the Claimant does not need to prove that the actual injury suffered by the Claimant was foreseeable. It is sufficient if the damage was similar in kind to that which was foreseeable, such as cramp or tenosynovitis. I am also quite satisfied that such risks have been well known for many years.*

*And specifically on the issue concerning the duty of care, the Defendants in my judgment owed the Claimant a duty of care not to expose her to the risk of suffering injury to her upper limbs, and an allied duty to take reasonable steps to reduce such risks to the minimum reasonably possible. In my judgment, they are in clear breach of that duty in addition to*

*being in breach of statutory duty, as I have set out above. Those breaches are, of course, very much interrelated.*

*I am satisfied that the Claimant's injury to her arms and wrists was caused or contributed to by those breaches. Accordingly, for all those reasons, I give judgment for the Claimant.*

### **6.3 MANUAL HANDLING OPERATIONS REGULATIONS**

At the start of the previous section dealing with the interpretation of the Health and Safety (Display Screen Equipment) Regulations it was possible to give an indication of the proportion of Judgments in claims associated with DSE use which made reference to the DSE Regulations. The same is not possible for the MHO Regulations. While from a legal perspective there may be some uncertainties concerning the boundaries and definitions of DSE equipment and DSE use, it is a relatively simple matter to identify cases in which the allegedly injurious work involved the use of what a lay person would readily identify as a DSE workstation. It is far harder, given that 'manual handling operations' is such a nebulous concept, to identify cases in which the allegedly injurious work could be said to involve a manual handling operation. Indeed, one of the issues which emerges from the analysis of the Courts' interpretation of the MHO Regulations is the type of work covered by the Regulations.

Of the cases in which Judgments had been obtained by the 30th June 2001, there is implicit or explicit reference to the MHO Regulations in only nine Judgments. All these Judgments are at County Court level.

#### **6.3.1 Cases which make implicit or passing reference to the MHO Regulations**

##### ***Conyon -v- Manor Bakeries***

##### ***Walsall County Court, November 2000***

In this case the Claimant sought damages for "bilateral repetitive strain injury". The Judgment refers to an alleged breach of statutory duty under the MHO Regulations, but the allegedly injurious work is not described and there is no indication of which parts of the MHO Regulations were allegedly breached. The Judge considered the medical evidence "as a preliminary yet definitive issue" and having found that the Claimant had failed "to prove on the balance of probability any causative link between her symptoms and her work" did not address "the wider aspects of the case on liability" in the Judgment.

##### ***Lindsay & Johnson -v- Claremont Garments Ltd***

##### ***Newcastle upon Tyne County Court, January 1998***

In this case the Claimants sought damages for injuries allegedly caused by ironing. There is a brief reference in the Judgment to the MHO Regulations:

*The movements required of Mrs. Lindsay and said to have been causative of her injury were the crab like movements of the left hand. This was but a part of her job. There was, in my judgment, no rapid repetitive actions nor twisting and gripping movements required. There was no forceful use of the muscles in a repetitive way, nor were the muscles used at great speed for prolonged periods, nor was she working at the limit of her range of movement. There was nothing faulty in the design of or the supply of the equipment or plant. The targets set out for the work were carefully worked out and accepted by the workers. There was, I find, no pressure by the management for the workforce to meet unreasonable targets.*

*There was minimal force, no postural difficulties. I find nothing in the task that she had to carry out that would alert the reasonable employer to any danger. There was, I accept, no reason why any reasonable employer could be expected to suspect that the system of work adopted would lead to the type of injuries sustained. There was an obligation, I find, to look*

*at the task of pressing anew when complaints of pain and difficulty were made, but I find that even if that had been carried out, as the defendants concede, in about December, 1991 there was nothing that could or should have been altered in the system of work.*

*In Mrs. Johnson's case minimal force was required to depress the membrane switch of the industrial iron used. No criticism, in my judgment, could be made of the equipment provided or the targets set. The complaint was of repetitive action of the vertical steaming movement. There was proper equipment provided. No movements were at the limit of the range of movement. There were no postural difficulties. The work station was well designed I find that in her case as well the three key elements of undesirable force, bad posture and high repetition were not present.*

*For the defendants it was conceded that their duty was to carry out a review of the pressing task in December, 1991. There is now the formal obligation imposed as from the 1st January, 1993 by the Management Regulations, 1992 and the Manual Handling Regulations, 1992. It is accepted that by that date the provision of elasticated supports and the complaints of arm pain by certain of the employees should have prompted a review, as would the state of knowledge that a reasonable employer within the garment industry ought to have had. I accept that had this been done no fault would have been found in the system of work or the equipment at the factory.*

### **Mainprize & Gill -v- Cranswick Country Foods Ltd Kingston upon Hull County Court, May 1999**

In this case the Claimants sought damages for upper limb injuries allegedly caused by their work as skilled butchers. The Judge makes brief reference in the Judgment to the MHO Regulations, but was clearly more concerned with the Defendant's negligence which he describes as "amounting to recklessness":

*In January 1994 the Defendants were required to produce a Health and Safety Policy and carry out an assessment under the Manual Handling Regulations (Vol B 252 at Page 270 and in particular at Page 278/279). At page 281 the Defendants observe "repetitive work done by boners" and under the column for recommendations considered "tea breaks and switching activities". In the action taken column there was either no reference to that part of that section or the initials "OK" appear. This observation was inserted without any consultation with any of the employees who were working on the line and who would, in my judgment, have welcomed additional breaks and ought, in my judgment, further, to have had some job rotation (either on a daily, half daily, or even hourly basis). The Defendants' consideration of these safety issues was perfunctory and superficial at its highest and, was more probably, non existent. These men were engaged in tasks (not only on the shoulder line but also on the other lines) in which they were handling meat which was sometimes very chilled (thereby requiring more effort) and were engaged in work which carried (even to a layman) an obvious risk to fingers, hands and arms. There is absolutely no evidence whatsoever to suggest that the Defendants took any professional advice on the safety, health and welfare of their employees notwithstanding complaints from their employees or the huge publicity during the 1980s relating to upper limb disorders caused by repetitive work.*

*The Defendants failed to provide any proper education to their employees as to how they might minimise or reduce the risk of strains etc, and gave them no warnings either as to the risk nor as to the need to report symptoms immediately (notwithstanding the fact that there was no works doctor or works nurse on site). Furthermore, and most importantly, they gave them no advice and education as to the increased risk which they faced upon a return from holiday or when commencing a completely new task. The medical evidence clearly established that the failure to introduce any preventative measures (eg increased rest breaks and/or a gradual return to repetitive activity after holidays) did materially increase the risk*

*of injury. The Defendants argue that that alone did not amount to them being negligent. I profoundly disagree. It seems to me that there has been by these Defendants the most abject failure to consider and implement the most simple and basic safeguards for the health and safety of their employees. In my judgment, being on piece rate, the Claimants ought to have been allowed to have such breaks as they wished themselves and should not have been required to work for such periods of time as the Defendants thought proper. It is obviously necessary for the Defendants to require a certain minimum production from their employees but, that having been achieved, an employee on piece rate ought to have been allowed to earn as little or as much above that figure as he or she considered reasonable. The consideration by that employee of what was reasonable depends upon the Defendants giving to them proper education, information and warnings as to the risks involved in the work (even though the risks may appear to be self obvious the employees require clear warning that the risks could involve long term injury). Furthermore the Defendants (and not the Claimants) knew that the risks were increased upon return to work after holiday and ought to have made allowance for such in the production rate they required of their employees on return and ought to have given proper education to their employees as to the reasonable steps they should take to protect themselves.*

*In my judgment by their gross negligent (amounting to recklessness) these Defendants turned what was a known and foreseeable risk to their employees engaged in these manual operations into an almost inevitable consequence that most of their employees would suffer significant aches and pains and some would inevitably suffer permanent injury.*

### **6.3.2 Cases involving a finding relating to a breach of the MHO Regulations**

#### ***Rance -v- Lomax Sayers Ltd Plymouth County Court, April 2001***

In this case the Claimant successfully claimed damages for tendonitis arising from her work as a Horticultural Assistant. Mr Recorder Donne begins his Judgment by describing the Claimant's work:

*In the Spring and Summer of each year, her main job was to prepare pot plants for marketing. There were two stages of preparation of pot plants - grading and marketing. Both stages needed much the same work but the grading stage (carried out twice) was easier in that the material at the base of the plant was rather easier to remove.*

*The Claimant spent about 90% of her time preparing the plants and about 10% loading up the van and watering. The loading of the van would take place every 2 to 3 days and would take about a morning. Watering would be done on the path with a hose the day before the loading of the van. Very much the bulk of her time, therefore, during these months was taken up with the preparation of pot plants.*

*That preparation, whether it be grading or marketing, involved taking up the pot in one hand, scraping out the moss and algae around the base of the plant and around the inner rim of the pot, removing any dead foliage (probably with the fingers) and then, with a pair of snippers, snipping off the ends of the branches to give an even overall appearance. Lastly, the pot was re-packed with a top layer of compost around the base of the plant.*

*Mrs. Rance's evidence (which I accept) was that the need for removing dead foliage was rare.*

*After completion of the process, the pot was put into a sectioned tray and when the tray of 20 or 30 was full, it was lifted off the work-top and carried over to the place adjacent to the previous tray on the ground. How long that part of the operation took depended on how far away the tray had to be taken. The work-top used by the Claimant was made up of planks on a wheelbarrow which she would move as and when appropriate.*

*The pots varied in size. The pot used most by the Claimant was a 7 cms high square one made of very light thin black plastic-type material. Even with the pot and compost in it, they were not heavy and their weight is not a relevant issue.*

*The Claimant did prepare larger pots 1 litre in size (sometimes 1.5 or 2 litres) but her method of preparing them was different to the smaller ones and not relevant, or certainly not important, to the issues in the case. It is her preparation of the small pots which is.*

It will be noted that the Judge explicitly states that the weight of the pot plants is "not a relevant issue". Later in the Judgment, the Judge again states that "weight is not relied upon by the Claimant as a factor in this case".

*It is the Claimant's case that the process which I have described and particularly the requirement to produce 1,000 pots a day for market led, in 1996, to her suffering upper limb disorders from which in November 1996 she had to give up work.*

After reviewing the evidence of the Engineering/Ergonomics Experts the Judge states:

*I find, based upon this and my own observation of the demonstration of the way Mrs. Rance carried out the task, that her wrists, particularly her left wrist, were at or near the extremes during a significantly repetitive process. It was not a process as repetitive as someone, given by way of example during the evidence, picking up and stacking bricks in repetitive movements of a few seconds only for hours on end, but I think it important to couple the repetition with the requirement (as I find there was) for speed. About 3 pots a minute was, in my view, a high requirement (I would go so far as to say a very high requirement) leading to the need for significant repetitive rotation of both wrists (particularly the left) for long overall periods. I accept that there were "variation breaks" but, even taking those into account, I think that this task, especially as carried out by the Claimant, was foreseeably risky in relation to upper limb disorders. .... Her breaks were 10 to 15 minutes in the morning and 30 minutes at lunch-time. I do not regard these as anything like sufficient to cater for the foreseeable risk of upper limb disorder which I have found there was.*

*I have had regard to the Manual Handling Regulations but, in the light of my findings, I do not think that they add very much. I have already referred to my view as to the need for assessment.*

*I therefore find:*

- (i) That it was foreseeable that each operative would carry out the task in his or her own way.*
- (ii) That there should have been an assessment of the way in which each operative carried out the task.*
- (iii) The way in which the Claimant carried it out was her natural way of doing it i.e. it was perfectly proper and not in breach of any safety requirement or common-sense.*
- (iv) If there had been assessment of the way she worked, it would or should have led to concern about the amount and extent of the rotation of both wrists.*
- (v) That concern could and should have been addressed by ameliorating the process with more breaks and/or a lesser requirement for the number of pots. I add here that I heard no evidence from any lay witnesses for the Defence. It follows that this aspect of the Claimant's case succeeds.*

After reviewing the medical evidence, the Judge states:



*In what I have found an interesting but not easy medical aspect of the case I find, for the reasons set out above, that the Claimant has proved to the necessary standard that she sustained tendonitis as the result of her work but not epicondylitis or any other injury. In 1996 she was clearly suffering from the development of inflammatory nodal osteo-arthritis in both hands which may have been exacerbated by her work, but was not caused by it.*

*Linking my findings in the two aspects of the claim (work and medical) I find that the Defendant was in breach of its statutory duty under the Manual Handling Operations Regulations 1992 under Regulation 4(1)(b)(i) in failing to make a suitable and sufficient assessment of the manual handling operation and Regulation 4(1)(b)(ii) in failing to take appropriate steps to reduce the risk of injury to employees undertaking manual handling operations to the lowest level reasonably practicable.*

*I find that they were negligent in relation to the following particulars of negligence pleaded in paragraph 6 of the Particulars of Claim: (a) (to the extent above), (b) to (j) inclusive and (n).*

*I find that these breaches and negligence were causative of the Claimant's tendonitis suffered increasingly through 1996 and on into 1997.*

*I find also that even if she had returned to work after a period of rest, the resumption of that work would have resurrected her tendonitis.*

*To that extent, therefore, her claim succeeds.*

This case provides an interesting interpretation of the MHO Regulations, given that even though weight was not considered a relevant issue, it was found that the employer should have undertaken a detailed risk assessment under Regulation 4(1)(b)(i).

***Rochester -v- Techfill  
Huddersfield County Court, July 2000***

In this case the Claimant successfully claimed that he had suffered Tenosynovitis while tightening caps on bottles. An Attendance Note of the Judgment refers to the Claimant working at a rate of 16 to 17 bottles per hour for periods in excess of 1.5 hours and to the force required to tighten the caps being approximately 3-4 Nm. The Judge is recorded as quoting Regulation 4 of the MHO Regulations and finding that "in these circumstances no sufficient risk assessment was made and I find the Defendants failed to take appropriate steps to reduce the risk of injury to the lowest level reasonably practicable. The Defendant company should have devised and enforced a regime of rotation." The Attendance Note of the Judgment refers to a breach of Regulation 4 (1)(b)(2) of the MHO Regulations.

***Sutton -v- British Trust for Conservation Volunteers Enterprises Ltd  
Central London County Court, September 1999***

A Note of Judgment in this case refers to the Claimant as having been engaged as a manual worker throughout his working life, primarily on building sites. However, his claim arose from his involvement as a volunteer on the Defendant's community action scheme for the unemployed. Each volunteer 'worked' two days a week and was expected to attend a half day job search. The Claimant undertook five main tasks, namely fencing, gravel loading, clearing of gorse bushes, concrete busting and earth clearing. The Claimant evidently only 'worked' 22 days and the heavy physical work of which he complained, namely gravel loading and concrete breaking, only took place over a total of three days. The Claimant sought damages for Lateral Epicondylitis, which the Medical Experts agreed he had developed in late 1993. The Claimant pleaded breaches of the MHO Regulations. The Note of Judgment states:

*With respect to the Manual Handling Operations Regulations 1992, it is argued by the defendants that these do not apply. Manual Handling Operations are defined in Regulation 2*

*of the Regulations. It is clear that the regulations and their definition as a whole are principally intended to deal with heavy loads but do not seem to include handling of tools and this appears to be supported by the guidance to the regulation.*

*[Counsel for the Defendant] says that the guidance is not binding on the judge, but not only do I find it persuasive, I agree with it and in the circumstances of this case, where it is said that sledge hammers and crow bars were too heavy, I find that the regulations do not apply.*

*Even if I am wrong, I have had no evidence of the weight of the crowbars/ sledge hammers used in this particular case. Even if they were too heavy I do not find that the regulations were contravened, as it was not suggested in the evidence of either Mr Sutton or Mr F that these tools were too heavy. The only complaint was that the work was arduous. In arguing that the regulations to apply, [Counsel for the Claimant] heavily relies on the case of Hawks v London Borough of Southwark, but I do not find that this case takes matters any further and there are very big differences between that case and this.*

**Oliver -v- Tesco Stores Ltd  
Central London County Court, July 1999**

In this case the Claimant successfully claimed that she had suffered an unspecified hand injury in June 1994 when retrieving a 4 kilogram box of sausages from a cage in a store room. The Judge evidently found that the Defendant was in breach of the MHO Regulations, but precisely which parts of the MHO Regulations were breached in this case is unclear from the Judgment:

*Mrs Oliver says that Tescos, her employers, are responsible for this accident because of the chaotic way in which they loaded the cages into the chiller room; there was no semblance of order; and that the cages were such that she could not move them. Apparently they are designed - nobody has quarrelled with this -with two fixed wheels and two swivel wheels. The cages are difficult to move. They will only move in the way in which they are put into the position in the chiller room. It is very difficult to swivel them.*

*She said she tried to move the cages, but they were so heavily laden that she could not move them. She did not think that the task of getting the box of sausages was beyond her capabilities. She could reach the box. She was able to take items out of the cage first of all. She did not ask for anybody else to come and move the cages for her. The delivery men had gone at that stage, and there was nobody else of the warehouse staff around. She had a customer waiting for sausages, so she did not want to keep that customer waiting too long while she went and searched the store to try and find somebody who could perhaps move the cage for her, not that it really occurred to her to do that, because this was not a task beyond her capabilities.*

*She says that Tescos are responsible for this by breach of the Manual Handling Operation Regulations 1992, in that the task involved twisting her trunk because of the position of the cages. The box of sausages was difficult to grasp, because with the length of time she had been in the chiller room her hands were getting cold. ....*

*Tescos were in breach of the regulations because there were space constraints preventing good posture: she had to twist her body to the left to get in to the target cage. She says therefore Tesco's are in breach of those regulations and they are responsible for her accident. ....*

*So what Mrs Oliver is saying is basically she was not given any training in how to manoeuvre the cages or how to unload the cages. She says that she was told how to pick heavy loads from the floor by kinetic lifting. Of course in this case she was not lifting a heavy load from the floor. She was lifting sausages off a shelf which was approximately at waist height. So she says that Tesco's are in breach in not giving her proper training either.*

.....

*There was a hazard presented to Mrs Oliver which should not have been. The cages should have been stacked properly. They should not just have been pushed in. Mrs Oliver said that the delivery men were always in a hurry. They never even left delivery notes of what they had delivered. They just drove the lorry up to the back door, dropped the back of the lorry, pushed off the cages, closed the door, closed the lorry and went off to the next delivery. There was no attempt on their part to put matters in a tidy order so that people could get at the cages without having to run the risk of injuries.*

*Counsel said on behalf of Mrs Oliver that, with the benefit of hindsight, probably Mrs Oliver should have got assistance. But hindsight is a marvellous thing - we can always do everything differently with hindsight. But at the time, faced with this task, Mrs Oliver felt it was not beyond her capabilities. And it should not have been beyond her capabilities to take a small packet of sausages off a cage if the cages had been properly stacked.*

*In all those circumstances I find this accident happened as Mrs Oliver said it did. It happened for the reason that Tesco's did not have a proper system for storing their cages and presented a hazard to Mrs Oliver, which they should not have done, in breach of their statutory duties and in breach of their general duties. In those circumstances I find that Mrs Oliver succeeds in her claim, that the responsibility for this accident rests : fairly and squarely with Tesco.*

***Gissing -v- Walkers Smith Snack Foods Ltd  
Lincoln County Court, July 1999***

In this case the Claimant claimed that packing around 3,000 bags of crisps per hour had caused an injury to his left wrist. The Medical Experts agreed that the Claimant had suffered a discreet episode of either Tenosynovitis or Peritendinitis Crepitans. The Claimant claimed, among other things, that the Defendant had breached the MHO Regulations. H H Judge Heath states:

*..... I have read the Manual Handling, Regulations and are of the opinion that they are neither aimed nor directed at this type of work and even if they were, I am not satisfied that the Defendants did breach the Regulations.*

***Moffitt -v- Norweb plc  
Manchester County Court, May 1997***

In this case the Claimant, an Overhead Linesman, successfully claimed damages for aggravation of Lateral Epicondylitis. The work is not described in detail in the Judgment, but there are references to pulling heavy cables and using heavy tools in awkward positions. The first reference to the MHO Regulations appears in the passage of the Judgment in which the Judge refers to the evidence of the Claimant's Engineering Expert:

*He said and it is agreed that the Manual Handling Operations Regulations 1992 applied to the work of an Overhead Linesman. He asked me to consider whether the Defendants were in breach of Regulations 4 (1) (a) and 4 (1) (b) (1) of the Regulations.*

The Judge subsequently states:

*Having listened to the submissions made by Counsel on behalf of both parties I have reached the conclusion that the Defendant were in breach of the Regulations and were also negligent.*

## **6.4 WORKPLACE (HEALTH, SAFETY AND WELFARE) REGULATIONS**

Only two references to Workplace (Health, Safety and Welfare) Regulations were found in the Judgments in claims for WRULDs which had been obtained by the 30th June 2001.

### ***Sharp -v- Yorkshire Bank Manchester County Court, April 2001***

This case has been referred to above, in 6.2.1, in the context of an implicit reference to the requirements of the DSE Regulations, which resulted in a finding of negligence. The Claimant, a part-time cashier, claimed damages for the acceleration of degenerative changes in her back. In the Judgment, Mr Recorder Hull states:

*In addition to those breaches at common law both Counsel accepted before me that breach of statutory duty would add little if anything to the Claimant's claim. The relevant sections of the Offices Shops and Railways Premises Act were repealed on the 1<sup>st</sup> of January 1993. I was informed by Counsel that the Workplace Regulations were of no relevance due to the fact that they came into effect in January 1996. Accordingly I make no finding in relation to any breach of statutory duty.*

### ***Conyon -v- Manor Bakeries Walsall County Court, November 2000***

In this case, which has already been referred to in section 6.3.1, the Claimant sought damages for "bilateral repetitive strain injury". The Judgment refers to an alleged breach of statutory duty under the WHSW Regulations, but the allegedly injurious work is not described and there is no indication of which parts of the WHSW Regulations were allegedly breached. The Judge considered the medical evidence "as a preliminary yet definitive issue" and having found that the Claimant had failed "to prove on the balance of probability any causative link between her symptoms and her work" did not address "the wider aspects of the case on liability" in the Judgment.

## **6.5 PROVISION AND USE OF WORK EQUIPMENT REGULATIONS**

Only two references to Provision and Use of Work Equipment Regulations were found in the Judgments in claims for WRULDs which had been obtained by the 30th June 2001.

### ***Donnellan -v- Halifax Building Society Manchester County Court, November 1999***

It will be recalled (from 6.2.2) that in this case, at trial, it was conceded by Counsel for the Claimant that the Claimant was not a "user" within the meaning of the DSE Regulations, due to the limited use she made of DSE while working as a mortgage adviser. However, the Claimant had also pleaded a breach of Regulation 5 of the Provision and Use of Work Equipment Regulations 1992. It was alleged that a short cable caused the keyboard to be offset to her right as the Claimant undertook a mortgage interview, which meant that to use the keyboard the Claimant's hand was in ulnar deviation. It was contended that this abnormal position of the hand was responsible for the Claimant's De Quervain's Syndrome. The Judge found that the Claimant's workstation was "suitable and sufficient in terms of its positioning" and that there was no breach of statutory duty.

### ***Sutton -v- British Trust for Conservation Volunteers Enterprises Ltd Central London County Court, September 1999***

This case has already been referred to in 6.3.2. A Note of Judgment in this case refers to the Claimant as having been engaged as a manual worker throughout his working life, primarily on

building sites. However, his claim arose from his involvement as a volunteer on the Defendant's community action scheme for the unemployed. Each volunteer 'worked' two days a week and was expected to attend a half day job search. The Claimant undertook five main tasks, namely fencing, gravel loading, clearing of gorse bushes, concrete busting and earth clearing. The Claimant evidently only 'worked' 22 days and the heavy physical work of which he complained, namely gravel loading and concrete breaking, only took place over a total of three days. The Claimant sought damages for Lateral Epicondylitis, which the Medical Experts agreed he had developed in late 1993. The Claimant pleaded breaches of the PUWE Regulations. The Note of Judgment states:

*With respect to the Provision and Use of Work Equipment Regulations 1992, it is alleged that the tools provided to the claimant were not suitable and that insufficient training/information was given with respect to the tools.*

*I disagree. Mr H demonstrated the task and ways in which tools were to be used. They were suitable and no complaint was made by either Mr Sutton or Mr F that they were not. Most were ordinary instruments used every day, aside from a Swedish axe, although it was the evidence of both Sutton and F that once they were shown how to use the axe they found it to be very good.*

## **6.6 PERSONAL PROTECTIVE EQUIPMENT AT WORK REGULATIONS**

The Judgments in claims for WRULDs which have been obtained by the 30th June 2001 make no reference to the Personal Protective Equipment at Work Regulations.

## **6.7 MANAGEMENT OF HEALTH AND SAFETY AT WORK REGULATIONS**

Only two references to Management of Health and Safety at Work Regulations were found in the Judgments in claims for WRULDs which had been obtained by the 30th June 2001.

### ***Sutton -v- British Trust for Conservation Volunteers Enterprises Ltd Central London County Court, September 1999***

This case has already been referred to in 6.3.2 and in 6.5. A Note of Judgment in this case refers to the Claimant as having been engaged as a manual worker throughout his working life, primarily on building sites. However, his claim arose from his involvement as a volunteer on the Defendant's community action scheme for the unemployed. Each volunteer 'worked' two days a week and was expected to attend a half day job search. The Claimant undertook five main tasks, namely fencing, gravel loading, clearing of gorse bushes, concrete busting and earth clearing. The Claimant evidently only 'worked' 22 days and the heavy physical work of which he complained, namely gravel loading and concrete breaking, only took place over a total of three days. The Claimant sought damages for Lateral Epicondylitis, which the Medical Experts agreed he had developed in late 1993. The Claimant pleaded breaches of the Management Regulations. The Note of Judgment states:

*With respect to breaches of the Management of Health & Safety at Work Regulations 1992, it is said that the defendants failed to make suitable and sufficient risk assessments. I do not agree. It was the evidence of Mr W that a general assessment of health and safety was made by the defendant's as required by their contract with the [Department of Employment]. The only valid point is that Mr Sutton did not attend the induction course but he certainly received instruction from Mr H who demonstrated tasks and use of tools and I can find no breaches of the Management of Health & Safety at Work Regulations, which in any event do not confer civil liability outside negligence, and I have already found that the defendants were not negligent.*

**Lindsay & Johnson -v- Claremont Garments Ltd  
Newcastle upon Tyne County Court, January 1998**

In this case, which has already been referred to in 6.3.1. the Claimants sought damages for injuries allegedly caused by ironing. There is a passing reference to the Management Regulations in this Judgment:

*The movements required of Mrs. Lindsay and said to have been causative of her injury were the crab like movements of the left hand. This was but a part of her job. There was, in my judgment, no rapid repetitive actions nor twisting and gripping movements required. There was no forceful use of the muscles in a repetitive way, nor were the muscles used at great speed for prolonged periods, nor was she working at the limit of her range of movement. There was nothing faulty in the design of or the supply of the equipment or plant. The targets set out for the work were carefully worked out and accepted by the workers. There was, I find, no pressure by the management for the workforce to meet unreasonable targets.*

*There was minimal force, no postural difficulties. I find nothing in the task that she had to carry out that would alert the reasonable employer to any danger. There was, I accept, no reason why any reasonable employer could be expected to suspect that the system of work adopted would lead to the type of injuries sustained. There was an obligation, I find, to look at the task of pressing anew when complaints of pain and difficulty were made, but I find that even if that had been carried out, as the defendants concede, in about December, 1991 there was nothing that could or should have been altered in the system of work.*

*In Mrs. Johnson's case minimal force was required to depress the membrane switch of the industrial iron used. No criticism, in my judgment, could be made of the equipment provided or the targets set. The complaint was of repetitive action of the vertical steaming movement. There was proper equipment provided. No movements were at the limit of the range of movement. There were no postural difficulties. The work station was well designed I find that in her case as well the three key elements of undesirable force, bad posture and high repetition were not present.*

*For the defendants it was conceded that their duty was to carry out a review of the pressing task in December, 1991. There is now the formal obligation imposed as from the 1st January, 1993 by the Management Regulations, 1992 and the Manual Handling Regulations, 1992. It is accepted that by that date the provision of elasticated supports and the complaints of arm pain by certain of the employees should have prompted a review, as would the state of knowledge that a reasonable employer within the garment industry ought to have had. I accept that had this been done no fault would have been found in the system of work or the equipment at the factory.*

It is perhaps not surprising that there are so few references to breaches of the Management of Health and Safety at Work Regulations, given that as noted at the start of this chapter Smith et al<sup>12</sup> state:

*... a breach of one of the very general duties in these Regulations (in particular, the obligation under reg 3 to undertake risk assessments, which is arguably central to the whole scheme of the present regulatory system, with its emphasis on risk) will not give rise directly to an action for breach of duty.*

However, Smith et al<sup>12</sup> go on to argue that breach of the Management Regulations may be actionable indirectly through the medium of a common law negligence action.

..... although the Management Regulations do not themselves support civil liability, there is no reason why they should not be relied upon as evidence of required practice, failure to follow which can constitute negligence. For one thing, the actual wording of the exclusion of civil liability in reg 22 does not preclude this indirect use of the Management Regulations in a negligence action; for another, certain other parts of the Regulations as a whole assume that key concepts in the Management Regulations (especially on risk assessment) are an integral part of the overall scheme of protection.

Thus, although the absence of a necessary risk assessment is not itself actionable as a breach of statutory duty, it is so central to the whole scheme that it should be considered important evidence of a failure to provide a safe system of work in all the circumstances, and therefore common law negligence. This argument is also applicable to other parts of the Management Regulations, such as health and safety arrangements, health surveillance, the need for procedures to deal with serious and imminent dangers and the principles of prevention.

A footnote explains that:

*The Management of Health and Safety at Work Regulations 1999, reg 22, only states that breach of a duty imposed by the Regulations is not to confer a right of action in any civil proceedings. It is submitted that this only means that the Regulations cannot be relied upon directly, in order to maintain an action for breach of statutory duty. In the case of an action for negligence, that cause of action already exists by virtue of the employer's want of care, and the Regulations are only being used to substantiate that want of care, not to 'confer' the right of action.*

Thus, while Judgments in personal injury claims for WRULDs might be expected to make few, if any, references to the Management Regulations in the context of a breach of statutory duty, reference to the Management Regulations might be expected in the passages of (future) Judgments which deal with negligence.

## 7 DISCUSSION, CONCLUSIONS AND RECOMMENDATIONS

### 7.1 DISCUSSION

It can be argued that the most important general finding to emerge from this exploratory study is the suggestion that it is not what HSE guidance says but what it does not say that is perhaps most significant. HSE guidance on WRULDs has so far rarely addressed explicitly some of the issues relating to the nature and causes of upper limb symptoms and the circumstances in which they arise which the Courts frequently consider. Most obviously, HSE guidance has not addressed Chronic Regional Pain Syndromes for which a significant proportion of the Claimants had sought damages, some successfully. Similarly, there are numerous references in the Judgments to an employer's duty of care, the scope and importance of which a lay person reading HSE guidance might not appreciate. Courts appear to be, or at least used to be, particularly interested in the 'duty to warn'. In 'white collar' cases there also appears to be a particular interest in whether or not there were adequate rest breaks, while in 'blue collar' cases the emphasis tends to be on whether or not there was adequate job rotation. The recent emphasis being placed on rehabilitation also raises questions about the Courts' interpretation of an employer's duty of care in managing employees who have reported upper limb disorders and when someone who has suffered from an upper limb disorder returns to work. While it is unreasonable to expect HSE guidance to cater for or to anticipate the immense variety of circumstances in which personal injury claims for WRULDs have arisen or might arise, it can be argued that a lay person reading HSE guidance might not appreciate some of the issues relating to the nature and causes of upper limb symptoms and an employer's duty of care which the Courts appear to consider important.

The most recent guidance on the Provision or the Use of Work Equipment Regulations 1998<sup>18</sup> and the Management of Health and Safety at Work Regulations 1999<sup>19</sup> explicitly states, albeit in the context of who is covered by the Regulations, that "only the Courts can give an authoritative interpretation of the law" and explains the legal status of ACOP and guidance material. However, the context suggests that 'the law' to which these passages refer is the criminal law. Thus, one of the questions raised by this exploratory study is whether HSE guidance adequately addresses common law duties. Following the guidance will not necessarily "be doing enough to comply with the law" if the guidance does not adequately address the common law duties.

It can also be argued that there appear, from a lay perspective, to be possible conflicts or at least inconsistencies between the common law duties and HSE guidance. For example, it is difficult from a lay perspective to reconcile paragraph 31 of the guidance on the DSE Regulations with the House of Lord's Judgment in *Pickford -v- Imperial Chemical Industries plc* and the High Court Judgment in *Moran -v- South Wales Argus*.

Paragraph 31 of the guidance<sup>9</sup> on the DSE Regulations states:

*Because of the varying nature and novelty of some display screen tasks, and because there is incomplete understanding of the development of chronic ill-health problems (particularly musculoskeletal ones), prediction of the nature and likelihood of problems based upon a purely objective evaluation of equipment may be difficult. It is therefore most important that employers should encourage early reporting by users of any symptoms which may be related to display screen work. The need to report and the organisational arrangements for making a report should be covered in training.*

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<sup>18</sup> *Safe use of work equipment* Approved Code Of Practice and Guidance L22, 2000

<sup>19</sup> *Management of Health and Safety at Work* Approved Code Of Practice and Guidance L21, 2000



In the case of **Pickford -v- Imperial Chemical Industries plc** the Claimant sought damages for Cramp of the hand PDA4, allegedly caused by her work as a secretary in the late 1980s. The case was originally heard in Chester High Court and Judgment in favour of the Defendant was given in November 1994. The Claimant appealed and Judgment in favour of the Claimant was given in July 1996. The Defendant appealed and Judgment was given in favour of the Defendant in the House of Lords in June 1998. In the House of Lord's Judgment, Lord Hope of Craighead states:

*As for the giving of warnings, the respondent said in her particulars of negligence that she should have been told of the risk of contracting PDA4. The giving of warnings of the risk of disease or injury is a precaution which is familiar in the field of litigation for personal injury. But in the case of conditions such as PDA4, which are not easily identifiable and not well understood, great caution must be exercised as to the content of any such warning and as to whether to give a warning at all is appropriate. To impose a duty which may cause more harm than good would be undesirable. The law does not compel employers to take steps which may bring about the condition which they wish to prevent. Conditions which are associated with functional or psychogenic disorders present particular difficulty. So the judge was right to pay careful attention to the advice of the experts, and to the practice in the industry, as to precise terms of any warning that the appellants might responsibly give to their employees about the risk of contracting PDA4.*

*[One of the Defendant's Medical Experts] said that those who were prone to anxiety might perceive that they had the symptoms of the disease, so a balance had to be struck. On the other hand a balanced warning might simply do no more than accord with the common sense precautions which everyone would take. [One of the Claimant's Medical Experts] said that it would be disgraceful to give a warning which said that if you developed pain you may never work again. The warning which he would have regarded as acceptable was simply to go and see the works doctor if you develop unusual pain or discomfort. But that was not the kind of warning which the respondent was looking for - she went her GP two days after she had noted in her diary for the first time that she had pain in her hands, and a few days later she was seen by the works doctor. The judge accepted the evidence of the appellant's ergonomist, that it was not the practice in industry in 1988 and 1989 to give a warning of any kind about the risk of contracting PDA4, and that of the appellants' chief medical officer, who said that no literature had ever come to his attention advocating such a warning. His evidence was that the appellants were well aware that poor siting of equipment could lead to eye strain and other disorders, and that steps had been taken to ensure suitable work station design and siting and that appropriate information was given to visual display operatives. But he would have regarded a warning that muscle fatigue might develop into PDA4, a rare disease, to be counterproductive and, in the absence of advice by a suitable expert body such as the Health and Safety Executive to the contrary, he did not consider it necessary or proper to give such warnings. The judge also accepted Dr. L's evidence that a formal system of instruction, warning and advice was adopted and implemented for typing staff in the accounts department as the working day was confined to accounts and difficulties in changing postures could arise in their case. But such a system was not considered necessary for secretaries as they carried out many non-typing duties in the course of their working day.*

In the case of **Moran -v- South Wales Argus** the Claimant sought damages for Repetitive Strain Syndrome allegedly caused by her work as a copytaker. In the Judgment given in Cardiff High Court in November 1994, the Judge states:

*..... the defendants' duty of care in such circumstances is to take such steps for the well-being of their office staff as to avoid injury, that the duty of care cannot extend to the avoidance of pain because pain is too vague and because some pain is inevitable in any manual occupation.*

It should be noted that in both these cases the alleged injuries arose prior to the DSE Regulations coming into force, but that the Judgments were given after they came into force. It would appear, from a lay perspective, that circumstances can arise in which following HSE guidance might be doing more than enough to comply with the common law. However, it is not intended to suggest that where the Courts' interpretations of employers' common law duties appear, from a lay perspective, to be inconsistent with HSE guidance on health and safety Regulations, the guidance can be ignored.

With respect to the Courts' interpretations of health and safety Regulations, it will come as no great surprise that the Judgments in personal injury claims for WRULDs which have been obtained so far make no reference to the Personal Protective Equipment at Work Regulations and make few references to the Workplace (Health, Safety and Welfare) Regulations, the Provision and Use of Work Equipment Regulations and the Management of Health and Safety at Work Regulations, none of which are of significance. While the Judgments shed some light on how County Courts have interpreted certain parts of the DSE and MHO Regulations, what is perhaps most surprising is that so few of the Judgments in personal injury claims for WRULDs even consider these Regulations, let alone provide an informative interpretation.

This can be explained, in part, by the fact that relatively few of the accumulated Judgments deal with cases in which the alleged injuries occurred after these Regulations came into force. It is also clear that claims for WRULDs often turn on issues relating to injury and causation and that liability is often a secondary issue in such cases. Of most significance, however, is the current lack of any definitive interpretation of any of the Regulations by a higher Court. No doubt higher Courts will, in due course, provide definitive interpretation of these Regulations in this type of claim.

It is clear that circumstances can arise in which the County Courts' interpretations of health and safety Regulations appear, from a lay perspective, to be inconsistent with HSE guidance on the Regulations. For example, it can be argued that a lay person reading HSE guidance on the DSE Regulations might not appreciate that Regulation 4 of the DSE Regulations requires regular rest breaks of 10 minutes every hour for a manager using DSE, as the learned Judge found in *McPherson -v- London Borough of Camden*, referred to in 6.2.2. Similarly, it can be argued that a lay person reading HSE guidance on the MHO Regulations might not appreciate that a task involving the handling of light objects required a detailed risk assessment under Regulation 4(1)(b)(i), as the learned Judge found in *Rance -v- Lomax Sayers Ltd*, referred to in 6.3.2. The County Court Judgments in personal injury claims for WRULDs show a lack of consistency in the interpretation of HSE guidance on WRULDs and in the interpretation of certain parts of the DSE Regulations and some confusion about the type of work which the Courts appear to consider is covered by the MHO Regulations. One of the underlying problems appears to be that there are no Regulations which specifically apply to repetitive work. This is somewhat ironic, given that anecdotal evidence suggests that the Directive from which the DSE Regulations were derived started life as the draft of a Directive on repetitive work.

Clearly, each case turns on its own facts and where the Courts' interpretations of health and safety Regulations or of employers' common law duties appear, from a lay perspective, to be inconsistent with HSE guidance, the inconsistencies are not necessarily due to some omission or flaw in the drafting of HSE guidance. While it is unreasonable to expect HSE guidance to anticipate or to cater for the immense variety of circumstances in which health and safety

Regulations or employers' common law duties might be invoked or interpreted in personal injury claims for WRULDs, it can be argued that where the Courts reach decisions which appear to be inconsistent with HSE guidance some revision to the guidance may be needed such that there is a reasonable expectation of the guidance being uniformly interpreted in the Courts and in the workplace. It would be presumptuous to suggest whether such revisions should seek to bring the guidance in line with the findings in some Courts to avoid misinterpretations in the workplace or whether such revisions should seek to clarify the guidance to avoid possible misunderstandings in the Courts. However, it can be suggested that following guidance which is not being uniformly interpreted in the Courts and in the workplace will not necessarily "be doing enough to comply with the law".

## **7.2 CONCLUSIONS**

This exploratory study has demonstrated that a web site can assist in generating and disseminating information on Judgments in personal injury claims, its most important roles being to provide a focus for the reporting of information and a readily accessible and efficient means of providing information. However, there is clearly scope for improving the effectiveness of such a web site.

This exploratory study has also demonstrated that the analysis of Judgments in personal injury claims can produce findings on a range of issues which might be of interest and practical use to those who draft guidance. However, there can be lengthy delays in such claims reaching Court and the Judgments becoming available for analysis.

This exploratory study has confirmed that, in the context of personal injury claims for WRULDs, the Courts' interpretations of certain health and safety Regulations and what constitutes an 'injury' in a legal sense might not be entirely consistent with what might reasonably be expected, by a lay person, reading HSE guidance.

With respect to WRULDs, the Courts' interpretation of HSE guidance documents and findings on the foreseeability of injury arising from various types of work are inextricably linked to the wider issue of the Courts' interpretation of an employer's duty of care.

While the 1992 Regulations undoubtedly imposed considerable changes in the way employers were obliged to deal with the risks of WRULDs, as yet, there is little evidence about how they have influenced the Courts' interpretation of an employer's duty of care in claims for WRULDs.

The full value of this research will only be achieved if the study is extended, such that the most recent Judgments and those emerging over the next few years are captured and analysed. At the very least, this should provide further interpretations of the Health and Safety (Display Screen Equipment) Regulations and the Manual Handling Operations Regulations and related guidance.

While the web site was primarily developed as a research tool, a mechanism for generating information on previously unknown cases and disseminating information on known cases, it could also be used to promote awareness of the possible consequences of failing to follow guidance on WRULDs and health and safety Regulations.

### **7.3 RECOMMENDATIONS**

The procurement and analysis of Judgments in personal injury claims for WRULDs should continue. The web site being an important focus for the reporting and dissemination of information, it should be maintained and efforts made to improve its effectiveness.

Consideration should be given to which of the issues which can be examined by analysing Judgments are of most interest and practical use and subsequent analyses tailored appropriately.

Consideration should be given to using the web site to promote awareness of the possible consequences of failing to follow guidance on WRULDs and health and safety Regulations.

Consideration should be given to applying a similar approach to other risks e.g. work-related stress.



## APPENDIX A

The "diagnosis options" developed for the Diagnostic Support Aid for Upper Limb Disorders reported in Contract Research Report 280/2000.

### Diagnosis option

Raynaud's Syndrome

Ganglion

Dupuytren's Contracture

Trigger Finger

Osteo-Arthritis

Rheumatoid-Arthritis

Carpal Tunnel Syndrome

De Quervain's Disease

Tenosynovitis

Non-specific diffuse forearm pain

Arthritis of Elbow

Olecranon Bursitis

Lateral Epicondylitis

Medial Epicondylitis

Bicipital Tendonitis

Rotator Cuff Tendonitis

Shoulder Capsulitis

Osteo-Arthritis of Acromioclavicular Joint

Cervical Spondylosis

Diffuse shoulder or neck pain

### Alternative labels

Raynaud's Phenomenon,  
Hand-Arm Vibration Syndrome,  
Vibration White Finger

Stenosing Tenosynovitis

De Quervain's Tenosynovitis,  
De Quervain's Tenovaginitis  
Tendinitis, Peritendinitis, Tenovaginitis  
"Impossible to make specific diagnosis"

Tennis Elbow  
Golfer's Elbow  
Humeral Tendinitis, Bicipital Tenosynovitis  
Supraspinatus Tendonitis,  
Infraspinatus Tendonitis,  
Teres Minor Tendonitis,  
Subscapularis Tendonitis, Rotator Cuff Tear,  
Subdeltoid Bursitis, Subacromial Bursitis  
Frozen Shoulder, Adhesive Capsulitis  
Acromioclavicular Syndrome  
Osteo-arthritis of the neck, Cervical Syndrome,  
Radiculopathy, Cervical Spondylarthrosis,  
Cervical Root Syndrome  
Tension Neck Syndrome,  
Cervicobrachial Syndrome,  
"Impossible to make specific diagnosis"





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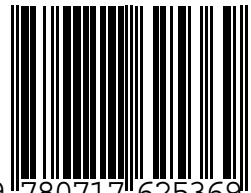
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**F**



# Stemming the MSD tide

Ergonomics can provide a useful way to minimise musculoskeletal disorders, but, argues **Brian Pearce**, it is an approach that must be employed appropriately.

**T**he potential for musculoskeletal disorders (MSDs) has existed ever since man, or woman, first picked up a tool or carried a load. Recent commentaries on

work-related MSDs note the dramatic growth in reports of such disorders in the last few decades. The paradox which few appear to have addressed is that this has occurred at a time when, compared with the conditions in the first half of the 20th century, working hours have reduced, work in general is physically less arduous, extensive health and safety legislation has been introduced, occupational health facilities have improved and ergonomics knowledge has been widely disseminated.

It can be argued that it is precisely because of these societal developments that we have become more aware and more concerned about such disorders. Employees have become less tolerant of experiencing aches and pains, let alone serious injuries, which in less enlightened days were considered part and parcel of the job – an inevitable consequence of their labours. Thus, while the workplace has become ‘safer’, expectations have also grown and what we are observing is an increase in reporting rather than an increase in incidence. A

more controversial explanation is that expectations have grown to the extent that virtually any ache or pain in the neck, back or upper limbs is perceived to be

a repetitive strain injury and that what we are observing, at least in part, is the redefinition of ‘the heart-ache and the thousand natural shocks that flesh is heir to’ as work-induced injuries.

Another explanation is that the dramatic growth in reports of work-related MSDs is the result of a true increase in morbidity which has coincided with the dramatic growth in the use of display screen equipment. If this is correct, the Health and Safety (Display Screen Equipment) Regulations must surely be the least cost-effective piece of health and safety legislation ever to have been introduced.

### **Work-induced or work-related?**

Work-related MSDs are popularly understood to be the result of acute or cumulative trauma. However, just because a musculoskeletal sensation or condition is described as a work-related disorder it does not necessarily follow that any pathology has been caused, aggravated or accelerated by work activities. The term ‘work-related’ can imply no more than that work activities make the sufferer aware of some pre-existing or naturally occurring musculoskeletal condition.

Some disorders and dysfunctions of the musculoskeletal system are more clearly defined than others. Some present with clear, objective, clinical signs of abnormality, while others are diagnosed on the basis of the patient’s response to examination or merely the

patient's report of a certain pattern of musculoskeletal sensations. While it would be nice to think that all medical practitioners used common diagnostic criteria and were equally skilled in the diagnosis of MSDs, it is manifestly clear that they do not<sup>1</sup>. In addition, differing sensitivity and specificity of diagnostic criteria can lead to discrepancies in diagnosis and hence prevalence estimates.

A wide variety of MSDs can occur quite naturally and there are, potentially, many non work-related causes of musculoskeletal sensations in the upper limbs. Musculoskeletal aches and pains are endemic in the population. According to Hadler<sup>2</sup>, at least five per cent of us will experience discomfort in our neck and upper extremities every six weeks. Nearly five per cent of us have experienced an episode of upper extremity morbidity distinctive in that it persisted for one month of the past year and was memorable. A study by Macfarlane et al<sup>3</sup> suggests that forearm pain is common and commonly co-occurs with other regional musculoskeletal pain syndromes and that forearm pain is associated not only with work-related repetitive movements, but is predicted by high levels of psychological distress and aspects of illness behaviour.

Some practitioners, particularly physiotherapists and GPs, appear willing to make categorical statements about the occupational nature of often vague signs and symptoms without giving due consideration to other possible causes and without ever having seen the workplace. Well-meaning but inappropriate medical (or other) advice can readily become an obstacle to recovery. Moreover, there is anecdotal evidence which suggests that some of those who have naturally occurring musculoskeletal discomfort or symptoms of a pre-existing disorder can contract what might be described as an iatrogenic 'injury' (caused or induced by the actions or words of a medical practitioner). For example: "I'm afraid you will keep on having this back [neck, shoulder, arm, hand] problem so long as you keep your current job" might be quite accurate advice, but can be interpreted as implying a causal relationship between the work and the disorder.

Thus, the individual with a musculoskeletal sensation becomes a patient upon visiting the GP, can leave the surgery with the perception of being an employee with a work-induced disorder, and can become a litigant with an injury upon visiting a solicitor. This is part of what is termed the 'social construction of injury' in which a variety of factors, including the press coverage of personal injury claims, induce in employees the perception that they have suffered work-induced injuries for which their employers are liable. This is in no

way intended to suggest that such individuals are, themselves, constructing their injuries. It merely suggests that how individuals, health and safety practitioners, doctors, lawyers and ergonomists, perceive musculoskeletal sensations can be strongly influenced by external factors and the circumstances in which we find ourselves placed<sup>4</sup>.

Unravelling the complex relationships between work activities and MSDs and quantifying the true scale of the problem requires sophisticated epidemiological studies. The 'evidence' for the epidemic of MSDs which is currently said to exist is largely based upon a survey of 'Self-reported Work-related Illness in 1995' printed by HSE Books (ISBN 0071761509X).

Precisely what those self-reporting MSDs were suffering from, how they came by their 'diagnoses' and what relationship there actually was between work activities and the reported disorders are all open to question.

Even the 'evidence' arising from (hopefully more reliable) epidemiological studies appears to be open to widely different interpretations. For example, using admittedly extremely rigorous criteria, Vender et al<sup>5</sup> concluded that none of the 2,054 studies reviewed established a causal relationship between distinct medical entities and work activities. In contrast, while acknowledging that current epidemiological evidence is often based on studies with weak designs, Buckle<sup>6</sup> suggests that the consistency in the results strongly supports a relation with factors arising from work. It would appear that when it comes to the interpretation of the evidence, 'belief' can be stronger than the rigour of the 'scientific method', such that 'supportive' evidence is preferentially recruited and the 'inconvenient' down-played or suppressed.

### **Differing approaches to back and upper limb disorders**

Although back problems are popularly understood to be associated with the physical demands of work, the available scientific evidence is equivocal<sup>7</sup>. In recent years, many of the commonly held beliefs about the prevention, causes, rehabilitation and treatment of back pain and back injuries have been challenged with the moves towards what is commonly referred to as an 'evidence-based' approach<sup>8</sup>.

In contrast to these recent changes in approach to back disorders, the HSE's latest guidance 'Upper limb disorders in the workplace' gives the impression that virtually all upper limb disorders, including non-specific pain syndromes, are primarily caused by work and that by applying the 'ergonomics approach' suggested in the guidance they will be eliminated. They have not been and will

not be. An ergonomics approach, correctly applied, can reduce the likelihood of work-induced disorders and should assist in accommodating those with work-related disorders, but it will not eliminate disorders which have been (mis)attributed to work by social factors.

Acknowledging that psychological and social factors can play an important role in the interpretation and attribution of symptoms does not deny the reality of the symptoms or the legitimacy of the concerns. Acknowledging that illness behaviour is a natural response does not imply malingering but does imply that psychological and social factors can be obstacles to recovery and are important considerations in the rehabilitation and treatment of MSDs. It should not matter to the prudent employer that the primary cause of some disorder was wholly unrelated to work activities, if a disorder influences an employee's ability to work efficiently, irrespective of any health and safety considerations, it is an issue which the employer needs to be aware of and manage. However, there is a balance to be struck between encouraging employers to recognise and deal sympathetically with disorders which probably originate outside of work, but which influence the ability to work, and those which are probably caused or at least significantly aggravated or accelerated by work. The former may only require localised changes to accommodate the individual, the latter may require significant changes to be made to the overall system of work.

### **The role of ergonomics**

Ergonomists view systems of work as involving complex interactions between human, social and technological components. Unfortunately, a simplistic view of ergonomics has grown up which focuses on the physical aspects of work: force, repetition rates and posture. For example, in September 1994 the HSE published a leaflet entitled 'Upper Limb Disorders Assessing The Risks' which might best be described as a triumph of graphic design over technical content. Even though the 'ergonomics approach' emphasises that psychosocial factors are equally important, these factors are frequently misunderstood or ignored. However, it has to be acknowledged that it is often far easier to tinker with the physical features of the workstation than tackle the root cause of the problem, e.g. the design of the job. Moreover, tinkering with the physical features of the workstation might well produce a 'Hawthorne effect' which gives the illusion of a successful ergonomics intervention: it can be the act of intervening itself, rather than any changes made, which 'improve' the situation.

In an ideal world all equipment, workstations and working environments would be designed to meet optimum

**“Problems appear to arise when well-intentioned but inexperienced practitioners attempt to incorporate ergonomic principles into risk management strategies”**



ergonomic criteria. In practice, the degree to which ergonomic principles are applied, or should be applied, is a function of the duration and intensity of the task being performed and the anticipated adverse consequences on those performing the task. Inevitably, ergonomic criteria are not absolute. There is a cost-benefit equation which must be considered. Ergonomic principles are clearly not inconsistent with the duty on employers to protect "so far as is reasonably practicable" the health and safety of employees, but ergonomists seek to provide not only a safe but also a satisfying and efficient system of work. The corollary of this is that to describe a system of work as not meeting optimum ergonomics criteria does not necessarily imply that it is unsafe or potentially injurious.

Problems appear to arise when well-intentioned but inexperienced practitioners attempt to incorporate ergonomic principles into risk management strategies. This has given rise to the bizarre notions of ergonomic risk factors and, worse, ergonomic injuries. Such oxymorons demonstrate a fundamental misunderstanding of ergonomic principles and of the differences between dis-ease and disease and of the differences between hazard and risk. Ergonomic recommendations which are intended to promote comfort and efficiency are (mis)interpreted as essential health and safety requirements. The dumbing-down of ergonomics principles results in attention being focussed solely on that which is easy to measure or change. Nowhere is this more apparent than in the multitude of risk assessments which have been undertaken in attempting to comply with the requirements of the Health and Safety (Display Screen Equipment) Regulations.

For example, most diagrams showing the seated DSE user illustrate a 'bolt upright' posture with the forearms horizontal. Simple observation of any large group of DSE users shows that many do not sit in this way. One of the founding fathers of ergonomics, Professor Etienne Grandjean, referred to the 'bolt upright' posture depicted in so many guidelines as 'wishful thinking' and suggested that such diagrams were a throwback to the early days of mechanical typewriters which required key forces of several hundred grams and were more easily operated in such a posture. Modern electronic keyboards which require much less force and have less key travel than mechanical typewriters are mainly operated by finger movements with hardly any assistance of the forearms<sup>9</sup>. DSE users don't sit, and don't need to sit, in a 'bolt-upright' posture. The general point is that diagrams which purport to show optimum postures for DSE use are useful aids, but should not be interpreted too

**“The dumbing-down of ergonomics principles results in attention being focused solely on that which is easy to measure or change”**

rigorously: a restriction of normal postural variation can itself be a hazard.

One of the many problems with Health and Safety (Display Screen Equipment) Regulations is that the Directive from which they are derived (90/270/EEC) was the subject of political horse-trading between Member States which resulted in a motley collection of very badly expressed 'minimum ergonomic requirements', which were somehow supposed to ensure the health and safety of DSE users. The validity and utility of many of these so-called 'minimum ergonomic requirements' are open to question. The Health and Safety (Display Screen Equipment) Regulations have recently been amended by the Health and Safety (Miscellaneous Amendments) Regulations 2002, which came into force on 17 September 2002.

The Consultative Document which heralded these changes gave the impression that this was a tidying up exercise and suggested that "The one-off cost of £30 million which was highly likely to be outweighed by increased productivity gain (and reduced absence, turnover etc) associated with these changes". This presumes that the Health and Safety (Display Screen Equipment) Regulations will actually bring about a significant reduction in the incidence, or indeed prevalence, of MSDs and the number of working days lost by DSE users. On the currently available evidence, it appears that these Regulations have probably done more harm than good: by distorting perceptions of ergonomic principles and of the (low) risks to which individual DSE users are exposed; and by diverting scarce health and safety resources from much more hazardous activities and effective rehabilitation initiatives.

**Lessons from the past**

The first recorded epidemic of work-related MSDs in the UK occurred in the civil service in the 1830s and was associated with the introduction of the steel nib. The report of an enquiry into a subsequent epidemic in the early 1900s, among telegraphists, has been suggested by Lucire<sup>10</sup> to be the origin of the term 'nervous breakdown'. The Australian 'RSI' epidemic in the 1980s was not resolved by simplistic ergonomic interventions but by changing perceptions of the hazards and the likely harms arising from work activities<sup>11</sup>.

Ergonomic principles, correctly applied, can undoubtedly play a part in controlling the currently perceived epidemic of MSDs, by making work "comfortable when we are well and accommodating when we are ill"<sup>12</sup>. However, from an ergonomics perspective there appears to be an urgent need to examine the true scale of the problem and the range of factors which promote and inhibit accurate perceptions of the risk of experiencing

MSDs at work. There are strong arguments for promoting evidence-based practice by all the stakeholders in this complex problem. **SHP**

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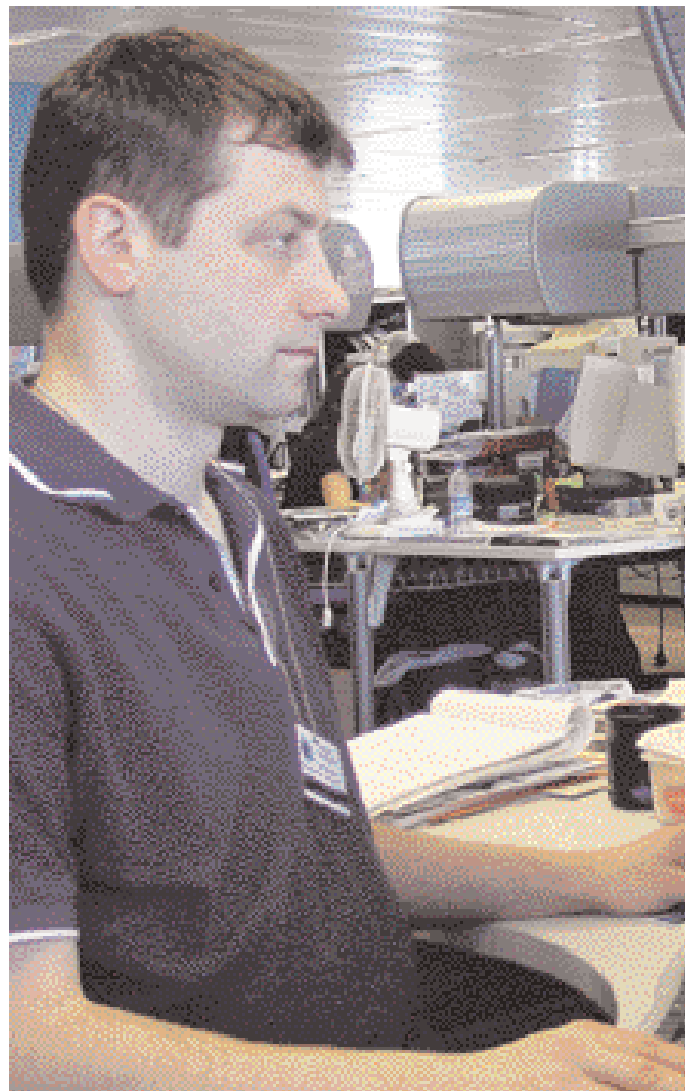
# In spite Sound evidence?

Developments in technology and a greater knowledge of risks have been cited as the reasons behind the HSE's revised guidance on the Health and Safety (Display Screen Equipment) Regulations 1992. But, asks **Brian Pearce**, where is the evidence that the DSE Regulations will bring about improvements to workplace health?

In launching the revised guidance on the DSE Regulations 1992, in February this year, the HSE noted: "Last year HSE inspectors visited more than 8000 workplaces concentrating on MSD risks, which led to 226 improvement notices and 31 prohibition notices being issued under either the Manual Handling Operations Regulations 1992 or the Health and Safety (Display Screen Equipment) Regulations 1992." Yet, such a presentation of the figures masks an important truth. As shown by the HSE's own published statistics, the 10 years in which the DSE Regulations have been in force have yielded just 82 HSE improvement notices under the DSE Regulations and no prohibition notices.

Perhaps most surprising, the published statistics show that no organisation has ever been prosecuted by the HSE for a breach of the DSE Regulations. Admittedly the evidence is limited, but it would appear that, for a variety of reasons, those responsible for the enforcement of health and safety legislation have previously viewed the DSE Regulations as a very low priority. So do the changes in the Regulations themselves and the recently-published guidance herald a change of approach that could, ultimately, help reduce the incidence of work-related ill-health?

The revised guidance is contained in two documents: *The law on VDUs: an easy guide*<sup>1</sup> – a revision of HSG90 – and the more detailed *Work with display screen equipment*<sup>2</sup> – a significant revision of L26. At the same time, the HSE launched a revision of a leaflet entitled



*Upper Limb Disorders Assessing The Risks, newly named Aching arms (or RSI) in small businesses*<sup>3</sup>. The wording for the new title is confusing given that the revised leaflet states: "HSE prefers to use the general term ULD [upper limb disorders] because problems might not be due to strain and there may not be any sign of injury," and that the HSE's revised guidance on the DSE Regulations includes the observation: "Media reports often refer to some, or all, ULDs as 'repetitive strain injury' (RSI) but this term is not a medical diagnosis and can be confusing."

The introduction to the more detailed guidance, *Work with display screen equipment*, states: "It is intended for people who need to consider all the detailed implications of the law." It can be argued that this is misleading in that, as the courts have made clear, *only* the courts can give an authoritative interpretation of the law.

### Changes to the Regulations

While the changes to the Regulations themselves are presented in the guidance as little more than a tidying-up exercise, it should be noted that the Consultative Document<sup>4</sup> which brought about these

changes estimated their one-off cost at around £30 million, on the optimistic assumption that 75 per cent of general employers complied with the DSE Regulations.

The majority of the cost arises from the change to regulation 3 which now requires employers to ensure that all DSE workstations, whether new or old, and whether or not they are used by 'users' or 'operators', comply with the Schedule of the Directive. Previously, it was possible to have DSE workstations which did not comply with the Schedule – for example, if they were used infrequently.

The reason for the change of wording in regulation 5, which relates to eye and eyesight testing and the provision of 'corrective appliance' is not made clear by the latest guidance. However, the Consultative Document explained that it was intended to clarify that employers who provide workers on an agency basis also have responsibilities under the regulation. With respect to the rewording of regulation 6, the revised guidance explains that the regulation now sets out more clearly when training should be provided: "Newly recruited users, and existing employees whose duties are changing in a way that will make them

become users, should be given training before they start doing the work that will make them a user."

### Increased scope

Coverage of the guidance takes into account technological and working trends. For example, the section on 'What is a workstation?' suggests the Regulations apply to the prolonged use of "mobile phones and personal organisers that can be used to compose and edit text, view images or connect to the Internet". The revised guidance states: "Any prolonged use of such devices for work purposes will be subject to the DSE Regulations and the circumstances of such cases will need to be individually assessed." However, "mobile phones that are in prolonged use only for spoken conversations are excluded . . . because their display screens are small".

There is also new guidance on the application of the Regulations to homeworkers, teleworkers and agency workers. The guidance acknowledges: "It is not always practicable for the employer to send someone else to conduct a risk assessment for homeworkers/teleworkers (particularly in the case of

**"No organisation has ever been prosecuted by the HSE for a breach of the DSE Regulations"**



### Pickford v Imperial Chemical Industries plc

In the case of *Pickford v Imperial Chemical Industries plc*, the claimant sought damages for cramp of the hand (PDA4), allegedly caused by her work as a secretary in the 1980s. The case was originally heard at Chester High Court with judgment in favour of the defendant given in November 1994. The claimant appealed and judgment in favour of the claimant was given in July 1996. The defendant then appealed and judgment in favour of the defendant was given in the House of Lords in June 1998. In this judgment, Lord Hope of Craighead stated:

"As for the giving of warnings, the respondent said in her particulars of negligence that she should have been told of the risk of contracting PDA4. The giving of warnings of the risk of disease or injury is a precaution which is familiar in the field of litigation for personal injury. But in the case of conditions such as PDA4, which are not easily identifiable and not well understood, great caution must be exercised as to the content of any such warning and as to whether to give a warning at all is appropriate. To impose a duty which may cause more harm than good would be undesirable. The law does not compel employers to take steps which may bring about the condition which they wish to prevent. Conditions which are associated with functional or psychogenic disorders present particular difficulty. So the judge was right to pay careful attention to the advice of the experts, and to the practice in the industry, as to precise terms of any warning that the appellants might responsibly give to their employees about the risk of contracting PDA4."

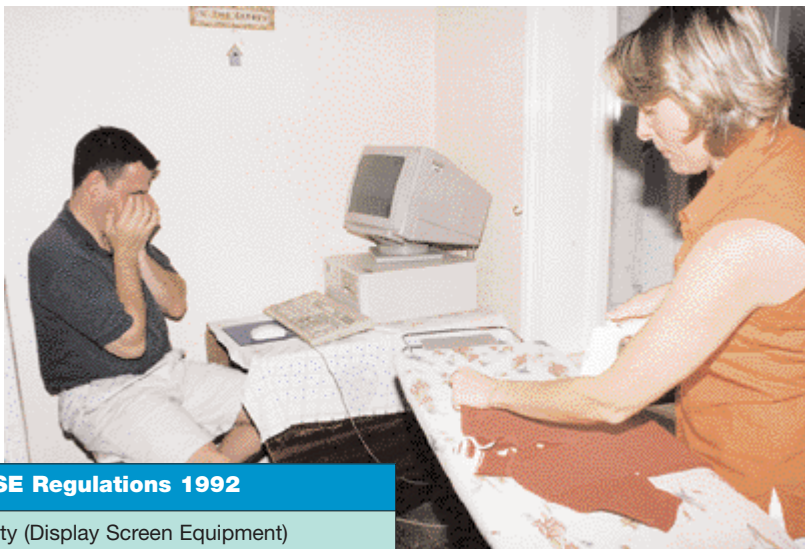
### Moran v South Wales Argus

In the case of *Moran v South Wales Argus*, the claimant sought damages for Repetitive Strain Syndrome, allegedly caused by her work as a copytaker. In the judgment given at Cardiff High Court in November 1994, the judge stated:

". . . the defendants' duty of care in such circumstances is to take such steps for the well-being of their office staff as to avoid injury, that the duty of care cannot extend to the avoidance of pain because pain is too vague and because some pain is inevitable in any manual occupation".



**Employers should train homeworkers to undertake their own risk assessment in relation to the DSE Regulations**



**Origins of the DSE Regulations 1992**

The Health and Safety (Display Screen Equipment) Regulations 1992 came about as a direct result of European Directive 90/270/EEC<sup>5</sup>. The UK government, at the time, did not look favourably upon the Directive when the original proposal<sup>6</sup> was presented by the Commission to the Council, in March 1988. A Select Committee of the House of Lords conducted an inquiry into the Directive and, in November 1988, published a report which was debated in the House of Lords in February 1989<sup>7</sup>. Their Lordships suggested that the scientific evidence that DSE use caused major health hazards was weak and that public concern was not itself a sufficient reason for having a Directive. The Committee concluded that there was inadequate justification for a Directive on DSE use. In abstaining, the UK was the only Member State not to vote in favour of the Directive at the Council of Ministers meeting in Brussels in October 1989.

mobile workers).” The recommended solution is for the employer to train such workers to undertake their own risk assessment. However, the guidance also acknowledges that “in the case of mobile teleworkers working for very short periods in hotel rooms and similar places, the full [risk assessment] procedure may not be necessary”. With respect to agency workers, the revised guidance spells out the respective responsibilities of host (client) employers and employment businesses (agencies). Among other things, employment businesses should “check that host employers carry out their duties”.

A new appendix on ‘Work with portable DSE’ acknowledges that “risk assessments for users of portables can be a challenge, as it is clearly not practicable to use an independent assessor to analyse each location where work may take place as a user travels around with their portable”, and that “[p]ortable users’ risk assessments for, say, half an hour’s work in a borrowed office, can be quite informal and need not be written down.” There is practical advice on selecting portable computers and planning tasks involving portable computers, which among other things, advocates the use of docking stations. However, at times, the advice borders on the patronising, e.g. “Do not carry equipment or papers unless they are really likely to be needed.”

There is also a new appendix on ‘Work

with a mouse, trackball or other pointing device’. This provides some very general advice on choosing and using a pointing device. It is suggested that mouse mats “are often helpful” but that “special wrist rests are not a requirement”. This is supplemented by some general advice on touchscreens and speech interfaces, though as regards the latter, it is suggested that “little is currently known about the health and safety aspects of their use”.

**Health effects of DSE work?**

The title of the appendix on the possible harms arising from DSE work has been changed from ‘Display screen equipment: possible effects on health’ to ‘Health effects of DSE work and principles of successful prevention, treatment and rehabilitation’. This appendix now refers to the HSC’s Priority Programmes on musculoskeletal disorders and stress and there is lengthy discussion of these two problems and how they might interact, with cross references to HSE guidance documents on back pain, ULDs and stress.

Early reporting of symptoms is given considerable emphasis in the revised guidance. It is recommended that employers should have a system in place which, among other things, should “encourage users to report any symptoms early” and “provide advice for users who report symptoms”.

It is difficult from a lay perspective to reconcile this emphasis on encouraging the early reporting of virtually any upper limb symptoms with the House of Lords’ judgment in *Pickford v Imperial Chemical Industries plc* and the High Court judgment in *Moran v South Wales Argus* (see panel). While it might be unreasonable to expect HSE guidance to explain an employer’s common law duties in any depth, it can be argued that guidance on the DSE Regulations which is “intended for people who need to consider all the detailed implications of the law” might at least acknowledge the existence of

such judgments. However, this is not the only significant omission in the revised guidance.

**Where is the evidence?**

The revised guidance on the DSE Regulations claims to bring the guidance up to date with “improvements in knowledge of risks”. However, nowhere in the revised guidance is there any sound evidence, or even a reference to a study, which shows that there are any significant health and safety risks to individual DSE users.

Some 10 years after the DSE Regulations came into force, those who foot the bill for implementing them, indeed those responsible for enforcing them, might justifiably ask: ‘Where is the evidence of harm arising from DSE use?’ The simplistic answer is in the civil courts. However, contrary to the impression given in the national press and by those who have a vested interest in promoting the risks of DSE use, which some would argue include the HSE, only a handful of the many millions of DSE users have been awarded damages by the courts. Where is the evidence that the DSE Regulations actually reduce the incidence of work-related ill-health or the number of working days lost? Readers of the revised guidance on the DSE Regulations could be forgiven for concluding that DSE stands for Despite Sound Evidence. **SHP**

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## **Ergonomic Considerations in Work-Related Upper Extremity Disorders**

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It is customary, indeed it almost seems to be obligatory, in any commentary on ergonomic considerations in work-related upper extremity disorders (WRUEDs) to pay homage to Ramazzini and his observations on scribes in 1713. Although this is no bad thing, many commentators leave the impression that WRUEDs were first recognized in the eighteenth century, whereas Dembe [1] noted that the ancient Egyptian writer of the Sellier Papyrus observed that the arms of masons were often "worn out by work," and Hippocrates provided one of the earliest known accounts of chronic disorders caused by repetitive occupational hand movements, in 550 BC. Although anecdotal comments by long-dead doctors and their predecessors may suggest that they were ahead of their times, it is possible that their perceptions of the causes of the maladies they observed were not necessarily correct.

The other apparently obligatory observation in more recent commentaries on WRUEDs is the dramatic growth in reports of such disorders in the last few decades. The paradox from an ergonomics perspective, which few commentators seem to have addressed, is that this has occurred at a time when, compared with the conditions in the first half of the twentieth century, working hours have been reduced, work in general is physically less arduous, extensive health and safety legislation has been introduced, occupational health facilities have improved, and ergonomics knowledge has been disseminated widely.

It can be argued that it is precisely because of these societal developments that we have become more aware of and more concerned about such disorders. Employees have become less tolerant of experiencing aches and pains, let alone serious injuries, which in less enlightened days were considered part and parcel of a job, an inevitable consequence of labor. Although the workplace has become safer, expectations also have grown and what we are observing is perhaps an increase in reporting rather than an increase in incidence. A more controversial explanation is that expectations have grown to the extent that virtually any ache or pain in the neck, back, or upper limbs can be perceived as being caused by repetitive strain or cumulative trauma, and what we are observing, at least in part, is the redefinition of "the heartache and the thousand natural shocks that flesh is heir to" as work-induced injuries.

Another explanation is that the dramatic growth in reports of WRUEDs is at least in part and despite moves toward an evidence-based approach the result of an increase in the willingness of some medical practitioners to ascribe a diagnostic label to that which might previously have been put into the "do not know" category. Some disorders and dysfunctions of the upper extremities are more clearly defined than others. Some conditions present with clear, objective, clinical signs of abnormality, whereas others are diagnosed on the basis of a patient's response to examination or merely a patient's report of a certain pattern of symptoms. Although it would be nice to think that all medical practitioners used common diagnostic criteria, it is clear that they do not [2]. Differing sensitivity and specificity of diagnostic criteria can lead to discrepancies in diagnosis and prevalence estimates in different countries.

## **Denotations and connotations**

The failure to distinguish the denotation from its connotations has been described by Cohen and colleagues [3] as the fundamental epistemologic error in the epidemic of upper extremity disorders that swept (parts of) Australia in the 1980s. The use of terms such as "cumulative trauma disorder" and "vibration white finger" as diagnostic labels presumes the mechanism that has caused the dis-ease or disease. The term "repetitive strain injury" (RSI) has the added disadvantage of implying that someone, usually the employer, is culpable.

Even terms such as "work-related upper extremity disorder" and "work related upper limb disorder", the term preferred in the United Kingdom, can be misinterpreted. It is clear that common upper extremity disorders, such as carpal tunnel syndrome and lateral epicondylitis, can be constitutional in origin and inevitably arise in the workplace and are almost inevitably perceived by some individuals as work-related. A condition can be perceived as work related when work activities merely make the sufferer aware of some previously asymptomatic condition or influence an individual's ability to work. It does not necessarily follow that a condition that is perceived or referred to as work related has been caused, aggravated, exacerbated, or accelerated by work activities. Many people die in bed, but that does not mean that beds are a serious hazard. Just because an upper extremity disorder manifests in the workplace does not mean that the work is hazardous.

## **The social construction of injury**

Anecdotal evidence suggests that some individuals who have naturally occurring sensations or symptoms of a constitutional disorder can develop what might be described as an iatrogenic injury. For example, "I'm afraid you will continue to have this arm problem so long as you keep your current job" might be accurate advice, but it can be interpreted as implying a causal relationship between the work and the disorder. Moreover, some practitioners in medical and related disciplines seem willing to make categorical statements concerning the occupational nature of often vague signs and symptoms without giving due consideration to other possible causes and without ever having seen the workplace.

An individual with an upper extremity sensation becomes a patient upon visiting the practitioner, can leave the consulting room with the perception of being an employee with a work-induced disorder, and becomes a claimant with an injury upon encountering the compensation system. This is part of what is termed the "social construction of injury", in which various factors, including the press coverage of compensation claims, induce in employees the perception that they have suffered work-induced injuries for which someone is liable. This is in no way intended to suggest that such individuals construct their own injuries. It merely suggests that how individuals, health and safety practitioners, doctors, lawyers, and ergonomists perceive musculoskeletal sensations can be influenced strongly by external factors and the circumstances in which we find ourselves placed [4, 5].

Unraveling the complex relationships between work activities and upper extremity disorders and quantifying the true scale of the problem requires sophisticated epidemiologic studies. Existing studies seem to be open to widely different

interpretations, however. For example, using admittedly rigorous criteria, Vender and colleagues [6] concluded that none of the 2054 studies reviewed established a causal relationship between distinct medical entities and work activities. In contrast, in reviewing much of the same literature and acknowledging that epidemiologic evidence is often based on studies with weak designs, Buckle [7] suggested that the consistency in the results strongly supported a relation with factors arising from work. Criticism [8] of more recent reviews by NIOSH [9] and the National Academy of Science [10] seems to confirm that when it comes to the interpretation of the evidence, belief can be stronger than the rigor of the scientific method, such that supportive evidence is preferentially recruited and the inconvenient is downplayed or suppressed.

Acknowledging that psychological factors and factors extrinsic to work can play an important role in the recognition and interpretation of symptoms does not deny the reality of the symptoms or the legitimacy of the concerns. A country's system of compensation can promote or inhibit the reporting, presentation, and rehabilitation of upper extremity disorders [11,12]. Recognizing that WRUEDs can be contagious in that they can arise from ideas and beliefs about work, spread by word of mouth rather than mouth to mouth, acknowledges that factors intrinsic to the workplace but not necessarily to the work itself can play an important role in the interpretation and attribution of symptoms. Recognizing that for some employees a splint is more a badge of injury than a therapeutic aid and that illness behavior may be a natural response to the prevailing circumstances does not imply malingering but suggests that psychological factors and factors extrinsic to work can play an important role in the treatment and rehabilitation of upper extremity disorders.

Much of the ergonomics literature gives the impression that virtually all upper extremity disorders are caused primarily by work and that by applying an ergonomics approach they will be eliminated. They will not. Correctly applied, an ergonomics approach can reduce the likelihood of work-induced disorders and assist in accommodating individuals who have work-related disorders, but it cannot eliminate disorders that have been (mistakenly) attributed to work by social processes.

### **The role of ergonomics**

Ergonomists view systems of work as involving complex interactions among human, social, and technological components. Unfortunately, a simplistic view of ergonomics has grown up that focuses on the physical aspects of work: force, repetition rates, and posture. Although the ergonomics approach emphasizes that psychosocial factors are equally important, they are frequently misunderstood or ignored. It has to be acknowledged, however, that it is often far easier to tinker with the physical features of the workstation than tackle the root cause of the problem (eg, the design of the job). Tinkering with the physical features of the workstation might well produce a Hawthorne effect, which gives the illusion of a successful ergonomics intervention.

In an ideal world, all equipment, workstations, and working environments would be designed to meet optimum ergonomics criteria. In practice, the degree to which ergonomics principles are applied - or should be applied - is a function of the duration and intensity of the task being performed and the anticipated adverse consequences on persons performing the task. Inevitably, ergonomics criteria are not absolute. A cost-

benefit equation must be considered. Ergonomics principles clearly are not inconsistent with the need to protect the health and safety of employees, but ergonomists seek to provide not only a safe but also a satisfying and efficient system of work. The corollary of this proposition is that to describe a system of work as not meeting optimum ergonomics criteria does not necessarily imply that it is unsafe or potentially injurious. Herein lies fertile ground for the seeds of misunderstanding to flourish.

Where does discomfort stop and a WRUED start? Work can be tiring, but what level of fatigue is unacceptable? Is stiffness or soreness after unaccustomed work a WRUED? Take, for example, an employee who has some sort of (previously undiagnosed) constitutional disorder, the symptoms of which are exacerbated by work, or at least the employee perceives they are. In the current climate in which virtually any manual activity is perceived as being capable of causing injury, the employee reports a WRUED. Recommending some sort of change in the workstation or work regimen with the intention of making the employee more comfortable is not a bad thing, but unless this change is explained carefully, the change can be interpreted as confirmation that something about the work caused or materially contributed to the employee's disorder, particularly if the change is perceived by the employee as making work more comfortable.

At around the same time, the employee may have been prescribed some sort of medication or provided with a splint or physiotherapy, any or all of which may have reduced the discomfort experienced at work. However, the change in the work - the ergonomics intervention - rather than the treatment can be perceived by the employee as reducing the discomfort, reinforcing the perception that the work itself was the cause of the employee's disorder. Interventions, medical or ergonomic, must be accompanied by carefully considered explanations that are not aimed solely at the individual concerned.

If an employee's fellow workers interpret the ergonomics intervention as suggesting that something about the work caused their colleague's symptoms, there may be calls for similar changes in their work, which is newly and inaccurately perceived as hazardous. Herein lies fertile ground for localized epidemics of WRUEDs to flourish. Experiences of dealing with such epidemics in several organizations in which there was no obvious hazardous activity suggested that failing to deal appropriately with the early cases, which were subsequently shown to be primarily constitutional in origin, permitted ideas and beliefs to flourish and the reporting of WRUEDs to increase for no obvious reason.

In one such epidemic, in which clusters of WRUEDs appeared in some premises but not others, despite there being an identical system of (boring) work in all the premises, significant increases in reporting of WRUEDs occurred shortly after the visits of ergonomics consultants who had been called to solve the problem. A subsequent analysis of sickness absence data showed that the proportion of sickness absence caused by WRUEDs had increased significantly in the 'infected' premises but that the overall level of sickness absence was fairly constant throughout the epidemic and much the same in all the premises.

Problems also seem to arise when well-intentioned but inexperienced practitioners attempt to incorporate ergonomics principles into risk management strategies. This approach has given rise to the bizarre notions of ergonomic risk factors and, worse, ergonomic injuries. Such oxymorons demonstrate a fundamental misunderstanding of ergonomics principles and of the differences between dis-ease and disease and of the differences between hazard and risk. Ergonomic recommendations that are intended to promote comfort and efficiency are (mis)interpreted as essential health and safety requirements. The dumbing down of ergonomics principles results in attention being focused solely on that which is easy to measure or change.

Nowhere is the misunderstanding of ergonomics principles more apparent than in the way upper extremity disorders among computer users have become associated with deficiencies in the physical features of the workstation or some aspect of the posture adopted to use the computer, which might, at most, have a trivial influence on comfort. For example, most diagrams show a seated computer user in a bolt upright posture with the forearms horizontal. Simple observation of any large group of computer users shows that many individuals do not sit in this way.

One of the founding fathers of ergonomics, Professor Etienne Grandjean, referred to the bolt upright posture depicted in so many guidelines as wishful thinking and suggested that such diagrams were a throwback to the early days of mechanical typewriters, which required key forces of several hundred grams and were more easily operated in such a posture [13]. Modern electronic keyboards, which require much less force and have less key travel than mechanical typewriters, are mainly operated by finger movements with hardly any assistance of the forearms. Computer users do not sit and do not need to sit in a bolt-upright posture. Diagrams that purport to show optimum postures for computer use are useful aids but should not be interpreted too rigorously. The more general point is that the body is built to move. Maintaining a static, constrained posture quickly can lead to discomfort. There is no one perfect posture for any particular task. Unless constrained by some feature of the tools used or the workstation, users usually adopt postures that they find comfortable.

Upper extremity disorders among computer users are worthy of note for several other reasons, not least because of the sheer number of people whose work involves the use of a screen, keyboard, and mouse. If we have got it wrong about what constitutes ergonomically sound computer usage, there is potentially a big problem. Some apostles of RSI would undoubtedly argue that we have got it wrong and that the dramatic increase in the reporting of WRUEDs in the last few decades has run more or less in parallel with the dramatic increase in the use of computers at home and at work. However, the most significant contribution to the debate about ergonomic considerations in WRUEDs arising from considering upper extremity disorders among computer users is the explanatory models of WRUEDs that they have generated. It is to such explanatory models that attention is turned.

### **Explanatory models of work-related upper extremity disorders**

In attempting to explain the abnormal, many models seem to ignore the normal (ie, that most work does not give rise to upper extremity disorders) and seem to assume that the cause of any WRUED is work. Many explanatory models look much like sketches of space stations and seem to exist in a vacuum, whereas in reality WRUEDs

exist in a sea of potential influences. Sauter and Swanson [14] provide one of the most sophisticated explanatory models of the possible linkages between upper extremity disorders and computer use found in the literature. They describe their ecological model as "an integration of the generic psychosocial stress process into the traditional biomechanical model of musculoskeletal disorders." Although at various points they allude to environmental forces and to the literature arising from the epidemic of RSI in Australia in the 1980s, their ecological model does not explain what happened in Australia.

### **Explanations of the Australian repetitive strain injury epidemic**

What is clear from the literature is that the Australian RSI epidemic in the 1980s was not caused simply by the physical demands of work. It was not resolved by simplistic ergonomic interventions but by changing perceptions of the hazards and the likely harms arising from work activities that had become distorted by the well-intentioned but misguided activities of the medical profession and related disciplines and various other factors unrelated to work.

A series of articles in the *Medical Journal of Australia* in September 1987 amounted to a recantation of the RSI concept by the Australian medical establishment. Ferguson [15] began his leading article entitled "Putting the epidemic to rest" by stating "With hindsight, the gigantic and costly Australian epidemic called 'repetition strain injury' (RSI) can be seen as a complex psychosocial phenomenon with elements of mass hysteria, that were superimposed on a base of widespread discomfort, fatigue and morbidity. The epidemic, to which the medical and legal professions, managements, unions, governments and the media have all contributed, is now waning, but endemic work-related musculoskeletal syndromes remain. It is important to examine the epidemic in the hope that its recurrence in some other guise may be prevented."

In an article entitled "RSI: a model of social iatrogenesis", Cleland [16] argued that clinical observations suggested that the pain may be caused by a disturbance of sensory function rather than a chronic unhealed tissue injury and went on to suggest that "With the model of disturbed sensory perception, one can predict a number of the effects of environmental influences upon disease expression and severity." He noted that educational programs and treatments that promote the idea that work activities can cause injury would be likely to cause further concern, which, in turn, could further heighten regional sensory awareness and complete a vicious cycle. In criticizing the term RSI, Cleland [16] also referred to "iatrogenesis by nomenclature."

Wright [17] argued that not only the term but also the concept of RSI should be abandoned. Hocking's article [18], which reported an inverse relationship between keystroke rate and rates of reporting of RSI in Telecom Australia, clearly showed the inadequacy of the traditional biomechanical model. Hocking [19] later postulated an iceberg of disease, the iceberg representing a mass of ill-defined bodily sensations and subclinical disease, only the tip of which is perceived as pain or clinically presented illness. Many other symptoms are coped with and remain subclinical. The iceberg floats in a social sea, however. If the density of the surrounding sea (ie, the social environment) increases because of organizational change or medical, media, or legal influences, the iceberg rises, the tip enlarges, and more illness is presented.



Dembe [1] concluded his detailed account of how social factors have shaped physicians' recognition and conception of cumulative trauma disorders in the United States by referring to events in Australia: "A question raised by the Australian experience is whether history will repeat itself in the United States, with CTDs eventually being subsumed as varieties of 'occupational stress', 'nervous fatigue', or some other comparable concept that implies a fundamentally psychological origin."

Another explanation of the Australian epidemic that is rarely referred to explicitly in the politically correct literature but was strongly hinted at in the Australian popular press, particularly as the epidemic declined, is that RSI was a good excuse for a 'sickie' (Australian slang for a sickness absence) and an easy route to unwarranted compensation. The press strongly hinted that many RSI sufferers were malingering or at least exaggerating their symptoms. Cynics suggested that the acronym RSI stood for retrospective supplementary income.

The most detailed account of the Australian RSI epidemic published so far is in a book entitled "Constructing RSI belief and desire", by an Australian forensic psychiatrist. Like many other Australians who have commented on the epidemic, however, Lucire [20] was involved intimately in the debate and holds trenchant views. Although many might question Lucire's explanation of the epidemic, there seems no reason to doubt her detailed account of the chronology of events and the key role played by the medical practitioners and related disciplines in initially legitimating and subsequently denouncing RSI.

No explanatory model of WRUEDs can afford to ignore the experiences in Australia. No satisfactory explanatory model call afford to ignore the possibility that some WRUEDs are (directly) induced by the (physical) demands of work, the possibility that some WRUEDs are a function of domestic and leisure activities, the probability that some WRUEDs are intrinsic to the individual, and the clear evidence that WRUEDs are multifactorial in origin and that factors extrinsic to work can shape ideas and beliefs about WRUEDs.

### **Beyond psychosocial processes: a contextual model**

The contextual model presented in Fig. 1 draws heavily on Sauter and Swanson's ecological model but attempts to place work-related disorders in a broader context by explicitly drawing attention to the range of factors that, it is suggested, can influence perceptions of upper extremity disorders. As is fitting for a model based on ergonomics principles, at its center is the individual. Individuals come in different shapes and sizes and vary in their capabilities and limitations. A significant minority have some sort of constitutional condition or at least a predisposition to some sort of disorder. Virtually all individuals experience ephemeral, naturally occurring aches and pains at some point.

The interaction of an individual with work and domestic and leisure activities, for the most part, contributes positively to mental and physical well-being. However, if the physical or psychological demands exceed the capabilities of an individual, there is the potential for physiological and/or psychological effects.

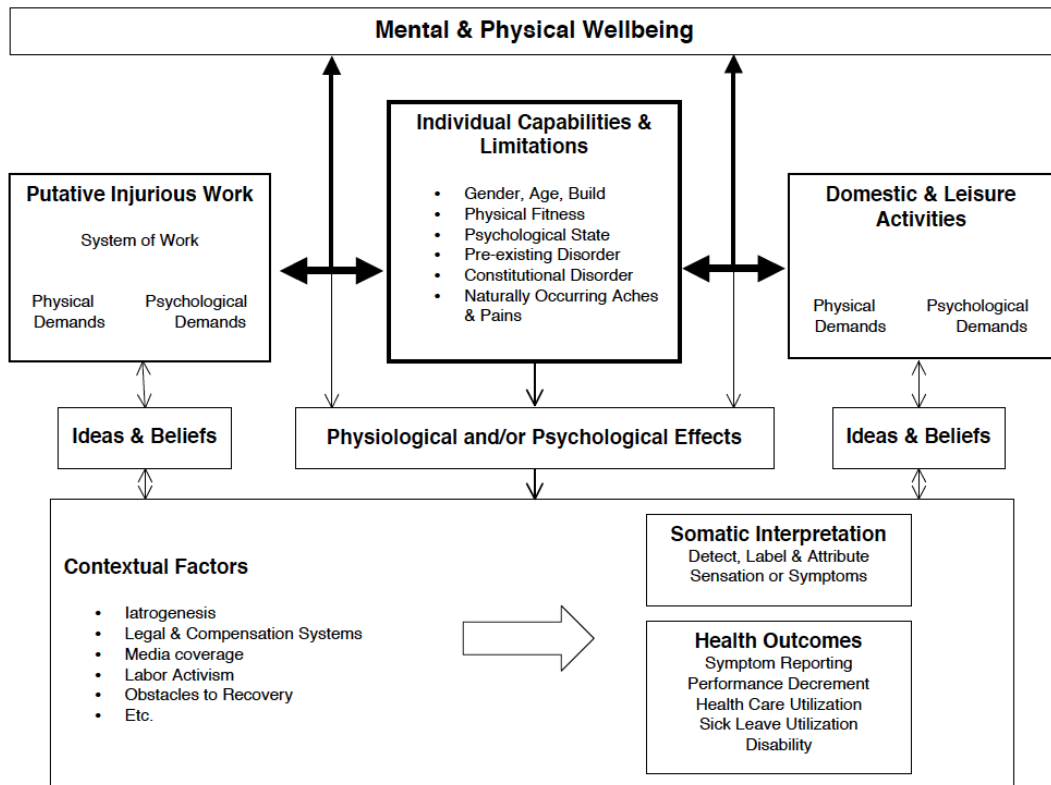


Fig. 1. A contextual model of work-related disorders

As in Sauter and Swanson's ecological model, physical damage or disease is not necessarily integral to the contextual model; however, the contextual model intentionally avoids using the terms "biomechanical strain" and "psychological strain." The other important point to note is that although physiological or psychological effects can arise from the interaction of an individual with work and domestic or leisure activities, there is also a direct path in which the etiologic focus is the individual.

As in Sauter and Swanson's ecological model, in the contextual model the psychological mediation of upper extremity disorders is considered in terms of normal psychological processes. While noting Sauter and Swanson's cautionary words about implicating psychological processes and psychiatric mechanisms in the cause of disease and possibly creating the impression that the disease is not real and of victim blaming and shifting the etiologic focus toward the worker and away from the job, an explanatory model must not prohibit an etiologic focus on the worker or ignore factors intrinsic to an individual. The contextual model implicitly acknowledges the possibility of malingering, somatization, and the exaggeration of symptoms as well as pre-existing conditions and constitutional disorders.

The contextual model explicitly acknowledges some of the factors extrinsic to work that can shape perceptions of upper extremity disorders and influence the process of somatic interpretation and the outcomes of experiencing physiological or psychological effects. Two pathways for the export and import of ideas and beliefs are shown to emphasize the sometimes starkly different and often distorted perceptions of the risks that arise from work and domestic and leisure activities. This approach is not

intended to suggest that work activities are always perceived as hazardous, whereas domestic and leisure activities are not. It merely allows for the same actual level of risk or the same adverse health outcome to be perceived differently, depending on - among other things - whether the activity was indulged in voluntarily or was a requirement of work. To illustrate some of the contextual factors and pathways in this model, it is expedient to return to the issue of upper extremity disorders among computer users and focus attention on experiences in the United Kingdom.

### **Work-related upper extremity disorders in the United Kingdom**

The first recorded epidemic of WRUEDs in the United Kingdom occurred in the civil service in the 1830s and was associated with the introduction of the steel nib to replace the quill pen [21]. The report of an enquiry into a subsequent epidemic in the early 1900s among telegraphists [22] was suggested by Lucire [23] to be the origin of the term "nervous breakdown." The rapid growth in the use of typewriters did not give rise to any reports of similar epidemics in the United Kingdom or, as Dembe [24] noted, in the United States.

Until the importation of the term RSI from Australia in the mid 1980s, a term popularly used in the United Kingdom for virtually any WRUEDs was "teno", which was short for tenosynovitis (eg, the trade union publication, *Tackling teno*). Pheasant [25] suggested the connection between tenosynovitis and the repetitive, short-cycle tasks of the industrial assembly line had been recognized in the United Kingdom since the 1930s. The first guidance on WRUEDs issued by the Health and Safety Executive (HSE) in 1977 suggested that tenosynovitis can occur especially in industries in which rapid, repetitive twisting and gripping movements are common [26]. All the examples given were of blue-collar work that involved obvious force. It was with the introduction of the notion of RSI and its associations with computer use that the reporting of WRUEDs took off in the United Kingdom.

Upon visiting Australia in November 1986, Waugh [27] referred to RSI as a "great innovation" and "the disease England has been waiting for." His article concluded, "I prophesy a tremendous future for this wankers' disease in Britain, as soon as a few more people learn about it. It will go through the country like a dose of salts." Clearly a few more people did learn about it, if the results from a trailer questionnaire on the 1990 Labor Force Survey are to be believed [28]: "Self-reports of musculoskeletal conditions far exceeded those of any other disease category. The estimated number of prevalent cases caused by work is 593,000 of which 50,000 fall into the RSI category, the majority of the remainder (300,000) being related to back problems." Precisely what the individuals who self-reported RSI were suffering from and how they came by their diagnoses remain open to question.

The term WRULD came into use in the United Kingdom after 1990, following the publication by the HSE of a guidance document entitled "Work related upper limb disorders: a guide to prevention" [29]. This guidance document adopted an ergonomics approach but primarily focused on blue-collar work. The opening paragraphs of this guidance made clear that musculoskeletal problems that affect the upper limbs are "common in the general population" and that "they can arise spontaneously and without any link to work." It also suggested that "The musculoskeletal system is well suited to produce repeated motions at low force

levels." It dismissed the term RSI in one sentence in a footnote: "Although in recent years the term 'Repetitive Strain Injury' (RSI) has been commonly used it is medically imprecise and not sufficiently accurate to cover the conditions observed." Nevertheless, the term RSI continued to be used by the media and in trade union publications.

### **Media coverage of work-related upper extremity disorders**

A review of the UK national press over the 10 years from the beginning of 1985 until the end of 1994 revealed that reports of compensation claims dominated the coverage of WRUEDs [30]. The image often portrayed in the national press was that of a metaphorical David, a victim of RSI, but with hand in sling rather than sling in hand, fighting several Goliaths including negligent employers, ignorant doctors, and inadequate compensation systems, but usually winning a substantial award.

A comparison of the press reports of court judgments in the five daily broadsheets with the actual wording in the judgments showed that in every case the press report referred to RSI despite the fact that most of the disorders for which damages were awarded involved one of the more well-defined clinical conditions, such as tenosynovitis. Two further themes emerged from this analysis: the portrayal of WRUEDs as predominantly associated with keyboard or computer use and, possibly linked to this, the preoccupation of journalists to write about RSI among journalists.

From 1989, there was a significant growth in the number and the proportion of press cuttings each year that primarily referred to keyboard users. In part, this growth merely reflected the increase in the number of awards - in and out of court - to keyboard users and the consequent increase in news reports of these awards. However, most features on WRUEDs also emphasized RSI among keyboard users. Examination of the database of court judgments in claims for WRUEDs in England and Wales [<http://www.HumaneTechnology.co.uk/wruld/>] suggests that there were four times more blue-collar WRUED claims than white-collar claims fought through the courts during the 10 years in question. Most of these blue-collar WRUED court judgments received no press coverage whatsoever.

It can be argued that the journalists' apparent preoccupation with writing about RSI among keyboard users merely reflected the fact that literally millions of people were using keyboards. However, the journalists were themselves keyboard users and possibly had a personal and professional interest in these matters. For example, one of the longest running stories found in the five daily broadsheets concerned an apparent epidemic of WRUEDs among journalists at the *Financial Times*. Although not disputing that such an event and its subsequent industrial relations and legal ramifications were newsworthy, it is questionable whether a similar situation in an organization not associated with the media would have been afforded such extensive coverage. It can be argued that if journalists perceived that they were exposed to the alleged hazard about which they were writing when composing their stories at a computer, it would not be surprising if their objectivity in reporting on WRUEDs was sometimes compromised.

From partway through 2000, the press coverage of court hearings and judgments in claims for WRUEDs associated with computer use effectively ceased, despite several

cases that might be considered noteworthy. It is perhaps no coincidence that by 2000, all known claims by journalists for WRUEDs had been thrown out and union backing for such claims seemed to have ceased. Subsequent coverage of WRUEDs usually included a reference to RSI being associated with computer use, even when the story concerned a completely different type of work. By 2000, an element of tongue in cheek writing also had begun to creep into the coverage of WRUEDs. Perhaps journalists were learning to live with their computers. It seems clear that whatever the story, RSI and computer use were, still are, and may be for some time to come indelibly (l)inked in the minds of some.

At approximately the same time that press coverage of WRUEDs associated with computer use was reaching its crescendo, the United Kingdom was introducing the first health and safety regulations that explicitly endorsed ergonomic principles by implementing European Directive 90/270/EEC "on the minimum safety and health requirements for work with display screen equipment" [31]. The resulting fiasco is a sobering lesson in how well-intentioned but misguided regulation can lead to distorted perceptions of ergonomics principles and of the low risks to which individual computer users are exposed and to the diversion of health and safety resources from arguably much more hazardous activities.

### **The implementation of ergonomic regulations in the United Kingdom**

Despite the UK government's and employers' clear lack of enthusiasm for specific legislation on the use of computers, lawmakers decided to implement the Directive in the United Kingdom under the Health and Safety at Work etc. Act 1974, which resulted in the Health and Safety (Display Screen Equipment) Regulations 1992 (DSE Regulations) coming into force on January 1, 1993.

The HSE published its first guidance on the DSE Regulations in November 1992, that is, only 2 months before the DSE regulations came into force [32]. At approximately the same time, the HSE issued a press release to warn employers about exploitation of the DSE regulations by unscrupulous suppliers of furniture, equipment, and services [33]: "Many of the claims being made about what the legislation says and what firms must do are bogus, aimed at getting businessmen to buy advice and then undertake unnecessary measures, usually involving further services or products." The DSE regulations require employers to undertake individual risk assessments of computer users. A user is defined as "an employee who habitually uses display screen equipment as a significant part of his normal work." This risk assessment must be "suitable and sufficient" and be reviewed when "there is reason to suspect it is no longer valid" or when there has been "a significant change." The HSE's guidance suggested that before the risk assessment, the user should be provided with training and information on a formidable list of issues.

Employers are also required to ensure that any workstation meets the requirements specified in the Schedule to the Regulations, which are very similar to the requirements in the Annex to the Directive. The validity and use of many of these so-called "minimum ergonomic requirements" are open to question. For example, the schedule suggests that in designing, selecting, commissioning, and modifying software and in designing tasks using display screen equipment, the employer shall

take into account five principles, one of which is that "the principles of software ergonomics must be applied, in particular to human data processing. "

A "Review of Health and Safety Regulation" published by the Health and Safety Commission (HSC) in May 1994 highlighted continuing dissatisfaction with the DSE regulations and estimated that the recurring costs of the DSE regulations were similar to the recurring benefits, whereas similar cost benefit analyses of other health and safety regulations typically show the benefits far outweighing the costs [34].

### **Adding insult to injury**

The DSE Regulations were amended by the Health and Safety (Miscellaneous Amendments) Regulations in 2002. The latest guidance on "What is a workstation?" now suggests the regulations apply to the prolonged use of "mobile phones and personal organisers that can be used to compose and edit text, view images or connect to the Internet" [35]. The revised guidance states; "Any prolonged use of such devices for work purposes will be subject to the DSE Regulations and the circumstances of such cases will need to be individually assessed." How hazardous is a personal digital assistant? "Mobile phones that are in prolonged use only for spoken conversations are excluded ... because their display screens are small."

The guidance acknowledges that "It is not always practicable for the employer to send someone else to conduct a risk assessment for homeworkers/teleworkers (particularly in the case of mobile workers)" and that "in the case of mobile teleworkers working for very short periods in hotel rooms and similar places, the full (risk assessment) procedure may not be necessary." How hazardous is using a laptop in a hotel room? Users of laptops are told that "risk assessments for, say, half an hour's work in a borrowed office can be quite informal and need not be written down" and not to carry "equipment or papers unless they are really likely to be needed."

At the same time that the HSE published revised guidance on the amended DSE regulations, the HSE launched a revision of a leaflet that was entitled "Upper limb disorders: assessing the risks" [36] and is currently called "Aching arms (or RSI) in small businesses" [37]. Both versions of this leaflet are a triumph of graphic design over technical content. The choice of wording for the new title is difficult to understand given that, on page 3, the revised leaflet says "HSE prefers to use the general term ULD because problems might not be due to strain and there may not be any sign of injury." The HSE's revised guidance on the DSE Regulations includes the observation that "Media reports often refer to some, or all, ULDs as RSI but this term is not a medical diagnosis and can be confusing."

### **Why bother?**

Employers who do not comply fully with the DSE Regulations, whether because of ignorance, misunderstandings, or a lack of conviction that the DSE Regulations address important health and safety issues, potentially expose themselves to criminal prosecution by the authorities responsible for the enforcement of health and safety legislation. The overall impression that can be drawn from the admittedly limited evidence currently available is that for various reasons, the authorities responsible for enforcement have viewed the DSE regulations as a low priority.

The revised guidance on the DSE regulations claims to bring the guidance up to date with "improvements in knowledge of risks." However, nowhere in the revised guidance is there any sound evidence or even a reference to a study that shows that there are any significant health and safety risks to individual computer users. There is no evidence that the DSE regulations have or will bring about a significant reduction in the incidence of upper extremity disorders and the number of working days lost by computer users. More than 10 years after the DSE Regulations came into force, the organizations that foot the bill for implementing them, indeed the authorities responsible for enforcing them, might justifiably ask, "Where is the evidence of harm arising from computer use?"

The simplistic answer is in the civil courts. However, contrary to the impression given in the national press and by individuals who have a vested interest in promoting the risks of computer use, only a handful of the many millions of computer users in the United Kingdom have been awarded damages by the courts for WRUEDs. One of the consequences of the incorporation of the Directive into UK legislation is that the DSE Regulations can be used to assist an employee who brings civil proceedings against an employer for an injury arising from computer use by pleading a breach of statutory duty, which is generally considered to be less difficult to prove than negligence. The admittedly unusual case of *Conaty v Barclays Bank plc*, which was heard in Central London County Court in April 2000, illustrates what can happen when lawyers get involved in such matters [38].

Fiona Conaty claimed that she had developed De Quervain's syndrome in November 1994 at the age of 22 as a result of numeric data entry. Her employer accepted that they had been in breach of the DSE Regulations by failing to conduct a suitable and sufficient risk assessment, by not planning her activities so that her work at the screen was periodically interrupted by breaks and changes in activities, and by failing to train and advise her about health and safety. She was described by the judge as habitually adopting "what is agreed to be a bad posture whereby her wrist was flexed and whilst using the numeric keys subject to ulnar deviation instead of being kept straight, as is recommended." It was also noted, however, that "She used only her right hand and made no use of her thumb in keyboarding, which accordingly she stuck out to the side of her right hand." In other words, this was a claim for De Quervain's syndrome, allegedly caused by the non-use of the thumb in a poor posture!

Both medical experts agreed that she had suffered De Quervain's syndrome and that they had no direct experience and were not aware of any cases in the literature of De Quervain's syndrome in a 22-year-old person without either a traumatic or hormonal cause. After reviewing the medical and ergonomics evidence, the judge said, "Although therefore there is no identified case where [De Quervain's syndrome] has been shown to be the result of deviation of the wrist not involving use of the thumb, I am not able on the evidence which includes acknowledgement of the lack of full knowledge of such relationships to dismiss such relationship as impossible." The judge found that the work was a possible cause and that he could find no other cause to identify as the probable or more probable cause. He concluded that the disorder was work related and "As such I have no difficulty in holding that it arises from the poor posture adopted by the Claimant which itself was caused by the Defendant's breaches of statutory duty, both in the layout of the workstation and lack of training

and concentration of keyboarding which I have identified." He awarded a total of £235,000 damages.

Although this county court decision set no legal precedent, it seems that the DSE Regulations assisted the claimant in this particular case, the admitted breaches of statutory duty effectively determining the outcome, but where is the evidence of the DSE Regulations being of benefit in a wider context? Where is the evidence that the DSE Regulations actually reduce the incidence of work related ill health or the number of working days lost? Persons responsible for dealing with the fallout from the DSE Regulations could be forgiven for concluding that DSE stands for "despite sound evidence."

WRUEDs among computer users have received much attention. Although there are no reliable statistics, anecdotal evidence suggests that there are probably significantly more blue-collar than white-collar WRUEDs. Regrettably, it seems as if their numbers are likely to increase, given that the HSE's latest guidance on blue-collar WRUEDs leaves the impression that virtually all upper extremity disorders, including nonspecific pain syndromes, are primarily caused by work and that by applying an ergonomics approach they can be eliminated [39]. RSI is dead - long live nonspecific pain syndromes.

### **Summary**

This commentary perhaps has cast some light on how upper extremity disorders might be related to work and perhaps cast some doubt on the popular perceptions of ergonomics. It would be wrong, however, to leave the impression that most WRUEDs are mostly unrelated to work activities or that ergonomics has little to contribute. If a disorder influences an employee's ability to work efficiently, regardless of any ergonomic or health and safety considerations, an employer must be aware of and manage the issue. A balance must be struck, however, between encouraging employers to recognize and deal sympathetically with disorders that probably originate outside of work but influence the ability to work and disorders that probably are caused or at least are significantly aggravated or accelerated by work. The former may only require localized changes to accommodate an individual; the latter may require significant changes to be made to the overall system of work. Correctly applied, ergonomic principles can contribute to both situations. If the analysis above is even partially correct, however, neither simplistic ergonomic interventions that focus on the physical aspects of work nor elaborate ergonomic regulations will reverse the growth in reports of WRUEDs - they are part of the problem not the solution.

In the current climate, in which virtually any manual activity is perceived as being capable of causing injury and in which there is a perceived epidemic of WRUEDs, it is understandable that there are calls for the introduction of ergonomic programs and a proactive response to search out WRUEDs. Just as critical as having appropriate systems in place to identify, treat, and manage upper extremity disorders when they do arise at work is communicating to workers in kind and carefully considered words, using words that avoid over-medicalizing or attributing to work "the heart-ache and the thousand natural shocks that flesh is heir to." Although patients desire a diagnostic



label for their symptoms, they should not be given labels presuming to know the causative mechanism of their condition.

Correctly applied, ergonomic principles undoubtedly can play a role in controlling the currently perceived epidemic of WRUEDs by making "workplaces that are comfortable when we are well and accommodating when we are ill" [40]. From an ergonomics perspective, however, there seems to be an urgent need to examine the true scale of the problem and the range of factors that promote and inhibit accurate perceptions of the risk of experiencing upper extremity disorders at work. There are strong arguments for promoting evidence-based practice by all the stakeholders in this complex problem.

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# Management of upper limb disorders and the biopsychosocial model

Prepared by the **University of Huddersfield,**  
**Health Services Consultancy, Humane Technology Ltd,**  
**Rolls-Royce plc** and **Pulvertaft Hand Centre**  
for the Health and Safety Executive 2008

# Management of upper limb disorders and the biopsychosocial model

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This review, using a best evidence synthesis, examined the evidence on management strategies for work-relevant upper limb disorders and established the extent to which the biopsychosocial model can be applied. Articles were found through systematic searching of electronic databases together with citation tracking. Information from included articles was extracted into evidence tables. Themes were identified and the information synthesised into high level evidence statements, which were distilled into key messages. The main results are presented in thematic sections covering classification/diagnosis, epidemiology, associations/risks, and management/treatment, focusing on return to work and taking account of distinctions between non-specific complaints and specific diagnoses.

Neither medical treatment nor ergonomic workplace interventions alone offer an optimal solution; rather, multimodal interventions show considerable promise, particularly for vocational outcomes. Early return to work, or work retention, is an important goal for most cases and may be facilitated, where necessary, by transitional work arrangements. The emergent evidence indicates that successful management strategies require all the players to be onside and acting in a coordinated fashion; this requires engaging employers and workers to participate.

The biopsychosocial model applies: biological considerations should not be ignored, but it is psychosocial factors that are important for vocational and disability outcomes. Implementation of interventions that address the full range of psychosocial issues will require a cultural shift in the way the relationship between upper limb complaints and work is conceived and handled. A number of evidence-based messages emerged, which can contribute to the needed cultural shift.

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# EXECUTIVE SUMMARY

## BACKGROUND

The study started from the recognition that upper limb disorders are experienced by most people, predominantly during working age: in that sense they can be considered to be common health problems. Although there is evidence that common health problems in general are characterised by a strong association with psychosocial factors, it is uncertain to what extent that holds true for upper limb disorders in particular.

The Health & Safety Executive acknowledges that not all work-relevant upper limb disorders can be prevented, and therefore has an interest in determining whether there are effective methods for managing cases, with particular focus on the suitability of a biopsychosocial approach, to help reduce the working days lost to musculoskeletal problems. This review aimed to provide an evidence-base for that question.

## METHODS

The methodology was a 'best evidence synthesis': summarising the available literature and drawing conclusions about the balance of evidence, based on its quality, quantity and consistency. A systematic search of major electronic databases was undertaken using appropriate keywords to retrieve articles pertaining to the development and management of upper limb disorders. In addition citation tracking was undertaken, together with searches of personal databases and the Internet. Each article for inclusion ( $n \sim 200$ ) was read and summarised; the original authors' main findings were extracted, checked, and entered into evidence tables. Themes were identified from the evidence tables and the information was synthesised into high level evidence statements and linked to the supporting evidence, which was graded to reflect the level of support. Finally, the retrieved material was then distilled into a number of key messages related to the aim of the project.

## FINDINGS

The main results are presented in thematic sections covering classification/diagnosis, epidemiology, associations/risks, and management/treatment, focusing on return to work and taking account of distinctions between non-specific complaints and specific diagnoses. As well as high level evidence statements, the main evidence themes are discussed in narrative format to further develop the ideas and put them into context, with particular reference to a biopsychosocial framework.

There is considerable uncertainty over classification and diagnosis for upper limb disorders; the inconsistent terminology impacts on studies of their epidemiology, treatment, and management. Upper limb disorders are commonly experienced irrespective of work and can lead to difficulty undertaking everyday tasks; this applies to specific diagnoses as well as non-specific complaints. Work has a limited overall role in the primary causation of ULDs, yet the symptoms are frequently work-relevant (some work tasks will be difficult for people experiencing upper limb symptoms, and may sometimes provoke symptoms that may otherwise not materialize). Management of cases shows more promise than attempts at primary prevention.

Neither medical treatment nor ergonomic workplace interventions alone offer an optimal solution; rather, multimodal interventions show considerable promise, particularly for vocational outcomes. Some specific diagnoses may require specific biomedical treatments, but the components of supplementary interventions directed at securing sustained return to work seem to be shared with regional pain disorders. Early return to work, or work retention, is an important goal for most cases and may be facilitated, where necessary, by transitional work arrangements. The emergent

evidence indicates that successful management strategies require all the players to be onside and acting in a coordinated fashion, in order to overcome obstacles to recovery and return to work.

### **INTERPRETATION**

The biopsychosocial model is certainly appropriate to understand the phenomenon of work-relevant upper limb disorders, and has important implications for their management. Biological considerations should not be ignored, particularly for initial treatment of cases with specific diagnoses, but it is psychosocial factors that are important when developing and implementing work retention and return to work interventions. Work is beneficial and people need to be helped and encouraged to remain in, or return to, work. This is true both for non-specific upper limb complaints and specific diagnoses. Interventions and management strategies need to be capable of addressing psychosocial issues, when required. This requires a cultural shift in the way the relationship between upper limb complaints and work is conceived and handled. Educational strategies aimed at employers, workers, and the public are likely to be the most useful method to achieve this.

### **KEY MESSAGES**

A number of evidence-based messages have been distilled, which should contribute to the needed cultural shift. Whilst these points apply to the whole range of players involved (population/workers; employers; health professionals; unions; lawyers; media; policy makers; enforcers), transforming them into suitable material for various purposes and media requires assimilating the detail contained in the text and evidence tables.

### CONCEPT MESSAGES

***Upper limb symptoms are a common experience*** - although symptoms are often triggered by physical stress (minor injury), recovery and return to full activities can be expected: activity is usually helpful: prolonged rest is not.

***Work is not the predominant cause*** - although some work will be difficult or impossible for a while, that does not mean the work is unsafe: most people can stay at work (sometimes using temporary adjustments), but absence is appropriate when job demands cannot be tolerated.

***Early return to work is important*** - it contributes to the recovery process and will usually do no harm; facilitating work retention and return to work requires support from workplace and healthcare

***All players onside is fundamental*** - sharing goals, beliefs and a commitment to coordinated action.

### PROCESS MESSAGES

***Promote self-management*** – give evidence-based information and advice - adopt a can-do approach, focusing on recovery rather than what's happened.

***Intervene using stepped care approach*** - treatment only if required (beware detrimental labels and over-medicalisation); encourage and support early activity; avoid prolonged rest; focus on participation, including work.

***Encourage early return to work*** - stay in touch with absent worker; use case management principles; focus on what worker can do rather than what they can't; provide transitional work arrangements (only if required, and time-limited).

***Endeavour to make work comfortable and accommodating*** - assess and control significant risks; ensure physical demands are within normal capabilities, but don't rely on ergonomics alone; accommodating cases shows more promise than prevention.

***Overcome obstacles*** - principles of rehabilitation should be applied early: focus on tackling biopsychosocial obstacles to participation - all players communicating openly and acting together, avoiding blame and conflict.



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# 1. INTRODUCTION

## 1.1 PREAMBLE

Musculoskeletal disorders are known to be responsible for a considerable proportion of work incapacity due to ill health. The Health and Safety Commission has included musculoskeletal disorders within its Ill Health Reduction Programme as a key contributor to its current Public Sector Agreement Targets. The Health and Safety Executive (HSE) judges that it requires the musculoskeletal disorders (MSD) programme to contribute an 8% reduction in the incidence of work-related MSDs by 2007-8. The targets also require HSE to achieve a 9% reduction in working days lost due to injuries and ill health by the same time, and the MSD programme will contribute to this. Upper limb disorders (ULDs) represent a significant part of the total number of MSDs, and need to be considered in the development of guidance on MSDs.

The HSE, in its guidance *Upper limb disorders in the workplace* (HSE 2002), acknowledges that not all ULDs can be prevented, and provides a section entitled "Manage any episodes of ULDs" that includes reference to diagnosis and return to work. However, the HSE recognises that there may be improved methods for managing cases of ULDs which, in principle and if implemented, could help address the working days lost target for ULDs.

As a consequence, HSE issued a tender specification for a piece of research to collate the scientific evidence on the management of ULDs, with particular focus on the suitability of a biopsychosocial approach. An additional specific requirement was the development of accurate (evidence-based) "simple headline message(s) about how people with ULDs should behave".

The commissioned research was to be principally a review of the available published literature (primarily existing reviews) in order to determine the extent that the evidence supports management of ULDs according to biopsychosocial principles. It was noted that use should be made of the papers and data on this subject that have been reviewed already by Waddell and Burton (Waddell & Burton 2004).

## 1.2 BACKGROUND

The study starts from the recognition that upper limb disorders (ULDs) afflict many people at some time, predominantly during working age. ULDs are characterised by symptoms (usually pain) which have inconsistent associations with workloss and disability. Whilst there is evidence that musculoskeletal disorders in general, like other common health problems, have a strong association with psychosocial factors (Waddell & Burton 2004), it is uncertain to what extent that holds true specifically for ULDs.

The biopsychosocial model has been shown to be highly applicable to the understanding and management of pain, and has successfully been applied in the management of problems such as low back pain. It may be that a biopsychosocial approach is equally applicable to other musculoskeletal disorders such as ULDs, but before reaching this conclusion it is necessary to consider whether there are differences between the two groups of conditions that might render application of the biopsychosocial model less relevant and useful. The field of ULDs is complicated because, in addition to the accepted existence of non-specific regional pain, there is a

plethora of commonly used diagnoses and classifications, many of which are predicated on specific pathophysiological features. Furthermore, so far as work-relevance is concerned, some of these specific conditions are prescribed industrial diseases and eligible (in the UK) for Industrial Injuries Disablement Benefit. Although certain specific diagnoses will relate to recognisable underlying pathology, there is considerable variation in diagnostic labelling. Plausible theoretical reasons for assuming that the underpinnings for non-specific musculoskeletal pain should vary by region of the body are not immediately apparent.

The field of low back pain is known to have a more extensive literature than that for other MSDs, and it is possible that knowledge from the back pain field can transfer across. Indeed it is conceivable, and even likely, that there will be some common factors that influence all MSDs, and these may be a mix of physical, physiological, psychological, or social/cultural (HSL (Lee & Higgins) 2006; HSL (Lunt et al) 2007). This review focuses on ULDs (including non-specific complaints and specific diagnoses), but draws inferences where appropriate from studies of back pain and other regional pain disorders, and pain of musculoskeletal origin.

### **1.3 RESEARCH PROPOSAL**

The present research project was commissioned by HSE with a commencement date of 01 April 2007, with a draft report to be presented within three months.

#### **1.3.1 Aim**

The aim of the review was to establish the extent to which the scientific evidence supports management of upper limb disorders according to the biopsychosocial model. (This should be distinguished from guideline development, which was not the purpose of this project).

#### **1.3.2 Objectives**

- Identify all the relevant literature, including recent publications and 'grey' literature, on the management of ULDs. Emphasis will be placed on effective management that achieves faster recovery and reduced times for return to work. The effectiveness of single-modality treatments (eg cortisone injections) will be summarised to provide context for the purposes of comparison.
- Provide an expert review of the available scientific information on the management of ULDs.
- Draw conclusions on the question of whether there is evidence that the biopsychosocial model can be successfully applied to the management of ULDs.
- Provide evidence-based, simple headline messages about what should be done to help people with ULDs recover quickly and achieve sustained return to work.

#### **1.3.3 Terminology**

Terminology is undoubtedly an issue in the field of upper limb disorders (whilst this term is used for convenience in this report, as noted below, there are alternatives that may more accurately reflect various aspects of the phenomenon). A multiplicity of terms is available to describe the same or similar things, and there is often a multiplicity of meanings that can be attributed to the same term. In addition to the regional-specific differentiation is the issue of the relationship with work.

A great variation in terminology is apparent across the literature, reflecting ongoing debates. For example, the words 'upper limb' emphasise the limb only, whereas 'upper

extremity' takes into account (a) the shoulders; and (b) that some symptoms perceived in the limb are due to neck or shoulder problems; whilst neither specifically includes neck symptoms, both are typically taken to include neck pain. There is also a distinction between terms that use the word 'disorder' (implying a known lesion) and 'complaints' (which reflect the self-reported nature of symptoms, and their inherent subjectivity). There is also a need to consider the meaning of the word 'work' in these terms, and the distinction between work-related and work-relevant (see below). Resolving these, and other related issues, is beyond the scope of this report but it means that some provisos and qualifications are necessary, and they will be discussed at pertinent points in the report. Meanwhile, some essential definitions are given briefly here, and discussed in more detail in the Appendix.

**Biopsychosocial:** refers to the concept that biological, psychological, and social factors combine to play a significant role in human functioning; and, these need to be treated or managed as interlinked systems.

**Non-specific regional pain/symptoms:** refers to self-reported complaints (predominantly pain) occurring in a regional anatomical distribution, and for which there is no agreed or demonstrable cogent underlying pathological explanation.

**Pain:** is an unpleasant sensory and emotional experience associated with actual or potential tissue damage, or described in terms of such damage.

**Psychosocial:** refers to the interaction between the person (beliefs, emotions, behaviour, etc) and their social environment (significant others, healthcare providers, people at the workplace, funders, etc), and how this influences their behaviour (what they do).

**Prevention:** the term can refer to preventing an injury/complaint from happening, or it can refer to an approach/intervention to reduce the consequences of an injury/complaint. It is not currently understood how to prevent people from developing musculoskeletal pain and discomfort. However, preventing deleterious consequences is potentially feasible.

**Upper limb disorder:** generally used as a generic term to cover specific diagnoses and non-specific complaints of the upper limb/extremity (hand, wrist, forearm, arm, shoulder), and may also include symptoms in the neck. *Disorder* is a term encompassing both illness and disease (*illness* being an absence of well-being perceived by the individual in the form of symptoms, or by others as an abnormality of function or behaviour for which the individual cannot be held responsible; *disease* being a combination of pathological abnormalities that are thought to be interrelated (Coggon et al. 2005)).

**Work-relevant:** refers to health complaints/disorders that, irrespective of cause, are experienced at the workplace to a greater or lesser extent, and which in turn impact on the performance of a worker. Most available evidence pertains to paid work and employment; however the idea likely applies equally to all forms of productive activity.

[Note: the terminology used in the cells of the evidence tables (Tables A1 to A4) follows that used by the original authors].

## **2. METHODOLOGY**

### **2.1 LITERATURE SEARCHING**

Two key search methods were employed: a search of electronic databases and identification of relevant literature from existing bibliographies held by the authors of this report or listed in other key references. In addition, general Internet searches were performed to attempt to identify any 'grey literature', for example reports published by government departments or other organisations.

A systematic literature search of Medline, Medline Daily Update, Medline Pending, Embase, CINAHL, AMED (Allied and Complementary Medicine Database), PsycInfo, Cochrane DSR (Database of Systematic Reviews), ACP (American College of Physicians) Journal Club, and DARE (Database of Abstracts of Reviews of Effects) was conducted in June 2007, limited to citations published from 1996 onwards.

In broad terms this included search strings with all relevant keywords that might identify musculoskeletal disorders of the upper extremities. Over 10,000 potential citations were identified, and all relevant citations were then selected using Boolean search terms to satisfy the selection process.

Citations retrieved from the systematic search were selected according to a priori criteria for relevance. Guidance received from the HSE about the topic was to focus the literature search on the following: tenosynovitis (hand/forearm), tendonitis (fingers/hand/forearm), rotator cuff tendonitis (including supraspinatus) and bicipital tendonitis, De Quervain's, carpal tunnel syndrome, shoulder capsulitis, tennis elbow, golfer's elbow, cervical spondylosis, diffuse/non-specific ULD, and 'tension neck'. These labels were not used exclusively; rather they formed the basis for determining operational boundaries for the topic and attempts were made to include a wide range of terms used to describe upper limb conditions in working-age adults.

To maintain the above focus, numerous conditions and topics were excluded: eg whiplash associated disorder, rheumatic and systemic diseases, brachial plexus avulsion, and fractures. In addition, disorders of peripheral circulation and phantom limb pain were excluded since they are conceptually different. The extensive (clinical) literature reporting on neck pain alone was excluded, but relevant aspects of the topic were included in the literature retrieved by the above search terms.

#### **2.1.1 Article selection**

It was neither possible nor practical to review all studies and articles retrieved. Systematic reviews and extensive narrative reviews were the primary focus, but individual studies were selected where they added additional or more detailed information. In addition, we identified literature relevant to specific aspects such as application of the biopsychosocial model and return to work.

Once a potential pool of articles and studies had been identified, tables consisting of titles and abstracts (when available) were circulated to three reviewers (KB; NK; BP), and each indicated which should be obtained for possible inclusion in the review.

Where there was disagreement, and that was only rare, it was remedied by consensus. However, the general approach was to view the full article or document if there was any likelihood that it may be relevant and appropriate to include. Copies of some 200 relevant articles were obtained, circulated, and archived.

## 2.2 DATA EXTRACTION AND SYNTHESIS

Each article for inclusion was read and summarised by one of the authors. The original authors' main findings were extracted and the data entered into evidence tables, which were organised to cover reviews in three main categories (epidemiology/risk factors; intervention/classification; concepts/guidance) supplemented by a separate table for original studies (see Tables A1 to A4). Where appropriate, the data table entries were amplified by explanatory or cautionary comments by the present reviewers (and displayed in italics). The data extractions were checked by the other two reviewers, with any revisions to the final wording achieved by consensus; they were then reviewed by the two clinical reviewers (LB; CB) who had not been involved in the original extraction, and any final amendments made.

### 2.2.1 Evidence statements

In order to summarise the data in the evidence tables, themes were identified by the reviewers and the information was synthesised into evidence statements, each linked to the supporting evidence. To reflect the nature of the subject matter and to aid interpretation, the emphasis was placed on high level evidence statements reflecting overarching principles rather than dealing with, say, specific treatments.

The text of the evidence statements is used to expand on the nature or limitations of the underlying evidence where necessary, and to offer caveats and cautions. In addition, the main evidence themes are discussed in narrative format to further develop the ideas and put them into context, with particular reference to a biopsychosocial framework.

The final wording of the evidence statements and accompanying text was developed through an iterative process involving all five authors of the review, and any disagreements were resolved by majority consensus guided by the reviewer with most clinical/scientific expertise in the area concerned.

### 2.2.2 Evidence grading

The strength of the scientific evidence supporting the statements was graded using an adaptation of a previously used system – see Box 1. Importantly, the strength of the evidence should be distinguished from the size of the effect: there may be strong evidence about an association between, say, work and a particular health outcome, yet the effect may be small. Conversely, weak evidence statements do not necessarily mean that it is untrue or unimportant, and may simply reflect limited scientific study.

<b>Box 1: Evidence grading system used to rate the strength of the scientific evidence underlying the evidence statements</b>		
	<b><i>Evidence grade</i></b>	<b><i>Definition</i></b>
***	<b>Strong</b>	generally consistent findings provided by (systematic review(s) of) multiple scientific studies.
**	<b>Moderate</b>	generally consistent findings provided by (review(s) of) fewer and/or lower quality scientific studies.
*	<b>Weak</b>	based on a single scientific study, general consensus and guidance, or inconsistent findings provided by (review(s) of) multiple scientific studies.

[Adapted from (Waddell & Burton 2006)]

### **2.2.3 Synthesis**

Finally the themes contained within the evidence statements were appraised; the retrieved material was distilled and synthesised into a number of key messages to reflect the evidence primarily, but not exclusively, on the relevance of the biopsychosocial model and a biopsychosocial approach to the management of work-relevant upper limb disorders.

The overall methodology follows that used in previous evidence reviews that attempted to bring together a diverse literature on a complex subject (Waddell & Burton 2004; Franche et al. 2005). It should be viewed as a 'best evidence synthesis', summarising the available literature and drawing conclusions about the balance of evidence, based on its quality, quantity and consistency (Slavin 1995). This approach offered the flexibility needed to handle complex topics, but at the same time took a rigorous approach when it came to assessing the strength of the scientific evidence.

It should be stressed that the evidence has been synthesised here in high level terms and the findings should not in any way be construed as a clinical guideline.

### **2.2.4 Quality assurance**

The draft report was peer reviewed by seven independent reviewers representing a number of disciplines with an interest in the topic, and also submitted to HSE for comment. The reviewers' comments were taken into account when preparing the final report for publication.



## 3. FINDINGS

### 3.1 STRUCTURE

The findings of the review are presented here in the form of 'evidence-statements' as a convenient way of summarising knowledge across complex themes; each statement is linked to the main supportive sources of evidence in Tables A1 to A5.

The presentation is in a logical sequence, starting from the need to define the disorders of concern, and to present the evidence on classification and diagnosis of upper limb disorders. Then the fundamental matter of epidemiology and risk factors follows, leading into the evidence on treatment, management approaches, and return to work. Within each section the implications of the evidence are discussed and additional evidence is introduced where this is helpful in amplifying the themes.

The intention is to reflect the aim of the review by providing high level evidence statements that inform on the more generic, overarching aspects of the topic, as opposed to specific circumstances.

### 3.2 CLASSIFICATION AND DIAGNOSIS

The intention here is to present the evidence on the extent to which upper limb disorders can be classified and recognised; exploration of detailed diagnostic criteria is beyond the scope of the review.

\*\* There is a wide spectrum of classification systems for ULDs in current clinical use, ranging from specific disorders to descriptive syndromes.

Table A2: (Nørregaard et al. 1999; Piligian et al. 2000)

\*\*\* Classification and diagnosis of ULDs is particularly problematic; there is a lack of agreement on diagnostic criteria, even for the more common specific diagnoses (eg tenosynovitis, epicondylitis, rotator cuff syndrome). Inconsistent application, both in the clinic and workplace, leads to misdiagnosis, incorrect labelling, and difficulties in interpretation of research findings.

Table A1: (Huisstede et al. 2006)

Table A2: (Helliwell 1996; Nørregaard et al. 1999; Piligian et al. 2000; Van Eerd et al. 2003; Walker-Bone et al. 2003a)

Table A4: (Beaton et al. 2007)

\*\* The scientific basis for descriptive classification terms implying a uniform aetiology, such as RSI (repetitive strain injuries) and CTD (cumulative trauma disorders), is weak or absent and they are inconsistently applied/understood; there is an argument that such terms should be avoided.

Table 1: (Szabo 2006)

Table A2 (Hagberg 2005)

Table 3 (Szabo & King 2000; Lucire 2003)

Table 4: (European Agency for Safety and Health at Work 2000)

Table A4: (Macfarlane et al. 2000; Bonde et al. 2003)

These nosological inconsistencies have led to debate and uncertainty over issues from pathology to causation (Beaton et al. 2007). It is likely that misdiagnoses will be common both in the clinic and in the workplace (Nørregaard et al. 1999), frequently manifested as patients receiving multiple and conflicting explanations and diagnostic labels from the various clinicians they encounter. This, in turn, will compromise the results of clinical trials due to heterogeneous participants. Similarly it will compromise epidemiological studies, where it is difficult to know whether 'cases' represent a homogenous population (Coggon et al. 2005). Furthermore, over-diagnosis of specific diseases may raise patient expectations, and promote false beliefs about work-relatedness (Helliwell 1996).

There is a conceptual argument that adopting the approach currently used in back pain and whiplash associated disorder, where a specific pathology-based diagnosis is eschewed in favour of simple description of the presenting symptoms and their correlates, is suitable for ULDs (HSL (Lee & Higgins) 2006; Beaton et al. 2007). Conversely, there is evidence that a carefully structured examination system can distinguish between specific and non-specific upper limb pain, yet that needs to be conducted by a health professional and the prognostic ability is not established (Walker-Bone et al. 2006). Alternatively, it is possible to achieve expert consensus on criteria for case definitions suitable for occupational surveillance systems, although the clinical validity of the classifications is uncertain (Harrington et al. 1998; Huisstede et al. 2007), and it is unknown if they will lead to improved clinical management.

These diagnostic uncertainties have encouraged some reviewers to discuss ULDs simply as regional musculoskeletal disorders, reflecting the subjective experience and difficulty in determining a specific cause or pathology in the vast majority of cases (Hadler 2005). Indeed, a considerable number of the articles retrieved for the present review take a 'lumping' approach whereby studies will include a variety of different disorders under labels such as 'work-related upper limb disorder' or simply 'musculoskeletal disorders'. Seemingly, then, a proportion of researchers and commentators believe there is sufficient commonality between disorders/complaints afflicting different anatomical regions (including even the low back in some studies) to justify lumping. However, that is not a universal view, and some researchers point to the possibility of specific neuropathic pathologies underlying what is often termed non-specific arm pain or RSI (Greening et al. 2003), whilst others point to the possibility, albeit rarely, of serious residual conditions such as dystonia (van Rijn et al. 2007). There are sometimes non-clinical needs for trying to split the disorders: eg the entitlement to Industrial Injuries Disablement Benefit (in the UK) is based on specific medical diagnoses implying a particular pathology (related to specific work).

There is the potential for this conceptual issue to have practical consequences when it comes to management strategies. On the one hand it may be argued that a specific diagnosis provides insight into pathogenesis, and therefore to effective treatment. On the other hand, it may be felt that many of the specific diagnoses offered to patients are in reality uncertain, and in any case tell us little about what treatment may be effective. Alternatively, there may be powerful generic approaches to management that can be combined with specific healthcare interventions. A utilitarian approach is that the optimal definition for a disorder may vary according to the circumstances in which it is applied (Coggon et al. 2005). Whilst an extensive conceptual review supported generic rehabilitation concepts for common health problems (Waddell & Burton 2004), it did not specifically address management of ULDs. Thus, there is a need to explore whether optimal management of ULDs is likely to be best served by a lumping or splitting approach, or by some combination of the two.

### 3.3 EPIDEMIOLOGY

The epidemiology of ULDs is essential to understanding how they arise, in whom, and to inform on their natural history. There are numerous epidemiological study designs that offer different perspectives on the subject, and it is important to realise their relative limitations when interpreting the data. (Punnett & Wegman 2004; Szabo 2006). Many studies of the epidemiology of ULDs have relied on cross-sectional observational designs (including surveillance data), which may illustrate an association between a given characteristic (eg job) and the existence of symptoms, but does not confirm a causative link. If study design is not carefully considered, along with the criteria for causation - strength, temporality, consistency, specificity, and dose-response of the association, plus biological plausibility (Szabo 2006) - there is a risk of misinterpreting the epidemiological evidence. Cross-sectional studies often report on the strength of *association* between a given outcome and a particular work characteristic and refer to it as a *risk* factor - although statistical terminology uses statistics such as relative risk, the indiscriminate use of the term risk factor can be misleading unless a direct link has been established through robust scientific studies. By and large, longitudinal studies (which can be either prospective or retrospective) will provide considerably more robust evidence for determining causation.

A further consideration when interpreting epidemiological studies on ULDs is the nature of the disorders themselves, and the way they affect people. There is a cascade in the way they are experienced, which is similar to that noted for other musculoskeletal problems such as back pain: a clear distinction should be made between the presence of symptoms, the reporting of symptoms, attributing symptoms to work, seeking health care, loss of time from work and long term damage, which may all have rather different determinants (Waddell & Burton 2001).

For example, a cross-sectional study might show a strong association between working above shoulder height and self-reported shoulder pain. That may simply reflect the fact that people with shoulder pain will find that job more difficult or painful because of their shoulder pain – the study shows a link between a work activity and symptoms, but does not provide evidence of a primary injury. Longitudinal studies can help, but even then the outcome of concern needs to be clearly defined: some factors may have a cogent relationship with duration of sick leave but without any plausible relationship with the onset of symptoms or development of a disorder (Walker-Bone et al. 2004b).

\*\*\* There is a very high background prevalence of upper limb pain and neck symptoms in the general population: 1-week prevalence in general population can be >50%. Estimates of the prevalence rates of specific diagnoses are less precise, but are considerably lower than for non-specific complaints. Rates vary depending on region, population, country, case definition, and on the question asked.

Table A1: (Walker-Bone et al. 2003b; Kuijpers et al. 2004; Walker-Bone & Cooper 2005; Huisstede et al. 2006; Palmer & Smedley 2007)

Table A4: (Walker-Bone et al. 2004a; Walker-Bone et al. 2004b; Silverstein et al. 2006; Roquelaure et al. 2006; Eltayeb et al. 2007)

\*\* Upper limb pain is frequently experienced in more than one region at the same time (both bilaterally and at anatomically adjacent sites).

Table A4: (Macfarlane et al. 2000; Walker-Bone et al. 2004a; Walker-Bone et al. 2004b)

\*\*\* ULDs often lead to difficulty with normal activities and to sickness absence, yet most workers with ULDs can and do remain at work.

Table A4: (Walker-Bone et al. 2004b; HSL (Lee & Higgins) 2006; Baldwin & Butler 2006; Silverstein et al. 2006)

\* Upper limb symptoms, and related disability, tend to be transient, yet they are frequently recurrent, and many ULDs can be considered common health problems.

Table A3: (Waddell & Burton 2004; HSL (Lee & Higgins) 2006)  
Table A4: (Silverstein et al. 2006)

### 3.4 ASSOCIATIONS AND RISKS

The issue of risk factors for ULDs is clearly highly relevant to the concept of preventing onset of symptoms or injury, but the subject is poorly understood and inconsistently documented. A whole host of factors, both occupational and personal, are purported to be 'risk factors', but the nature of those risks and their potential outcome(s) are readily misunderstood.

The UK legislative framework for health and safety requires employers to undertake risk assessments, with the intention of identifying hazards and controlling risks: here a hazard is something with the potential to cause harm (this can include substances or machines, methods of work and other aspects of work organisation), whilst risk expresses the likelihood that the harm from a particular hazard is realised (the extent of risk covers the number of people exposed and the consequences for them) – risk therefore reflects both the likelihood that harm will occur and its severity.

Implicit in this approach is the idea that controlling risk at the workplace will result in (some measure of) prevention of injury and ill health. Whilst that approach has had considerable success for safety outcomes (eg reducing major injuries and occupational diseases), it has not had the same effect on health outcomes (eg pain and disability due to musculoskeletal symptoms, which are sometimes characterised as injuries) (Hadler 2005; Szabo 2006). This is evident from the high levels of growth in disability and work loss associated with musculoskeletal pain over the very period when industrialised countries have implemented occupational safety and health legislation, and developed inspectorates for compliance and enforcement (Burton 1997; Coggon et al. 2007). When considering prescription, the Industrial Injuries Advisory Council (IIAC) recognises that for diseases which commonly occur in the general population there may be no difference in the pathology or clinical features to distinguish an occupational from a non-occupational cause, and in these circumstances IIAC looks for consistent evidence that the risk of developing the disease is more than doubled in a given occupation (IIAC 2006). Only if a substantial proportion of cases of a health condition are caused by work is the hazard/risk control strategy likely to have a meaningful impact. For instance, if the odds ratios for physical risk factors are low, then preventive strategies (even if highly successful) will have small effect sizes and avert only a small proportion of overall cases.

The issue of prevention was fully explored during development of the European Commission sponsored *European guidelines for prevention in low back pain* (Burton et al. 2006a) ([www.backpaineurope.org](http://www.backpaineurope.org)). The guideline development team considered that 'the general nature and course of commonly experienced low back pain means that there is limited scope for preventing its incidence (first-time onset); if primary causative mechanisms remain largely undetermined, risk factor modification is unlikely to achieve prevention. However, there is considerable scope, in principle, for

prevention of the *consequences* of low back pain – e.g. episodes (recurrence), care seeking, disability, and workloss. Whilst the basic epidemiology suggests these concepts may be applicable to ULDs, further consideration of the evidence on ‘risk factors’ is needed to permit robust conclusions. It should be noted, however, that the available literature does not always clearly distinguish the outcome being studied (eg it is not always apparent whether a factor is being explored for its relationship with the onset of new symptoms, the reporting of pre-existing symptoms, the need for time off work, or for transition to long-term disability); furthermore some reviews of purported risk factors have included cross-sectional as well as longitudinal studies.

### 3.4.1 Occupational factors

\*\* Large-scale influential reviews published around the turn of the millennium (which included much cross-sectional data) concluded that there were strong associations between biomechanical occupational stressors (eg repetition, force) and ULDs: backed by plausible mechanisms from the biomechanics literature, the association was generally considered to be causative, particularly for prolonged or multiple exposures (though a dose-response relationship generally was not evident).

Table A1: (NIOSH 1997; National Research Council 1999; National Research Council 2001)

\*\*\* More recent epidemiological studies involving longitudinal designs also suggest an association between physical exposures and development of ULDs, but they report the effect size to be rather modest and largely confined to intense exposures. The predominant outcome investigated (primary causation, symptom expression, or symptom modification) is inconsistent across studies and remains a subject of debate. This is true for regional complaints and (with few exceptions, eg (IIAC 2006)) most of the specific diagnoses.

Table A1: (Punnett & Wegman 2004; Walker-Bone & Cooper 2005; IIAC 2006; Bongers et al. 2006; Ijmker et al. 2007; Palmer & Smedley 2007; Palmer et al. 2007c)

Table A3: (Coggon et al. 2007)

Table A4: (van den Heuvel et al. 2006; Thomsen et al. 2007)

\* The evidence that cumulative exposure to typical (modern) work is the cause of most reported upper limb injury is limited and inconsistent.

Table A3: (Dembe 1996; NIOSH 1997; Hadler 2005)

Table A4: (Macfarlane et al. 2000)

\*\*\* Workplace psychosocial factors (beliefs, perceptions, and work organisation) have consistently been found to be associated with various aspects of ULDs, including symptom expression, care seeking, sickness absence, and disability.

Table A1: (NIOSH 1997; National Research Council 2001; Bongers et al. 2002; Woods & Buckle 2002; Walker-Bone & Cooper 2005; Woods 2005; Bongers et al. 2006)

Table A4: (Macfarlane et al. 2000; Devereux et al. 2004; van den Heuvel et al. 2005; Burton et al. 2005)

### 3.4.2 Personal factors

\*\*\* Individual psychological factors (such as anxiety, distress, and depression) have consistently been found to be associated with various aspects of ULDs, including symptom expression, care seeking, sickness absence, and disability.

Table 1A: (National Research Council 2001; Mallen et al. 2007)

Table A3: (Hadler 2005)

Table A4: (Henderson et al. 2005; Coutu et al. 2007;  
Alizadehkhayat et al. 2007)

\*\*\* Older age is associated with more, and more troublesome, upper limb complaints; older people have a somewhat less favourable prognosis.

Table A1: (Walker-Bone et al. 2003b; Kuijpers et al. 2004)

Table A4: (Dziedzic et al. 2007)

\*\* Upper limb complaints and (most) specific diagnoses are more common among females; this likely reflects a reporting phenomenon rather than a physiological issue in all but a few specific diagnoses.

Table A1: (Walker-Bone et al. 2003b; Hooftman et al. 2004)

Table A4: (Walker-Bone et al. 2004a; Eltayeb et al. 2007)

There is no doubt that certain jobs can legitimately be considered to entail hazards that are, on the balance of probabilities, risk factors for the development of certain specific diseases (IIAC 2006), yet these diseases account for a relatively small proportion of all ULDs.

There can be little doubt, also, that many upper limb symptoms result from some physical stress across joints and in soft tissues, but work is not the exclusive (or necessarily most important) source of such stress. Indeed, it is clear from the epidemiology that many people will experience upper limb symptoms without any exposure to the sort of physical stress that conceivably could result in meaningful injury. There is emerging evidence that a combination of exposure to physical and psychosocial factors at work has a stronger association than either type of factor alone (Warren et al. 2000; Devereux et al. 2004). By and large, the duration of exposure has been inconsistently reported across the epidemiological literature, so attributing upper limb complaints to cumulative exposure is by no means fully justified; in view of the potential deleterious consequences of perpetuating unhelpful myths about the relationships between work and health, the concept might best be put aside unless and until further evidence becomes available. Of interest in this respect is that one of the strongest predictors of incident upper limb symptoms among workers can be a prior history of symptoms, as opposed to work exposures such as repetitiveness, work pace, or forceful awkward postures (Descatha et al. 2007).

In view of the widespread experience of upper limb symptoms in the community, the patchy nature of associations between work characteristics and ULDs (both non-specific and specific), and the difficulty of establishing cogent occupational causation (Hadler 2003), the often used collective term 'work-related' seems not altogether accurate and potentially misleading. Instead, it seems more reasonable to refer to ULDs among workers as **work-relevant**, which avoids undue concentration on occupational causation yet allows recognition that work can be troublesome for people experiencing upper limb symptoms, irrespective of their cause (see Definitions in

Appendix for further discussion). Making this distinction is likely to be fundamental to advances in the management of upper limb complaints.

Regardless of the causation debate, the consistent association between upper limb complaints and the physical demands of work shows that ULDs are frequently work-relevant: remaining at work may be difficult or impossible in the face of symptoms. Recognition of this issue is likely to be an important aspect for successful interventions.

Overall, the evidence in Tables A1 and A2 suggests that permanent impairment is the exception, but a proportion of people do experience long-term difficulties. The fact that deleterious consequences of ULDs, such as disability, sick leave, depend more on psychosocial influences than on what has happened physically, will need to be taken into account and addressed if people are to be helped fully to participate.

### **3.5 MANAGEMENT APPROACHES AND TREATMENT**

The fact that most people experience upper limb symptoms, and that many do not seek healthcare, supports the view that it can be considered 'normal' to have one or even several complaints (Eriksen & Ihlebaek 2002). Indeed, musculoskeletal pain may be perceived as no more than inconvenient discomfort until some other (usually psychosocial) life event changes the situation from a person with a predicament into someone who seeks care (Hadler 2005; ARMA 2007). However, some people will experience altogether more severe symptoms, possibly resulting from a specific injury or pathology, and they will expect healthcare to provide pain relief and to address the pathology. Other individuals will be more concerned with participation - obtaining help with work retention/return. All may need to recognise that ULD pain and discomfort may be decreased but not eliminated in the majority of cases (Hagberg 2005).

#### **3.5.1 Summary of biomedical treatments for specific diagnoses**

There was no intention to perform an exhaustive review of the effectiveness of the biomedical interventions that are currently provided for people with ULDs, but a short 'review of reviews' here provides a broad overview. This information is summarised in Table A5. It is included to provide a context against which to compare and contrast the biopsychosocial and other interventions that are the main subject of the project.

\*\*\* There is strong evidence for the effectiveness of the following treatments: exercise for rotator cuff tendonitis; oral steroids for shoulder pain such as impingement syndrome or capsulitis; and, corticosteroid injections for tenosynovitis. There is strong evidence that oral diuretics for carpal tunnel syndrome (CTS); and, extracorporeal shock wave therapy for epicondylitis are ineffective. In general, the effect sizes tend to be modest and limited to clinical outcomes.

Table A5: (multiple citations)

\*\* There is moderate evidence for the effectiveness of surgery to treat CTS. There is moderate evidence that pyridoxine vitamin B6 for CTS, and massage for tendonitis are ineffective.

Table A5: (multiple citations)

\* There is weak evidence for the effectiveness of the following treatments: manipulation, corticosteroid injections, and oral steroids for CTS; ergonomics, exercise, and massage for diffuse non-specific upper extremity pain; acupuncture, ultrasound,

exercise, manipulation, corticosteroid injections, and topical nonsteroidal anti-inflammatory drugs (NSAID) for epicondylitis; manipulation, corticosteroid injections, and oral NSAIDs for rotator cuff tendonitis; laser, electromagnetic fields and ionization (in short term only), ultrasound (in short term only), ergonomics, exercise, corticosteroid injections, and oral NSAIDs for shoulder pain such as impingement syndrome or capsulitis; and, ergonomics for tension neck syndrome. There is weak evidence that laser, oral NSAIDs, and yoga for CTS; and, laser, and electromagnetic fields and ionization for epicondylitis are ineffective.

Table A5: (multiple citations)

### **3.5.2 Interventions in respect of general musculoskeletal disorders**

The search retrieved additional relevant information about interventions for musculoskeletal problems in general, which reflects the view that there is a commonality to MSDs that justifies considering their management in a generic sense.

\* General management principles are to provide advice that promotes self-management, such as staying active and engaging in productive activity (with appropriate modifications). Pain modulation and control should be directed toward allowing appropriate levels of activity.

Table A2: (ARMA 2007; Breen et al. 2007)

\*\*\* Programmes using cognitive-behavioural approaches are effective and cost-effective at reducing pain and increasing productive activity in both the earlier and later phases.

Table A2: (Meijer et al. 2005; Hanson et al. 2006)  
Table A4: (Marhold et al. 2001)

\* Multimodal integrated interventions that address both biomechanical and psychosocial aspects at the same time should be useful for managing musculoskeletal problems in the workplace.

Table A2: (National Research Council 2001; Selander et al. 2002;  
Waddell & Burton 2004; Cole et al. 2006)  
Table A4: (Feuerstein et al. 2003a)

\* Worksite physical activity programmes can have a positive effect in respect of MSDs (leading to reduced subjective complaints, notably low back pain).

Table A2: (Proper et al. 2003)

### **3.5.3 Interventions specifically in respect of upper limb disorders**

In addition to the information concerning MSDs in general, the search retrieved numerous studies concerning interventions more specifically on people with ULDs; specific diagnoses were generally included along with non-specific complaints.

\* There is limited evidence for the effectiveness of multidisciplinary biopsychosocial rehabilitation for neck pain and shoulder pain, or for 'RSI'.

Table A2: (Karjalainen et al. 2003a; Karjalainen et al. 2003b)  
Table A3: (Lucire 2003)



\*\* However, pain management programmes, using cognitive-behavioural principles, and multidisciplinary occupational rehabilitation for people with ULDs can improve occupational outcomes in the short term, and significantly reduce sickness absence in the longer term. Earlier intervention appears to yield better results.

Table A2: (Feuerstein et al. 1999; Crawford & Laiou 2007)

\* There is a conceptual case that rehabilitation should be started early, and that long periods of rest or sick leave are generally counterproductive.

Table A2: (NHMRC 2004; Helliwell & Taylor 2004; Hagberg 2005)

Table A3: (Franche & Krause 2002; Waddell & Burton 2004)

\*\* Ergonomic work (re)design, directed at equipment or organisation, has not been shown to have a significant effect on incidence and prevalence rates of ULDs. Ergonomics interventions can improve worker comfort (which is valuable): in principle, that can contribute positively to multimodal interventions.

Table A1 (Szabo 2006)

Table A2: (Pransky et al. 2002; Boocock et al. 2007)

Table A3: (Szabo & King 2000; Karsh et al. 2001; Hadler 2005)

Table A4: (Christmansson et al. 1999)

\* There is limited evidence that ergonomic adjustments (mouse/keyboard design) can reduce upper limb pain in display screen workers, but insufficient evidence for equipment interventions among manufacturing workers.

Table A2: (Williams et al. 2004; Verhagen et al. 2006; Boocock et al. 2007)

\* In general, resting injured upper limbs delays recovery; early activity improves pain and stiffness, and can speed return to work yet does not increase complications or residual symptoms, and may lead to less treatment consumption.

Table A2: (Buckwalter 1995; Nash et al. 2004)

Table A3: (Melhorn 2005)

Table A4: (Haahr & Andersen 2003; Cheng & Hung 2007)

It is notable that the evidence supporting some biomedical interventions, which focuses on clinical outcomes, is considerably stronger than that for rehabilitation and ergonomic interventions focused on vocational outcomes. This is partly a reflection of the difficulty in conducting high quality scientific studies (eg randomised controlled trials) in the workplace environment, but also reflects the heterogeneous nature of the interventions and their implementation. It is not always clear just what was included in the interventions and whether the studies actually managed to implement the interventions they intended to test – for instance, demonstrating the effectiveness of workplace ‘rehabilitation’ readily can be compromised by difficulties in overcoming obstacles to implementation (McCluskey et al. 2006). Furthermore, it may be that workplace interventions are not necessarily transferable to different settings – a recent systematic review identified no single-dimensional or multidimensional strategy for intervention that was considered effective across occupational settings (Boocock et al. 2007). It may be that some interventions introduce mixed messages, thus undermining the effect – an intervention may have a beneficial impact on one outcome whilst having a detrimental effect on another (eg provision of a modified keyboard may relieve symptoms for the individual, but at the same time might create the erroneous belief (by

other workers as well as the individual) that the original equipment was incorrect and the cause of the trouble).

Overall, for the non-biomedical interventions, it would seem that those directed at helping the individual with a ULD complaint towards early activation are likely to be more effective than strategies directed at reducing exposure to physical stressors. This apparent lack of primary preventive effect from ergonomics interventions might be expected from the underlying epidemiology: if only a small number of cases are directly attributable to a given exposure, it becomes very difficult to detect any meaningful reduction in the number of cases on removal of the exposure. Nevertheless, looking at other outcomes such as work retention and return to work may offer a substantial role for workplace interventions to accommodate workers who are hurting.

### 3.5.4 Return to work

Since work is (generally) good for health and well being, and can have a therapeutic role for people with common health problems (Waddell & Burton 2006), getting back to work can be seen as an important outcome for the absent worker faced with an upper limb disorder. Achieving return to work (RTW) is more a matter of management than treatment; that is not to eschew healthcare, but rather recognition that a coordinated effort may be required.

\* There is wide consensus that early RTW is an important goal, which should be facilitated by multimodal interventions, including provision of accurate information, pain relief, and encouragement of activity. An integrative approach by all the players (notably employer, worker, and health professional) is conceptually a fundamental requirement.

Table A2: (Kupper et al. 2004; Helliwell & Taylor 2004; Hagberg 2005; Meijer et al. 2005; Franche et al. 2005; Breen et al. 2007)

Table A3: (Waddell & Burton 2004; Melhorn 2005; HSL (Lee & Higgins) 2006; Cheng & Hung 2007)

\*\* Although the components of RTW interventions vary, there is emerging evidence that integrative approaches can be effective for MSDs in general and, probably also for ULDs. Case management shows promise for getting all the players onside. Facilitation of RTW through temporary transitional work arrangements (modified work) seems to be an important component.

Table A2: (Franche et al. 2005; Breen et al. 2007)

Table A3: (Selander et al. 2002; Shaw et al. 2002; Hanson et al. 2006)

Table A4: (Feuerstein et al. 2003a; Shaw & Feuerstein 2004; Abásolo et al. 2005; Cole et al. 2006; McCluskey et al. 2006)

Return to work is not always a straightforward outcome (Kendall & Thompson 1998), and many studies have considered it simply in terms of the first return to work. The majority of workers with ULDs find the symptoms resolve quickly and they return to work, yet a small but significant proportion experience recurrent work absence, or unusually lengthy spells of absence with low probabilities of returning to work. Hence, it can be misleading to focus on the first return to work since a first return does not necessarily mark the end of work disability (Baldwin & Butler 2006). This all brings up the question of whether people should return to work whilst symptomatic. For back pain it has become established that there is no need to await total resolution of symptoms before reactivation and return to work – in fact that is seen as detrimental (Carter & Birrell 2000). Whilst the evidence is less extensive for ULDs, it is reasonable to think

that the same principles will apply. In which case, early return to work should be encouraged even when symptoms remain, and that integrative approaches to support the returnee (including transitional work arrangements if necessary) should be made available and should, in principle, contribute to a sustained return (Franche et al. 2005) – it follows that if the employer fails to provide this facility, further workloss is more likely and the situation may be perpetuated, hence the need for all players to be onside.

### **3.5.5 Non-specific complaints and specific diagnoses**

Overall, when considering management of ULDs, the bulk of the literature has either concentrated on regional symptoms (termed disorders by some investigators) or has taken an even wider perspective and combined regional symptoms (including the upper limb) under generic labels such as work-related musculoskeletal disorder.

\* There is insufficient robust evidence to identify reliable prognostic indicators that are applicable across the ULD spectrum (specific diagnoses and regional complaints).

Table A1 (NIOSH 1997; Kuijpers et al. 2004)  
Table A2: (Nørregaard et al. 1999; Hagberg 2005)  
Table A4: (Ryall et al. 2007)

\* There is inconsistent and conflicting evidence on whether and to what extent certain specific diagnoses and regional complaints should be conceived differently in terms of overall management targeted at vocational outcomes.

Table A3: (Melhorn 2005; Hadler 2005; Derebery et al. 2006; Staal et al. 2007)

Whilst there are numerous treatments offered to people with specific upper limb diagnoses, their RTW management (after healthcare has achieved improvement in clinical outcomes) is less well documented. Whilst there seems to be good reason to separate (some) specific diagnoses when making clinical decisions about treatment, there is little evidence that the distinction is helpful when considering vocational outcomes and rehabilitation. It can be argued that returning a hurting worker to their job relies on achieving an acceptable balance between ‘capacity’ and ‘tolerance’, and this concept is largely independent of whether the individual has a specific diagnosis or regional complaint (Melhorn 2005; Derebery et al. 2006). Furthermore, the substantial general pain literature supports the importance of psychological and psychosocial factors (eg the so-called yellow flags and blue flags) in the development of persistent symptoms and disability, irrespective of diagnosis or underlying pathology (Main & Spanswick 2000).

Viewed overall, there is good reason to expect effective interventions for ULDs to have a combined approach: specific treatment (when needed, using a stepped approach) coupled with workplace accommodation (when needed, on a temporary basis). Whilst lumping and splitting approaches may be helpful under differing circumstances (Coggon et al. 2005), achieving a balance in terminology is likely to be particularly important: if wrongly applied, diagnostic labels can alarm and harm, whereas unemotive complaint-based labels can help ‘normalize’ the experience and ease the path to participation in productive activity.

## 4. BIOPSYCHOSOCIAL MODEL

The determinants of symptom onset, the decision to seek help or healthcare, and the development of long-term problems appear to be different (Macfarlane et al. 2000; Schultz et al. 2000), albeit with some overlap. The reason an individual who is experiencing symptoms of pain or discomfort decides to seek help is not always entirely clear, but the decision appears to often involve an appraisal that one can no longer cope, or fear that something serious has happened (Hadler 2005).

A basic biomedical model seeks to identify disease and its manifestations, understand its mechanisms, and intervene to effect prevention or cure. The healthcare provider conducts a clinical assessment, and attempts to arrive at a diagnosis, or a working hypothesis in cases where diagnostic tests are to be used. These may confirm or refute the working hypothesis, in which case an alternative or differential diagnosis is considered.

However, this biomedical model has some limitations and one area that it meets significant difficulty is explaining various phenomena of pain. The combined biomedical/psychosomatic model began to be seriously challenged by the study of pain in the middle of the 20<sup>th</sup> century, leading to Melzack and Wall's key revolutionary Gate Control Theory, published by in 1965. This suggested that subjectively experienced pain is not merely the result of activation of pain receptor neurons, but rather the interaction between ascending information to the central nervous system and descending control systems that can inhibit and modulate pain information. These concepts facilitated a whole new understanding of pain perception and pain management, which has flourished into a large area of scientific and clinical endeavour.

The predominant musculoskeletal symptom is pain, and for this reason there has been something of a convergence between the fields of musculoskeletal medicine and pain management. When a patient presents with a musculoskeletal health problem, such as a ULD, the first clinical treatment response is to attempt to abolish or minimise the symptom of pain. It is anticipated that this will be achieved through reduction of important biological mechanisms such as spasm, inflammation, or restrictions in motion. The most common interventions are extremely familiar to nearly the whole population, since either they have experienced them themselves, or have observed someone use them. This is a consequence of the commonness of musculoskeletal pain and discomfort. The most common treatments involve use of oral medications, biomechanical methods such as manipulation or massage, or injections. The principal goal is symptomatic relief from pain. It is assumed, according to the biomedical model, that relief from pain will result in restoration of normal function. That is, the patient will return to their usual life, and full activities including work.

Individual response to treatments and interventions is highly variable. Some people get better, and return to normal life as expected; others get much better, but do not return to normal life; some others do not get better, but still return to normal life; and, others do not get better and do not return to normal life.

One explanation could be that the wrong type of treatment was selected, and this is frequently an initial assumption made by healthcare providers. Patient expectation seems to be geared toward this idea also. The consequence is that more treatment is given, perhaps of several types. A competing explanation might be that the clinician is attempting to treat pain and discomfort that represents a 'normal experience' for a proportion of the population.

There is a major concern that repeated treatment failures, from the provision of serial ineffective therapy, convey potentially harmful messages to the patient, including the following:

- There is a problem that needs medical/physical treatment
- The treatments will cure the problem
- Pain reduction is necessary first (before rehabilitation, or return to activity)
- The clinician is responsible for getting you better (patient has passive role)

These may be harmful or deleterious in the sense that they facilitate beliefs and behaviours that are unhelpful and contribute to reduced levels of activity, higher levels of distress, and a tendency to consume more healthcare and extended absence. The same sort of harmful messages are, of course, likely to arise from ineffective or inappropriate workplace (ergonomic) interventions.

The biopsychosocial model assumes that biological, psychological and social factors can all play a significant role in pain problems. The major implication of this is that it may be necessary to treat biological, psychological and social issues as interlinked systems (see Appendix).

The model draws a distinction between the actual pathological processes that cause disease, and the patient's perception of their health and the effects on it (illness). Illness and disease are not necessarily directly related. A patient may be well (no disease or injury), but if they feel unwell that's an illness. Similarly, patients who are diseased or injured may say they feel completely all right, and hence do not exhibit illness. The biopsychosocial model acknowledges the illness, as much as the injury or disease. Table 1 uses the scenario of a clinical visit to illustrate the differing perspectives between a biomedical and biopsychosocial approach; the same ideas apply to non-clinical perspectives.

**Table 1. Contrasting the biomedical and biopsychosocial models for ULDs**

	<b>Biomedical Model</b>	<b>Biopsychosocial Model</b>
<b>Presentation</b>	Focus is on physical causes of disease. Clinician asks questions about onset and cause, pain history, and other symptoms. However, empirical signs and symptoms of pain and tenderness are considered paramount.	Clinician aims to ascertain psychosocial and physical processes that may contribute to the arm pain. Clinician may ask for a history of recent life stressors and behaviours, in addition to conducting a clinical examination.
<b>Diagnosis</b>	Clinician examines the arm, and may consider x-ray and/or other lab tests (depending on signs and symptoms) and forms diagnosis.	Based on a combination of clinical examination of the arm, psychosocial factors, (probably without X-ray or other lab tests) the clinician forms an explanation for the symptoms.
<b>Treatment</b>	Medical plan prescribed for the patient based on biological aetiology and pathogenesis.	Clinician discusses available interventions with special attention to behaviours and lifestyles that could influence pain and adherence to the treatment plan. The patient is involved in formulating and implementing the plan.

The biopsychosocial model is on the face of it more time-consuming, and therefore more resource-intensive. However, the basic application of biopsychosocial principles can be applied without requiring exhaustive input. For example, in the low back pain field, it is advocated that individuals should be provided with explanations designed to

prevent development of unhelpful beliefs, and to adopt self-management coping strategies and behaviours (eg *The Back Book* (London, TSO)); this approach can be effective ((Burton et al. 1999; Buchbinder et al. 2001), and has been suggested for ULDs (HSL (Lee & Higgins) 2006).

The biopsychosocial model offers a variety of possible clinical pathways *including those proposed by the biomedical model*. Additional approaches include a shift away from focusing on symptom elimination, and toward changes in function and activity. This is usually achieved through providing cognitive-behavioural intervention, including pain management programmes. Similarly, biopsychosocial principles can be applied to non-clinical interventions, such as those delivered at the workplace.

When considering outcomes, the biopsychosocial model acknowledges the illness (what the person does, the behaviour they engage in), as much as the injury or disease itself. This means that the targets and goals for clinical outcomes go beyond 'cure' and abolition of symptoms. For example, even if the symptom of upper extremity pain cannot be reduced, the goal of returning the individual to productive activity is considered to be of value, in and of itself. This is because the individual's quality of life is always multidimensional in nature. Some aspects of the person's life might be significantly improved, even if symptoms cannot be modified.

This approach is sometimes parodied as 'learning to live' with pain, or as carrying on 'in spite of' pain. Neither is strictly true, from a biopsychosocial perspective, since the inter-relatedness of all these factors means that typically if improvement can be made in some areas there is a 'knock-on' effect into others, at least with respect to perception (eg the individual who has successfully returned to work but the pain is still there, yet it is no longer so important or so 'bothersome').

Finally, an important consideration is the belief that certain types of MSDs, including specific diagnoses, are different to the regional complaints and need to be managed differently. For example, some researchers have advanced the hypothesis that problems such as complex regional pain syndrome may include cases that have a neuropathic pain disorder, or that tenosynovitis is an inflammatory disorder that must be rested. But, overall, is there any theoretical reason to consider musculoskeletal disorders in various regions of the human body to be fundamentally different, when they share the same type of tissue and physiological processes? A considerable body of knowledge about common musculoskeletal health problems has resulted in consistent messages about biopsychosocial management of the disorders and their symptoms, stressing the importance of facilitating return to work, which run across anatomical regions (Waddell & Burton 2004; Talmage & Melhorn 2005; Hadler 2005). The debate will continue beyond this report, but it is important to stress that a biopsychosocial approach is about helping people return to normal productive activity: treatment to reduce pathology and symptoms may be necessary but it is not sufficient; the workplace also has a contributory role.

If a biopsychosocial perspective for the management of upper limb complaints is to be adopted, this evidence review is but one step in the process. It is important to acknowledge that there may well be resistance to adopting such an approach along with hurdles to its practical application. While lessons can perhaps be learnt from how a biopsychosocial perspective for the management of low back pain developed and was successfully introduced, it cannot be assumed that the stakeholders involved in upper limb disorders will necessarily respond in the same way. Changing the way in which upper limb disorders are managed will require careful consideration of the way in which the change is managed.

## 5. SYNTHESIS

### 5.1 INTERPRETATION

The epidemiological evidence is quite clear: musculoskeletal symptoms affecting the upper limb and neck are a common experience among the general population, tending to be a recurrent complaint. This high prevalence suggests that the symptoms arise from normal physiological processes and everyday events, such as fatigue or soft tissue strain, rather than some sinister pathology. Indeed, a specific diagnosis cannot reliably be established for the majority of people with ULDs: they might best be viewed as having a regional complaint. Much less common are the specific diagnoses implicating pathology or injury. There is considerable debate over their classification and, whilst some consensus seems possible, diagnostic criteria remain unreliable – many cases will be mislabelled (whether colloquially or by a healthcare professional).

For many people, their symptoms will be work-relevant: their work may be painful or difficult irrespective of the origin of the symptoms. However, even when work is related to the expression of symptoms, that does not mean work was necessarily the underlying cause: it is apparent that work is not the predominant cause of most ULDs.

Many people with ULDs cope without recourse to healthcare or need for sick leave. Many of those who do seek healthcare will be doing so simply because they are not able to cope with this particular episode of neck/arm pain (Hadler 2003), though a small proportion will have a more significant disorder. Irrespective of severity, a small number of people with ULDs will progress to persistent pain and/or long-term disability.

This pattern is typical of a wide range of common health problems, sometimes termed subjective health complaints (Eriksen & Ihlebaek 2002), in which personal and cultural factors are a predominant feature, notably the psychological and social variables that influence beliefs and behaviours (Waddell & Burton 2004). Although the evidence is limited for ULDs, knowledge from the literature on other musculoskeletal problems strongly implicates psychosocial factors as drivers for symptom reporting, workloss, and disability (Fordyce 1995; Burton et al. 2006b). These factors have been characterised as yellow, blue and black flags representing psychological, workplace and systems influences (Main & Burton 2000), which act as obstacles to recovery and obstacles to return to work (Waddell & Burton 2004). Since there is no particular reason to expect that complaints and disorders related to the musculoskeletal apparatus of the upper limb and neck is fundamentally different from the musculoskeletal apparatus of the lower back, it is logical and reasonable to surmise that there will be shared influences, and what evidence there is supports psychosocial factors as being important in understanding and managing ULDs.

Clinical management of ULDs is seemingly less effective than might be expected, perhaps reflecting the difficulties around classification and diagnosis, together with uncertainties over the optimal timing of treatment delivery (longer duration of symptoms having a negative impact on outcomes (Mallen et al. 2007). However, in principle, there is likely to be benefit from biomedical interventions aimed at controlling symptoms (and/or targeting any identifiable pathology) whilst offering support and encouragement for early return to normal activities (including work).

To impact on vocational outcomes (work retention and return to work), interventions require more than biomedical treatment. There is a need to address the range of psychosocial factors (obstacles to recovery/return to work) at both the individual and

workplace level, and those efforts need to be coordinated and integrated among the relevant players, including the individual worker.

Despite the difficulties surrounding recognition of the specific diagnoses, the 'bio' component must be acknowledged. Some patients will have recognised pathology requiring medical or surgical intervention (which may involve short-term rest). However, once that treatment has been delivered (or even while it is being completed), there is no robust evidence suggesting that multimodal approaches to facilitating normal activity return to work are precluded for specific diagnoses (though their implementation may require something of a cultural shift in how specific diagnoses should be conceived and managed). There is some concern that applying the principles of an active approach together with early return to work will be inappropriate for some conditions such as 'tenosynovitis', where anecdotally rest is the preferred option (HSL (Lee & Higgins) 2006). However, these fears may be (at least in part) unfounded: although limited, the evidence on ULDs (both specific and regional) is consistent with the principle of an active approach that is promoted and implemented for MSDs in general (Buckwalter 1995) and, importantly, there is no robust contradictory evidence. The notion of 'rest' as a sole treatment, (implying withdrawal from participation) is likely to be unhelpful: even if specific aggravating activities need to be avoided short-term, that does not preclude other activities and exercises being undertaken as part of therapy (Jebson & Steyers 1997). So far as post-surgical management is concerned, there has been an increasing recognition of the benefits of early activation following most surgical procedures, and restrictions may be more a matter of the surgeon's idiosyncratic advice than any absolute need (Ratzon et al. 2006).

Although early work-return is seen as advantageous, simply sending someone directly back to a job they find painful is counter-intuitive and inappropriate. There is a strong case for using transitional work arrangements as the facilitator, which takes account of both biological and psychosocial obstacles to RTW. There is considerable evidence for the use of temporary modification of activities to support people with regional pain states on their return to normal activity, and there is no clear evidence that the principle cannot or should not be applied to the specific diagnoses.

Just because the epidemiological pattern of most ULDs does not favour ergonomic interventions as a significant primary preventive measure, this does not mean there is no merit in making work ergonomically acceptable. Jobs, naturally, should be within the reasonable capabilities of the workers; if job tasks are close to, or exceed, physiological limits, a proportion of workers are going to succumb to injury. However, portions of the ergonomics literature and official guidance give the erroneous impression that work is intrinsically the predominant cause of ULDs, and that by applying an 'ergonomics approach' they will be eliminated. The evidence reviewed here indicates they will not. Furthermore, a possible problem with ergonomic interventions is that they can reinforce workers' beliefs that they are exposed to a serious hazard, and thereby encourage undue reporting of symptoms, inappropriate workloss, and development of disability (Coggon et al. 2007). Nevertheless, an ergonomics approach, correctly applied, should improve comfort and efficiency, and assist in accommodating those with work-relevant complaints or disorders. The adage '*work should be comfortable when we are well and accommodating when we are ill*' (Hadler 1997) is certainly apposite – good ergonomics will not stop all workers' arms hurting, yet it is a necessary, albeit not sufficient, tool for managing the ULD phenomenon.

Viewed overall, the evidence on the management of ULDs favours neither biomedical nor workplace interventions alone, either for regional complaints or specific diagnoses. Rather, the evidence indicates what is needed is a biopsychosocial approach, which necessitates multimodal interventions with all the players onside and acting in unison.



Whilst the evidence-base supporting this principle of integrating the beliefs and behaviours of all the relevant players is as yet limited, the concept is central to overcoming biopsychosocial obstacles (Waddell & Burton 2004). Achieving all that will require a cultural shift in the way the relationship between upper limb complaints and work is conceived and handled. Educational strategies are likely to be a useful tool in that respect, but will need to be carefully developed and tailored to the relevant target audience (Shaw et al. 2007).

The biopsychosocial model remains ill-understood in some circles, thus compromising its adoption. Importantly the biopsychosocial approach does not seek to 'blame' the individual or suggest it is 'all in the mind', and does not aim to devalue the contributions of ergonomics and biomedical interventions. However, acknowledging the crucial role of personal and occupational psychological factors (impacting on all the players) does not deny the reality of the symptoms or the legitimacy of the concerns. The biopsychosocial model assumes that biological, psychological, and social factors all play a significant role in determining the full range of outcomes, and that these factors need to be addressed in a positive and constructive climate.

## 5.2 FUTURE DIRECTIONS

The findings of this review complement, and should feed into, the UK Government's Health, Work and Well-being strategy [www.health-and-work.gov.uk/](http://www.health-and-work.gov.uk/). There is an accepted need to shift the culture surrounding the relationship between work and health (Waddell & Burton 2006) and growing acceptance that modern rehabilitation approaches may be more effective than primary prevention strategies in the overall management of work-relevant health problems.

The available evidence reviewed here strongly supports the adoption of a biopsychosocial perspective for the management of ULDs. Although the supporting evidence is less well developed than that for back pain, it points in the same direction and, importantly, there is no robust conflicting evidence.

If the need for cultural change is accepted then there is also a need for policy makers to rethink the priorities of certain underlying concepts (eg primary prevention v management: work-caused v work-relevant) and develop means to disseminate evidence-based information to the various players (employers, workers, healthcare, unions, lawyers, legislators). Media campaigns are increasingly seen as a suitable vehicle to contribute to public health and cultural change in respect of health behaviours, supplemented by complementary guidance material (eg the TSO publications such as *The Back Book* and *Work & Health*); there seems to be good reason to suppose the issue of ULDs should be similarly targeted (as recommended by an HSL consensus workshop (HSL (Lee & Higgins) 2006)).

Whilst the overall message may be clear – biopsychosocial factors are influential in the phenomenon of upper limb complaints and need to be addressed – there are gaps in the evidence. Observational studies will help to better understand the natural history of non-specific complaints and the specific diagnoses, and controlled trials are needed to determine the most appropriate means for implementing both clinical and workplace care. Innovative multimodal interventions seem promising, yet the optimal content, timing and method of delivery is yet to be determined. Nevertheless, the detailed evidence assembled during this review is extensive, so perhaps the most immediate task is to look at the detail (which was not the purpose of this review) in order to blend the findings with what has been learned in other fields, in order to guide the development of those multimodal approaches.

## 6. KEY MESSAGES

The brief for this review sought accurate (evidence-based) simple headline messages about ULDs. The findings are unequivocal: targeting messages just at the individual with an upper limb complaint will be suboptimal. A number of messages do emerge from the evidence, and may well contribute to the needed cultural shift. However, they apply to the whole range of players involved (population/workers; employers; health professionals; unions; lawyers; media; policy makers; enforcers), so they will need to be carefully constructed for each target group, tailored to their needs, and comprehensively disseminated if positive change is to be achieved.

The evidence gathered and analysed in this review was extensive, and whilst not all of it was specific to ULDs, its overall interpretation reveals a considerable quantity of evidence-based information and advice that is applicable to the management of ULDs. It is convenient to summarise this information in bullet form; transforming these points into suitable material for various purposes and media requires assimilating the detail contained in the text and evidence tables.

The messages are presented in two groups, reflecting the need to provide (1) facts and ideas to improve understanding and inform attitudes and beliefs (concept messages), and (2) advice on the necessary actions, and what should and should not be done (process messages).

### **CONCEPT MESSAGES**

- **□ *Upper limb symptoms are a common experience -***
  - they are generally transitory but recurrent;
  - they are often triggered by physical stress (minor injury):
    - due to everyday activities as well as work,
    - but, rarely do they reflect irreparable damage;
  - some cases need treatment, but many settle with self-management:
    - activity is usually helpful: prolonged rest is not;
  - recovery and return to full activities can be expected:
    - lasting impairment is rare.
- **□ *Work is not the predominant cause -***
  - some work will be difficult or impossible for a short while:
    - yet that does not mean the work is unsafe,
      - **□ indeed, over-attribution to work is detrimental;**
  - most people can stay at work (sometimes with temporary adjustments):
    - but, absence is appropriate if job demands cannot be tolerated.
- **□ *Early return to work is important -***
  - it contributes to the recovery process and will usually do no harm;
  - facilitating early return requires support from workplace and healthcare.
- **□ *All players onside is fundamental -***
  - sharing goals, beliefs and a commitment to coordinated action.

## **PROCESS MESSAGES**

### **• Promote self-management -**

- Give evidence-based information and advice:
  - adopt a can-do approach,
  - dispel myths,
  - focus on recovery rather than what's happened.

### **• Intervene using stepped care approach -**

- provide only what's needed when it's needed:
  - treatment only if required,
  - beware detrimental labels and over-medicalisation;
- encourage and support early activity:
  - avoid prolonged rest;
- focus on participation - including work.

### **• Encourage early return to work -**

- stay in touch with absent worker;
- use case management principles;
- focus on what worker can do rather than what they can't:
  - a fit note may be more helpful than a sick note;
- provide transitional work arrangements:
  - but only if required, and time-limited.

### **• Endeavour to make work comfortable and accommodating -**

- assess and control significant risks:
  - ensure physical demands are within normal capabilities,
  - but, don't rely on ergonomics alone;
- accommodating cases shows more promise than prevention.

### **• Overcome obstacles -**

- principles of rehabilitation should be applied early:
  - focus on tackling biopsychosocial obstacles to participation;
- all players communicating openly and acting together:
  - avoiding blame and conflict.

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# APPENDIX

## DEFINITIONS

### ***Allodynia***

Allodynia is pain due to a stimulus that does not normally provoke pain (International Association for the Study of Pain 1994).

### ***Hyperalgesia***

Hyperalgesia is an increased response to a stimulus that is normally painful (International Association for the Study of Pain 1994).

### ***Biopsychosocial***

Most people understand that “health is good” and “disease is bad”, and this dichotomy separating health and disease became firmly embedded in the doctrine of specific aetiology from the 19th century onwards. Health and disease became to be considered as separate entities, defined by the presence or absence of a specific biological factor. This conceptual approach is frequently referred to as the “biomedical model”, and the “psychosomatic model” complements it. This broadly proposes that somatic symptoms, which cannot be readily explained by biological factors, are due primarily to psychological factors. The problem for the biomedical/psychosomatic model is that the mere presence of a biological factor does not guarantee the development of disease, nor does the inability to detect biological causes automatically implicate psychogenic causation. For this reason the World Health Organization (WHO) proposed in 1948 that health is a complete state of “physical, mental and social well-being, and not merely the absence of disease and infirmity”. Ongoing dissatisfaction with the constraints and limitations of the biomedical model led to the development of other models. Among these was the “biopsychosocial model”.

It is believed that the term biopsychosocial was first used in 1977 by George Engel in an article discussing the need for a new medical model (Engel 1977). In broad terms the biopsychosocial model posits that biological, psychological, and social factors combine to play a significant role in human functioning. The concept has been adopted into academic fields including medicine, psychology, and sociology. However, to date, a single irreducible biopsychosocial model has yet to be published.

The important implication of the biopsychosocial model for healthcare is that biological, psychological and social issues should be treated as interlinked systems. In the musculoskeletal arena, perhaps the greatest contribution to development of the biopsychosocial model has arisen within the study of pain. Based on the earlier work of Merskey and Spear (Merskey & Spear 1967), the International Association for the Study of Pain adopted a biopsychosocial definition of pain as “an unpleasant sensory and emotional experience associated with actual or potential tissue damage, or described in terms of such damage” (International Association for the Study of Pain 1994).

The description of pain as a biopsychosocial phenomenon has undergone development. Initially John Loeser (Loeser 1982) identified four dimensions of pain: nociception, pain, suffering, and pain behaviour. He defined these as follows: Nociception = potentially tissue-damaging thermal or mechanical energy impinging

upon specialized nerve endings that in turn activate A-delta and C fibres. Pain = nociceptive input to the nervous system. Suffering = negative affective response generated in higher nervous centres by pain and other situations such as loss of loved objects, stress, anxiety, etc. Pain behaviour = all forms of behaviour generated by the individual commonly understood to reflect the presence of nociception, including speech, facial expression, posture, seeking health care attention, taking medications, refusing to work. Only pain behaviour is considered directly observable. The most important subsequent refinement to the biopsychosocial model of pain has been the explicit recognition that the social and environmental context in which pain occurs can play an important role (Fig 1).



**Fig.1 Biopsychosocial model of pain**

It is important to note that while the biopsychosocial model proposes biological, psychological, and social issues should be treated as interlinked systems, it does not require that all of these must necessarily be addressed in each and every case. Rather, it suggests that relevant and important factors should be managed. Proponents of the biomedical model often overlook this.

Within the occupational ‘rehabilitation’ framework a further refinement has been the development of the concept of identifying obstacles to return to work.

A major strength of the biopsychosocial model is that it provides a wider spectrum for potential interventions, and this can yield great benefits to some individuals who had previously been consigned to an untreatable category. The most obvious example within the musculoskeletal arena has been the development and delivery of pain management and rehabilitation approaches based on cognitive-behavioural principles. However, considerable care needs to be exercised to identify suitable candidates for these interventions, since they are not required or appropriate for all.

For the purposes of this report the term ‘biopsychosocial’ refers to the concept that biological, psychological, and social factors combine to play a significant role in human functioning; and, these need to be treated or managed as interlinked systems.

[Note, sometimes the term ‘multidisciplinary’ treatment is used as if it were a synonym for ‘biopsychosocial’ intervention. In regular musculoskeletal clinical practice it is common to have multidisciplinary treatments entirely within a biomedical framework. Likewise, it is possible for a single clinician to deliver a biopsychosocial intervention].

### ***Pain***

Pain is an unpleasant sensory and emotional experience associated with actual or potential tissue damage, or described in terms of such damage (International Association for the Study of Pain 1994).

## **Prevention**

The meaning of the term 'prevention' appears straightforward and obvious. However, in the musculoskeletal arena it can refer to several different things, and is often used ubiquitously without careful explanation.

There are two important domains to consider. The first is temporal. There has been an expanding evidence base that demonstrates the factors relevant to musculoskeletal disorders vary across different time "phases". There are different factors implicated in the onset of symptoms, the reporting of musculoskeletal problems, and the development of long-term problems (e.g. work disability). Prevention may be successful at certain phases, but not at others. Sometimes the terminology 'primary prevention' is used to denote interventions designed to prevent onset of injury or disease; 'secondary prevention' to describe approaches to prevent acute problems becoming chronic or persistent; and, 'tertiary prevention' to refer to attempts to recover function and quality of life among the long-term disabled.

The second important domain is the possible targets, or goals, for prevention. In practice, these are usually the same as outcomes (although the relevance or importance of each outcome depends on the perspective of the stakeholder – e.g. patient, clinician, spouse and family, employer and workplace, funder, etc.). Musculoskeletal disorders often involve pain problems, which are multidimensional in nature. That is, there are several important components such as symptom severity, functional limitations, associated psychological distress, and important behavioural implications that include productive activity.

This means that the overall prevention field is complex, and unlikely to be responsive to uni-dimensional interventions. For example, in the prevention of onset of injury or disease, the most common principle is one of hazard identification using some form of risk assessment based on an agreed rule or "standard". This approach rests on a sequence of assumptions. First, is that risks and hazards are known and understood. Second, is that they can be accurately identified in practice. Third, is that once they have been identified they can be eliminated, or at least reduced, and this will yield a subsequent reduction in cases of injury or illness. However, this does not always hold true. Nor does it necessarily take account of multifactorial and complex causation.

While what might constitute effective primary prevention approaches for musculoskeletal problems remains unclear, there is strong evidence for benefit from both the secondary and tertiary approaches. However, tertiary approaches are expensive and labour-intensive; and, secondary prevention approaches tend to be underutilized. This may be due to their application of the biopsychosocial model, and the perceived conflict of this with the prevailing biomedical model.

The term 'prevention' can refer to preventing an injury/complaint from happening, or it can refer to an approach/intervention to reduce the consequences of an injury/complaint. It is not currently understood how to prevent people from developing musculoskeletal pain and discomfort. However, preventing deleterious consequences is potentially feasible: it needs much greater emphasis, and should be targeted at a specific phase of a musculoskeletal disorder, with clearly defined targets or goals.

## **Productive activity**

This term refers to any activity that is productive, whether it is remunerated or not. That is, it includes paid work whether part-time or full-time, voluntary work, studying, domestic work, etc. It is therefore a more inclusive term than 'work', which tends to only describe those in paid employment and fails to recognise that people participate in a

wide variety of productive activities that may require equal or greater personal effort than paid work, and may place similar biomechanical demands on the individual.

### ***Complex Regional Pain Syndrome (CRPS)***

CRPS is a term promoted by the International Association for the Study of Pain to replace 'reflex sympathetic dystrophy' and 'causalgia'. In their 1994 published taxonomy IASP established diagnostic criteria for CRPS as follows:

1. The presence of an initiating event
2. A cause of immobilization
3. Continuous pain, allodynia and/or hyperalgesia
4. Skin temperature changes more than 1.1° C difference from the homologous body part
5. Evidence at some time of oedema, skin colour changes and abnormal pseudomotor activity in the area of pain
6. No existence of other condition that would otherwise account for the degree of pain and dysfunction

This taxonomy also defined two types of CRPS. Type I (reflex sympathetic dystrophy) where minor injuries or fracture of a limb precede the onset of symptoms; and, Type II (causalgia), which develops after injury to a major peripheral nerve.

### ***Psychosocial***

The psychologist Erik Erikson brought the term 'psychosocial' into common use in his most influential work, *Childhood and Society* (Erikson 1950), in which he divided the human life cycle into eight psychosocial stages of development with a specific focus on personality development. In this context the term referred to psychological development in, and interaction with, a social environment. The individual may not be fully aware of this interactive relationship with their environment. Erikson proposed that human personality, in principle, develops according to steps predetermined in the growing person's readiness to be driven toward, to be aware of, and to interact with a widening social radius.

The clinical and healthcare arena gradually adopted the term, without formal definition, and its popularity has steadily increased. Current uses can be found in the following areas (Martikainen et al. 2002): causes and risk factors ('psychosocial causation', 'psychosocial influences', 'psychosocial risk factors'), mediating factors and contexts ('psychosocial mechanisms', 'psychosocial environment', 'psychosocial context', 'psychosocial resources', 'psychosocial support'), and outcomes ('psychosocial (di)stress', 'psychosocial well-being' and 'psychosocial health'). Unspecified use of the term ultimately degrades its usefulness, so that it ends up referring to everything and nothing in particular.

Dictionary entries provide definitions such as "pertaining to the influence of social factors on an individual's mind or behaviour, and to the interrelation of behavioural and social factors" (Oxford English Dictionary, 2007), or "combination of psychological and social factors" (National Institutes of Health, 2007). Within the musculoskeletal arena, and the conceptual development of 'psychosocial yellow flags', the term refers to "the interaction between the person and their social environment, and the influences on their behaviour" (Kendall et al. 1997).

The important feature here is that 'psychosocial' factors refer to the interaction between influences at the social and the individual level, but are neither solely one nor the other. Furthermore, it fully encompasses the influence of the social environment on individual's beliefs, attitudes, emotions and behaviours. It is important to note that the social environment includes not only family and friends, but also extends to a number



of groups including: employers, line managers and co-workers; healthcare providers and those that provide advice; governmental agencies, insurers and other funders. For those with injuries or diseases, the interactions with these multiple influences form the relevant psychosocial factors. A major strength of this conceptual approach is that it allows identification of causal and contributory relationships that are both multidimensional and bi-directional. However, great care needs to be exercised to prevent confusion between cause and effect.

For the purposes of this report the term 'psychosocial' refers to the interaction between the person (beliefs, emotions, behaviour, etc) and their social environment (significant others, healthcare providers, people at the workplace, funders, etc), and the influences on their behaviour (what they do).

Note, the term 'psychosocial' is different from 'psychological', which refers more narrowly to the cognitive and behavioural aspects of individuals. These are shaped by, and based on, matters that range from hereditary factors through to interactions with others.

### ***Work-relevant***

The idea of work being a contributor to morbidity, documented by Ramazzini at the beginning of the 18<sup>th</sup> century (Ramazzini 1700) has, quite rightly, had a powerful influence on occupational health and ergonomics, although it needs to be accepted that science has moved on in more recent years. For any disease or injury, the attribution of causality is most salient when it may lead to an effective preventive strategy. To this end, surveillance and sentinel systems have been established to identify potential and actual causal links, and to overcome the problem of identifying these despite long latency periods (Kendall, 2005). A good example that is widely acknowledged as successful was the identification of asbestos exposure as a cause of lung cancer and mesothelioma. Sometimes, exposure to potentially harmful things happens during the course of working, or while a person is present in their workplace. This observation historically led to the development of two cornerstones of modern working life: prevention strategies through occupational safety and health initiatives, and relevant insurance and compensation systems.

Prevention programmes are delivered nowadays under the rubric of 'occupational safety and health'. The most common principle used is one of hazard identification using some form of risk assessment based on an agreed rule or 'standard'. This approach rests on a sequence of assumptions. First, is that risks and hazards are known and understood. Second, is that they can be accurately identified in practice. Third, is that once they have been identified they can be eliminated, or at least reduced, and this will yield a subsequent reduction in cases of injury or illness (Kendall, in press). Unfortunately this sequence of assumptions does not always hold true in its entirety. For this reason, there is a lack of agreement over what constitutes a truly effective occupational safety and health system.

The notion that a worker might be made ill or injured during the course of their employment runs counter to the principle that he or she has the right to undertake work without it impacting adversely on their health. This is now formally expressed in documents such as "The Declaration of Fundamental Principles and Rights at Work" adopted by the ILO (International Labour Organisation, 1988). This conclusion led to the development of the concepts of compensation for a worker. In practice this occurs through recourse to placing claims before the courts, or through making insurance or compensation claims. The basis for all these claims is an assumed causal connection between an exposure at work and the appearance of a disease or injury. Unequivocal evidence of such connection is not always forthcoming, and in reality the inquiry into

cause is apt to produce perplexing legal and philosophical problems that the courts frequently have difficulty in resolving.

These historical developments led to the growth of occupational health, and importantly to the emergence of a lexicon of terminology that include a host of words and phrases to describe the relationship between work and health. These are too prolific in number to list or discuss here.

However, two areas of terminology are worthy of brief discussion. First is the term 'work-related', and its variants. Second, are terms describing clinical presentations that incorporate an assumption about causation, and the involvement of the workplace. In the upper extremity arena these include "repetitive strain injury" (RSI), "cumulative trauma disorder" (CTD), "occupational overuse syndrome" (OOS), "work-related upper extremity/limb disorder" (WRUED/WRULD), etc. It is clear from current scientific knowledge that direct causation for musculoskeletal health problems by a singular and unique factor is rare indeed. It is also clear, that in some circumstances, work and workplace factors can contribute to the development or exacerbation of signs and symptoms in an individual. However, these may also interact with multiple factors to produce and maintain the relevant health problem. That is, any causal relationships may be complex and indirect.

For this reason, it is argued that terminology which assumes or implies a causal relationship between work and health is best avoided. The term 'work-relevant' achieves this goal (Faber et al. 2006). It acknowledges there is a relationship to work and the workplace, but recognises this may be complex and indirect - the relationship may be causal, contributory, or coincidental. Furthermore, it acknowledges that health problems may themselves impact on the workplace.

For the purposes of this report the term 'work-relevant' refers to health complaints/disorders that, irrespective of cause, are experienced at the workplace to a greater or lesser extent, and which in turn impact on the performance of a worker.

## EVIDENCE TABLES

**Table A1. Reviews on epidemiology and risk factors**

<b>Table A1. Reviews on epidemiology and risk factors</b>	
<b>Authors</b>	<b>Key features</b> ( <i>Reviewers' comments in italic</i> )
(Bongers et al. 2002)  Systematic review	<p><b>Are psychosocial factors, risk factors for symptoms and signs of the shoulder, elbow, or hand/wrist?: a review of the epidemiological literature</b></p> <p>Moderate quality systematic review of studies published between 1980 and 1999, using a priori selection criteria and levels of evidence. Identified 200 studies, and included 28. Of these, only one was a prospective study (of medium quality), one was retrospective, and one was a case-control study. The remainder were cross-sectional. A broad range of psychosocial factors were considered including: qualitative and quantitative job demands, stimulus from work, job control, social support, job satisfaction, perceived job stress, rest break opportunities in a job and two non-work psychosocial factors, i.e., support by family and friends and worry, distress and non-work stress reactions. The large majority of cross-sectional studies reported at least one association between psychosocial factors and upper extremity symptoms or signs. However, the single prospective study found increased perceived monotony" to be a risk factor for hand/wrist discomfort. The retrospective study found limited rest breaks and relatively high time pressure to be risk factors. The case control study found an association with a specific work organisation factor (no job rotation between different work stations), but found no association with either autonomy or rest break opportunities. Overall, this review found only weak evidence for psychosocial factors to be contributors to upper limb disorders. <i>(There appears to be an error in this systematic review. The appendix with data extraction material states that Bergqvist (1995) used 341 VDU workers as subjects. However, the numbers of subjects were 260 and 353 in the two citations listed for Bergqvist (1995) in the bibliography).</i></p>
(Bongers et al. 2006)  Narrative review	<p><b>Epidemiology of work-related neck and upper limb problems: (1) psychosocial and personal risk factors</b></p> <p>Work related neck and upper limb symptoms have a multifactorial origin. Physical, psychosocial, or personal factors can reinforce each other and their influence can also be mediated by cultural or societal factors. An overview is presented of the results of recent epidemiological studies on work related psychosocial and personal risk factors for neck and upper limb symptoms. In addition, the interplay between these factors and the possible intermediate role of individual work style in this process is explored. It is now possible to base conclusions on numerous longitudinal studies. High work demands or little control at work are often related to ULD symptoms. However, this relationship is neither very strong nor very specific. Perceived stress, general distress, and other pain (comorbidity), though less extensively studied, are quite consistently related to neck and upper limb symptoms. Job dissatisfaction does not contribute to neck and upper limb symptoms. Too little research on personal characteristics is available to draw any conclusions. It is plausible that behavioural aspects, such as work style, are of importance in the aetiology of work related upper limb symptoms but the (promising) evidence is too scarce to draw conclusions. <i>(See companion entry in Table A2).</i></p>
(Gerr et al. 2006)  Quasi-systematic review	<p><b>Keyboard use and musculoskeletal outcomes among computer users</b></p> <p>Reviews the epidemiological evidence examining associations between upper extremity musculoskeletal symptoms and disorders, the intensity of keyboard use and users' postures. A search of the peer-reviewed medical literature between 1966 and November 2005 identified a total of 558 citations. Only thirty-nine epidemiological studies examining associations between computer use and MSD outcomes were identified in which: the sample size was &gt;20; posture was ascertained by a study investigator (as opposed to self-report); or computer use was ascertained, by self-report or other methods, in units of hours-per-day, hours-per-week, or as a percentage of work-time. Despite concluding that "several methodological limitations including non-representative samples, imprecise or biased measures of exposure and health outcome, incomplete control of confounding variables, and reversal of cause and effect" may have contributed to "the heterogeneity of observed results" the authors felt able to identify a number of "trends" in the findings: associations between various aspects of computer use are associated with neck/upper limb symptoms/disorders. <i>(This review seems to underplay the severe methodological limitations of</i></p>

Table A1. Reviews on epidemiology and risk factors	
Authors	Key features <i>(Reviewers' comments in italic)</i>
	<i>most of the studies identified: because most of the studies were cross-sectional and there was little difference in the number of 'positive' and 'negative' studies, an alternative explanation might be that there is limited and inconsistent evidence for a close association between computer use and neck/upper limb symptoms/disorders ).</i>
(Hoofman et al. 2004)  Systematic review	<b>Gender differences in the relations between work-related physical and psychosocial risk factors and musculoskeletal complaints</b> The authors conducted a systematic review of the literature to establish whether the reported gender differences in prevalence rates for musculoskeletal complaints might be due to differences in the effect of exposure to work-related physical and psychosocial risk factors. 31 studies were included, and scored for methodological quality (range 29% to 81%). Risk factors considered for back pain were lifting, awkward postures, heavy physical work, whole-body vibration, job demands, job control, job satisfaction, and social support. Evidence was found for male > female only for lifting. For neck-shoulder complaints the risk factors considered were repetition, hand-arm vibration, arm posture, arm force, job demands, job control, and social support. Evidence was found for male > female for hand-arm vibration, and for female > male for arm posture.
(Huisstede et al. 2006)  Systematic review	<b>Incidence and prevalence of upper-extremity musculoskeletal disorders. a systematic appraisal of the literature</b> A systematic appraisal of the worldwide incidence and prevalence rates of upper extremity disorders (UED) available in scientific literature. Studies that recruited at least 500 people, collected data by using questionnaires, interviews and/or physical examinations, and reported incidence or prevalence rates of the whole upper-extremity including neck, were included. No studies were found with regard to the incidence of UEDs and 13 studies that reported prevalence rates of UEDs were included. The point prevalence ranged from 1.6–53%; the 12-months prevalence ranged from 2.3–41%. One study reported on the lifetime prevalence (29%). We did not find evidence of a clear increasing or decreasing pattern over time. In general, higher prevalence rates of UEDs were found in women than in men and the estimates of self-reported complaints were higher than those acquired by using (in addition) physical examinations. The case definitions for UEDs used in the studies, differed enormously, which impacted on the prevalence rates. <i>(This study, pleading for unambiguous terminology, was a precursor to Huisstede et al 2007 Table A4).</i>
(IIAC 2006) †  UK Legislation	<b>Prescribed diseases</b> (Industrial Injuries Advisory Council) The UK law provides for payment of benefits to people who are suffering from certain diseases contracted in the course of certain types of employment. These diseases are referred to as prescribed diseases and are listed in Regulations. There is no entitlement to benefit in respect of a disease if it is not listed in the Regulations, or if the person's job is not listed against the particular disease. This is especially important for diseases common in the population at large, where it is known that some workers would have got the disease whatever job they did. A disease can only be prescribed if the risk to workers in a certain occupation is substantially greater than the risk to the general population, and the link between the disease and the occupation can be established in each individual case or presumed with reasonable certainty. In diseases which occur in the general population (e.g. chronic bronchitis and emphysema) there may be no difference in the pathology or clinical features to distinguish an occupational from a non-occupational cause. In these circumstances, in order to recommend prescription, IIAC looks for consistent evidence that the risk of developing the disease is more than doubled in a given occupation. There are a number of common musculoskeletal disorders that are considered prescribed diseases: cramp of the hand or forearm due to repetitive movements; subcutaneous cellulitis of the hand due to manual labour causing severe friction or pressure; bursitis or subcutaneous cellulitis at the knee due to severe prolonged external friction or pressure; bursitis or cellulitis at the elbow due to severe or prolonged external friction or pressure; traumatic inflammation of the tendons (tenosynovitis) affecting the hand due to manual labour or frequent or repeated movements of the hand or wrist; vibration white finger and carpal tunnel syndrome related to use of hand-held vibrating tools; osteoarthritis of the hip in agriculture as a farmer or farm worker for a period 10 years. <i>(Whilst it is recognised that exposures in certain jobs are related to certain musculoskeletal diseases, it is not implied as inevitable that exposure to the job will result in the disease).</i>

**Table A1. Reviews on epidemiology and risk factors**

<b>Authors</b>	<b>Key features</b> <i>(Reviewers' comments in italic)</i>
(Ijmker et al. 2007)  Systematic review	<b>Should office workers spend fewer hours at their computer?</b> Based on 9 articles (6 were high quality) there is moderate evidence for a positive association between duration of mouse use and hand-arm symptoms, with indications for a dose-response relationship. Risk estimates were stronger for hand-arm region than neck-shoulder region, and stronger for mouse use than for total computer use or keyboard use. A pathophysiological model focusing on overuse of muscles during computer use supports these differences. Further studies are required to determine the safe level of computer use – usage needs to be measured more objectively, and distinguishing between different aspects of usage, eg mouse v keyboard. <i>(A strong point of this review is inclusion of only longitudinal studies, but 'outcomes' were restricted largely to self-reported symptoms – varying regions and over varying periods (recent days to months) – thus it is not possible to distinguish between work-caused disorder and work-relevant symptoms).</i>
(Keyserling 2000)  Narrative review	<b>Workplace risk factors and occupational musculoskeletal disorders, part 2: a review of biomechanical and psychophysical research on risk factors associated with upper extremity disorders</b> Narrative review of laboratory biomechanical and psychophysical studies, with reference to models for work-related ULD's based on these. The authors pointed out the results of these studies complement, but do not replace, epidemiological data. They concluded there is a wide range of potential risk factors including: forceful prehensile exertions; exertions involving a flexed or extending wrist; exertions involving radial or ulnar deviation; exertions involving pinch grip posture or pressing with the finger tips; repetitive hand exertions (task frequency); task duration/shift length; distance moved (displacement of object during hand-intense work); dynamic effects of hand motions (wrist acceleration); work with pneumatic fastening tools (nut runners, screwdrivers, etc); keyboard work; and, work with gloves. <i>(Information about the strength of these observed associations was not provided, nor is there any indication of the relative importance of these potential risk factors relative to each other, or to other factors).</i> Job and task factors that are significantly related to Biomechanical Strain are: Magnitude of grip/pinch/trigger force; Exertion with finger tip (pinch or pressing action); Posture: wrist flexion or extension; Posture: wrist ulnar deviation; Posture: work with elevated shoulder; Dynamics of wrist motion (acceleration); Duration of work activity; Torque output of pneumatic hand tool; Torque impulse of pneumatic hand tool; Keyboard "make force" ; Arm support during keyboard work; Working with gloves; and, Population variability. Job and task factors that are significantly related to Psychophysical Strain are: Magnitude of grip/pinch/trigger force; Posture: wrist flexion or extension; Posture: wrist ulnar deviation; Posture: work with elevated shoulder; Frequency of repeated hand motions; Displacement distance during transfer Tasks; Duration of work activity; Torque output of pneumatic hand tool; Torque impulse of pneumatic hand tool; Handle configuration of pneumatic hand tool; Vertical and horizontal reach with hand tool; Weight of pneumatic hand tool; and, Population variability. The authors also pointed out that further research is required to understand the quantitative relationship between exposure to these factors and the incidence and severity of a work-related ULD. However, they advise that these task attributes should be incorporated into job evaluation and job design procedures in order to reduce exposures to factors that are known to increase biomechanical and/or psychophysical strain.
(Kuijpers et al. 2004)  Systematic review	<b>Systematic review of prognostic cohort studies on shoulder disorders</b> The reviewers noted that shoulder complaints are common and have an unfavourable outcome in many patients, yet there is little consensus about prognostic indicators that can identify patients at high and low risk of chronicity. Identified 16 articles focusing on the prognosis of shoulder disorders, and assessed the methodological quality of these 16 studies. Six were deemed to be high quality. It was noted that there is wide variation among the studies with respect to length of follow-up, the study population used, the evaluated prognostic factors, types of outcome measures used, and the methods of analysis employed. Because of this heterogeneity statistical pooling of data was not conducted, and instead a qualitative 'best-evidence synthesis' was completed. The reviewers concluded (based on factors with RR or OR > 2.0) that: (1) there is strong evidence that high pain intensity predicts a poorer outcome in primary care populations; (2) there is strong evidence that middle age (45-54) is associated with poor outcome in occupational populations; and, (3) there is moderate evidence that a long duration of complaints, and high disability score at baseline predict a poorer outcome in primary care. Factors with RR or OR between 0.5 and 2.0 or a not statistically significant association included years of education, repetitive work, precipitating trauma and instability of the glenohumeral joint. The authors advised caution in interpreting these findings since they are based on a small number of highly heterogeneous studies.

**Table A1. Reviews on epidemiology and risk factors**

<b>Authors</b>	<b>Key features</b> ( <i>Reviewers' comments in italic</i> )
(Lederman 2003)  Narrative review	<b>Neuromuscular and musculoskeletal problems in instrumental musicians</b> Reviews the major playing-related disorders seen in 1353 instrumental musicians, who are described as tending to be introspective, self-analytical, and exceptionally single-minded and determined about their art. They often set high standards for themselves, which are sometimes unrealistic. Their expectation of others, including their health-care providers, may be similarly high. Many are almost pathologically fearful of medical, to say nothing of surgical, interventions. The major diagnoses included musculoskeletal disorders in 64%, peripheral nerve problems in 20%, and focal dystonia in 8%. Of these instrumentalists, 60% were women, although men were the majority in the group with focal dystonia. Among musculoskeletal disorders, regional muscle pain syndromes, particularly of the upper limb, upper trunk, and neck, were most common. Specific entities such as tendinitis and ligament sprain were less common. Frequent peripheral nerve disorders included thoracic outlet syndrome, ulnar neuropathy at the elbow, and carpal tunnel syndrome. Each instrument group showed a characteristic distribution of symptoms and signs that appeared to be directly related to the static and dynamic stresses inherent in the playing of the instrument. With carefully designed treatment, the majority of instrumental musicians can return to full and pain-free playing. Nerve entrapment syndromes have the highest treatment success rate, followed by musculoskeletal pain syndromes. Despite some recent innovative approaches, focal dystonia remains largely resistant to therapy. ( <i>This review is of interest here mainly because it suggests instrumentalists are highly motivated to 'return to work' and most apparently do; focal dystonia seems a separate issue needing special consideration</i> ).
(Mallen et al. 2007)  Systematic review	<b>Prognostic factors for musculoskeletal pain: a systematic review</b> Forty-five observational cohort studies in primary care were included. Eleven factors, assessed at baseline, were found to be associated with poor outcome at follow up for at least two different regional pain complaints: higher pain severity at baseline, longer pain duration, multiple-site pain, previous pain episodes, anxiety and/or depression, higher somatic perceptions and/or distress, adverse coping strategies, low social support, older age, higher baseline disability, and greater movement restriction. Despite substantial heterogeneity in the design and analysis of original studies, this review has identified potential generic prognostic indicators that may be useful when assessing any regional musculoskeletal pain complaint. However, It is unclear whether these indicators, used alone, or in combination, can correctly estimate the likely course of individual patients' problems. Further research is needed, particularly in peripheral joint pain and using assessment methods feasible for routine practice.
(Marinus & van Hilten 2006)  Systematic review	<b>Clinical expression profiles of complex regional pain syndrome, fibromyalgia and a-specific repetitive strain injury: more common denominators than pain?</b> The aim of this review was to evaluate and compare the clinical manifestations, disease course, risk factors and demographic characteristics of Complex Regional Pain Syndrome type 1 (CRPS), fibromyalgia (FM) and a-specific Repetitive Strain Injury (RSI). Studies were included only if they had 20 or more subjects (n= 59 on CRPS; n= 73 on FM; n=7 on RSI). Comparisons were made for the characteristics of CRPS, FM, and RSI across a large number of variables that included epidemiology, disease course and the role of trauma, distribution of symptoms, pain and sensory signs and symptoms, autonomic signs and symptoms, motor signs and symptoms, trophic signs and symptoms, systemic signs and symptoms, psychological characteristics, and factors associated with onset or progression. The reviewers noted that all three disease types show similarities in age distribution, male-female ratio, pain characteristics and sensory signs and symptoms. Motor, autonomic and trophic changes are frequently reported in CRPS, but only occasionally in FM and RSI. Systemic symptoms are found in patients with CRPS and FM, and in a subgroup of patients with RSI. In all three disorders, symptoms usually start locally, but may spread to other body regions later, which, in the case of FM, is a prerequisite for diagnosis. Disease onset is always, usually, or occasionally of traumatic origin in RSI, CRPS and FM, respectively. Anxiety and depression are more frequent in patients compared to controls, but probably not very different from patients with other pain conditions or chronic diseases. The authors concluded that, aside from some obvious differences, there are many common features to CRPS, FM and RSI. They suggested this indicates a common pathway may be involved.
(Melrose et al. 2007)	<b>Better display screen equipment (DSE) work-related ill health data</b> The project sought information about the extent of such ill health in DSE workers through a survey of employees. It compared the data with those in the scientific literature. An extensive literature review sought to identify consistent evidence on any possible causal role of workplace factors. The survey found

**Table A1. Reviews on epidemiology and risk factors**

<b>Authors</b>	<b>Key features</b> ( <i>Reviewers' comments in italic</i> )
Narrative review + survey	high prevalences in DSE users of self-reported symptoms, eg. headaches (52%), eye discomfort (58%), and neck pain (47%); other symptoms such as back (37%) and shoulder (39%) pain were also frequently reported. Most of those reporting symptoms did not take any time off work. These findings are broadly consistent with other studies in the literature. The results showed a significant influence of DSE work in that the prevalences of symptoms were higher among those who spent more time at their computer at work and among those who worked for longer without a break. All symptoms were more common among respondents who had indications of stress, anxiety and/or depression. These findings are again consistent with the published literature. Although many studies have examined possible causal factors, methodological differences make it hard to draw any firm conclusions about causation of symptoms. Comparing these results with those of earlier research provides no positive evidence that the introduction of legislation on DSE work in 1993 has reduced ill-health in DSE workers. However there are substantial uncertainties, not least over the extent to which the provisions of the legislation have been fully implemented, and it cannot be safely concluded that the legislation has had no effect.
(National Research Council 1999) †  Workshop report	<b>Work-related musculoskeletal disorders</b> There is a strong association between biomechanical stressors at work and reported musculoskeletal pain, injury, loss of work and disability. There is a strong biological plausibility to the relationship between the incidence of musculoskeletal disorders and high-exposure occupations, but methodological weaknesses make it difficult to draw strong causal inferences or to establish the relative importance of task and other factors. Evidence that lower levels of biomechanical stress are associated with musculoskeletal disorders remains less definite. Research clearly demonstrates that reducing the amount of biomechanical stress and interventions which tailor corrective action to individual, organisational and job characteristics can reduce the reported rate of musculoskeletal disorders for workers who perform high-risk tasks.
(National Research Council 2001) †  Panel review	<b>Musculoskeletal disorders and the workplace</b> This US panel concluded: musculoskeletal disorders should be approached in the context of the whole person rather than focusing on body regions in isolation. There is a clear relationship between disorders of the upper extremities and repetition, force and vibration. ( <i>That relationship is not claimed to necessarily be causative</i> ). Work-related psychosocial factors associated with upper extremity disorders include high job demands and high job stress. Some individual characteristics (e.g. age, psychosocial factors) affect vulnerability to work-related musculoskeletal disorders. The basic biomechanics literatures provide evidence of plausible mechanisms for the association between musculoskeletal disorders and workplace physical exposures. Modification of various physical factors and psychosocial factors could reduce the risk of symptoms for low back and upper extremity disorders. ( <i>Essentially a 'panel consensus' document, albeit comprehensively reviewing the literature. Focused on evidence for work-relatedness of musculoskeletal disorders and the potential value of ergonomics interventions</i> ). ( <i>Also in Table A2</i> ).
(NIOSH 1997) †  Systematic review	<b>Musculoskeletal disorders and workplace factors: a critical review of epidemiologic evidence for work-related musculoskeletal disorders of the neck, upper extremity, and low back</b> (National Institute for Occupational Safety and Health) ( <i>Large, systematic review of the epidemiological evidence on risk factors for a wide variety of work-related musculoskeletal disorders</i> ). Concluded that the consistently positive findings from a large number of cross-sectional studies ( <i>which do not establish causation</i> ), strengthened by the limited number of prospective studies, provides strong evidence for increased risk of work-related musculoskeletal disorders for some body parts. For some body parts and risk factors there is some epidemiological evidence for a causal relationship. For other body parts and risk factors, there are insufficient studies from which to draw conclusions or the overall conclusion from the studies is equivocal. In general there is limited detailed quantitative information about exposure-response relationships between risk factors and musculoskeletal disorders. The reviewers considered that the epidemiological literature identified a number of specific physical exposures strongly associated with specific musculoskeletal disorders when exposures are intense, prolonged, and particularly when workers are exposed to several risk factors simultaneously. There is evidence that psychosocial factors related to the job and work environment play a role in the development of work-related musculoskeletal disorders of the upper extremity and back. Musculoskeletal disorders can also be caused by non-work exposures. There are insufficient studies to determine whether continued exposure to physical factors alters the prognosis of musculoskeletal disorders. ( <i>This</i>



**Table A1. Reviews on epidemiology and risk factors**

<b>Authors</b>	<b>Key features</b> <i>(Reviewers' comments in italic)</i>
	<i>review does not clearly distinguish between incidence, prevalence, injury, chronicity, and work loss, and simply assumes that statistical associations represent a causal relationship. Because of the focus on risk factors as opposed to outcomes, it provides little information on work retention or return-to-work).</i>
(Palmer et al. 2007b)  Systematic review	<b>Carpal tunnel syndrome and its relation to occupation</b> Data extracted from 38 primary reports on comparison of job titles (22), physical activities in the job (13), or both (3). Reasonable evidence that regular and prolonged use of hand-held vibratory tools increases the risk of CTS >2-fold and found substantial evidence for similar or even higher risks from prolonged and highly repetitious flexion and extension of the wrist, especially when allied with a forceful grip. The balance of evidence on keyboard and computer work did not indicate an important association with CTS. The source papers recognised to have various limitations: eg retrospective exposure data, biased case recruitment, heterogeneous case definition, small sample size, but the evidence was considered consistent. <i>(It should be emphasized that the implicated exposures variously are prolonged, forceful, highly repetitive, or involving substantial wrist excursions: less extreme exposures in outwardly similar work cannot be considered to carry the same risk).</i>
(Palmer et al. 2007c)  Systematic review	<b>Compensating occupationally related tenosynovitis and epicondylitis.</b> Data extracted on populations, exposure contrasts, and estimates of effect from 18 papers. Most based analyses on job titles rather than on directly assessed physical activities. Few jobs studied more than once. Little consistent evidence of jobs or work activities that carried a more than doubling of risk for either disorder. Highlights difficulty of compensating disorders that are not specific to work and for which there are no distinctive clinical features in occupationally related cases. There is a relative lack of data to support work attribution for tenosynovitis and epicondylitis. <i>(Review commissioned by IIAC with natural focus on their criteria for occupational diseases – see IIAC (2006) – Table A1).</i>
(Palmer & Smedley 2007)  Systematic review	<b>Work relatedness of chronic neck pain with physical findings – a systematic review</b> Systematic review of the work-relatedness of neck-shoulder disorders with associated physical findings – focus on studies incorporating a physical examination. 21 relevant reports (four prospective) were found. Most considered the outcome tension neck syndrome. Exposures included repetitive work, static loading, neck flexion, force, and occupational psychosocial factors (computer users excluded). The evidence base rests on 2 high quality investigations in the same population, plus sundry observations of mainly retrospective or cross-sectional studies. Moderate evidence was found for a causal relation for repetition at the shoulder and for neck flexion allied with repetition. Limited evidence was found for hand-wrist repetition, neck flexion with respect to static loading and force in the absence of repetition, and high job demands, low control, low job support and job strain. Evidence is lacking on the validity, clinical course, and functional importance of this diagnostic entity – case definition is problematic.
(Punnett & Wegman 2004)‡  Narrative review	<b>Work-related musculoskeletal disorders: the epidemiologic evidence and the debate</b> The debate about the work-relatedness of musculoskeletal disorders reflects both confusion about epidemiological principles and gaps in the scientific literature. Some dispute remains over the relative importance of physical ergonomic risk factors. This paper is said to address the controversy with reference to the report from the National Research Council (2001). The authors consider the available epidemiological evidence to be substantial, but accept more research is needed concerning the latency effect, natural history, prognosis, and potential for selection bias in the form of the healthy worker effect. Examination techniques still do not exist that can serve as a gold standard for many of the symptoms commonly reported in workplace studies. Exposure assessment has too often been limited to crude indicators such as job title, and lack of standardized exposure measures limits ability to compare studies. Despite these challenges, the epidemiological literature on work-related musculoskeletal disorders in combination with extensive laboratory evidence of pathomechanisms related to work stressors is convincing to most ( <i>sic</i> ). <i>(As important as the underlying data is the way it is interpreted – that part of the debate remains unresolved).</i>



**Table A1. Reviews on epidemiology and risk factors**

<b>Authors</b>	<b>Key features</b> <i>(Reviewers' comments in italic)</i>
(Szabo 2006)  Narrative review	<p><b>Determining causation of work-related upper extremity disorders</b></p> <p>This paper discusses nature of epidemiological evidence and study design: surveillance (monitor population for departures in the typical number of cases over time; cross-sectional or prevalence study (cannot establish temporal association between exposure and outcome); case-control (compares exposures in groups with and without the disease); prospective cohort study (temporal association between exposure and outcome can be established); randomised study (overcomes selection bias but potential ethical conflicts). Paper also discusses the criteria for causality (ie strength, temporality, consistency, specificity, and dose-response of the association, plus biological plausibility). If these factors are not taken into account, there is a risk of misinterpreting epidemiological evidence. The vague definition of 'repetitive stress/strain injury' indicates that scientific studies have failed to show that low-force repetitive movements cause injury. Whilst ergonomics proponents argue that elimination of certain risk factors related to force, repetition, posture and duration can prevent or cure RSI, scientific support is scant. Ergonomics interventions doubtless improve worker comfort (which is of benefit to the worker) but that does not equate with prevention or cure: improved ergonomics generally has not lowered the incidence or prevalence of work-related musculoskeletal disorders. Author points out that much of the uncertainty and confusion surrounding RSI-type conditions is due to misunderstanding of the relevant terms. An occupational disease is one where there is a direct cause and effect between a hazard and the disease (eg silicosis). A disease is considered work related when the work environment and the performance of work contribute significantly, but as one of several factors, to causation of the disease. Epidemiologists refer to risk factors as being associated with rather than causes of a disease, because the cause-effect link often cannot be established. A worker's decision to report a symptom is influenced by personal, psychosocial, and economic factors, as is the progression from symptoms to disability. When a worker reports an upper extremity symptom while at work, the 'workplace paradigm' labels the symptom as work-related (provoking a search for a physical factor to blame). The idea of early reporting of symptoms may be seen attractive to reduce the progression to disease or injury status. But, the symptoms are common yet progression is the exception – thus, there may be limited benefit from early reporting. Most patients will not understand the concepts of causation, so a short discussion to explain these concepts is warranted (and may spare them the dehumanizing medico-legal experience, and time/money can be saved on useless physical interventions). <i>(Another related confusion comes when the association between symptoms and work is simply misinterpreted: a particular job may be more difficult or painful for people with a disorder, but that says nothing about cause-effect. Where a causal relationship is not established, a better term may be 'work-relevant', which does not stimulate assumptions about causal relationships).</i></p>
(Walker-Bone et al. 2003b)  Narrative review	<p><b>Soft-tissue rheumatic disorders of the neck and upper limb: prevalence and risk factors</b></p> <p>Review of authoritative reviews and relevant text books for data about epidemiology of regional pain or specific soft-tissue entities. Numerous epidemiologic studies among different populations suggest a high point prevalence of pain in the shoulder (18% to 26%), elbow (8% to 12%), and wrist/hand (9% to 17%). Less clear is the proportion of pain caused by specific upper-limb disorders as compared with nonspecific pain; however, as many as 6% of adults may have carpal tunnel syndrome. Significant risk factors for these disorders include age, female gender, obesity, and association with mechanical exposures (eg, posture, force, repetition, vibration) in the workplace. Also implicated are psychological well-being and psychosocial workplace factors such as high levels of demand, poor control, and poor support. Pain and soft-tissue rheumatic disorders of the neck and upper limb are common. It appears that individual, mechanical, and psychosocial factors all contribute to upper-limb disorders, suggesting that future strategies for prevention will need to address each of these factors.</p>
(Walker-Bone & Cooper 2005) †  Narrative review	<p><b>Hard work never hurt anyone: or did it? A review of occupational associations of soft tissue musculoskeletal disorders of the neck and upper limb</b></p> <p>Focus was occupational associations with neck and upper limb musculoskeletal disorders. Considered separately neck disorders, shoulder disorders, epicondylitis, non-specific forearm pain, and carpal tunnel syndrome.</p> <ul style="list-style-type: none"> <li>• Neck disorders: High background prevalence of neck pain among adults in developed countries (point prevalence up to 34%); contributes to sickness absence and demands on medical services. Neck pain and neck disorders are associated with mechanical and psychosocial workplace factors (with complex interactions) – preventive strategies are not convincing.</li> <li>• Shoulder disorders: High background prevalence of shoulder pain (point prevalence up to 26%). Symptoms/disorders are associated with overhead work</li> </ul>

**Table A1. Reviews on epidemiology and risk factors**

Authors	Key features <i>(Reviewers' comments in italic)</i>
	<p>and possibly repetitive work: occupational psychosocial factors are also implicated (this holds true even when the outcome studied is a specific diagnosis).</p> <ul style="list-style-type: none"> <li>• Epicondylitis: Strenuous manual tasks seem to be associated with epicondylitis, but unclear if mechanical factors initiate the disorder or aggravate a tendency among predisposed people: emerging evidence suggesting association with psychosocial factors.</li> <li>• Non-specific forearm pain: Rare among working age adults (point prevalence 0.5%). Significantly associated with psychological distress but not with any mechanical exposures.</li> <li>• Carpal tunnel syndrome: Aetiology controversial due to problem of case definition. Overall, workplace factors may be contributory (force, repetition, and vibration).</li> </ul> <p>Neck and upper limb pain is a common problem among working age adults and contributes to sick leave. Workplace factors such as prolonged abnormal posture and repetition contribute to these conditions. Psychosocial influences show the aetiology is complex, and both types of factor may be important, though there is insufficient evidence to determine the relative contribution. <i>(The odds ratios quoted from the original studies tended to be &lt;2 for physical factors and &gt;3 for psychosocial factors – see Coggon et al 2007 – Table A3).</i></p>
(Woods 2005)‡  Narrative review	<p><b>Work-related musculoskeletal health and social support</b></p> <p>Concerns the relationship between the level of social support at work (e.g. poor communication channels, unsatisfactory work relationships, unsupportive organisational culture) and work-related musculoskeletal ill-health (reported symptoms, sick leave, medical consultation, disability retirement). Indicates a lack of social support (from co-workers, supervisors, or managers) is a risk factor for musculoskeletal ill-health <i>(though not necessarily causative)</i>. In addition, there is limited evidence that poor social support is associated with musculoskeletal sickness absence, restricted activity, and not returning to work after a musculoskeletal problem. <i>(As elsewhere, ULDs are considered generically with MSDs)</i>. Prevention programmes should involve psychosocial as well as ergonomic elements. A small number of studies have shown the effects of good social support and its importance in protecting against musculoskeletal ill-health and helping workers cope with problems. <i>(The findings are based on cross-sectional, case-control studies and prospective research)</i>.</p>
(Woods & Buckle 2002) ‡  Narrative review	<p><b>Work, inequality and musculoskeletal health</b></p> <p>A review of the relationship between aspects of work, inequality, and musculoskeletal health <i>(as elsewhere, ULDs considered generically with 'musculoskeletal')</i>. Concerned the following workplace and individual factors and their association with musculoskeletal ill health: social support, access to health information/education at work, job insecurity, low status work, income, education level, age, gender, and ethnicity. Numerous associations were found, but gaps in knowledge, complex interrelationships, and lack of independence of the variables meant that attributing causal relationships was not possible. Notes that some studies have broadened the scope to consider psychosocial factors (eg temporary or insecure work, social support at work) but there remains a paucity of knowledge for socio-economic factors such as poor housing, access to health care services and unemployment <i>(these are encompassed within the biopsychosocial model)</i>. Notes that access to health information/education at work may have a role in prevention/reduction of musculoskeletal ill health problems.</p>

[CTS = carpal tunnel syndrome; DSE = display screen equipment; IIAC = Industrial Injuries Advisory Council; MSD = musculoskeletal disorder; OR = odds ratio; RSI = repetitive strain injury; RR = risk ratio; UED = upper extremity disorder; ULD = upper limb disorder]

[J = data extraction (adapted) from Waddell & Burton 2004. ‡ = data extraction (adapted) from Waddell & Burton 2006]

**Table A2. Reviews on interventions and classification**

<b>Table A2. Reviews on interventions and classification</b>	
<b>Authors</b>	<b>Key features</b> ( <i>Reviewers' comments in italic</i> )
(ARMA 2007)  Consensus statement	<p><b>Standards of care for people with regional musculoskeletal pain</b> (UK Arthritis and Musculoskeletal Alliance)</p> <p><i>(Developed by expert working group, which access to the evidence. The Standards are intended to inform health care policy makers in respect of regional musculoskeletal pain).</i> Notes high prevalence of self-reported ULDs: eg 10-30% of population have had shoulder pain lasting &gt;1 week in previous month; 5-10% experience elbow pain and 5-15% experience hand pain; ~10% have forearm pain at any one time. States both physical and psychosocial factors appear to be risk factors, the most important being psychosocial distress, repetitive movements of limb, undue forceful movements, monotonous work, and lack of autonomy at work. These may be interrelated: musculoskeletal pain may be no more than an inconvenience until some other life incident changes the situation from a person with a predicament into someone who seeks care. Recreational activity is considered an important contributor to the physical factors involved in onset, perhaps leading to advice-conflicts (<i>it is not made clear if this applies to both upper and lower limb regional pain</i>).</p> <p>The Standards take a biopsychosocial perspective and are given for: Promoting musculoskeletal health; Information on self-management and prevention; Information on services, treatments, and providers; Access to diagnosis; Assessment of needs; Individualised care plans; Pain relief; Support to remain in, or return to, work, education, or the home environment; Involvement of people with regional musculoskeletal pain in; Multidisciplinary teams, Self-management. Most regional musculoskeletal pain can and should be managed in the community. Notes role of psychosocial factors (identified by the 'flags' system) as obstacles to recovery: management requires adequate information (to remain active, to continue at work or in education wherever possible and maintain other normal activities), pain control (adequate to allow reactivation), biopsychosocial assessment and intervention in or near the workplace (for improved early management).</p>
(Andrew et al. 2005)  Systematic review	<p><b>Carpal tunnel syndrome – splinting or surgery? a systematic review</b></p> <p>Literature review based on database search. Only 2 studies met inclusion criteria. Both were non-blinded RCTs with patients (n=22 females, single-centre, UK; n=176, multicentre, Netherlands) allocated to either surgery or splinting arms. In both studies clinical outcomes (symptoms, nerve conduction studies) were statistically better in the surgical groups than the splinting groups, but this difference disappeared when the results of both studies were pooled (using Review Manager, RevMan, software from the Cochrane Collaboration). The authors concluded that surgery seems to be more efficacious, but that the evidence is currently inconclusive until more RCT's are conducted.</p>
(Bisset et al. 2005)  Systematic review	<p><b>A systematic review and meta-analysis of clinical trials on physical interventions for lateral epicondylalgia</b></p> <p>High quality systematic review that identified 76 RCTs on lateral epicondylalgia (tennis elbow), and selected 28 as suitable for meta-analysis. These were scored using the modified PEDro rating scale (15 items) to assess methodological quality. Only 28 studies met the a priori criteria of a minimum 50% quality score (8 out of 15 criteria). Only 8 studies performed a long-term follow-up (&gt;6-months). The range of interventions used in the studies were (1) Non-electrotherapeutic: exercise (n=1), manipulation (n=3), orthotics and taping (n=9), acupuncture (n=4); and (2) Electrotherapeutic: laser (n=6), extracorporeal shock wave therapy (ESW) (n=2), electromagnetic field and ionisation (n=4), ultrasound and phonophoresis (ultrasound with a hydrocortisone coupling gel, n=5). The results found indications that exercise and manipulation may be beneficial, but this requires further research to confirm. Conclusions regarding the effectiveness of orthotics and taping, and acupuncture could not be drawn. The evidence for laser was equivocal, but tended to suggest no benefit over placebo. The two high-quality RCT's for extracorporeal shock wave therapy (ESWT) found it was ineffective. The evidence for electromagnetic field and ionisation, and ultrasound and phonophoresis, was equivocal, and conclusions could not be drawn. A weak effect for combined therapy (deep friction massage, ultrasound, and exercise) compared to corticosteroid injection, but not when compared to manipulation. In summary, the reviewers found a lack of evidence for physical interventions for tennis elbow, with positive evidence that ESWT is ineffective.</p>

**Table A2. Reviews on interventions and classification**

<b>Authors</b>	<b>Key features</b> <i>(Reviewers' comments in italic)</i>
(Bongers et al. 2006)  Narrative review	<b>Epidemiology of work-related neck and upper limb problems: (2) effective interventions from a bio-behavioural perspective</b> There are few controlled trials of individual or organisational interventions for work-related neck and upper limb symptoms. This precludes any conclusions on effectiveness of bio-behavioural interventions for reduction of neck and upper limb problems and return to work after symptoms. From the low back pain intervention research there is evidence that interventions should be targeted at both the worker and the organisation and that interventions will only be successful when all the players are involved. <i>(See companion entry in Table A1).</i>
(Boocock et al. 2007)  Systematic review	<b>Interventions for prevention and management of neck/upper extremity musculoskeletal conditions</b> Review of non-clinical intervention programmes for neck/upper extremity musculoskeletal conditions: 31 studies included, covering mechanical exposure interventions; production systems/organisational culture; modifier interventions - directed variously at people without pain, with pain, or with chronic pain. Heterogeneity of subjects and outcome measures, and limited information on the interventions <i>(predominantly ergonomics, quasi-ergonomics, and exercise)</i> . No one single-dimensional or multidimensional strategy for intervention was considered effective across occupational settings. Limited evidence that work environment/workstation adjustments (mouse/keyboard design) can improve neck/upper extremity musculoskeletal conditions in display screen workers, but insufficient evidence for equipment interventions among manufacturing workers. Evidence to support the benefits of production systems/organisational culture interventions is lacking. Until better evidence is available, interventions for the prevention and management of neck/upper extremity musculoskeletal conditions should continue to use multifactorial approaches. <i>(See also Williams et al 2004, Verhagen et al 2006).</i>
(Borkholder et al. 2004)  Systematic review	<b>The efficacy of splinting for lateral epicondylitis: a systematic review</b> Systematic literature review that selected 11 articles, and graded them according to strength of evidence. One was accorded level 1b, and ten were level 2b (Sackett's levels of evidence). The reviewers suggested they had identified good quality evidence offering "early positive, but not conclusive, support for the effectiveness of splinting lateral epicondylitis". <i>(The level 1b study, Labelle et al 1997, in fact was an RCT to test the effectiveness of an oral NSAID, diclofenac, against placebo. Both groups were given cast immobilisation for 14 days. Outcome measures were Jamar dynamometer, pain and function. However, follow-up was only for 4 weeks. The authors of the systematic review have interpreted the finding that both groups exhibited significant improvement to mean that the cast immobilisation was an effective treatment, whereas these short-term changes may equally have been due to a positive natural history, placebo, or other non-specific factors. Other studies categorised as level 2b have also been interpreted in a similar manner. Careful reading of the source data suggests there is a lack of evidence for splinting).</i> <i>(See also Struijs 2001)</i>
(Breen et al. 2007)  Narrative review	<b>Early pain management for musculoskeletal disorders</b> <i>(Although focused on proposing care pathways, the search strategy retrieved articles with a biopsychosocial perspective; evidence reviewed has wider implications).</i> The pathways are for employees, employers and health professionals and start within the first week of onset. The evidence was variable in quality across MSDs, with ULDs in need of greatest development. Latest evidence and current thinking supports the use of biopsychosocial assessment and intervention in close proximity to work for improved early management of MSDs. The employee and employer have the main roles, with musculoskeletal practitioners being the preferred healthcare providers. Psychosocial influences are significant predictors of outcome for non-specific MSDs, together with high level of initial pain. Combinations of physical load factors potentially implicated in tenosynovitis or peritenonitis of wrist or forearm, but imprecise measurement of exposure makes the association undependable. <u>Neck pain:</u> Current thinking (albeit in a climate of largely inconclusive evidence) supports a very similar approach to that for back pain (information and reassurance; stay active, adequate pain control; manual therapy if not improving; temporary modified work if needed). <u>Shoulder pain:</u> Some support for combined interventions including active exercises, stretching, and hot and cold. Tentative evidence for ultrasound for calcific tendonitis. <u>Upper limb disorders:</u> Current thinking focuses more on work modifications and physical and mental reconditioning than on treatment. But, treatment may be of value for resistant problems: rotator cuff tendonitis (local steroid injection); epicondylitis (topical NSAID); carpal tunnel syndrome (individual exercise/keyboard adaptations).

**Table A2. Reviews on interventions and classification**

<b>Authors</b>	<b>Key features</b> <i>(Reviewers' comments in italic)</i>
	<p><u>Generic care pathway</u>:- Stage 1 – within 1 week: Discussion, assessment and action planning with employer → activity modification considered → involvement of health professional (if concerned). Stage 2 – if not recovered in 2 weeks: Reassessment and revised action plan → monitor and amend staged recovery plan, together with employer with focus on activity and function (as distinct from pain alone).</p> <p><u>Employee pathway</u>: Stage 1 – within 1 week: Advice – MSDs common, self-limiting and may have nothing to do with work or injury; control the pain, stay at work (even if some pain); stay active, perhaps with modified activities → tell employer about problem and discuss effect of work activities → if worried, consider seeing health professional (active physical treatment) + keep in touch with work → Stage 2 – if not recovered in 2 weeks: Do not be discouraged; use pain control and (if necessary) + modified activities at work and/or seek other treatment; plans with employer for workplace accommodation; if the plan not helping recovery, need to identify with employer and healthcare professional what needs to be done. <i>(Especially in early stages, psychosocial factors, and interventions, are promoted; need for all players onsite).</i></p>
(Brosseau et al. 2002) Cochrane	<p><b>Deep transverse friction massage for treating tendinitis</b></p> <p>When combined with other physiotherapy modalities, deep transverse friction massage did not show consistent benefit over the control of pain, or improvement of grip strength and functional status for patients with lateral forearm tendonitis.</p>
(Buchbinder et al. 2002) Cochrane	<p><b>Surgery for lateral elbow pain</b></p> <p>Various operations have been described based upon the surgeon's concept of the pathological entity. The most described surgical procedures involve release of the extensor carpi radialis brevis (ECRB) from the lateral epicondyle region based upon the premise that there is pathology in the attachment of ECRB to the lateral epicondyle. The reviewers were not able to identify any published controlled trials, and noted that without a control group it was not possible to draw any conclusions on the effectiveness of this treatment</p>
(Buchbinder et al. 2003) Cochrane	<p><b>Corticosteroid injections for shoulder pain</b></p> <p>The reviewers found that for rotator cuff disease, subacromial steroid injection was demonstrated to have a small benefit over placebo in some trials however no benefit of subacromial steroid injection over NSAID was demonstrated based upon the pooled results of three trials. For adhesive capsulitis, two trials suggested a possible early benefit of intra-articular steroid injection over placebo but there was insufficient data for pooling of any of the trials. One trial suggested short-term benefit of intra-articular corticosteroid injection over physiotherapy in the short-term (RR 1.7 at seven weeks). However, the reviewers urged caution when interpreting these findings due to small sample sizes, variable methodological quality and heterogeneity, meaning that currently there is little overall evidence to guide treatment</p>
(Buchbinder et al. 2005) Cochrane	<p><b>Shock wave therapy for lateral elbow pain</b></p> <p>The review included 9 trials that randomised 1006 subjects with lateral elbow pain to extracorporeal shock wave therapy (ESWT) or placebo, and 1 trial that randomised 93 subjects to ESWT or steroid injection. Eleven of the 13 pooled analyses found no significant benefit of ESWT over placebo. The reviewers concluded there is strong evidence that shock wave therapy provides little or no benefit in terms of pain and function in lateral elbow pain, and there is good evidence (from a single trial) that steroid injection may be more effective than ESWT</p>
(Buchbinder et al. 2006) Cochrane	<p><b>Oral steroids for adhesive capsulitis</b></p> <p>Five RCTs using subjects with adhesive capsulitis, frozen shoulder, stiff painful shoulder or peri-arthritis and interventions of oral steroids compared to placebo, no treatment, or any other treatment were included. The reviewers concluded there is good evidence that oral steroids provide significant short-term benefits in pain, range of movement of the shoulder and function in adhesive capsulitis but the effect may not be maintained beyond six weeks.</p>
(Buckwalter 1995)	<p><b>Activity vs. rest in the treatment of bone, soft tissue and joint injuries</b></p> <p>One of the most important advances in the treatment of musculoskeletal injuries has come from understanding that controlled early resumption of activity can promote restoration of function, and that treatment of injuries with prolonged rest may delay recovery and adversely affect normal tissues. In the last</p>

**Table A2. Reviews on interventions and classification**

<b>Authors</b>	<b>Key features</b> ( <i>Reviewers' comments in italic</i> )
Narrative review	decade of the nineteenth century two widely respected orthopaedists with extensive clinical experience strongly advocated opposing treatments of musculoskeletal injuries. Hugh Owen Thomas in Liverpool believed that enforced, uninterrupted prolonged rest produced the best results. He noted that movement of injured tissues increased inflammation, and that, "It would indeed be as reasonable to attempt to cure a fever patient by kicking him out of bed, as to benefit joint disease by a wriggling at the articulation." Just Lucas-Championnier in Paris took the opposite position. He argued that early controlled active motion accelerated restoration of function, although he noted that mobility had to be given in limited doses. In general, Thomas' views met with greater acceptance in the early part of this century, but experimental studies of the last several decades generally support Lucas-Championnier. They confirm and help explain the deleterious effects of prolonged rest and the beneficial effects of activity on the musculoskeletal tissues. They have shown that maintenance of normal bone, tendon and ligament, articular cartilage and muscle structure and composition require repetitive use, and that changes in the patterns of tissue loading can strengthen or weaken normal tissues. Although all the musculoskeletal tissues can respond to repetitive loading, they vary in the magnitude and type of response to specific patterns of activity. Furthermore, their responsiveness may decline with increasing age. Skeletal muscle and bone demonstrate the most apparent response to changes in activity in individuals of any age. Cartilage and dense fibrous tissues also can respond to loading, but the responses are more difficult to measure. The effects of loading on injured tissues have been less extensively studied, but the available evidence indicates that repair tissues respond to loading and, like immature normal tissues, may be more sensitive to cyclic loading and motion than mature normal tissues. However, early motion and loading of injured tissues is not without risks. Premature or excessive loading and motion of repair tissue can inhibit or stop repair. ( <i>Though perhaps somewhat idiosyncratic, this 'early' article is included since there is a paucity of reviews that consider activity v rest for MSDs.</i> ) ( <i>See also Nash et al 2004.</i> )
(Cleland & Durall 2002)  Systematic review	<b>Physical therapy for adhesive capsulitis: systematic review</b> Reviewers searched for "Non-operative experimental or descriptive research-based outcomes studies of physical therapy", and selected 12 that had quality scores on a 16-point scale ranging from 38% to 69%, with a mean of 54%. 7 of these were prospective case series, 2 were prospective non-randomised comparison studies (one compared physical therapy with manipulation finding no significant differences, and the other compared physical therapy with calcitonin injections also finding no significant differences), 1 was a retrospective case series, and 2 were RCT's. One RCT compared 6 weeks of treatment by a physiotherapist or 6 weeks of corticosteroid injections administered by GP's. Outcomes (pain, and shoulder disability) were significantly better for the injection group at 7 weeks, although the gap narrowed to little difference by 26 and 52-week follow-up. The other RCT divided patients, on the basis of physical examination, into two diagnostic groups: a shoulder girdle group (n = 58) and a synovial group (n = 114). Patients in the shoulder girdle group were randomised to manipulation or physiotherapy, and patients in the synovial group were randomised to corticosteroid injection, manipulation, or physiotherapy. In the shoulder girdle group duration of complaints was significantly shorter after manipulation compared with physiotherapy. Also the number of patients reporting treatment failure was less with manipulation. In the synovial group duration of complaints was shortest after corticosteroid injection compared with manipulation and physiotherapy. These results indicate that to treat shoulder girdle disorders manipulation may be the preferred treatment, whereas for the synovial disorders, corticosteroid injection seems the best treatment. ( <i>The case series, either prospective or retrospective, is a descriptive study that by its very nature does not test the hypothesis of treatment efficacy. The main value of case series is to explore new areas, and to find support for conducting controlled clinical trials.</i> )
(Cole et al. 2006)  Narrative review	<b>Integrative interventions for MSDs: nature, evidence, challenges &amp; directions</b> Review focused on neck and upper extremity, with the aim of exemplifying "integrative" interventions, rather than being an exhaustive review. They describe "integrative" workplace interventions to include both biomechanical and psychosocial aspects, aiming at achieving both primary and secondary prevention, and/or consisting of multiple components versus only a single component. Authors noted that currently there are mixed messages on workplace intervention effectiveness due to a variety of reasons, including a lack of participation in research by workplaces. They argued that there are many opportunities to expand the range of 'integrative interventions'. They find an integrated approach to both biological and psychosocial to be appealing, since it allows the targeting of two main categories of risks, to better prevent and manage musculoskeletal disorders in the workplace. They pointed out that given there are multiple causes for workplace injury, illness and disability, then preventing these problems requires multiple solutions, operating in synergy. Also, that effort



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	to reduce workplace injury, illness and disability should build on combined strategies for primary and secondary prevention. They highlighted the use of multiple component interventions such as combining proactive case management from insurers with workplace ergonomic interventions to facilitate faster return to work. ( <i>Somewhat more conceptual than definitive review</i> ).
<p>(Crawford &amp; Laiou 2007)</p> <p>Quasi-systematic review</p>	<p><b>Conservative treatment of work-related upper limb disorders</b></p> <p>Summarises the evidence base for conservative clinical management of ULDs including specific and non-specific conditions (articles published 1993-2004; variable quality). Much of the evidence for the efficacy of various conservative treatments for the management of ULDs is generally limited and of low quality – positive statements given with caution:</p> <p><u>Carpal tunnel syndrome</u>: +ve for local steroid injection, exercise, stretching: no evidence for NSAIDs and workplace intervention strategies.</p> <p><u>Epicondylitis</u>: +ve for short term symptomatic relief from local steroid injections, acupuncture, topical NSAIDs; longer-term relief from 'physiotherapy'.</p> <p><u>Rotator cuff syndrome and bicipital tendonitis</u>: +ve for local steroid injection, NSAIDs, although evidence unclear. (<i>Straps/braces not included in review</i>).</p> <p><u>Shoulder capsulitis</u>: +ve for local steroid injection: no evidence for other conservative approaches.</p> <p><u>Impingement syndrome</u>: +ve for exercise and NSAIDs, but evidence low quality.</p> <p><u>Tension neck syndrome</u>: +ve for ergonomic interventions to reduce discomfort: physical training does not have an impact.</p> <p><u>Tenosynovitis, tendonitis, de Quervain's disease, or diffuse non-specific ULDs</u>: no evidence to support or refute conservative treatment.</p> <p><u>General management of work-related MSDs</u>: few papers found – considered not surprising as each disorder has its own diagnosis and aetiology and it would be unlikely that a generalized approach would help clinical management. (<i>However, that does not mean generalized approaches are precluded, and lack of evidence is not evidence against</i>).</p> <p><u>Pain management programmes</u>: +ve for cognitive behavioural programmes (especially early) for occupational outcomes: +ve for hypnosis with biofeedback for RSI pain, but low quality.</p> <p>Authors note that it may be more appropriate to use the term 'tendinopathy' to describe common painful overuse tendon conditions (as opposed to 'tendonitis') since a degenerative disorder rather than an inflammatory one is revealed in the tendon.</p>
<p>(Desmeules et al. 2003)</p> <p>Systematic review</p>	<p><b>Therapeutic exercise and orthopedic manual therapy for impingement syndrome: a systematic review.</b></p> <p>Review of seven RCT's up to 2002 using therapeutic exercise and orthopaedic manual therapy for the treatment of impingement syndrome (included rotator cuff tendinitis, or bursitis). Used a methodological score to evaluate quality of the studies, and noted most were 'low' to 'very low' quality with average score of 58%. This review confirmed the lack of uniformity in defining impingement syndrome. Results were equivocal. The three trials with the best methodological score (67%) found: supervised exercise with manual therapy was superior to supervised exercise alone on measures of strength, pain, and function at 2-months; arthroscopic surgery and supervised exercise were better than placebo (detuned laser) for pain and function at 30-months; and, a treatment package of exercises, hot packs, soft tissue mobilisation and education was improved by the addition of joint mobilisations on measures of pain, but not for ROM or function at 3 to 4 weeks. One study found improvements in pain-free abduction, flexion ROM, and function at 1-month due to therapeutic exercise compared to 'no treatment'. Two trials found no differences between study groups: arthroscopic subacromial decompression with physiotherapy-supervised exercises versus self-training exercises; and, 'classic physiotherapy' (exercise, massage, physical applications) versus manipulation versus corticosteroid injections. The lowest quality trial (38%) found open anterior acromioplasty to be superior to exercise and education. The authors concluded there was limited evidence to support the effectiveness of therapeutic exercise and manual therapy to treat impingement syndrome. (<i>Note, no attempt was made to consider the relative effectiveness of these two interventions independent of each other. Furthermore, the authors conclusion needs to be placed in the context of negative findings, and weak methodological quality including very short follow-up periods</i>).</p>
<p>(Ejnisman et al. 2004)</p>	<p><b>Interventions for tears of the rotator cuff in adults</b></p> <p>Tears of the rotator cuff tendons, which surround the joints of the shoulder, are one of the most common causes of pain and disability in the upper extremity. 8 randomised or quasi-randomised clinical trials involving tears of the rotator cuff, involving conservative interventions or surgery were included</p>

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Cochrane	(nonsteroidal anti-inflammatory drugs, intra-articular or subacromial glucocorticosteroid injection, oral glucocorticosteroid treatment, physiotherapy, and open or arthroscopic surgery). The reviewers concluded there is a lack of evidence to support or refute the efficacy of common interventions.
(Feuerstein et al. 1999)  Narrative review	<b>Clinical management of carpal tunnel syndrome: a 12-year review of outcomes</b> Searched for prospective, multiple-group (ie both randomised and non-randomised, with control group) treatment studies for carpal tunnel syndrome. These were classified into six intervention categories as follows (with the number of studies in each category): surgery (n=14; 6 randomised, and 8 non-randomised), pharmacological/vitamins/steroids (n=6), physical therapy/splinting (n=6), chiropractic/manipulation (n=1), biobehavioral therapies (n=5), and occupational/work rehabilitation (n=2). The methodological quality of the various studies was not assessed. The strength, or level, of evidence was not included. The methodological limitations of the studies were discussed. The reviewers noted that the majority of studies assessed the effects of surgical interventions, and offered the following conclusions: (a) Endoscopic release was associated with higher levels of physical functioning and fewer days to return to work when compared to open release; (b) Limited evidence indicated: 1) steroid injections and oral use of B6 were associated with pain reduction; 2) in comparison to splinting, range of motion exercises appeared to be associated with less pain and fewer days to return to work; 3) cognitive behaviour therapy yielded reductions in pain, anxiety, and depression; and, 4) multidisciplinary occupational rehabilitation was associated with a higher percentage of chronic cases returning to work than usual care; and, (c) Workers' compensation status was associated with increased time to return to work following surgery.
(Fleisch et al. 2007)  Systematic review	<b>Corticosteroid injections in the treatment of trigger finger: a level I and II systematic review</b> Reviewers identified four English-language prospective randomized controlled trials using injectable corticosteroids to treat trigger finger (defined by the authors as a tendonitis, and stenosing tenosynovitis). All four RCTs use adult subjects and had greater than 85% follow-up. The authors noted that the incidence of trigger finger is greatest in women (75%), with an average patient age range of 52 to 62 years. Using a combined analysis of the four studies the reviewers concluded that corticosteroid injections are effective in 57% of patients.
(Franche et al. 2005) †  Systematic	<b>Workplace-based return-to-work interventions: a systematic review of the quantitative literature</b> Reviews return-to-work interventions provided at the workplace to workers disabled with musculoskeletal or other pain-related conditions. There was strong evidence that work disability duration is significantly reduced by work accommodation offers and contact between healthcare provider and workplace; and moderate evidence that it is reduced by interventions which include early contact with worker by workplace, ergonomic work site visits, and presence of a return-to-work coordinator. For these five intervention components, there was moderate evidence that they reduce costs associated with work disability duration. There was limited evidence on the sustainability of these effects. There was mixed evidence regarding direct impact on quality-of-life outcomes. ( <i>Importantly, however, this review found no evidence that return to work had adverse impact on quality of life</i> ). Overall, the evidence base shows workplace-based interventions can reduce work disability duration and associated costs. ( <i>In common with others, this review considered musculoskeletal and other pain problems generically in respect of RTW interventions</i> ).
(Gerritsen et al. 2002)  Systematic review	<b>Conservative treatment options for carpal tunnel syndrome: a systematic review of randomised controlled trials</b> Reviewers identified 14 RCT's and graded these for methodological quality, and strength of evidence. Treatment types (and numbers of studies) were: Steroid injections (n=3); Ultrasound treatment (n=2); Pyridoxine (n=2); Oral diuretics (n=2); Oral steroid (n=1); and one study each (n=4) of chiropractic manipulation, yoga, soft-laser (Helium-Neon) light on acupuncture points, and plaster-of-paris splinting of hand/wrist/arm for 1-month. The reviewers originally intended to conduct a meta-analysis and pool data. However, they refrained from this, due largely to the small number of trials and numbers of subjects involved. They offered the following conclusions. Steroid injections: there is limited (level 3) evidence that steroid injection proximal to the carpal tunnel is more effective than placebo in improving CTS symptoms in the short-term (1 month). The same applies to a steroid injection into the carpal tunnel, compared with an intramuscular steroid injection. Ultrasound: there is conflicting (level 3) evidence that ultrasound is more effective than placebo in relieving CTS symptoms in the short-term, and limited evidence (level 3) for its long-term effectiveness. Pyridoxine (vitamin B6): there is moderate (level 2) evidence that pyridoxine and placebo are equally effective. Oral diuretics: there is strong (level 1) evidence that oral diuretics are not more effective than placebo. Oral steroid: there is limited (level 3) evidence that NSAID's are not more effective than placebo, but there is conflicting limited (level 3) evidence



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	that short-term relief may be obtained. Chiropractic manipulation: no conclusions could be drawn due to lack of symptom outcome measure. Yoga: there is limited (level 3) evidence that yoga is not more effective than 'current treatment'. Soft-laser light on acupuncture points: there is limited (level 3) evidence that soft-laser acupuncture is not more effective in relieving symptoms than placebo. Plaster splinting for one-month: there is limited (level 3) evidence that at 1-year follow-up splinting was significantly less effective than surgery in providing symptom relief. The authors concluded that there is still little known about the efficacy of most conservative treatment options for CTS.
(Goodyear-Smith & Arroll 2004)  Systematic review	<b>What can family physicians offer patients with carpal tunnel syndrome other than surgery? A systematic review of nonsurgical management</b> Reviewers assessed two systematic reviews (Cochrane review by Marshall et al (2000 – now dated 2007), and the narrative review by Feuerstein et al (1999)). 16 RCT's, and one non-randomised study for methodological quality (using PEDro scale). The authors noted that CTS has a positive natural history with a "considerable percentage...resolving] spontaneously". <i>(Despite using similar methodology to the earlier review by Gerritsen et al (2001), these reviewers included only 10 of the 14 studies included in that meticulous systematic review. It is noteworthy that they did not cite the Gerritsen et al (2001) review).</i> The authors concluded there is strong evidence that local corticosteroid injections <i>(in contrast to Gerritsen et al's finding of only limited evidence)</i> , and to a lesser extent oral corticosteroids <i>(consistent with Gerritsen et al)</i> , give short-term relief for CTS sufferers. They found limited evidence to indicate that splinting, laser-acupuncture, yoga, and therapeutic ultrasound may be effective in the short to medium term (up to 6 months). <i>(This is in contrast to Gerritsen et al 2001 who found limited evidence that splinting is less effective than surgery; laser-acupuncture and yoga are not effective; and, that ultrasound may be effective in the long-term but short-term findings are equivocal).</i> The authors also concluded the evidence for nerve and tendon gliding exercises is "tentative", and that the evidence does not support the use of NSAID's, diuretics, pyridoxine (vitamin B6), chiropractic treatment, or magnet treatment.
(Green et al. 1998)  Systematic review	<b>Systematic review of randomised controlled trials of interventions for painful shoulder: selection criteria, outcome assessment, and efficacy</b> Randomised controlled trials of non-steroidal anti-inflammatory drugs, intra-articular and subacromial glucocorticosteroid injection, oral glucocorticosteroid treatment, physiotherapy, manipulation under anaesthesia, hydrodilatation, and surgery for shoulder pain were included. This review has confirmed the lack of uniformity in the way shoulder disorders are labelled and defined. It has also highlighted the wide variation in assessment of outcome in clinical trials investigating the efficacy of interventions for painful shoulder, which limits data pooling and comparison of trials. There is little evidence to support or refute the efficacy of common interventions for shoulder pain. The only conclusions that may be drawn about efficacy are that non-steroidal anti-inflammatory drugs and subacromial glucocorti-costeroid injection may be superior to placebo in improving range of abduction in rotator cuff tendinitis and that the addition of corticosteroid injection to non-steroidal anti-inflammatory drugs does not seem to confer further benefit. No conclusions can be drawn about the efficacy of the interventions studied for adhesive capsulitis.
(Green et al. 2002)  Cochrane	<b>Acupuncture for lateral elbow pain</b> 4 small RCTs were identified, all with design flaws, which precluded meta-analysis. The authors concluded there is insufficient evidence to either support or refute the use of acupuncture (either needle or laser) in the treatment of lateral elbow pain. <i>(See also Trinh et al 2004)</i>
(Green et al. 2001)  Cochrane	<b>Non-steroidal anti-inflammatory drugs (NSAIDs) for treating lateral elbow pain in adults</b> Included 14 randomised and quasi-randomised trials using NSAIDs (oral or topical) compared to placebo or another intervention, or comparing two NSAIDs (oral or topical) to each other, in adults with lateral elbow pain (tennis elbow). There is some support for the use of topical NSAIDs to relieve lateral elbow pain at least in the short term. There remains insufficient evidence to recommend or discourage the use of oral NSAID, although it appears injection may be more effective than oral NSAID in the short term. A direct comparison between topical and oral NSAID has not been made and so no conclusions can be drawn regarding the best method of administration.

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(Green et al. 2003) Cochrane	<b>Physiotherapy interventions for shoulder pain</b> Twenty six trials met the inclusion criteria. Methodological quality was variable and trial populations were generally small (median sample size = 48, range 14 to 180). Exercise was demonstrated to be effective in terms of short term recovery in rotator cuff disease (RR 7.74), and longer term benefit with respect to function (RR 2.45). Combining mobilisation with exercise resulted in additional benefit when compared to exercise alone for rotator cuff disease. Laser therapy was demonstrated to be more effective than placebo (RR 3.71 (1.89, 7.28) for adhesive capsulitis but not for rotator cuff tendinitis. Both ultrasound and pulsed electromagnetic field therapy resulted in improvement compared to placebo in pain in calcific tendinitis (RR 1.81 and 1.9 respectively). There is no evidence of the effect of ultrasound in shoulder pain (mixed diagnosis), adhesive capsulitis or rotator cuff tendinitis. When compared to exercises, ultrasound is of no additional benefit over and above exercise alone. There is some evidence that for rotator cuff disease, corticosteroid injections are superior to physiotherapy and no evidence that physiotherapy alone is of benefit for adhesive capsulitis.
(Green et al. 2005) Cochrane	<b>Acupuncture for shoulder pain</b> Nine trials of varying methodological quality met the inclusion criteria, using various placebos. All trials had poor descriptions of interventions. The reviewers concluded that there is little evidence to support or refute the use of acupuncture for shoulder pain although there may be short-term benefit with respect to pain and function.
(Hagberg 2005) Narrative review	<b>Clinical assessment, prognosis and return to work with reference to work related neck and upper limb disorders</b> 65 relevant articles were identified (published between 1980 and 2002) that addressed assessment, prognosis and RTW for neck and upper limb problems. Many of these were found to be review articles and the author noted a paucity of randomised studies of prognosis and return to work with reference to neck and upper limb disorders. It was concluded that clinical assessment should include (in addition to history, exposures, and diagnostic tests) testing range of motion; testing muscle contraction pain and muscle strength; palpation of muscle tendons and insertions; and specific tests (such as Spurling's neck compression test, Arm-Lasègue test, Phalen test, Roos test, and bursa test). The author pointed out that the scientific basis for terms such as RSI (repetitive strain injuries) and CTD (cumulative trauma disorders) is weak or absent, and should therefore be avoided. Treatment that focuses on keeping the patient active and maintains contact with the workplace is recommended. Non-specific neck and upper arm pain and discomfort may be decreased but not eliminated in the majority of cases. Rehabilitation is best started early and should provide workplace accommodation, and if this is not available RTW may not be indicated. The prognosis for most work related disorders is variable and it seems that ergonomic and psychosocial stress, pain severity, and pain coping style predict short-term clinical outcomes whereas number of past treatments/providers, recommendation for surgery and pain coping style predict longer-term outcomes.
(Hanson et al. 2006) Narrative review + cross-sectional survey	<b>The costs and benefits of active case management and rehabilitation for musculoskeletal disorders</b> Project aimed to review evidence on the costs and benefits of active case management and rehabilitation programmes for musculoskeletal disorder; to identify potential incentives, and obstacles to, the adoption of these programmes; and, to describe a model programme based on the evidence and assess its acceptability to stakeholders. This project involved a literature review, and a cross-sectional survey of current providers in the UK (through focus groups and questionnaires). The authors concluded there is moderate evidence that case management approaches are effective and can yield a variety of benefits that are cost effective. The benefits observed include reduced healthcare costs, reduced treatment duration, reduced sick-leave and time off work, improved worker productivity, reduced compensation claims and litigation, reduced claim duration and more rapid claim closure. An outline of the key components of successful and cost-effective case management was provided. There is strong evidence that rehabilitation programmes using a cognitive-behavioural orientation and an activity focus are effective, and cost-effective at reducing pain and increasing productive activity in both the sub-acute and the chronic groups. There is also strong evidence that the use of these interventions at the sub-acute stage can prevent the development of long-term problems and reduce time off work. Furthermore, there is good evidence that this is highly cost-effective, especially when the intervention is selectively delivered to individuals screened as having a high risk for a poor outcome. The key components of good quality rehabilitation service delivery were outlined. An evidence-based delivery model was outlined (with high acceptability to UK providers, although there was acknowledgement that applicability to small

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	employers was uncertain) using the following key features: create the right culture; manage workers with musculoskeletal disorder; manage the return to work process; and, monitor and review the programme effectiveness. ( <i>Review was concerned with MSDs in general, not focused on upper limb disorders. See also Williams et al 2004</i> ).
(Harris & Susman 2002)  Summary of clinical guideline	<b>Managing musculoskeletal complaints with rehabilitation therapy: summary of the Philadelphia Panel evidence-based clinical practice guidelines on musculoskeletal rehabilitation interventions</b> The Philadelphia Panel has published evidence-based guidelines for selected rehabilitation interventions in the management of low back, knee, neck, and shoulder pain. This article provides a summary and overview. The only guideline recommendation relevant to upper limb disorders is that Panel recommends "the use of therapeutic ultrasound in the treatment of calcific tendonitis of the shoulder". The Panel stated in the source material for shoulder pain (Philadelphia Panel 2001) that "Only 1 positive recommendation of clinical benefit was developed. Ultrasound provided clinically important pain relief relative to a control for patients with calcific tendonitis in the short term (less than 2 months)".
(Helliwell 1996)  Narrative review	<b>Diagnostic criteria for work-related upper limb disorders</b> ( <i>Literature review and discussion with health professionals, conducted for HSE</i> ). Distinguishes between specific conditions (eg epicondylitis, tenosynovitis, carpal tunnel syndrome) and non-specific soft tissue syndrome (sensory – primarily pain). Clinical diagnostic criteria use symptoms and physical signs, but different physicians may not elicit these physical signs in same patient. Where sensitivity and specificity of criteria are available (eg for carpal tunnel syndrome) the results are poor. Different diagnostic criteria suit different purposes: primary care requires high sensitivity in order not to miss cases; secondary care requires high specificity in order not to over-diagnose. High sensitivity criteria may raise problems such as increasing patient expectations, promoting belief of work-relatedness. Makes the comment that psychosocial factors are probably important in the presentation and continuation of work-related upper limb disorders ( <i>though little evidence quoted</i> ).
(Helliwell & Taylor 2004) ‡  Narrative review	<b>Repetitive strain injury</b> Pain in the forearm is common in the community. In the workplace reporting of symptoms is associated with frequent high repetition, high forces, prolonged abnormal postures, and psychosocial issues. Early intervention and active management is important: the principles of the well-developed back pain guidelines apply – reassurance (addressing psychosocial factors), maintain work if possible, temporary activity modification. Ergonomic interventions may make the workplace more comfortable, and may reduce sickness absence. ( <i>Focus was mostly on clinical issues</i> ).
(Karjalainen et al. 2003a) †  Cochrane	<b>Biopsychosocial rehabilitation for upper limb repetitive strain injuries (RSI) in working age adults (Cochrane review)</b> Only two relevant studies found, both low quality and clinical relevance unsatisfactory. Little scientific evidence for effectiveness of biopsychosocial rehabilitation for RSI. One small trial suggested hypnosis supplementary to comprehensive treatment can decrease pain intensity for acute RSI at 6-weeks. Need for high quality trials. ( <i>Clearly little 'scientific' work done in this field –no information on vocational outcomes</i> )
(Karjalainen et al. 2003b) †  Cochrane	<b>Multidisciplinary biopsychosocial rehabilitation for neck and shoulder pain among working age adults (Cochrane review)</b> Only two relevant studies found: 1 low quality randomised trial and 1 low quality controlled trial. Limited scientific evidence for effectiveness of multidisciplinary biopsychosocial rehabilitation for neck and shoulder pain, compared with other commonly used intervention. Urgent need for high quality trials. ( <i>Clearly little 'scientific' work done in this field, but work outcomes were a feature of the included studies</i> ).
(Karsh et al. 2001) †  Narrative review	<b>Workplace ergonomic interventions to control musculoskeletal disorders</b> Ergonomic interventions to control musculoskeletal disorders are, in many instances, effective in reducing musculoskeletal pain, discomfort, and injury. Although weight of evidence from rigorous controlled trials in not substantial, authors argue that weight of evidence from other designs shows definite positive benefit ( <i>yet previous reviews have less definitive findings</i> ). Interventions were: back belts, ergonomic/lifting training, exercise, job redesign, multiple intervention components. 84% of studies found positive results, although majority had mixed results – only 32% had experimental or quasi-experimental designs. ( <i>Focus was reduction of musculoskeletal disorders or their risk factors - importantly, medical and return to work interventions were excluded, but</i>

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(Konijnenberg et al. 2001) Systematic review	<p><b>Conservative treatment for repetitive strain injuries</b></p> <p>The goal of the review was to evaluate the effectiveness of conservative treatment options for repetitive strain injury (RSI). The trials had to include a conservative, i.e. non-surgical, therapy arm. All types of conservative intervention that were prescribed or performed in the treatment of RSI were included: occupational therapy, physiotherapy, exercises, behavioural therapy, chiropractic, multidisciplinary treatment or medication. Ergonomic measures were also included. RSI was defined as any work disorder of the upper extremity, neck or thoracic region in adults of a working age (18 to 65 years), due to repetitive work or continuous strain at work. Patients with such complaints that were non-work-related were excluded. All occupational groups were included. Fifteen studies were included (12 RCT's and 3 non-randomised controlled clinical trials). The methodological quality of the included studies was found to be low, with problems of concealment of allocation, blinding and lack of intention to treat analyses. Using 'best-evidence synthesis', no strong evidence was found for the effectiveness of any treatment options. Limited evidence that multidisciplinary rehabilitation, ergonomic intervention measures, exercises, and spinal manipulation combined with soft tissue therapy are effective in providing symptom relief or improving activities of daily living. There is conflicting evidence for effectiveness of behavioural therapy. Concludes that little is known about the effectiveness of conservative treatment for RSI (<i>Focus on clinical outcomes rather than RTW</i>). (See also <i>Verhagen et al 2007</i>).</p>
(Kupper et al. 2004) HSE Research Report	<p><b>The challenge of managing upper limb disorders – how can health professionals become more effective?</b></p> <p>Combination of literature review and interview/questionnaire survey. Authors found that there was not enough quality research (e.g. randomised controlled trials and systematic reviews) that studied the effectiveness of treatments and management approaches to enable them to determine what best practice should comprise. Generally physiotherapists and OH nurses were aware of psychosocial issues and favoured keeping the ULD sufferer active and in employment rather than taking sick leave. There was a limited amount of evidence to suggest that this overall approach is favourable. Numerous recommendations were made, with a strong theme of inter-professional communication and communication between healthcare and the workplace: written information and advice for all the players was advocated.</p>
(Marshall et al. 2007) Cochrane	<p><b>Local corticosteroid injection for carpal tunnel syndrome</b></p> <p>Five RCTs used in the review. Local corticosteroid injection for carpal tunnel syndrome provides greater clinical improvement in symptoms one month after injection compared to placebo. Symptom relief beyond one month compared to placebo has not been demonstrated. Local corticosteroid injection provides significantly greater clinical improvement compared to oral steroid up to three months after treatment. Local corticosteroid injection does not provide improved clinical outcome compared to either anti-inflammatory treatment and splinting after eight weeks or Helium –Neon laser treatment after six months.</p>
(Mason et al. 2004) Systematic review	<p><b>Topical NSAIDs for chronic musculoskeletal pain: systematic review and meta-analysis</b></p> <p>The reviewers, adding to an earlier systematic review, identified double-blind RCT's comparing topical NSAID with either placebo or another active treatment, in adults with chronic pain. A total of 25 studies were included in this review. A hierarchy of outcomes was used to extract efficacy information in the following order of preference: (1) number of patients with a 50% or more reduction in pain; (2) patient reported global assessment of treatment; (3) pain on movement; (4) pain on rest or spontaneous pain; and, (5) physician or investigator global assessment of treatment. Fourteen trials (1,502 patients) provided data on efficacy. Topical NSAIDs were significantly better than placebo. The mean placebo response rate was 26% ranging from 7% to 78%. The mean treatment response rate was 48% ranging from 2% to 90%. The number needed to treat (NNT) was 4.6 (95% CI 3.8 to 5.9) for one patient to experience improvement in chronic musculoskeletal pain at two weeks with topical NSAIDs, compared with placebo. These findings were not altered by trial quality, validity and size, outcome reported, or condition treated. It was noted that local adverse events (6%), systemic adverse events (3%), or the numbers withdrawing due to an adverse event were the same for topical NSAID and placebo. The reviewers also observed that 3 trials found no difference when comparing topical and oral NSAIDs. They concluded topical NSAIDs are effective and safe in treating chronic musculoskeletal conditions for two weeks. (<i>Note, no information is provided on pain site or type of musculoskeletal disorder. A text search of the article for terms such as wrist, arm, elbow, hand, shoulder etc reveals these words have not been used at all in the article</i>).</p>

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<b>Authors</b>	<b>Key features</b> ( <i>Reviewers' comments in italic</i> )
(Meijer et al. 2005)  Systematic review	<b>Evaluation of effective return-to-work treatment programs for sick-listed patients with non-specific musculoskeletal complaints: a systematic review</b> Eighteen high quality studies reporting on 22 treatment programmes. Overall, the findings were inconsistent: only 7 programmes resulted in faster return to work, though none had negative findings. What appeared to be essential to the success of treatment programs was knowledge, psychological, physical and work conditioning, possibly supplemented with relaxation exercises. However, most of the high study populations (64%) were limited to low back pain patients – four studies did include patients with a wide variety of musculoskeletal disorders but did not itemize the treatment effects on return to work by sub-population. No studies were found that examined the effect of treatment programs on return to work by itemized region of the musculoskeletal system, such as non-specific upper extremity musculoskeletal complaints.
(Muller et al. 2004)  Systematic review	<b>Effectiveness of hand therapy interventions in primary management of carpal tunnel syndrome: a systematic review</b> The reviewers included studies in English, where the patients had a diagnosis of CTS, and one or more physiotherapeutic interventions (that could be used by physiotherapists/hand therapists/occupational therapists according to their scope of practice) were evaluated. 24 studies were included, and the quality of each study was evaluated (24 criteria, Structured Effectiveness Quality Evaluation Scale). Grades of recommendations were made based on the level of evidence (grade A = consistent level 1 studies, to grade D = level 5 evidence, from inconsistent or inconclusive studies). These recommendations were made for the following interventions (Grades): Splinting (B & C), Ultrasound (B), Nerve Gliding Exercises (B), Addition of Nerve and Tendon Gliding Exercises to Splinting (B & C), Magnetic Therapy (B), Low-level Laser (C), Yoga (B & C), Acupuncture (D), and Combined Therapies (B & C). The reviewers concluded, "current evidence demonstrates a significant benefit (grade B recommendations) from splinting, ultrasound, nerve gliding exercises, carpal bone mobilization, magnetic therapy, and yoga". ( <i>Note, these reviewers have simply repeated the significant finding from each study they included, without attempting to pool information or data, or to explain inconsistencies or equivocal results. This means the 9 studies on splinting have yielded 9 recommendations, such as "Fu I-time splinting improves median nerve conduction more than night splinting alone" and "Fu I-time splinting does not reduce symptom severity or improve function more than night splinting alone". It is not at all clear how recommendations such as these could be translated into best clinical practice guidance.</i> )
(Nash et al. 2004)  Systematic review	<b>Resting injured limbs delays recovery: A systematic review</b> The authors noted that rest is commonly used as primary treatment, rather than just palliation, for injured limbs. They identified 49 eligible RCT's of immobilisation for soft tissue injuries and fractures of both upper and lower limbs (total of 3,366 subjects), in order to seek evidence of benefit or harm from immobilisation or mobilisation of acute limb injury in adults. The outcomes considered by the reviewers included pain, swelling, cost, range of motion, days lost from work, and complications from treatment. The reviewers noted that all the studies concluded there was either no difference between rest and early mobilisation, or there was a benefit from early mobilisation over rest. The reported benefits included: earlier return to work; decreased pain, swelling, and stiffness; and, a greater preserved range of joint motion. Furthermore, early mobilisation caused no increased complications, deformity or residual symptoms. The reviewers concluded there is strong evidence that early mobilisation decreases pain, swelling and stiffness, especially in the short-term, without longer-term cosmetic or radiologic deformity. They also found there is moderate evidence to conclude patients usually (but not always) prefer early mobilisation, and return to work sooner. The final conclusion was that we should not assume any benefit from resting or immobilising acute upper or lower limb injuries in adults, and that therefore rest appears to be an overused treatment. ( <i>Note, only two studies were identified that compared rest and mobilisation for upper limb non-fracture injuries. One non-randomised study compared early mobilisation with immobilisation in flexor tendon repair in Zone II, and found a significant benefit on range of motion from early activation. A RCT compared immobilisation with early mobilisation for posterior luxation of the elbow in adults, and found benefits from early activation with respect to loss of amplitude of elbow movement (particularly extension), stiffness, instability, relapses, pain and ossification. The authors concluded therefore that early mobilisation allows recovery of better quality elbow function without inducing instability or recurrence. However, 21 studies were found for lower limb non-fracture injuries, supporting the overall conclusions of the review.</i> ) ( <i>See also Buckwalter 1995.</i> )



**Table A2. Reviews on interventions and classification**

<b>Authors</b>	<b>Key features</b> ( <i>Reviewers' comments in italic</i> )
(National Research Council 2001) f  Narrative review	<b>Musculoskeletal disorders and the workplace</b> The weight and pattern of the evidence supports the conclusion that primary and secondary prevention interventions to reduce the incidence, severity and consequences of MSDs in the workplace are effective when properly implemented. The most effective strategies involve a combined approach: mediate physical stressors, involve employees, and employer commitment. No specific design, restriction, or practice for universal application is supported by the scientific literature. ( <i>Essentially a 'panel consensus' document, albeit comprehensively reviewing the literature. Focused on evidence for causation and on ergonomics interventions as opposed to 'rehabilitation' or RTW). (Also in Table A1).</i> )
(NHMRC 2004)‡  Clinical guidelines	<b>Management of acute musculoskeletal pain</b> (National Health and Medical research Council) Australian evidence-based clinical guidelines for management of a variety of painful musculoskeletal conditions. Conditions covered comprise: acute low back pain, acute thoracic pain, acute neck pain, acute shoulder pain, acute knee pain. ( <i>Occupational issues and return to work were not the focus of this guidance, but the recommendations regarding activity are of relevance to work</i> ). For neck pain, encouraging the resumption of normal activities and movement of the neck is more effective than a collar and rest. For shoulder pain, although pain may make it difficult to carry out usual activities, it is important to resume normal activities as soon as possible. ( <i>No guidelines produced for other ULDs</i> ).
(Nørregaard et al. 1999)  Narrative review	<b>A narrative review on classification of pain conditions of the upper extremities</b> Local and regional musculoskeletal discomfort and pain in the shoulder girdle or upper extremities are often reported, especially in the working population. Describes the most important problems and factors when classifying musculotendinous pain in the upper extremities and shoulders, including an detailed analysis of four common diagnoses: wrist tenosynovitis, lateral epicondylitis, rotator-cuff tendinitis, myofascial pain syndrome) fulfil basic criteria of validity. It is evident that there are some serious problems regarding the validity of the current classification of the conditions. Clinical criteria are often poorly defined and the reliability insufficiently tested. The relationship to objective pathoanatomic or physiological findings seems inconsistent. The prognosis with and without treatment also seems heterogeneous and can vary between studies. A generally accepted terminology is lacking in the pathogenetically complex regional muscle pain conditions. ( <i>It seems clear that many people with common upper limb symptoms will be misdiagnosed</i> ).
(O'Connor et al. 2003)  Cochrane	<b>Non-surgical treatment (other than steroid injection) for carpal tunnel syndrome</b> Twenty-one trials involving 884 people were included. Current evidence shows significant short-term benefit from oral steroids, splinting, ultrasound, yoga and carpal bone mobilisation. Other non-surgical treatments do not produce significant benefit.
(Pilgian et al. 2000) f  Narrative review	<b>Evaluation and management of chronic work-related musculoskeletal disorders of the distal upper extremity</b> Includes de Quervain's disease, tendonitis, epicondylitis, cubital tunnel syndrome, hand-arm vibration syndrome. Diagnostic criteria are an issue. Dearth of studies evaluating clinical treatment or ergonomic interventions: most treatment recommendations based on consensus. Aim of treatment seen as reduction of pain and disability + restoration of function. Workplace ergonomic modification seen as critical adjunct to medical management: in absence of ergonomist, clinician should take steps. ( <i>Suggests that management options are basically 'healthcare', but role of workplace modification recommended for all the conditions</i> ).
(Pransky et al. 2002) f  Narrative review	<b>Stress and work-related upper extremity disorders: implications for prevention and management</b> Stress and work-related upper limb disorders are linked. Although evidence is incomplete, it is suggestive that individual and workplace interventions (targeted at stress reduction) delivered in primary care or workplace may be helpful. Examples studied included: numerous outcomes including stress, upper limb symptoms, and work outcomes; numerous (combined) interventions including stress reduction techniques, CBT, physical rehabilitation, pain management. Tabulated examples indicated that effects of 'ergonomics-only' interventions were inconsistent. Further research warranted. ( <i>Preliminary evidence that combining ergonomics and stress management/rehabilitation interventions may be effective</i> ).

**Table A2. Reviews on interventions and classification**

<b>Authors</b>	<b>Key features</b> ( <i>Reviewers' comments in italic</i> )
(Proper et al. 2003) ‡  Systematic review	<b>Worksite physical activity programs and physical activity, fitness and health</b> Fifteen randomised trials and 11 non-randomised trials of high quality. Strong evidence was found for positive effect of a worksite physical activity program on physical activity and musculoskeletal disorders ( <i>as elsewhere, MSDs are generically considered as a group</i> ). Limited evidence was found for a positive effect on fatigue. For physical fitness, general health, blood serum lipids, and blood pressure, inconclusive evidence or no evidence was found for a positive effect. To increase the level of physical activity and to reduce the risk of musculoskeletal disorders, the implementation of worksite physical activity programs is supported. ( <i>The conclusion that activity programmes can reduce the risk of MSDs was based on three RCTs, but inspection of these source studies confirmed they all used self-report of symptoms as outcome data. None collected incidence, or claim data. The relevance of self-reported pain ratings to MSDs, or the likelihood that a person will complain of symptoms, is not clear. Note also they excluded two studies of only slightly lower quality that found no effect. The reviewers themselves noted that other systematic reviews have tended to conclude the associations between physical activity and fitness and problems such as low back pain are unclear. Hence, this review suggests, at most, that worksite physical activity programmes may reduce the likelihood that participants will experience symptoms of musculoskeletal pain, such as back pain</i> ).
(Scholten et al. 2004)  Cochrane	<b>Surgical treatment options for carpal tunnel syndrome</b> Carpal tunnel syndrome is a common disorder, for which several surgical treatment options are available. This review included 23 studies, with fair to good methodological quality. The reviewers concluded there is no strong evidence supporting the need for replacement of standard open carpal tunnel release by existing alternative surgical procedures (such as endoscopic) for the treatment of carpal tunnel syndrome.
(Selander et al. 2002) †  Quasi-systematic review	<b>Return to work following vocational rehabilitation for neck, back and shoulder problems: risk factors reviewed</b> Musculoskeletal problems were defined as neck, back and shoulder problems. Multidisciplinary treatment more effective than single-mode treatment. Education may be more effective than work training. Inconsistent evidence for value of early vocational rehabilitation. Involvement of client/patient in vocational rehabilitation seen as important. A vocational rehabilitation counsellor to guide client through system may be helpful, but depends on competences. ( <i>As elsewhere MSDs are generically considered as a group. Focus of the review was largely on 'obstacles': no programme details given in discussion of 'effective' rehabilitation</i> ).
(Smidt et al. 2005)  Systematic review	<b>Effectiveness of exercise therapy: a best-evidence summary of systematic reviews</b> The goal of this review was to summarise the available evidence on the effectiveness of exercise therapy for patients with disorders of the musculoskeletal, nervous, respiratory, and cardiovascular systems. Reviews were selected by two reviewers that included at least one RCT investigating the effectiveness of exercise therapy, used clinically relevant outcome measures, and were written in English, German or Dutch. Then 13 independent and blinded reviewers were asked to participate in review selection, quality assessment, and data extraction. The authors reported that 104 systematic reviews were selected, of which 45 were considered to be "reasonable or good quality". The reviewers concluded that exercise therapy is effective for patients with knee osteoarthritis, sub-acute (6 to 12 weeks) and chronic ( $\geq 12$ weeks) low back pain, cystic fibrosis, chronic obstructive pulmonary disease, and intermittent claudication. Furthermore, there are indications that exercise therapy is effective for patients with ankylosing spondylitis, hip osteoarthritis, Parkinson's disease, and for patients who have suffered a stroke. However, they found there is currently insufficient evidence to support or refute the effectiveness of exercise therapy for patients with neck pain, shoulder pain, repetitive strain injury, rheumatoid arthritis, asthma, and bronchiectasis. They also concluded that exercise therapy is not effective for patients with acute low back pain.
(Struijs et al. 2002)  Cochrane	<b>Orthotic devices for the treatment of tennis elbow</b> Five small RCTs were included in the review, but the authors concluded no definitive conclusions could be drawn concerning effectiveness of orthotic devices (eg forearm straps) for lateral epicondylitis. (See also Borkholder et al 2004)

**Table A2. Reviews on interventions and classification**

<b>Authors</b>	<b>Key features</b> ( <i>Reviewers' comments in italic</i> )
(Thien et al. 2004) Cochrane	<b>Rehabilitation after surgery for flexor tendon injuries in the hand</b> Post-operative rehabilitation of the flexor tendons in the hand consists of a short period of immobilisation while pain and swelling diminish, followed by progressive mobilisation to maximize the range of motion of the affected fingers. By altering the time of immobilisation and the manner of subsequent mobilisation different rehabilitation regimes are created. This review aimed to determine the optimal rehabilitation strategy, but found insufficient evidence from RCTs to define it.
(Trinh et al. 2004) Systematic review	<b>Acupuncture for the alleviation of lateral epicondyle pain: a systematic review</b> Authors stated from their experience in this area, that they felt the Cochrane review by Green et al (2001). on lateral epicondyle pain was heterogeneous, in which case meta-analysis might not be the most appropriate method of synthesizing the evidence. Since that review, 4 new trials have been identified. Systematic review of 6 randomised and quasi-randomised controlled trials; all rated high quality. All the studies suggested that acupuncture was effective in the short-term relief of lateral epicondyle pain. Due to heterogeneity, a best evidence synthesis approach was used. Five of six studies indicated that acupuncture treatment was more effective compared to a control treatment. Noted an absence of a consistent definition of lateral epicondyle pain in the literature. ( <i>See also Green et al 2001</i> ).
(Trudel et al. 2004) Systematic review	<b>Rehabilitation for patients with lateral epicondylitis: a systematic review</b> 31 studies were included in this review. Each was assessed for methodological quality, and levels of evidence. The reviewers concluded there is evidence that nearly all the interventions they considered (namely ultrasound, acupuncture, Rebox (Rehabilitation Box, is an electrotherapeutic device, similar but different to a TENS unit), exercise, mobilization and manipulations, and ionisation with diclofenac) show positive effects in the reduction of pain and in the improvement of function for those with lateral epicondylitis. They added there is also evidence to show that pulsed electromagnetic fields, and laser are ineffective in the management of this condition.
(Van Eerd et al. 2003) Systematic review	<b>Classification systems for upper-limb musculoskeletal disorders in workers: a review of the literature</b> The reviewers' goal was to provide a review of the available classification systems and to describe their similarities and differences. 27 classification systems were found that described disorders of the muscle, tendon, or nerve that may be caused or aggravated by work, and these were included in the review. The authors focused on comparing three aspects of the classification systems: the diagnostic labels applied, the disorders identified, and the criteria described for the disorders. The authors found 88 distinct labels for disorders, ranging from neck to fingers and encompassed muscle, tendon, joint, and nerve (neurologic) injuries. The types of disorders also ranged from those with specific diagnoses (e.g., triceps tendinitis) to less well defined entities (e.g., nonspecific diffuse forearm pain or nonspecific discomfort). Relabelling disorders reduced the number from 88 to 44 cluster labels (e.g., rotator cuff tendinitis and supraspinatus tendinitis were clustered under the label "rotator cuff tendinitis"). In attempting to compare disorders across classification systems the reviewers noted the systems ranged from describing a single disorder, through to 22 disorders. The maximum number of disorders in common between systems was 15 of 44 possible disorders. It was observed that although a number of systems may describe the same disorders, they may not all use the same criteria to define them. The reviewers concluded overall that there is little agreement across the systems.
(Verdugo et al. 2003) Cochrane	<b>Surgical versus non-surgical treatment for carpal tunnel syndrome</b> Surgical treatment is widely preferred for carpal tunnel syndrome to non-surgical or conservative therapies for people who have overt symptoms, while mild cases are usually not treated. This review aimed to compare the efficacy of surgical treatment of carpal tunnel syndrome with non-surgical treatment. Only 2 RCTs were included, with 198 subjects in total. The reviewers concluded that surgical treatment of carpal tunnel syndrome relieves symptoms significantly better than splinting, but noted that further research is needed to discover whether this conclusion applies to people with mild symptoms.
(Verhagen et al. 2007)	<b>Exercise proves effective in a systematic review of work-related complaints of the arm, neck, or shoulder</b> The Netherlands has achieved consensus about the term "complaints of the arm, neck, and/or shoulder" (CANS), which can be either work-related or not work-related. Work-related CANS can be divided into specific conditions such as carpal tunnel syndrome, which has relatively clear diagnostic criteria and



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<b>Authors</b>	<b>Key features</b> ( <i>Reviewers' comments in italic</i> )
Systematic review	<p>pathology, or nonspecific conditions such as tension neck syndrome, which is primarily defined by the location of complaints and whose pathophysiology is less clearly defined or relatively unknown. Systematic review of articles published up to March 2005: 26 randomised studies of frequently performed interventions in work-related upper extremity musculoskeletal disorders. Findings:</p> <p><u>Exercises</u>: There is limited evidence that exercises are more effective compared to massage. There is conflicting evidence concerning the efficacy of exercises over treatment or as add-on treatment, and no differences between various kinds of exercises can be found yet.</p> <p><u>Behavioural therapy</u> (<i>the term used by the authors, but actually refers mostly to relaxation therapy</i>): There is conflicting evidence about the effectiveness of behavioural therapy when compared to no treatment or waiting list controls.</p> <p><u>Ergonomics</u>: There is conflicting evidence concerning the effectiveness of ergonomic programs over no treatment, although there is limited evidence that breaks during computer work are effective. There is limited evidence for the effectiveness of some keyboards in people with carpal tunnel syndrome compared to placebo but conflicting compared to other keyboards.</p> <p><u>Group therapy vs individual therapy</u>: There is conflicting evidence concerning the effectiveness of individual vs. group therapy.</p> <p><u>Massage</u>: There is limited evidence for the effectiveness of massage as add-on treatment to manual therapy.</p> <p><u>Manual therapy</u>: There is limited evidence for the effectiveness of manual therapy as add-on treatment to exercises.</p> <p><u>Energized splint</u>: There is one low-quality study comparing an "energized splint" with placebo, but no data are available</p> <p>Because of heterogeneity (of the interventions, the quality of studies and the definitions of work-relatedness), drawing firm conclusions about the efficacy of treatment becomes difficult. Nevertheless, the review contributed to the body of knowledge of nonspecific work-related disorders. Although including more studies than Konijnenberg et al (2001), the main conclusions in both reviews that no strong evidence was found for the effectiveness of conservative treatments still remains. In conclusion, this review shows limited evidence for the efficacy of specific keyboards with an alternative force displacement or geometry only for patients with carpal tunnel syndrome. There is limited evidence for the efficacy of exercises when compared to massage, adding breaks during computer work, massage as add-on treatment to manual therapy, and manual therapy as add-on treatment to exercises in patients with nonspecific work-related complaints. Furthermore, the review clearly shows a need for defining what can be considered a "work-related disorder". (<i>See also Konijnenberg et al 2001</i>).</p>
(Verhagen et al. 2006) Cochrane	<p><b>Ergonomic and physiotherapeutic interventions for treating work-related complaints of the arm, neck or shoulder in adults</b></p> <p>Conservative interventions such as physiotherapy and ergonomic adjustments (such as keyboard adjustments or ergonomic advice) are frequently offered as treatments for most work-related complaints of the arm, neck or shoulder. This review aimed to determine their effectiveness. 21 studies (mostly with low methodological quality) were included, evaluating 25 interventions. The authors concluded there is limited evidence for the effectiveness of keyboards with an alternative force-displacement of the keys or an alternative geometry, and limited evidence for the effectiveness of exercises compared to massage; breaks during computer work compared to no breaks; massage as an add-on treatment to manual therapy; and manual therapy as an add-on treatment to exercises. (<i>See also Boocock et al 2007; Williams et al 2004</i>).</p>
(Walker-Bone et al. 2003a) Narrative review	<p><b>Criteria for assessing pain and nonarticular soft-tissue rheumatic disorders of the neck and upper limb</b></p> <p>The aim of this article was to undertake a systematic review of the literature on diagnostic criteria for soft-tissue rheumatic disorders of the neck and upper limb to describe the criteria used and the evidence underpinning them. Altogether, the search identified 117 relevant research articles, among which 69 included a physical examination component, but few specified diagnostic criteria. Evidence supported respectable levels of between observer repeatability regarding: symptom questionnaires; measurement of shoulder range of motion with a goniometer; tests for carpal tunnel syndrome; and demonstration of neck tenderness. The Katz hand diagram, and combinations of physical signs of carpal tunnel syndrome, show reasonable sensitivity and specificity for that diagnosis but only among patients referred to specialists with that putative diagnosis; no such validity has been shown among the general population. Only 1 diagnostic examination schedule has published data on both the reliability and the validity of its criteria and diagnoses. For the remaining soft-tissue upper-limb disorders, diagnostic criteria rely apparently on face and content validity and reliability data have not been published. At present, the diagnosis of most of these conditions relies heavily on the clinical opinions of investigators and there are insufficient data to indicate that these criteria are repeatable,</p>

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	sensitive, or specific. As a result of the choice and use of different case definitions and diagnostic criteria, epidemiologic research enquiries have necessarily produced varying estimates of occurrence and risk associated with exposures. So far as nonspecific arm pain is concerned, terms such as RSI and CTD seem unsatisfactory because they may be misnomers, and because loose use of these terms has impeded proper communication about the range of diagnostic entities being studied or reported.
(Williams et al. 2004)  Systematic review	<b>Effectiveness of workplace rehabilitation interventions in the treatment of work-related upper extremity disorders: a systematic review</b> Methodological considerations reduced 53 initially selected papers to 8 for analysis. The findings indicate there is insufficient evidence to identify effective workplace rehabilitation interventions for work-related upper extremity disorders. Although the evidence may be poor, it tends to favour a positive impact for several workplace interventions such as ergonomic modifications in keyboard designs ( <i>see also Boocock et al 2007; Verhagen et al 2006</i> ), rest and exercise breaks, nurse case managers' training on accommodations ( <i>see also Hanson et al 2006</i> ), and exercise programmes.

[CANS = complaints of the arm, neck, and/or shoulder; CBT = cognitive behavioural therapy; CTS = carpal tunnel syndrome; CTD cumulative trauma disorder; ESWT = extracorporeal shock wave therapy; MSD = musculoskeletal disorder; NSAID = nonsteroidal anti-inflammatory drug; RCT = randomised controlled trial; RSI = repetitive strain injury; RTW = return to work; ULD = upper limb disorder]

[J = data extraction (adapted) from Waddell & Burton 2004. † = data extraction (adapted) from Waddell & Burton 2006]

**Table A3. Conceptual reviews, texts, and guidance**

<b>Table A3. Conceptual reviews, texts, and guidance</b>	
<b>Authors</b>	<b>Key features</b> ( <i>Reviewers' comments in italic</i> )
(Buckle & Devereux 1999)  Narrative review	<p><b>Work-related neck and upper limb musculoskeletal disorders</b></p> <p>A scientific research information project launched by the European Agency for Safety and Health at Work examined the evidence on the work-relatedness of ULDs. Diagnostic difficulties recognised. Understanding of pathogenesis varies greatly with regard to the specific disorders (<i>with difficulties in establishing agreed pathogenesis of symptoms, the word 'disorder' may not be entirely appropriate for many of symptomatic states</i>). It was felt that scientific reports, using defined criteria for causality, established a strong positive relationship between the occurrence of some work-related ULDs and the performance of work, especially where workers were highly exposed to workplace risk factors. Consistently reported risk factors requiring consideration in the workplace are postural (notably relating to the shoulder and wrist), force applications at the hand, hand-arm exposure to vibration, direct mechanical pressure on body tissues, effects of cold work environment, work organisation and worker perceptions of the work organisation (psychosocial work factors). There is debate about the issue of repetitiveness; repetitiveness within work is linked to the concept of work/recovery. When a worker is not actively engaged in the task under investigation, it is frequently assumed that recovery time is being provided. However, this may not be the case if that worker moves from the task to another with similar postural or force demands. Repetitive continuous work was considered to be work involving rapid hand movements which were almost continuous and involved rapid steady motion. It is mentioned that there is some research evidence suggesting that when daily exposure time exceeds four hours, the rates of ULD complaints increase in the shoulder/neck, particularly for seated tasks such as VDU operation. However, it was considered that further debate on this issue is required. There is some consensus that fatigue is a potential precursor for some ULDs. Notes growing belief that the social dimension to ULDs may require additional strategies for prevention. (<i>Ergonomic focus on physical work-related risks and scope for prevention rather than biopsychosocial issues</i>).</p>
(Clauw & Williams 2002)  Conceptual review	<p><b>Relationship between stress and pain in work-related upper extremity disorders: the hidden role of chronic multisymptom illnesses</b></p> <p>This article critically reviews the case definitions of the new class of stress-mediated illness or chronic multi-symptom illness (CMI) and evaluates the existing evidence supporting centrally mediated physiological changes (e.g., sensory hypervigilance, dysautonomia) that manifest as symptoms of pain and fatigue in some individuals experiencing chronic stressors. While explanations for prolonged pain and fatigue have historically focused on mechanisms involving peripheral pathology or psychiatric explanations, ample evidences support the role of altered Central Nervous System function in accounting for symptom manifestation in CMI. Symptom expression (e.g., pain and fatigue) from central dysregulation would be expected to occur in a subset of individuals in the population, including a subset of individuals with work-related upper extremity disorders. Thus when symptoms such as pain and fatigue persist beyond a reasonable period, consideration of CMI and associated assessment and interventions focused on central mechanisms may be worthwhile. There has been little work examining whether workrelated injuries might represent a localized or regional form of CMI. But there are many reasons that this would be plausible. First, there are a large number of other regional or localized pain syndromes that have been established as being related to CMI, including irritable bowel syndrome, temporomandibular joint syndrome, and chronic low back pain. Just as with other CMI, the severity of the initial injury (stressor) in the workplace seems to be less important in predicting chronicity than the environment in which the injury occurs. Finally, peripheral factors (e.g., tissue damage or biomechanical factors) do not typically explain the chronic symptoms that occur in workplace injuries, but neither do purely psychological factors. The primary reason to determine whether a CMI may be present is that these conditions involve prominent central rather than peripheral mechanisms, and thus both the pharmacologic (e.g., low doses of tricyclic compounds instead of nonsteroidal antiinflammatory drugs) and non-pharmacologic (e.g., aerobic exercise and cognitive behavioural therapy) approaches would be quite different. (<i>CMI seems to be an alternative term for what have been described elsewhere as common health problems (Waddell &amp; Burton 2004) or subjective health complaints (Eriksen &amp; Ihlebaek 2002), and thus are best viewed from a biopsychosocial perspective</i>).</p>

**Table A3. Conceptual reviews, texts, and guidance**

<b>Authors</b>	<b>Key features</b> ( <i>Reviewers' comments in italic</i> )
(Coggon et al. 2007)  Position statement	<p><b>Occupation and upper limb disorders</b>  <i>(This editorial is included here as a carefully reasoned and referenced presentation of various issues and (at that time) unresolved questions surrounding the work-relatedness of ULDs). In epidemiological terms, when relative risks are small (&lt;3, which is typically found for physical risk factors associated with ULDs – see Walker-Bone &amp; Cooper 2005 – Table A1) there is doubt about the true relationship. Development of upper limb symptoms and disability is complex and depends on psychosocial and cultural influences as well as physical factors: it is notable that the problem of ULDs has come to prominence when physical demands of work have generally declined. If psychosocial influences are especially important, it is possible that placing a strong focus on ergonomics might create a culture in which workers believe they are at high risk, and this perception itself generates disease. Advice to rest is frequently given, but it is unclear whether restricting activity is the best approach: a strong emphasis on reducing activity in patients with non-specific ULDs may reinforce perceptions of injury and encourage long-term disability (as found with back pain). Further research needs to focus on resolving the major uncertainties in relation to prevention and management, which requires a satisfactory diagnostic classification that can be applied in longitudinal studies.</i></p>
(Dembe 1996)  Conceptual textbook	<p><b>Occupation and disease: how social factors affect the conception of work-related disorders</b>  <i>Examines the ways in which what are termed 'Key Social Factors' have influenced the recognition of cumulative trauma disorders, back pain and noise-induced hearing loss as work-related conditions. Each social factor's apparent impact in shaping the medical conception of the occupational nature of each of the three disorders was assessed on the basis of an interpretation of the entire case history, taking into account such considerations as the timing and magnitude of increases in medical reporting of the disorder subsequent to the social development, the apparent strength of association between the social factor and reports of the disorder, and physicians' own statements and writings concerning their understanding of the relationship between their characterization of the disorder as occupational and the particular social factor. Based upon such considerations, each social factor was ranked according to whether it appeared to have a high, moderate, low or no impact for each type of disorder. Wide variations in the suggested impact of each social factor on the three types of disorder. For cumulative trauma disorders: 'Cultural Stereotyping' is suggested to have had a HIGH impact; 'New Technologies', 'Financial Compensation', 'Economic Instability', 'Media Attention' and 'Political Action' are suggested to have had a MODERATE impact; 'Medical Specialisation', 'Marketing Efforts', 'Military Conflicts' and 'Economic Costs' are suggested to have had a LOW impact; and 'Environmental Concerns' are suggested to have had a NO apparent impact. <i>(This study clearly reflects a subjective, North American perspective and, given the 'evidence' advanced, the validity of the rankings of the impact of some of the social factors that are suggested to have shaped physicians' recognition and conception of occupational disorders is open to question. Nevertheless, a rare and thought-provoking attempt at examining possible 'social' aspects of the ill-defined concept of 'psychosocial factors' that cites a substantial literature).</i></i></p>
(Derebery et al. 2006)  Collection of narrative reviews	<p><i>(A series of commissioned articles in an issue of Clinics in Occupational and Environmental Medicine devoted to occupational injuries and diseases of the upper extremity, only the most pertinent of which are extracted below)</i>  <u>Prevention of delayed recovery and disability of work-related upper extremity disorders</u> (Derebery &amp; Tullis 2006) argues that when a worker experiences delayed recovery and unexpected disability, significant contributing psychosocial factors must be assessed for and managed appropriately. A maladaptive belief or understanding about the condition and disability by a patient presents an obstacle to successful treatment. Using cognitive behavioral therapy techniques may be an effective means of managing this challenge for the clinician.  <u>Ergonomic considerations in work-related upper extremity disorders</u> (Pearce 2006) argues that an ergonomics approach, correctly applied, can reduce the likelihood of work-induced disorders and can assist in accommodating those with work-related disorders, but that it cannot eliminate disorders which have been (mistakenly) attributed to work by social processes. A 'contextual' model of work-related upper limb disorders is proposed which explicitly acknowledges that factors extrinsic to work can shape perceptions of upper extremity disorders and influence the process of somatic interpretation and the health outcomes.  <u>Epidemiology of work-related upper extremity disorders: understanding prevalence and outcomes to impact provider performances using a practice management reporting tool</u> (Giang 2006) provides data on the prevalence and pattern of 187,030 work-related upper extremity disorders and their outcomes and costs.</p>

**Table A3. Conceptual reviews, texts, and guidance**

<b>Authors</b>	<b>Key features</b> ( <i>Reviewers' comments in italic</i> )
	<p><u>Tendinitis and tendinosis of the elbow, wrist, and hands</u> (Wainstein &amp; Nailor 2006) suggest that tension overload and shear stress are the two mechanisms most likely responsible for most upper extremity tendinopathies. Clinical presentation includes localized pain and tenderness. Most treatment options have yet to undergo evaluation for efficacy in well-designed clinical trials, yet there is a generally favourable response to nonoperative or conservative management. Cases resistant to conservative treatment may require surgical intervention.</p> <p><u>Compression neuropathies of the upper extremity</u> (Corwin 2006) discusses the anatomy, neurophysiology, and electrodiagnosis of nerve compression. Common and uncommon compression and entrapment syndromes of the upper extremity are described. Errors in diagnosis occur when the neurologic or electrodiagnostic examinations are incomplete or inaccurate.</p> <p><u>Work-related carpal tunnel syndrome: the facts and the myths</u> (Derebery 2006) argues that the concept of work-related carpal tunnel syndrome has grown to such proportion (in the US) as to be problematic for society, having spawned health care industries to support a cultural concept and a largely mythical medical paradigm. Because of these social and economic forces, cultural perceptions and expectations have adjusted to this flawed medical model. Success in improving patient management and making the best use of sound medical evidence depends on the concurrent use of educational strategies addressing social influences and attitudinal changes of physicians, patients, and third-party administrators.</p> <p><u>Rheumatic diseases that can be confused with work-related upper extremity disorders</u> (June 2006) suggests that rheumatic illnesses are a common cause for musculoskeletal complaints in the general population and can affect all ages including people in the prime of their working years. Secondary problems, such as entrapment neuropathies, enthesopathies, and Raynaud's syndrome, can be associated with various inflammatory arthritides. A detailed history and physical are the most important tools in screening for potential inflammatory disease in workers with upper extremity complaints.</p> <p><u>Complex regional pain syndrome type I in the upper extremity</u> (Doro et al. 2006) focuses on CRPS type 1 as it pertains to the upper extremity. In general, patients who have complex regional pain syndrome suffer from pain, sensory changes, oedema, sweating, and temperature disturbance in the afflicted extremity. Chronic changes can involve the skin, nails, and bone. The pathophysiology of this condition remains unclear and is probably multifactorial, involving persistent inflammation, the sympathetic nervous system, the central nervous system and external stimuli. Treatment should be based on a multidisciplinary experienced team approach that is focused on functional restoration.</p> <p><u>Fibromyalgia and myofascial pain syndromes and the workers' compensation environment: an update</u> (Hayden et al. 2006) suggests controversy exists as to whether fibromyalgia and myofascial pain syndromes represent a specific pathology or are merely terms to describe clinical conditions that provide patients with the reassurance that their symptoms are real and help clinicians with therapeutic direction. In the occupational health setting, this uncertainty can lead to significant difficulty in determining short- and long-term disability and assigning culpability to an individual's work environment.</p> <p><u>Occupational and physical therapy for work-related upper extremity disorders: how we can influence outcomes</u> (Driver 2006) argues that physical and occupational therapy plays a crucial role in the management of upper extremity disorders. Skilled therapy intervention requires that a therapist be able to identify and treat an injured worker in a holistic manner by looking at the whole individual, including issues that involve mechanical dysfunctions, psychosocial issues that include job satisfaction, and other age-related organic comorbidities. Therapists who work with injured employees must be highly skilled in identifying behavioural and organic disorders and must be confident in communicating these findings to various members of the health care team to help facilitate further medical testing.</p>
(Devereux 2003) f  Conceptual review	<p><b>Work-related stress as a risk factor for WMSDs: implications for ergonomics interventions</b></p> <p>Epidemiological and psycho-physiological evidence implicating work-related mental stress and development of work-related musculoskeletal disorders. Ergonomic interventions in the workplace are needed to reduce the risks of physical and psychosocial work risk factors for musculoskeletal disorders via organisation design changes. Individual susceptibility should be an increasing concern for ergonomists. (<i>As elsewhere MSDs are generically considered as a group. Focus was on ergonomic primary intervention, but concept of targeting organisational (stress) factors and individual susceptibility may have implications for rehabilitation</i>).</p>

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(European Agency for Safety and Health at Work 2007) Factsheet	<p><b>Work-related neck and upper limb disorders</b></p> <p>Many workers, in a wide range of jobs, develop WRULDs and they are the most common form of occupational disease in Europe, accounting for over 45 % of all occupational diseases. Although some work-related upper limb disorders (WRULD) result from the acute application of extreme force, most are caused by the effects of many repeated, apparently moderate applications of force, sustained over an extended period. These can result in muscle fatigue and microscopic injuries in the soft tissues of the neck and upper limbs, and WRULDs.</p> <p>Activities increasing the risk of developing WRULDs:</p> <p>In the <i>neck and shoulders</i>:</p> <ul style="list-style-type: none"> <li>■ working in positions where the weight of parts of the body has to be supported, or objects held, such as working with elevated arms;</li> <li>■ prolonged work in static postures, involving the continuous contraction of the same muscle groups, e.g. working with microscope;</li> <li>■ repeated lifting of the arms or turning the head to the side.</li> </ul> <p>In the <i>elbow, wrist and hands</i>:</p> <ul style="list-style-type: none"> <li>■ use of great muscular force to handle objects, e.g. grasping with a large grip or pinch grip;</li> <li>■ working with the wrists in deviated postures, e.g. turned inwards or outwards;</li> <li>■ repeating the same wrist movements.</li> </ul> <p>Further risk factors for WRULDs include the following: Work environment; Individual factors; Organisational and psychological factors. All of these factors may act separately, but the risk is greater if several risk factors work together.</p> <p><i>The Agency's stance is focused on the risks of work and the prevention of harm through the risk assessment-control approach, which owes more to concepts of 'safety' that do not fully accommodate work-relevant aspects of 'health'. However, in the previous factsheet (FACTS 71) the potential value of work seems to be acknowledged:</i></p> <p>Keeping workers with MSds at work should be an integral part of workplace MSD policy. A special emphasis should be placed on multidisciplinary approaches, which combine prevention and rehabilitation. Particularlaly important is the role of social and organisational support in enabling workers with MSDs both to return to work and to stay in work.</p>
(Feuerstein et al. 2004) Conceptual review	<p><b>From confounders to suspected risk factors: psychosocial factors and work-related upper extremity disorders</b></p> <p>Argued that the search for identifying bio-behavioural mechanisms underlying psychosocial variables contribution to work-related upper extremity disorders has been hindered by broad scope of the psychosocial domain, with too many variables. Suggested that 'workstyle' may be a plausible and measurable factor, defined as how a worker performs tasks in response to increasing work demands. It is considered to be an enduring set of learned and reinforced strategies for completing, responding to, or coping with increased job demands, and is not considered to be a personality factor. They outlined a workstyle model that proposes this factor is predictive of upper extremity symptoms. A subsequent publication (Feuerstein et al. 2005) described the development of a 136-item scale to measure workstyle. <i>(The model outlined fails to differentiate between factors that might predict onset of symptoms, the report of symptoms, and the development of disability and work loss. The utility of the model remains open to empirical testing, but it may generate useful hypotheses)</i></p>
(Feuerstein & Harrington 2006) Conference consensus	<p><b>Secondary prevention of work-related upper extremity disorders: recommendations from the Annapolis conference</b></p> <p>Narrative summary of recommendations from a 2005 conference aimed at preventing disability due to work-related ULD's. Consensus conclusions included the following: (1) new conceptual models are required with a broad biobehavioural perspective (2) the workplace is dynamic with continuously changing characteristics of fluctuating demands, tasks, work areas, and postures (3) effective interventions seem to need an interdisciplinary approach (4) the ergonomics field needs to expand in order to adapt to the changing workplace (5) non-occupational health practitioners are neither prepared nor knowledgeable about ergonomics and other risk factors in the workplace (6) programmes with both management and worker participation are likely to be best (7) insurance systems fail to account for all relevant costs appropriate to an injury, and this prevents focus on secondary prevention. <i>(Supports concepts of work-related upper extremity disorder as a biopsychosocial phenomenon, and disability prevention requires all players onside).</i></p>



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(Franche & Krause 2002)  Conceptual review	<p><b>Readiness for return to work following injury or illness: conceptualizing the interpersonal impact of health care, workplace, and insurance factors</b></p> <p>These authors defined RTW as a behaviour that is influenced by a variety of physical, social, psychological, and economic factors. They argue there are two prevailing models of work disability: the Readiness for Change Model that originated from the health promotion field, and addresses motivation for changing behaviour; and, the Phase Model of Disability developed for epidemiological study of work disability that addresses the developmental and temporal aspects of disability. Both models allow for a timing of interventions in the RTW process, the first based on the motivational state of the employee and the second on duration of work disability. There is evidence for the phase-specificity of predictors of work disability after occupational injury or illness, with specific predictors of disability during the acute, subacute, and chronic phases of disability. They propose a Readiness for Return-to-Work Model that places the injured/ill employee as the primary agent of change, as he/she interacts with various parties in the RTW process. It does not comment on the interpersonal impact of the employee on the employer, health care provider, and insurer, but focuses solely on the unidirectional impact of these parties on the employee. They argue that both the Readiness for Return-to-Work Model and the Phase Model of Disability should be used in combination when designing intervention and risk factor studies. They believe that the former will allow research to identify motivation for and behaviour of RTW, and the latter to identify functional ability and pain severity, which are clearly related to time elapsed since time of onset, as well as RTW outcomes. <i>(The potential benefit from the proposed conceptualization could be more focused research designs that allow identification of specific contributing/risk factors as well as the components of successful intervention that might contribute to specific outcomes, such as RTW without symptom modification).</i></p>
(Hadler 2005)  Conceptual textbook	<p><b>Occupational musculoskeletal disorders</b></p> <p>Lays out evidence-based argument for a model of the experience of MSDs (including ULD):- a 'well person' who experiences ULD is faced with a predicament that requires numerous influences to be processed (intensity of symptoms and incapacity, beliefs and attitudes (self and others, including constructions of treatment providers). The outcomes (options) of the processing are: [a] persist as a person and deal with the experience; [2] choose to be a patient with an illness, [3] choose to be a claimant with an illness. The choice process is driven largely by psychosocial influences, reflecting coping ability. The preferred term is regional musculoskeletal disorders (which reflects the subjective experience and does not presuppose a specific cause or pathology), and they should be characterised as an illness not an injury. Everyone experiences regional musculoskeletal pain (repeatedly); most episodes pass and are forgotten; some episodes may be disruptive and challenge coping – physicians need to understand that seldom is "My arm is hurting" the chief complaint: rather, it is a case of "My arm is hurting, but the reason I'm here is because I can't cope with this episode myself". Diagnostic uncertainty prevails; labels suggestive of cause/pathology are harmful; undue medicalization is unhelpful (especially surgery) – management of ULDs should be targeted at helping people cope, and avoid the contest of blame. Most arm pain is a predicament of life – work is rarely the cause, but the symptoms may be more relevant because of some aspect of work. Work should be comfortable when we feel well and accommodating when we do not. <i>(A partisan stance that will appeal to many and offend others – however, a powerful, skilfully argued case promoting a biopsychosocial approach that references a substantial literature).</i></p>
(Helliwell 1999)  Narrative review	<p><b>The elbow, forearm, wrist and hand</b></p> <p>Pain in the forearm is relatively common in the community: non-specific forearm pain is more frequent (9–20%) than specific soft-tissue syndromes, although carpal tunnel syndrome has a prevalence of 9%. Absence of agreed criteria hinders attempts to compare the results of different studies. Both specific and nonspecific disorders probably occur more often in work involving frequent repetition, high forces, and prolonged abnormal postures. Nevertheless, other factors are involved in the presentation and continuation of the pain. Notable among these factors is the workplace environment: the attitude to workers and their welfare, the physical conditions and the design of the job. Management of regional musculoskeletal pain using the medical model of illness may be inappropriate; rather it should be multidisciplinary, taking a wider look at the problem, although there is some evidence that primary prevention, with active surveillance using sensitive criteria and early intervention, is effective. Treating the pain while ignoring the associated fear, distress, anxiety, and depression may not resolve the problem. Physical treatments have not been extensively evaluated except for local steroid injections, which have a modest beneficial effect. Cognitive behavioural therapy has benefit in the mid term, but is costly.</p>

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(HSE 2002)  Workplace guidance	<p><b>Upper limb disorders in the workplace</b> (Health &amp; Safety Executive)</p> <p>Guidance for employers in the UK on the prevention and management of work-related upper limb disorders (WRULD). Suggests that following the guidance will normally be doing enough to comply with the law (<i>but makes no explicit reference to legal precedents that appear to be inconsistent with the guidance</i>). Acknowledges that not all upper limb disorders (ULD) are work-related but suggests that experience has shown that ULDs are often directly linked to workplace activities, or if due to a non-work cause, often made worse by work. Suggests psychosocial and physical risk factors are of equal importance, but simplistically summarises (in an appendix) evidence (<i>mostly derived from NIOSH (1997) see table A1</i>) of association with occupational activity for: bursitis/cellulitis; carpal tunnel syndrome; cramp of the hand; cubital tunnel syndrome; De Quervain's disease; Dupuytren's contracture; epicondylitis; ganglion; osteoarthritis; rotator cuff tendinitis-bicipital tendinitis; shoulder capsulitis; stenosing tenosynovitis; tenosynovitis; and vibration white finger. Also comments on non-specific pain syndromes. Advocates a seven-stage framework for the management of ULD risks: understand the issues and commit to action; create the right organisational environment; assess the risks of ULDs in your workplace; reduce the risks of ULDs; educate and inform your workforce; manage any episodes of ULDs; and carry out regular checks on programme effectiveness. Section on managing episodes of ULDs comments on continuing to work with symptoms and suggests it is often possible to return to work before symptoms have resolved and that in some cases this may be advantageous, but acknowledges that this depends on medical advice and the nature of the underlying condition.</p>
(HSL (Lee & Higgins) 2006)  Workshop report	<p><b>Musculoskeletal disorder and RTW workshop</b> (Health and Safety Laboratory)</p> <p><i>(Workshop divided into low back pain and upper limb disorders + literature review with focus on modified work: just upper limb disorders data extracted here)</i>. Modified work not always needed - many people with MSDs self-manage, don't seek healthcare, and either don't take time off work or soon return to their usual work. For others, work modifications (transitional work arrangements) may enable return more quickly.</p> <p>Specific diagnosis in ULDs probably not critical to fitness for work activities unless inflammatory. It seems likely that advice to 'stay active' should apply to the majority of people: consensus that messages in 'The Back Book' should also be used for people with ULDs (similar booklet needed for ULDs following more work on evidence base). General recognition of problem of health professionals inappropriately prescribing rest and issuing sick notes: health professionals need to be informed that pain does not mean necessarily that individual cannot work: evidence needed to clarify circumstances when rest required, but consensus suggested appropriate only in minority of cases (ie inflammatory, though this not formally confirmed). Numerous obstacles to RTW - inappropriate diagnosis, poor advice, waiting lists, psychosocial factors (yellow and blue flags), lack of support. It was considered the biopsychosocial model can be a useful 'tool', though concern raised about skills to handle psychological issues (<i>distinction between the model aiding understanding and interventions based on the model perhaps not fully appreciated by participants</i>).</p>
(HSL (Lunt et al) 2007)  Scoping review	<p><b>Applying the biopsychosocial approach to managing risks of contemporary occupational health conditions</b></p> <p>Review commissioned by HSE to identify (1) employers' practices in applying risk management to common health problems, (2) biopsychosocial mechanisms by which such problems develop and are maintained, (3) individual, work environment and socio-demographic influences on well being. The uptake of the biopsychosocial approach has been hampered (for various reasons) despite the approach's greater scope in explaining the development and progression of common health problems CHP). Biopsychosocial mechanisms can be implicated in the onset of most occupational health conditions - conditions can be distinguished according to whether the main cause concerns physical or psychosocial hazards: CHPs appear to fall into the latter category. The biopsychosocial mechanisms that maintain occupational health conditions, by comparison, appear more consistent across all conditions, regardless of original cause. Onset of psychosocial-induced symptoms appears predisposed by a vulnerability generated from a combination of biological, psychological and environmental risk factors. A sudden increase in, or continuation of external stressors can act to 'tip the balance' and precipitate symptom expression. Social gradient, job control, effort-reward balance, social support, and health behaviours appear to strongly predispose vulnerability. Beliefs about the cause, consequences and controllability of common health problems are an important determinant of the ways in which employees respond to a health condition and maintenance of the condition. External reinforcers such as compensation, sickness benefits, avoidance of situations perceived as pain inducing,</p>



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	avoidance of unwanted responsibilities or undesirable situations can also help maintain 'being sick' where the underlying physiological pathology indicates otherwise. In the event that biopsychosocial risk factors cannot be reduced, ensuring the presence of well-being resources, such as increased social support, or positive health behaviours, should buffer any adverse effects of stressors. <i>(Focused on common health problems in general but, assuming ULDs are CHPs, then principles likely to apply).</i>
(Huang et al. 2002)  Conceptual review	<b>Occupational stress and work-related upper extremity disorders: concepts and models</b> Descriptive article about models of occupational stress and their applicability to work-related upper limb disorders. Provides overview of concepts and definitions for occupational stress, models of occupational stress and health, the Siegrist model of effort-reward imbalance at work, the demand/decision latitude model, multivariable models of work-related musculoskeletal symptoms/disorders, dose-response models, epidemiological models, ecological models, the biopsychosocial model of job stress, the balance theory of job design and stress, and the workstyle model. The authors offer the conclusion that few of the psychological, psychophysiological, and behavioural mechanisms integral to the models have been empirically substantiated.
(Jerosch-Herold et al. 2006)  Conceptual systematic review	<b>A systematic review of outcomes assessed in randomized controlled trials of surgical interventions for carpal tunnel syndrome using the International Classification of Functioning, Disability and Health (ICF) as a reference tool</b> Review of outcomes used in RTC's of surgical interventions for carpal tunnel syndrome, and comparison of these with biopsychosocial concepts contained in the International Classification of Functioning, Disability and Health (ICF, part of the family of classifications developed by WHO). 28 relevant RCT's were identified. The most frequently assessed outcomes were self-reported symptom resolution, grip or pinch strength and return to work. The majority of studies used outcome measures that assessed impairment of body function and body structure. A small number of studies used measures of activity and participation, such as measures of hand dexterity, use of hand in activities of daily living, and/or functional status. Only a quarter measured satisfaction. The authors concluded that studies to date have focused primarily on assessment of impairment and less on the activity limitations and participation restrictions. They suggested that a minimum set of outcome measures should include patient-reported scales of symptom severity and functional status, clinical measures of motor and sensory function and everyday performance in self-care, work and leisure as well as health-related quality of life.
(Lucire 2003)  Historical and conceptual text	<b>Constructing RSI: belief and desire</b> <i>(An account and explanation, by a forensic psychiatrist who was intimately involved, of the 1980s Australian repetitive strain injury (RSI) 'epidemic').</i> Two incommensurable paradigms of explanation guided diagnosis and management of the Australian epidemic of arm symptoms. These were the injury paradigm and the somatization paradigm. In the injury paradigm, symptoms were seen as evidence of a musculotendinous injury caused by a preceding task or by various characteristics of the workplace. The epidemic was to be managed by control of traumatizing agents and the subject, usually female, was not to be held responsible either for her condition or for her recovery. The injury paradigm claimed the dominant position. The notion of overuse, interested unions and industrial activists who sought to control output and protect jobs threatened by word processors which seemed to threaten job security. The unions wanted to have medical justification. The physicians who became involved in providing this justification contributed to a campaign of preventive medicine and workplace improvement. RSI was promoted by unions and accepted by government because, being ideologically based, it served social functions which were considered legitimate at the time. The epidemic of RSI is better explained as somatization than as injury. The somatization paradigm interpreted undiagnosable symptoms as a functional disorder or, if a pathological entity was known to have preceded their onset, as functional overlay. However, to say that a claimant was somatizing, one would have to disregard the social implications of the patient having been given a diagnosis of RSI. The diagnosis effectively ruled out any investigation of the ethical position of the somatizing subject since, for the duration of the incapacity, the physician assumed responsibility for the patient's illness behaviour and for determining fitness for work. Somatizing theory focused on the vulnerable affected subject. It failed to accommodate the role of the physician in guiding the emergence and the succession of symptoms. It did not accommodate the societal and cultural factors that made somatizing an acceptable, even desirable, way of being in the world. Blaming the workplace, through diagnosing injury, or medicalizing the patient by diagnosing somatization, both served the interests of the medical profession. The epidemic highlighted the extent to which society can eschew scientific knowledge in favour of inappropriate beliefs. <i>(A skilfully argued case that will appeal to some and offend many. References a substantial literature).</i>

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(Melhorn 2005)§  Physician guidance	<p><b>Working with common upper extremity problems</b>  <i>(A chapter from an American Medical Association guide book presenting evidence-based advice to physicians involved in workability assessments – the approach involves consideration of risk, capacity, and tolerance at the individual level).</i></p> <p>Takes a biopsychosocial approach - medical treatment should be used as appropriate, whilst early RTW is beneficial and prolonged absence undesirable. Uses concepts of 'risk', 'capacity' and 'tolerance'. Risk refers to chance of harm to patient or general public. Capacity refers to limitations in terms of strength, flexibility, endurance, etc - if it is not objectively obvious that the individual lacks the current ability to do certain job tasks, whether they will work is usually a question of tolerance. Tolerance is the ability to tolerate sustained work or activity at a given level; symptoms such as pain or fatigue are what limit the ability – the individual may be capable of the task but not to be able to perform it comfortably: when there is no objective pathology (rather only symptoms) working despite symptoms poses no major risk. Returning an individual with an upper extremity problem to work requires a balance between the demands of the job and the capability/tolerance of the patient.</p> <p><u>Shoulder impingement/rotator cuff syndrome</u>: staying at work or RTW is primarily based on tolerance: most can return to previous employment levels after treatment: temporary modified work helpful (including after surgery): capacity limited in chronic cases by decreased shoulder motion: severe imaging changes may dictate change of work.</p> <p><u>Rotator cuff tear</u>: risk increases with age: staying at work or RTW is primarily based on size and duration of tear; permanent task modifications (limit hand-over-shoulder tasks) to usual job may be required: long-term discomfort with activities likely.</p> <p><u>Epicondylitis</u>: staying at work or RTW is primarily based on tolerance rather than capacity or risk: temporary modified work can help return to previous employment levels: symptoms tend to be chronic with activities, but not progressive: return to very heavy work may be difficult (patient must decide whether rewards of work outweigh the pain).</p> <p><u>Ulnar nerve entrapment (elbow)</u>: staying at work or RTW is primarily based on tolerance: early diagnosis and treatment important to minimise risk of neurological damage: most can return to previous work with permanent task modification (rotation; limited exposure to vibrating hand tools).</p> <p><u>Carpal tunnel syndrome</u>: aetiology controversial and diagnosis difficult: for early cases staying at work or RTW is primarily based on tolerance: residual functional loss rare if treatment is early: most can return to previous employment levels, perhaps with permanent task modification (rotation; limited exposure to vibrating hand tools).</p> <p><u>De Quervain's tenosynovitis</u>: staying at work or RTW is primarily based on tolerance: symptoms may be chronic with activities though not progressive: most can return to previous employment levels: returning to very heavy work for extended periods may be difficult (possibly change job).</p> <p><u>Trigger finger/thumb</u>: staying at work or RTW is primarily based on tolerance: surgery often has good outcome: most can return to previous employment levels: temporary modifications may help.</p> <p><u>Non-traumatic soft tissue disorder</u>: synonymous with regional arm pain: although pain associated with physical activities, cause-effect not established: staying at work or RTW is based on tolerance, not risk or capacity: cases frustrating for clinicians to manage because symptoms can remain disproportionate despite appropriate healthcare and modified work: interventions must be based on biopsychosocial model.</p> <p>Severe conditions require the consideration of risk (work restrictions) and capacity (work limitations). Most often, the factor hindering RTW is tolerance (of symptoms). Return the individual to work requires a balance between the demands of the job and the capability of the person. Communication and education are key to addressing tolerance issues. Temporary workplace guidance for tolerance must allow for speedy return to work, with the interests of the person being the primary responsibility –reducing work disability, improving outcome for work-related injuries, and advancing the quality of life.</p>
(Moon & Sauter 1996)  Conference papers	<p><b>Beyond biomechanics – psychosocial aspects of musculoskeletal disorders in office work</b>  <i>(A somewhat dated collection of viewpoints arising from a multidisciplinary conference in 1993 that addressed non-biomechanical influences on musculoskeletal disorders in office work. Many of the contributors have since gone on to publish articles that are extracted in other tables. Primarily of interest now in that some of the contributions reflect the concerns that the adoption of a biopsychosocial approach may encounter).</i></p> <p><u>A psychosocial view of cumulative trauma disorders: implications for occupational health and prevention</u> (Moon 1996) suggests that even at its simplest, a biopsychosocial approach to cumulative trauma disorders (CTD) predicts complex research issues and hurdles to practical application; but ethical issues may</p>

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	<p>be the greatest concern. The central ethical concern is the danger of blaming workers for the CDT phenomenon. Raising the psychosocial issue at all may be risky.</p> <p><u>Social consequences of disclosing psychosocial concomitants of disease and injury</u> (Skelton 1996) questions whether it is advisable to devote resources to identifying psychosocial concomitants of CTDs and whether the likelihood that disclosure of such concomitants, if they are discovered, will be misconstrued by the public, creating harmful repercussions for workers afflicted with CTDs.</p> <p><u>An ecological model of musculoskeletal disorders in office work</u> (Sauter &amp; Swanson 1996) suggests an important feature of the model is that psychological mediation of musculoskeletal disorders is discussed in terms of normal psychological processes which are fairly well understood in social and health psychology. Notes that the rather extensive psychological literature on the perception and attribution of symptoms has received little or no attention in ergonomics and occupational health.</p> <p><u>Some social and cultural anthropologic aspects of musculoskeletal disorders as exemplified by the Telecom Australia RSI epidemic</u> (Hocking 1996) postulates an 'iceberg of disease', the iceberg representing a mass of ill-defined bodily sensations and subclinical disease, but only the tip is perceived as pain or clinically presented illness. Many other symptoms are coped with and remain subclinical. However, the iceberg floats in a social sea. If the density of the surrounding sea, the social environment, increases, due to organisational change or medical, media or legal influences, the iceberg rises, the tip enlarges, and more illness is presented.</p>
<p>(Palmer et al. 2007a)</p> <p>Physician guidance</p>	<p><b>Fitness for work</b>  <i>(A Faculty of Occupational Medicine book presenting the medical aspects of fitness for work for those involved in addressing the health issues associated with employment)</i>. The chapter on 'support and rehabilitation - restoring fitness for work' (Aylward &amp; Sawney 2007) focuses on common health problems which de facto generically includes ULDs: authors take a strong biopsychosocial stance stressing the health and social benefits of (return to) work – vocational rehabilitation needs to address obstacles and engage all key players. The chapter on 'orthopaedics and trauma of the limbs' (Cox &amp; Nugent 2007) outlines diagnostic criteria, extent of work-relatedness and medical treatments; return to work aspects discussed only for some upper limb conditions - <i>(ULDs are a relatively small component of this chapter, which takes a strongly biomedical stance)</i>.</p>
<p>(Schultz et al. 2000)</p> <p>Conceptual review</p>	<p><b>Models of diagnosis and rehabilitation in musculoskeletal pain-related occupational disability</b></p> <p>A systematic analysis of the theoretical and empirical literature on pain-related disability was undertaken to identify current conceptual models of diagnosis and rehabilitation. Five conceptual models were reviewed: the biomedical model, the psychiatric model, the insurance model, the labour relations model, and the biopsychosocial model. The authors provide an overview of the theoretical tenets of each model, the underlying values, and the implications for clinical practice, and management by compensation and healthcare systems. The authors concluded that while none of the models of diagnosis and rehabilitation in pain-related disability have proven to be of no benefit in conceptualizing and planning care for individuals with pain, each of the models possess unique applications and limitations. The principal tenet of the biopsychosocial model is the recognition of the complexity of the phenomenon of pain within humans. The second tenet involves a conceptual distinction between impairment and disability. The third is that organic pathology does not reliably predict impairment and disability. Psychological and sociocultural factors play a major role in defining pain and mediating the reaction to injury and subsequent disability. The biopsychosocial model tends to be labour intensive, time consuming and expensive, requiring an organizational structure that supports teamwork, and high treatment motivation on the part of the individual with the pain condition, and appears to constitute too luxurious a model for simple injuries with an acute pain component that occurs to adaptable people who possess well-developed coping skills. <i>(The authors' concept of applying the biopsychosocial model seems to rest with rehabilitation programmes, yet they clearly recognise the applicability of biopsychosocial principles for managing pain and disability).</i> ' It is evident that the applicability of a given model of rehabilitation of pain-related occupational disability depends largely on two factors: (1) time since injury and (2) the clinical complexity of the case as determined by the interaction of pain presentation, functional tolerances, comorbid conditions, pre-existing factors, current environmental stressors, workplace demands and resources, and individual coping skills and adaptability. <i>(It seems clear that we are destined to live in a "house of many paradigms", yet the management of healthcare invariably fails to reflect this)</i>.</p>

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<b>Authors</b>	<b>Key features</b> <i>(Reviewers' comments in italic)</i>
(Shaw et al. 2002) f Conceptual review	<p><b>Secondary prevention and the workplace</b></p> <p>Conceptually, 'secondary prevention interventions in the workplace' may focus on early detection and treatment of mild/moderate symptoms, and on accommodating temporary functional limitations to aid recovery and reduce likelihood of recurrence. Review examines several interventions aimed at physical work environment, modified duty, educational and exercise approaches, case management, and programmes for supervisors. Integrating care and facilitating communication among workers, health-care providers and the workplace emerge as salient features. As a whole the evidence shows that there is considerable potential to reduce disability and longer-term problems associated with work-related musculoskeletal pain. Efforts to reduce ergonomic risk factors, to enhance education and fitness, and to influence case managers and supervisors provide opportunities for effective secondary prevention. Integrating care and facilitating communication among workers, health care providers and the workplace emerge as particularly salient. <i>(A carefully conducted and argued review displaying the potential for modern joined-up management, though robust scientific evidence limited).</i></p>
(Staal et al. 2007) Narrative review	<p><b>Aetiology and management of work-related upper extremity disorders</b></p> <p>Chapter that reviews both localised and widespread problems of the upper limbs that are work related. The Dutch authors use the term Work-related upper extremity disorders (WRUED), and note this is an umbrella term used for a range of symptoms and disorders localised in the neck, shoulder, elbow, forearm, wrist and/or hand. These symptoms may include pain, swelling, stiffness, numbness, tingling, clumsiness, loss of coordination, loss of strength, skin discoloration and temperature differences, and give rise to limitations in activities either at work or during leisure time. The discussion of risk factors notes they are usually subdivided in to work-related physical risk factors, work-related psychosocial risk factors, and personal risk factors. However, the reviewers observed that current evidence points to a multifactorial aetiology. They also noted that patient with chronic WRUED should be viewed from a psychological or even social standpoint, rather than purely focusing on the pathophysiological mechanisms that underlie upper limb symptoms. That is, they are advocating a biopsychosocial approach. Following consideration of available evidence from RCTs and systematic reviews, the authors concluded that among the many available treatment options both exercises and ergonomic measures may be considered as the most promising treatment alternatives for WRUED. However, they urged caution, given the limited evidence-base.</p>
(Szabo & King 2000) Conceptual review	<p><b>Repetitive stress injury: diagnosis or self-fulfilling prophecy?</b></p> <p><i>(Arguably a partisan view reflecting one side of the US public debate of the time, yet citing appropriate, if selected, scientific literature).</i></p> <ul style="list-style-type: none"> <li>•□The vague definitions of so-called repetitive stress injuries are indicative of the fact that scientific studies have failed to show that repetitive motion causes injury.</li> <li>•□Given the uncertainty about causation, work-related musculoskeletal disorders (WRMSDs) is a more readily accepted term to describe these phenomena.</li> <li>•□There is little doubt that most ergonomic interventions increase comfort in the work environment, which is of great benefit to the worker.</li> <li>• Many proponents of ergonomics assert that the elimination of certain risk factors related to force, repetition, and posture can prevent or even cure work related musculoskeletal disorders of the upper extremity. However, there is little scientific support for this position.</li> <li>• Undue reliance on ergonomics to treat musculoskeletal disorders, to the exclusion of proper diagnosis and attention to medical and health risk factors, can have adverse consequences for the patient.</li> <li>•□Science rather than politics and public policy should determine what causes injury and disease.</li> </ul> <p><i>(The authors' discussion leads to a somewhat biomedical view on interventions and (not extracted here) focuses on litigation issues).</i></p>
(Waddell & Burton 2004) Conceptual review	<p><b>Concepts of rehabilitation for common health problems</b></p> <p><i>(This review covered a range of common health problems, but only the information related to musculoskeletal disorders is noted here).</i></p> <p>Evidence is presented to support the view that common health problems (inclusive of ULDs in general) are best understood through the biopsychosocial model, and that this impacts on rehabilitation and management. The negative consequences of obstacles to recovery (inclusive of popular myths) are highlighted.</p> <p><u>Musculoskeletal disorders:</u> There seem to be common strands to the different musculoskeletal symptoms/disorders: a general consensus that a</p>

**Table A3. Conceptual reviews, texts, and guidance**

Authors	Key features <i>(Reviewers' comments in italic)</i>
	<p>multidisciplinary approach to management with all the key players onsite is most appropriate. A broadly similar range of approaches has been used for the management and rehabilitation of all musculoskeletal disorders, irrespective of the actual disorder or its assumed cause. Medical treatment may differ depending on the specific symptoms or diagnosis, but restoration of function involves issues that are independent of the condition. Early interventions are advocated, though too early an intervention may be inappropriate and even counter-productive in some settings. Multidimensional interventions (inclusive of addressing psychosocial and psychological issues) are considered to offer the greater potential; achieving vocational outcomes requires more than just healthcare – occupational and ergonomic interventions should be integrated, and have the potential to impact on psychosocial factors (including reduction of workplace stress) as well as reducing physical exposures. Modified work should be a temporary measure to accommodate reduced capacity; it facilitates early return to normal duties, assuming the risks are suitably assessed and controlled – assignment to permanent modified work can be harmful. The outstanding theme is the importance of linking rehabilitation interventions to the workplace (inclusive of appropriate education to get all players (healthcare; worker; workplace) onsite. <i>(The data extractions concerning ULDs are included in the evidence tables for the present review: identified by §).</i></p>
<p>(Waddell &amp; Burton 2006)  Quasi-systematic review</p>	<p><b>Is work good for health and well-being?</b> <i>(This review covered a range of common health problems, but only the information related to musculoskeletal disorders is noted here).</i></p> <p>Evidence on musculoskeletal conditions (inclusive of ULDs in general) supports four main themes: a) the high background prevalence in the general population; b) work can be a risk factor; c) psychosocial factors are important modifiers; d) the need to combine clinical and occupational interventions. The high background prevalence of musculoskeletal symptoms means that a substantial proportion of musculoskeletal conditions are not caused by work. Most people with musculoskeletal conditions continue to work; many patients with severe musculoskeletal diseases such as rheumatoid arthritis remain at work and experience health benefits. Musculoskeletal symptoms (whatever their cause) may make it harder to cope with physical demands at work, but that does not <i>necessarily</i> imply a causal relationship or indicate that work is causing (further) harm. Intense exposures to physical demands at work can be risk factors for musculoskeletal symptoms, 'injury' and certain specific musculoskeletal conditions. However, causation is usually multifactorial and the scientific evidence is somewhat ambivalent: much depends on the outcome of interest. Physical demands at work can precipitate or aggravate musculoskeletal symptoms and cause 'injuries' but physical demands of work only account for a modest proportion of the impact of musculoskeletal symptoms in workers. The physical demands of modern work (assuming adequate risk control and except in very specific circumstances) play a modest role in the development of actual musculoskeletal pathology. Sickness absence and disability depend more on individual and work-related psychosocial factors than on biomedical factors or the physical demands of work. It is unhelpful to view physical demands from a purely negative perspective, ie 'hazards' with potential only to cause 'harm'. Physical activity is fundamental to physiological health and fitness and an important part of rehabilitation from injury or illness. Work can be therapeutic. Thus, modern clinical management for most musculoskeletal conditions emphasizes advice and support to remain in work or to return as soon as possible. People with musculoskeletal conditions who are helped to return to work can enjoy better health (level of pain, function, quality of life) than those who remain of work. The return to work process may need organisational interventions: risk reassessment/control, and modified work: the duration of modified work depends on the condition - for common musculoskeletal conditions such as neck or arm pain it should be temporary and transitional. <i>(The data extractions concerning ULDs are included in the evidence tables for the present review: identified by ‡).</i></p>

[CHP = common health problem; CTD = cumulative trauma disorder; ICF = International Classification of Functioning, Disability and Health; MSD = musculoskeletal disorder; RCT = randomised controlled trial; RTW = return-to-work; RSI = repetitive strain injury; ULD = upper limb disorder; VDU = visual display unit; WRUED = work-related upper extremity disorders; WRULD = work-related neck and upper limb disorder]

[§ = data extraction (adapted) from Waddell & Burton 2004. ‡ = data extraction (adapted) from Waddell & Burton 2006]

**Table A4. Individual studies of particular relevance**

<b>Table A4. Individual studies of particular relevance</b>				
<b>Authors</b>	<b>Study type</b>	<b>Topic</b>	<b>ULD condition</b>	<b>Key findings</b> ( <i>Reviewers' comments in italic</i> )
(Abásolo et al. 2005)	RCT	Work disability	Regional MSDs	<p><b>A health system program to reduce work disability related to musculoskeletal disorders</b></p> <p>Large RCT with n=7805 control and 5272 intervention subjects with episodes of MSD-related temporary work disability in two health Madrid districts, with 4-year follow-up. The control group received standard primary care management, with referral to specialised care if needed. The intervention group received a specific program, administered by rheumatologists, in which care was delivered during regular visits and included 3 main elements: education, protocol-based clinical management, and performing medical administrative duties (such as writing prescriptions, and sick notes). The intervention consisted of avoidance of bed rest, early mobilisation, avoidance of splints, stretching exercises, ergonomic training, provision of educational booklets, and suggestions for optimal levels of physical activity. Return to work was never forced. Specific protocols for regional MSD's were created, including ones for shoulder, and arm and hand. The exact proportion of cases with upper limb disorders was not reported, but non-spine problems appear to have been about 50% of total cases. Temporary work disability, long-term work disability, and costs were significantly decreased in the intervention group. The net economic benefit was €11 for each euro spent. Furthermore, patients in the intervention group were significantly more satisfied. <i>(This study illustrates the potential benefit from considering work disability due to MSD's to be a relevant health problem worthy of intervention. The personal and financial impact of such problems may be mitigated by participating in a similar programme that combines patient education with protocol-driven early rehabilitation based on biopsychosocial principles, although this was not explicitly stated by the authors).</i></p>
(Adams & de C Williams 2003)	Mixed cross-sectional survey, and retrospective case series	RTW	Chronic upper limb pain	<p><b>What affects return to work for graduates of a pain management program with chronic upper limb pain?</b></p> <p>The authors observed that chronic upper limb pain often causes work loss, yet rates for RTW after attending a (biopsychosocial) pain management programme are disappointingly low. The study aimed to identify factors relevant to RTW in sample of 103 patients with chronic upper limb pain. Data were collected by telephone interview. Data (writing and typing speed, self-efficacy, catastrophising, medication use, and adherence to pain management techniques 1-month after programme) was also available from before and after treatment. They reported that 55 individuals were working or in training after the programme, whereas 54 had been in the 3 months before. There were changes in employment status: 30 participants improved their work status, 10 reduced it, and 61 remained stable. Higher self-efficacy, lower catastrophising, faster writing speed, and less medication use significantly predicted RTW. Use of pain management strategies, and typing speed, did not. The authors suggested that non-workers may be characterised as</p>



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				predicating work on considerable adaptations or flexibility in conditions, not expecting much help from employers in providing these, and not believing themselves fully capable of sustaining a job. The overall conclusion offered was that RTW depended on specific beliefs concerning work-relevant strategies.
(Alizadehkhayat et al. 2007)	Case-control	Psychological and functional status	Tennis elbow	<p><b>Pain, functional disability, and psychologic status in tennis elbow</b></p> <p>Small study comparing tennis elbow patients with healthy controls for pain and functional disability, and evaluated the relationship between the 2 major psychological factors (anxiety and depression) and tennis elbow. 16 subjects per group. Tennis elbow patients showed markedly increased pain and functional disability. Significantly elevated levels of depression and anxiety (on Hospital Anxiety and Depression Scale) in tennis elbow patients: according to the anxiety and depression subscales of the, 55% and 36% of patients, respectively, were classified as probable cases. Authors recommended psychological assessment in the development of supportive and treatment strategies for tennis elbow patients.</p>
(Baldwin & Butler 2006)	Retrospective survey + narrative review	RTW	ULDs	<p><b>Upper extremity disorders in the workplace: costs and outcomes beyond the first return to work</b></p> <p>Noted that majority of workers compensation claims in Quebec for work-related upper extremity disorders are resolved quickly and the worker returns to work, although a small but significant proportion experience unusually lengthy spells of work absence. A small fraction of injured workers with the longest spells of work absence have extremely low probabilities of returning to work. These imply large productivity losses for employers. Mean workers compensation claim costs in the US are between \$5000 and \$8000, but this is not a good measure due to the highly skewed nature of the duration distribution for upper extremity claims. The total cost burden of work-related upper extremity disorders is large because of the relatively high incidence of the conditions. Estimates of the costs of work-related upper extremity disorders derived from administrative data are certain to underestimate the true costs on society, however, because many cases go unreported, and because indemnity benefits may not cover periods of prolonged or recurrent spells of work absence. Some evidence suggests that recurring spells of work absence may increase the disability burden further, but this hypothesis is not well documented. Approximately one-third of workers with upper extremity disorders are at risk of prolonged employment instability following their injury. The goal of the retrospective study was to determine post-injury employment patterns and return-to-work probabilities in a sample of 1,317 workers with upper extremity disorders, up to 5 years. It was found that most workers with cumulative trauma disorders of the upper extremities (CTD) return to work at least once, but a first return does not necessarily mark the end of work disability. Two-thirds workers with CTD or work-related back pain experience injury-related absences after their first return to work. Focusing on the first return to work is misleading for both injury groups, but even more so for CTD, as they appear to be even</p>

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				more susceptible to multiple spells of work absence. ( <i>The results of this study have two important implications. First, studies of predictors for RTW in upper limb disorders should consider longer-term work outcomes, rather than merely first return to work. Second, that rehabilitation approaches may need to target work-maintenance and sustainability, in addition to RTW.</i> )
(Beaton et al. 2007)	Physician workshops	Classification system	Upper limb disorders in workers	<p><b>A pattern recognition approach to the development of a classification system for upper-limb musculoskeletal disorders of workers</b></p> <p>Questionnaire and physical assessment of 242 workers: physical examination findings dichotomized to normal/abnormal: experienced physicians attending workshops led through pattern recognition (clustering and naming clusters) to arrive at classification system: good face value but low interobserver reliability: revised to produce a triaxial classification system with good reliability. The signs and symptoms axes quantified areas involved in upper limbs: third axis described the likelihood of a specific diagnosis being made and degree of certainty. (<i>The following extracts from the introduction and discussion of this study are of most relevance to the present project</i>): Inconsistencies over classification has led to wide-ranging debates over the causes, pathology, and even existence of these disorders; this threatens to divert attention away from the real goal of their management – to reduce the burden at a personal, workplace and societal level. This classification system is of value to epidemiologists and to clinicians: it provides an overall view of the location of both symptoms and signs (none, local, regional, diffuse), and permits the clinician to describe a level of certainty (none, possible, probable, definite) around the diagnosis. Viewing the symptoms and signs axes as descriptive of the complexity of the worker's state, and the potential diagnosis axis as important for directing early effective treatment. As in the case of back pain and whiplash associated disorders, it may be that by returning to a simple description of the presentation rather than pursuing very specific diagnoses, a system can be developed that distinguishes patients likely to recover quickly from those who may be slower to recover. The debate over the diagnosis of musculoskeletal disorders may be hampering the ultimate goal – to advance our understanding of work-related pain and reduce its impact on peoples' lives and productivity. (<i>This is very much a clinical approach to (prognostic) classification and does not involve psychosocial variables; nevertheless, the observed parallels with back pain and whiplash disorders are of interest and call into question the ultimate value of a specific diagnosis for many cases.</i>)</p>
(Bisset et al. 2006)	RCT	Clinical management	Lateral epicondylitis	<p><b>Mobilisation with movement and exercise, corticosteroid injection, or wait and see for tennis elbow: randomised trial</b></p> <p>Single-blind Australian randomised comparison of physiotherapy (n= 66), no treatment (n= 67), and corticosteroid injections (n= 65) in total of 198 subjects with clinically diagnosed tennis elbow (of &gt;6 weeks duration, mean = 22 weeks). Outcome measures were global improvement, pain-free grip force, and assessor's rating of severity (at 3, 6,</p>



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				12, 26, & 52 weeks). Results indicated that corticosteroid injection was not superior to either physiotherapy or wait-and-see in the short-term. In the longer-term it was inferior to both. The authors concluded that physiotherapy combining elbow manipulation and exercise has a superior benefit to wait and see in the first six weeks and to corticosteroid injections after six weeks, providing a reasonable alternative to injections in the mid to long term. <i>(The results of this study lend support to the use of corticosteroid injections within the first six weeks, but do not really support the provision of physiotherapy subsequent to that, since the outcomes were similar to wait-and-see. Furthermore, the cost was higher – requiring 8 sessions versus 1 or 2 for wait-and-see). (See also Smidt et al 2002)</i>
(Bonde et al. 2003)	Longitudinal	Prognosis	Shoulder tendonitis	<b>Prognosis of shoulder tendonitis in repetitive work: a follow up study in a cohort of Danish industrial and service workers</b> The physical and psychosocial work environment is expected to modify recovery from shoulder disorders, but knowledge is limited. Follow up study of musculoskeletal disorders in industrial and service workers, 113 employees were identified with a history of shoulder pain combined with clinical signs of shoulder tendonitis. Some 50% of workers recovered within 10 months (95% CI 6 to 14 months) - this estimate is most likely biased towards too high a value. Recovery of clinically verified shoulder tendonitis in industry and service workers is in most cases a matter of several months. While higher age substantially slows down the rate of recovery, physical work characteristics seem not to be important modifiers of the course of the disease. Perception of high job demands, low job control, and social support at the workplace are strongly related to slow recovery, but may be a consequence rather than a cause of the disorder. Occupational health management and counselling of patients with clinical shoulder disorders should acknowledge the favourable but often slow course of shoulder tendonitis.
(Burton et al. 2005) RR323	Workforce survey	Psychosocial factors + absence	General MSDs ( <i>mainly back pain</i> )	<b>Obstacles to recovery from musculoskeletal disorders in industry</b> Results confirmed a general association between perceptions of the psychosocial work environment and self-reports of previous symptoms/disability related to musculoskeletal disorders. Several different aspects of work and the work environment (blue flags) were associated with symptoms and previous workloss. The associations were additive and similar to that of psychological distress (yellow flag). Prospectively, scores beyond statistically determined cut-off points on both blue and yellow flags predicted the likelihood of future absence, but not its duration.
(Calnan et al. 2005)	Postal survey + interviews	Patient evaluation of healthcare services	ULDs	<b>Evaluating health-care: the perspectives of sufferers with upper limb pain</b> A qualitative study using postal survey of 2781 upper limb patients in the UK was augmented by interviews with 47 of these subjects to identify patient evaluation of their healthcare experiences. Lack of precise diagnosis, or conflicting explanations resulted in the majority of patients adopting the explanation that was accompanied by the most

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				successful alleviation of symptoms. Medication was seen as a superficial treatment that fails to address root causes, that will lose effectiveness over time, and that may mask doing further damage. Patients are generally convinced that treatments are only partially effective, but the scepticism is aimed at the treatments and not the healthcare providers. Complementary treatments are not usually a first choice for people with ULDs unless they have prior experience, but when they do see these therapists following informal referral they are usually satisfied with care received. <i>(The findings from this study indicate the need to provide accurate information to patients about the effectiveness of treatments, the limitations of treatment, and the role for self-management approaches. This may have the potential to limit 'shopping around', and seeking ineffective complementary therapies).</i>
(Cheng et al. 2002)	Retrospective case series	Outcomes relevant to employer, provider, and employee	Work-related upper extremity disorders	<b>Employer, physical therapist, and employee outcomes in the management of work-related upper extremity disorders</b> Retrospective file review of 221 upper extremity cases treated on-site at a workplace clinic at a large company (n=4000 employees). Diagnoses included tendonitis, sprain/strain, capsulitis, joint restriction, muscle weakness, and compression neuropathy over the shoulder, elbow, and wrist/hand areas. Patients with cervical-related upper extremity disorders, and those whose problem was not considered to be work-related, were excluded. Two experienced therapists reviewed all physiotherapy records. Outcomes were measured from three different perspectives: provider, employer, and patient. Provider outcome was defined as "achieving" or "not-achieving" PT goals and was subjectively determined by the direct care-providing physical therapist at the end of case closure based upon their clinical judgement. Patient outcomes were measured with the SF-36. Employer outcome was categorized as "remaining-on/returning-to regular job" or "job change", based on a comparison of discharge work status with initial work status. 81% of the patients achieved PT goals at discharge. 77% remained-on or returned-to pre-injury jobs at time of case closure. On the SF-36 the bodily pain and physical functioning scores showed significant improvement after PT, but the role limitations due to physical problems did not significantly change. <i>(Case series is one of a group of descriptive studies that by their very nature do not test the hypothesis of treatment efficacy, and this means results need to be interpreted cautiously. At best, they indicate further research is warranted, ideally with a control group).</i>
(Cheng & Li-Tsang 2005)	Cross-sectional survey	Return to work	Low back pain and work-related upper limb disorder	<b>A comparison of self-perceived physical and psycho-social worker profiles of people with direct work injury, chronic low back pain, and cumulative trauma</b> Small cross-sectional survey (n=64, of which had 24 LBP, and 40 had work-related upper limb disorder) with the goal being to identify characteristics of injured workers that are associated with work-readiness (measured by self-report questionnaire). Results indicated that self-perceived pain and physical functioning were significant factors influencing the readiness for returning to work.

**Table A4. Individual studies of particular relevance**

<b>Authors</b>	<b>Study type</b>	<b>Topic</b>	<b>ULD condition</b>	<b>Key findings</b> <i>(Reviewers' comments in italic)</i>
(Cheng & Hung 2007)	RCT	Work hardening rehabilitation	Rotator cuff disorder	<p><b>Randomised controlled trial of workplace-based rehabilitation for work-related rotator cuff disorder</b></p> <p>The researchers noted that workplace factors are often neglected by healthcare providers when attempting to return people with occupational injuries to work. They ran an RCT using 103 subjects with work-related rotator cuff syndrome, allocated to a work hardening programme in either the clinic or at the workplace. The control group were given traditional generic work hardening training, while experimental group received workplace-based work hardening training with input specific to the pathology and biomechanics of rotator cuff disorder and specific to their job tasks. At four week follow-up there was a significant difference between the groups with 71% of the workplace group back at work versus 37% of the control group. They also observed a significant reduction in complaints of shoulder problems and functional limitations at work. They concluded that it is more effective to deliver RTW intervention in the workplace, since this integrates psychosocial workplace factors related to being off work and absent from work routine. <i>(This study had a short follow-up period and therefore it is not known whether the RTW outcomes were sustained, or if there were any differences in recurrence or re-injury rates. Despite this, the findings are indicative that delivery of an intervention that addresses psychosocial workplace factors, in addition to biological and biomechanical ones, can be useful and effective at enhancing RTW outcomes following upper limb injury).</i></p>
(Christmansson et al. 1999)	Case series	Ergonomics – organisational redesign	Work-related ULDs	<p><b>Task design, psycho-social work climate and upper extremity pain disorders – effects of an organisational redesign on manual repetitive assembly jobs</b></p> <p>Case series analysing effect of job redesign in a manufacturing company on assembly workers (before n= 17; after n =12). This resulted in changes to the overall organisation of the production system, control systems, and work design. Assembly jobs were considered to be more varied, less repetitive, and more autonomous. No major changes were made in product mix, product designs, or workplace layouts and there were thus no major changes in the assembly operations. Medical assessment indicated that 8/17 workers before, and 9/12 after, experienced upper limb pain disorders. The authors concluded that changes in work design did not prevent work-related musculoskeletal disorders. Furthermore, the efficiency of production was not improved. <i>(Suggests that ergonomics alone is unlikely to prevent work-related ULDs).</i></p>
(Coutu et al. 2007)	Prospective	Distress	MSDs	<p><b>Level of distress among workers undergoing work rehabilitation for musculoskeletal disorders</b></p> <p>Objective was to examine workers' distress levels before they start work rehabilitation and to compare it to those in a healthy population; and to assess the correlations between distress and biopsychosocial factors. 228 workers on sick leave due to persistent pain from an MSD and who were referred to an interdisciplinary work rehabilitation program. The workers had very high distress levels compared to normative data. Multiple</p>

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Authors	Study type	Topic	ULD condition	Key findings ( <i>Reviewers' comments in italic</i> )
				regression showed that duration of absence, high occupational stress, perception of disability, and fear of movement and (re)injury were significantly associated with distress. Distress is not just a predictor of work disability, but an independent outcome measure: this shift of paradigm could provide a more comprehensive approach in the understanding of workers' disability.
(Descatha et al. 2007)	Surveillance	Epidemiology – predictive factors for incidence	Upper-limb work-related musculoskeletal disorders	<p><b>Predictive factors for incident musculoskeletal disorders in an in-plant surveillance programme</b></p> <p>Surveillance of workers in a large shoe factory (n=166 followed up): the predictive role of general, personal, and occupational factors was explored for the incidence of upper-limb work-related musculoskeletal disorders over the following year. Incidence rate was 26%: work pace and prior history were the only significant predictors. In multivariable model (where input variables included distress, physical fatigue, repetitiveness, task precision) only prior history remained in the model. The annual incidence rate 3 years later was 23%: a multivariable model retained the prior history along with psychological distress as significant predictors. (<i>Importantly</i>), some generally accepted risk factors such as repetitiveness, work pace, forceful awkward postures, were not associated with incidence. Surveillance programmes need to take account of personal factors including prior history of symptoms. (<i>This result mirrors the experience with back pain where the strongest predictor of future trouble seems to be previous trouble, leading to the suggestion that upper-limb work-related musculoskeletal disorders also represent a recurrent phenomenon with work factors having a relatively limited predictive role in the generation of symptoms</i>).</p>
(Devereux et al. 2002)	Cross-sectional survey	Epidemiology – physical + psychosocial factors at work	Neck and upper limb symptoms	<p><b>Epidemiological study to investigate potential interaction between physical and psychosocial factors at work that may increase the risk of symptoms of musculoskeletal disorder of the neck and upper limb</b></p> <p>Cross-sectional postal survey of 869 manual handlers, delivery drivers, technicians, customer services computer operators, and general office staff from 26 randomly selected UK sites (response rate 59%, from 1514). Each worker was classified into one of four mutually exclusive groups (by measuring physical exposure, based on lifting and frequency of specific loads, and variables such as vibration; and, psychosocial exposure, based on mental demands, job control, and social support): (1) low physical &amp; low psychosocial, (2) low physical &amp; high psychosocial (3) high physical &amp; low psychosocial exposure (4) high physical &amp; high psychosocial. Subjects classified as (3) or (4) tended to be younger, and all were male. About one-third of the sample reported experiencing symptoms (musculoskeletal symptoms in the neck, shoulders, elbows, and hands or wrists were defined by aches, pain, or discomfort during the 7 days preceding completion of the questionnaire). Workers with both high physical and high psychosocial exposures were much more likely to report symptoms (OR for neck =1.25, wrist/hand=7.55, upper limb (including shoulders)=3.74). Psychosocial factors were more important when exposure to</p>

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Authors	Study type	Topic	ULD condition	Key findings ( <i>Reviewers' comments in italic</i> )
				physical factors were high than when they were low. The authors concluded this suggests an interaction between physical and psychological risk factors that increase the risk of reporting upper limb problems. Furthermore, this suggests that interventions should focus on both types of factors.
(Devereux et al. 2004)	Prospective epidemiological cohort study	Stress and musculoskeletal disorders	Musculoskeletal disorders (including upper extremity subset)	<p><b>The role of work stress and psychological factors in the development of musculoskeletal disorders: the stress and MSD study</b></p> <p>Research commissioned by the HSE in the UK, to establish the role of stress and other psychological factors in the development and reporting of MSD's. Initial response rate to survey was 39% (of 8,000) and subsequently 3,139 workers were followed for about 15 months. Subjects were from 20 organisations, across 11 industrial sectors. Results indicated that high perceived job stress was an intermediate factor between high exposure to both physical and psychosocial work risk factors and self-reported low-back, upper back and hands/wrists complaints. The authors concluded that psychosomatic symptoms, depression, and perceived life stress might act independently to increase the likelihood of developing musculoskeletal complaints. Psychosocial risk factors for high perceived job stress were: extrinsic and intrinsic effort, role conflict and verbal abuse or confrontations with clients or the general public were workplace risk factors for high perceived job stress. Individual demographics, traits, attitudes, or wellbeing factors were not implicated in the causation of self-reported musculoskeletal complaints. High exposure to both physical and psychosocial work risk factors resulted in the greatest likelihood of reporting musculoskeletal complaints. (<i>This study provides good evidence of causal relationships, due to the large sample size and prospective design</i>).</p>
(de Mos et al. 2007)	Retrospective cohort	Epidemiology – incidence rate	Chronic regional pain syndrome	<p><b>The incidence of complex regional pain syndrome: a population-based study</b></p> <p>Chronic regional pain syndrome can occur in an extremity after any type of injury or spontaneously. Large 10-year retrospective cohort study in Dutch primary care records. Incidence rate estimated as 26.2 per 100,000 person years (four times higher than the one previous population estimate): females affected more than males (OR 3.4): females in age category 61-70 most commonly affected: upper extremity &gt; lower extremity, and fracture most common precipitating event.</p>
(Dziedzic et al. 2007)	Cross-sectional survey	Epidemiology – impact/disability	Musculoskeletal hand problems	<p><b>The impact of musculoskeletal hand problems in older adults: findings from the North Staffordshire Osteoarthritis Project (NorStOP)</b></p> <p>Survey of 7878 subjects who responded to a baseline questionnaire; participants defined as having hand problems were sent a second questionnaire, which included questions about hand pain and disability. One-year period prevalence of hand problems was 47% and estimated 1-month period prevalence of hand pain was 31%. These figures varied little with age. Severe hand-related disability affected 12% of this sample, was significantly more common in females than males, and increased in prevalence to the oldest age-groups. In summary: musculoskeletal hand problems are common, painful and</p>

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<b>Authors</b>	<b>Study type</b>	<b>Topic</b>	<b>ULD condition</b>	<b>Key findings</b> ( <i>Reviewers' comments in italic</i> )
				have a significant influence on many dimensions of health. Women and the very old appear especially vulnerable to the effect of hand problems on their daily activities. Only a minority of the study group were seeking or using healthcare for their hand problems.
(Eltayeb et al. 2007)	Cross-sectional survey	Epidemiology - prevalence	Complaints of arm, neck and shoulder – computer office workers	<b>Prevalence of complaints of arm, neck and shoulder among computer office workers and psychometric evaluation of a risk factor questionnaire</b> Survey of complaints of arm, neck and shoulder (CANS) among computer office workers (n= 264). The one-year prevalence rate of CANS indicated that 54% of the respondents reported at least one complaint in the arm, neck and/or shoulder. The highest prevalence rates were found for neck and shoulder symptoms (33% and 31% respectively), followed by hand and upper arm complaints (11% to 12%) and elbow, lower arm and wrist complaints (6% to 7%) - "right side" complaints were more frequently reported than "left side" complaints or "both sides" complaints (except for shoulder where "both sides" which were more frequently reported than single sided. Females reported higher prevalence rates for the various upper extremity regions.
(European Agency for Safety and Health at Work 2000)	Survey of European states	Epidemiology – prevalence	RSI	<b>Repetitive strain injuries in the member states of the European Union: the results of an information request</b> Among the Member States of the European Union, various terms are used to describe upper limb musculoskeletal disorders that refer to complaints ranging from the neck to the fingers. Few governments have a definition for the term RSI, although the media frequently use the term. The prevalence of RSI-related complaints varies substantially among Member States; of the four Member States that replied solely or mainly regarding RSI related to VDU work, only France specified that there are apparently no significant problems related to VDU work. However, in The Netherlands there is some public concern about the proportion of RSI-related complaints among VDU users (which, it is said, could affect 56% of the workers in some sectors), and Denmark reported that there was now sufficient proof of a relationship between VDU work and RSI-related complaints. Some Member States reported that these disorders were more common in blue-collar workers than in white-collar workers, and that females are affected more than males. Six of fifteen Member States (including the UK) reported that legal proceedings against employers occur in order to claim compensation for RSI-related health damage.
(Feuerstein et al. 2000b)	Uncontrolled outcome study	Multicomponent intervention	Work-related upper extremity disorders	<b>Multicomponent intervention for work-related upper extremity disorders</b> Reports on an uncontrolled group outcome study of the effects of a multicomponent intervention for both asymptomatic sign language interpreters (n=53). Outcomes: number of cases reported to human resources, workers' compensation indemnity, and medical costs assessed annually for 3 years following the intervention and compared with pre-intervention levels. Multicomponent intervention (eleven 1.5 hour group sessions) focused on education of workers, and supervisors as well as reducing biomechanical exposures. Results indicated a 69% reduction in the number of cases reporting upper



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				extremity problems in the 3 years following the intervention. Indemnity costs were reduced by 64% and were maintained over the next 2 years. Health care costs had smaller change. A partial rebound in all outcome measures observed in Year 3. But, in the previous year there was an initial consultation to inform the intervention and modify workloads: the authors acknowledge the benefits may reflect the initial consultation rather than the formal intervention. <i>(This study is best considered as an initial investigation of simultaneously educating the players, but the authors' interpretation seems over-optimistic - meaningful conclusions are compromised by weak methodology).</i>
(Feuerstein et al. 2000a)	Prospective	Outcome predictors	Work-related upper extremity disorder	<p><b>Development of a screen for predicting clinical outcomes in patients with work-related upper extremity disorders</b></p> <p>Prospective study of 70 upper extremity disorder subjects (n=61 at 12-month follow-up) to investigate ability of a variety of variables to predict clinical outcomes. These included demographic, occupational, medical, symptom, physical, ergonomic, occupational psychosocial, work demands, social support, employer practices, and individual psychosocial variables. Clinical outcome was measured with a composite index of median scores split into "good" or "poor" that included symptom severity, function, days off work, and mental health. The various outcome variables were only moderately correlated. They were combined in linear fashion, using simple summation. Predictors of outcome were derived from a logistic regression model: at 1-month (correct classification rate 74%) by upper extremity comorbidity, pain severity within past week, ergonomic risk exposure, job support, and catastrophising; at 3-months (classification 81%) by symptom severity scale, job stress, and catastrophising; at 12-months (classification 82%) by number of prior treatments or providers, recommended for surgery, and catastrophising. The authors concluded it is possible to predict clinical outcomes from various combinations of self-reported medical history, symptom severity, ergonomic exposures at work, job stress, level of job support, and pain coping style. <i>(Unfortunately no analysis was performed to identify predictors of specific outcomes, such as return to work, level of disability, symptom severity)</i></p>
(Feuerstein et al. 2003b)	Cross-sectional survey	Modified work	Work-related ULDS	<p><b>Clinical and workplace factors associated with a return to modified duty in work-related upper extremity disorders</b></p> <p>Cross-sectional postal survey 165 US federal government employees (response rate 29%, from 573: 127 females, 38 males) who were unable to resume their normal work after filing a workers compensation claim for a work-related upper extremity disorders (with ICD-9 diagnosis). Measures included pain and symptoms; upper limb functional limitations; self-reported ergonomic exposure; general health; problem solving; physical exertion at work; work style; and treatment helpfulness rating. Subjects not working, compared to those on modified duties, were more likely to report a diagnosis of mononeuropathy; higher pain; greater functional limitations; and, higher level of ergonomic stressors (OR=3.16, 1.43, 1.63, 1.62 respectively). The authors concluded</p>

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				these results support an independent association of upper extremity pain, functional limitation, and workplace ergonomic exposure with the ability of employees to return to modified duties at work. They suggested rates of returning to modified duties may be enhanced by assessing perceived functional limitations and ergonomic exposures in addition to type and severity of symptoms. <i>(See also Shaw &amp; Feuerstein 2004)</i>
(Feuerstein et al. 2003a)	RCT	Integrated case management	Work-related upper extremity disorders	<b>Integrated case management for work-related upper-extremity disorders: Impact of patient satisfaction on health and work status</b> Randomised trial comparing "usual care" (which involved nurse case managers focusing on medical management and workplace accommodation) with "integrated case management" (ICM), where the nurse case managers had been trained in the integration of ergonomic and psychosocial assessment and intervention into work-related upper extremity disorder care and recovery). ICM resulted in significantly higher levels of patient satisfaction. Direct comparisons of other outcomes were not made between the two groups. Instead, the authors conducted multiple linear regression analyses to identify baseline predictors of specific outcomes, and this included group membership. Upper extremity symptom severity was predicted by patient satisfaction at 6-months but not at 12-months; by ergonomic exposures at 12-months; and, by general distress at both 6- and 12-months. Upper extremity functional limitation was predicted by female gender at both 6- and 12-months; by general distress at both 6- and 12-months; by patient satisfaction only at 6-months; and, by treatment group only at 12-months. Longer duration for successful RTW was predicted by older age, upper extremity functional limitations, and lower patient satisfaction. The authors concluded that ICM is associated with improved clinical and work outcomes among those with persistent work-related upper extremity disorders and work loss. They suggest that it provides a pragmatic context to individually consider and address those unique ergonomic and psychosocial factors within the work environment. <i>(The lack of direct statistical comparisons between outcomes by treatment group undermines the strength of these otherwise intriguing conclusions)</i>
(Feuerstein et al. 2005)	Cross-sectional survey	Questionnaire to measure workstyle	Upper extremity pain	<b>Workstyle: development of a measure of response to work in those with upper extremity pain</b> Questionnaire development to measure workstyle (defined as the behavioural, cognitive, and physiological responses to increases in work demands) administered to 282 symptomatic and asymptomatic office workers, to determine psychometric properties. 136 items divided into two sets of items for the final workstyle measure: a set of characteristic responses to work and a set of emotional/physiological responses to increased work demands (dichotomous responses). Results of factor analysis yielded subscales theoretically consistent with the construct under study, including: working through pain, social reactivity at work, limited workplace support, deadlines/pressure, self imposed work pace/workload, breaks, mood, pain/tension, autonomic response, and numbness tingling.



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				Furthermore, results indicated acceptable psychometric properties (internal consistency, test-retest reliability, and construct & discriminant validity). ( <i>Supports biopsychosocial influences on the experience of work-related upper extremity pain</i> ).
(Gimeno et al. 2005)	Prospective survey	Return to work after surgery	Carpal tunnel	<p><b>The role of job strain on return to work after carpal tunnel surgery</b></p> <p>The goal of this study was to examine the impact of job strain (defined as high psychological job demands and low job control, measured by questionnaires including subset of Job Content Questionnaire) on RTW and work role functioning (measured with 26-item questionnaire) following carpal tunnel release surgery (measured at 2 months (n=128) and 6 months (n=122)). Logistic regression results indicated that early RTW (at 2-months) was less likely for those with high demands and high control (active work), and medium-term RTW (at 6-months) was less likely for those with having a job with higher demands than job control (high strain). The authors concluded these findings emphasise the potential role for psychosocial work conditions to influence the RTW process, and that this is consistent with the demand-control model.</p>
(Greening et al. 2003)	Exploratory case-control study	Assessment/ diagnosis technique, without independent reference standard	Non-specific arm pain	<p><b>Sensory and autonomic function in the hands of patients with non-specific arm pain (NSAP) and asymptomatic office workers</b></p> <p>This study addressed the hypothesis that NSAP has a neuropathic cause, using three groups of subjects matched for age and gender: patients with NSAP (n=47), office workers using VDU &gt;40% of time but without NSAP (n=40), and an asymptomatic control group of office workers using VDU &lt;40% of their time (n=44). Measures included: flare responses to iontophoresis of histamine (a sensory C-fiber effect) in the median innervated area of the hand; sympathetic vasoconstrictor responses to ice stimulation over C7; and, vibration threshold over areas of the hand innervated by the median, ulnar and radial nerves was evaluated using a 100 Hz vibrometer. Significant differences from controls were found on all three measures for the NSAP patient group and on two measures for the office workers. Flare area was reduced by 33% in the patients and by 30% in the office workers. Reflex vasoconstriction was reduced by 20% in the patient group but was not altered in office worker group. Over the median innervated area on the hand, vibration threshold was elevated by 47% in the patients and by 21% in the office workers. These results indicate reduced function associated with both small and large sensory fibers, and functional change in sympathetic fibers, in the NSAP patients. The office workers using VDU &gt;40% of the time demonstrated a similar but smaller trend for reduced nerve function associated with both small and large sensory fiber function, but had no change in the sympathetic reflex. The authors suggested these findings were consistent with NSAP patients having a minor neuropathy. (<i>This small exploratory study has provided interesting findings. However, it is unclear whether the observed differences may be contributing causes of the chronic pain problem, effects from it, or a mixture of both. Furthermore, the homogeneity of NSAP patients recruited from physiotherapy, rheumatology and orthopaedic clinics is not clear. Should these findings be replicated, and</i></p>

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				<i>indeed turns out to have a neuropathic component, the key question will be to determine how relevant this factor might be compared to other factors that contribute to this multifactorial problem)</i>
(Greening et al. 2005)	Exploratory case-control study	Assessment/ diagnosis technique, without independent reference standard	Whiplash and non-specific arm pain	<p><b>In vivo study of nerve movement and mechanosensitivity of the median nerve in whiplash and non-specific arm pain patients</b></p> <p>This study addressed the hypothesis that patients with whiplash or NSAP can be differentiated on the basis of nerve movement and nerve trunk mechanosensitivity. 9 whiplash patients were compared with 8 controls, and 8 NSAP patients with 7 controls. Measures included: ULTT1 (consisting of 90° shoulder abduction, and elbow and wrist extension; has been shown to tension the median nerve and brachial plexus); mechanical allodynia over the carpal tunnel; mechanical allodynia just proximal to the carpal tunnel; mechanical allodynia at cords brachial plexus in the supra clavicular fossa; and, TOS (Roo's Test). Longitudinal nerve movement in the forearm was reduced by 71% in the post-whiplash patients, and by 68% in NSAP patients compared to controls. In the whiplash patients the pattern of transverse median nerve movement at the proximal carpal tunnel was significantly different to controls (patient mean=2.57+/-0.80 mm (SEM) in a radial direction; control mean=0.39+/-0.52 mm in an ulnar direction). Signs of neural mechanosensitivity (i.e. painful responses to median nerve trunk and brachial plexus pressure and stretch) were apparent in both patients groups. The authors concluded that these observed changes are contributors to symptoms of whiplash and NSAP. <i>(This very small exploratory study does not provide information about the reliability of any measures. It is unclear whether the observed differences may be contributing causes to chronic pain problems, effects from it, or a mixture of both)</i></p>
(Gummesson et al. 2003)	Cross-sectional survey	Epidemiology – population prevalence	Chronic upper extremity pain	<p><b>Chronic upper extremity pain and co-occurring symptoms in a general population</b></p> <p>A postal survey with an 83% response rate was used to identify the prevalence of chronic upper extremity pain in a Swedish general population sample. It contained items concerning general health, bodily pain, and physical function, as well as questions involving the upper extremities and about the presence, location, duration, frequency, and severity of the symptoms of pain, numbness, and tingling. There were also questions regarding morbidity, sociodemographic data, smoking habits, and physical exercise. Chronic upper extremity pain associated with physical impairment was reported by 21% (of these, 68% were female). The shoulder and upper arm was the most common painful area. 11% reported chronic numbness or tingling. Of those with chronic upper extremity pain associated with physical impairment, 7% reported coexisting chronic numbness or tingling. Chronic pain in multiple areas (neck, low back, or lower extremity) was reported by 81% of those with chronic upper extremity pain associated with physical impairment. Subjects reporting physical impairment-associated upper extremity pain, or pain with coexistent numbness or tingling, were significantly more likely to be blue-collar or manual</p>

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				workers, long-term work absentees, overweight (only among women), and current or former smokers (except for women with numbness or tingling). The authors concluded that chronic upper extremity pain associated with physical impairment, with or without numbness and tingling, is common in the general population. Furthermore, multiple chronic pain sites were also frequent.
(Haahr & Andersen 2003)	RCT	Prognostic factors	Lateral epicondylitis	<p><b>Prognostic factors in lateral epicondylitis: a randomized trial with one-year follow-up in 266 new cases treated with minimal occupational intervention or the usual approach in general practice</b></p> <p>Danish RCT to compare a brief occupational intervention with standard GP care in new cases (n=266, age 18-66) of lateral epicondylitis. The intervention group received a clinical examination and were then given information: the main message was that lateral epicondylitis is usually a self-limiting condition with a favourable prognosis, and variable pain intensity. Patients were also informed that no specific treatment seems to improve the overall long-term prognosis. Advice was given against complete rest and the patients were encouraged to stay active, but with advice to avoid activities found to exaggerate the pain. In cases with a history of strenuous job tasks, the patient was encouraged to adjust work conditions if possible. The patients were then seen by an ergonomist, who gave instructions in performing a graded exercise programme, which was to be used as long as symptoms persisted. Pain reduction was similar in both groups at 1-year follow-up. The intervention group used less treatment and fewer treatment modalities, but there was no reduction in the number of GP and physiotherapist visits. Poor overall improvement was associated with employment in manual jobs (OR=3.0), high level of physical strain at work (OR=8.5), high level of pain at baseline (OR=2.3). Pain reduction less than 50% was associated with manual jobs (OR=2.3), high physical strain at work (OR=3.6), high baseline distress (OR=1.9) and symptoms on dominant side (OR=3.1): no relation was found between the type of medical treatment given/chosen and prognosis. This may have implications for the future management of lateral epicondylitis in terms of a greater focus on interaction with the workplace regarding job modification to reduce physical demands during recovery. (<i>See also Bissett et al 2006; Smidt et al 2002</i>).</p>
(Harman & Ruyak 2005)	Case-control (laboratory)	Task performance	Persistent pain (80% shoulder-neck)	<p><b>Working through the pain: a controlled study of the impact of persistent pain on performing a computer task</b></p> <p>A large percentage of employees experience persistent pain while at work. Controlled study examining the impact of persistent pain on performance in a working population 40 participants (20 pain, 20 controls: 80% cases were working) undertook a computer-based series of tests. People with persistent low-level pain demonstrate a reduction in performance compared with controls (presenteeism). (<i>Mirrors other studies showing high levels of MSD pain among people in work. Whilst the pain may affect aspects of work performance, that does not equate to detrimental effects on the workers</i>).</p>

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(Harrington et al. 1998)	Delphi consensus	Case definition	ULDs	<b>Surveillance case definitions for work related upper limb pain syndromes</b> To establish consensus case definitions for several common work related upper limb pain syndromes for use in surveillance or studies of the aetiology of these conditions. Questionnaire sent to multidisciplinary group of health professionals plus a consensus conference. Consensus case definitions were agreed for carpal tunnel syndrome, tenosynovitis of the wrist, de Quervain's disease of the wrist, epicondylitis, shoulder capsulitis (frozen shoulder), and shoulder tendonitis. The consensus group also identified a condition defined as "non-specific diffuse forearm pain" although this is essentially a diagnosis made by exclusion. The group did not have enough experience of the thoracic outlet syndrome to make recommendations. The criteria may also be useful in surveillance programmes and as aids to case management.
(Henderson et al. 2005)	Cross sectional patient survey	Biopsychosocial modelling	Chronic work-related diffuse upper limb pain or CTS	<b>Chronic upper limb pain: an exploration of the biopsychosocial model</b> Questionnaires for pain, disability, and personality; psychiatric morbidity assessed by interview. Illness behaviour measured by assessing coping strategies, illness beliefs, financial benefits, movements of affected limb. In both pain conditions, disability was positively correlated with present pain intensity, depression, helpless coping style, and receipt of state financial benefits; and was negatively correlated with age. Final model explained 15% of the variance and correctly classified 75% of all patients. Inclusion of diagnostic group has no effect on these models. The correlations between disability and pain intensity with both psychosocial and physical factors support the biopsychosocial model of disability (and pain to lesser extent) irrespective of the diagnosis.
(Hill et al. 2007)	Cross-sectional survey	Illness perceptions	Musculoskeletal hand problems	<b>The illness perceptions associated with health and behavioural outcomes in people with musculoskeletal hand problems: findings from the North Staffordshire Osteoarthritis Project (NorStOP)</b> Two-stage cross-sectional postal survey: individuals aged 50 yrs and over, registered with general practices in North Staffordshire. Stage 1, a Health Survey questionnaire, sent to 11 230 individuals and enquired about general health status, including anxiety and depression. Individuals reporting hand problems at Stage 1 were sent Stage 2, a detailed hand questionnaire. The results suggest that older people who consider their musculoskeletal hand problem to have negative effects on their life will be more likely to encounter difficulties that may lead them to consult, take medication or both. There was little difference between individuals who did and those who did not report their hand problem to be osteoarthritis with respect to perceptions or between perceptions associated with health and behaviour. Understanding these illness perceptions may identify opportunities for intervention.
(Huang & Feuerstein 2004)	Cross-sectional	Work disability	Low back and/or upper extremity	<b>Identifying work organisation targets for a work-related musculoskeletal symptom prevention programme</b> Questionnaire study of 248 US Marines (87% male, average age 27.9 years), selected

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			symptoms	from jobs (primarily office-based) considered to have higher rates of musculoskeletal conditions. Data collected included age, gender, marital status, education level, rank, length of service, military occupational specialty, and length of time in speciality. Additionally, biomechanical exposures/ergonomic factors, characteristics of work organization, individual psychosocial stressors, musculoskeletal symptoms, and general health were assessed. Logistic regression models derived for back pain only (20%), upper extremity only (21%), back pain plus upper extremity (29%), and asymptomatic (30%) groups. Those with concurrent low back and upper extremity symptoms were significantly older than asymptomatic individuals. Time pressure and ergonomic stressors (measured by the Job Requirements and Physical Demands Survey) were significantly associated with all symptomatic groups. Cognitive processing was associated with combined back and upper extremity pain. Interpersonal demands were associated with a lower risk of back pain only. Compared to asymptomatic individuals, all three symptomatic groups had significantly greater pain intensity and lower levels of physical function. However, the symptomatic groups did not differ from the asymptomatic group on a global measure of mental health suggesting that differential levels of distress cannot account for the observed findings regarding the risks of work organization on the symptoms. The authors concluded their findings suggest secondary prevention programmes should incorporate methods that target ergonomic factors and work organization that contribute to increased time pressure and cognitive stress.
(Hughes et al. 2007)	Experimental study	Risk factors whilst typing	ULDs	<b>Effects of psychosocial and individual factors on physiological risk factors for upper extremity musculoskeletal disorders while typing</b> Experimental 3x3 factorial study to test the effects of three levels of mental workload and three levels of time pressure on several physiological, performance and psychological variables. 18 typists completed nine experimental trials representing each combination of mental workload (imposed by using verbal arithmetic tasks) and time pressure (imposed by typing speed constraints). Authors concluded that the specific psychosocial and individual factors under investigation mediate physical factors during typing: while it is difficult to address some psychosocial factors in the workplace, allowing employees to arrange the order of activities can relieve mental workload, and avoiding machine-paced work can relieve time pressure.
(Huisstede et al. 2007)	Delphi consensus	Classification	Complaints of the arm, neck and/or shoulder	<b>Multidisciplinary consensus on the terminology and classification of complaints of the arm, neck and/or shoulder</b> 47 experts in the field of upper-extremity musculoskeletal disorders were delegated by 11 medical and paramedical professional associations to form the expert panel. The experts reported the consensus in a model. This so-called CANS model describes the term, definition and classification of complaints of arm, neck and/or shoulder (CANS) and helps professionals to classify patients unambiguously. CANS is defined as "musculoskeletal complaints of arm, neck and/or shoulder not caused by acute trauma or by any systemic

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				<p>disease". The experts classified 23 disorders as specific CANS, because they were judged as diagnosable disorders. All other complaints were called non-specific CANS. In addition, the experts defined "alert symptoms" on the top of the model. The expert panel decided to use "complaints" instead of "complaints of pain" because pain and also other sensations, such as tingling, can be involved. The factor "work-relatedness" is not mentioned in the CANS model, and is not a decision-making factor for including or excluding patients in the CANS model. The model does more justice to reality, as activities at work as well as activities in daily living, such as housekeeping, sports, hobbies and stress at home, can influence the complaints. The group did not develop consensus on the diagnostic criteria for these disorders because the aim of the project was to agree on an "unambiguous language". <i>(Conceptually the model seeks to reflect the high prevalence, subjective nature, and multifactorial origin of upper limb complaints. Applying the classification will requires the skills of health professionals. The 'alert symptoms' are not actually 'red flag' symptoms, but simply a reminder that upper limb symptoms can be due to organic pathology).</i></p>
(Ijzelenberg et al. 2004)	Cross-sectional	Risk factors	MSDs and sickness absence	<p><b>Different risk factors for musculoskeletal complaints and musculoskeletal sickness absence</b>            Questionnaire survey with 87% response rate of laundry and dry-cleaning workers (n=373, 66% female). The 12-month prevalence of musculoskeletal complaints and related sickness absence were 50% for LBP, with 14% taking sickness absence; 58% for upper extremity complaints (neck 31%, shoulder 45%, elbow/wrist/hand 24%), with 14% taking sickness absence. Logistic regression was used to identify factors associated musculoskeletal complaints, and taking sickness absence as separate dependent variables. The presence of upper extremity musculoskeletal complaints was associated with female gender, strenuous arm movements, and low job satisfaction, but the opposite for non-immigrants, and those actively involved in a sport. Sickness absence was associated with gender, being an immigrant, and strenuous arm movements. There were some differences for LBP. The authors concluded that work-related physical and psychosocial factors appear to determine the occurrence of musculoskeletal symptoms, whereas individual factors seem to determine whether these persons will take sick leave.</p>
(Ijzelenberg & Burdorf 2005)	Longitudinal questionnaire survey	Risk factors: symptoms and healthcare	General MSDs (including low back pain)	<p><b>Risk factors for musculoskeletal symptoms and ensuing health care use and sick leave</b>            Longitudinal questionnaire survey of industrial workers (590 eligible subjects, 505 (86%) responded, 407 available at 6-month follow-up (81%)). Variables included demographic and work-related factors, musculoskeletal symptoms, healthcare use, and sick leave. The one-year prevalence of neck/upper extremity symptoms was 56%, with a 62% recurrence rate during the 6-month study period. The proportion reporting chronic neck/upper limb symptoms was 10.8% at baseline and 13.8% at follow-up. At baseline 22.9% reported elbow, wrist or hand pain and this reduced to 19.9% at follow-up. According to the</p>



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				multivariate analysis, risk for neck/upper limb symptoms was high job strain; for use of healthcare it was being female and high job strain; for sick leave it was being female, living alone, and high job strain. The results were slightly different for low back pain (risk of symptoms was due to high-perceived physical load, high job strain, and reduced social support from the supervisor; healthcare use was due to high-perceived physical workload and reduced social support from the supervisor; and, sick leave was due to older age and high job strain). The authors concluded that prevention strategies aimed at preventing onset of symptoms and reducing sick leave may need to target different sets of risk factors for different types of musculoskeletal problems.
(Kendall & Thompson 1998)	Narrative review and quasi-experimental comparative study	Multimodal RTW programme	Chronic musculoskeletal pain	<p><b>A pilot program for dealing with the comorbidity of chronic pain and long-term unemployment</b></p> <p>Provides a narrative review of the role of cognitive-behavioural programmes for chronic musculoskeletal pain in the RTW process, and concludes there have been mixed results reported in the literature. At least part of the reason for this is methodological, with inconsistent methods for describing and measuring RTW outcomes. Furthermore, most studies fail to report whether patients have jobs open to return to. The authors describe four possible employment outcomes for chronic pain patients (SJSE-Same Job, Same Employer; DJSE-Different Job, Same Employer; SJDE-Same Job, Different Employer; and, DJDE-Different Job, Different Employer) and note that the majority of long-term chronic pain patients do not have jobs open for them, therefore the relevant RTW outcome involves either SJDE or DJDE. They hypothesise that for these cases the availability of a job may be an important determinant in the RTW process, but that this is more dependent on features such as job-seeking skills and labour market conditions than on health status. That is, many chronic pain patients experience the problems of long-term unemployment in addition to their pain problem. They describe the development of a conceptual approach for managing work-disability and chronic pain as comorbid problems. This involves simultaneously addressing problems such as identifying transferable skills, CV preparation, applying for a job and attending an interview, etc. along with developing pain management skills and coping strategies. They describe a waiting-list controlled study that found significantly improved RTW rates following delivery of this intervention.</p>
(Macfarlane et al. 2000)	Prospective cohort study	Mechanical and psychosocial factors	Forearm pain	<p><b>Role of mechanical and psychosocial factors in the onset of forearm pain: prospective population based study</b></p> <p>This study aimed to determine the relative contribution of (a) psychological factors, features of somatisation, and health anxiety and behaviour, (b) work related mechanical factors, and (c) work related psychosocial factors in the onset of forearm pain. 1,953 subjects aged 18 to 65 were selected from a much larger pool in another related study, who had been randomly selected from GP registers in Altrincham, Greater Manchester. The method was a 2-year prospective population-based cohort study, with retrospective assessment of workplace exposures. Baseline data was collected for 1,715 subjects by</p>

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Authors	Study type	Topic	ULD condition	Key findings <i>(Reviewers' comments in italic)</i>
				<p>questionnaire. At 2-year follow-up 1,398 subjects were available and complete data was collected for 1,260. Of these, 105 reported forearm pain of new onset lasting at least one day in the past month. Among these, 67% also reported shoulder pain, 65% back pain, and 45% chronic widespread pain. Increased risks of onset were associated with high levels of psychological distress (relative risk, RR 2.4), reporting at least two other somatic symptoms (RR 1.7), and high scores on the illness behaviour subscale of the illness attitude scales. The two work-related mechanical exposures associated with the highest risk of forearm pain in the future were repetitive movements of the arm (RR 4.1) or wrists (RR 3.4), whereas the strongest work-related psychosocial risk was dissatisfaction with support from colleagues or supervisors (RR 4.7). The authors concluded that psychological distress, aspects of illness behaviour, and other somatic symptoms are important predictors of onset of forearm pain in addition to work-related psychosocial and mechanical factors. They further argued that terminology such as "cumulative trauma disorder" or "repetitive strain injury" (which imply a single uniform aetiology) are misleading and should be avoided.</p>
(Marhold et al. 2001)	RCT	CBT programme for RTW	Musculoskeletal pain	<p><b>A cognitive-behavioral return-to-work program: effects on pain patients with a history of long-term versus short-term sick leave</b></p> <p>RCT with 72 female subjects aged 25 to 60 with a diagnosis of musculoskeletal pain, an open job, but on sick leave due to the pain problem. Half the subjects (n=36) were on long-term sick leave (&gt;12 months) at the start of the program and the other (n=36) had a history of short-term sick leave (2-6 months). These groups were randomised to receive the experimental intervention, or the control condition (treatment-as-usual, in practice receiving treatment from doctors, physiotherapists, and nurses). This meant there were four groups with 18 subjects each. The treatment groups were admitted to a 12-session outpatient cognitive-behavioural return-to-work programme. This was conducted by a psychologist, and contained coping strategies such as applied relaxation, stress management, graded activity training and pacing; how to manage difficulties in their return-to-work process; and, how to generalise coping strategies to different risk factors at their workplaces. The CBT programme was more effective at reducing the number of days sick leave over the following 6-months, compared to the control groups. However, it was most effective for those with a shorter history of sick leave. The treatment programme also helped the patients on short-term sick leave to increase their ability to control and decrease pain and to increase their general activity level (measured by self-report questionnaires) compared to the control condition. These results emphasise the need for return-to-work strategies to delivered early to prevent long-term sick leave and disability. <i>(This is a good quality RCT that used a sample with musculoskeletal pain problems at a mixture of bodily sites. They were all soft-tissue in nature, but the focus was not exclusively on upper-limb pain. Given the likelihood that many persistent upper limb pain problems result from similar processes, no matter what the site, this approach may yield promise in general).</i></p>



**Table A4. Individual studies of particular relevance**

<b>Authors</b>	<b>Study type</b>	<b>Topic</b>	<b>ULD condition</b>	<b>Key findings</b> <i>(Reviewers' comments in italic)</i>
(Meijer et al. 2006)	RCT	Multidisciplinary treatment	ULDs	<p><b>Cost-effectiveness of multidisciplinary treatment in sick-listed patients with upper extremity musculoskeletal disorders: a randomized, controlled trial with one-year follow-up</b></p> <p>Small trial (n=38) comparing multidisciplinary treatment with usual occupational health care. The intervention consisted of psychological and physical sessions provided by a medical specialist, a psychologist, a physiotherapist and an occupational therapist – it aimed at reconditioning, “demedicalising”, unrestrained moving, and return-to-work. Multidisciplinary treatment affects individuals positively – improved physical disability, severity of complaint, kinesiophobia, and physical functioning. No significant difference in (cost-) effectiveness on the societal level (RTW) as compared to usual care.</p>
(McBeth et al. 2003)	Prospective survey	Epidemiology – risk factors	Chronic widespread pain	<p><b>The role of workplace low-level mechanical trauma, posture and environment in the onset of chronic widespread pain</b></p> <p>Population-based 3-year prospective survey of 1658 symptom-free working-age adults. Baseline data: work-related mechanical and environmental factors and individual psychosocial factors. In multivariate analysis, pushing/pulling heavy weights, repetitive wrist movements, kneeling, and other pain at baseline were somewhat associated with new-onset chronic widespread pain. However, the strongest predictor was a high score on the illness behaviour scale. There is only limited support for low-level mechanical injury being a risk factor for chronic widespread pain, the onset of which is multifactorial and strongly associated with individual psychosocial factors. <i>(Although there may be similarities, chronic widespread pain and regional pain are different entities).</i></p>
(McCluskey et al. 2006)	Controlled trial	Biopsychosocial workplace intervention	General MSDs <i>(mainly back pain)</i>	<p><b>The implementation of occupational health guidelines principles for reducing sickness absence due to musculoskeletal disorders</b></p> <p>Occupational health nurses trained to implement a workplace intervention for MSDs that used biopsychosocial principles for overcoming obstacles to recovery and facilitating return to work (no specific healthcare component) – programme aimed to get all players onside. If delivered early, the programme improved return to work time for presenting spell, and also reduced further absence over ensuing 12 months. <i>(This was a pragmatic trial of an intervention package – not possible to disentangle the psychosocial components from the early delivery).</i></p>
(Mikkelsen et al. 2007)	Observational study	Computer and mouse use		<p><b>Validity of questionnaire self-reports on computer, mouse and keyboard usage during a 4 week period</b></p> <p>Self-reports on computer, mouse and keyboard usage times were positively associated with objectively measured activity, but the validity was low. Self-reports explained only between a quarter and a third of the variance of objectively measured activity, and was even lower for one measure (keyboard time). Self-reports overestimated usage times. Overestimation was large at low levels and declined with increasing levels of objectively measured activity. Mouse usage time proportion was an exception with a near 1:1</p>

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				relationship. Variability in objectively measured activity, arm pain, gender, and age influenced self-reports in a systematic way, but the effects were modest and sometimes in different directions. Studies using self-reports to establish relations between computer work times and musculoskeletal pain could be biased and lead to falsely increased or decreased risk estimates.
(Morse et al. 1998)	Randomised population-based telephone survey	Economic and social costs	Work-related MSDs (upper extremity symptoms)	<p><b>The economic and social consequences of work-related musculoskeletal disorders: the Connecticut upper-extremity surveillance project (CUSP)</b></p> <p>A population-based telephone survey was conducted in Connecticut to determine the social and economic impact of work-related musculoskeletal disorders (pain or discomfort was identifier of 'case'). Respondents had spent an average of \$489 annually out-of-pocket. Only 21% of individuals who had had medical visits or procedures reported having them paid for by workers' compensation. The WRMSD cases reported much higher levels of difficulty in daily tasks rated by the activities of daily living scale, with odds ratios ranging from 8.2 (child care) to 35.2 (bathing). The cases were significantly more likely to have moved for financial reasons (OR = 2.41), including having lost a home (OR = 3.44). The cases were also significantly more likely to have lost a car due to finances (OR = 2.45), more likely to have been divorced (OR = 1.91), and less likely to have been promoted (OR = 0.45). The study supports significant externalization of costs for WRMSD out of the workers' compensation system and a substantial social and economic impact on workers. The overall results of the survey are contrary to the position that WRMSD are over-reported. (<i>Irrespective of purported cause and this being a US study, these social consequences might be avoidable with appropriate management of ULDs</i>). (<i>Same sample as Warren et al 2000</i>).</p>
(Munir et al. 2007)	Cross-sectional survey	Distress	Common health problems (incl. musculoskeletal pain)	<p><b>Work factors related to psychological and health-related distress among employees with chronic illnesses</b></p> <p>Examined specific psychosocial factors associated with distress amongst a sample of 1029 employees managing either musculoskeletal pain (n=324), arthritis and rheumatism (n=192), asthma (n=174), depression and anxiety (n=152), heart disease (n=96) or diabetes (n=91). Low psychological well-being and high distress were associated with an increase in work limitations, poorer management of illness symptoms at work, high presentieesm, and low workplace support. To enable individuals to effectively manage both their illness and their work without serious repercussions, it is important for both healthcare professionals and employers alike, to improve the well-being of workers with chronic illness by supporting and facilitating their efforts to over-come health-related limitations at work. (<i>Although not focused on ULDs, this study has a general message regarding common health problems and work – accepting that work is desirable, workers need some help from the other players</i>).</p>

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<b>Authors</b>	<b>Study type</b>	<b>Topic</b>	<b>ULD condition</b>	<b>Key findings</b> ( <i>Reviewers' comments in italic</i> )
(Papanicolaou et al. 2001)	Cross-sectional survey	Epidemiology - prevalence of nerve compression symptoms	Carpal tunnel syndrome	<p><b>The prevalence and characteristics of nerve compression symptoms in the general population</b></p> <p>The goal of this study was to evaluate the prevalence and intensity of nerve compression symptoms, and hence to estimate the prevalence of carpal tunnel syndrome (CTS) in the general population. It was conducted in response to the observed rise in the US in the incidence of disorders associated with repetitive trauma, of which the major portion is CTS. Complete data was collected by postal survey on 390 individuals, from a total pool of 1559. Telephone interview data were collected from 110 randomly selected non-responders, to allow for correction to the data collected from the responders. Three main measures were used: the Katz Hand Diagramme; the SF-36 general health questionnaire; and, the Carpal Tunnel Instrument. After correcting for non-responders the lowest estimate for prevalence of CTS in the US population was 3.7%.</p>
(Porter-Moffitt et al. 2006)	Cross-sectional	Biopsychosocial profiles	MSDs including ULDs	<p><b>Biopsychosocial profiles of different pain diagnostic groups</b></p> <p>Biopsychosocial profiles were examined for 7 different pain diagnostic syndromes (fibromyalgia, upper extremity pain, cervical pain, thoracic pain, lumbar pain, lower extremity pain, and headache). 661 patients (50% low back pain). In general, the lumbar, fibromyalgia, and lower extremity groups reported more physical/functional limitations, and the fibromyalgia and headache groups reported more psychosocial difficulties. Individuals with upper extremity disorders (n=32) were more likely to be involved in pending litigation, which could be due to the type of work that patients are involved in that would require upper extremity use. The upper extremity group had significantly more health care visits during the past 6 months; this could be due to the fact that upper extremity disorders can limit one's ability to perform daily tasks and activities, which could lead individuals to visit their physicians in search of relief or assistance. Also, this group scored high on measures of depression, and their high depression levels could also cause them to seek outside help and feel unsure that they could handle their pain alone. (<i>These data place ULDs firmly in the biopsychosocial arena</i>).</p>
(Ratzon et al. 2006)	Longitudinal	RTW + surgeon recommendations	Carpal tunnel surgery	<p><b>Time to return to work and surgeons' recommendations after carpal tunnel release</b></p> <p>Fifty consecutive employed patients undergoing carpal tunnel surgery were tested pre-operatively, and then post-operatively using both questionnaires and objective testing. Time to return to work was extremely variable ranging from 1 to 88 days. Post-operative recommendations by the surgeon varied widely from 1 to 36 days. Surgeons' recommendations were the strongest predictors of delayed return to work, with physical work and lack of self-rated health adding significantly to the predictive model. Patient symptoms and objective findings of disability did not add significantly to a logistic regression model either predicting return to work or the surgeon's recommendations. Physical leisure activity more common in those who returned early. Belief that early return will damage health more common in late returners. Authors suggest much sick leave</p>

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				unnecessary, and conclude that workers will return to work in less than 3 weeks if recommended by the surgeon - regaining full preoperative function is not a prerequisite.
(Roquelaure et al. 2006) + (Melchior et al. 2006)	Random sample cross-sectional surveillance	Epidemiology - Physical work factors	ULDs	<p><b>Why are manual workers at high risk of upper limb disorders? The role of physical work factors in a random sample of workers in France (the Pays de la Loire study)</b></p> <p>Random sample of 2656 French men and women (20–59 years old) participating in a study on the prevalence of work related upper limb disorders. More than 50% experienced non-specific musculoskeletal symptoms during preceding 12 months, and 30% experienced them in preceding week. Prevalence ratios (PR) of physician-diagnosed musculoskeletal disorders were calculated for manual versus non-manual workers (any of six principal upper limb disorders (rotator cuff syndrome, epicondylitis, cubital tunnel syndrome, extensor/flexor tendonitis/tenosynovitis, de Quervain's disease, and carpal tunnel syndrome): 11.3% of men and 15.1% of women were diagnosed with an upper limb disorder (rotator cuff &gt; carpal tunnel syndrome &gt; lateral epicondylitis). PRs increased with age and varied widely across economic sectors and occupations. The risk was especially high in manual workers (PRs: 1.40 to 2.10). Physical work factors accounted for over 50% of occupational disparities overall, 62% (men) to 67% (women) for rotator cuff syndrome, and 96% (women) for carpal tunnel syndrome. In working men and women, upper limb musculoskeletal disorders are frequent. Physical work exposures, such as repetitive and forceful movements, are an important source of risk and in particular account for a large proportion of excess morbidity among manual workers. (<i>Cross-sectional design, thus unable to address primary causation, but the study did provide data on occupational physician-diagnosed specific ULDs as well as self-reporting: but, confirms high prevalence of ULDs. Authors acknowledged that the occupational physicians who took part in the study may have been particularly concerned by workers' musculoskeletal health, and they had access to participants' data before the clinical examination, which may have lead to information bias in respect or occupational causation Authors concluded around 90% of cases could be classified as work-related (according to An expert criteria consensus document) but the cross-sectional design and the fact that work exposures were self-reported, limits their claim that there is a need for prevention programmes; the concept of work-relevant was seemingly not considered.</i></p>
(Shaw & Feuerstein 2004)	RCT + conceptual interpretation	Modified work + case management	Work-related ULDs	<p><b>Generating workplace accommodations: lessons learned from the Integrated Case Management Study</b></p> <p>Modified duty and other accommodations by employers have been shown to be helpful in managing workplace disability associated with injuries and illnesses. The results of a randomized controlled study of case management services for work-related upper extremity disorders inform on improving accommodation efforts. To facilitate accommodations, case managers developed a written list of needed workplace accommodations that specified responsibilities and target dates for obtaining</p>

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				management approvals and ordering, installing, or modifying equipment or workstations. Although this systematic approach led to more accommodations, 25% of those recommended were never implemented. Therefore, significant obstacles may remain for employers to allow or provide some accommodations, even when relatively rigorous approach to needs assessment and implementation is followed. Design of self-report measures of function, exposure, and accommodation should take into account the collaborative, back-and-forth process that may be necessary to reach agreement about accommodations that are helpful to workers and feasible for employers. Measures that list a variety of possible accommodations and provide physiological rationale might yield the best results. ( <i>Emphasises that, whilst modified work can be advocated, achieving the optimal accommodations may require careful negotiation between employee, workplace, and healthcare</i> ) ( <i>See also Feuerstein et al 2003</i> ).
(Shaw et al. 2007)	Longitudinal	Workplace management	General MSDs	<p><b>A staged approach to reducing musculoskeletal disorders (MSDs) in the workplace: a long term follow-up</b></p> <p>New tools to measure organisational and worker stage of change with respect to MSDs were developed and then used to develop interventions tailored to manager and worker stage of change. The effectiveness of tailored compared to standard interventions was measured on a variety of levels, including stage of change and self-reported musculoskeletal discomfort. Evaluations were conducted 6 months after the implementation of the interventions. Tailored interventions were significantly more effective in promoting risk-awareness; promoting progression through the stages of change; promoting behaviour change and reducing self-reported musculoskeletal discomfort in a number of body areas. To determine if the positive findings seen at 6 months persist over the long term, the authors conducted a longer-term follow-up of the interventions at 15 months post-intervention and at 20 months post-intervention. The impact of the tailored interventions was sustained from 6 months post-intervention to 15 and 20 months post-intervention. For some body areas, there were further reductions in the percentage of workers reporting discomfort at 15 and 20 months compared to 6 months. While standard interventions showed some reductions in discomfort at 15 and 20 months, tailored interventions had a far greater impact in terms of changing behaviour and reducing MSD symptoms from 6 months to 20 months. (<i>The authors suggest</i>) The findings provide strong evidence for the long-term effectiveness of tailored interventions versus standard interventions in promoting behaviour change and reducing musculoskeletal discomfort. Wide adoption of this approach is likely to make a significant contribution to reducing both the prevalence and incidence of MSDs.</p>
(Silverstein et al. 2006)	Longitudinal	Epidemiology – incidence, prevalence, persistence	Rotator cuff tendinitis	<p><b>Natural course of nontraumatic rotator cuff tendinitis and shoulder symptoms in a working population</b></p> <p>Prospective study of 436 active workers conducted at 12 different worksites (mostly manufacturing) - follow-up of 62% of baseline cohort, which itself was a 65%</p>

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				participation rate. Detailed health interviews, psychosocial questionnaires, and physical examinations were conducted at baseline and again after 1 year, with shorter evaluations at 4 and 8 months. Two-thirds had symptoms and/or signs at baseline, though they were still working. The prevalence of rotator cuff tendinitis at baseline was 7.6% right; 4.8% left, and for shoulder symptoms was 18.6% right; 11.2% left. The annual incidence of rotator cuff tendinitis was 5.5% right; 2.9% left. Higher proportions of participants with current symptoms or physical findings at baseline became clinical cases after 1 year. The 1-year persistence of symptoms was 41%; the 1-year persistence of clinical case status was 31%. There were significant differences at baseline between the asymptomatic participants and the clinical cases with respect to physical health on the SF-12, the perception of general health, and the frequency of high hand force exposure. Interference with work performance or productivity was notable for some of the clinical cases, but missed workdays were reported infrequently. Reported job changes were common across the population (not just among the cases). Symptoms and physical findings appear to predict clinical case status within 1 year. Shoulder problems appear to be frequent and volatile in their course. ( <i>Workloss is not inevitable. These data emphasise the recurrent and persistent nature of symptoms and signs in rotator cuff tendinitis; previous trouble is a predictor of future trouble. Psychosocial factors were not used in prediction model</i> ).
(Singh et al. 2004)	Prospective case series	Interdisciplinary pain management	Complex regional pain syndrome	<b>The value of interdisciplinary pain management in complex regional pain syndrome type I: A prospective outcome study</b> Authors reports that an intensive approach to upper extremity CRPS, combining physical and occupational therapy under-girded by an aggressive neuropsychological behavioural strategy, and aided by interventional and medical treatment, produced significant, persistent improvement in function. At 2-year follow-up 75% of patients were employed. ( <i>A very heavy duty intervention</i> ).
(Sjögren et al. 2005)	RCT	Workplace exercises	Headache; neck or shoulder pain	<b>Effects of a workplace physical exercise intervention on the intensity of headache and neck and shoulder symptoms and upper extremity muscular strength of office workers: a cluster randomized controlled cross-over trial</b> Examination of the effects of a workplace physical exercise intervention (daily light resistance training) on the perceived intensity of headache and neck and shoulder symptoms, as well as on the extension and flexion strength of the upper extremities. The study was a cluster randomized controlled trial. The cross-over design consisted of physical exercise intervention (15 weeks) and no-intervention (15 weeks). The subjects (n=53) were office workers (mean age 47) who reported headache (n=41) symptoms in the neck (n=37) or shoulders (n=41), which had restricted their daily activities during the last 12 months. Physical exercise intervention resulted in a slight, but statistically significant, decrease in the intensity of headache and neck symptoms, as well as an increase in the extension strength of the upper extremities; the intervention had no effect on the intensity of shoulder symptoms or the flexion strength of the upper extremities.



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<b>Authors</b>	<b>Study type</b>	<b>Topic</b>	<b>ULD condition</b>	<b>Key findings</b> <i>(Reviewers' comments in italic)</i>
(Smidt et al. 2002)	RCT	Clinical management	Epicondylitis	<p><b>Corticosteroid injections, physiotherapy, or a wait-and-see policy for lateral epicondylitis: a randomised controlled trial</b></p> <p>Patients (n=185) from primary care with &gt;6 weeks symptoms randomly allocated to (1) treatment with corticosteroid injections (max 3), (2) physiotherapy (9 treatments of ultrasound, deep friction massage, and exercise programme, (3) wait-and-see following advice on spontaneous improvement and discussion of pain provoking activities + analgesics. At 6 weeks, corticosteroid injections were significantly better than all other therapy options for all outcome measures. However, the benefit only lasted a short time - recurrence rate in the injection group was high. Long-term differences between injections and physiotherapy were significantly in favour of physiotherapy. Physiotherapy had better results than a wait and-see policy, but differences were not significant. Patients should be properly informed about the advantages and disadvantages of the treatment options for lateral epicondylitis. The decision to treat with physiotherapy or to adopt a wait-and-see policy might depend on available resources, since the relative gain of physiotherapy is small. <i>(See also Bissett et al 2006).</i></p>
(Thomsen et al. 2007)	Prospective	Risk factors	Hand-wrist disorders	<p><b>Risk factors for hand-wrist disorders in repetitive work</b></p> <p>Using questionnaires and physical examinations, the prevalence and incidence of hand-wrist pain and possible extensor tendonitis (wrist pain and palpation tenderness) were determined in 3123 employees in 19 industrial settings. With the use of questionnaires and video recordings of homogenous work tasks number of wrist movements, hand force requirements, and wrist position were analysed as risk factors for hand-wrist disorders, controlling for potential personal and psychosocial confounders. All participants were re examined three times during a follow-up period of three years. Force but not repetition and position was related to hand-wrist pain and possible tendonitis in the baseline analyses showing an exposure-response pattern. Odds ratios for the risk of hand pain was 1.7 and for possible tendonitis 1.9. There was no significant interaction between the ergonomic factors. In the follow-up analyses force remained a risk factor for hand pain (OR 1.4) and for possible tendonitis (OR 2.9). Repetition was also a risk factor for the onset of hand-wrist pain (OR 1.6). Increasing levels of force were associated with prevalent and incident hand-wrist pain and possible extensor tendonitis. The results for repetition were less consistent. Working with the hand in a nonneutral position could not be identified as a risk factor. <i>(The term hand-wrist disorders was defined as self-reported symptoms with or without palpation tenderness, thus the outcome here strictly is symptoms not a specific diagnosis or disorder).</i></p>
(Tsauo et al. 2004)	Comparative study	Exercise and health education	Neck and shoulder complaints	<p><b>Physical exercise and health education for neck and shoulder complaints among sedentary workers</b></p> <p>To assess the effectiveness of 3 different health promotion exercise programs for work-related shoulder and neck pain, a total of 178 employees were recruited and grouped. Those in the "Self-exercise group" (n = 56) were given a lecture about the exercise</p>

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				program and then performed the program by themselves during their office break. "Team-exercise group I" (n = 69) performed the program once under the supervision of a physiotherapist after the lecture. "Team-exercise group II" (n = 14) performed the program twice; once under a physiotherapist's supervision. When daily change of pain threshold (post-work - pre-work) was treated as an improvement index, the odds ratios for the self-exercise group, team-exercise group I and team-exercise group II were 1.39, 4.63 (p < 0.05) and 7.06 (p < 0.05), respectively, compared with the reference group. An intensive team-exercise program is beneficial in reducing neck and shoulder symptoms in sedentary workers.
(van den Heuvel et al. 2005)	Prospective cohort study	Epidemiology – psychosocial work characteristics	Neck and upper limb symptoms	<b>Psychosocial work characteristics in relation to neck and upper limb symptoms</b> Used 787 workers (mixed occupations) who reported no symptoms at baseline, and provided complete follow-up data at 3 years. The 3-year cumulative incidence was 24% for neck/shoulder symptoms and 15% for elbow/wrist/hand symptoms. Both univariate and multivariate analyses conducted. Variables controlled for were age and gender, physical risk factors, stress symptoms, and personal factors. High job demands predicted neck/shoulder symptoms (RR 2.1) and elbow/wrist/hand symptoms (RR 1.9). Low social support was identified as a risk factor for elbow/wrist/hand symptoms (RR 2.2).
(van den Heuvel et al. 2006)	Prospective cohort study	Epidemiology – physical factors of work	Neck and upper limb symptoms	<b>Do work-related physical factors predict neck and upper limb symptoms in office workers?</b> Examined the influence of physical exposure at work on neck and upper limb symptoms in office workers; prospective cohort study with a follow-up period of 3 years. Only a limited number of work-related physical factors were related to neck and upper limb symptoms in office workers: neck rotation and self-reported neck extension were identified as risk factors (small ORs) for neck-shoulder symptoms, whilst none of the physical variables were significantly associated with elbow–wrist–hand symptoms. There was non-significant indication of an adverse effect from longer working time.
(van Rijn et al. 2007)	Retrospective analysis of clinical data	Onset of movement disorder	Chronic regional pain syndrome	<b>Onset and progression of dystonia in complex regional pain syndrome</b> Complex regional pain syndrome (CRPS) may lead to movement disorders (MDs) in some patients. Retrospective evaluation of the clinical and temporal characteristics of MDs in patients with CRPS. 185 five patients suffered CRPS in one or more extremities. MDs occurred in 121 patients, with dystonia (91%) being the most prevalent. We conclude that dystonia in CRPS shows highly variable onset latency and is associated with younger age at onset and increased risk of developing dystonia in other extremities. The delayed onset and progression of dystonia in CRPS may indicate the involvement of a different underlying mechanism, possibly associated with maladaptive neuroplasticity.
(Walker-Bone et al. 2004b)	Cross-sectional survey	Epidemiology - pattern and determinants	Neck and upper limb pain	<b>The anatomical pattern and determinants of pain in the neck and upper limbs: an epidemiologic study</b> Community survey (62% response from 9,696 working-age adults) concerning pattern



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				and determinants of neck, shoulder, elbow, wrist/hand pain. 1-week prevalence 44% for any site (neck 24% - shoulder 24% - elbow 11% - wrist/hand 21%). 1-week prevalence of difficulty with normal activities 31% for any site (neck 17% - shoulder 14% - elbow 7% - wrist/hand 15%). Pain frequently bilateral, in dominant arm, and at anatomically adjacent sites: pain at all sites far more common than statistically expected. Being female, unemployed, a blue-collar worker, or a smoker were independent risk factors for extensive pain, but strongest association was with psychological ill-health. The excess of symptoms in dominant arm could result from physical stresses, but also possible that higher levels of activity increase awareness of symptoms without necessarily causing local pathology in the arm.
(Walker-Bone et al. 2004a)	Cross-sectional survey	Epidemiology – prevalence and impact	Upper limb symptoms and disorders	<p><b>Prevalence and impact of musculoskeletal disorders of the upper limb in the general population</b></p> <p>Study using 6,038 (who were responders from initial sample of 9,696 adults of working age, randomly selected from GP registers) that aimed to determine prevalence and impact of upper limb disorders in the general population. 3,152 (52%) reported symptoms (pain lasting 1 day or longer, or dysesthesia lasting at least 3 minutes) in the last 7 days. Allowing for overlap of symptoms (neck or upper limb) this corresponded to a 1-week prevalence of 24% for neck pain, 36% for upper limb pain, and 27% for sensory symptoms. All responders who reported symptoms in the previous week were invited to an assessment, and 1,960 accepted this offer. They did not differ from those who declined. Of subjects with pain, 44.8% had 1 or more specific soft-tissue disorders. Site-specific prevalence rates were: shoulder tendinitis 4.5% (male) and 6.1% (female); adhesive capsulitis 8.2%(male) and 10.1%(female); lateral epicondylitis 1.3% (male) and 1.1% (female); de Quervain's disease 0.5% (male) and 1.3% (female); other tenosynovitis of the hand or wrist, 1.1% (male) and 2.2% (female). The authors observed that their estimates of prevalence for specific disorders were similar to others found in the literature, and that specific disorders tended to cluster in individuals, with particular overlap at the shoulder. They also noted that upper limb disorders are disabling and interfere with everyday activities, and that individual sufferers use a lot of healthcare. <i>(These results indicate that upper limb pain is relatively common within the general population, and this results in a variety of specific disorders)</i></p>
(Walker-Bone et al. 2006)	Cross-sectional survey + physical exam	Classification	Specific and non-specific upper limb pain	<p><b>Risk factors for specific upper limb disorders as compared with non-specific upper limb pain: assessing the utility of a structured examination schedule</b></p> <p>A questionnaire about upper limb pain and demographic, occupational and psychosocial risk factors mailed to primary care patients; those reporting arm or neck pain had structured physical examination and classified as specific or non-specific upper limb disorder (ULD). 10,420 questionnaires mailed; response rate 59%. Of 4,170 eligible respondents, 2,248 were pain free and 496 with persistent shoulder, elbow, or wrist pain were examined: 250 had specific disorder(s) but no non-specific pain; 176 had non-</p>

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Authors	Study type	Topic	ULD condition	Key findings ( <i>Reviewers' comments in italic</i> )
				<p>specific pain but no specific disorder; 70 had mixed pattern of complaint. In general, physical risk factors were more strongly associated with specific disorders than with non-specific. Eg specific disorders at the shoulder and elbow were more frequently associated with being in blue-collar job than non-specific shoulder or elbow pain, and hand-wrist tendonitis was more commonly associated with repetitive keyboard work than non-specific hand-wrist pain. However, the pattern was not entirely consistent – non-specific shoulder pain showed stronger association with overhead work, and risks associated with repeated elbow bending were little different for epicondylitis and non-specific elbow pain. Associations with indices of mental health tended to be similar for specific and non-specific disorders at same site; this association between psychosocial factors and specific disorders was unexpected – possibly reflecting negative effect of the ULD on mental health or that psychosocial factors favouring persistence. Whilst the differences in association with risk factors between classification groups are consistent with the differences in pathology, the presence of physical signs might simply be an index of severity. (<i>These results from a cross-sectional study do not imply causation</i>). Future work needs to test the prognostic ability of the classification scheme.</p>
(Warren et al. 2000)	Case control	Epidemiology – biopsychosocial associations	Work-related MSDs (upper extremity symptoms)	<p><b>Biomechanical, psychosocial, and organizational risk factors for WRMSD: population-based estimates from the Connecticut upper-extremity surveillance project (CUSP)</b></p> <p>Case-control study of a population-based telephone survey of 3,798 working adults: upper extremity symptoms (pain or discomfort was identifier of 'case') were associated with biomechanical, psychosocial, and organizational factors. In several models, biomechanical exposures with strong associations were static postures (odds ratios [ORs] = 2.00-5.45); repeated pushing, pulling, lifting (ORs = 1.86-12.75); and repeated neck bending (ORs = 1.07-12.8). Psychosocial and organizational factors consistently retained in these models were demands (ORs = 1.26-1.59) and organizational support (ORs = 0.53-0.79). Decision latitude entered less frequently (ORs = 0.30-0.49). This research may have implications for intervention strategies. First, reducing both biomechanical and psychosocial risk may be more effective than focusing solely on engineering controls. Second, organizational culture and policy may have strong implications for WRMSD prevalence and control. WRMSDs demonstrate strong associations with a complex web of biomechanical, psychosocial, and organisational factors. (<i>The associations here cannot be concluded to be causative, but the data do, as the authors say, provide an epidemiological broad brush, which supports the view that WRMSDs are a biopsychosocial phenomenon with implications for symptom management as well as (ostensibly) for prevention</i>). (<i>Same sample as Morse et al 1998</i>).</p>
(Waylett-Rendall & Niemeyer 2004)	Retrospective case analysis	RTW	Upper extremity cumulative	<p><b>Exploratory analysis to identify factors impacting return-to-work outcomes in cases of cumulative trauma disorder</b></p> <p>A retrospective analysis was performed on 459 workers' compensation cases with upper</p>

<b>Table A4. Individual studies of particular relevance</b>				
<b>Authors</b>	<b>Study type</b>	<b>Topic</b>	<b>ULD condition</b>	<b>Key findings</b> ( <i>Reviewers' comments in italic</i> )
			trauma disorders + CTS	extremity cumulative trauma disorders and a subset of 312 with carpal tunnel syndrome. The outcome criterion was return to work as a dichotomous variable. Only two significant correlations with return to work were found: the therapist's estimate of rehabilitation potential and the patient's outcome expectation of the ability to work. Further investigation of the role of beliefs and expectations in the therapeutic process would be a productive area for prospective study. It is suggested that the dynamics of factors influencing return to work in individuals with upper extremity CTD may be quite different than for low back pain and merits further investigation ( <i>though the two factors highlighted are also correlated with RTW in low back pain</i> ).

[CRPS = chronic regional pain syndrome ; CTD = cumulative trauma disorder; CTS = carpal tunnel syndrome; MSD = musculoskeletal disorder; ICM = integrated case management"; NSAP = non-specific arm pain; OR = odds ratio; RCT = randomised controlled trial; RSI (repetitive strain injury; RTW = return to work; ULD = upper limb disorder; WRMSD = work-related musculoskeletal disorder]

**Table A5 Evidence grid for biomedical management of ULDs**

	Acupuncture	Extracorporeal shockwave therapy, ESWT	Laser	Electromagnetic field and ionization	Ultrasound and phonophoresis	Rebox	Ergonomics	Exercise	Manipulation	Massage, deep transverse friction	Splinting, Orthotics, Taping	Injections, corticosteroid	Oral diuretics	Oral NSAIDs	Oral steroids	Pyridoxine, vitamin B6	Topical NSAIDs	Surgery	Yoga	
CTS (carpal tunnel syndrome)			- *	? ?	? ?				+ *		? *	+ * §	- ***	- *	+ * §	- **		+ **	- *	Andrew et al 2005; Crawford & Laiou 2007; Feuerstein et al 1999; Gerritsen et al 2002; Goodyear-Smith & Arroll 2004; Marshall et al 2007; O'Connor et al 2003; Scholten et al 2002; Verdugo et al 2003
Diffuse upper extremity pain; non-specific ULD; RSI; CTD; CRPS							+ *	+ *	? *	+ *										Konijnenberg et al 2001; Smidt et al 2005; Verhagen et al 2006; Verhagen et al 2007
Lateral epicondylitis; Medial epicondylitis	+ * §	- ***	- *	- *	+ *	+ *		+ *	+ *		? *	+ *					+ *	? *		Bisset et al 2005; Borkholder et al 2004; Buchbinder et al 2002; Buchbinder et al 2005; Crawford & Laiou 2007; Green et al 2002; Struijs et al 2002; Trinh et al 2004; Trudel et al 2004
Rotator cuff tendonitis (including supraspinatus and bicipital tendonitis)								+ ***	+ *			+ *		+ *						Buchbinder et al 2003; Crawford & Laiou 2007; Green et al 1998; Green et al 2003
Shoulder pain; impingement syndrome; shoulder capsulitis			+ *	+ *	+ *		+ *	+ *	? *			+ *		+ *	+ ***					Buchbinder et al 2003; Buchbinder et al 2006; Cleland & Durall 2002; Crawford & Laiou 2007; Desmeules et al 2003; Green et al 1998; Green et al 2003; Smidt et al 2005; Verhagen et al 2006
Tension neck syndrome							+ *													Crawford & Laiou 2007
Tendonitis (fingers/hand/forearm)										- **	? §§§									Brosseau et al 2002; Thien et al 2004
Trigger finger												+ ***								Fleisch et al 2007
De Quervain's syndrome; 'Tenosynovitis'																				Crawford & Laiou 2007

+ evidence of effectiveness   - evidence not effective   ? evidence inconclusive or equivocal   \* weak evidence   \*\* moderate evidence   \*\*\* strong evidence

**Notes:** The findings from Muller et al (2004) not included due to near impossibility with interpretation   §=Short-term benefit only   §§=Calcific tendonitis only   §§§=Post-surgical only





# Management of upper limb disorders and the biopsychosocial model

This review, using a best evidence synthesis, examined the evidence on management strategies for work-relevant upper limb disorders and established the extent to which the biopsychosocial model can be applied. Articles were found through systematic searching of electronic databases together with citation tracking. Information from included articles was extracted into evidence tables. Themes were identified and the information synthesised into high level evidence statements, which were distilled into key messages. The main results are presented in thematic sections covering classification/diagnosis, epidemiology, associations/risks, and management/treatment, focusing on return to work and taking account of distinctions between non-specific complaints and specific diagnoses.

Neither medical treatment nor ergonomic workplace interventions alone offer an optimal solution; rather, multimodal interventions show considerable promise, particularly for vocational outcomes. Early return to work, or work retention, is an important goal for most cases and may be facilitated, where necessary, by transitional work arrangements. The emergent evidence indicates that successful management strategies require all the players to be onside and acting in a coordinated fashion; this requires engaging employers and workers to participate.

The biopsychosocial model applies: biological considerations should not be ignored, but it is psychosocial factors that are important for vocational and disability outcomes. Implementation of interventions that address the full range of psychosocial issues will require a cultural shift in the way the relationship between upper limb complaints and work is conceived and handled. A number of evidence-based messages emerged, which can contribute to the needed cultural shift.

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# Management of work-relevant upper limb disorders: a review

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<b>Background</b>	Upper limb disorders (ULDs) are clinically challenging and responsible for considerable work loss. There is a need to determine effective approaches for their management.
<b>Aim</b>	To determine evidence-based management strategies for work-relevant ULDs and explore whether a biopsychosocial approach is appropriate.
<b>Methods</b>	Literature review using a best evidence synthesis. Data from articles identified through systematic searching of electronic databases and citation tracking were extracted into evidence tables. The information was synthesized into high-level evidence statements, which were ordered into themes covering classification/diagnosis, epidemiology, associations/risks and management/treatment, focusing on return to work or work retention and taking account of distinctions between non-specific complaints and specific diagnoses.
<b>Results</b>	Neither biomedical treatment nor ergonomic workplace interventions alone offer an optimal solution; rather, multimodal interventions show considerable promise, particularly for occupational outcomes. Early return to work, or work retention, is an important goal for most cases and may be facilitated, where necessary, by transitional work arrangements. The emergent evidence indicates that successful management strategies require all the players to be onsite and acting in a coordinated fashion; this requires engaging employers and workers to participate.
<b>Conclusions</b>	The biopsychosocial model applies: biological considerations should not be ignored, but psychosocial factors are more influential for occupational outcomes. Implementation of interventions that address the full range of psychosocial issues will require a cultural shift in the way the relationship between upper limb complaints and work is conceived and handled. Dissemination of evidence-based messages can contribute to the needed cultural shift.
<b>Key words</b>	Biopsychosocial; interventions; return to work; upper limb disorders; work relevant.

## Introduction

This paper reports on a literature review commissioned by the UK Health & Safety Executive. The present article is an abridged version of the original report entitled 'Management of upper limb disorders and the biopsychosocial model' [1].

Acknowledging that musculoskeletal disorders (MSDs) are responsible for a considerable proportion of work loss and that not all upper limb disorders (ULDs)

manifesting at work can be prevented [2], there is a need to determine effective approaches for managing those cases that do occur.

ULDs are characterized by symptoms (usually pain) which have inconsistent associations with work loss and disability. While there is evidence that MSDs in general, like other common health problems, have a strong association with psychosocial factors [3], it is uncertain to what extent that holds true specifically for ULDs.

This review aimed to establish the extent to which the scientific evidence supports management of ULDs according to the biopsychosocial model. In particular, the objective was to draw conclusions on the question of whether there is evidence that the biopsychosocial model can be successfully applied to the management of ULDs and to provide evidence-based, high-level messages about what should be done to help people with ULDs recover quickly and achieve sustained return to work.

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## Methods

The overall methodology should be viewed as a 'best evidence synthesis', summarizing the available literature and drawing conclusions about the balance of evidence, based on its quality, quantity and consistency [4]. This approach offers the flexibility needed to handle complex topics, but at the same time takes a rigorous approach when it came to assessing the strength of the scientific evidence. A more detailed description is in the original report [1].

An electronic search of the major electronic databases was conducted in June 2007, limited to articles published from 1996 onwards. It included search strings with all relevant keywords that might include the wide range of terms used to describe upper limb conditions in working-age adults. The main search was supplemented with citation tracking and hand searching to identify non-indexed material and relevant grey literature (grey literature includes conference proceedings, dissertations, theses, clinical trials registries and other reports). To maintain focus on occupationally relevant disorders, some conditions and topics, such as rheumatic and systemic diseases, fractures and disorders of peripheral circulation were excluded.

Systematic reviews and extensive narrative reviews were the primary focus, but individual studies were selected where they provided additional or more detailed information. Once a potential pool of articles and studies was identified, the titles and abstracts were circulated among three reviewers (K.B., N.A.S.K., B.G.P.), who decided by consensus which full articles to select for possible inclusion in the review. Copies of some 200 relevant articles were obtained, circulated, analysed and archived.

Summary data from included articles were entered into detailed evidence tables, which accompany the original report [1]. Themes in the data were identified and organized to cover three main categories: epidemiology/risk factors, intervention/classification and concepts/guidance. The information was synthesized into high-level evidence statements, each linked to the supporting evidence, with the final wording of the evidence statements developed through an iterative process involving all five reviewers. Finally, the information contained within the evidence statements was distilled into a number of key messages related to evidence-based management of work-relevant ULDs.

The strength of the scientific evidence supporting the statements was graded using the system in Table 1. The strength of the evidence should be distinguished from the size of the effect: there may be strong evidence about a particular association, yet the effect size may be small.

## Results

The findings of the review are presented in the form of high-level 'evidence statements' as a convenient way of summarizing knowledge across complex themes, with each statement being linked to the main supportive sources of evidence.

**Table 1.** Evidence grading system used to rate the strength of the scientific evidence underlying the evidence statements (adapted from [5])

	Evidence grade	Definition
***	Strong	Generally, consistent findings provided by (systematic reviews of) multiple scientific studies.
**	Moderate	Generally consistent findings provided by (reviews of) fewer and/or lower quality scientific studies.
*	Weak	Based on a single scientific study, general consensus and guidance or inconsistent findings provided by (reviews of) multiple scientific studies.

The first set of statements concern the extent to which ULDs can be classified and recognized; exploration of detailed diagnostic criteria was beyond the scope of the review (Box 1).

Nosological inconsistencies have led to debate and uncertainty over issues from pathology to causation [12]. It is likely that misdiagnoses will be common both in the clinic and in the workplace [8], frequently manifested as patients receiving multiple and conflicting explanations and diagnostic labels from the various clinicians they encounter.

While it is possible to achieve expert consensus on criteria for case definitions suitable for occupational surveillance systems, the clinical validity of the classifications is uncertain [20,21], and it is unknown if they lead to improved clinical management.

A considerable number of the articles retrieved for the present review take a 'lumping' approach whereby studies will include a variety of different disorders under labels such as 'work-related upper limb disorder' or simply 'musculoskeletal disorders'. However, that is not a universal view, and some researchers point to the possibility of specific neuropathic pathologies underlying what is often termed non-specific arm pain, 'cumulative trauma disorders' or 'repetitive strain injuries' [22]. An alternative utilitarian approach is that the optimal definition for a disorder may vary according to the circumstances in which it is applied [23].

The epidemiology of ULDs is essential to understanding how they arise, in whom, and to inform on their natural history (Box 2). There is a cascade in the way they are experienced and expressed, which is similar to that noted for other musculoskeletal problems such as back pain: a clear distinction should be made between the presence of symptoms, the reporting of symptoms, attributing symptoms to work, seeking health care, loss of time from work and long-term damage, which may all have rather different determinants [24].

The issue of risk factors for ULDs is clearly highly relevant to the concept of preventing onset of symptoms or

### Box 1. Classification and diagnosis

- \*\*\* Classification and diagnosis of ULDs is particularly problematic; there is a lack of agreement on diagnostic criteria, even for the more common specific diagnoses (e.g. tenosynovitis, epicondylitis and rotator cuff syndrome). Inconsistent application, both in the clinic and in the workplace, leads to misdiagnosis, incorrect labeling and difficulties in interpretation of research findings [6–12].
- \*\* The scientific basis for descriptive classification terms implying a uniform aetiology, such as repetitive strain injuries and cumulative trauma disorders, is weak or absent and they are inconsistently applied/understood; there is an argument that such terms should be avoided [13–19].

### Box 2. Epidemiology

- \*\*\* There is a very high background prevalence of upper limb pain and neck symptoms in the general population: the 1-week prevalence in general population can be as high as 50%. Estimates of the prevalence rates of specific diagnoses are less precise, but are considerably lower than for non-specific complaints. Rates vary depending on region, population, country, case definition and on the question asked [6,25–33].
- \*\* Upper limb pain is often recurrent and frequently experienced in more than one region at the same time (both bilaterally and at anatomically adjacent sites) [19,29–31].
- \*\*\* ULDs often lead to difficulty with normal activities and to sickness absence, yet most workers with ULDs can and do remain at work [29,31,34,35].

injury, but the subject is poorly understood and inconsistently documented (Box 3). Many factors, both occupational and personal, are purported to be ‘risk factors’, but the nature of those risks and their potential outcomes are readily misunderstood. This is evident in the high levels of growth in disability and work loss associated with musculoskeletal pain over the very period when industrialized countries have implemented occupational safety and health legislation and developed inspectorates for compliance and enforcement [36,37]. Thus, further consideration of the evidence on risk factors is needed to permit robust conclusions.

There is no doubt that certain jobs can legitimately be considered to entail hazards that are, on the balance of probabilities, risk factors for the development of certain

### Box 3. Associations and risks

- \*\* Large-scale influential reviews published around the turn of the millennium (which included much cross-sectional data) concluded that there were strong associations between biomechanical occupational stressors (e.g. repetition, force) and ULDs: backed by plausible mechanisms from the biomechanics literature, the association was generally considered to be causative, particularly for prolonged or multiple exposures (though a dose–response relationship generally was not evident) [38–40].
- \*\*\* More recent epidemiological studies involving longitudinal designs also suggest an association between physical exposures and development of ULDs, but they report the effect size to be rather modest and largely confined to intense exposures. The predominant outcome investigated (primary causation, symptom expression or symptom modification) is inconsistent across studies and remains a subject of debate. This is true for regional complaints and (with few exceptions [41]) most of the specific diagnoses [26,28,36,41–47].
- \* The evidence that cumulative exposure to typical (modern) work is the cause of most reported upper limb injury is limited and inconsistent [19,38,48,49].
- \*\*\* Workplace psychosocial factors (beliefs, perceptions and work organization) have consistently been found to be associated with various aspects of ULDs, including symptom expression, care seeking, sickness absence and disability [19,26,38,40,42,50–55].
- \*\*\* Individual psychological factors (such as anxiety, distress and depression) have consistently been found to be associated with various aspects of ULDs, including symptom expression, care seeking, sickness absence and disability [40,48,56–59].

specific diseases [41], yet these diseases account for a relatively small proportion of all ULDs. Many non-specific upper limb symptoms are likely to result from some physical stress across joints and in soft tissues, but work is not the exclusive (or necessarily most important) source of such stress. There is emerging evidence that a combination of exposure to physical and psychosocial factors at work has a stronger association than either type of factor alone [55,60]. By and large, the duration of exposure has been inconsistently reported across the epidemiological literature, so attributing upper limb complaints to cumulative exposure is by no means fully justified. Of interest in this respect is that one of the strongest predictors of incident

upper limb symptoms among workers can be a prior history of symptoms, as opposed to work exposures such as repetitiveness, work pace or forceful awkward postures [61].

In view of the widespread experience of upper limb symptoms in the community, the patchy nature of associations between work characteristics and ULDs (both non-specific and specific), and the difficulty of establishing cogent occupational causation [62], the often used collective term 'work related', seems not altogether accurate and potentially misleading. Instead, it seems more reasonable to refer to ULDs among workers as 'work relevant', which avoids undue occupational attribution and the notion of permanent impairment yet acknowledges that work can be troublesome for people experiencing upper limb symptoms, irrespective of cause.

The retrieved articles on management and treatment covered a wide range of outcomes, clinical presentations and interventions. The effectiveness of biomedical treatments was outside the scope of the review, but a simple 'review of reviews' indicates that many common treatments for ULDs are less effective than might be expected. While some are effective for specific diagnoses (exercise for rotator cuff tendonitis; oral steroids for shoulder pain such as impingement syndrome or capsulitis and corticosteroid injections for tenosynovitis), effect sizes tend to be small and are limited to clinical outcomes [1].

The retrieved material on management approaches for ULDs tended to reflect a view that there is a commonality to MSD that justifies considering their management in a generic sense (Box 4).

In addition to the information concerning MSDs in general, the search retrieved studies concerning interventions specifically on people with ULDs; specific diagnoses were generally included along with non-specific complaints (Boxes 5–7).

#### **Box 4. Interventions for MSDs in general**

- \* General management principles are to provide advice that promotes self-management, such as staying active and engaging in productive activity (with appropriate modifications). Pain modulation and control should be directed towards allowing appropriate levels of activity [63,64].
- \*\*\* Programmes using cognitive-behavioural approaches are effective and cost-effective at reducing pain and increasing productive activity in both the earlier and the later phases [65–67].
- \* Multimodal integrated interventions that address both biomechanical and psychosocial aspects at the same time should be useful for managing musculoskeletal problems in the workplace [3,40,68–70].

The bulk of the literature reporting on the management of ULDs has either concentrated on regional symptoms (termed disorders by some investigators) or taken an even wider perspective and combined regional symptoms (including the upper limb) under generic labels such as work-related musculoskeletal disorder. While there seems to be good reason to separate (some) specific diagnoses when making clinical decisions about treatment, there is little evidence that the distinction is helpful when considering vocational outcomes and rehabilitation. It can be argued that returning a hurting worker to their job relies on achieving an acceptable balance between 'capacity' and 'tolerance', and this concept is largely independent of whether the individual has a specific diagnosis or regional complaint [85,95].

Overall, the evidence indicates that effective interventions for work-relevant ULDs require a multimodal approach: specific treatment (when needed, using a stepped approach) coupled with workplace accommodation (when needed, on a temporary basis). While lumping and splitting approaches may be helpful under differing circumstances [23], achieving a balance in terminology is likely to be

#### **Box 5. Interventions specifically in respect of ULDs**

- \*\* Pain management programmes using cognitive-behavioural principles and multidisciplinary occupational rehabilitation for people with ULDs can improve occupational outcomes in the short term and significantly reduce sickness absence in the longer term. Earlier intervention appears to yield better results [71,72].
- \* There is a conceptual case that rehabilitation should be started early and that long periods of rest or sick leave are generally counterproductive [14,73–76].
- \*\* Ergonomic work redesign directed at equipment or organization has not been shown to have a significant effect on incidence and prevalence rates of ULDs. Ergonomic interventions can improve worker comfort (which is valuable) which can in principle contribute positively to multimodal interventions [13,15,48,77–80].
- \* There is limited evidence that ergonomic adjustments (mouse/keyboard design) can reduce upper limb pain in display screen workers but insufficient evidence for equipment interventions among manufacturing workers [78,81,82].
- \* In general resting injured upper limbs delays recovery; early activity improves pain and stiffness and can speed return to work yet does not increase complications or residual symptoms and may lead to less treatment consumption [83–87].



**Box 6. Return to work**

- \* There is wide consensus that early return to work is an important goal which should be facilitated by multimodal interventions including provision of accurate information pain relief and encouragement of activity. An integrative approach by all the players (notably employer worker and health professional) is conceptually a fundamental requirement [14,34,64,66,73,76,85,87–89].
- \*\* Although the components of return to work interventions vary there is emerging evidence that integrative approaches can be effective for MSDs in general and probably also for ULDs. Case management shows promise for getting all the players onside. Facilitation of return to work through temporary transitional work arrangements (modified work) seems to be an important component [64,68–70,89–93].

**Box 7. Non-specific complaints and specific diagnoses**

- \* There is insufficient robust evidence to identify reliable prognostic indicators that are applicable across the ULD spectrum (specific diagnoses and regional complaints) [8,14,27,38,94].
- \* There is inconsistent and conflicting evidence on whether and to what extent certain specific diagnoses and regional complaints should be conceived differently in terms of overall management targeted at vocational outcomes [48,85,95,96].

particularly important: if wrongly applied, diagnostic labels can alarm and harm, whereas unemotive complaint-based labels can help ‘normalize’ the experience and ease the path to participation in productive activity.

**Discussion**

This review used a best evidence synthesis to summarize the balance of the wide range of retrieved evidence [4], which has been synthesized in high-level terms to provide a set of messages to guide the management of work-relevant ULDs.

The epidemiological evidence is quite clear: musculoskeletal symptoms affecting the upper limb and neck are a common experience among the general population, tending to be a recurrent complaint. A specific pathology cannot reliably be established for the majority of people with upper limb symptoms, indicating they might best be viewed as having a regional complaint. There is considerable debate over the classification of the various specific diagnoses and,

while some consensus seems possible, diagnostic criteria remain unreliable—many cases will be mislabelled (whether colloquially or by a health care professional).

For many people, their symptoms will be work relevant: their work may be painful or difficult irrespective of the origin of the symptoms. However, even when work is related to the expression of symptoms, that does not mean work was necessarily the underlying cause: it is apparent that work is not the predominant cause of most ULD episodes.

Many people with ULDs cope without recourse to health care or need for sick leave, yet a small number of people with ULDs will progress to persistent pain and/or long-term disability, irrespective of severity or diagnosis. This pattern is typical of a wide range of common health problems, in which personal and cultural factors are a predominant feature, notably the psychological and social variables that influence beliefs and behaviours [3]. Although the evidence is limited for ULDs, knowledge from the literature on other musculoskeletal problems strongly implicates psychosocial factors as drivers for symptom reporting, work loss and disability [97,98]. Since there is no particular reason to expect that complaints and disorders related to the musculoskeletal apparatus of the upper limb and neck are fundamentally different from the musculoskeletal apparatus of the lower back, it is logical and reasonable to surmise that there will be shared influences. Indeed, what evidence there is supports psychosocial factors as being important in understanding and managing ULDs.

Biomedical management of ULDs is seemingly less effective than might be expected, perhaps reflecting the difficulties around classification and diagnosis, together with uncertainties over the optimal timing of treatment delivery (longer duration of symptoms having a negative impact on outcomes [56]). Nevertheless, in principle, there is likely to be benefit from biomedical interventions aimed at controlling symptoms (and/or targeting any identifiable pathology) while offering support and encouragement for early return to normal activities (including work). However, in order to impact on work outcomes, intervention requires more than biomedical treatment. There is a need to address the range of psychosocial factors (obstacles to recovery/return to work) at both the individual and workplace levels, and those efforts need to be coordinated and integrated among the relevant players, including the individual worker.

Some patients will have a recognized pathology requiring medical or surgical intervention (which may involve short-term rest), and there is some concern that applying the principles of an active approach together with early return to work will be inappropriate for some conditions such as ‘tenosynovitis’, where anecdotally rest is the preferred option [34]. Although limited, the evidence on work-relevant ULDs (both specific and regional) is consistent with the principle of the active approach promoted

and implemented for MSDs in general [84]: importantly, there is no robust contradictory evidence. The notion of ‘rest’ as a sole treatment is likely to be unhelpful: even if specific aggravating activities need to be modified or avoided short term that does not preclude other activities and exercises being undertaken as part of therapy [99]. So far as post-surgical management is concerned, there has been an increasing recognition of the benefits of early activation following most surgical procedures, and restrictions may be more a matter of the surgeon’s idiosyncratic advice than any absolute need [100].

Although early work return is seen as advantageous, simply sending someone directly back to a job they find painful is counterintuitive and inappropriate. There is a strong case for using transitional work arrangements as the facilitator, which takes account of both biological and psychosocial obstacles to return to work. There is considerable evidence for the use of temporary modification of activities to support people with regional pain states on their return to normal activity, and there is no clear evidence that the principle cannot or should not be applied to the specific diagnoses.

Just because the epidemiological pattern of most ULDs does not favour ergonomic interventions as a significant primary preventive measure, this does not mean that there is no merit in making work ergonomically acceptable; jobs, naturally, should be within the reasonable capabilities of the workers. Unfortunately, portions of the ergonomics literature and official guidance give the erroneous impression that work is intrinsically the major cause of ULDs and that by applying an ‘ergonomics approach’ they will be eliminated. The evidence reviewed here indicates that they will not. Furthermore, a possible problem with ergonomic interventions is that they can reinforce workers’ beliefs that they are exposed to a significant hazard, and thereby encourage undue reporting of symptoms, inappropriate work loss and development of disability [36]. Nevertheless, an ergonomics approach, correctly applied, should improve comfort and efficiency, thus assisting in accommodating those with work-relevant complaints or disorders.

Viewed overall, the evidence on the management of ULDs favours neither biomedical nor workplace interventions alone, either for regional complaints or specific diagnoses. Rather, what is needed is a biopsychosocial approach, which necessitates multimodal interventions with all the players onside and acting in unison. While the evidence base supporting the principle of addressing the beliefs and behaviours of all the relevant players is as yet limited, the concept is central to overcoming biopsychosocial obstacles [3]. Achieving all that will require a cultural shift in the way the relationship between upper limb complaints and work is conceived and handled. Educational strategies are likely to be a useful tool in that respect, but will need to be carefully developed and tailored to the relevant target audience [101].

If the need for cultural change is accepted, then there is also a need for policymakers to rethink the priorities of certain underlying concepts (e.g. primary prevention versus management: work caused versus work relevant) and develop means to disseminate evidence-based information to the various players (employers, workers, health care providers, unions and trade/professional organizations, lawyers, legislators and decision makers). Media campaigns are increasingly seen as a suitable vehicle to contribute to public health and cultural change in respect of health behaviours, supplemented by guidance material and patient education; this strategy has been recommended specifically in respect of ULDs [34].

While the overall message may be clear—biopsychosocial factors are influential in the phenomenon of upper limb complaints and need to be addressed—there are gaps in the evidence. Observational studies will help to better understand the natural history of non-specific complaints and the specific diagnoses, and controlled trials are needed to determine the most appropriate means for implementing both clinical and workplace care. Innovative multimodal interventions seem promising, yet the optimal content, timing and method of delivery needs further clarification.

A number of salient messages emerge from the evidence, which may contribute to the needed cultural shift. They apply to the whole range of players involved (population/workers, employers, health professionals, unions, lawyers, media, policymakers and enforcers), so they will need to be carefully constructed for each target group, tailored to their needs and comprehensively disseminated. The main messages are reflected here in the key points and are available in expanded form in the original report [1].

### Key points

- ULDs can be triggered by everyday activities and overattribution to work can be detrimental to recovery: overmedicalization and negative diagnostic labels are unhelpful.
- Many cases settle with self-management—this should be encouraged—though some need treatment: intervention should take a stepped care approach, based on a biopsychosocial principles.
- Early return to work is important, though some work may be difficult or impossible to perform for a short while: work should be comfortable and accommodating.

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## Conflicts of interest

None declared.

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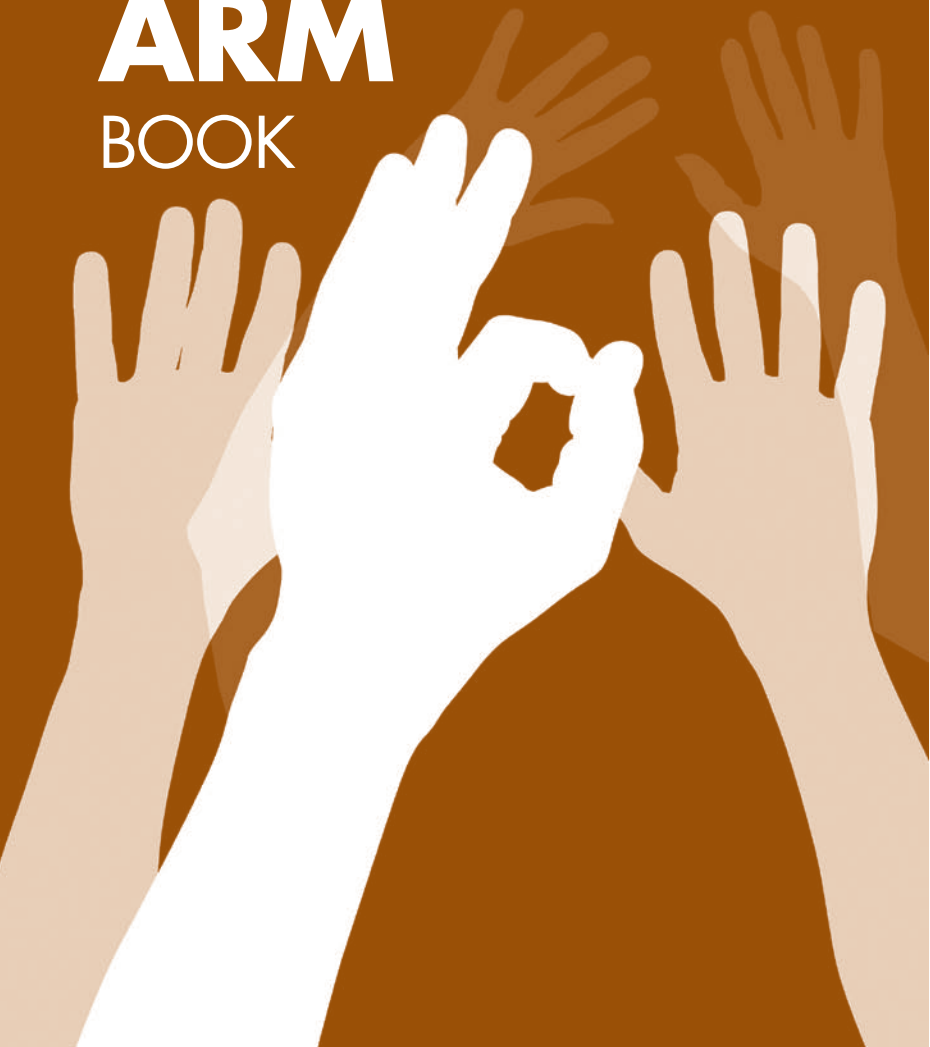


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## WHY THE ARM BOOK?

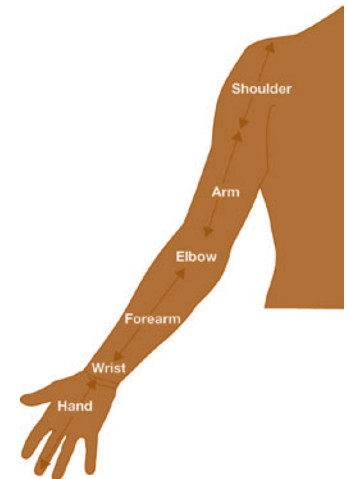
So you’ve got pain in your arm – it may be anywhere from the shoulder to the fingertips. You’re not alone. In fact most people get pain in their upper limbs at some stage during their lives.

Like most others you’re probably uncertain about whether to rest, whether to seek treatment, and whether to go to work. Probably you’re also worried about what’s going on and what the future holds.

*The Arm Book* is here to answer these and other questions in terms you can understand – no jargon, just sound information and advice. It tells you what you need to know to get back to what you usually do. It also tells you what to expect, from whom, and when.

## WHO IS IT FOR?

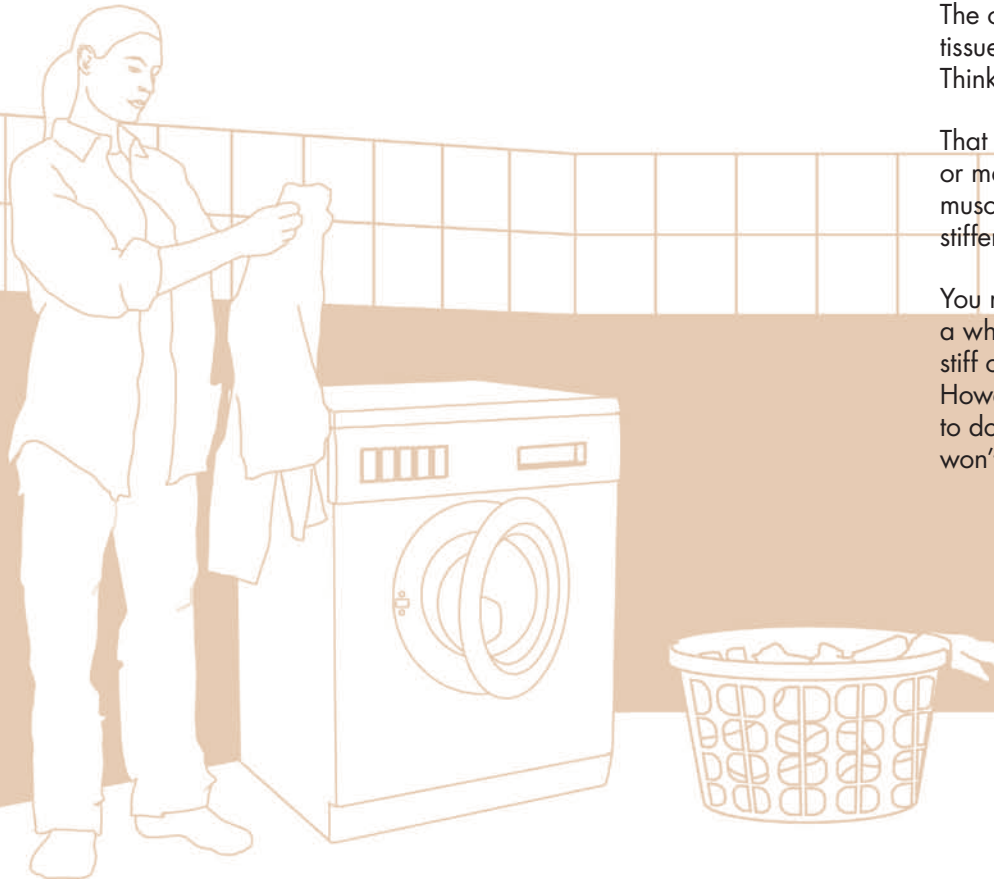
This booklet is for people with painful arm problems. The sort of conditions you’ll have heard about such as tennis elbow, carpal tunnel syndrome, or frozen shoulder. Actually, they have a lot of similarities, and are often bundled together under the term upper limb disorders.



The focus of the following advice is about helping you manage things and getting on with life. How you do this is pretty much always the same, no matter why you got arm pain in the first place.

You may need treatment, or you may not. Most pain gets better on its own, but some types of arm pain certainly do need treatment from a doctor or therapist.

The trick is to make best use of that treatment so you can stay active. It really is important you understand this, so you don't fall into the trap of avoiding all activity.



## CAUSES AND EFFECTS

So, what might have happened to cause your pain? You're bound to be curious, but most times you'll find you get different explanations from different people! So far as getting on with things is concerned, it actually doesn't matter too much what's gone wrong.

Arm pain can be triggered, or set off, by all sorts of everyday activities. People sometimes recall a specific incident like a wrench or a bump, but often there is no obvious single event or activity. In many cases it's most likely to be a combination of things.

The chances are that the pain is coming from soft-tissues around the joints – muscles, ligaments, tendons. Think of it like a strain or sprain.

That means parts of the arm may be sore to the touch or may be very painful to move for a while. The muscles may hurt when you use them, and things may stiffen up.

You may find you simply cannot do certain things for a while, such as reaching up because your shoulder is stiff or lifting the kettle because your elbow is painful. However, there are lots of other things you will be able to do just fine, so carry on doing them – being active won't be harmful.

Sometimes pain is more severe than it is at other times. It may seem to spread and appear in different parts of the arm. Because that's the way our nervous system works, it isn't anything to worry about. It's really not unusual to have a lot of pain without any permanent damage.

### *Labels*

There are dozens of commonly used labels for arm pain. Most of them relate to a medical diagnosis, but doctors don't always agree on these labels or on what causes the problems, especially in the early stages. This means the label you're given may be quite general - for instance, the term tennis elbow tends to be used as a generic label for various elbow problems.

Other labels are not medical and are frankly unhelpful. The classic example is so-called 'RSI' (repetitive strain injury). Science has shown that people with arm pain that is put down to 'RSI' do not have a strain or an injury, and often have not done anything repetitive! The term 'RSI' is misleading in that it suggests you should avoid movement and activity. As you read this booklet you'll see that inactivity is not the best way forward.

The individual conditions affecting the arms can be rather difficult to disentangle. For our purposes they can be grouped around each of the joints, because the way you can best deal with them is much the same. Here are a few examples you may come across:

**Shoulder:** frozen shoulder; impingement syndrome; rotator cuff injury; tendonitis.....

**Elbow:** tennis elbow, golfer's elbow, epicondylitis.....

**Wrist and hand:** de Quervains; tenosynovitis; carpal tunnel syndrome; **trigger** finger; ganglion.....

The diagnosis – the medical term for your condition – may be important to your doctor or therapist of course. They need to understand the problem in order to work out whether you need specific treatment to relieve your symptoms. It is important to understand that you have a soft-tissue problem, not a serious injury. There are many causes for these problems. The way to speed your recovery and get back to your usual activities is pretty much the same whatever the diagnosis.





## Work and arm pain

Arm pain is often not caused by work. Yet work can be difficult or painful because of it. We'll advise you what to do about this a bit later on.

You've probably heard that repetitive or strenuous work causes arm pain, or that arm pain at work is due to a build up of strain over months or years. We now know that this is not what usually happens. Most people do the same job for years without any problem.

This is important because if you mistakenly believe the activities you do at work are the cause of your arm pain then you'll be tempted to stay away from work. And that won't be helpful.

There are a couple of conditions linked to specific types of job. Yet they can also result from everyday situations, and are sometimes associated with normal aging.

*Tenosynovitis:* is thought to be an inflammation of the tendons of the forearm or hand. It's sometimes seen in people whose work involves frequent or repeated movements of the hand or wrist. However, most people doing that sort of work do **not** get tenosynovitis.

*Carpal tunnel syndrome:* is due to compression of the nerves at the front of the wrist. It is thought to occur in some people whose work involves using vibrating hand-held power tools or repeatedly bending the wrist up and down. However, most people who do that sort of work do **not** get carpal tunnel syndrome.

Remember, in most cases, work is no more likely to be the cause of arm pain than some leisure activities. Even when your problem has been triggered by a

work activity, which happens sometimes, it is unlikely to result in serious injury. It would be a mistake to think the work must have been dangerous just because you experienced or developed pain while at work. We'll talk about working safely with arm pain later on.

## FACTS ABOUT ARM PAIN

Now seems a good time to summarise the main facts about arm pain.

- Arm pain is a frequent experience -
  - it is generally short-lived but can happen again
  - it is often triggered by a physical strain (minor over-exertion):
    - due to everyday activities, including work
    - it hardly ever involves serious damage
  - some cases need treatment, but many settle with self-management:
    - activity is usually helpful: prolonged rest is not
  - you can expect recovery and early return to your usual activities and work:
    - lasting effects are uncommon
- There is a lot you can do to help yourself -
  - many people don't need treatment from a doctor or therapist
    - medication from the pharmacist can help



- Work is not the major cause -
  - some work can be difficult or impossible initially:
    - yet that does not mean the work is unsafe
    - blaming work is often wrong and unhelpful
  - most people manage to stay at work:
    - you may need to reduce hours or have some time off if your job mainly involves strenuous use of your arms
- Early return to work is important -
  - it contributes to the recovery process and will usually do no harm
    - getting back to work quickly requires support from both the workplace and the doctor

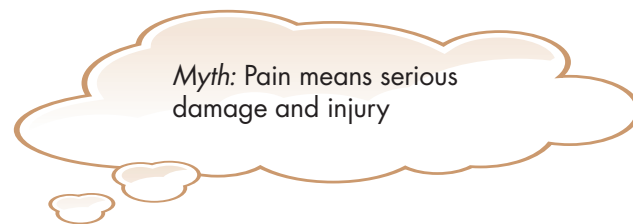
There are two other very important facts for you to know:

- There is little chance that the pain or discomfort can simply be 'switched off' by taking medications or having treatments. It is likely to improve gradually
- Resting and avoiding using your arm for more than a few days is generally a bad idea. Because it results in loss of flexibility and muscle strength, rest tends to do more harm than good. Of course you may need to make some changes to the way you go about doing things for a while

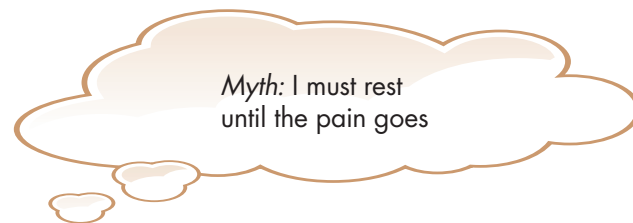


## MYTHS

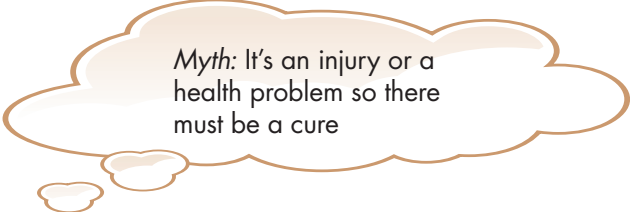
There are lots of myths about soft-tissue pain: what it is, and how to deal with it. Scientific research shows that many of the stories you are likely to hear are wrong. The myths need busting. Read this booklet carefully to get the facts about your problem, and what has been proven to help.



- This is not always the case: pain can occur without injury
- Even when specific tissues are affected, activity and work are not usually taboo
- Temporary discomfort is often part of recovery

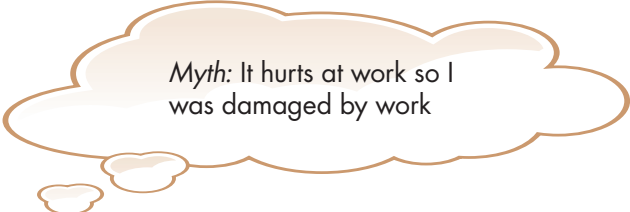


- Quite the contrary – activity leads to faster and more sustained recovery and return to work
- Temporary reduction of activity may be required, but long-term rest is a bad idea



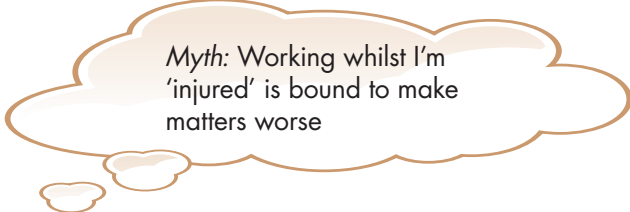
*Myth:* It's an injury or a health problem so there must be a cure

- Not really - most people, do not seek or need treatment for most episodes of arm problems
- Sometimes treatment is needed of course, but reliance on treatment alone is not enough to help with return to work



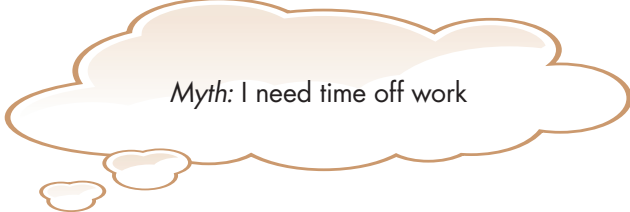
*Myth:* It hurts at work so I was damaged by work

- Arm pain is common across the whole population, regardless of type of work
- Work or activity can trigger symptoms, but most work is unlikely to cause serious damage



*Myth:* Working whilst I'm 'injured' is bound to make matters worse

- The actual condition is usually not made worse by continuing to work (assuming control of significant risks)
- Work can be difficult or uncomfortable, but that doesn't mean it is doing damage or making matters worse



*Myth:* I need time off work

- Often sick leave is not needed – staying at work is generally good – maybe you'll need some temporary help to do your job
- Ask your doc for a 'fit note' at the outset so you don't lose time off work!

*Myth:* Obviously I can't go back to work until 100% fixed

- Most people can, and do, get back to work with ongoing symptoms – with the right support they come to no harm

It's all too easy for the myths to take over. With what you've learned so far you'll be able to spot where things went wrong for Sam:

I got up one morning and had a really sore elbow. It sort of had a burning feeling so I went to see the doc and was told to take some tablets and to rest and stay off work. It didn't get any better so I was sent for x-rays, which they said showed some 'degeneration'. That was a bit scary to hear. Of course I had to wait to get treatment. When I did get to see a therapist I was told it was my job that started it, so I shouldn't go back till I was fully fixed. They couldn't tell me how long that would be so I got worried and confused. After a while I felt down in the dumps too. The family won't let me do anything; they're scared I'll get worse. I don't get out much, so I'm lonely. The people at work haven't been in touch, so I don't know what's happening about me going back. Some other people are saying I should make a claim. It's all turned into a bit of a nightmare. All I wanted was a bit of help, but now it's taken over my life...

## OBSTACLES TO RECOVERY

Various things can get in the way of your recovery and can stop you getting back to work and activity. You need to spot these and do something about them if you're going to help yourself get back to your normal life. It's often helpful to talk with others about how to deal with these obstacles.

Personal obstacles involve how you feel and think:

- Unhelpful attitudes and beliefs about health and work
- Uncertainty
- Anxiety and depression
- Loss of routine and work habits

Work-related obstacles can block your return to work:

- Loss of contact with work
- Negative attitudes by people at work
- Modified work not available
- Misunderstandings and disagreements between you, your employer, and doctor/therapist

Health-related obstacles can confuse and delay:

- Conflicting advice
- Waiting lists
- Prolonged sick leave
- Ineffective treatments

## Warning signs to watch out for

You'll struggle to recover and return to work if you:

- convince yourself there is something seriously wrong
- are unable to accept reassurance and help
- avoid activity in case it makes things worse
- get withdrawn and depressed
- are fearful and uncertain about going back to work

You need to make a plan to get active and working.

The key is communication and action. There are two main issues:

**Recovery** depends on working with the health professionals who are helping you, and on your own motivation and effort.

Treatment can help to reduce your symptoms, but you are the one who has to get active – see activity as part of the treatment.

Ask yourself: What can I do to be a 'coper' and not an 'avoider'?

**Returning to work** depends on you and your employer working together, and that needs communication.

The key thing is to stay in touch with the people at work – figure out what’s needed to help you return.

Ask yourself: What obstacles are getting in the way of my going back to work, and who do I need to talk to about overcoming these (by problem-solving and negotiation).

#### Overcoming obstacles:

- Accept reassurance and help instead of thinking there is something seriously wrong
- Focus on what you can do
- Be active, knowing that activity aids recovery



## MANAGING YOUR ARM PAIN

There are three things you need to do:

- Understand your problem
- Get help to relieve symptoms
- Keep up your usual activities (including work)

### *Understand your problem*

The first thing you need to understand is that you do **not** have a serious disease or injury. Your GP or physiotherapist can usually tell very quickly that you do not have a major problem. But, in the early stages it is difficult for them to work out exactly what’s wrong. That explains some of the confusion over labels

or diagnoses. Fortunately it doesn’t matter too much for overall management of the vast majority of arm problems.

Once you have been reassured that you do not have a serious problem you are likely to be given a diagnosis by the doctor or physiotherapist. This will be offered as an explanation of

your symptoms. Don’t be frightened by the words! It’s common to get different explanations and labels when you see different practitioners. This can feel confusing, and it is probably best not to focus too much on the diagnosis.

### UNDERSTANDING

*“The pain was so sharp when it started it felt agonising, and I thought straight away to myself this must be serious.*

*I was so relieved when it soon got better – I should have realised I’d only strained things.”*

The most important thing is for you to understand that you have soft-tissue pain or discomfort, not a serious problem; and that there are many causes for these problems. However, what you do to help yourself is usually the most important factor in your recovery. This involves symptom relief, and being active.

### Relieve your symptoms

You may have a variety of symptoms. The most common is pain or discomfort. However, some people get feelings such as muscle cramping, stiffness, numbness, burning, tingling, pins-and-needles, or muscle weakness.

Reducing your symptoms makes it easier to get active and will help you get on with doing the normal things in life.

For soft tissue problems the two main forms of medicine are:

- Anti-inflammatory medication (such as ibuprofen or diclofenac). This can be bought over-the-counter from the pharmacy as pills or as a gel to rub on. Both can be effective for reducing symptoms of pain and discomfort, but if your arm pain is quite localized, the gel rubbed into the painful area can be very useful
- Pain relief. You can get several types from your chemist. It is usually better to take them regularly 'by-the-clock' while you recover, and not to wait until pain builds up and is harder to control

#### RELIEVING SYMPTOMS

*"I used to think that there was a cure for everything. Now I realise that my body can do a lot of its own recovery. The thing I can do to help it is being positive and applying a bit of common sense and getting some pain relief to let me do things."*

There is no point continuing to take any medication if it does not help.

Another approach to easing the pain is to use movement to get relief: exercise and activity are good at releasing the body's natural chemicals that dull pain. You may also get relief from gentle muscle stretches or massage (another person may do this to you, or you may do it to yourself). Some people find hot or cold packs helpful.

Find what works best for you – it may be a combination of these things. Remember, controlling the pain is only part of the story. You need to combine it with activity if you are to get better quickly.

Sometimes, of course, people need additional help. If it's very painful and things are not improving in a few days, you may need some treatment.

Therapists use massage and exercises to help reduce the pain and get you going again. If you get some relief, it may be repeated a number of times while you recover. If you get no relief, a different type of treatment may be tried.

In the few cases where a very specific soft-tissue structure is affected, an anti-inflammatory injection may be offered. Injections that are effective may be repeated a couple of times.

Surgery is hardly ever needed, except in the rare cases when a specific tissue has been torn, broken or compressed so badly that it cannot heal and repair itself.

## Stay active

Nearly everyone with arm pain due to soft-tissue problems is able to return to their usual activities in due course.

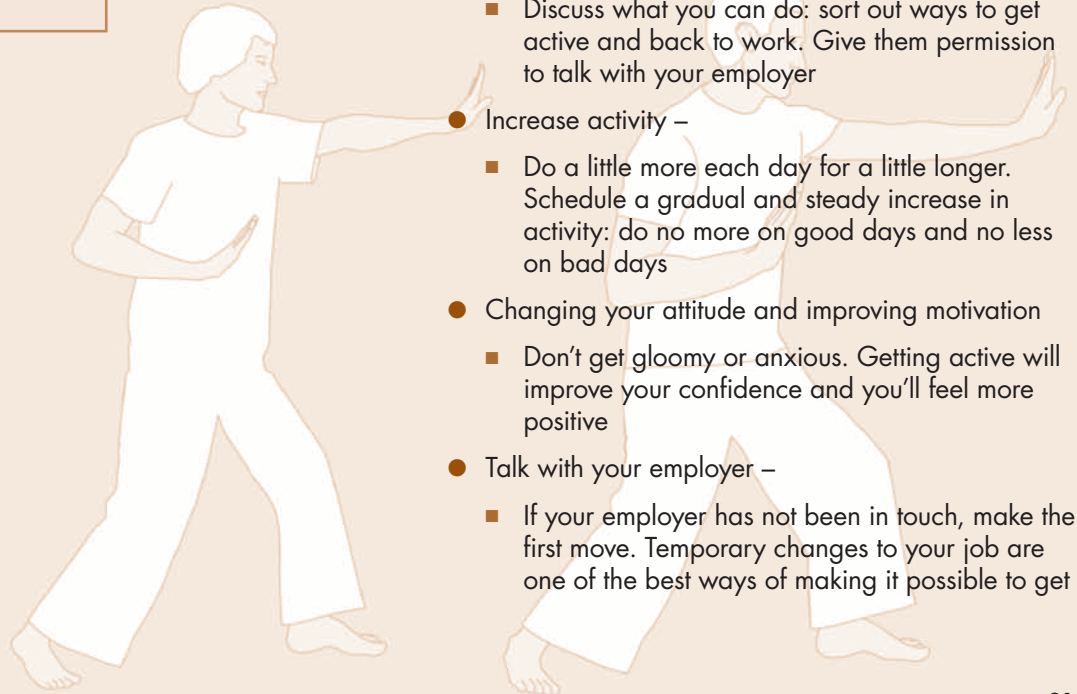
In general it is very important that you do not cease all activity. Rest and inactivity leads to muscle wasting and stiffness – too much rest is never useful for soft tissue problems. Movement stimulates blood flow and provides the chemicals needed for healing to take place. Movement also prevents muscle wasting. With soft tissue problems we need to remember the ‘use-it-or-lose-it’ phrase.

Gradually increase your activity levels. Don’t give up your usual activities, and also introduce some additional exercise, such as walking, swimming, cycling, running, yoga, tai chi – whatever you enjoy.

You have to allow some time for natural healing. The normal recovery course for soft tissue problems takes days or weeks. You can expect to have niggles and some setbacks as you improve. These can be frustrating, but you can do the very same things to help yourself as you did at the beginning. Continue to increase your activity levels. You may find you need to adjust what you do for a while. Don’t let that lead you to rest up completely.

### STAYING ACTIVE

*“When the shoulder pain started, I thought I had better stop moving it. Then I discovered I was doing the opposite to what I should have been doing. As I gradually increased the movement, it started feeling better and the pain reduced.”*



## Action summary

Putting your plan into action:

- Take control –
  - Take responsibility for your recovery, making best use of help available
- Set realistic goals –
  - Give yourself a clear timeline for getting back to work and activity. Use weeks, not months
- Have a ‘can-do’ approach –
  - Avoid dwelling on what you can’t do easily at present. You’ll find you can do a lot of things – at work and leisure
- Talk with your health professional –
  - Discuss what you can do: sort out ways to get active and back to work. Give them permission to talk with your employer
- Increase activity –
  - Do a little more each day for a little longer. Schedule a gradual and steady increase in activity: do no more on good days and no less on bad days
- Changing your attitude and improving motivation
  - Don’t get gloomy or anxious. Getting active will improve your confidence and you’ll feel more positive
- Talk with your employer –
  - If your employer has not been in touch, make the first move. Temporary changes to your job are one of the best ways of making it possible to get



back to work: talk it through with your line manager

- Put it all together –
  - Make sure that you and your doctor and your employer all know what is happening and what you are planning. Tell them you want help to be a copier

Dealing with the 'ups and downs' of recovery  
Remember that the process of getting better is usually an up and down one. Stay positive and don't give up



## WHEN TO SEE YOUR DOCTOR

Although you can deal with a lot of arm problems yourself, there may be times when you are uncertain and feel the need to check. That's quite understandable. But you need to be realistic about what you expect from the doctor or therapist.

This is especially true in the early stages. It is very difficult to make an accurate diagnosis at the start, and most doctors will use what is known as a stepped care approach. Basically this means doing just what's needed and no more. Since most arm problems will settle with anti-inflammatory medication and exercise, that is what will be offered initially. It is only if things don't settle that further steps will be offered. This may involve physiotherapy or further medication. If the problem persists you may be sent for tests to establish the diagnosis, or you may be referred to a specialist. This will not apply to many people with arm pain.

Don't worry if you need to go through a few of these steps - it can take a little time. You should still try to carry on as normally as possible. Just check with your doctor or therapist whether there's anything you really should not be doing.

If you answer 'yes' to some of these questions, mention it to your doctor on your next visit:

Do you have a fever or chills? Do you have persistent tingling or numbness? Have you lost weight without any reason? Are you feeling really unwell? Is the part that hurts red, swollen, or hot? Do you have severe pain that is getting much worse?



## Fit note

The fit note is a great idea, and can really help you. Why is this? Because it helps to focus on the things you can still do. Rather than the doctor having to sign you unfit for all work, you can be signed as fit for some work even if not your full job. Your doctor can help decide what parts of your job you can safely do. You need to take part in this by helping your doctor understand what you actually do at work.

The next bit is to sort out with your boss or line manager the tasks you can still do, and how best to adjust your job so you can keep working while you recover. This is much better than long periods off work and prevents things developing into a long-term problem. It makes sense to help yourself by asking for a fit note rather than expecting to be signed off sick.



## How to stay at work

Most people with arm problems can safely stay at work or get back to work with a bit of common sense and support at work. You may be told your arm pain is due to your work. This might be the case, but usually isn't. Even if it is, you should try to stay at work.

Obviously it depends on your work, but you may need to modify the way you do things to start with. It makes sense to avoid irritating the painful part of the arm too much – some discomfort is unavoidable and won't do any harm, but you'll want to pass up on really painful tasks.

There are various things you can do to help you stay at work. These are typical examples of what people say is helpful:

- change the tasks regularly
- avoid over-reaching
- take regular short breaks
- reduce weights
- get help from co-workers.

You can work out for yourself what is best for you, depending on what part of your arm is troubling you. Have a chat with your line manager and explain how you feel the job can be modified to help you out.

If that fails, you may need to look at the workplace itself, including tools and furniture. You may also discuss with your manager or safety rep whether a formal assessment is needed.

## Two types:

One **avoids** activity, the other **copes**

- 😞 The 'avoider' becomes frightened, rests a lot, worries about the future and does too little
- The 'avoider' believes that hurting always means further damage – it doesn't
- 😊 The 'coper' accepts it will soon get better, stays positive, keeps active and stays at work
- The 'coper' knows the best thing is to get on with it

Who suffers most?

Avoiders: they have pain for longer, have more time off work and become disabled.

How do I become a **coper**?

- Don't get worried: it's not that serious...
- Control your pain: take the tablets!
- Stay active: this is better than over-resting
- Be patient: it's normal to get bad days
- Focus on work: get a little help from your friends

Mia's story shows how it should all be done. Simple as!



I had a problem with my shoulder a while back, now it was here again. It felt worse this time, so I got the doc to check it out. Probably muscular she said, and it should settle OK - no need to stop doing anything. That made sense – my dad had the same problem, but it never laid him up. Anyway, after a week the shoulder wasn't any better and I couldn't manage at work. So I went back to the doc and she said I needed some rehab. So, I worked out a plan of action with my boss: agree a timeline → get some therapy → organise some help at work. One of my friends reckoned it must have been caused at work, but that just had to be rubbish – I know I've got a physical job but I've been doing it for years and nothing's changed. I just needed some help to get my shoulder working again. The therapist agreed, and when I told her that my job could be made easier for a while, she said going back could actually help. The doc wrote to my boss about what I could manage, and when I went in to see the people at work they were really helpful. Just a few weeks later I was back at my usual work!

People want accurate information and advice about their health problems. They need to be certain about what is best to do and what is safe to do. **The Arm Book** has been written to meet that need for people with common upper limb problems.

Based on sound scientific evidence, **The Arm Book** answers your important questions: what's happened, what to do about it, whether to seek treatment, whether to rest, whether to stay at work, and what the future holds. The news is good – there is a lot you can do to help yourself and get back to normal – **The Arm Book** tells you how.

To be sure it contains all the latest thinking, it has been written by a team of experts:

### **Clinical psychology**

Dr Nicholas Kendall

### **Occupational medicine**

Dr Lisa Birrell

### **Hand and Arm surgery**

Mr Chris Bainbridge

### **Ergonomics**

Mr Brian Pearce

### **Occupational health**

Prof Kim Burton



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