NECK AND BACK INJURIES IN SPORT

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The Sports and Soft Tissue Injury Clinic is attached to the physiotherapy department of the Royal Perth (Rehabilitation) Hospital, and began in a small way in 1969. The clinic's patient load has increased by about one-third each year. We now treat about 200 patients per month.

Approximately 91% of our patients have injuries sustained at sport or physical recreation. Of the non-sport injuries 20% are conditions relating to the neck or back, but these same conditions account for only 8.4% of the athletic injuries treated in the clinic. The percentage of patients with neck and back ailments seen in the general outpatients department is higher than 20%; and is higher again in private practice.

Sports injuries are divided into three main categories.

(i) Extrinsic injuries, involving external violence, for example, collision with an opponent or goalpost, or being struck by a ball, bat or stick. They include haematomae, ligament sprains and tears, and fractures of bone.

(ii) Intrinsic injuries, basically caused by clumsiness or inco-ordination, but sometimes with some external influence; they include muscle component strains and tears, and avulsion fractures.

(iii) Injuries caused by unaccustomed use, and overuse. These have similar pathology, but in the former case are seen in the untrained person, and the latter, in the trained athlete. These injuries include such conditions at tendonitis, bursitis, joint synovitis and stress fractures.

In a sample of 267 sports injuries to the neck and back (Table I), it can be seen that most of these injuries fall into the third category. A slightly lower total is seen in the second category and less again in the first. However, if we examine each sport separately the pattern changes somewhat with the specific nature of the game. For example, there will be a completely different pattern of injuries in a body contact sport such as Rugby Union from that in a non-contact sport such as cricket (Table II).

Table I

<table>
<thead>
<tr>
<th>CATEGORY</th>
<th>MISCELLANEOUS</th>
<th>AUST. RULES</th>
<th>HOCKEY</th>
<th>CRICKET</th>
<th>RUGBY UNION</th>
<th>SOCCER</th>
<th>GYMNASTICS</th>
<th>ATHLETICS</th>
<th>BASKETBALL</th>
<th>SQUASH</th>
<th>WT. TRAINING</th>
<th>NETBALL</th>
<th>RUGBY LEAGUE</th>
<th>ROWING</th>
<th>TOTAL</th>
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<tbody>
<tr>
<td>EXTRINSIC INTRINSIC UNACCUSTOMED OR OVERUSE</td>
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<td>21 10</td>
<td>4 9</td>
<td>15 9</td>
<td>4 4</td>
<td>1 6</td>
<td>5 9</td>
<td>1 9</td>
<td>2 5</td>
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<td>1 2</td>
<td>3 6</td>
<td>5 4</td>
<td>14 3</td>
<td>1 2</td>
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<tr>
<td>TOTAL</td>
<td>44 41 18</td>
<td>41 10 13</td>
<td>27 15 13</td>
<td>25 10 5</td>
<td>24 23 15</td>
<td>14 12 5</td>
<td>23 12 5</td>
<td>14 10 1</td>
<td>4 8</td>
<td>3 7</td>
<td>2 4</td>
<td>106 7</td>
<td>267 3</td>
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Sample of Neck and Back Injuries (Sport)

1Delivered at the XIV Biennial Congress of the Australian Physiotherapy Association, Sydney, August 1975.

Comparison of Injuries in Different Sports

In Rugby Union 62.5% of neck and back injuries are caused by the external violence encountered in scrums and tackles, and include haematomae, joint sprains, longitudinal ligament tears, fractures of spinous processes, transverse processes, ribs or vertebral bodies and occasional fracture-dislocations of vertebral joints.

The majority of neck and back injuries in cricket are either intrinsic or due to overuse, affecting the fast bowler more than any other member of the team. The repetitious unilateral ballistic movement, from extension with rotation in one direction to flexion and rotation in the opposite direction is the cause of muscle component strains and tears, joint sprains, intervertebral disc lesions, avulsion fractures of ribs, and stress fractures of vertebral components such as pars inter-articulares, articular processes, and transverse processes.

In the sports where most injuries to the back are in the intrinsic and overuse categories the number of injuries seem to be directly proportional to the amount of flexion with rotation that the sport demands. So that in a sport such as hockey the forwards, who most run with and dribble the ball, suffer the most often with backache.

It is interesting that activities involving hyperextension movements, as seen sometimes in gymnastics and often in acrobatic dancing seem to produce relatively few back problems. Acrobats, for example, who perform "bend-back" movements often get brief discomfort as they return to the upright position but get immediate relief by full flexion. However, injuries are not uncommon in these sports, particularly when new and complicated movements are being practised — and especially when being performed on bars or beam.

Lack of joint flexibility and muscle extensibility is a major predisposing factor in neck and back injuries during gymnastic and acrobatic activities.

The risk of degenerative and traumatic lesions of the spine in sports that involve heavy resistance exercises is now well known; Wood and Hayes (1974) have shown how lifting weights increases the 'shearing' and 'compressional' components of intervertebral stress. The risk however, is not confined to competitive weight-lifters, as athletes in many different sports routinely incorporate weight-training as part of their preparation; furthermore, heavy resistance may be applied in many different ways. For example, water resistance in canoeing and rowing; carrying a partner in pre-season training exercises or lifting an opponent in wrestling and judo; throwing the hammer, discus or shot.

We have a seasonal crop of older athletes with backache when clubs are using weight-training and exercises such as "piggy-back relays" in their pre-season preparations.

Clinical experience to date seems to indicate that rowers develop degenerative changes mainly at the thoraco-lumbar junction, whereas weight-lifters suffer degenerative changes mainly at the lumbo-sacral junction; 'throwers' in field events more often have thoracic and thoraco-lumbar lesions, plus cervical injuries caused by the rotational 'whipping' action in throwing.

Table III shows the general incidence of lesions at each spinal level.

Developmental and congenital abnormalities of the spine such as Scheuermann's disease and spondylolisthesis present a special problem in sports medicine, particularly when it is necessary to advise a young athlete to refrain from vigorous activity for a number of months, or to give up one sport completely for another. It is interesting to observe how easy it sometimes is to get a workman with a spondylolisthesis to lay down his tools — and how hard it is, on the other hand, to get an Australian Rules football player, with the same problem, to change his sport.

Another consideration peculiar to sport is the counter-irritant effect during a game, or competition. In team games involving a lot of body contact, players often take hard knocks but forget them quickly as they dive back into battle, so it is not surprising that 51.6% do not feel their injury until after the game when levels of arousal have returned to zero.

normal (Table IV). It is for this reason that careful examination of the patient is backed up by radiography probably more often with sports injuries than with other patients. An illustration of this point would be the Rugby Union player who hurt his neck when a serum collapsed upon him. His neck felt "a little stiff and sore" the next day so he decided to contrive a massage from a local masseur, however, on learning that his friend had an appointment at the Sports Injury Clinic he thought that he would give ns a "try" instead. On subsequent examination his signs and symptoms did not appear too severe, but, his X-ray showed a potentially unstable fracture through the vertebral bodies of C2 and C3.

The definition, or interpretation, of pain is another variable in sports injuries that will tend to tone down description of pain, whereas the runner, on the other hand, will usually not return to his sport until fully recovered and reconditioned; therefore his description of pain will tend to be more accurate, even a little exaggerated.

Levels of participation (Table V) and age grouping (Table VI) probably only reflect percentages of each grade and age-group participating in sport in general. However, the fact that 40% of injuries were due to unaccustomed use, or overuse, and that 45% were active in lower grades, does suggest a lack of specific fitness. On the other hand, the fact that neck and back injuries account for less than 9% of athletic injuries treated in the clinic, could be an indication that even the degree of fitness attained through somewhat irregular exercise might be useful in preventing the spinal problems so common amongst more sedentary people.

Aust J. Physiother., XXI, 4, December, 1975

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<tr>
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<td>THORACIC</td>
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*Anatomical Site of Injury Related to Sport*

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<tr>
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<td>3rd QUARTER</td>
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<td>4th QUARTER</td>
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<tr>
<td>PAIN FELT</td>
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<tr>
<td>AFTER GAME</td>
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<td><strong>TOTAL</strong></td>
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*Onset of Pain per Stage of Game*
TREATMENT

Treatment of sports injuries is considered in three stages:

Treatment on the field: early management, which is essentially First-Aid but should be considered as the start of a definitive treatment. Good First-Aid will certainly shorten the recovery time and make further treatment easier and more uncomplicated.

The definitive treatment: the therapeutic measures taken in the department to accelerate resolution of the injury.

Treat and train: the measures taken in an attempt to maintain fitness, particularly cardio-vascular fitness, until such time as a more specific light training can be resumed.

Methods of management on the field will depend upon the severity of injury. Suspected serious spinal injuries will require immobilisation, a meticulous lift onto a stretcher, then transport to a casualty department, as described in First Aid manuals and elsewhere (Gray, 1974). Management of less severe injuries will include cold applications such as ice, 'Skefron', cold water or spirit, compression applied by elastic bandages or elastoplast, support, if necessary, using corsets, belts, slings and strapping or improvised collars of soft rubber or towels.

The physiotherapist's priorities should always be for the well-being of the patient rather than the outcome of the competition and this will mean that on occasions he will need to stand firm when in negotiation with the coach whose priorities are somewhat different.

Progressive treatment regimes will vary in accordance with the site of injury and the specific tissues involved. Our general approach is one of intensive treatment with early movement and where possible we keep patients in the clinic for most of the day — particularly in early stages.

Our aims of treatment are:

(i) To resolve inflammatory process and promote removal of inflammatory products.

(ii) To restore joint mobility and proprioception.

(iii) To restore muscle strength, power, endurance and extensibility.
(iv) To maintain general fitness.

Reduction of pain and swelling of recent injury is promoted by the use of ice, compression, elevation and on occasions, anti-inflammatory and analgesic drugs prescribed by the Clinic medical officer. Once stasis is established, further reduction of pain and swelling is promoted using ice, contrast packs, or pulsed ultra-sound. When the pain and/or swelling is localised to a relatively small area, an ionisation of histamine or renotin, is sometimes used. This latter method is particularly useful as a counter-irritant for severe pain localised to a joint or soft tissue. A small pad, containing the renotin, is placed under the anode plate and over the painful spot. A larger dispersive pad is placed under the cathode plate over another level of the spine. Direct current at a strength of just over 2 milliamperes per square inch of anodal pad is given for about five minutes, after which time the pads are left in place and a gentle surged faradism is applied for 10-15 minutes. The ionisation produces a counter-irritant, and a slight anaphoresis encourages removal of swelling. The surged faradism further reduces swelling by circulatory changes and also provides a gentle mobilisation. The pads are then removed, the skin cleaned thoroughly and strapping is applied. This technique is sometimes criticised as being old-fashioned, but this technique is often dramatically effective in reducing pain and initiating movement.

Our choice of heat to accelerate resolution is usually ultra-sound for inter-fascial, intra-muscular and deep joint lesions, and microwave for muscular and superficial joint lesions. Frequently we use a combination of continuous ultra-sound followed by pulsed sound — or microwave, followed by pulsed sound.

It is felt that for most injuries, a gradually progressive exercise scheme is the most important treatment modality to restore muscle strength, endurance, mobility, and proprioception, and as a self-manipulation with the aim of reducing pain. Pain-free movement patterns are established and the patient instructed to 'press' into the full range, repeating the exercise a little but often throughout the day, but stressing that exercise should always be performed within limit of pain and swelling.

Manipulation is used where indicated for joint lesions. The method of manipulation used will depend upon the specific problem encountered and could be any one of the methods advocated by Cyriax (1965), Stoddard (1964) or Maitland (1968).

Traction techniques are also varied according to signs but in most cases will be intermittent mechanical traction using the ‘Tru-Trac’ apparatus.

Transverse friction kneadings are occasionally employed on relatively superficial and localised lesions such as strains of the lumbosacral fascia and sprains of interspinous ligaments.

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It is often stated in the literature that “there is no such thing as rest in the treatment of athletic injuries”. I think this sometimes misleading statement requires some qualification. There are many conditions that will settle down quite quickly with a little bit of rest and some palliative heat or sound; particularly the old degenerative conditions that have been stirred up by unaccustomed use. It is also well known that it is unwise to exercise a part that is acutely inflamed. But it is important to a top class athlete that injury does not 'rob' him of his hard earned general fitness — therefore it is essential that he be directed in general exercise whilst resting the part — and this is what we call 'treat and train'. The athlete with a neck or back lesion might still be able to swim, cycle, lift light weights in a prone or supine position, or perform blanket sliding exercises — propelling himself, or herself, along the gym floor on a blanket in the prone or supine position. This type of programme will ensure that the athlete will be able to return safely and quickly to his more specific training, thereby reducing the risk of his sustaining an unaccustomed use type injury.

**Conclusion**

The main predisposing factors in neck and back injuries are:
(i) A lack of specific fitness.
(ii) Lack of joint flexibility and muscle extensibility.

_Aust.J.Physiother., XXI, 4, December, 1975_
(iii) Congenital and developmental abnormalities.

Prophylactic measures that could be employed to help reduce neck and back injuries would therefore include:

(i) A gradually progressive specific training programme.

(ii) Regular flexibility and strength tests with a separate exercise programme to suit any deficiencies detected.

(iii) A warm-up programme that includes stretching exercises before training and competition.

(iv) Adequate treatment for injuries, whilst training within capabilities, returning to competition only when fully recovered (Gray, 1974).

REFERENCES


