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# Lower back pain: a need for thorough assessment

Lower back pain is defined as pain, muscle tension or stiffness localized below the costal margin and above the inferior gluteal folds, with or without leg pain (Chambers et al, 2001). It has many causes and associated risk factors, making the process of assessment and diagnosis complex. An understanding of these factors and how to undertake a thorough assessment is necessary to provide patients presenting with lower back pain with the most appropriate management and referral as required.

## Prevalence and epidemiology

Cohen et al (2008) reported that lifetime adult prevalence of lower back pain varies between 50–80%. It is a common problem, with up to 84% of the UK population suffering with some level of lower back pain (Mercer et al, 2006). From these figures it is suggested that 26–37% relapse in terms of absence from work, with about 11–12% of the population being disabled by the condition.

## Aetiology

A plethora of factors are associated with lower back pain, both specific and non-specific, but Cohen et al (2008) suggest that the risk factors for progression to chronic back pain are predominantly psychosocial and occupational (Table 1).

## Cost

It is hard to estimate the impact of back pain on the quality of life of the individual. Moore et al (2003) reported that back pain in the UK cost the public purse:

- £481 million in NHS costs
- £197 million in non-NHS costs
- £1.4 billion in benefits
- £3.8 billion in annual loss of production from an estimated 52 million working days lost in Britain.

Maniadakis and Gray (2000) reported that the direct health-care costs of back pain in the UK in 1998 were £1.6 billion (including the private health care sector). They also estimated non-health care costs at about £10.7 billion.

The Department of Health (DH) published the *National Service Framework for Long-Term Conditions* (NSF) in 2005 and the musculoskeletal services framework (MSF) the following year (DH, 2006) to improve outcomes for people with long-term conditions, including lower back pain.

The MSF describes over 200 musculoskeletal conditions affecting millions of people of all ages (DH, 2006). These include all forms of arthritis, back pain and osteoporosis. It is stated in the MSF that some of these musculoskeletal conditions, including those resulting from injuries, can result in long-term disability.

**Table 1. Lower back pain: causes and risk factors**

Specific causes	Inflammatory	Rheumatoid arthritis
		Ankylosing spondylitis
		Reactive arthritis
	Mechanical	Osteoarthritis
		Facet joint pain
		Lumbar spondylosis
		Spondylolisthesis
		Radiculopathy
		Degenerative disc or joint disease
		Fracture
	Metabolic	Osteoporosis
		Paget's disease
		Osteomalacia
Others	Tumour	
	Infection	
Non-specific causes	Poor posture, sitting and standing	
	Lifting ergonomics	
	Unknown causes	
Non-specific factors increasing the risk of developing chronic back pain	Overweight	
	Smoking	
	Pregnancy	
	Long-term use of medication (e.g. corticosteroids)	
	Stress	
	Depression	
	Occupation	

From: National Institute for Health and Clinical Excellence, 2009; NHS Choices, 2010.

*Making a detailed assessment is vital for an accurate diagnosis of lower back pain and appropriate management. Michael Concannon and Andy Bridgen explain how*

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## CASE STUDY

Gary is a 45-year-old male with type 2 diabetes. He is being treated with metformin 500mg three times daily, glimepiride 80mg twice daily. He does not have a good record of control for his blood glucose. His HbA<sub>1c</sub> recordings are between 64–97 mmol/mol (8–11%) He has been referred to the practice nurse for a review assessment because of recent polyuria and is presenting with lower limb paraesthesia.

Gary is a full-time shop owner. The role involves prolonged sitting and standing and also involves moving and sorting heavy deliveries. He has a history of lower back pain but 6 weeks ago his symptoms altered following an incident at work lifting heavy boxes. Previously he complained of a constant, but variable, ache across the lumbar region and buttocks, affecting daily activities. Since the recent injury he reports unremitting pain in the lower back (Gary indicates this to be in the L4–L5 region). He also complains that he has a ‘numb bum’ with pins and needles in the right leg.

### Review with practice nurse

The GP prescribed non-steroidal anti-inflammatory drugs (NSAIDs) to help with the pain, but Gary does not gain any comfort from them.

In the review, the practice nurse’s subjective assessment also reveals that Gary has noticed a urinary increase (polyuria).

The dermatomal assessment shows a loss of sensation originating from spinal nerve route at S1, S2 and S3. The reflex assessment indicates right leg unilateral weakness of the ankle jerk. A neurological assessment highlights knee flexion and foot plantar flexion weakness with myotome loss (indicating S1 involvement).

Because the subjective assessment of the lumbar spine has proved positive, the practice nurse considers performing further specific tests related to

spinal cord symptoms, looking for disturbances in the sensory or motor pathways, e.g. bilateral tingling in hands or feet, disturbance of gait, or disturbance of more than one sensory or motor pathway.

These tests reveal saddle anaesthesia, paraesthesia in the region and bladder dysfunction (polyuria, as indicated previously).

With respect to physical examination and palpation, because of the red flags highlighted in the previous tests, the nurse elects not to perform a physical examination of the spine.

### Diagnosis

Gary has serious pathology (possible cauda equina) warranting urgent medical investigation.

Cauda equina syndrome is most commonly caused by lumbar disc herniation compressing the cauda equina section of the spine. It is characterized by dysfunction of bladder, bowel or sexual function, and sensory changes in saddle or perianal area. These can be combined with other symptoms: back pain (with or without sciatic-type pains), sensory changes or numbness in the lower limbs, lower limb weakness and reduction or loss of reflexes in the lower limbs. Cauda equina is a clinical emergency as surgical decompression is urgently required. Research suggests that intervention less than 48 hours after the onset of symptoms will produce a better outcome than intervention delayed for longer than this (Lavy et al, 2009). Differential diagnoses for cauda equina include mechanical back pain or prolapsed lumbar disc, fracture of lumbar vertebrae, spinal tumour, spinal cord compression and peripheral neuropathy (Lavy et al, 2009).

### Management

Gary is referred as an emergency to the accident and emergency department for suspected cauda equina.

For people with musculoskeletal conditions, the MSF advocates a wide range of high-quality support and treatment, from simple advice to highly technical, specialized medical and surgical treatments. In practice, while excellent care is provided in some places, in many areas services are fragmented and incoherent, with poor access to care.

Multidisciplinary interface services are central to the MSF, acting as a one-stop shop for assessment, diagnosis, treatment or referral to other specialists. The triage process identifies people who can benefit from rapid access to local services, and those who will need hospital referral.

Gary may be a typical example of a patient who presents with lower back pain suffering from more than one long-term condition (*Case Study*). His symptoms mask an acute and urgent condition requiring good assessment, diagnosis and triage. It is important that patients are triaged into the appropriate group for management of low back pain. The three groups are (Van Tulder et al, 2006):

- Serious spinal pathology
- Nerve root compression
- Non-specific low back pain.

### Assessment and diagnosis

There are a variety of models of assessment that enable a clinician to establish a working diagnosis and management plan. The importance of which assessments are undertaken is predominantly dependent on the clinician’s ability to prioritize. This requires skills which may only be gained with reflective experience in assessment.

A subjective assessment should always be included. This will establish the site, quality, intensity and type of pain or symptoms. A 24-hour pattern also needs to be established. Along with the history of the presenting condition, the medical, drug and social history should be ascertained and previous investigations considered.

It is then possible to undertake the necessary objective examinations, which may include observations (e.g. for signs of muscle wastage, asymmetry, abnormal gait), examining movement and clearance, neurological tests, palpation, and determining muscle length, strength and endurance around the site.

These subjective and objective observations provide an overall impression and may offer a diagnosis on the basis of which a management plan can be agreed.

## Information gathering

Subjective history taking is essential and arguably the most important aspect of the clinician's interaction with a patient who is seeking help. The information obtained allows a planned and individually tailored objective assessment to be arranged, beginning with a problem list.

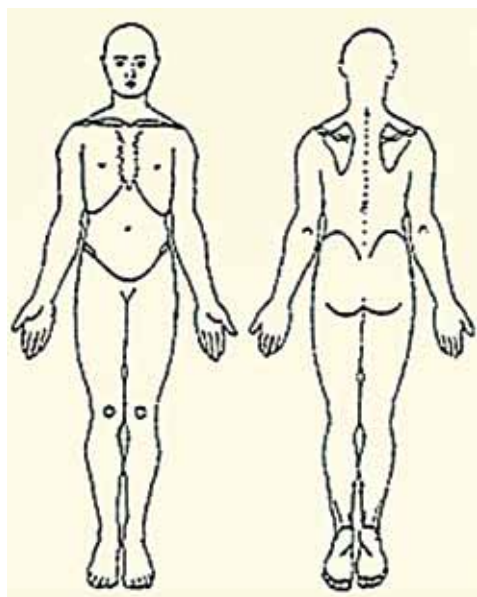
In musculoskeletal care, the problem list helps the practitioner decide whether it is appropriate to treat the patient and if not, where best to send the patient for further assessment or treatment. Cohen et al (2008) emphasize this point, suggesting that the main value of a history and physical examination is to determine which patients should receive intervention or be referred on for imaging and more specialist interventions. This remains the key challenge to all first-line health professionals dealing with people who present with lower back pain.

It is essential, according to NICE guidelines (2009), that care should be patient centred, offering good communication between health professionals and patients and that it should be supported by evidence-based, written information tailored to the patient's needs.

## The presenting complaint

It is essential that the presenting symptoms are recorded accurately, perhaps using a simple body chart to map the area (*Figure 1*). When locating the symptomatic area, it is important to examine proximal and distal to the site to establish the extent of involved structures around the site (clearance).

**Figure 1. Simple body chart.**



## 24-hour pattern

A key element of assessment of lower back pain is to establish the 24-hour pattern of pain and symptoms. This gives a more detailed view of aggravating and easing factors, and also gives information on any sleep disturbances that affect the patient. If the patient's symptoms wake him/her at night as a result of maintaining or changing position, the clinician needs to analyse the position or movement in terms of the structures being stressed (Ryder, 2011). Altered sleep postures to relieve lower back pain (as a result, for instance, of sleeping in the spare room so as not to disturb a partner) can perpetuate the problem (Fraser, 2009).

## Red and yellow flags

Special questions may be used to establish red or yellow flags. With regard to lower back pain, red flags are any indicators of possible serious spinal pathology (Waddell, 2004). The Royal College of General Practitioners (RCGP) guidelines (1999) state that difficulty with micturition, loss of sphincter tone, urinary or faecal incontinence, saddle anaesthesia and gait disturbance are signs for emergency referral as they can indicate serious spinal pathology.

Other common red flags do not require immediate referral but can be indicators of a serious underlying condition. These include age of onset <20 years or >55 years, history of violent trauma, constant progressive non-mechanical pain, unexplained weight loss, being systemically unwell, history of cancer, history of drug abuse or prolonged immunosuppression, thoracic pain, major loss of lumbar flexion and fever (Fraser, 2009).

Yellow flags are psychosocial risk indicators for developing or perpetuating chronic

**Table 2. Red and yellow flags for lower back pain**

<b>Red flags</b> (possible indicators of serious spinal pathology)	<b>Yellow flags</b> (psychosocial factors shown to be indicative of long-term chronicity and disability)
Thoracic pain	A negative attitude that back pain is harmful or potentially severely disabling
Fever and unexplained weight loss	Fear avoidance behaviour and reduced activity levels
Bladder or bowel dysfunction	An expectation that passive, rather than active, treatment will be beneficial
History of carcinoma	A tendency to depression, low morale, and social withdrawal
Ill health or presence of other medical illness	Social or financial problems
Progressive neurological deficit	Compensation issues
Disturbed gait, saddle anaesthesia	
Age of onset <20 years or >55 years	

pain and long-term disability including work-loss associated with low back pain (Van Tulder et al, 2006). The presence of yellow flags does not mean that the symptoms of lower back pain are all ‘in the patient’s mind’ (Fraser, 2009).

Key yellow flags are inappropriate attitudes and beliefs about back pain, e.g. the belief that back pain is harmful or potentially severely disabling, and inappropriate pain behaviour, e.g. fear-avoidance behaviour and reduced activity levels, compensation issues, poor work satisfaction, depression, anxiety, stress and withdrawal from social interaction (Van Tulder et al, 2006).

Once identified, doing something about these yellow flags is more difficult. As nobody likes having his/her beliefs challenged, it is important to improve the patient’s knowledge of lower back pain and improve his/her sense of control over the condition.

**Past medical, drug and social history**

This may offer insight into previous episodes of the same or similar symptoms and may be indicative of a progressive dysfunction, aetiology or, indeed, non-concordance with previous management planning.

**Pain: site, quality, intensity and type**

Pain and questions relating to it are a key component of any musculoskeletal assessment. It is important to remember that pain is complex and is a subjective phenomenon, different for each individual (Ryder, 2011). It would be impossible in this article to cover this challenging topic in depth, so a brief overview of the main areas is given.

The initial questions to ask are about the site, quality, intensity, type and depth of pain (Orazio, 1999; Fraser, 2009; Ryder 2011). The mapping exercise begins by asking the patient where the pain is. Questions about the quality and intensity of the pain include asking for the patient’s subjective description of the pain. The quality of pain may give a clue as to the structure injured (Magee, 2006) (*Table 3*) but care should be taken because this can be misleading (Fraser, 2009; Ryder, 2011).

Establishing the type of pain is a way of distinguishing the characteristics of the pain mechanism involved (examples are given in *Table 4*). This enables a greater understanding of the cause of lower back pain (Doubell et al, 2002).

**Objective examination**

In Gary’s case, many of the objective assessments were unnecessary. The essential components were established in the subjective history, in which the spinal cord symptoms were established.

**Neurological assessment**

The dermatomal (sensory) assessment using light touch and sharp/blunt modalities showed a loss of sensation originating from nerve routes S1, S2 and S3.

The integrity of the ankle reflex arc was assessed and indicated right leg unilateral weakness of the ankle.

A motor function test was conducted using a resisted (isometric) test, which highlighted knee flexion and foot plantar flexion weakness with myotome loss (indicating S1 and S2 involvement).

Here red flags were linked to the neurological findings, which led to a referral for

**Table 3. Pain as indicator of the structure that may be injured**

Type of pain	Structure possibly injured
Deep, nagging, dull	Bone
Dull ache	Muscle
Sharp, shooting	Nerve root
Sharp, bright, lightning-like	Nerve
Burning, pressure-like, stinging, aching	Sympathetic nerve
Throbbing, diffuse	Vascular

**Table 4. Characteristics of pain mechanisms**

Mechanism	Characteristics	Associations
Mechanical nociceptor	Localized intermittent Predictable response to movement No pain on waking but pain on rising	A combination of mechanical and inflammatory nociceptor mechanisms is a common cause of lower back pain. The patient describes an intermittent dull ache made worse by sitting or bending
Inflammatory nociceptor	Constant/varying Worsened by rapid movement Pain in the night and on waking High irritability and severity	
Peripheral neurogenic	Anatomical distribution Burning, sharp, shooting Paraesthesia, dysaesthesia, allodynia Provoked by nerve stretch, compression or palpation	Sciatica is an example of peripheral neurogenic pain as the pain follows the nerve distribution of the sciatic nerve
Central sensitization	Lesion or dysfunction in the central nervous system Widespread non-anatomical distribution Increased sensitivity to pain Inconsistent response to stimuli and tests	In lower back pain this type of pain is associated with severe spinal trauma or is secondary to a neurological condition
Autonomic	Develops following trauma and has similar symptoms to central sensitization Burning, deep and crawling unusual type of pain Associated changes to circulation and sweat production	Complex regional pain syndrome is an example of this
Affective	Result of cognitive and emotional influences, e.g fear, anxiety or anger	This is an indicator that lower back pain has become a chronic pain issue

From: International Association for the Study of Pain, 1994; Fraser, 2009; Ryder, 2011

urgent medical investigations with a diagnostic query of cauda equina.

## Management

There is widespread support in the literature that physical activity, exercise and early return to normal activity, e.g. work, are beneficial in acute lower back pain and preventing it from becoming a chronic problem (Orazio, 1999; Wohlberg et al, 2003; Adams et al, 2006; Van Tulder et al, 2006; Fraser, 2009). This needs to be linked to a consistent message from health professionals about the importance of coping with low back pain (Fraser, 2009).

If lower back pain is allowed to become chronic then psychological and social factors have been shown to play a major role in exacerbating the biological substrate of pain by influencing pain perception and the development of chronic disability (Main and de Williams, 2002). This links in to the yellow flags section. It is important that these factors are addressed as the European guidelines for the management of chronic non-specific low back pain show that this gives the best chance of a positive outcome (Airaksinen et al, 2006).

## Conclusions

Underlying conditions can be masked by the symptoms of other health problems and in a busy clinic can be missed if the health practitioner is focused on a pathology-based assessment rather than a more holistic one. The case history of Gary highlights the need for objectivity in discerning an appropriate assessment pathway and redirection to alternative services.

Successful management of low back pain and the recovery process depend on individual motivation and effort. Changing individual perceptions, attitudes and behaviour is central to the rehabilitation of low back pain (Adams et al, 2006).

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## KEY POINTS

- Up to 84% of the UK population suffer with some level of lower back pain and about 11–12% are disabled by it
- Lower back pain costs the public purse more than £6 billion
- Thorough history-taking and a straightforward musculoskeletal assessment enables appropriate referral and intervention
- The literature supports the idea that physical activity and exercise, and an early return to normal activity are beneficial in lower back pain and prevent it becoming a chronic problem