

Chronic back pain

Mark A Jackson FRCA
Karen H Simpson FRCA

Key points

Chronic back pain is a major cause of disability in the Western world.

Chronic back pain can be triaged into simple chronic back pain, spinal nerve root pain and serious spinal pathology.

Red flag markers are indicative of serious spinal pathology.

Assessment of disability and of psychological distress is important.

Management of back pain should involve a multidisciplinary team.

The term chronic back pain is used to describe pain that occurs between the lower costal margins and the gluteal folds that persists for >3 months. Back pain is one of the most common reasons for chronic disability and incapacity in the Western world.¹ In the United Kingdom, up to 50 million working days are lost each year, and half a million people receive long-term State Incapacity Benefit because of back pain. Each year, this condition costs the UK economy up to £5 billion, and the NHS >£481 million. Back pain is extremely common; its life-time prevalence is 60–85%. A vast majority of cases settle spontaneously within 3 months. About 6% of the patients develop long standing or serious disabling back pain; they account for >80% of the use of health care resources for back pain. Risk factors for the transition from acute to chronic back pain include signs of nerve root involvement, an ongoing compensation claim, long time off work, high levels of psychological distress and depression, poor physical fitness, and heavy smoking.²

Clinical presentation

Chronic back pain can be triaged into three categories: simple musculoskeletal back pain (95%), spinal nerve root pain (4–5%) and serious spinal pathology (1%).

Simple musculoskeletal pain

Simple musculoskeletal back pain accounts for the majority of cases. It is mechanical in nature and occurs in the age group of 20–55 yr. Pain occurs mainly around the lumbosacral area and the buttocks; it is often associated with referred leg pain into the upper thighs that rarely extends below the knees. The pain is typically described as a dull ache that varies with physical activity. Patients are generally otherwise physically well.

Discogenic pain (arising from the intervertebral discs) accounts for 40% of mechanical back pain. The intervertebral discs form

the main articulation between the vertebral bodies. The disc is formed by an outer layer (annulus fibrosus) that consists of concentric bands of fibrous lamellae. The disc receives its sensory innervation from the sinuvertebral nerve and grey rami communicantes. The nucleus pulposus occupies the central area of the disc and it consists of a network of collagen fibres enmeshed in a mucoprotein gel. The nucleus pulposus has no sensory innervation, so its degradation is not a direct cause of pain. Discogenic pain probably occurs as a result of internal disc changes that lead to leakage of the contents of the nucleus pulposus into disruptions within the annulus fibrosus.

The sacroiliac joint is the largest axial joint in the body and it is surrounded by a fibrous capsule. Pregnancy may lead to pain in the sacroiliac joints. Sacroiliac joint pain accounts for ~20% of mechanical back pain. In sacroiliac pain, as with the majority of causes of mechanical back pain, there are no unique identifying features in the history and physical examination to pin point this diagnosis. However, pain arising from this joint has been recorded rarely above the level of the transverse process of L5. Stressing the joint may reproduce the patient's pain.

Pain arising from the lower lumbar facet joints accounts for 10–15% of mechanical back pain in young adults and up to 40% of cases in the elderly. The facet joints (zygapophysial joints) consist of paired synovial joints formed from the superior articular process of one vertebra and the inferior articular process of the vertebra above (Fig. 1). These joints function to stabilize the spine and limit rotation and shift. Certain features in the history may suggest facet joint involvement in the generation of pain (e.g. increasing pain with lateral bending, rotational movement and extension rather than flexion and the presence of paravertebral tenderness). Unfortunately, these signs are not specific to facet joint pain and a diagnosis cannot be made by history and examination alone.

Mark A Jackson FRCA

Senior Registrar in Pain Medicine
Westmead Hospital
Sydney
Australia

Karen H Simpson FRCA

Consultant in Pain Medicine
Pain Management Service
L Ward
Seacroft Hospital
York Road
Leeds
LS14 6UH
UK
Tel: 01132 063711
Fax: 01132 737564
E-mail: Karen.simpson@dsl.pipex.com
(for correspondence)

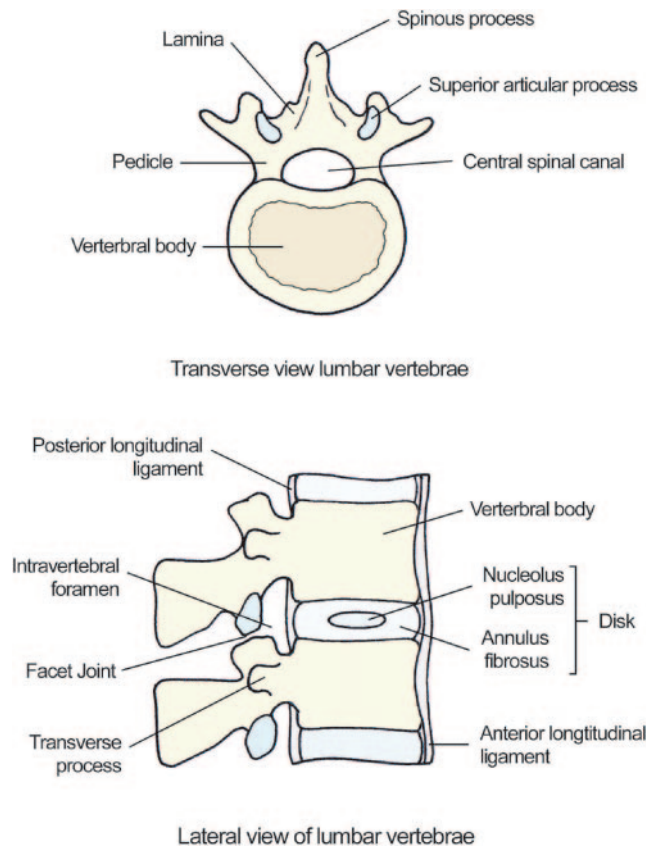


Fig. 1 Anatomy of the lumbar spine.

Ligaments of the spinal column help to stabilize the spine and set limits to certain movements. Strains or tears in these ligaments can cause chronic back pain. The muscles of the lumbar spine may also be a source of pain (myofascial pain). Such pain is characterized by the presence of trigger points in the muscles. This is defined as a tender point in a taut band of muscle that can cause referred pain. Palpation or needling of these trigger points can reproduce the patient's pain.

Spinal nerve root pain

Spinal nerve root pain is often well localized, radiating down the leg in a dermatomal pattern. The radicular element is characteristically much worse than the associated back pain because it is neuropathic. The pain typically radiates below the knee into the foot. It is described as a sharp, electric shock-like pain and is well localized. Nerve root pain should not be confused with referred back pain; the latter rarely extends below the knee and is poorly localized. Paraesthesia may occur along the same dermatomal distribution as the pain. Coughing, straining and sneezing often reproduce or exacerbate radicular pain. Both the straight leg raise test and femoral stretch test can be used to elicit signs of nerve root irritation. Neurological examination may reveal sensory, motor and reflex abnormalities. Nerve root pain can be caused by disc herniation, spinal stenosis

Table 1 'Red flag' markers for serious spinal pathology

Presentation <20 or >55 yr
History of significant trauma
Constant progressive thoracic pain
Past history of cancer, steroid therapy, i.v. drug abuse or HIV infection
Unexplained weight loss
Systemically unwell
Cauda equina syndrome (saddle anaesthesia, gait/sphincter disturbance)
Structural deformity
Marked restriction of lumbar flexion (<5 cm)
Non-mechanical pain

and epidural adhesions. The nerve roots leave the spinal canal via the intervertebral foramina. These are bounded anteriorly by the posterior longitudinal ligament, intervertebral discs and vertebral bodies. They are bounded posteriorly by the facet joints, pedicle and ligamentum flavum (Fig. 1).

Posterior disc herniation can compress nerves directly by herniation into the central canal or into the intervertebral foramen. The peak age for disc herniation is 30–55 yr. The disc can become increasingly prone to herniation secondary to tears and degeneration in the annulus fibrosus. Pain arises from compression of the nerve roots and also from inflammatory changes that occur in response to the herniated disc material.

Spinal stenosis typically occurs after the age of 55 yr and is a result of bone and ligament hypertrophy leading to reduction in the diameter of the spinal canal and intervertebral foramina causing compression and chronic inflammatory changes of the nerve roots with the development of adhesions. Its clinical features include neurogenic claudication pain that occurs after 10–20 min of walking. It is important to differentiate this from claudication pain secondary to vascular insufficiency. Extension of the spine exacerbates pain and flexion often eases it. Patients often describe walking up hill easier than walking on the flat; they can often cycle even if they cannot walk.

Epidural adhesions can lead to nerve root pain. These can occur after spinal surgery, chronic inflammation as a response to leakage of nucleus pulposus from damaged discs or from cytokines released from facet joints. Pain associated with epidural adhesions is mostly continuous and independent of activity; the distribution of pain can be mono- or multi-segmental, and unilateral or bilateral.

Serious spinal pathology

Serious spinal pathology is rare and 'red flag markers' in the history (Table 1) should alert the physician to the possibility of serious pathology and the need for further investigations to exclude spinal tumours, infection, trauma, inflammatory diseases and cauda equina syndrome.

Patient assessment

History and examination of the patient by appropriate health-care professionals allows triage that will guide management. It is not necessary for all patients with back pain to be triaged

by medical staff and assessment by other professionals (e.g. specialist nurses and physiotherapists) can be useful. It is essential to assess any associated disability. Specific questions should be asked about restrictions to activities of daily living (e.g. sleep, personal care, mobility, socializing and work). Questionnaires can be used as more reproducible assessment tools; two commonly used questionnaires are the Oswestry Disability Index and the Roland Disability Questionnaire. It is also important to look for features of anxiety (e.g. apprehension, tension, difficulty coping, increased dependence on others and poor concentration). Depression may also present with anhedonia, hopelessness, loss of self-esteem, appearing withdrawn and crying; it may also be associated with some physical symptoms including early morning awakening, and loss of appetite and libido. Patients with persistent pain often present with anger. These problems may indicate the need for more formal psychological assessment and management.

Investigations

Serious spinal pathology

The history and examination are likely to dictate the most appropriate investigations and referral pathways for patients in this category. Plain radiographs of the lumbosacral spine are recommended to look for spinal tumours and fractures. Simple tests (e.g. WBC, ESR and plasma viscosity) are needed to screen for inflammatory disorders, infection and malignancy. However, normal results do not exclude serious spinal pathology and, if the history is suggestive of a sinister cause for the pain, further investigation is required and early radiological advice is needed.

Nerve root pain

Plain radiographs are of no benefit in the assessment of nerve root pain. CT shows bone architecture and MRI is the investigation of choice for assessing soft tissues. MRI is more useful than CT as an investigation for nerve root pain, unless the history is suggestive of spinal stenosis, when CT may be more appropriate. Imaging reveals many false positive abnormalities; many MRI studies of pain-free subjects have highlighted the presence of asymptomatic herniated discs, marked degenerative changes and nerve impingement. Therefore, the results of these investigations should be viewed in the context of the clinical presentation. Nerve conduction studies are not recommended for investigating nerve root pain; they have a high false positive rate and often lack the sensitivity to make a specific diagnosis. However, they can be useful for distinguishing between a radicular and peripheral neuropathic pain.

Simple musculoskeletal back pain

Plain radiographs, CT and MRI generally have no role in the investigation of chronic musculoskeletal back pain; there are many false positive findings and they do not alter treatment

plans. Diagnostic nerve blocks can sometimes be used to investigate the cause of simple chronic back pain (e.g. lumbar medial branch nerve blocks can be used to assess whether pain is originating from the facet joints). Pain relief after anaesthetizing these nerves as selectively as possible may suggest that some of these patients may benefit from radiofrequency lesioning of the lumbar medial branch nerves. Similarly, sacroiliac joint injections can be used to assess the sacroiliac joints as a source of pain.

Management

The management of serious spinal pathology depends on the nature of the problem and will not be discussed further. Nerve root pain and simple back pain can be managed within a pain management clinic using a multidisciplinary approach. The aims of the treatment are to improve pain and optimize physical, psychological and social functions.

Drugs

Evidence supports the use of non-steroidal anti-inflammatory drugs (NSAIDs) and opioids in the management of back pain, although the use of long-term NSAIDs requires careful assessment of benefits and risks. Initial management is often regular acetaminophen and NSAID+/- a weak opioid. A strong opioid may be appropriate; opioid prescribing in this context should follow agreed recommendations such as those produced by the British Pain Society. The use of immediate release opioids should usually be avoided. There is evidence supporting the use of tricyclic antidepressants and anticonvulsants for neuropathic pain. Drugs such as methocarbamol, baclofen and benzodiazepines are sometimes used for muscle spasm, but there is little supporting evidence for this and long-term use should be avoided.

Psychology

There is strong evidence to support the use of some psychological approaches (e.g. cognitive behaviour therapy) to manage chronic pain in adults either as an individual therapy or in a group setting. This approach reduces pain and disability-related behaviour and improves function. Pain management programs combine physical and psychological strategies. They address education about pain and the distinction between acute and chronic pain, relaxation techniques, goal setting, pacing activities, attention management, and cognitive restructuring techniques.

Physical therapies

Graded exercise programs are a recommended treatment for back pain, and there is strong evidence to support the use of exercise therapy.³ It is more effective than standard care in a primary care setting. Patients achieve similar pain relief and improvement in disability with low impact aerobic exercise or

conventional physiotherapy programmes. It has also been shown that spinal manipulation is more effective than placebo.

Interventional treatments

These approaches are described in detail elsewhere.^{4,5} There is no evidence to support the use of caudal and lumbar epidural injections in the treatment of simple musculoskeletal back pain. These treatments may have a role in the early treatment of nerve root pain in some patients. Transforaminal nerve root injections have been shown to be effective in reducing the need for disc surgery. Facet joint injections can produce short-term pain relief, but evidence is lacking to support their use as a satisfactory long-term treatment for musculoskeletal back pain. Some studies suggest that radiofrequency lesioning of the lumbar medial branch nerves markedly reduces pain and produces a significant and sustained improvement in physical function.⁶ However, there are conflicting data concerning the efficacy of this treatment. It is important to note that the negative study did not recruit patients for treatment on the basis of pain relief after diagnostic medial branch blocks, perhaps highlighting the importance of careful patient selection.

Transcutaneous electrical nerve stimulation

Transcutaneous electrical nerve stimulation may be more effective than placebo in reducing pain in the short term but there is little evidence to support its long-term use.

Spinal cord stimulation

Spinal cord stimulation may be useful in carefully selected patients. For example, it has produced significant pain relief in ~50% of cases in studies of patients with failed back surgery

syndrome and radicular pain. Its use in simple mechanical back pain is less clearly defined.

Acupuncture

Acupuncture can produce short-term pain relief. However, this is not often sustained and prolonged courses may be required.

Surgery

Surgical procedures for spinal stenosis and surgical discectomy can provide pain relief for nerve root pain. The evidence for lumbar decompression/fusion surgery for degenerative conditions of the spine is of poor quality and these procedures are generally not recommended.

References

1. Jensen TS, Wilson PR, Rice ASC. *Chronic Pain, Clinical Pain Management*. London: Arnold, 2003
2. Waddell G. *The Back Pain Revolution*. Edinburgh: Churchill Livingstone, 1998
3. Hayden JA, van Tulder MW, Malmivaara A, Koes BW. Exercise therapy for treatment of non-specific low back pain. *Cochrane Database Syst Rev* 2005; **20**: CD000335
4. Bogduk N. *Practice Guidelines for Spinal Diagnostic and Treatment Procedures*. California: International Spine Intervention Society, 2004
5. Breivik H, Campbell W, Eccleston C. *Practical Applications and Procedures, Clinical Pain Management*. London: Arnold, 2003
6. Dreyfuss P, Halbrook B, Pauza K, Joshi A. Efficacy and validity of radiofrequency neurotomy for chronic lumbar zygapophysial joint pain. *Spine* 2000; **25**: 1270–7. Department for Work and Pensions. Available from www.dwp.gov.uk.

Please see multiple choice questions 13–15.