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Low Back Pain and Sciatica

Introduction to back pain and sciatica

Low back pain is an extremely common problem that is often poorly managed. Back pain is a particular challenge because it is so common, demanding of medical resources and a major cause of physical, psychological and social disability. Most back pain is simple and self-limiting but it is important to recognise that which is not.

See also separate [Examination of the Spine](#), [Lumbar Spinal Stenosis](#) and [Back Pain in Children](#) articles.

The aims of back pain assessment are^[1]:

- To recognise serious pathology.
- To relieve pain.
- To improve function.
- To recognise and assess level of disability.
- To identify barriers to recovery.
- To prevent recurrence or persistence of symptoms.

Definitions of back pains^[2]

- Mechanical back pain arises from the spinal joints, vertebrae or soft tissues and characteristically it varies with posture and is exacerbated by movement.
- A specific cause such as intervertebral disc prolapse, vertebral fracture or facet joint injury may be identified in some cases.
- Nonspecific low back pain is diagnosed when lower back pain cannot be attributed to a specific cause.
- Inflammatory low back pain is caused by rheumatoid conditions such as ankylosing spondylitis affecting the spinal joints. It tends to present with pain and stiffness on waking and is improved by movement. It tends to have an insidious onset and follows a chronic course.
- Low back pain may be classified as acute (present for less than six weeks) or chronic (present for more than six weeks).

Epidemiology

- Back pain is extremely common. 60-80% of people in the UK report back pain at some time in their lives^[1].
- A UK population-based cross-sectional study of people aged 25 years and older found the one-month period prevalence of low back pain to be around 30%, peaking at age 41-50 years. The one-year prevalence of chronic low back pain is about 1%^[2].
- For most people, low back pain is nonspecific and serious specific causes are rare^[2].
- Highly demanding jobs, prolonged standing and awkward lifting are the most consistent factors predisposing to low back pain^[3].
- Obesity increases risk. Other risk factors include psychosocial work-related stress and family history.

Presentation

History should include:

- Establishing when the pain started.
- Confirming whether pain was sudden or gradual in onset.
- Identifying the location of the pain.
- Enquiring whether there is pain radiation to anywhere else.
- Establishing whether there are aggravating or relieving factors.
- Confirming whether the patient has had this problem previously.
- Noting the patient's occupation, what it involves and hobbies or sport.
- Asking the patient to confirm what they think caused the pain.
- Noting past medical history. Steroid use predisposes to osteoporosis. Establish whether there has been malignancy that metastasises to bone (lung, breast, prostate, thyroid, kidney) or myeloma.
- Asking the patient to confirm how they have been managing the condition. This includes analgesics taken, whether they have been adequate and the patient's attitude to the condition.

Examination

See also separate [Examination of the Spine](#) article.

- A brief examination for acute back pain is recommended with the patient undressed, revealing the spine and standing.
- The brief examination should incorporate: inspection, palpation, brief neurological examination and an assessment of function.

- More detailed neurological examination will be necessary if the history suggests any red flags - eg, confirming saddle anaesthesia and diminished anal tone if cauda equina syndrome (CES) is suspected.
- Passive straight leg raising is often used to assist diagnosis of nerve root pain. A Cochrane review of 16 cohort studies found that it was highly sensitive but specificity varied widely^[4].

Red flags^[2]

Assess for symptoms and signs of serious spinal pathology but do not base suspicion for underlying pathology on the presence of a single red flag.

- CES:
 - Saddle anaesthesia or paraesthesia.
 - Recent onset of bladder dysfunction.
 - Recent onset of faecal incontinence.
 - Perianal/perineal sensory loss.
 - Unexpected laxity of the anal sphincter.
 - Severe or progressive neurological deficit in the lower extremities.
- Spinal fracture:
 - Sudden onset of severe central pain in the spine which is relieved by lying down.
 - Major trauma such as a road accident or fall from a height.
 - Minor trauma, or even just strenuous lifting, in people with osteoporosis.
 - Structural deformity of the spine (such as a step from one vertebra to an adjacent vertebra).
 - Point tenderness over the vertebral body.
- Cancer or infection:
 - Pain that remains when lying down, aching night-time pain that disturbs sleep, and thoracic pain could also be caused by an aortic aneurysm.
 - Onset in people aged above 50 years or below 20 years.
 - History of cancer.
 - Constitutional symptoms, such as fever, chills, or unexplained weight loss.
 - Recent bacterial infection - eg, urinary tract infection.
 - Intravenous drug misuse.
 - Immune suppression.
 - Structural deformity of the spine (such as scoliosis).
 - Point tenderness over the vertebral body.

A Cochrane review has sounded a note of caution with respect to interpreting individual 'red flags'. Further research on the reliability of combinations of features is recommended^[5].

Differential diagnosis

Red flags may suggest spinal fracture, cancer, infection or serious pathology associated with a prolapsed intervertebral disc.

Other causes of back pain include:

- Primary malignancy:
 - Reticulo-endothelial system (**myeloma** is the most likely).
 - **Carcinoma of pancreas**.
 - **Osteosarcoma** (this does not usually affect the spine).
- Secondary cancers are usually from:
 - Bronchus.
 - Breast.
 - Prostate.
 - Thyroid.
 - Kidney.
- Bone disorders including:
 - **Paget's disease of bone** (affects the pelvis in 72% of cases and the lumbar spine in 58%).
 - **Osteoporosis** (leading to vertebral collapse).
 - **Spinal stenosis**.
- Inflammatory disease - for example^[1]:
 - **Ankylosing spondylitis** which tends to present:
 - Slowly in men under the age of 40 years.
 - With a rigid back.
 - With aggravation by inactivity and relief with exercise.
 - **Psoriatic arthritis** (rash or a family history of psoriasis).
 - **Reactive arthritis** (symptoms including urethritis).
 - Arthritis associated with **inflammatory bowel disease** (usually arthritis is peripheral).

- Infection:
 - Never forget tuberculosis (**osteomyelitis** can occur).
 - HIV predisposes to infections (including **tuberculosis**).
 - Renal tract infection (**pyelonephritis** can also cause referred back pain).
- Causes from outside the spinal column include:
 - **Dissecting aortic aneurysm**.
 - A posterior **duodenal ulcer** presenting as back pain, which may be difficult to diagnose. If a gastric ulcer presents for the first time over the age of 40 years, malignancy needs to be excluded.
 - Nephrolithiasis.
 - Pyelonephritis.

Investigations

- **NB:** if the diagnosis would appear to be simple back pain then no investigation is required.
- If other diagnoses are entertained, appropriate investigations are in order, depending upon the suspicion.

Diagnostic imaging

This is indicated only if serious or specific pathology is likely - eg, red flags [2, 6]:

- Plain X-ray of the lumbar spine:
 - Provides the same dose of radiation as around 120 chest X-rays and, in return, offers very limited information and rarely affects management.
 - Should not be used routinely. One study found that in patients with no features of serious underlying disease, early radiology made no difference to the outcome [7]. Imaging may be appropriate in the following circumstances:
 - If fracture is suspected, X-ray is of value.
 - With metastatic carcinoma. Those from prostate are sclerotic, those from lung, thyroid and kidney are osteolytic and those from breast may be either. Lesions below 2 cm in diameter may not be seen on plain X-ray but a scintillation scan with technetium ^{99m}Tc is much more sensitive.
 - Collapse from osteoporosis or myeloma may be seen.
 - Paget's disease of bone may be seen.
- CT scans often show stress fractures and spondylolisthesis best.
- MRI:
 - Gives a good picture of soft tissues, including discs and anything impinging on nerves or the spinal cord.
 - Disc lesions are best displayed by MRI scans. MRI is the most useful investigation in nerve root compression, discitis and suspected neoplastic disease [2, 6].

Blood and urine tests

- FBC, ESR, CRP, urine analysis if cancer, infection or inflammation is suspected [2, 6].
- LFTs may be helpful. Alkaline phosphatase can be elevated in metastatic disease and Paget's disease of bone.
- PSA will be raised particularly in carcinoma of the prostate.
- Urinary hydroxyproline will be markedly elevated (with increased bone turnover) in Paget's disease of bone.
- Nephrolithiasis may produce red cells in the urine.

Other investigations

A wide variety of further investigations may be required when other pathologies are suspected. For example:

- CXR may show primary or secondary carcinoma or pulmonary tuberculosis.
- Ultrasound will show renal stones and is the best way to visualise the pancreas. It can also give a good picture of an aneurysm, allowing it to be measured accurately and to detect possible dissection.
- Endoscopy may confirm a posterior ulcer and allow tests for *Helicobacter pylori* infection or malignancy.

Management

The principles of management involve keeping the patient active and giving analgesia to facilitate this. Now only in exceptional cases is rest considered appropriate and then for no longer than 48 hours.

Conservative treatments for lumbar disc herniation include analgesics, non-steroidal antiinflammatory medication, manual therapy and acupuncture. Epidural corticosteroid injections can also be used to reduce nerve pain in the short term [8].

Lumbar discectomy is considered if there is severe nerve compression or where there are persistent symptoms that are unresponsive to conservative treatment. Surgical techniques include open discectomy, microdiscectomy or minimally invasive alternatives using percutaneous endoscopic approaches [8, 9].

The basics of management

- Recognition of those causes of back pain that are a cause for concern and taking appropriate action (red flags).
- Planning a simple route for recovery with the patient, being positive and reassuring

- Recognising and addressing any factors that may mitigate against a swift recovery, including negative attitudes and even compensation neurosis (yellow flags).
- Relief of pain.
- Addressing issues that may predispose to further episodes, including poor practice at work or poor ergonomics.

Management of simple low back pain

- Give information, reassurance and advice.
- **Do not** prescribe bed rest.
- Advise the patient to stay as active as possible.
- Consider regular pain relief; lowest dose, short course of non-steroidal anti-inflammatory drugs^[10]. Consider also a short course of muscle relaxants.
- Only offer weak opioids if non-steroidal anti-inflammatories are ineffective, contraindicated or not tolerated.
- Paracetamol mono-therapy has been shown to be ineffective and should not be recommended.^[10]
- Referral:
 - Consider physical treatments, manipulation or multidisciplinary approaches if not resuming normal activities or if off work^[11].
 - It is now recommended that such referrals be considered earlier than previously recommended - that is, 'after a week or two' (see 'Referral guidance' recommendations, below).
 - Multidisciplinary approaches include, for example, cognitive behavioural programmes and back schools^[12, 10].
 - McKenzie exercises (a programme of exercises that patients can be taught to do at home) are popular^[13]. One study found that the McKenzie method was slightly more effective in relieving disability compared to attendance at a back school but there was no difference in terms of pain relief^[14].

Management of suspected serious pathology or red flags

If a red flag has shown, appropriate action must be taken. This will mean referral for investigation and for treatment. In the case of CES, for example, urgent referral to a neurosurgeon or specialist orthopaedic surgeon is required.

Management of chronic pain, psychosocial factors and yellow flags

Patients may, quite reasonably, assume that pain is a warning sign that tells us that if something hurts we should not do it. Very often this is true but with back pain it is necessary to work through the pain and to overcome it. There may well be psychosocial barriers to active rehabilitation with prolongation and chronicity as risks. These are called yellow flags. They include^[15]:

- Belief that pain and activity are harmful.
- Sickness behaviours, such as extended rest.
- Social withdrawal.
- Emotional problems such as low or negative mood, depression, anxiety and stress.
- Problems and/or dissatisfaction at work.
- Problems with claims or compensation, or time off work.
- Overprotective family; lack of support.
- Inappropriate expectations of treatment, including low expectations of active participation in treatment.

Although there has been some doubt about the value of this approach, the overall evidence suggests that targeting yellow flags, particularly when they are at high levels, does seem to lead to positive results^[15].

Discuss work and predisposing factors for back pain.

- If heavy lifting is involved, establish whether there was an induction course when techniques were taught.
- Often it is not so much the weight but a large, awkward package that causes injury.
- Seating and posture are often more important nowadays:
 - Consider desks, chairs, computer screens and keyboards at work.
 - Look at time spent in the car and how comfortable it is and adjustment of the seat and steering wheel.
 - Fork lift trucks and large goods vehicles may transmit vibration all day.
- Discuss getting back to work.
- Discuss what improvements may be made to the workplace to reduce the risk of recurrence.
- Give the patient a positive attitude and enthusiasm to recover.

Not everyone finds that those in authority at work are sympathetic or wish to make the environment safer but where work is supportive, the prognosis is better^[16].

Referral guidance^[2, 6]

Remember, when assessing whether to refer, that motor deficits and bowel or bladder disturbances are more reliable than sensory signs.

- If red flags suggest a serious condition, refer with appropriate urgency. This means immediately for CES.
- If there is progressive, persistent or severe neurological deficit, refer for neurosurgical or orthopaedic assessment, preferably to be seen within one week.
- If pain or disability remain problematic for more than a week or two, consider early referral for physiotherapy or other physical therapy.

- If, after six weeks, sciatica is still disabling and distressing, refer for neurosurgical or orthopaedic assessment, preferably to be seen within three weeks.
- If pain or disability continue to be a problem despite appropriate pharmacotherapy and physical therapy, consider referral to a multidisciplinary back pain service or a chronic pain clinic.

Physical, cognitive and behavioural therapies

A Cochrane review - albeit of a small number of trials - found spinal manipulation to be no better than other therapies^[17]. However, a study of men and women aged between 18 years and 35 years with acute back pain found that chiropractic manipulative therapy in conjunction with standard GP care afforded significant advantages in decreasing pain and improving physical functioning compared to standard care alone^[18]. A systematic review of osteopathy for the treatment of chronic low back pain was inconclusive and recommended more research.^[19] See separate article [Complementary and Alternative Medicine](#) article. A systematic review of acupuncture found some evidence of benefit but further trials are needed^[20]. Traction is not recommended^[21].

The evidence base for the value of physiotherapy per se is surprisingly small. However, recent evidence suggests that its effectiveness can be increased when used in conjunction with a validated tool such as the STarT Back screening tool developed at Keele University^[22]. This allocates patients to different treatment pathways based on their prognosis (low, medium, or high risk of poor outcome) and is designed for ease of use in primary care^[23].

It is important to be active and positive to prevent back pain from becoming chronic. If it does, cognitive and behavioural therapy with relaxation therapy may be helpful. A Cochrane review reported that no type of behavioural therapy is better than any other^[24]. There may also be benefit from 'back schools'^[25] and from exercise therapy^[26].

Evidence to support the use of peripheral nerve-field stimulation for the management of chronic back pain is limited. The National Institute for Health and Care Excellence (NICE) recommends that any clinician using this treatment should explain the risks and benefits to individual patients, inform the clinical governance lead of their trust and register the patient's details with the UK Neuromodulation Register^[27].

Complications

- Acute back pain may become chronic. This may be because of failure of active management or behaviour by the patient that predisposes to chronicity rather than cure. Targeted care as described above, with the early recognition and management of yellow flags and the use of a validated tool to tailor management to prognosis, may help to minimise the risk of chronicity.
- Failure to diagnose CES and to take immediate action may lead to long-term neurological damage.
- Other sinister causes of back pain may have a fatal outcome. The prognosis may be improved by early and effective intervention.

Prognosis

This will depend entirely on the diagnosis. Generally for simple low back pain, if chronicity can be prevented, then recovery should be full but in a variable time. Back pain in old age probably is, as many assume, simply a feature of advancing years. Analgesics may help but it is most important to stay active.

A systematic review found that the majority of patients with acute or persistent low back pain improved within six weeks. Improvement slowed after that time and a minority of patients still had pain and disability after one year^[28].

If there is not a good response to management within 4-6 weeks, referral for further investigation and treatment should be undertaken^[26].

Prevention

The prevention of back pain in the workplace depends on the nature of the work and reference has already been made to the increasing number of office-based rather than manual workers affected by the condition. There is no evidence for the effectiveness of lumbar supports or education and limited evidence for the efficacy of exercise^[29].

Much more work has been done on secondary prevention, addressing physical and psychosocial issues, once an episode of back pain has occurred.

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