

An approach to low back pain

Back and neck pain are second only to upper respiratory infections as reasons for GP consultations.

J A SHIPLEY, MB ChB, MMed(Orth)
Professor, Department of Orthopaedics, University of the Free State, Bloemfontein

Raised in England and Kenya, Professor Shipley graduated MB ChB at UCT. He specialised in orthopaedics at the University of the Free State and developed a special interest in spinal surgery. He is currently Professor of Orthopaedics at UFS, and President Elect of the South African Orthopaedic Association.

The vast majority of cases of low back pain are self limiting or recurrent minor ailments that do not cause any significant disability. Only some 5% eventually qualify for surgery, and with good patient selection the surgical results are satisfactory. The economic implications are enormous, with between \$33 and \$55 billion spent annually on direct medical costs in the USA.

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Epidemiology

The annual incidence of low back pain in the USA is about 5%, and more than 80% of the population will experience at least one serious episode of back pain in their lifetime. Back pain is the reason for some 14% of new GP consultations. Low back pain is the leading cause of disability in the working population below the age of 45 years.

Causes

The most common causes of low back pain are given in Table I.

Table I. Common causes of low back pain

- Disc degeneration
- Acute
- Chronic
- Pathological fracture (metastases, osteoporosis)
- Facet pain
- Spondylolysis/spondylolisthesis
- Infection
- Stress fracture
- Sacro-iliac pain

It must be kept in mind that a specific diagnosis can only be made in a minority of cases of back pain, probably only in 12 - 15%. Consequently, the majority of patients can only be treated symptomatically and expectantly. Even if a possible cause is present, such as disc degeneration, there is often poor correlation with

symptomatology. We have all seen patients who are asymptomatic but who have gross radiographic degeneration, and others who are crippled by pain but whose radiographs are normal.

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Types of pain

Back pain can be divided into four components: mechanical, pathological, referred and radicular pain. The distinction is important because of its relation to diagnosis and treatment.

Mechanical pain is usually caused by degeneration or injury. It is intermittent, related to activity or posture, and relieved by rest.

Pathological pain suggests underlying pathology (infection, inflammation, tumour or fracture). It is continuous, unrelenting, and typically worse at night.

Referred pain. Pain experienced in the back may be caused by a pathological condition elsewhere in the body (often retroperitoneal), e.g. aortic aneurysm, pancreatic condition, perforating peptic ulcer. Lumbar spine pain is often referred to the buttock and thigh (but not below the knee), and must be distinguished from radicular or nerve root pain. The pain is often deep and poorly localised.

Radicular pain is caused by nerve root irritation or compression, e.g. disc herniation, spinal stenosis. It is typically experienced as limb pain, but is accompanied by neurological symptoms (sensory, weakness, sphincter disturbance) in contrast to referred pain.

Clinical approach

A thorough history is as important as the examination, if not more so. The location and type of pain should be determined, as well as the duration and mode of onset. A history of trauma is obviously important. An acute onset suggests a mechanical problem such as disc herniation or fracture, while a gradual onset is more consistent with degeneration or low-grade inflammation. Severity of symptoms, their progression since onset, and their response to rest or lying down and medication should be assessed. Nerve involvement must be determined by questioning the patient about loss of sensory or motor function, and by limitation of

walking distance due to spinal stenosis. It is important to differentiate loss of function caused by pain from true muscular weakness. Patients should be specifically questioned with regard to loss of sphincter function suggesting cauda equina involvement. Systemic symptoms or a previous history of malignancy or tuberculosis are possible indicators of metastases or infection. A full systemic history is necessary to identify possible sources of referred pain and complicating factors such as diabetes, which may influence treatment.

At the end of the clinical examination the doctor should be able to identify patients with significant pathology of the spine and nerve roots, and have a working diagnosis that must be confirmed by special investigations, if necessary.

A general examination should be performed with the patient in underclothes, noting abnormalities of movement or posture that may indicate the severity of the problem. A rigid immobile spine, with loss of lordosis or fixed scoliosis, suggests a significant spinal problem, in contrast to a patient who moves easily without protecting the back. Spinal motion and the relation of movement to pain should then be assessed; pain on flexion suggests a disc or vertebral body causing pain, while pain on extension is more consistent with posterior element problems such as facet arthrosis or spondylolisthesis. Pain radiating down a leg on flexing to that side is probably caused by a nerve root being compressed.

Nerve root irritation is detected by the femoral (L2, 3, 4) and sciatic (L4, 5; S1, 2, 3) stretch tests. These are nonspecific indicators of nerve involvement, confirming the presence of a radiculopathy. The actual nerve roots involved must then be identified by examination of reflexes, motor power and sensation. Of these modalities, the reflexes

are the most objective, and test both motor and sensory functions of the nerve root, although allowance must be made for loss of reflexes due to age or disease, e.g. diabetes. Perineal sensation must be tested, especially if there is any possibility of cauda equina deficit.

Foot pulses must be checked, especially to distinguish between spinal and vascular claudication. Hips, and to a lesser extent knees, may cause symptoms similar to nerve pain, and must be examined. An abdominal examination should also be performed.

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All of this is time consuming, and may appear very academic and impractical in a busy practice or clinic. However, a thoroughly performed and well-documented initial examination will allow rational treatment from the beginning, minimising unnecessary investigations or referrals, while identifying a small group of patients needing urgent attention. The essential information can be obtained in a very short time (Table II).

Investigations

At the end of the examination, most patients will fall into one of two broad groups – those with a specific diagnosis, and those with nonspecific back pain, either acute or chronic. Regardless of this, there are ‘red flag’ indications for immediate further investigation of certain patients (Table III).

Table III. Red flags – indications for further investigation

Persistent symptoms continuous for more than 6 weeks
Extremes of age: children, adults above 50 years of age
Pathological pain
Systemic symptoms (fever, loss of appetite or weight)
History of trauma, tumour, TB, etc.
Neurological deficit (not just symptoms)
Deformity

Haematological and biochemical investigations

The following investigations must be done: A white cell and differential count, ESR and C-reactive protein for possible infections, inflammatory arthritis or malignancy.

Serum calcium and alkaline phosphatase are useful markers for metabolic bone disease (e.g. Paget’s disease). Protein electrophoresis and Bence Jones protein determination in the urine may be necessary to exclude myelomatosis.

Radiology

A series of lumbar spine radiographs is an inexpensive starting point, although they are not sensitive with regard to early pathology or disc disease. Disc and facet degeneration, spondylolysis, spondylolisthesis, and vertebral collapse or destruction by trauma, infection or a tumour may be visible. Keep in mind that 40 - 50% of a vertebral body is eroded before erosion becomes evident on a radiograph,

Table II. The 5-minute back examination

History
Site of pain
Radiation of pain
Type of pain (mechanical, pathological)
Neurological symptoms
Onset: acute/chronic
History of trauma, cancer, TB, diabetes, HIV
Systemic symptoms
Examination
Standing
Protective posture
Deformity
Touch toes, extend fully, ? pain, ? limited
Walk on toes, heels, squat and stand up (L3 - S1 motor)
Lying
Spinal tenderness
Light touch (simultaneously stroke both legs with fingers)
Knee and ankle reflexes
Straight leg raise/ femoral stretch
Foot pulses



Ripples of relief

and that there is poor correlation between radiological degeneration and symptoms.

Isotope scans are useful to localise pathology if this can not be done clinically, but are not diagnostic of any specific condition.

CT scans show bony detail well, but even modern scanners do not show soft tissue well. Their main value is the evaluation of a bony lesion in the spine that has been recognised on radiography.

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MRI is the most informative investigation with regard to soft tissues, including neural structures, and also demonstrates early infections, infiltration of tumours and condition of the discs. It is a very sensitive method of investigation, and the pathology shown often has little bearing on the patient's symptoms. MRI findings therefore cannot be considered in isolation, but must be correlated with the clinical findings for their relevance. This re-emphasises the importance of the clinical examination in decision making. Generally, MRI should be reserved for two situations – as a preoperative examination to confirm a clinical diagnosis and to detect serious pathology in the case of an uncertain diagnosis with the patient not responding to treatment.

Management of different back pain syndromes

Acute, nonspecific back pain

This group of patients will have predominant mechanical back pain, possibly referred to the buttock and thigh. The prognosis is extremely good. Sixty per cent of them will return to work within a week, and 90% within 6 weeks. Only 4% will go on to develop chronic back disability.

Treatment is essentially supportive while nature takes its course. Bed rest for a day or two – not longer – is justified for those with severe pain. Analgesics and anti-inflammatory medication should be given as necessary, and the patient kept active within the limits of pain. He/she should return to work as soon as possible, but no bending, lifting or carrying is allowed. As the pain subsides a physiotherapy programme should be started with the aim of restoring strength and mobility to the spine. Currently, no specific programme appears to be superior to any other. Chiropractic manipulation is effective in the acute phase. An important part of treatment is education with regard to back function, and especially how to reduce the risk of re-injury during the patient's work and leisure activities; this is the domain of the physio- and occupational therapist.

Many elderly patients are unwilling or unable to undergo physiotherapy; the temporary use of a lumbar corset (e.g. Freeman) is invaluable in these cases.

Acute, specific back pain

Acute disc herniation typically results in acute back pain after a forced movement, usually a combination of twisting and bending, followed by radicular pain in the leg. There is nerve root irritation, and possibly a

nerve deficit. This is a clinical diagnosis. The symptoms are so characteristic that special investigations are usually unnecessary.

Patients with disc herniation take longer to recover than those with nonspecific back pain, but nevertheless have an excellent prognosis for spontaneous recovery; 50% of cases recover within 4 weeks, and 95% within 6 months. Even patients with massive disc herniation recover completely without surgery. The initial treatment is the same as for nonspecific pain, but opioid analgesia and hospital admission for a few days may be necessary for pain control. A short course of oral steroids (5 days) is often beneficial, but carries the risks of gastritis and avascular necrosis of the femoral head.

The standard treatment in the USA and Europe is 6 - 8 weeks of conservative treatment. The only indications for emergency surgery are a cauda equina syndrome, and progressive, severe neurological deficit. Failure to control incapacitating pain after a reasonable period, or severe neurological deficit that does not resolve, are relative indications for surgery, although there is no evidence that discectomy improves neurological recovery. At 2 years after acute herniation there is no difference in outcome of surgical compared

Pain medication with non-steroidal anti-inflammatory drugs (NSAIDs) and non-opioid analgesics, combined with antidepressants at night, is the mainstay of medical treatment.

with conservative treatment. Epidural steroid injections and rehabilitation programmes have been shown to reduce surgical rates by half.

Spondylolisthesis. Both common types of spondylolisthesis can cause acute back and radicular pain, but there is usually a history of mild episodes of pain. In younger patients this type of pain is more commonly caused by spondylolysis. Degenerative spondylolisthesis occurs more frequently in the elderly, and is the commonest cause of spinal stenosis. Both may be complicated by an acute disc herniation. Treatment should be as for other acute back problems. The majority of patients can be treated conservatively, while periodic episodes of pain may cause temporary disability. A spine brace is useful to control symptoms in an active older patient or during a flare-up of pain. If the frequency or severity of

pain is unacceptable, or if radiculopathy persists, surgery becomes an option. Patients must be reassured that acute paralysis is virtually unknown in these cases, and that the outcome will not be worse if surgery is delayed.

Management of vertebral compression fractures, metastases and infections are beyond the scope of this article.

Chronic nonspecific pain

This type of pain occurs in patients with mechanical back pain, no radiculopathy, and trivial radiological changes that do not explain the severity of their symptoms. Because no specific level or lesion that causes the pain can be identified, surgery is a gamble and unlikely to help. Many of these patients have abnormal pain physiology, and have a high incidence of psychological disorders

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Low back pain

such as depression or alcoholism, and are dissatisfied at work.

The practical approach is to do a full clinical evaluation and all appropriate investigations. If no convincing cause is identified the patient should be referred to a pain control unit and for a comprehensive rehabilitation programme. Pain blocks are of diagnostic as well as therapeutic value because failure to give relief suggests that the back is not the source of the pain. Facet

blocks may identify the facet as a pain generator, and radio-frequency rhizotomy may help these patients.

Pain medication with non-steroidal anti-inflammatory drugs (NSAIDs) and non-opioid analgesics, combined with antidepressants at night, is the mainstay of medical treatment. Anti-epileptics such as phenytoin or gabapentin are useful for neuritic pain. Psychotherapy may be helpful.

These patients must be taught to take responsibility for their condition, and discouraged from becoming dependent on medical (and above all surgical) interventions. It is important to keep them active and working, because if they discontinue work for 6 months only 50% return to work; this figure falls to 25% if they do not work for a year.

In a nutshell

- Acute back pain is an extremely common complaint that is self limiting in the vast majority of cases.
- No specific diagnosis is possible in most cases.
- A thorough history and an examination are usually the most important diagnostic procedures.
- Radiographic changes are only significant if they explain the clinical findings.
- Seven 'red flag' indications for immediate special investigations are listed.
- Most patients should be treated conservatively for 6 weeks.
- The only absolute indication for emergency surgery is a cauda equina syndrome or similar severe or progressive neurological deficit.
- Relative indications for surgery are severe unresponsive pain or persistent neurological deficit.
- Surgery for chronic back pain is only indicated where the clinical picture correlates with significant pathology that is surgically correctable.
- Chronic nonspecific pain is not amenable to surgery and should be treated in a pain control clinic and by a rehabilitation programme.

Single Suture

Pain control in premature babies

Brain scans of premature babies suggest that they may be suffering in silence – their faces may not always register if they are feeling pain. Nurses in pre-term intensive care units check whether their charges are in pain by measuring their heart rate and the sweatiness of their palms – and whether or not they show pain on their faces. This helps them to decide when to give painkillers. Now Rebecca Slater and colleagues at University College, London, have shown that babies may be in pain without any of these signs showing up.

They scanned the brains of prematurely born babies as blood was taken from their heels for routine analysis. In 30 scans, a part of the brain known to register pain in adults was activated. Yet, in 10 of these procedures, the babies did not grimace or show outward signs of pain, suggesting that measurements don't necessarily correlate with what is happening in the brain.

New Scientist 2008; 28 June: p. 20.

Single Suture

Peppers really do relieve pain

Traditional Chinese medicine has known for centuries that peppers relieve pain, and now neuroscientists have confirmed this. Apparently the molecule responsible for the tingle you feel when you eat Sichuan peppers, the fruits of the 'toothache tree', is an effective anaesthetic. It apparently generates a feeling that is similar to touching your tongue to the 'terminals of a 9 volt battery'.

New Scientist 2008; 28 June: p. 7.