

# Low back pain

## – a brief summary



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### The Impact

The burden of illness from low back pain in New Zealand is a major community cost. ACC pays in excess of \$350 million per annum for the direct costs of low back pain of which a relatively small amount contributes towards true back injury.<sup>1</sup> As a result, in 1995 the ACC initiated a project to use the international evidence base to manage low back pain in order to improve clinical outcomes. In the UK, the estimated cost to the NHS is £481 million with non-NHS costs (private consultations/prescriptions) being an additional £197 million.<sup>2</sup> A typical GP practice with five doctors and 10 000 patients bears costs of about £88 000 per annum. Also 6% of employed people with back pain lose at least one working day per four weeks owing to back pain.

### Time frame

One of the difficulties in discussing 'low back pain' is that not everyone talks about the same thing. The correct use of words becomes important because the biological basis, natural history and response to therapy are different for each defined type. Pain is a biopsychosocial experience with important affective, cognitive, behavioural and sensory components which the patient usually expresses in terms of tissue damage – because that is how it feels! This implication of injury is not always factual, especially if the pain has been present for a long time. But the public exposure to violent

television and the cult of sport with its concomitant injury rate, be it football, boxing, martial arts, car or motorcycle racing etc., reinforces the idea of pain related to 'tissue damage'.

The International Association for the Study of Pain (IASP) has been at pains to clarify the taxonomy of pain since Bonica in 1979 expressed the need to do so. Hence, the following definitions are in current use:

- Acute low back pain is pain that has lasted less than three months.
- Chronic low back pain is pain that persists longer than three months (for research purposes, six months).
- Subacute low back pain is pain present for more than six weeks and less than three months.

### Where is low back pain?<sup>3</sup>

Low back pain is lumbar, sacral or lumbosacral in position and these regions are well defined topographically. Lumbar pain is pain in an area bounded by a transverse line through the T12 spinous process above and the S1 spinous process below, and the lateral margins of the erector spinae muscles. Sacral pain is pain in an area overlying the sacrum, bounded by imaginary lines through the L5/S1 junction above, the sacro-coccygeal junction below, and laterally by vertical lines through the posterior superior and

posterior inferior iliac spines. By implication, therefore, pain extending beyond the lateral margins of erector spinae muscles is not back pain even though it seems to have proximity.

### Natural history

Much research has been done to evaluate the natural history. While conventional wisdom has suggested that 'most patients will get better', the data tends to belie this. Von Korff suggested that in patients with onset of low back pain within the last six months, it would appear that approximately 21% fully recover, 40% continue to suffer pain at six months, 60% relapse within 12 months, and 8% have continuing pain with disability at 12 months.<sup>4</sup> Croft, in a British study of 463 general practice patients with low back pain, found that 59% had a single consultation and that 32% had a second consultation within three months.<sup>5</sup>

Independent follow-up review at 12 months showed that only 25% had recovered. Or, put another way, 75% did not recover – but they did not come back to their doctor. Thus, because your patient

does not come back, it does not mean he or she has become better. A more recent study in Australia suggests that using evidence-based guidelines for management of acute low back

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pain patients gives a better long-term outcome with less pain and a reduced consumption of medical care.<sup>6</sup>

### Referred pain and radicular pain (sciatica)

Some confusion arises when there is low back pain associated with pain going down the back of the thigh, even to the foot. Radicular pain is pain caused by the stimulation of nerve roots and typically is expressed as pain shooting down the leg in a band about 5 cm wide, with a cutaneous quality, and which may be associated with a neurological deficit. Thus, radicular pain is primarily a leg pain.

In contrast, pain in the low back, buttock or proximal thigh is unlikely to be radicular, and pain extending below the knee is not necessarily radicular. This latter can be referred pain from the innervated somatic structures around the spine and can be explained neurobiologically by convergence of nociception from various sources within the dorsal horn of the spinal cord. The quality of the pain is important and can be indicative of its nature. Referred pain from one of the back structures implies that there are nociceptive nerve endings in the pain-generating site. A study of the regional anatomy reveals that there is a nerve supply in the outer

third of the intervertebral disc, the anterior longitudinal ligament, the posterior longitudinal ligament, the anterior dura covering the spinal nerve, the zygapophyseal joints, the various zygapophyseal joint ligaments and the paravertebral muscles – longissimus thoracis, ilio-costalis and multifidus muscles. Thus there is face validity for a pain source in these structures. Pain which is extensive, not well localised with

vague boundaries, tending to a dull ache rather than a shooting pain suggests somatic referred pain from one of these structures. It seems that the more the pain 'shoots' the more likely it is to be radicular in origin.

### Evidence-based causes of chronic low back pain

There are many putative causes of low back pain but clinical examination does not identify them. The patient who comes in with low back pain does not complain of 'posterior longitudinal ligament pain' or 'zygapophyseal joint pain' or even 'discogenic pain'. They just have 'low back pain'. There is no evidence that the clinical examination will identify the cause. It is unwise to label a patient with 'damage' of a specific structure as this may come back to haunt the clinician later when he or she is trying to manage a patient's beliefs and cognitions. It is more clinically honest to call it 'low back pain of unknown origin' and to explain the 'why's and wherefore's' of this appellation to the patient. Even the term 'low back strain/sprain' is presumptive of a tissue diagnosis and presupposes injury to muscle fibres (strain) or damage at the musculotendinous junction (sprain).

Evidence does exist for the prevalence of three sources of pain, and the diagnoses have been validated with nerve blocks (concordant), provocative discography<sup>7</sup> and experimental evidence where appropriate. Using these tools for the assessment of low back pain, the zygapophyseal joints contribute a

prevalence of about 15% (CI 10–20%) – up to 40% in the older age group, the sacroiliac joints 15%, and internal disc disruption (IDD) 39%.<sup>8</sup> All other causes make up the remaining 30%.

## Key Points

- While conventional wisdom has suggested that 'most patients will get better', the data tends to belie this.
- There are many putative causes of low back pain but clinical examination does not identify them.
- Plain x-rays have no place in the diagnosis of low back pain because there is no evidence that plain films of the lumbar spine can diagnose the cause of low back pain.
- It should be noted that 'disc bulges' found on MRI cannot be presumed to be the cause of pain in low back pain patients as there is a significant prevalence in the asymptomatic population.

## History

The features of the history for low back pain are the same as for pain anywhere and include details of the presenting complaint, length of illness, site of pain, location and spread, quality, severity, frequency, duration, time of onset, mode of onset, precipitating factors, aggravating factors, relieving factors and associated features. Red flags are features in the history which suggest a more serious underlying problem and which usually indicate the necessity for plain x-rays. These include a past history of cancer, significant trauma or minor trauma in patients aged over 50 years, known osteoporosis, the use of corticosteroid medication, weight loss, a temperature >37.8°, risk factors for infections such as catheterisations and intravenous drug abuse etc., neurological deficit, and failure to improve over one month. A past history of cancer equates to a high risk and begs an ESR test and spinal x-ray.<sup>9</sup> (Spec .98, Sens .31, LR 15.5). Alternatively if under 50 yrs, with no history cancer,

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no weight loss, no signs systemic illness and shows some sign of improvement, then the cancer risk is low and does not beg further investigation. If the patient is over 50 years old, with low back pain failing to improve, weight loss and some systemic symptoms (e.g. malaise), then arrange an ESR. If ESR is less than 20 mm/hr, no investigation is required; if greater than 20 mm/hr, arrange a x-ray.

## Imaging

### Plain films

One of the areas where cost-savings can be made is by the intelligent use of imaging. Unfortunately there are no 'Ottawa Low Back Rules' but some general principles apply based on available evidence. In essence, plain x-rays have no place in the diagnosis of low back pain because there is no evidence that plain films of the lumbar spine can diagnose the cause of low back pain. Also there is no justification in using them as a screening test just in case they reveal something not seen or suspected. Spondylosis, disc degeneration, facet degeneration or osteoarthritis are not legitimate diagnoses of the cause or source of low back pain and represent radiological diagnoses, not clinical diagnoses. The x-ray presence of distinctive entities like spondylolysis do not identify the cause of the back pain because of the prevalence in the asymptomatic community (7.2%).<sup>10</sup> The only justification for imaging in the early stage of acute back pain is the presence of a 'red flag' as detailed above. Scavone<sup>11</sup> in a utilisation review of 871 patients and their lumbar x-rays found that:

- one in four were normal;
- one in eight were radiologically diagnostic – i.e. degenerative dis-

Table 1. MRI Scans<sup>13</sup>

N = 67 ASYMPTOMATIC INDIVIDUALS

	Herniated Nucleus Pulposus	Disc Bulge	Spinal Stenosis	Disc Degeneration
All Ages	24%		4%	
Age 20–39	20%	54%		34%
Age 40–59	22%			
Age 60–80	36%	79%	21%	92%

ease or spondylolysis but did not identify the cause of pain;

- fractures were the next largest group and there was a history of trauma;
- metastatic disease was found in 1% and was unsuspected in only two patients (0.2%).

The conclusion was that the overall poor diagnostic yield does not warrant imaging – i.e. 499 x-rays are done before finding the one positive one. Public funding cannot support this use.

A recent article by McGuirk et al. has shown that using evidence-based approach to management can decrease the use of x-rays (from 28% to 4%) and advanced imaging (from 10% to 2%) and help reduce the cost of care per patient from A\$472 to A\$276.

### The spectre of chronicity is the greatest potential burden in the problem of low back pain

pars interarticularis which is important because it allows the introduction of strategies for averting fracture by modifying training. Once fracture has occurred, bone scan has no utility. Also, bone scans for pars defect are not positive in asymptomatic patients. So there is no utility unless there is pain.

unless there is pain.

### Cat scan

In general, the technique is good for bone, spinal canal, zygapophyseal joint, bony detachment, and pars deficit. It is not a good device for diagnosing the source of acute back pain.<sup>12</sup>

### MRI scans

A technique excellent for spine, bone marrow, soft tissue and joints, but bone signal is poor. It is good for nerves in the spinal canal; generally very sensitive; T2 weighted images are water bright. MRI is the most appropriate screening test for *chronic* LBP. If a 'high intensity zone' (HIZ) is seen in posterior annulus of a symptomatic patient, studies show that there is a 90% chance of the disc being the cause of pain.

It should be noted that 'disc bulges' found on MRI cannot be presumed to be the cause of pain in low back pain patients as there is a significant prevalence in the asymptomatic population. Also, it cannot be justified for investigation of *acute* low back pain even to screen for 'red flag' conditions as utilisation reviews attest to the paucity of 'red flag' conditions found. (See Table 1)

### Prognostic risk factors for chronicity

The spectre of chronicity is the greatest potential burden in the problem of low back pain to the individual,

the financial resources of the health services, and the cost to the country in lost employment. It is important to identify those at risk and intervene early. A past history of back pain, long duration, poor work capacity and disability are negative biological predictors. Yellow flags<sup>14</sup> or psychosocial risk factors include low education standard, job dissatisfaction, depression, poor coping skills, excessive distress, excessive sickness impact, fear avoidance behaviour and a tendency to overly rate loads. Difficulties in beliefs, cognitions and behaviours may militate against return to work and these should be addressed early in a patient's care, preferably in the first month of management. Clues include:

- a belief that pain is harmful which leads to fear avoidance behaviour;
- a belief that all pain must be abolished before attempting return to work;
- an expectation and fear of increased pain with activity or work;
- a belief that work is harmful;
- a poor work history;
- an unsupportive work environment;
- an expectation of 'techno-fix' for pain;
- a passive attitude to rehabilitation;

- use of extended rest and recumbency;
- a significant withdrawal from activities of daily living;
- avoidance of normal activity;
- impaired sleep because of pain;
- an increased use of alcohol or illegal drugs since onset of pain;
- depression;
- feeling useless and not needed;
- irritability;
- anxiety about bodily sensations;
- overprotective partner / spouse;
- socially punitive partner / spouse;
- lack of support to talk about problems.

Patients with chronic low back pain often feel that health care professionals rate the patient's pain as less severe than patients do themselves, and advise patients that the 'pain will go away anyway'. The patent lack of truth in this discourages patients from seeking help. Also, many patients hold fears of drug addiction which may lead to under-treatment of acute pain especially when it may have a great utility.

### Principles of treatment of acute low back pain

It is important for the doctor to take his patient's complaint of acute low back pain seriously and to have some idea of a few treatment strategies. A simple approach, included below, is one which relates to the patient's complaints. (Acknowledgements to Dr Phillip Watson, Brisbane).

#### "I hurt"

Explain, use analgesics, ? needling, ? manual therapy

#### "I can't move"

Explain, stretch, activate

#### "I can't work"

Enquire, explain, encourage, help resume

#### "I'm scared"

Enquire, explain, rationalise, coping strategies

The evidence associated with treatment modalities is a complex issue and is not dealt with here.

### Many patients hold fears of drug addiction which may lead to under-treatment of acute pain

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