

LOW BACK PAIN MODULE



Complements of *painHEALTH* website

Learning objectives

By the end of this module participants should be able to:

- Understand that low back pain (LBP) is the most common cause of pain and disability in the world.
- Understand the classification of LBP and how this relates to diagnosis and management.
- Screen for 'red flags' (serious medical conditions) (mnemonic 'TINT') and 'yellow flags' (psychosocial issues) (mnemonic 'CHAMPS') associated with LBP.
- Understand the causes, assessment and management of *radicular* leg pain.
- Demonstrate how to perform a *straight leg raise test* and a *slump test*.
- Demonstrate how to test power, reflexes and dermatomes related to L4, L5 and S1 spinal nerves.
- Provide patients with therapeutic information about LBP, focusing on realistic expectations, reducing catastrophic thinking and encouraging active coping and self-management.
- Understand that psychosocial factors ('yellow flags'), particularly catastrophic thinking and stress-loading, are the best predictors for developing chronic low back pain.
- Understand that opioid analgesia should be avoided for the treatment of chronic non-specific LBP, particularly in younger patients.
- Understand that a multimodal and multidisciplinary approach should be applied to the management of LBP.
- Apply the 'PainChecker'™ approach to the assessment and management of LBP.

Essential pre-module reading: Maher CG, et al. Managing low back pain in primary care. *Aust Prescr* [Internet]. 2011 [cited 2015 May 31]; 34:128–132. Available from: <http://www.australianprescriber.com/magazine/34/5/article/1216.pdf>

Low Back Pain (LBP)

What is LBP?

- Pain located in lower back and buttocks.
 - bounded by the posterior rib margins, inferior gluteal folds and the flanks.
 - may radiate into thighs, legs, groin, flank and abdomen.



Figure 1: Anatomical boundaries for low back pain.

https://firstthealthassociates.chiromatrixbase.com/clients/4688/images/core_strength_18.jpg

Fast fact: The 'old-fashioned' term for LBP was *lumbago*.

How is LBP classified?

- *Timing* (acute or chronic?).
- *Cause* (if a cause can be found?).
- *Leg pain* (present or not?).

Timing

- **Acute** (<3M).
- **Chronic** (persistent) (≥3M).

Cause

- **Non-specific low back pain** (NSLBP).
 - No cause** can be identified in **80%** of cases of LBP!
- **Specific low back pain** (SLBP).
 - A specific cause ('pain generator') is identified in **20%** of cases.

Leg pain (20% of cases)

- **Referred** leg pain ('referred' from musculoskeletal structures) (**90%** of cases).
- **Radicular** leg pain (so-called 'sciatica') (due to nerve root irritation) (**10%** of cases).

Who gets LBP?

- LBP is so common it's considered '*a normal part of being human*'.
- LBP is most common in middle age.
- LBP is rare in childhood.
- Childhood back pain should always be investigated as a '**red flag**' (see below).
- Incidence: 80% over a lifetime.
- Prevalence: 10% of the population at any one time.
- That's 2.2 million Australians right now.
- Up to 75% will experience a repeat episode of LBP within one year.
- 20% will develop chronic low back pain (CLBP) after an acute back pain episode.

What are the impacts of LBP on society?

- LBP is the most common chronic pain condition worldwide.
- LBP is the leading cause of *disability*.
- Accounts for 5-10% of all GP visits.
- Major cause of healthcare, workers' compensation and disability claims.
- Australians spend \$5 billion a year on LBP treatments.

Reference: Hoy D, March L, Brooks P, et al. The global burden of low back pain: estimates from the Global Burden of Disease 2010 study. *Ann Rheum Dis* [Internet]. 2014 [cited 2015 May 31]; 73: 968–974. Available from: <http://ard.bmj.com/content/73/6/968.full.pdf+html>

What usually triggers an episode of acute LBP?

- Work.
- Sports.
- Vigorous physical activity or exercise.
- Lifting, twisting, straining.
- Repetitive use of lower back.
- Pregnancy.

- **'Red flags'** (TINT) (see below).
- Other pathology (pelvic, visceral or renal disease, aortic aneurysm, shingles) (<5%).

What are risk factors for developing LBP?

- Work injury.
- Sports.
- Psychosocial stress.
- Spinal surgery.
- Family history.
- High BMI.
- Smoking.
- Lack of physical fitness.

Reference: Parreira P, Maher CG, Latimer J, Steffens D, Blyth F, Li Q, Ferreira ML. Can patients identify what triggers their back pain? Secondary analysis of a case-crossover study. Pain 2015 Jun 1. [Epub ahead of print] PMID: 26039901

Module exercise: List five strategies that could reduce the risk of someone developing LBP?

What are some of the specific causes of LBP (*pain generators*)?

- Anatomical structures that cause LBP are called '*pain generators*'.
- Because there are many structures in the back, *in most cases (80%)* it is difficult to pinpoint a *specific* cause of LBP.
- That's why most LBP is classified as '*non-specific*' (NSLBP).
- The most common LBP generators are musculoskeletal structures, including;
- Intervertebral discs (40%), facet joints (10-20%), sacro-iliac joints (10-20%), cluneal nerves (10-20%), myofascial tissues (trigger points).
- Pin-pointing a *specific* pain generator usually involves:
 - **Imaging** (x-rays or MRI scans).
 - **A diagnostic local anaesthetic block** of the pain generator, such as facet joint.

Specific back pain generators

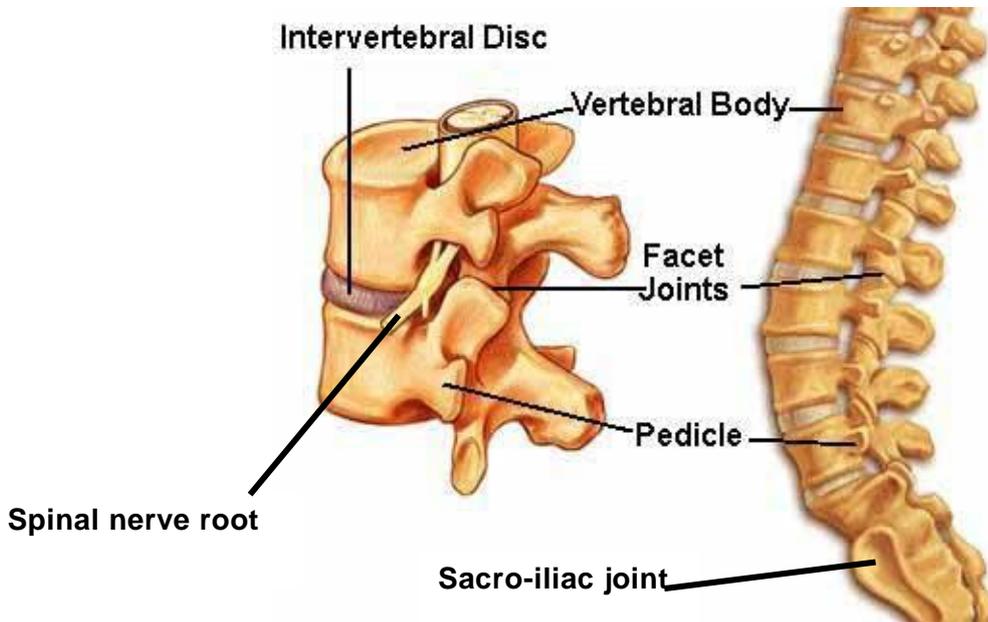


Figure 2: Diagram of the spine: structures in-and-around the lower spine which may cause back pain.
http://www.chiro.org/LINKS/Anatomy_101.shtml

Intervertebral discs (40%)

- The most common LBP generators (40%).
- Discs develop small tears or 'fissures' (like cracks in a car tyre) which irritate nerve fibres in the **annulus fibrosus**, causing pain (see Fig. 3).
- This is called **Internal Disc Disruption (IDD)**.
- Despite IDD being the most common cause of back pain, there is no procedure, drug or operation (eg. discectomy or spinal fusion) that reliably treats this condition.

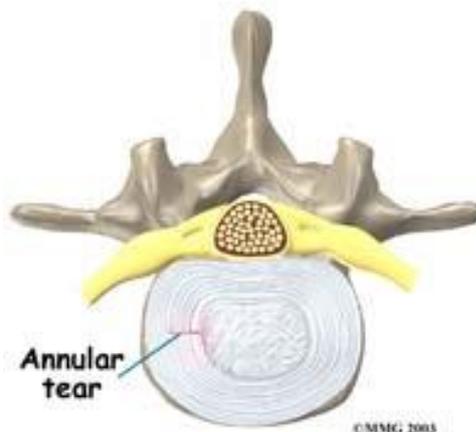


Figure 3: Intervertebral disc, axial view. Annular tears causing internal disc disruption are the most common pain generators in LBP.

http://www.backcarebootcamp.com/images/program/bcbc_6_annular_tear.jpg

Modic vertebral end-plate changes

- Diagnosed on an MRI scan, these are *inflammatory changes in the bone marrow* of the vertebral end plates, which can be associated with back pain in some cases (see Fig. 4).

- **Fast fact:** Scandinavian scientists recently proposed that Modic inflammation in vertebral end plates was caused by a low-grade acne bacteria infection which means LBP could be treated with antibiotics!

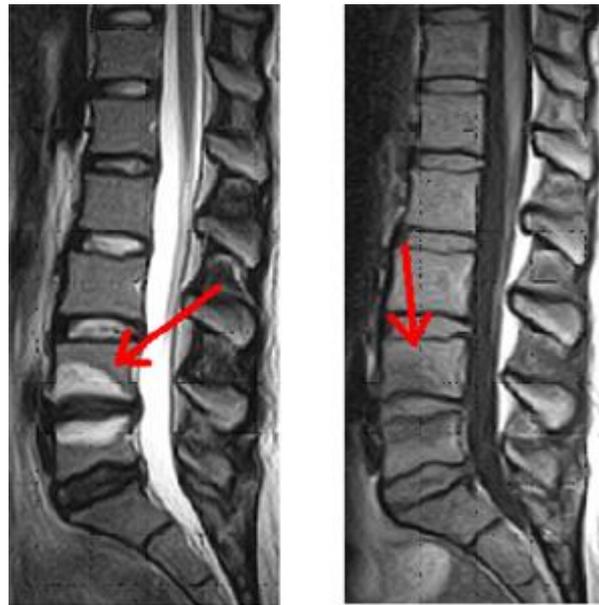


Figure 4. Modic changes in lumbar vertebral body end-plates on MRI.

<http://images.yuku.com.s3.amazonaws.com/image/gif/c05256543996f34ace8fa92b35f9069d4a95eff.gif>

Facet (zygapophyseal or 'Z') joints (10-40%)

- Small joints on the outside of the lumbar spine (look like 'fins') (see Fig. 2).
- They can develop osteoarthritis which in turn may cause spinal pain.
- Facet joint pain is most common in over 60s and rare in younger persons.
- The only way to diagnose facet joint pain is to perform a **diagnostic local anaesthetic block** of the joint.

Sacroiliac joints (SIJs) (10-20%)

- Are the largest joints in the body.
- SIJ pain is felt (one-sided predominantly) in the low back, buttock and posterior thigh.
- SIJ pain is common in **inflammatory (seronegative) arthritis** eg. *ankylosing spondylitis*.

Leg pain (associated with LBP) (20%)

- Leg pain is associated with back pain **in 20%** of cases.
- **Referred leg pain:** is most common (90%) and caused by discs, facet joints or SIJs and
- **Radicular leg pain:** (sometimes called 'sciatica') is much less common (10%) and is caused by compression or inflammation of lumbar spinal nerve roots.

Radiculopathy and radicular leg pain

- **Radicular:** means 'spinal nerve root.'
- **Radiculopathy:** means 'pathology' of a spinal nerve root
- **Radiculitis:** means an 'inflamed' nerve root.

Radicular leg pain is caused by:

- *Compression* of a lumbar spinal nerve root by a *disc prolapse* (hernia).
- *Compression* of a nerve root in an *intervertebral foramen* or in the *central spinal canal*—*this is called spinal stenosis.*
- *Inflammation* of a nerve root and/or the **dorsal root ganglion.**
- An *annular tear* can 'spill' disc contents (*nucleus pulposus*) on to a nearby nerve root, causing inflammation (*radiculitis*) and radiculopathy (see Fig 7).

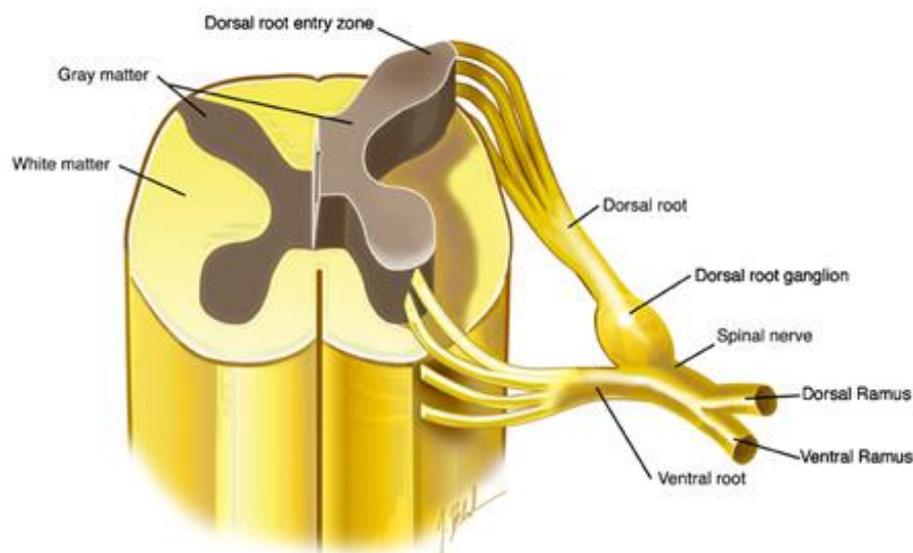


Figure 5. Typical anatomy of a spinal nerve root.

http://www.daviddarling.info/encyclopedia/N/nerve_root.html

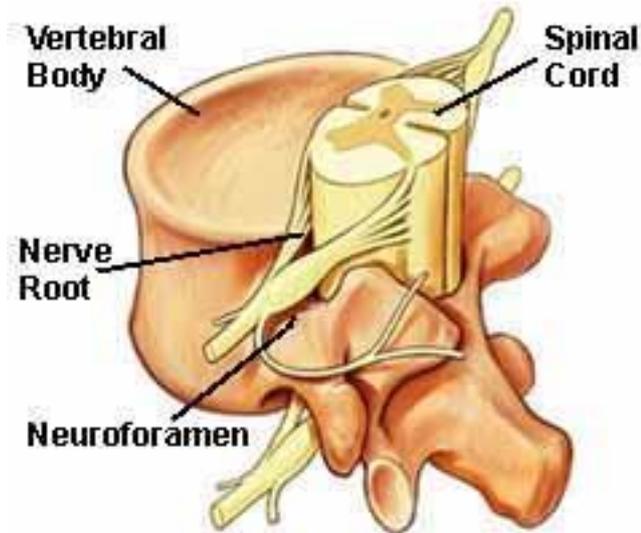


Figure 6. Lumbar nerve root related to a vertebra.

http://www.chiro.org/LINKS/Anatomy_101.shtml

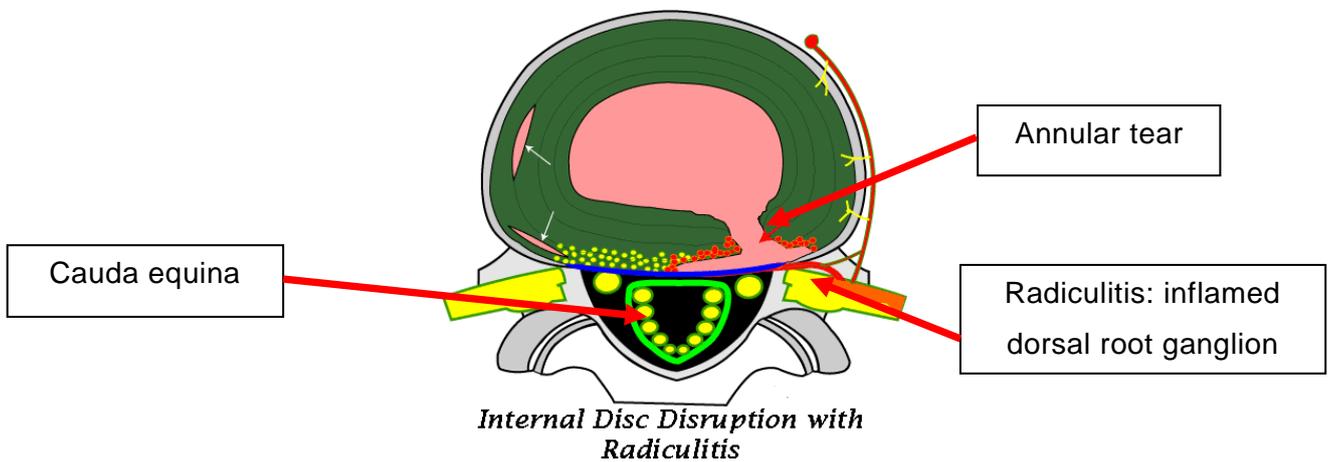


Figure 7. Internal disc disruption (IDD) with chemical inflammation of the nerve root and dorsal root ganglion (radiculitis).

http://www.southcoastspine.com.au/images/Causes_of_Back_and_Neck_Pain/anatomy-normal-disc.png

Radiculopathy

- **Radicular pain** is a form of *neuropathic* (nerve) pain.
- Pain described as ‘electrical’: *burning, aching, shooting, stabbing, electric shocks*.
- Look for *sensory signs and symptoms* in the leg (allodynia, paresthesiae, numbness).
- Look for *motor signs and symptoms* in the leg (weakness, reduced ankle or knee reflexes).

Diagnosis of radicular leg pain

- **90%** of radicular leg pain involves the L5 or S1 spinal nerve roots.

Applied neuro-anatomy

- A lumbar disc protrusion compresses the spinal nerve root **below** it.
 - L4/5 disc protrusion = L5 nerve root compression.
 - L5/S1 disc protrusion = S1 nerve root compression.
- NB: in the **cervical spine** a disc protrusion compresses the spinal nerve root **above** it.

To diagnose radicular leg pain you need ‘3 Ps’

- **Pain** (leg).
- **Physical** examination findings.
- **Picture**: MRI or CT scan.

Pain

- Pain with neuropathic qualities.
- Typical pattern of radiation (see Fig. 11b below).

Physical examination

- Power (see Fig. 11b)
- Reflexes
- *Straight leg raise test* (see Fig. 9)
- *Slump test* (see Fig. 10)
- Sensation (numbness, allodynia) (see Fig. 11b).

Clinical presentation of L5 or S1 radiculopathy

- Identify patterns of leg pain, numbness, motor & reflex changes seen in Figure 11b.
- *Scan (MRI or CT) of the lumbar spine* demonstrates a nerve root compression corresponding with the clinical presentation.

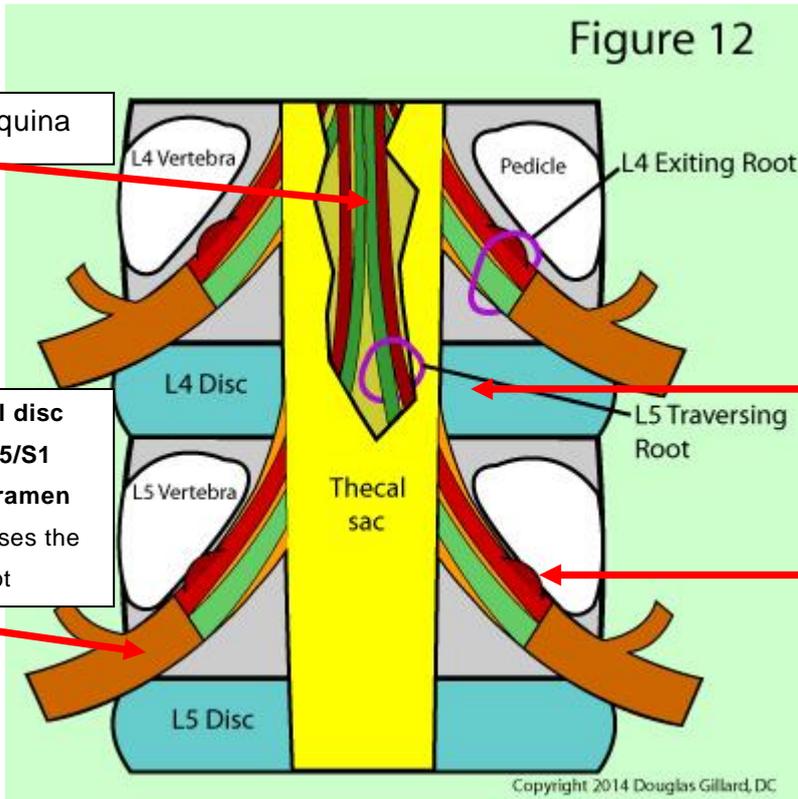


Figure 8. Saggital view of lumbar spine showing where disc protrusions & nerve roots may intersect, causing radiculopathy. <http://www.chirogeek.com/Anatomy%20Page/Images/Anatomy%20PG/traver-exit-roots.jpg>

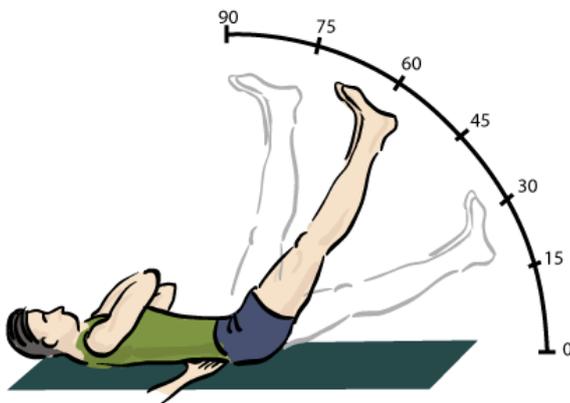


Figure 9. Straight leg raise test for radicular leg pain. http://en.wikipedia.org/wiki/Straight_leg_raise#/media/File:Straight-leg-test.gif



Figure 10. Slump test for radicular leg pain.
<https://lumbarspineassessment.files.wordpress.com/2012/10/slump1.jpg?w=900>



Figure 11a. Sagittal MRI of lumbar spine demonstrating an L5/S1 disc protrusion.

Figure 1: Testing for lumbar nerve root impingement

Nerve root	L4	L5	S1
Pain			
Numbness			
Motor weakness	Extension of quadriceps	Dorsiflexion of great toe and foot	Plantar flexion of great toe and foot
Screening exam	Squat and rise	Heel walking	Walking on toes
Reflexes	Knee jerk	None reliable	Ankle jerk

Figure 11b. Patterns of motor weakness, reflex changes, pain and numbness for L4, L5 & S1 radiculopathy.

Bigos S, Bowyer O, Braen G, et al. Acute low back pain problems in adults: Clinical Practice Guideline, Quick Reference Guide Number. 14. Rockville, MD: U.S. Department of Health and Human Services, Public Health Service, Agency for Health Care Policy and Research. AHCPR Pub. No. 95-0643. December 1994. Available from: <http://www.chirobase.org/07Strategy/AHCPR/clinicians.pdf>

Spinal stenosis (lumbar) is a pain syndrome consisting of:

1. Low back pain.
 2. Radicular leg pain (usually bilateral).
 3. **Claudication** (leg pain & numbness that worsens after walking a set distance).
 4. A spinal MRI or CT scan showing narrowing (stenosis) of lumbar central spinal canal.
- Spinal stenosis may be due to: disc protrusion, facet joint enlargement (osteophytes), or 'slippage' of vertebral bodies (*spondylolisthesis*) (see below).
 - Spinal stenosis usually affects the elderly (over 70s).
 - Back pain and aching legs (claudication) develops after walking a set distance (especially climbing stairs).
 - Claudication is relieved by rest or leaning over a shopping trolley whilst walking in the supermarket!



Figure 12. Saggital MRI of lumbar spine demonstrating an L4/5 disc protrusion causing a central spinal stenosis. Note obliteration of the (white) CSF signal (cauda equina compression).
<http://spinedisease.com/el-kadi/wp-content/uploads/mri-lumbar-stenosis.png>

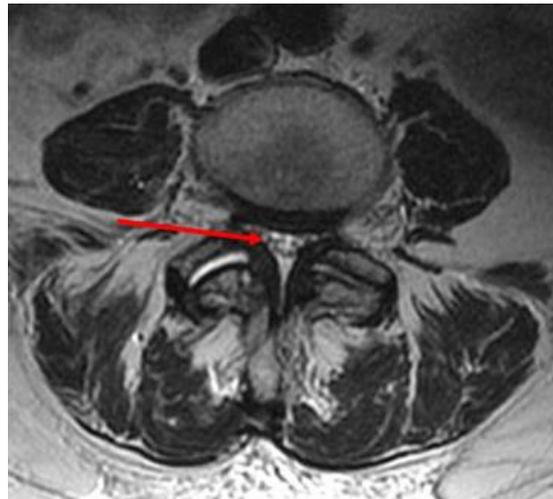


Figure 13. Axial MRI of lumbar spine demonstrating a disc protrusion causing a central spinal stenosis. Note obliteration of the (white) CSF signal (cauda equina compression).
http://www.srs.org/patient_and_family/the_aging_spine/graphics/closed_spinal_canal_MRI.jpg



Figure 14. Leaning over a shopping trolley whilst walking decompresses the cauda equina in the lower back and reduces leg pain in patients with spinal stenosis.
http://www.longstreetclinic.com/images/stenosis_cart.jpg

Module question

Q. Why do you think claudication *worsens* when someone with spinal stenosis climbs a flight of stairs, and why does walking leaning over a shopping trolley help?

A. The diameter of the lumbar central spinal canal is increased by flexing the spine, taking pressure off the nerves of the cauda equina and thus reducing leg pain.

Pars fractures

- About 10% of the population are born with an increased risk of developing small fractures in the pedicles of the spinal arch.
- These are called *pars (stress) fractures* and are more common in younger people with low back pain, and in fast bowlers.
- L5 pedicles are most commonly affected.
- Pars fractures (bilateral) can lead to 'slippage' of adjacent vertebrae (spondylolisthesis) and central spinal canal stenosis (see Fig. 16).
- It's not really clear if they cause low back pain.

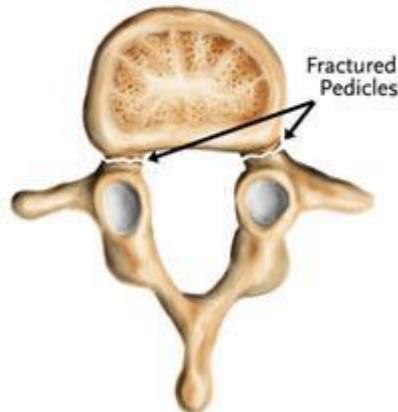


Figure 15. Pars fractures of lumbar vertebral pedicles.
<http://drbrettaylor.com/wp-content/uploads/2011/09/spondy5.jpg>

Back pain terminology

- **Spondyl:** means 'spine'.
- **Spondylosis:** means 'degeneration' of the spine eg. osteoarthritis, disc degeneration.
- **Spondylitis:** means 'inflammation' of the spine, such as ankylosing spondylitis.
- **Spondylolisthesis:** is slippage ('listhesis') of the spine, where one vertebral body moves relative to its neighbour.
 - Associated with pars fractures or degenerative facet changes (elderly).
 - Spondylo*listhesis* can cause nerve root compression.

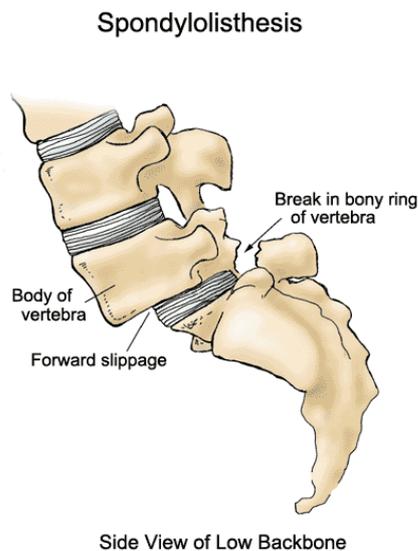


Figure 16. L5 on S1 "listhesis" (slippage) due to bilateral L5 pars fractures.
<http://perfectformphysio.com.au/wp-content/uploads/2013/04/spondylolisthesis1.gif>

Cluneal neuralgia 10-20%

- *Cluneal neuralgia* (due to cluneal nerve compression in thoraco-lumbar fascia) is an often-forgotten cause of unilateral low back, buttock and thigh pain.
- The 3 branches of the *superior cluneal nerve* descend from T12, L1 and tunnel through the *thoraco-lumbar fascia at the top of the iliac crest* where they may be compressed; somewhat like a carpal tunnel syndrome of the back! (see Fig. 17).
- Cluneal nerves may also be damaged by iliac bone graft harvesting during spinal surgery.

Clinical presentation

- Usually history of *twisting or rotational injury* to lower back, or iliac bone graft harvest.
- Low back, buttock and thigh pain: usually unilateral, 'aching' & neuropathic pain qualities.
- Altered sensation (increased or decreased) of skin over the buttock.

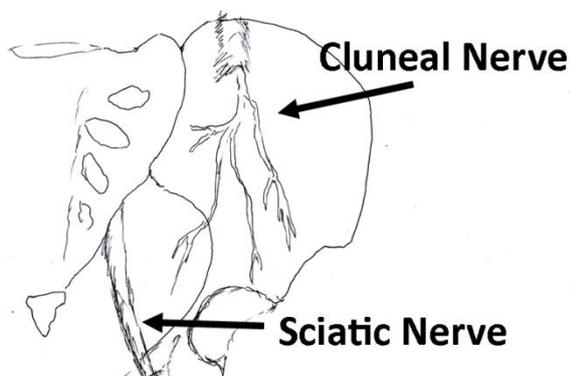


Figure 17: Cluneal nerve passing through tunnel of thoraco-lumbar fascia-tunnel compression.
<http://www.bing.com/images/search?q=cluneal+nerve&view=detailv2&&id=9AD204B3203B884F9F3468B17D27B77EF0ACB9B4&selectedIndex=37&ccid=6VOixxh&simid=608003216089677995&thid=JN.Qvv8SjWMA%2fkPAZUGjLBkcw&ajaxhist=0>

Cluneal nerve tests (*perform these on every back pain patient*).

- Get a toothpick, start over the mid back (about T7) in line with top of iliac crest and go down one side; altered sensation over the buttock suggests cluneal neuralgia.
- Press over the top of the iliac crest (in 11-1 o'clock position) with one finger—if tender and reproduces the pain, suggests cluneal neuralgia.

Myofascial structures in the low back.

- Back muscles attached to the spine act like 'scaffolding' to support and stabilise it (referred to as **spinal core stability**).
- These muscles may develop 'knots' ('trigger points') which cause pain.
- Specific muscles in the buttock, such as the *piriformis* and the *gluteals* may also cause low back pain, often radiating from the buttock, down the back of the leg (similar to 'sciatica').

Risk factors for LBP: The 'flags' concept

- 'Flags' remind us of things-not-to-miss when assessing anyone with musculoskeletal pain.
- 'Flags' should be checked **every time** you see a patient with musculoskeletal pain.
- **Red flags** are biomedical conditions that should not be missed, such as a fracture or cancer (The good news is that red flags cause less than 5% of low back pain).
- **Yellow flags** are psychosocial factors that predict increased risk of developing chronic low back pain and disability.

Red flags

Remember the mnemonic **TINT**

Tumour, Infection or Inflammation, Neurological (*cauda equina*), Trauma.

- **Red flags** include vertebral fractures (osteoporosis), infections of discs and bones, tumours (eg. breast or prostate cancer), inflammatory arthritis, or nerve, cauda equina or spinal cord compression.

Important **red flags** when taking a history are:

- Cancer history.
- Steroid use.
- Trauma (falls in the elderly) (vertebral or pelvic fractures).

- Intravenous drug use (discitis or osteomyelitis of the spine).
- Extremes of age (< 20 or > 70).
- Night pain and sweats.

Cauda equina syndrome

Do NOT miss this **red flag** presenting with:

- Leg weakness.
- Change in bladder or bowel function.
- Numbness in the saddle region.

Cauda equina syndrome is a neurosurgical emergency, requiring urgent referral.

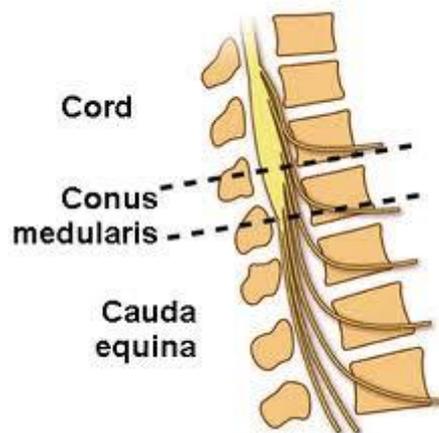


Figure 18. the Cauda Equina in lumbar spine.

<http://www.resus.com.au/wp-content/uploads/2012/03/images3.jpeg>

Discitis

- Discitis is like the labour pain of the back
- If LBP is severe, the patient is distressed and there is a risk of systemic infection IVDU, diabetes, endocarditis, it is discitis until proven otherwise

Yellow flags

Remember the mnemonic **CHAMPS**

Catastrophic-thinking, **H**ypervigilance, **A**nxiety, **M**edically-focused, **P**assive-coping, **S**tress or **S**ubstance over-use.

- 20% of patients with acute back pain develop chronic low back pain within 12M.
- Yellow flags are the best predictors of developing chronic low back pain and disability after an injury.
- Yellow flags are more predictive than an MRI scan!

What are the best predictors of chronic back pain and disability?

- Yellow flags.
- Severe acute back pain.
- Psychosocial stress.
- Unhappiness at work (I hate my boss and my job).
- Maladaptive coping behaviours (passive rather than active).
- Functional impairments.
- Poor general health and fitness.
- Depression, anxiety.
- Substance or medication overuse.

Fast fact: A study at the Boeing aircraft factory in the 1960s found the best predictor of developing chronic pain and disability after a back injury was how much you disliked your boss.

Malingering

- Malingering is deliberately acting sick for secondary gain, such as financial compensation.
- Malingering is not a psychological disorder—it is acting and deceit.
- Despite folklore to the contrary, malingering is uncommon (less than 5% of patients chronic LBP and disability)
- Insurers often confuse malingering and yellow flags when investigating patients reporting low back pain—especially using video surveillance.

10 key messages

1. LBP is the world's leading cause of chronic pain and disability.
2. LBP is classified according to *timing*, *cause* and presence-or-absence of *leg pain*.
3. LBP is triggered by vigorous physical activity, lifting, twisting or straining, most often at work.
4. Most back pain is classified as 'non-specific' (NSLBP) because it is difficult to pinpoint a specific pain generator.
5. Intervertebral disc disruption (40%), facet joint arthropathy (20-40%), sacroiliac joint arthropathy (10-20%) and cluneal neuropathy (10%) are the most common low back pain generators.
6. Radicular leg pain ('sciatica') occurs in less than 10% of cases.
7. **Every time** you see someone with musculoskeletal pain, check for 'flags'.
8. TINT (red flags)
9. CHAMPS (yellow flags): predictors of chronic pain and disability after injury.
10. Do NOT miss cauda equina syndrome (weak legs, bladder/bowel, saddle-numbness).

Management of low back pain

Essential pre reading

- Australian prescriber 2011
[pdfhttp://www.australianprescriber.com/magazine/34/5/128/32](http://www.australianprescriber.com/magazine/34/5/128/32)
- NPS Back pain 2013
<http://www.nps.org.au/conditions/nervous-system-problems/pain/for-individuals/pain-conditions/low-back-pain/back-pain-acute-low/back-pain-choices>

Management of *acute* low back pain

Brief summary

Key messages

- Keep it simple (KISS).
- Watchful waiting.
- Reassure and educate.
- Site, cause & leg pain?
- Identify flags
- Simple analgesia (paracetamol, NSAIDs, tramadol, tapentadol)
- Comfort measures (heat packs).
- Keep moving and keep working.

See ALBP check list

Management of *Chronic* Low Back Pain.

Classify and clarify the diagnosis if possible (look for pathology or 'pain generators')?

- KISS (Keep it simple)
- Classify
- Reassure and educate
- Exclude red flags

Keep moving

-Imaging?

- MRI or CT +/- a bone scan (not always necessary)
- Blood tests (red flags & inflammatory markers)?
- Diagnostic spinal blocks?
 - Facet joint pain generators (20%)
 - lumbar medial branch facet blocks with local anaesthetic
 - if positive; radiofrequency facet neurotomies (NNT=5)
 - Sacro-iliac joint pain generators (20%)
 - SIJ injection?
 - ‘Discogenic pain’ (internal disc disruption) (40%)?
 - procedures don’t help, so no point in doing discography
- Myofascial trigger points
 - trigger point injection?

-Constantly check for ‘yellow flags’

Adopt a multidisciplinary, bio psycho social approach

- Exercise therapy (Level I) (doesn’t matter what type) (spinal core stability?)
- Multidisciplinary pain management programmes (intensive) (eg PUMP) (Level I)
- CBT (Level I)
- Analgesia (need to reinforce the goal of improving *function with analgeics*)
 - paracetamol (Level II)
 - NSAIDs/coxibs (not continuously, for flare-ups only)
 - tramadol SR (Level II)
 - duloxetine (Level II)
 - opioids (controversial, very limited evidence of benefit) (caution)
- Acupuncture (?), spinal manipulation (?), massage (?), functional restoration (?) (US 2007)

Back schools *may improve functional and return to work outcomes* (Cochrane 2010)

No clear evidence to support: epidural steroids, facet joint injections (NNT 11), TENS, lumbar supports, traction, prolotherapy (alone) (Cochrane 2010).

Notes:

- Promote patient self-management in back pain.
- Emphasise functional outcomes.
- The search for spinal 'pain generators' is usually futile.
- Remember myofascial pain, trochanteric bursitis and piriformis syndrome.

Workers compensation

How to prevent CLBP

Prevent injury

Prevent diseases

Identify yellow flags early

workplace

Essential post-module reading

- Read patient handout about chronic lower back pain
- Look at Painhealth website

<http://painhealth.csse.uwa.edu.au/pain-condition-low-back-pain.html>

Module revision and consolidation exercise

<https://networks.anzca.edu.au/d2l/le/content/6750/Home>

Ten key messages

Post module quiz

Key links

Back pain choices

<http://www.nps.org.au/conditions/nervous-system-problems/pain/for-individuals/pain-conditions/low-back-pain/back-pain-acute-low/back-pain-choices/back-pain-table>

NICE recommendations

<http://www.nice.org.uk/guidance/cg88/chapter/1-guidance>

Cochrane back and neck pain

<http://back.cochrane.org/our-reviews>

Many patients are frightened by the words in their x-ray reports, such as '*bulges*', '*protrusions*', '*degeneration*', '*nerve entrapment*' and '*slippage*'. However these are just technical words used by x-ray specialists in their reports to other doctors and are not as disastrous as they sound.

Don't get worried by your x-ray report-discuss it with your doctor.

Be aware that *jargon* used by health care professionals such as, '*degeneration of the spine*', '*disability*', '*slipped discs*' and '*bone-on-bone*', sound a lot worse than what's actually happening in your back!

Test injections, X-rays and scans

Medial branch (facet joint) blocks: Sometimes we perform local anaesthetic *test injections* of the nerves going to the facet joints (medial branch blocks) to see if they might be ‘causing’ a person’s back pain. If the pain settles whilst the local anaesthetic is working (usually 4 hours or so) we assume the facet joints are causing the pain.

‘**Trigger point**’ injections of local anaesthetic into back muscles sometimes help to diagnose and treat low back pain.

Injecting into the discs (‘discograms’) are painful procedures that don’t help much with the diagnosis of back pain and may cause serious complications such as spinal infections-we don’t recommend these in our clinic.

MRIs, CT scans and bone scans provide information about the *structure* of the bones, tissues and nerves in the spine but are not *diagnostic* on their own.

MANAGEMENT OF BACK PAIN

Time for some honesty

You may have noticed we talk about *pain ‘management’* and not so much about pain ‘cure’. Realistically, a ‘cure’ for low back pain is *the exception rather than the rule* (probably less than 20% of cases). That doesn’t mean we can’t do anything to help you, but we want to give you *realistic* expectations and accurate information.

Many patients go from doctor to doctor, physiotherapist to chiropractor, herbalist to surgeon, looking for that elusive cure. This can be disheartening, exhausting and expensive.

Analgesics (pain relievers)

-Opioids (morphine-based pain killers (eg. Oxycontin, MS Contin, ‘patches’, Journista, methadone, codeine) are *not* very effective in treating chronic low back pain (*effective in only 1 in 5 patients*), they have many *side effects* (sleepiness, reduced breathing, increased pain sensitivity, nausea, constipation, hormone deficiency [especially testosterone in men], dependency and addiction, death in overdose) and should only be used with great caution, especially in younger patients (< 60 years of age) and those with a history of substance abuse.

Older patients with significant arthritis in their spine causing back pain may benefit *more* from small doses of stronger opioids.

-Paracetamol (eg. panadol, panadol osteo) is very effective and inexpensive-consider taking 'regular' doses.

-Tramadol There's very good evidence of effectiveness in back pain; taken either *regularly* (slow-release form) or '*as required.*'

-Non-steroidal anti inflammatory drugs (eg. Celebrex, Naproxen, Ibuprofen) are very effective pain relievers, but should only be used from time-to-time, mainly for pain 'flare-ups'. Taking them *all the time* increases your risk of high blood pressure, heart and kidney problems, strokes and stomach ulcers. However, some patients with arthritis are prescribed anti inflammatories *regularly* after the doctor has considered the risks and benefits. Topical gels (eg voltaren gel) may provide a limited degree of relief.

-Duloxetine (Cymbalta™) is an antidepressant with good pain-relieving effects in CLBP.

-Gabapentin and pregabalin are nerve pain medications-sometimes helpful in patients with 'sciatica' (pain going down the leg due to a 'trapped nerve' in the back).

-High dose fish oil: Need to take 'arthritis-strength' doses, usually around 9g of fish oil per day.

-Glucosamine or Chondroitin Sulphate: Currently, there is no evidence they help in spinal pain.

Physical therapies; 'Stay active': A vital part of management.

Physiotherapy (PT) is a vital part of effective back pain management. A lot of what pain specialists do is to provide pain relief so you're able to work with the physiotherapist, which is usually what helps the most over the long-term.

Remember, the main aim of PT for back pain is to improve your *function* and to prevent your pain and disability from getting worse-pain relief is a 'bonus'.

Physical activity of any kind sends 'good messages' to the brain, signalling that 'you're OK'- the brain concludes; 'you're able move around, so your spine can't be all that bad'!

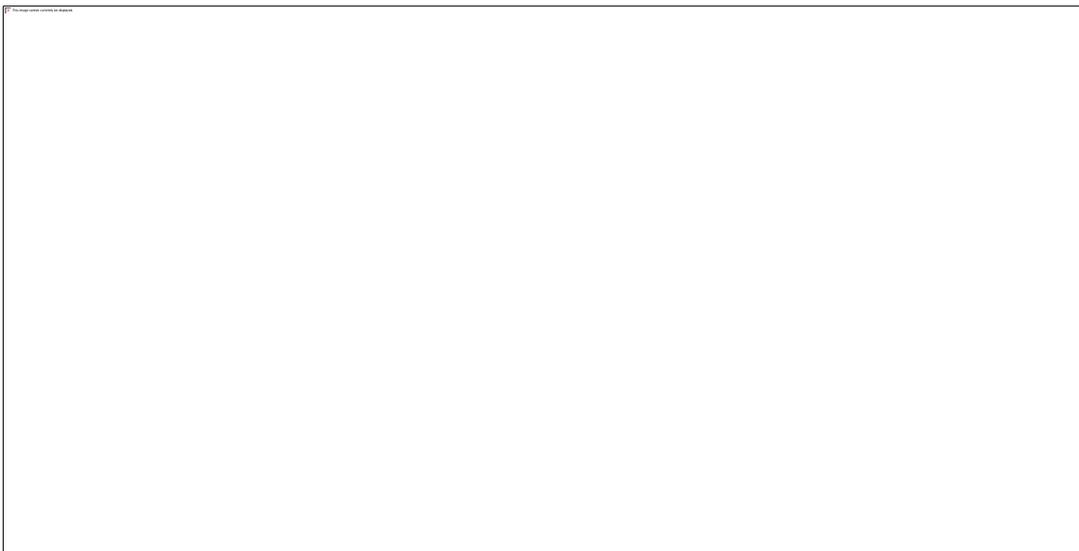
'Out of Africa': Remember, we evolved over thousands of years to walk for days through the grasslands of Africa-so whenever we reproduce this (simply walking or other physical activities) the brain thinks 'everything's OK'-this in turn makes it *harder* for the pain alarm to be set off.

But, if we lay in bed for days with a sore back, not only does this make us stiff and sore, but the brain thinks-'this isn't right, he should be walking around-there must be something going on in his back'. As a result, the pain signal *increases* and can now be set off by the slightest trigger.

'I'm scared to move': Some patients are frightened of physiotherapy (and movement in general, such as lifting, bending, walking) because it 'hurts too much' or it 'might make my back worse' (or cause more 'damage'). We call this *fear-avoidance*-it's a kind of pain phobia and can be quite disabling.

With fear avoidance, we focus constantly on 'what could go wrong with my back if I do anything' (this is called *catastrophising*) and a vicious cycle of pain, fear and avoidance is set up (see diagram below), leading to more and more disability. However, physiotherapists and psychologists have effective ways of helping with this problem.

Fear Avoidance Model (J Vlaeyen et al)



Physiotherapy and gentle activities such as walking or swimming are very *unlikely* to ‘damage’ to your back, even if you experience some pain at the time.

Remember to stay as active as possible.

Exercise: Is very helpful, but there’s probably no ‘superior’ exercise regime. Walking, stretches, swimming or water-walking (hydrotherapy) are probably best. Be guided by your physiotherapist.

Spinal core stability: ‘Core muscles’ of the abdominal wall and the back support and stabilize the spinal column. Strengthening these muscles may reduce back pain and improving mobility. Some physiotherapists use an ultrasound machine so you can see your own core muscles contracting, which helps you to ‘train them up’.

Spinal manipulation: Is probably not all that helpful for CLBP, but it may help with *acute* back pain or pain ‘flare-ups’.

Pilates and stretches: Can be helpful.

Massage: May reduce muscle tension and discomfort in the lower back, but it’s usually a temporary measure (hours to days).

‘Trigger point’ release: Loosening-up painful ‘knots’ (trigger points) in the muscles of the back and neck may be helpful in some cases.

Physical treatments

Heat therapy (heat wraps): Effective for treating flare-ups of *acute* back pain.

Spinal corsets and back braces: Are *not* helpful in the treatment of CLBP and may actually make the situation worse by reducing spinal flexibility.

Acupuncture: ‘The jury is still out’. There’s a big ‘placebo’ effect, but it may be helpful for back pain in some cases. As a general rule, if five sessions of acupuncture don’t do anything, then it’s unlikely more will work-save your money.

TENS machine: Is a simple electrical stimulator (the size of a transistor radio) applied to the back, which produces an ‘electrical buzzing sensation’ in the skin which turns-off the pain signal. It’s the

same effect as ‘rubbing’ your arm if you’ve injured. There’s not a lot of evidence that TENS is helpful for CLBP, but it sometimes helps, is drug free, low risk and relatively cheap.

Procedures (spinal injections)

Effectiveness: Unfortunately, there’s no ‘magic’ procedure or injection for back pain. We say a *50% (or greater) reduction in your pain for at least 3 months* is a ‘successful’ result after a back pain procedure.

Facet joint injections (FJIs): These are the most common spinal injections performed in Australia. A small amount of steroid (cortisone) and local anaesthetic is injected under x-ray guidance into the facet joints. FJIs are effective in only *1 in 10 patients* with low back pain. They may be ‘worth a go’ at least once if your doctor advises it, but if the FJIs don’t work the first time, don’t keep on having repeat injections in the hope they may work later!

Facet joint (medial branch) neurotomies (‘rhizotomies’): This involves cauterizing or freezing the small nerves that go to the facet joints (performed under local anaesthetic with an x-ray machine). Neurotomies are successful in about *1 in 5 patients*.

Spinal epidural steroid injections: A small amount of steroid (cortisone) and local anaesthetic is injected around a nerve going to the leg, near a protruding spinal disc. This reduces **leg pain** in *1 in 3 patients*. Epidurals often work well for a few days or weeks but may then wear-off.

Epidural steroid (cortisone) injections *do not* reduce **back** pain

Sacro-iliac joint steroid injections: May be helpful in patients with an inflammatory or arthritic condition (like ankylosing spondylitis), but are not very effective in patients with joint ‘wear and tear’ or injury (eg. after childbirth).

‘Trigger point’ injections: Placing a fine needle or injecting local anaesthetic into a tight muscle ‘knot’ (trigger point) may reduce back pain in some cases. It’s not well studied, but is relatively low risk and inexpensive.

Unfortunately, there’s no *procedure* or *operation* that reliably reduces pain coming from a spinal *disc*, even though discs cause up to 40% of chronic back pain!

Spinal operations (fusions, laminectomies): Surgery should always be a last resort-all good spinal surgeons will tell you this. For *leg pain* due to a disc compressing a spinal nerve (sciatica), or *spinal stenosis* (see above), surgery may be helpful in some cases. For the treatment of back pain alone, the success rate is much lower. The use of implantable *artificial discs* is controversial. You should discuss these issues with your surgeon.

WARNING

Surgery *is required urgently* if you develops weakness or severe numbness in your leg(s), or you lose control of bladder or bowel function. If this happens, you need to go to the *nearest emergency department immediately (not to your GP)*.

‘High-tech stuff’-implantable spinal morphine pumps and spinal cord stimulators: Implantable morphine pumps ‘trickle’ powerful doses of morphine and other pain medications directly into the spinal fluid in the back. This technique is being used much less however, as there are considerable complications and costs involved and the pumps don’t seem to work very well over the long-term.

Spinal cord stimulators are like ‘pacemakers’ of the spine, or an implantable TENS machine. Wires are placed into the epidural space of the spine and electrical impulses are sent from a pacemaker implanted under the skin. These impulses block the pain signals emerging from the back. There’s some evidence that spinal cord stimulators may help in a select group of patients with back pain after failed spinal surgery. However, like implantable morphine pumps, these devices have a high complication rate and are very expensive.

CLINICAL PSYCHOLOGY AND BEHAVIOURAL PAIN MANAGEMENT

‘Stressing the stress’: The **main factor** that predicts a person’s risk of developing *chronic back pain*, is not what the MRI scan shows or what the doctor says; it’s the number of ‘*psycho-social stressors*’ (called ‘yellow flags’) the person is dealing with in their life. These includes depression, anxiety, financial or family stresses and work issues (the risk of developing chronic back pain and disability is ‘sky-high’ if you hate your work or your boss-this isn’t *malingering*-it’s simply a big stress).

The more stresses you have to deal with, the greater the risk that your back pain may not improve.

Amazingly, life-stressors (‘yellow flags’) are *more powerful than an MRI scan* in predicting the onset of chronic low back pain!

‘Evolution again’: When we were apes ‘walking on all-fours’, our back and neck muscles would ‘tense-up’ when attacked by predators, so we could run away or fight (‘fight or flight’). Even now, millions of years later, our neck and back muscles still tense up when we are under ‘attack’-now days not by a tiger, but by a boss, family members or a mortgage! That’s why *stress management* (including relaxation) is a vital part of dealing with back (and neck) pain!

Clinical psychology: Techniques such as *Cognitive Behavioural Therapy (CBT)* and *Mindfulness-Based Stress Reduction* are very effective components of a pain management programme.

Is it all in my head?

When we bring up issues such as ‘stress and back pain’, it doesn’t mean we think your pain isn’t ‘real’, ‘it’s all in your head’, you’re ‘weak’, ‘crazy’ or ‘malingering’-it simply highlights the scientific fact that *stress increases the pain signal* in people with back problems.

Pain management programmes: Such as STEPS and PUMP at Fremantle Hospital, are courses (lasting from 2 days to a few weeks) run by a health care team (physiotherapists, psychologists, occupational therapists, doctors and nurses) providing physical and behavioural therapies, as well as education and lifestyle tips to help manage many pain conditions, especially CLBP.

There’s *very good scientific evidence* that pain management programmes improve *function* and *quality of life* in people with low back pain. Sometimes the pain also improves, but not always. People often say, “my back pain hasn’t improved all that much, but I’m functioning and coping with it much better” (such as using less medications, or returning to part-time work or sports).

An inconvenient truth: Realistic expectations

In most cases, a *cure* for your back pain will not be possible. Your aim should be to improve coping, physical function and your quality of life.

To learn how to do this, we strongly recommend that all patients with chronic low back pain complete a *pain management programme*.

Get active; You take control: We encourage people with back pain to concentrate on *active pain management*, where *you* do things to help yourself (eg. relaxation, walking, stretches, gym, swimming, work or sports), rather than *passive* strategies (eg. rest, massage, trigger point

release, ultrasound, heat treatments, cupping, acupuncture, injections, hypnosis) where something is done *to* you.

Conclusion: Managing chronic low back pain is much the same as managing any chronic health condition, like diabetes, asthma or high blood pressure. Although it may not be ‘cured’, it *can* be managed effectively. However, pain management is usually a long-term project with few quick fixes and takes a lot of effort and staying power.

Disclaimer: generic information only – not intended as specific clinical direc

Notes of Eric J Visser, Pain Medicine Specialist Fremantle Hospital 2013

Resources (they are getting out of date)

- Cochrane (getting out of date)
- ‘Synthesis of reviews’ for LBP *Dagenais S et al, Spine J (2010)*
- Systematic review of pharmacology for NSCLBP *Kuijpers et al Eur J Spine (2010)*
- NICE UK sub-acute & persistent NSLBP (2009)
- US guidelines for back pain: American Pain Society and College of Physicians (2007)
- European guidelines (acute and chronic LBP) (2006)
- New Zealand acute low back pain guidelines (2004) (yellow flags)
- Australian NHMRC acute musculoskeletal pain guidelines (acute back pain) (2003)
- RACGP: review article Acute LBP : *Wilk V. AFP October 2004*

MANAGEMENT OF CHRONIC NON-SPECIFIC LOW BACK PAIN

Classify and clarify the diagnosis if possible (look for pathology or ‘pain generators’)?

-Imaging?

-MRI or CT +/- a bone scan (not always necessary)

-Blood tests (red flags & inflammatory markers)?

-Diagnostic spinal blocks?

-Facet joint pain generators (20%)

-lumbar medial branch facet blocks with local anaesthetic

-if *positive*; radiofrequency facet neurotomies (NNT=5)

-*Sacro-iliac joint pain generators (20%)*

-SIJ injection?

-'*Discogenic pain*' (*internal disc disruption*) (40%)?

-procedures don't help, so no point in doing discography

-Myofascial trigger points

-trigger point injection?

-Constantly check for developing 'yellow flags'

Adopt a multidisciplinary, bio psycho social approach

-Exercise therapy (Level I) (doesn't matter what type) (spinal core stability?)

-**Multidisciplinary pain management programmes (intensive) (eg PUMP) (Level I)**

-CBT (Level I)

-**Analgesia (need to reinforce the goal of improving *function with analgeics*)**

-paracetamol (Level II)

-NSAIDs/coxibs (not continuously, for flare-ups only)

-tramadol SR (Level II)

-duloxetine (Level II)

-opioids (controversial, very limited evidence of benefit) (caution)

-Acupuncture (?), spinal manipulation (?), massage (?), functional restoration (?) (US 2007)

Back schools may improve functional and return to work outcomes (Cochrane 2010)

No clear evidence to support: epidural steroids, facet joint injections (NNT 11), TENS, lumbar supports, traction, prolotherapy (alone) (Cochrane 2010).

Notes:

- Promote patient self-management in back pain.
- Emphasise functional outcomes.
- The search for spinal 'pain generators' is usually futile.
- Remember myofascial pain, trochanteric bursitis and piriformis syndrome.

“Pain is a more terrible lord of mankind than even death himself” (Albert Schweitzer)

Pain is “an unpleasant sensory and emotional experience associated with actual or potential tissue damage, or described in terms of such damage.”

What is pain?

- Pain is a complex, multidimensional, highly-personalised, *experience* in situations of perceived tissue damage, which in turn conditions and motivates us to take action to avoid tissue damage.
- Pain is unpleasant.
- Pain is an *experience*, not just a sensation.
- Pain has a *sensory* (hurting) and *emotional* (suffering) dimensions.
- Pain has social, spiritual & philosophical dimensions.
- Pain is what the person-in-pain says it is.
- Each person learns the meaning of pain based on their own life experiences.
- We can only really know someone is experiencing pain by them telling us (verbal reports).
- You need a conscious brain to experience pain (the basis of general anaesthesia) (the brain of pain falls mainly in the brain).
- Pain is more than the perception of tissue injury (it’s not even one of the five primary senses).
- Pain can be experienced without tissue damage (a very important concept to remember).
- The word ‘*pain*’ is a modern English derivative of the Latin root for ‘punishment’, *poenos* (as in *sub-poena*-‘under punishment’).
- The concept of *pain* as a ‘punishment’ is expressed in many languages, cultures and epochs, suggests that pain is more than just ‘hurting’.

- Some philosophers consider pain as an (essentially) unexplainable and unique experience of the self, existing in a realm (the aporia) that is impossible for an outside ‘observer’ such as a doctor, spouse, philosopher or priest, to truly access and understand.
- Pain is as difficult to understand as consciousness, love or anxiety and yet it pervades the existence of many living things on this planet and in particular the human condition.

See article for more details

ANZCA 1, patient information about pain EPM

Quiz questions

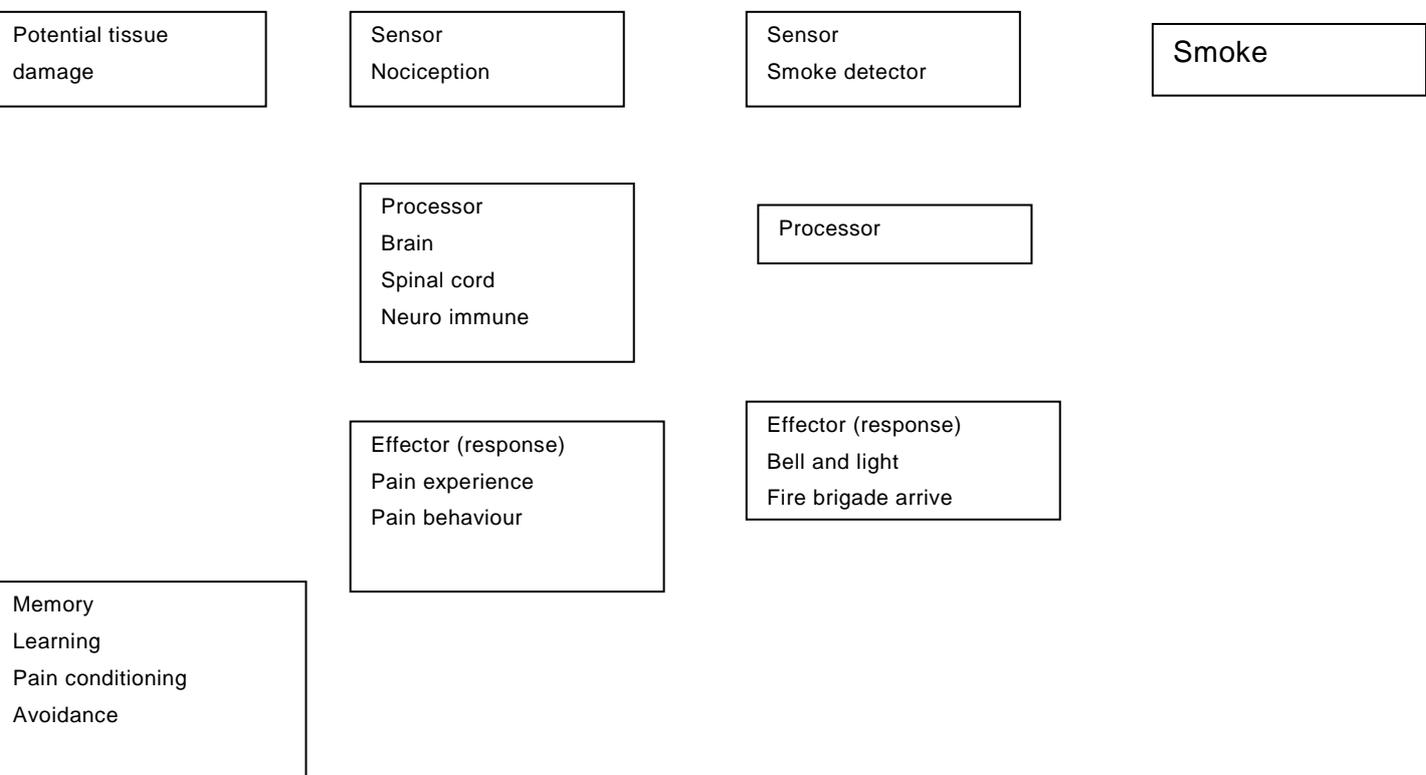
Nociception

John Connor: *Does it hurt when you get shot?* The Terminator: *I sense injuries. The data could be called "pain."* Terminator 2: *Judgment Day (1991)*

- Pain and nociception are not the same.
- *Nociception* is ‘the [neurophysiologic] process of encoding and processing noxious (tissue-injuring) stimuli” *transduction* of the energy released during tissue damage into electrical impulses for *transmission* in the nervous system.
I sense injuries...The data could be called ‘pain’.”
- It is the process of encoding and transmitting a tissue damaging stimulus in the nervous system” (IASP 2008)
- Pain is an ‘output’ generated by the brain.
- Nociception is a brain ‘input’ which usually triggers pain.
- Other pain triggers include: nerve damage (neuropathic pain), stress, the sickness response, anxiety and altered cortical sensory processing.
- You can experience pain without nociception (tissue damage).
- Examples: phantom pain, allodynia, back pain with a ‘normal’ looking MRI.
- You can experience pain with only *potential* tissue damage (eg. fingernail, hot plate).
- *Nociception* is comparable to the process of sound energy being converted into nerve impulses in the inner ear and transmitted to the auditory cortex. *Hearing* is the *conscious perception* of these auditory stimuli, and pain is like ‘music’, *the complex sensory and emotional experience* (the emotional swell of beautiful music). Like pain, you can also ‘experience’ music in the absence of a sensory stimulus (a tune playing in your head)

Pain as a tissue
damage alarm

- Pain has evolved over millions of years to protect life forms from tissue damage.
- Nociception and pain are highly preserved in phylogeny-evolutionary survival advantage.
-
- Pain is the body's major tissue defence system (think about some others?).
- We need pain to survive (see link)
- Like a man made smoke detector, the pain alarm system is comprised of



- The pain alarm has evolved to amplify the 'pain signals' so the tissue emergency is not ignored.
- The pain alarm (effector) response includes pain behaviours (which helps us escape from the tissue damaging situation and engender help from others), such as grimacing, limping, taking a panadol or calling an ambulance
- Pain is a conditioning system, 'teaching' the organism to avoid situations associated with tissue-damage (thorn bush, sabre-toothed tiger, fire)

- In chronic pain, the alarm keeps on ringing even-though the tissue emergency is over: chronic pain is an alarm malfunction where the alarm just keeps ringing louder and louder.
- The pain alarm is very robust after millions of years of evolution-it takes a lot to switch it off, explaining the trouble we have with chronic pain.

Link to slide sections pdf