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Thorough assessment central to management of low back pain

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Abstract

Low back pain is nociceptive in nature i.e. described as a dull pain or ache. It may be associated with hip and upper leg pain. Low back pain is a symptom with a range of possible causes. Most cases are either mechanical in origin or neurogenic. However, rarer secondary causes must also be considered to ensure serious pathology is not missed. Around 65-70% of cases do not have an identifiable pathoanatomical cause. A focused musculoskeletal and neurological examination should be carried out. If both red flag symptoms and radicular features are absent, the back pain is likely to be of mechanical origin and in many cases will resolve with simple management. Risk stratification tools such as the validated STarT Back tool, provide an approach to categorise patients into low, medium and high risk of continuing pain and disability. It is important to provide advice and information to help patients self-manage their condition. Exercise is recommended. However, manual therapies, e.g. spinal manipulation or massage, or psychological therapies should only be considered as part of a treatment package including exercise. Combined physical and psychological programmes are appropriate in patients at high risk of chronicity (e.g. those with a high STarT Back score) or patients who have not improved with other treatments. Complex cases can be referred to the pain service, where patients will undergo a comprehensive holistic assessment, and specialist physiotherapy, psychology and group-based pain management programmes are also available.

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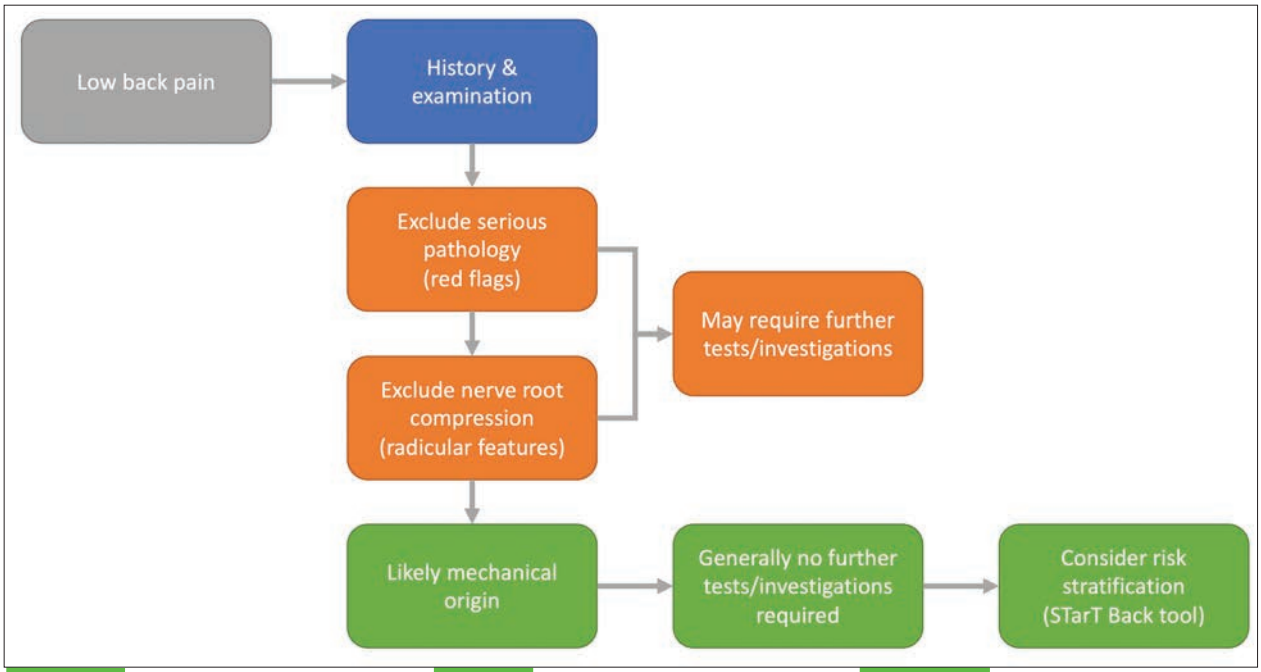

FIGURE 1
Guide to the initial assessment of back pain, adapted from Campbell and Colvin[5]

What are the common causes?

LOW BACK PAIN, DEFINED AS PAIN OR DISCOMFORT LOCALISED BELOW THE COSTAL MARGIN AND above the inferior gluteal folds,[1] is nociceptive in nature i.e. described as a dull pain or ache. It may be associated with hip and upper leg pain.

It is distinct from sciatica, which is a neuropathic pain, described as burning or tingling, of radicular origin that commonly radiates to below the knee and may be accompanied by sensory and motor deficits.

Low back pain that persists for 3 months or longer, beyond the time required for normal tissue healing after acute injury, is classified as chronic.

Low back pain is a common problem; estimates for the lifetime prevalence range from 50 to 80%, while the point prevalence is 7.3-19.1%.[2,3] Low back pain is now the leading cause of disability globally.[4] Although most episodes are of a benign origin and will resolve within the acute period, 3-4% of young adults (aged 18-44) and 5-7% of older adults (aged ≥ 45) will develop chronic low back pain and disability.[5]

How should patients be assessed?

COMMON CAUSES

Low back pain is a symptom with a range of possible causes, see box 1, p24. The majority of cases are either mechanical in origin (arising from the musculoskeletal components of the spine) or neurogenic (arising from nerve root irritation).

However, the rarer secondary causes of back pain must also be considered to ensure serious pathology is not missed. It is notable that 65-70% of cases do not have an identifiable pathoanatomical cause.[6]

ASSESSMENT

The breadth of causes of low back pain and the severity of their consequences can make the diagnostic process challenging. The absence of an overt anatomical cause in two thirds of cases can be difficult to accept for both doctor and patient, especially when balancing the desire for a definitive answer with the physical, psychological and economic consequences of unnecessary investigation. Figure 1, above, demonstrates an approach to the assessment of low back pain that can help guide the initial assessment.[5]

The exclusion of serious pathology can be guided by considering red flag symptoms and signs, see box 2, p24.[7] Although the red flag concept is well established in undergraduate and postgraduate teaching, and within clinical guidelines, it is not wholly evidenced based.

Verhagen and colleagues looked at 16 national and international guidelines for low back pain and found 46 discrete red flags being used.[8] Similarly, Downie and colleagues reviewed 14 studies evaluating 53 red flags and found only a small subset increased the likelihood of detecting a spinal fracture or malignancy.[9] Nevertheless, we believe that when used as a cognitive guide rather than a formal assessment tool the red flag system does have a part to play in risk stratification.

If red flags are not present, it is helpful to determine the presence or absence of radicular features, as nerve root compression may warrant a different investigation/management pathway. Relevant features in the history may include: unilateral leg pain radiating »

Which patients should be referred?

below the knee, low back pain that is less severe than leg pain, and paraesthesia or numbness in a dermatomal distribution.[10] A focused musculoskeletal and neurological examination is outlined in box 3, p25.[10]

If there are no red flag symptoms or radicular features, the back pain is likely to be of mechanical origin and often resolves with simple management.

However, as indicated above, some patients with a seemingly simple presentation progress to chronicity with a significant burden of disability. Identifying this sub-population early is difficult, but can help target high demand interventions (e.g. intensive physiotherapy, psychology) to those at risk.

Patient specific psychosocial factors (sometimes referred to as yellow flags) are implicated in this process. These may include: pain beliefs (e.g. pain is always harmful, injury is inevitable), emotional responses (e.g. pain anxiety/depression), and pain behaviour (e.g. avoidance of activity because of the expectation of pain, expectation of passive treatment).[11]

Occupational factors (blue flags e.g. an unsupportive work environment) and contextual factors (black flags e.g. return to work legislation) have also been described.[11]

The range of flags and the depth of some of the underlying issues make a full de novo assessment difficult within primary care. Risk stratification tools such as the validated STarT Back tool, see box 4, p25,[12] provide an approach to categorise patients as low, medium and high risk of continuing pain and disability. Questions 5-9 form a psychosocial subscale that provides an indication of the degree of yellow flag features for a particular individual.

CONFIRMING DIAGNOSIS

The presence of concerning features in the history and examination, and/or a constellation of red flags will warrant further investigation. However, where these indications are absent, routine imaging is not recommended.[5]

Plain lumbar X-rays have a low sensitivity and specificity for detecting anatomical abnormalities, do not improve outcomes, and are not cost effective.[13,14]

Magnetic resonance imaging (MRI) should be used with caution because of the high likelihood of incidental findings. Jensen and colleagues demonstrated that 64% of asymptomatic people have an anatomical abnormality in the lumbar spine on MRI.[15] Anatomical changes are poorly correlated with back pain symptoms, so the mainstay of assessment remains clinical judgement. In some areas, access to lumbar spine MRI is limited to secondary care.

MANAGEMENT

The NICE guideline *NG59 Low back pain and sciatica in over 16s: assessment and management*, published in 2016, was revised and updated in 2020.[7]

A number of non-pharmacological, pharmacological and invasive

Box 1

Common causes of low back pain, adapted from Cohen et al[6]

Mechanical (80-90%)
- Unknown cause - often attributed to muscle strain or ligamentous injury (65-70%)
- Degenerative disc or joint disease
- Vertebral fracture
- Congenital deformity (e.g. scoliosis, kyphosis)
- Spondylolysis and spondylolisthesis
- Failed back surgery syndrome (e.g. arachnoiditis, epidural adhesions); may cause mechanical or neurogenic back pain

Neurogenic (5-15%)
- Disc herniation
- Spinal stenosis
- Osteophytic nerve root compression
- Annular fissure with chemical irritation of nerve root
- Failed back surgery syndrome (e.g. arachnoiditis, epidural adhesions); may cause mechanical or neurogenic back pain
- Infection (e.g. herpes zoster)

Non-mechanical spinal conditions (1-2%)
- Inflammatory (e.g. rheumatoid arthritis, spondyloarthropathies, such as ankylosing spondylitis)
- Paget's disease
- Neoplastic disease
- Infection (e.g. osteomyelitis, discitis)
- Other (e.g. Scheuermann's disease, Baastrup's disease)

Referred visceral pain (1-2%)
- Gastrointestinal disease (e.g. inflammatory bowel disease, pancreatitis)
- Renal disease (e.g. nephrolithiasis, pyelonephritis)
- Vascular disease (e.g. abdominal aortic aneurysm)

Other (2-4%)
- Fibromyalgia
- Somatoform disorders
- Malingering

Box 2

Red flag symptoms and signs[7]

Cauda equina syndrome
- Severe or progressive bilateral neurological deficit of the legs
- New urinary retention and/or urinary incontinence
- New faecal incontinence
- Perianal or perineal sensory loss (saddle anaesthesia or paraesthesia)
- Unexpected laxity of the anal sphincter

Spinal fracture
- Sudden onset severe central spinal pain, relieved by lying down
- History of major/minor trauma or strenuous lifting in people with osteoporosis or those who use corticosteroids
- Structural deformity of the spine
- Point tenderness over a vertebral body

Cancer
- Age ≥ 50
- Gradual onset of symptoms
- Pain when supine, that disturbs sleep or is aggravated by straining
- Thoracic pain
- Localised spinal tenderness
- No improvement after four to six weeks of conservative therapy
- Unexplained weight loss
- History of cancer

Infection
- Fever
- Tuberculosis
- Recent urinary tract infection
- Diabetes
- History of intravenous drug use
- HIV infection
- Immunosuppression

interventions that are in regular use in some contexts are not recommended because of poor quality evidence or lack of an evidence base.

However, this has been controversial; the Faculty of Pain Medicine and British Pain Society issued a joint statement in response to the consultation draft of the revised guideline expressing 'very significant concerns,' especially relating to pharmacological management.[16] A full discussion on this topic is beyond the scope of this article, however it is important to consider that guidelines are there to support clinical decision making, not to limit it.

Self-management of back pain is at the core of NG59. Clinicians should provide advice and information to patients to help them self-manage their condition.

Exercise, including NHS delivered group sessions, is recommended and includes a graded activity or exercise programme that targets improvements in function and prevention of worsening disability. Since evidence showing that one form of exercise is better than another is not available, guidelines recommend exercise programmes that take the patient's individual needs, preferences, and capabilities into account when deciding on the type of exercise.[17]

Manual therapies, e.g. spinal manipulation or massage, or psychological therapies should only be considered as part of a treatment package including exercise.

Combined physical and psychological programmes are appropriate in patients at high risk of chronicity (e.g. those with a high STarT Back score) or patients who have not improved with other treatments.

Non-pharmacological therapies that are not recommended by NICE include: all forms of orthotics, low back traction, acupuncture, ultrasound, percutaneous or transcutaneous electrical nerve stimulation (PENS or TENS), and interferential therapy.

The evidence for analgesic drugs in acute and chronic back pain is similar. For both categories, paracetamol (as a sole agent) is not recommended, but NSAIDs and weak opioids (e.g. codeine) can be used as second-line or adjunctive therapy. Other opioids may have limited use in selected patients (use with caution).

For acute back pain, muscle relaxants may have limited use in selected patients, but evidence is insufficient for chronic back pain. It is advisable to avoid using diazepam for more than 2 weeks due to the high risk of tolerance and addiction.[16] For chronic back pain, selective norepinephrine reuptake inhibitors can be used as second-line or adjunctive therapy, but the role for antiseizure medications is uncertain. However, neither drug group has sufficient evidence for use in the acute phase.[16]

Gaps between evidence and practice are well documented, with limited use of recommended first-line treatments »

Box 3

Focused musculoskeletal and neurological examination[8]

- **Observe gait and pain behaviour**
- **Observe the spine for deformity/abnormal curvature**
- **Palpate the bony spine and paraspinal muscles**
- **Assess range of spine motion (standing): flexion, extension, lateral flexion and rotation**
  - Pain on flexion that radiates to the leg may be disc herniation with nerve root impingement
  - Pain on extension may be facet arthropathy or spinal stenosis
- **Examine active and passive movement of the hips (supine)**
  - Normal range of motion: 130° flexion, 15° extension, 45° internal/external rotation
  - Pain in any of these movements suggests hip pathology
- **Straight leg raise**
  - Positive if radicular pain is reproduced at 60° or less
  - Pain indicates sciatic nerve or L4-S2 nerve root irritation
- **Assess lower limb sensation**
- **Assess lower limb reflexes**
- **Femoral stretch test (prone)**
  - Positive if radicular pain is reproduced between 80 and 100°
  - Pain indicates femoral nerve or L2-L4 nerve root irritation
- **Consider a general examination where indicated**

Box 4

STarT Back screening tool[10]

For Q1-8, score 1 for Yes, 0 for No

Q1 My back pain has spread down my leg(s) at some time in the past two weeks

Q2 I have had pain in the shoulder or neck at some time in the past two weeks

Q3 In the past two weeks, I have only walked short distances because of my back pain

Q4 In the past two weeks, I have dressed more slowly than usual because of my back pain

Q5 It is not really safe for someone with a condition like mine to be physically active

Q6 Worrying thoughts have been going through my mind a lot of the time in the past two weeks

Q7 I feel that my back pain is terrible and that it is never going to get any better

Q8 In general I have not enjoyed all the things I used to enjoy in the past two weeks

Q9 Overall, how bothersome has your back pain been in the past two weeks?
Not at all (0), slightly (0), moderately (0), very much (1), extremely (1)

STarT Back scoring
Total score 0-3 = low risk; Q5-9 (psychosocial subscale) score 4-5 = high risk; any other score = medium risk

key points

SELECTED BY

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Low back pain is nociceptive in nature i.e. described as a dull pain or ache. It may be associated with hip and upper leg pain. Low back pain that persists for ≥ 3 months, beyond the time required for normal tissue healing after acute injury, is classified as chronic. Estimates for the lifetime prevalence range from 50 to 80%. Although most episodes are of a benign origin and will resolve within the acute period, 3-4% of adults aged 18-44 and 5-7% of those aged ≥ 45 will develop chronic low back pain and disability.

Low back pain is a symptom with a range of possible causes. Most cases are either mechanical in origin (arising from the musculoskeletal components of the spine) or neurogenic (arising from nerve root irritation). However, rarer secondary causes must also be considered to ensure serious pathology is not missed. Around 65-70% of cases do not have an identifiable pathoanatomical cause.

If red flags are not present, it is helpful to determine the presence or absence of radicular features, as nerve root compression may warrant a different investigation and management pathway. Relevant features in the history may include: unilateral leg pain radiating below the knee, low back pain that is less severe than leg pain, and paraesthesia or numbness in a dermatomal distribution. A focused musculoskeletal and neurological examination should be carried out. If both red flag symptoms and radicular features are absent, the back pain is likely to be of mechanical origin and in many cases will resolve with simple management. Risk stratification tools such as the validated STarT Back tool provide an approach to categorise patients into low, medium and high risk of continuing pain and disability.

It is important to provide advice and information to help patients self-manage their condition. Exercise is recommended. However, manual therapies, e.g. spinal manipulation or massage, or psychological therapies should only be considered as part of a treatment package including exercise. Combined physical and psychological programmes are appropriate in patients at high risk of chronicity (e.g. those with a high STarT Back score) or patients who have not improved with other treatments. The evidence for analgesic drugs in acute and chronic back pain is similar. For both categories, paracetamol (as a sole agent) is not recommended, but NSAIDs and weak opioids (e.g. codeine) can be used as second-line or adjunctive therapy.

Patients with suspicion of ankylosing spondylitis should be referred to rheumatology, suspicion of cauda equina syndrome to the emergency department/neurosurgery immediately. Those with persistent radicular symptoms for more than six weeks despite treatment should be considered for referral to orthopaedics or neurosurgery. Complex cases can be referred to the pain service, where patients will undergo a comprehensive holistic assessment, and specialist physiotherapy, psychology and group-based pain management programmes are also available.

and inappropriately high use of imaging, rest, opioids, spinal injections and surgery.[17] This may be challenging to address, but potential solutions include: focused implementation of best practice, the redesign of clinical pathways, integrated health and occupational care, and public health and prevention strategies.[17]

SELF-MANAGEMENT

Self-management is pivotal in managing back pain. In many cases, providing information, reassurance, signposting to local services and encouraging exercise is enough to help patients through an acute episode.

It is important to allow and encourage individual patients to take charge of their own management plan. As we have discussed, those who look for passive treatment options are more likely to progress to chronicity.

Patients should be warned of the red flag symptoms for cauda equina, and of increasing neurological deficit in radicular pain (see box 2, p24). If patients experience these symptoms they should go to the emergency department.

REFERRAL

Patients with specific clinical features should be referred to the appropriate specialty on an appropriate timescale e.g. suspicion of ankylosing spondylitis to rheumatology, suspicion of cauda equina syndrome to the emergency department/neurosurgery immediately. Those with persistent radicular symptoms for more than six weeks despite treatment should be considered for referral to orthopaedics or neurosurgery.

Most uncomplicated cases can be managed in primary care. Complex cases can be referred to the pain service, where patients will undergo a comprehensive holistic assessment, and where specialist physiotherapy, psychology and group-based pain management programmes are also available. Interventional pain procedures are less frequently offered these days, though NICE suggests that medial branch nerve blocks and radiofrequency ablation for facet joint arthropathy and epidural steroids for lumbar radicular pain may be appropriate in selected cases.

Competing interests
Dr Mick Serpell has received fees (paid to Glasgow University) for clinical trials from Pfizer, Grünenthal, GW Pharmaceuticals, GSK, Napp, Astellas, Astra Zeneca. He has been a speaker/chair at educational meetings sponsored by Grünenthal, Pfizer, MIMS Haymarket. He has undertaken consultancy work on advisory boards for Napp and Astellas. Dr Dhaneesha Senaratne has no competing interests

REFERENCES

1 Burton AK, Balagué F, Cardon G et al. Chapter 2 European guidelines for prevention in low back pain. *Eur Spine J* 2006;15(Suppl 2):s136-68
2 Versus Arthritis. The state of musculoskeletal health 2021. Versus Arthritis 2021 [Last accessed 26 July 2022] www.versusarthritis.org/media/24653/state-of-msk-health2-2021.pdf
3 Hartvigsen J, Hancock MJ, Kongsted A et al. What low back pain is and why we need to pay attention. *Lancet* 2018;391:2356-67
4 Global Burden of Disease, Injury Incidence, Prevalence Collaborators. Global, regional, and national incidence, prevalence, and years lived with disability for 310 diseases and injuries, 1990-2015: a systematic analysis for the Global Burden of Disease Study 2015. *Lancet* 2016;388:1545-1602
5 Campbell J, Colvin LA. Management of low back pain. *BMJ* 2013;347:f3148
6 Cohen SP, Argoff CE, Carragee EJ. Management of low back pain. *BMJ* 2008;337:a2718
7 National Institute for Health and Care Excellence. NG59. Low back pain and sciatica in over 16s: assessment and management. NICE. London 2016 updated 2020 www.nice.org.uk/guidelines/ng59 [Last accessed 7 July 2022]
8 Verhagen AP, Downie A, Popal N et al. Red flags presented in current low back pain guidelines: a review. *Eur Spine J* 2016;25(9):2788-2802
9 Downie A, Williams CM, Henschke N et al. Red flags to screen for malignancy and fracture in patients with low back pain: systematic review. *BMJ* 2013;347:f7095
10 National Institute for Health and Care Excellence. Clinical knowledge summaries: Sciatica (lumbar radiculopathy). 2022 [Last accessed 7 July 2022] https://cks.nice.org.uk/topics/sciatica-lumbar-radiculopathy/
11 Nicholas MK, Linton SJ, Watson PJ et al. Early identification and management of psychological risk factors ("Yellow Flags") in patients with low back pain: a reappraisal. *Phys Ther* 2011; 91(5):737-53
12 Hill JC, Dunn KM, Lewis M et al. A primary care back pain screening tool: identifying patient subgroups for initial treatment. *Arthritis Rheum* 2008;59(5):632-41
13 Chou R, Fu R, Carrino JA, Deyo RA. Imaging strategies for low-back pain: systematic review and meta-analysis. *Lancet* 2009;373(9662):463-72
14 Miller P, Kendrick D, Bentley E, Fielding K. Cost-effectiveness of lumbar spine radiography in primary care patients with low back pain. *Spine* 2002;27(20): 2291-97
15 Jensen MC, Brant-Zawadzki MN, Obuchowski N et al. Magnetic resonance imaging of the lumbar spine in people without back pain. *N Engl J Med* 1994;331(2):69-73
16 Faculty of Pain Medicine. Faculty of Pain Medicine and British Pain Society express concern over recently published NICE guidance on managing low back pain and sciatica. 2020 [Last accessed 7 July 2022] https://fpm.ac.uk/fpm-and-bps-concerns-nice-low-back-pain-sciatica-guidance
17 Foster NE, Anema JR, Cherkin D et al. Prevention and treatment of low back pain: evidence, challenges, and promising directions. *Lancet* 2018;391(10137):2368-83

Useful information

The British Pain Society
www.britishpainsociety.org

Pain Management
www.paindata.org

Pain Concern
https://painconcern.org.uk

Pain Association
https://painassociation.co.uk