Case Discussion in Medicine

Low Back Pain for Clinicians : An Evidence Based Approach

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Low back pain is one of the most common causes of disability and missed workdays across the Globe. Symptoms may range from non-specific mild complaints like stiffness to frank inability to perform daily activities and with an increase in sedentary lifestyle and aging, the prevalence of such complaints is expected to increase. A thorough history and physical examination are essential for the evaluation of low back pain, especially in the primary care setting with diagnostic tests based on specific findings and response to initial therapy. The localisation of pain and its associated "red flags" may provide important clues for patient referral and treatment. Pharmacologic, non-pharmacologic and surgical options may all be tried, depending on the nature and cause of pain and disability. Several Clinical Practice Guidelines have been proposed for highlighting a feasible approach to the management of both acute and chronic low back pain.

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"The greatest evil is physical pain"
— Saint Augustine

Low back pain is a common medical condition and among the most common causes of disability Worldwide, even if the underlying cause may not always be a grave one. Surveys have revealed it as the second most common symptomatic reason for physician visits[1] and only up to half the number of patients seek medical care as most of the cases are self-limiting. Global epidemiologic studies have estimated the point prevalence to range from 15-30%[2], while recent Indian data reveals a similar figure of 32%[3] in a North-Indian setting. The associated economic burden is quite significant, including both costs of direct medical care or physiotherapy, as well as the indirect expenses incurred from losing out on work and facing disability.

While the bulk of low back pain as a presenting complaint is faced in a primary care setting, various aspects of management are shared amongst physicians, neurologists, rheumatologists, emergency care practitioners as well as non-allopathic healthcare providers like chiropractors and physiotherapists. Symptomatic outcomes are marginally better with intensive treatment, but not all patients require a detailed diagnostic workup or long-term management.

Editor's Comment :

- LBP is the commonest symptom people experienced in their life time.
- Non-inflammatory etiology is the predominant component.
- Imaging modality like MRI is to be used in the selected population where "red flag sign" is there.
- Non inflammatory group require supportive care with physiatrist modulation where as inflammatory pain require NSAID as disease modifying drugs followed by synthetic biologic DMARD.

Recognizing early indicators of poor prognosis smoothens the transition to pain-free or disability-free living.

Among the guidelines for managing low back pain, the UK National Institute for Health and Care Excellence (NICE) clinical guideline for low-back pain and sciatica from 2016[4] and the clinical practice guideline from the American College of Physicians (ACP) from 2017[5] have been used to provide evidence for this review discussing the primary management and supportive care for low back pain.

Aetiology & Definitions :

Low Back Pain (LBP) refers to pain experienced in the lumbosacral or spinal regions with or without neural compromise or visceral referred pain. The differential diagnoses for low back pain have been elaborated in Table 1 and may be divided into the following groups: mechanical (spinal), non-mechanical (spinal) and visceral/miscellaneous. The Quebec Taskforce Classification for Spinal Disorders[6] has defined the duration of acute (2– 4 weeks), subacute (≤12 weeks) and chronic (typically ≤12 weeks) LBP and the pathophysiologic pathways or exact cause for any of these may not be entirely clear. Causes like disc

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Table 1 — *Differential Diagnosis of low back pain (modified from Atlas and Deyo[7])*

Mechanical Spinal Causes	Non-mechanical Spinal Causes	Visceral and Miscellaneous
Idiopathic (lumbar strain/ ligamentous)	Neoplastic	Gastrointestinal
Degenerative	• Metastases	• IBD
• Disc	• Myeloma	• Pancreatitis
• Facet joints	• Lymphoma	• Diverticulitis
• DISH	• Primary spinal cord tumor	Renal
Spondylosis	Infective	• Pyelonephritis
Spondylolisthesis	• Osteomyelitis	• Nephrolithiasis
Spinal canal stenosis	• Discitis	Vascular
Disc herniation/disruption	• Epidural abscess	• Abdominal Aortic aneurysm
Vertebral fracture	Inflammatory	• AortoarteritisPelvic
Congenital	• Ankylosing Spondylitis	• Endometriosis
• Kyphosis	• Psoriatic Arthritis	• PID
• Scoliosis	• Reactive Arthritis	Fibromyalgia
• Transitional vertebra	Paget's Disease	Somatoform disorder
	Scheuermann's Disease	

(DISH : Diffuse Idiopathic Skeletal Hyperostosis; IBD : Inflammatory Bowel Disease; PID : Pelvic Inflammatory Disease)

herniation can be a persistent anatomical and mechanical cause of nerve root irritation, while some inflammatory conditions can lead to the dysregulated modulation of pain-processing nerve fibres and be harder to localize or treat.

Some of the common conditions or symptoms related to LBP are as follows:

- Sciatica: Leg pain localizing to lumbar sacral nerve roots, usually of the L4 to S1 levels.
- Spondylolisthesis: A vertebra slipping out in relation to the vertebra beneath it.
- Spondylolysis: A defect in the pars interarticularis; commonly seen with stress fractures and back pain.
- Spondylosis: Degenerative arthritis of spine.
- Disc Protrusion & Bulge: In protrusion, the nucleus pulposus pushes completely through the annulus and squeezes out of the disc. In a bulge, the bulged disc material is still contained within the annulus. If a piece of the disc is broken, it's called a sequestered fragment.
- Cauda Equina Syndrome: Compression of the cauda (bundle of nerve roots in the lower spinal canal). This may cause bowel or bladder issues or saddle anesthesia.
- Spinal Stenosis: Crowding of spinal canal, either by osteoarthritis, osteophytes or ligamentous thickening. The narrowing of the canal can cause nerve root compression.
- Myelitis: An inflammatory condition of the spinal cord. Frequently, white matter and demyelination are involved.
- Conus Medullaris Syndrome: Lesions where the spinal cord tapers and ends, between the first and second lumbar vertebrae and may cause increased tone and reflexes

History & Physical Examination :

Acute LBP usually has an underlying mechanical cause like trauma or vigorous exercise. The nature of pain may be described by the patient as "shooting" in radiculopathy or "throbbing/aching" in musculoskeletal causes. Radiation of pain may Reveal Radiculopathy or Visceral Referred Pain Syndromes and differentiating neuropathic pain is important while deciding on treatment protocols.

The main aim of initial evaluation is to stratify patients into 3 major groups:

- Patients with "red flag" signs: Major underlying illness requiring further investigations or referral, seen in a minority of cases (Table 2)
- Patients with Nerve Root Involvement (Radiculopathy): A thorough examination including site of radiation, local deformities of spine, areas of motor and sensory involvement (Table 3), diminished deep reflexes or worsening on sneezing/straight leg raising.
- Non-specific back pain: Majority of patients are of this category with milder symptoms.

A detailed examination should include a thorough nervous system examination, as well as other systems to check for underlying causes. The Waddell manoeuvres may be used for suspected cases of non-organic back pain (Fig 1). Forward and lateral flexion of the spine, gait abnormalities and focussed joint examination may point towards the causative disease process (Table 4).

One should always look out for "Yellow flags" (psychological behavioural factors: beliefs and coping strategies about pain and support) "Blue flags" (socio-economic factors: work status and health insurance benefits), and "Black flags" (occupational factors: working conditions and policies) associated with LBP

Table 2 — *Red Flag features in Low Back Pain*

Feature	Suspected Condition(s)	Associated findings
Age >50 years	Malignancy; Osteoporosis	Constitutional features (weight loss), bleeding, lymph nodes, smoking; Trauma, postmenopausal female, contraceptive or steroid use
Age <20 years	Congenital (Spina bifida, kyphosis, epiphyseal dysplasia)	Family history, other birthmarks or anomalies, neurologic symptoms
Constitutional features (Fever, weight loss)	Malignancy; Infections	Features of primary organ involvement, anemia, bleeding;Features of meningitis, associated neurologic deficit
Inflammatory LBP	Ankylosing Spondylitis; Psoriatic Arthritis; Reactive Arthritis; Arthritis associated with IBD	Age <40 years (especially men), morning stiffness >30 min, improvement with exercise and NSAIDs, duration >3 months
Neurologic deficit	Myelopathy; Radiculopathy	Sudden onset weakness, bladder or bowel involvement, sensory loss, diminished reflexes
Immunosuppressive or steroid use, Drug use/HIV	Vertebral fracture; Infections	Focal tenderness, neurologic deficit, deformity, worse on movement; Constitutional features

Table 3 — *Neurologic findings in Nerve Root affection*

Nerve Root	Motor Weakness	Sensory Affection	Reflex
L2	Hip flexion & adduction	Anterior thigh	Cremasteric
L3	Quadriceps adductors	Anterior & medial thigh	Patellar
L4	Knee extension, hip flexion	Anterior thigh, medial malleolus	Patellar
L5	Great toe dorsiflexion	Dorsal foot, lateral leg	None
S1	Plantar flexion	Lateral foot, heel Posterior leg	Achilles

to facilitate rehabilitation later.

Diagnostic Testing :

Imaging :

Imaging modalities are often performed in the evaluation of LBP but are seldom necessary or useful. Guidelines do not recommend the use of imaging for non-specific back pain (>85% cases). Moreover, >30% adults without symptoms of LBP may have positive imaging findings like Degenerative Disc Disease[9], thus leading to more confusion than clarity in management.

Plain radiographs may be a satisfactory modality to reassure patients of the absence of any obvious or major spinal pathology but the yields from such radiographs are too low to justify their routine use, unless there are risks of vertebral fracture or persistent, refractory LBP. Both anteroposterior and lateral views may be required in such cases.

In case of strong suspicion of cord pathology, nerve root

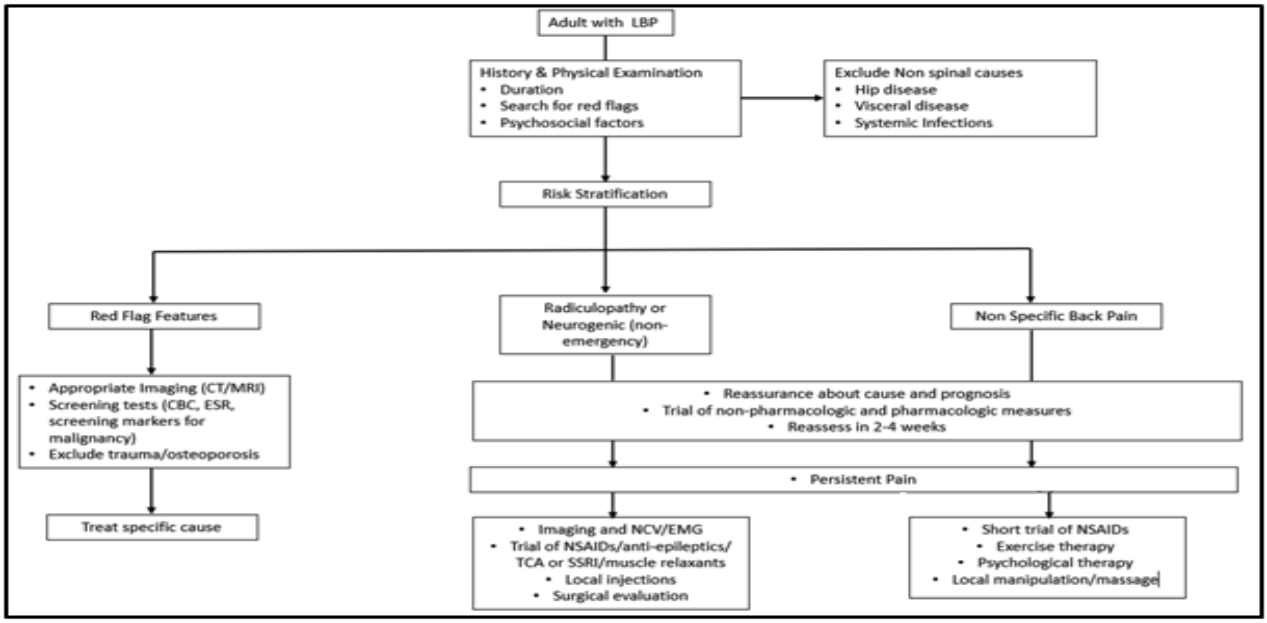

Fig 1 — Algorithm for Approaching Low Back Pain

Table 4 — *Waddell Signs[14] for Non-organic LBP*

Category	Signs
Tenderness	• Superficial Skin tender to light touch • Non-anatomic deep tenderness not localized to one area
Simulation	• Axial loading of spine over skull of standing patient elicits low back pain • Roation : shoulders and pelvis rotated in the same plane elicits low back pain
Distraction	• Differences in supine straight-leg-raising and seated straight-leg-raising
Regional	• Weakness : many muscle groups give away weakness (patient does not give full effort on minor muscle testing) • Sensory : sensory loss in stocking or glove distribution; non-dermatomal
Overraction	• Disproportionate facial or verbal expression (ie, pain behavior)

involvement or suspected malignancy, advanced imaging techniques like Computed Tomography (CT) or Magnetic Resonance Imaging (MRI) should be advised, especially for persistent symptoms of radiculopathy or spinal stenosis despite empirical treatment. MRI is often preferred by physicians as it is comparable to CT in diagnosing Spinal Degenerative Diseases, while being more sensitive in the diagnosis of any other inflammatory, vascular or soft tissue pathology[9], without the risk of radiation exposure. Inflammatory low back pain may be diagnosed as sacroiliitis early using MRI to show erosions or bone marrow edema. Most guidelines recommend the use of imaging in the presence of either red flag features or pain persisting beyond 4-8 weeks with conservative management.

Electrodiagnostic Studies :

Nerve Conduction Studies (NCV) or Electromyography (EMG) may be used to confirm the diagnosis in cases of suspected sciatica, Radiculopathy or Neuropathy. Inflammatory Muscle Diseases may be picked up on EMG as persistent LBP with thigh pains and weakness. The sensitivity of EMG has been shown to be comparable to CT or MRI in localizing radiculopathy[10] but sensory root injury cannot be ascertained by it.

Treatment :

Most cases of acute LBP may be self-limiting, and non-specific pain may be managed primarily by reassurance or lifestyle changes. A multidisciplinary approach is advocated by all the Clinical practice guidelines for managing LBP. An algorithm to approach and manage LBP has been summarised in Fig 1.

Acute LBP management :

Guidelines recommend early, active ambulation over bedrest for acute LBP with reassurance about good prognosis, limiting the need for bedrest only for severe disabling pain or injury. Non pharmacologic management is usually preferred. There is low quality of evidence favouring the use of massages and manual spinal manipulation, but they both have been recommended for use in the NICE as well as the ACP guidelines for acute LBP.

Psychological and cognitive-behavioral approaches are recommended as part of a broader treatment plan. ACP (not NICE) recommends the use of acupuncture and local heat application in cases of acute LBP but there is only low quality of evidence and there is not enough evidence to support stimulation techniques like Transcutaneous Electrical Nerve Stimulation (TENS) due to lack in RCT data.

NSAIDs have been recommended for the shortest possible duration. Opiods are endorsed by the NICE guidelines while short duration use of muscle relaxants are recommended as second line therapy by the ACP but with low quality evidence in their favour. Corticosteroids are not recommended by any of the guidelines.

Chronic LBP Management :

Data from RCTs provide evidence that exercise therapy, cognitive behavioural therapy or spinal manipulation may be preferred for managing persistent non-specific LBP. Therapeutic Ultrasonography or TENS-like techniques have not shown meaningful results in altering the outcome in chronic pain.

While the use of NSAIDs over placebo is recommended by both US and UK, other modalities like anti-depressants, muscle relaxants or epidural or facet joint steroid injections have not shown significant benefits and are not recommended based on this insufficient evidence[12].

Specific Management :

Radiculopathy requires a multidisciplinary approach, including active exercise therapy and the use of anti-epileptics like Gabapentin, Pregabalin and Topiramate are recommended by most existing guidelines based on moderate quality of evidence.

Tricyclic anti-depressants (eg: Amitriptyline) or Selective Serotonin Reuptake Inhibitors (SSRIS) like Duloxetine are recommended in both sciatic pain or for features of chronic pain syndrome not responding to non-pharmacologic measures. Even opiods may be used for refractory cases.

Epidural steroid injections (NICE endorsed) or

surgical procedures like discectomy may be recommended in cases with nerve compression.

Referrals for surgery, rehabilitation or psychological therapy are often based on questionnaires used by physicians as screening tools but the accuracy of these tools are modest at best[13]. Decisions of referral are best tailored to the individual patient based on a combination of clinical or imaging findings, to facilitate any urgent interventions as and when needed.

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