Chapter 7

Evaluation of Patient with Back Pain

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International Association for the Study of Pain (IASP) defines lumbar spinal pain as pain perceived anywhere within a region bounded by the last thoracic spinous process, the first sacral spinous process and the lateral border of erector spinae. Sacral spinal pain is defined as pain perceived anywhere in a region bounded by first sacral spinous process, posterior sacrococcygeal joints and the posterior superior iliac spines. Low back pain is defined as lumbar spinal pain or sacral spinal pain or any combination of the two.[1] Low back pain is also defined as pain and discomfort, localised below the costal margin and above the inferior gluteal folds, with or without leg pain.[2]

History

Duration[2,3]

Low back pain can be classified depending on the duration into:

1. ***Acute low back pain:*** Low back pain persisting for less than 6 weeks.
2. ***Subacute low back pain:*** Low back pain persisting between 6 and 12 weeks
3. ***Chronic low back pain:*** Low back pain persisting for 12 weeks or more.

Pain generator may change as the pain becomes chronic and long-standing. For example, in case of acute lumbar disc prolapse, the pain generator is the inflamed, irritable nerve root generating the ectopic signals. But as the pain becomes long-standing (without treatment), due to sensitization of the nervous system, the pain becomes more centralized. It also helps in establishing the treatment plan as the management of acute low back pain and chronic low back pain differs.

Radiation

Low back pain need not be restricted to lumbar and sacral regions. Pain can be referred to other regions, most commonly lower limbs. Referred pain is pain perceived in a region innervated by nerves other than the nerves that innervate the actual source of pain.[3] The upper lumbar facet joint pain may be referred to flanks, hips and lateral thigh, whereas pain from the lower lumbar facet joints are referred to posterior thigh. Facet joint pain is rarely referred below knees.[4] Similarly pain from sacroiliac joint may be referred to lower lumbar region, abdomen, lower limbs and rarely to the foot.[5] Patients with degenerative disc disease (not disc prolapse) have axial back pain which can be referred to anterior thigh (L3–L4 disc), lateral thigh (L4–L5 disc) and posterior thigh (L5–S1)[6] (Fig. 7.1). Radicular pain due to nerve root irritation caused by herniated disc causes pain radiating along a narrow band which follows a dermatomal pattern (segment of the skin supplied by a single particular nerve root).[7] Same rule applies to the pain caused by herpes zoster. Pain due to entrapment neuropathies follows the distribution of the affected nerves. For example, pain in meralgia paresthetica is seen in distribution of lateral femoral cutaneous nerve (anterolateral aspect of thigh).[8]

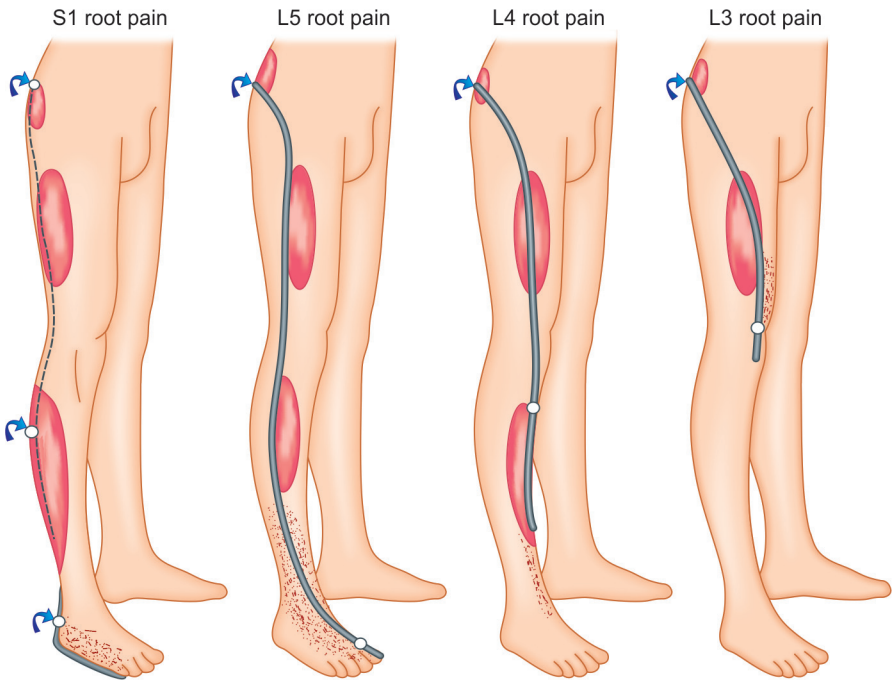


Fig. 7.1: Pain radiation to lower limb according to dermatomes

Quality[9]

Assessing the quality of pain again helps in making the diagnosis. Pain from the facet joints, sacroiliac joints are usually aching types and can be well localized to the area where the pain is originating. Discogenic pain is very vague, and not well localized. Radicular pain and pain due to entrapment neuropathy is sharp, shooting, lancinating or electric in nature.

Intensity

This can be assessed by using standard pain assessment scales—visual analog scale (VAS) or numerical rating scale (NRS). Although it may not help in making the clinical diagnosis, it may aid in selecting the analgesics or invasive treatment.

VAS

The pain VAS is a continuous scale comprised of usually 10 centimetres (100 mm) in length, anchored by 2 verbal descriptors, one for each symptom extreme. For pain intensity, the scale is most commonly anchored by "no pain" (score of 0) and "pain as bad as it could be" or "worst imaginable pain" (score of 10).[10]

NRS

The NRS is a segmented numeric version of the visual analog scale (VAS) in which a respondent selects a whole number (0–10 integers) that best reflects the intensity of their pain. An 11-point numeric scale (NRS 11) with 0 representing one pain extreme (e.g. "no pain") and 10 representing the other pain extreme (e.g. "pain as bad as you can imagine" and "worst pain imaginable").[10]

Aggravating and Relieving Factors

Lumbar facet joint pain is usually aggravated on backward extension, lateral bending and lateral rotation. The facet joints are loaded during these movements and relieved on lumbar flexion which unloads the joint. Rising in the morning is difficult due to pain and stiffness.[6,11]

Pain of coccidynia is aggravated by sitting and decreased by standing. Hence, the patients frequently use soft cushion or ring to sit and avoid hard surfaces.[12,13] Discogenic pain again increases on axial loading (sitting, lumbar flexion) and reduces by recumbancy.[8] Similarly the pain due to vertebral compression fracture also increases when the patient is sitting. Pain due to ligament sprain and myofascial pain syndrome are aggravated by movements which stretch the affected ligament and muscle. In case of myofascial pain syndrome affecting quadratus lumborum, the pain is worsened in sitting position as the muscle stretches in this position and relieves by standing. Whereas pain of iliopsoas is least in sitting position and aggravates during change of posture from sitting to standing. Pain due to piriformis syndrome is aggravated during squatting which again stretches the piriformis muscle. Similarly, interspinous ligament pain is more while the patient is sitting or bending forwards. Radicular pain is aggravated by bending forwards which stretches the affected nerve, coughing and straining (which increases the intradiscal pressure momentarily) and partial relief is obtain when patient is at rest.[7] Patients with lumbar canal stenosis give a typical history of back pain, numbness and heaviness in the lower limbs while walking which are completely relieved by rest and forward bending.

Red Flags

The most important thing in evaluation of a patient with low back pain is to look for any red flags. Red flags are the danger signs indicating serious underlying condition that needs immediate surgical intervention.

Red Flags for Low Back Pain[2]

1. Trauma—history of major trauma, even minor trauma in elderly patients and patients on long-term steroid treatment is considered red flag as they are prone for fractures.
2. Tumor—history suggestive of malignancy like profound weight loss, cachexia, and back pain in a patient already diagnosed with cancer.
3. Infection—history suggestive of infection like fever, weight loss, immunosuppression.
4. Neurological deficits including bladder bowel disturbance and motor power 3/5 or less.

Patients presenting with any of the above signs and symptoms, immediate radiologic assessment and possible surgical interventions within 8 hours or at least before 24 hours.

Psychological Assessment

This is an important part of evaluation as the patients with long-standing low back pain will be having emotional disturbances like depression, anxiety, sleep disturbances, loss of appetite.

Clinical Examination

Examination follows the pattern described in the general examination chapter.

Inspection of Back and Leg

Look for asymmetry or deformity; skin lesion, muscle wasting, muscle hypertrophy, muscle fasciculation, gait, posture, range of motion.

Muscle wasting may be sign of motor neuron disease. Gait may be antalgic (painful) gait, steppage gait (due to foot drop) or a gait abnormality due to stiff back as a result of paraspinal muscle spasm. Posture is again a cause for chronic strain on different ligaments.

Range of Motion

The normal ranges of motion of the lumbar spine are 15° of extension, 40° of flexion, 30° of lateral bending, and 40° of lateral rotation to each side.[14]

Palpation

1. Tenderness
2. Swelling
3. Local rise of temperature.

Tenderness over particular part indicates pathology which can extend from superficial skin to underlying organ. In early phase or acute phase of CRPS, the temperature of the affected area is raised; the limb is swollen, edematous, shiny and red. In late or dystrophic phase, the skin is cold, atrophic, discolored with loss of hairs.[14] Skin temperature is also reduced and the limb may be cold and discolored in case of vascular pain conditions like Reynaud's disease, Berger's disease and other collagen vascular disorders.

Other important palpatory findings that are important in assessing a patient with pain are allodynia and hyperalgesia.

Motor Testing

Increased muscle tone may be due to spasm of a particular muscle group. Truncal dystonia, stiff person syndrome may be present. Lower limb testing must be included when patient complains of leg pain along with back pain. It is important to predict the site of neural dysfunction.

Power

Each muscle group is to be tested, keeping in mind which root and nerve supply them.

Grade 0	Complete paralysis
Grade 1	A flicker of contraction only
Grade 2	Power detectable only when gravity is excluded by appropriate postural adjustment
Grade 3	The limb can be held against the force of gravity, but not against the examiner's resistance
Grade 4	The limb can be held against gravity and against some resistance, but is not normal (a percentage estimate, or a grade of 4+, 4 or 4– is often applied)
Grade 5	Normal power

Sensory System Examination

Sensory modalities that can be tested include:

- Pain
- Temperature
- Tactile sensibility: This includes light touch and pressure, and tactile localization and discrimination
- Vibration: Place a tuning fork on the malleolus. If deficient, move up to head of fibula or to ASIS.
- Position sense: The appreciation of passive movement. Test with big toe movement.
- Stereognosis: Recognition of the size, shape, weight and form of object.

Reflexes

Deep Reflexes

- *Knee jerk (L2–L4):* The quadriceps contracts when the patellar tendon is briskly tapped. With the patient supine, pass your hand under the knee to be tested so that it supports the relaxed leg with the knee flexed at a little less than 90°. Strike the patellar tendon midway between its origin and its insertion. Look for a contraction of the quadriceps (Fig. 7.2). The knee jerk can often more easily be elicited with the patient sitting up with the legs dangling freely over the edge of the bed.
- *Ankle jerk (S1, S2):* Slightly dorsiflex the ankle so as to stretch the Achilles tendon and, with your other hand, strike the tendon on its posterior surface, or the sole of the foot. A quick contraction of the calf muscles results.

Superficial Reflexes

- *Cremasteric reflex (L1/2):* Stroke the skin at the upper inner part of the thigh. The testicle moves upwards.

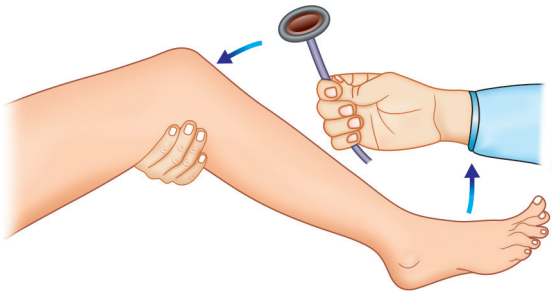
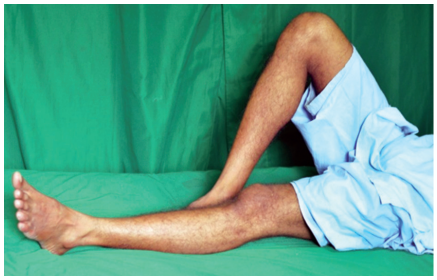


Fig. 7.2: Knee reflex

- ***The plantar reflex (L5, S1):*** The outer edge of the sole of the foot is stimulated by firmly scratching a key or a stick along it from the heel towards the little toe. Flexor plantar response is normal.
- ***Anal reflex (S3, S4):*** Gently scratch the skin on either side of the anus. A brisk contraction of the sphincter should immediately occur.
- ***Bulbocavernosus reflex (S3, S4):*** Pinching of dorsum of glans penis causes contraction of bulbocavernosus.

Special Tests

- ***The Lasegue/straight leg raising (SLR) test for lumbar root irritation:*** The basis for the Lasegue/straight leg raising test is the belief that the stretching of the lumbar nerve trunks that form the sciatic nerve is non-painful in healthy but is painful when inflamed, irritated or entrapped. This test also has good correlation with positive findings on magnetic resonance imaging (MRI) of the lumbar spine and lumbar plexus as well as electromyography (EMG). To perform the Lasegue/straight leg raising test, the patient is placed in the supine position on the examination table with the unaffected leg flexed to 45° at the knee and the affected leg placed flat against the table. With the ankle of the affected leg placed at 90° of flexion, the examiner slowly raises the affected leg toward the ceiling while keeping the knee fully extended (Figs 7.3 and 7.4). The test is positive if the patient complains of pain and paresthesias into the affected extremity that are similar to the pain that the patient has been experiencing. If this maneuver reproduces the patient's pain, the test may be considered positive.
- ***The sitting straight leg raising test for lumbar root irritation:*** To perform the sitting straight leg raising test, the patient is placed in the sitting position. The examiner then has the patient lean slightly forward to increase tension on the lumbar



Figs 7.3 and 7.4: SLR test

nerve roots. With the ankle of the affected leg placed at 90° of flexion, the examiner slowly raises the affected leg toward the ceiling making the knee fully extended (Fig. 7.5). The test is positive if the patient complains of similar pain and paresthesia into the affected extremity that the patient has been experiencing.

- ***Tests for sacroiliac joint pain:***
  - The Patrick/FABER test: FABER is an acronym that helps to remind the examiner that he or she is checking for limitation of pain of flexion, abduction and external rotation (FABER). To perform the Patrick/FABER test, the patient is placed in the supine position and the knee and hip are flexed to 90°. The examiner then has the patient place the foot of his or her affected extremity on the opposite knee. The thigh is then slowly abducted and externally rotated toward the examination table (Figs 7.6 and 7.7). Pain will occur in gluteal region near PSIS.

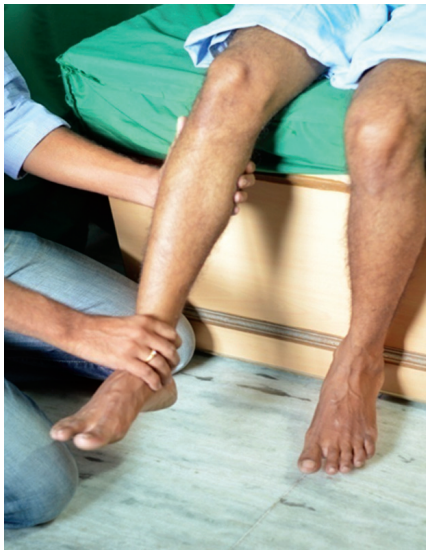
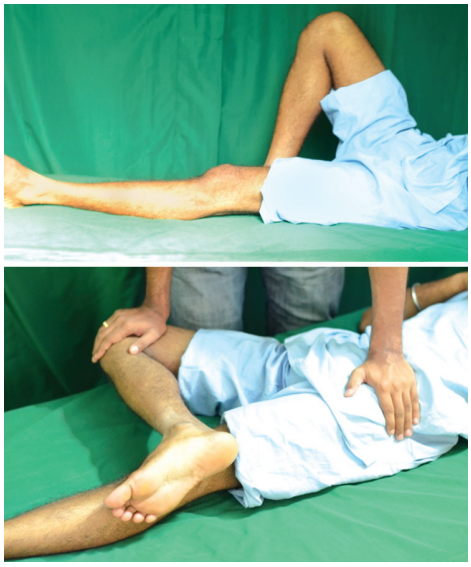


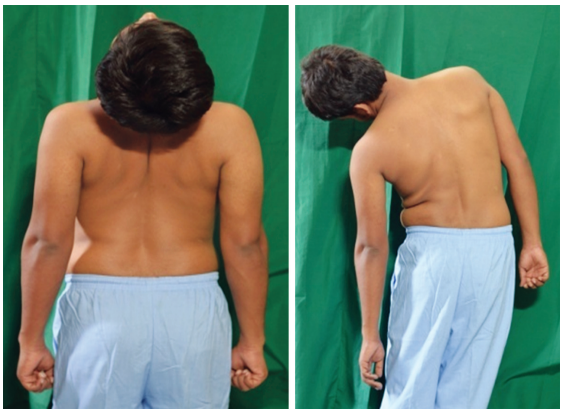
Fig. 7.5: Sitting SLR



Figs 7.6 and 7.7: FABER test

– Other tests of interest include:
  - The distraction test
  - Thigh thrust
  - Gaenslen's test
  - Compression test
  - Sacral thrust
  - Test for facet joint pain—facet loading test: In the standing position, patient hyperextends the back and then tries to rotate on either side. Rotation towards the affected side may elicit the pain at a particular point on the back (Figs 7.8 and 7.9). The aim is to stretch the facet joint capsule and thereby producing the pain.

- ***Test for piriformis syndrome:***
  – Freiberg's maneuver of forceful internal rotation of the extended thigh elicits buttock pain by stretching the piriformis muscle (Fig. 7.10).



Figs 7.8 and 7.9: Facet loading test

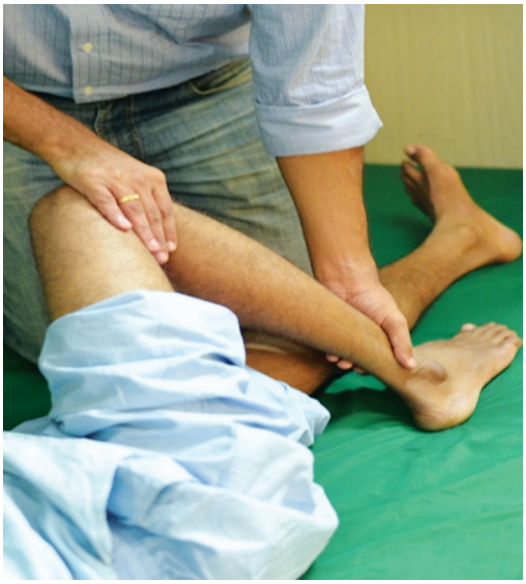


Fig. 7.10. Freiberg's test

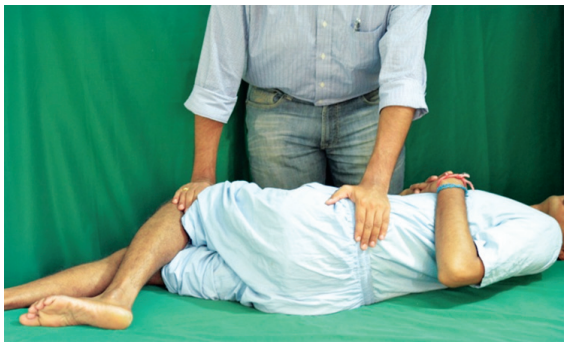


Fig. 7.11: FAIR test

– Pace sign, the FAIR test may be performed with the patient in a lateral recumbent position, with the affected side up, the hip flexed to an angle of 60°, and the knee flexed to an angle of 60° to 90°. While stabilizing the hip, the examiner internally rotates and adducts the hip by applying downward pressure to the knee (Fig. 7.11).

Investigations

Most cases of acute low back pain irrespective of the cause subside within 4–6 weeks. Hence no radiological imaging is warranted during this period, the exception being presence of red flags. In case the patient presents with any of the red flags mentioned above, magnetic resonance imaging of the lumbosacral spine is indicated. A plain X-ray of the lumbosacral spine is more than sufficient during the initial management of acute low back pain.[14]

Blood Tests

Complete hemogram with inflammatory markers like ESR, CRP, platelets, RA factor, HLA B 27, uric acid levels is must when infective or inflammatory back pain is suspected.

Radiology

X-ray can reveal minor to major fractures of the spine, spondylolisthesis which can be the cause of the patient's low back pain. MRI of the lumbosacral spine is indicated when there is a red flag during initial evaluation. It helps in identifying serious disorders like tumor, large disc herniations in case of cauda equina syndrome, a spinal hematoma, abscess or infective foci in the spine. Disadvantage is it is more expensive. CT scan—CT shows bony details better than MRI does. Hence, it is preferred when one needs to evaluate bony details (fractures, scoliosis) and when there are contraindications to MRI, as in patients with metal implant devices.

Electrodiagnostic Studies

Nerve conduction studies (NCV) and electromyographs (EMG) may be used in patients with radiculopathy when clinical examination suggests multilevel root lesions, when symptoms do not match imaging studies, and when patients have breakaway weakness.

Biopsy and Culture

In cases of osteomyelitis and for histopathologic diagnosis of infection, malignancy, or other lesions.

LOW BACK PAIN ALGORITHM

Case example: A 48-year-old male patient presented with lower back pain radiating down the lateral side of right leg and foot up to great toe. It was gradual in onset with intensity of 9 of 10 on NRS. Pain was associated with burning and tingling sensation over the right foot. Back pain was aggravated by sitting, standing and bending forward and leg pain was aggravated on walking with partial relief on lying down and after taking analgesics like oral diclofenac. Past history of trauma, fever, cough and weight loss was not present. Bladder bowel function was normal.

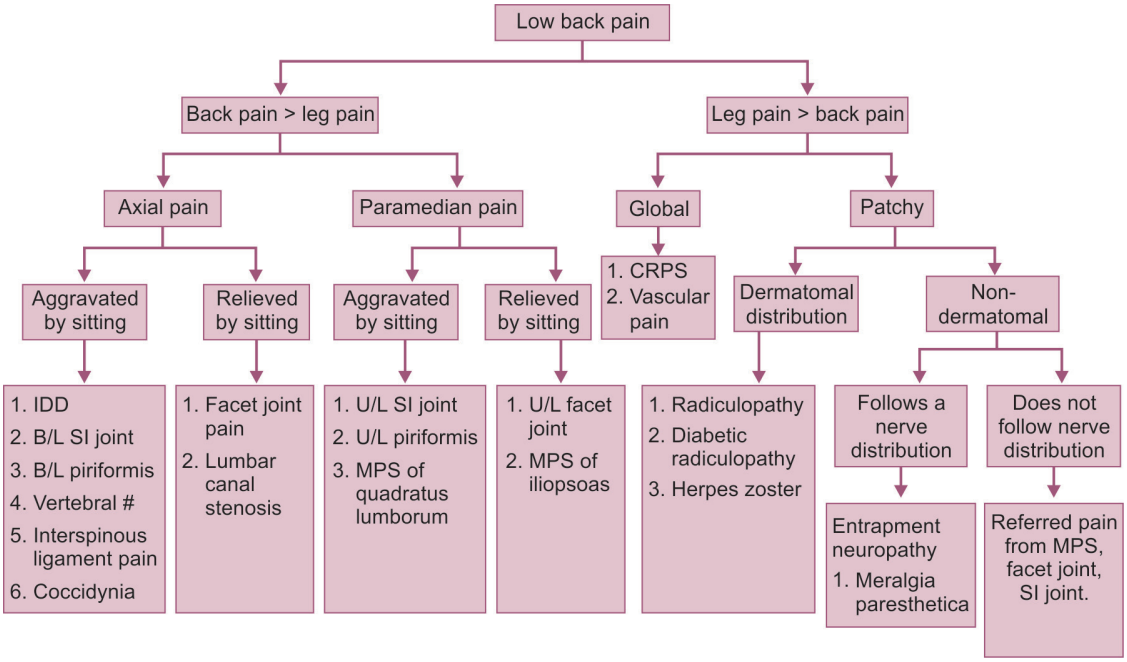
On exam, SLR was positive on right side at 30°.

Sensory loss was present over dorsum of right foot (space between first and second toe) weak dorsiflexion of right foot (foot drop) sluggish plantar reflex.

Tenderness was present on L5–S1 paramedian region.

Flowchart 7.1 describes the simple algorithm for diagnosis of low back pain

Flowchart 7.1: Algorithm for diagnosis of low back pain



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