

Backache is a price we pay for our upright posture. It affects about 60-80% of world population¹. Most patients with acute low back pain, with or without radicular symptoms, have musculoskeletal or degenerative disorders that do not require specific treatment and are often self-limited. Approximately 85% of patients with low back pain cannot be given a definitive diagnosis. However, the possibility of more serious abnormalities that require specific treatment should always be excluded. Although there is no evidence that back pain prevalence has increased, reported disability and absence from work due to back pain have increased significantly in the last 30 years².

RISK FACTORS

- a. Older age
- b. Heavy labour (in particular jobs requiring lifting in an awkward position).
- c. Long-distance driving and whole-body vibration such as experienced by a lorry driver
- d. Lower education and income
- e. Smoking

- f. Obesity
- g. Psychosocial risk factors like job dissatisfaction, unhealthy relations result into fear/avoidance behaviour and reduced activity levels, excessive reliance on aids and appliances, depressed mood, withdrawal from social interaction and various somatisation disorders particularly low back pain.³

NON MECHANICAL CAUSES^{4,6,7}

Infection (#)

- 1. Osteomyelitis
- 2. Septic discitis
- 3. Paraspinous abscess
- 4. Epidural abscess
- 5. Shingles

Inflammatory(*)

- 1. Ankylosing spondylitis
- 2. Rheumatoid arthritis
- 3. Psoriatic arthritis
- 4. Reiters

CLASSIFICATION⁴

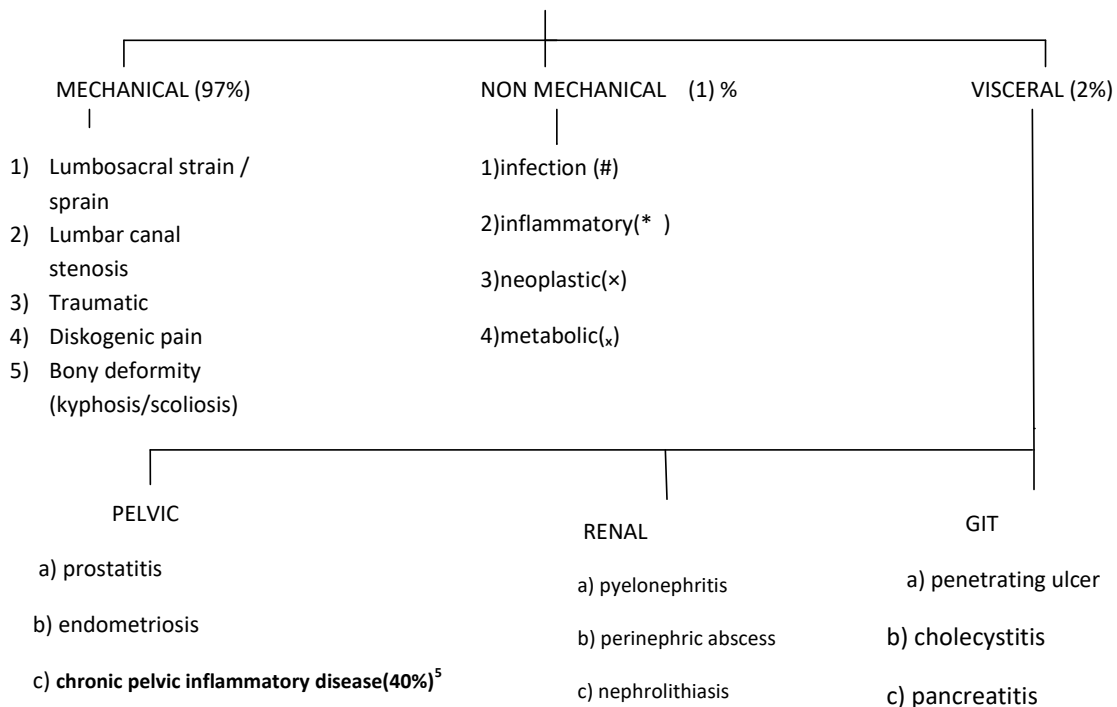


Table 1:	
Mechanical causes	Symptoms and Signs
Lumbosacral sprain/strain	Post traumatic pain confined to lower back with paraspinal muscle spasm.
Vertebral fracture	History of trauma, point tenderness and paraspinal muscle spasm present. Features of radiculopathy present.
Lumbar canal stenosis	History of buttock and low back pain (Pseudoclaudication). Pain relieved with rest.
Lumbosacral disc disease	History of limitation of spinal flexion. The pain is located in the low back only or referred to the back of leg, back of thigh and buttock. Features of radiculopathy are present. All symptoms exaggerated by maneuvers. Cauda equina syndrome signifies an injury of multiple lumbosacral nerve roots within the spinal canal distal to the termination of the spinal cord at L1-2. Low back pain, weakness and areflexia in the ankle, saddle anesthesia, or loss of bladder function may occur.
Non mechanical causes	
Infection	Fever with other constitutional symptoms, pain worsens on movement; primary source of infection can be often associated.
Inflammatory	This spinal disease has young onset, patients are often males below age 45 years. Insidious onset of low back and buttock pain accompanied with morning back stiffness, nocturnal pain, pain unrelieved by rest but improving with exercise. Loss of the normal lumbar lordosis and exaggeration of thoracic kyphosis develop as the disease progresses. Similar to ankylosing spondylitis, restricted movements may accompany reactive arthritis (formerly known as Reiter's syndrome), Psoriatic arthritis, and chronic inflammatory bowel disease.
Neoplastic	Pain constant dull in character worsened at night with no improvement on rest. Neurologic deficits may be seen.
Metabolic	Pain (localized or radicular) and compression fractures which are seen on radiological imaging and are often asymptomatic. Precipitating factors like steroid abuse, immobilization, thyroid disorders etc. may be present.
Visceral causes	
GIT, Renal, Pelvic organs	Referred pain particularly to the posterior spinal segments that innervates the organ. Local signs are absent with little pain on movements.
Postural back pain	Nonspecific chronic vague pain with no anatomical lesions on exhaustive investigations. Most common cause is poor posture or malingering.

5. Inflammatory bowel disease

Neoplastic(x)

1. Metastatic malignancy
2. Lymphoma/ leukemia
3. Multiple myeloma
4. Spinal cord and retroperitoneal tumours.

Metabolic (x)

1. Osteoporosis
2. Osteomalacia
3. Paget's disease of bone

CLASSIFICATION (BASIS OF DURATION)⁴

- A. Acute (1 day - <6 weeks)
- B. Subacute (6 weeks - ≤12 weeks)
- C. Chronic (> 12 weeks)

CLINICAL FEATURES^{6,7}

Low backache is defined as pain related to the area between lower ribs and gluteal folds with or without non neuropathic leg pain. It can be a symptom in any age

Waddell Test	
Tenderness	Superficial, non anatomic tenderness to light touch
Simulation	
Axial loading	Vertical loading on a standing patient's skull produces low back pain
Rotation	Passive rotation of shoulders and pelvis in same plane causes low back pain
Distraction	Discrepancy between findings on sitting and supine straight leg raising tests
Regional disturbances	
Weakness	"Cogwheel" (give-way) weakness
Sensory	Non dermatomal sensory loss
Overreaction	Disproportionate facial expression, verbalization or tremor during examination

Three or more inappropriate responses suggest complicating psychosocial issues in patients with low back pain.

group from 20-55 years. According to etiology the pain may vary or improve on attaining various postures.

Nerve Root	Pain	Sensory	Motor	Reflex
L4	Antero lateral thigh and medial calf	Medial part leg	Knee extensors, hip adductors	Knee
L5	Lateral calf, dorsal foot, buttocks	Dorsum of foot	Foot evertors, foot dorsiflexors and hip abductors	
S1	Buttocks, posterior thigh, calf	Sole and lateral border foot	Hip extensors, toeflexors, foot plantar flexion	Ankle

PSYCHOGENIC LOW BACK PAIN⁸

If the distribution of pain is nonanatomic, a psychogenic cause is highly likely. The Waddell tests is a set of five maneuvers performed during a routine physical examination to identify patients in whom non organic issues play an important role in the persistence of low backache.

RED FLAG SIGNS ASSOCIATED WITH LOW BACKACHE⁷

1. Progressive motor weakness
2. Gait disturbances
3. Faecal incontinence
4. Saddle anaesthesia
5. Signs of radiculopathy
6. Motor, sensory or reflex signs.

DIAGNOSIS^{3,6,7,9}

A good examination of the lumbar spine and relevant nerves can be accomplished in less than 5 min if it is done systematically.

A complete and thorough history (with emphasis on mood and sleep cycle of the patient) and clinical examination is must and investigations are necessary to pinpoint the etiology of the disease.

Examination of the spine begins with inspection of the entire spinal curvature, lower limbs and the gait of the patient. Apart from musculoskeletal system examination, neurological (especially tone and deep tendon reflexes) and vascular system examination should also be done thoroughly. Complete examination includes thorough examination of abdomen and rectum to rule out any visceral cause if present.

INSPECTION

- A. Standing posture
 - i. Any exaggerated or flattened spinal curvatures,
 - ii. Asymmetry of skin folds,
 - iii. Spinal deformities,
 - iv. Muscle atrophy
 - v. Abnormal hair growth in the area.
- B. Sitting posture: look for asymmetry of pelvis
- C. Recumbent posture

Look for limb length discrepancy (apparent or true). True length discrepancy (lengthening and shortening) is measured from ASIS (anterior

superior iliac spine) to a distal fixed landmark like tibial tuberosity or medial malleolus.

Gait

Should be evaluated while standing in front, to the side and behind the patient.

Range of motion

At lumbar spine this is evaluated with the patient standing upright. If full range of active motion is achieved by the patient, gentle pressure to be applied to check for a further passive range of motion. Care to be taken when applying pressure, as it could exacerbate the patient's symptoms.

Range of motion at the hip joint also to be examined. Hip pain and symmetry in motion should be noted.

PALPATION

Purpose of palpation of the lumbar spine—

- i. To locate tender areas
- ii. To confirm findings previously demonstrated in the inspection.

Palpation along the midline is used to check for bony tenderness and for deformity. Muscles just lateral to the spinous processes should also be palpated for tender points or spasms. In this position, the transverse processes, which are positioned deep to paraspinal muscles, can also be appreciated.

The patient is instructed to lie supine, and the anterior superior iliac spine, anterior inferior iliac spine, and pubic bones should be palpated.

STRAIGHT LEG RAISING TEST

It is used to evaluate for lumbar nerve root irritation. In this test lower limb is passively flexed at hip with knee held in extended position. It is said to be positive if patient's symptoms can be reproduced. While performing the straight leg raise test, sometimes symptoms may be produced in the contralateral leg. This is termed as crossed straight leg raise test and indicates central lumbar disc herniation.

LASEGUE TEST

It is also used to evaluate lumbar nerve irritation. It is performed in the same fashion as the straight leg raise test. Once a complaint of pain or tightness is achieved, the leg is slowly lowered 5°-10° or until radicular symptoms disappear. While holding the leg in this lowered position, passively dorsiflex the foot. The test is positive if there's reproduction of symptoms in this position.

PATRICK TEST

The test is used to evaluate for pathology of the sacroiliac joint and hip joint. The patient lies supine on the examination table and is asked to place one foot on the opposite knee by placing the hip in flexion abduction external rotation. While supporting the pelvis with one hand, the physician presses firmly down on the flexed knee while supporting the pelvis at the opposite anterior superior iliac spine. A positive test is when pain in the sacroiliac joint of the leg can be demonstrated. It is a common finding in inflammatory arthritis.

NEUROLOGICAL EXAMINATION

The neurological examination is an important part in the lumbar spine evaluation. The spinal cord and the nerve roots can contribute to or cause lumbar pain. The neurological examination consists of 3 elements: motor, sensory, and reflex.

VASCULAR SYSTEM

Check peripheral pulses of dorsalis pedis artery and tibialis posterior artery. The character should be compared bilaterally.

LABORATORY EVALUATION

Biochemical Investigations

- I. CBC with ESR: The sedimentation rate is the most useful blood test in patients suspected of having spinal infection since it is elevated in up to 80 per cent of cases. Neutrophilia and anaemia are also commonly seen in patients with neoplasia and infection.
- II. RA factor/CRP.
- III. HLA B-27.
- IV. Urine routine microscopy.
- V. Markers for malignancy (PSA, CEA, etc.).
- VI. Laboratory evaluation of patients with osteoporosis and/or pathological fractures should include serum calcium, phosphorus, alkaline phosphatase as well as serum and urine.

RADIOLOGICAL INVESTIGATIONS

In general, imaging procedures are not required for patients with uncomplicated neck or back pain of less than 1 month's duration

1. Spinal X-rays are required only if the pain is associated with certain 'red flag' symptoms or signs, which indicate a high risk of more serious underlying problems:
 - a. Starts before the age of 20 or after 50 years.
 - b. Is persistent and a serious cause is suspected.
 - c. Is worse at night or in the morning, when an inflammatory arthritis (e.g. ankylosing spondylitis), infection or a spinal tumour may be the cause.
 - d. Is associated with a systemic illness, fever or weight loss.

- e. Is associated with neurological symptoms or signs.

2. CT SCAN

It is diagnostic study when the spinal and neurological levels are clear and bony pathology is suspected. CT scan is superior to routine x-rays for the detection of fractures involving posterior spine structures, craniocervical and craniothoracic junctions, C1 and C2 vertebrae, bone fragments within the spinal canal, or misalignment

3. MRI OR CT Myelography: Spine MRI's yield exquisite views of intraspinal and adjacent soft tissue anatomy.

It is useful in following scenarios -

- i. when the exact spinal and neurologic levels are unclear,
- ii. when a pathological condition of the spinal cord or soft tissues is suspected,
- iii. when postoperative disc herniation is possible, or
- iv. when an underlying infectious or neoplastic cause is suspected.

CT Myelography is useful in identifying nerve root pathology, particularly in patients with previous lumbar spinal surgery or with a metal fixation device in place. It provides elucidation of neural compression or arachnoiditis when several spinal operations have been undertaken and for the treatment of foramina and spinal canal stenosis.

RADIONUCLIDE BONE SCINTIGRAPHY with technetium-99m is helpful in conditions characterized by increased bone turnover. These include bone metastases, fracture, Paget's disease, and infections. Gallium-67 binds to polymorphonuclear leucocytes and can be helpful in the evaluation of vertebral osteomyelitis and sacroiliac septic arthritis. Typically, bone scans are negative in patients with multiple myeloma which is characterized by lytic lesions.

Neurophysiological studies are rarely indicated except in patients in whom it is difficult to distinguish between a neuropathy, radiculopathy, or plexopathy. Fibrillations in the para spinous muscles are the most common and earliest findings seen in radiculopathy. Their presence indicates a lesion proximal to the vertebral foramen and excludes a plexopathy. The H reflex noted on is used to evaluate for an S1 radiculopathy or to distinguish from an L5 radiculopathy.

TREATMENT

- A. Non pharmacological
- B. Pharmacological
- C. Surgical

NON PHARMACOLOGICAL ¹⁰

Bed rest was advised previously, however latest teaching if allowing early mobilization with back strengthening

178 exercises, aerobics and stretching exercises. Supervised intense physical exercise has been found to be effective in alleviating symptoms. Yoga in its many forms has been found to be effective alternative to these exercise regimens.

Cognitive behavioural therapy that includes helping patients to identify and modify his/her thinking regarding pain and disease per say. These interventions often encourage self-management, assist in staying active, and reduce potential concerns about LBP.

Spinal manipulation, massage acupuncture and TENS are the other available options.

PHARMACOLOGICAL⁶

About 90 per cent of patients with a herniated lumbar disc will improve significantly with limited rest, analgesics, and anti-inflammatory drugs. The role of epidural steroids remains unclear. They may afford short-term improvement in leg pain but they do not reduce the need for surgery.

Drugs that are commonly used are NSAID (acetaminophen) are effective. The risk of renal and gastrointestinal toxicity is increased in patients with preexisting comorbidities.

Benzodiazepines like clonazepam operates via GABA-mediated mechanisms provide muscle relaxation as well as benefit in anxiety.

Skeletal muscle relaxants like cyclobenzapramine, methocarbamol, carisoprodol, chlorzoxazone, and metaxalone provide symptomatic relief. However sedation is a very common and disturbing side effect.

SURGICAL^{3,11,12}

Indications for surgery include persistent disabling buttock and/or leg pain despite 2 to 3 months of conservative management, and/or severe or progressive worsening neurological deficit whilst on treatment. Surgery may also be indicated in patients with neurological claudication due to spinal stenosis, but only after all attempts with conservative management have failed.

Patients with spinal stenosis who are more incapacitated by back pain than by neurological claudication probably should not be operated on, since surgery is rarely effective and may even worsen back pain.

Surgical procedures can further be classified as minimally invasive and invasive techniques.

MINIMAL INVASIVE TECHNIQUES

- I. Intradiskal electrothermal therapy a minimally invasive technique where the annulus is subjected to thermo modulation. The proposed mechanism is shrinkage of collagen fibers and coagulation neural tissues, thereby improving the pain.
- II. Percutaneous adhesiolysis with or without spinal endoscopy is another interventional technique used to manage chronic low backache.
- III. Transforaminal corticosteroid injections is another method for pain alleviation. It requires minimal

volume of drug to be injected into the pathological site.

- IV. Epidural injections have been widely used in direct placement near the involved nerve root.
- V. Vertebroplasty is a percutaneous technique that involves the placement of a needle (or needles) into a fractured vertebral body, and then bone cement is injected to strengthen the structures, lessens the deformity, and reduces associated pain. Kyphoplasty is another similar technique for pain alleviation.

Apart from these methods, procedure like spinal fusions are also being performed. The need for such procedure is doubtful because segmental instability cannot be demonstrated in all cases.

CONCLUSION

Backache, though a common complaint should neither be ignored nor over zealously investigated and treated. The art of diagnosing and treating this condition lies in the physician's awareness about this symptom, his ability to elicit a detailed history, conducting a meticulous examination and judicious use of available investigatory modalities. Majority of patients can be treated by offering lifestyle modifications like graded back exercises, yoga and cognitive behavioural therapies as definitive diagnosis is not possible in majority of cases. The corner stone of treatment is staying active and early mobilization if no contraindication exists.

REFERENCES

1. Hoy D, Brooks P, Blyth F, Buchbinder R. The Epidemiology of low back pain. *Best Pract Res Clin Rheumatol* 2010; 24:769-81.
2. Goldman: Cecil Medicine, 25th edition.
3. Kumar & Clark: clinical medicine, 8th edition.
4. EULAR Textbook on rheumatic diseases, 2nd edition.
5. Sutton MY, Strenberg M, Zaida A, et al. Trends in pelvic inflammatory disease hospital discharges and ambulatory visits, United States 1985-2001. *Sex Trans Dis* 2005; 32:778-784. [PubMed].
6. Harrison's Principles of Internal Medicine, 19th edition.
7. Davidson's Principle & Practice of medicine, 22nd edition.
8. Waddell G, McCulloch JA, Kummel E, et al. Nonorganic physical signs in low-back pain. *Spine* 1980; 5:117-25.
9. Chou R, Qaseem A, Snow V, et al. Diagnosis and treatment of low back pain: A joint clinical practice guideline from the American College of Physicians and the American Pain Society. *Ann Intern Med* 2007; 147:478-491.
10. Chou R1, Huffman LH; Nonpharmacological therapies for acute and chronic low back pain. *Ann Intern Med* 2007; 147:492-504.
11. Lamb SE et al: Group cognitive behavioural treatment for low-back pain in primary care: A randomised controlled trial and cost-effectiveness analysis. *Lancet* 2010; 375:916.
12. Mummaneni PV et al: Clinical and radiographic analysis of cervical disk arthroplasty compared with allograft fusion: A randomized controlled clinical trial. *J Neurosurg Spine* 2007; 6:198.