



Low Back Pain

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Low back pain - Definition

Pain that occurs in an area with boundaries between the lowest rib and the crease of the buttocks

Epidemiology:

- Backache ranks second only to the common cold as a cause of missed workdays.
- 80-90% adults will have backache at some points in their lives.
- Most prevalent age: 30-50 years

Epidemiology:

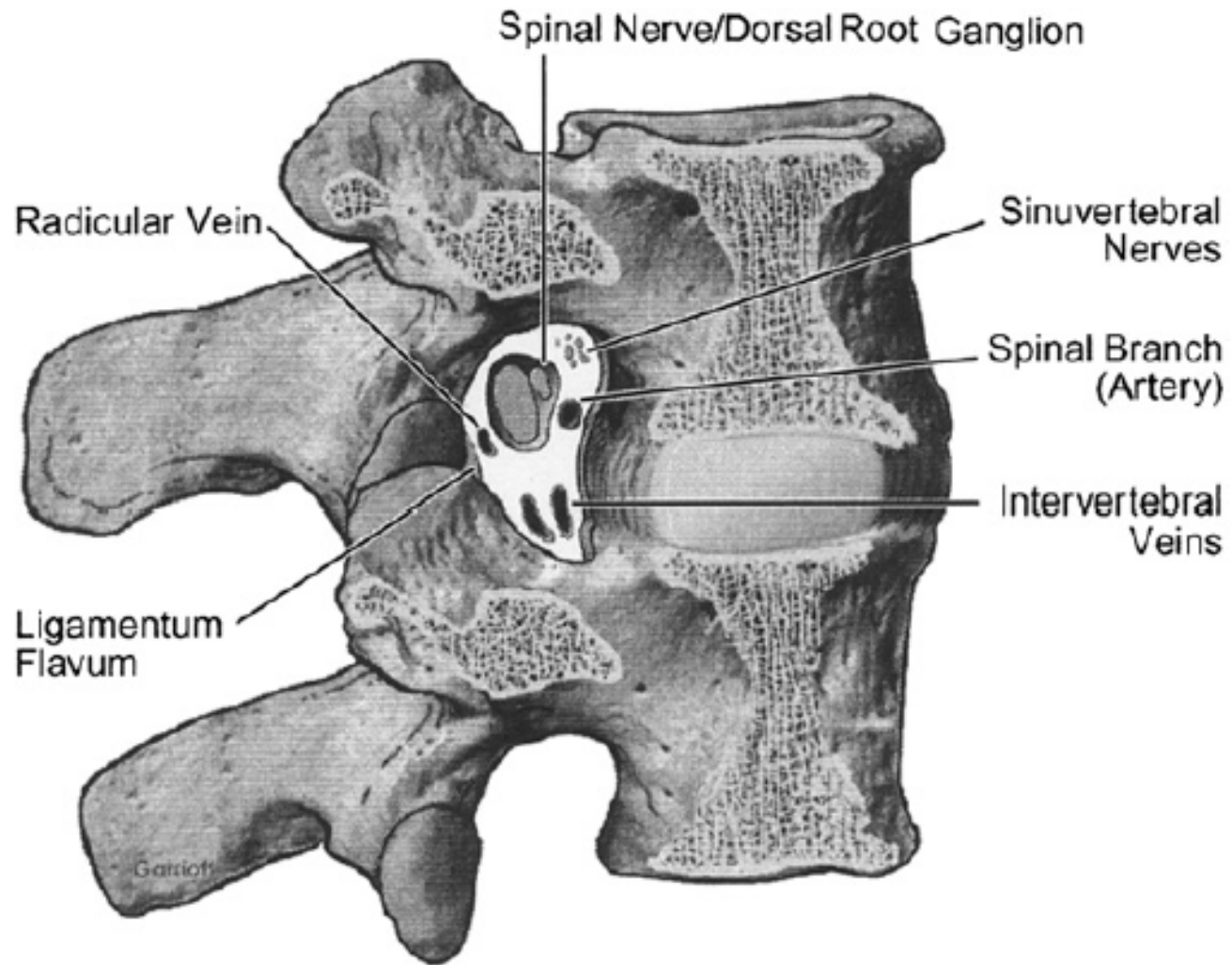
- Leading cause of disability of adults < 45 years old
- Third cause of disability in those > 45 years old
- 90 % of cases of LBP resolve without treatment within 6-12 weeks
- 40-50 % LBP cases resolve without treatment in 1 week
- 75 % of cases with nerve root involvement can resolve in 6 months

Anatomy

THE SPINAL COLUMN CONSISTS OF

- VERTEBRAE
- APOPHYSEAL JOINTS
- STABILIZING LIGAMENTS
- PARASPINAL ABDOMINAL MUSCLES
- INTERVERTEBRAL DISCS

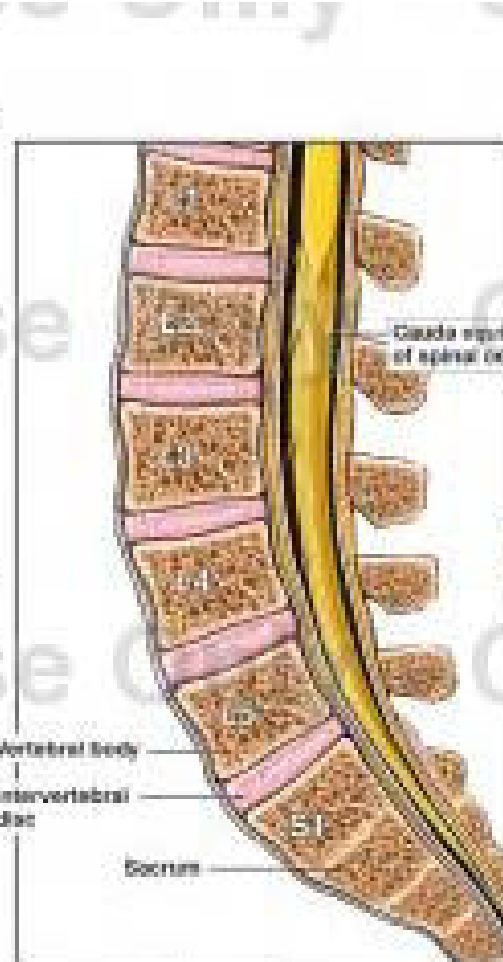
Anatomy



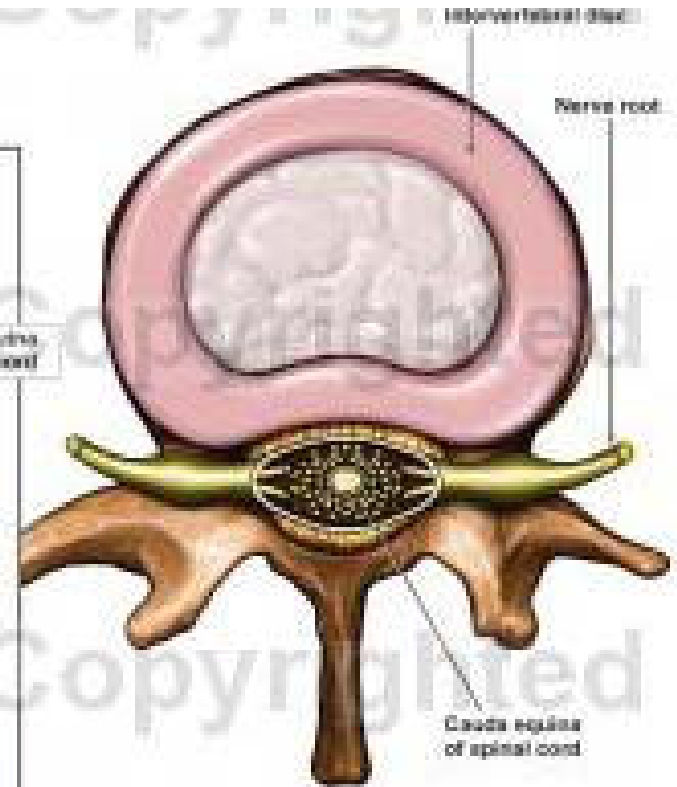
Anatomy



Posterior view of lumbar spine and pelvis

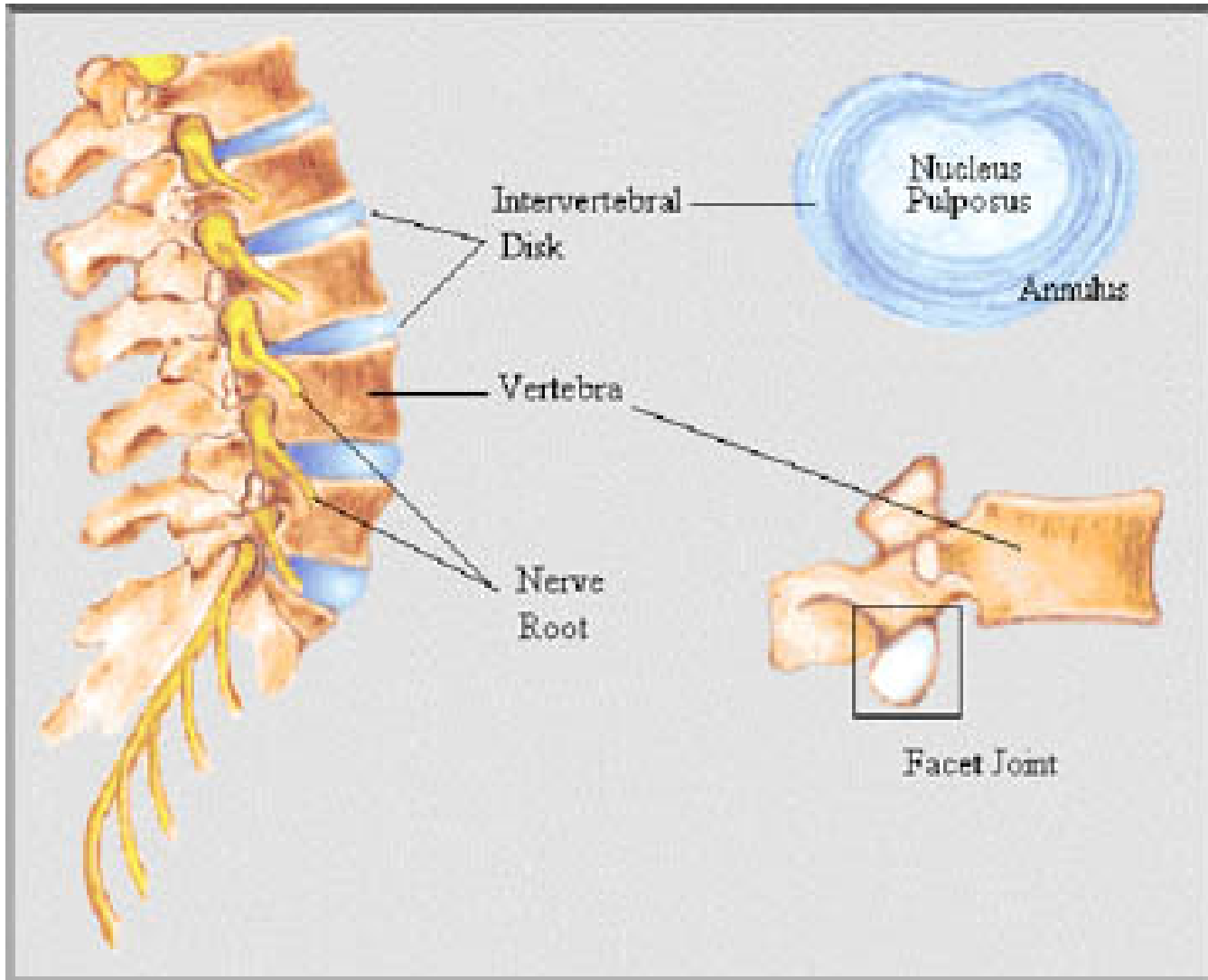


Sagittal view of lumbar spine

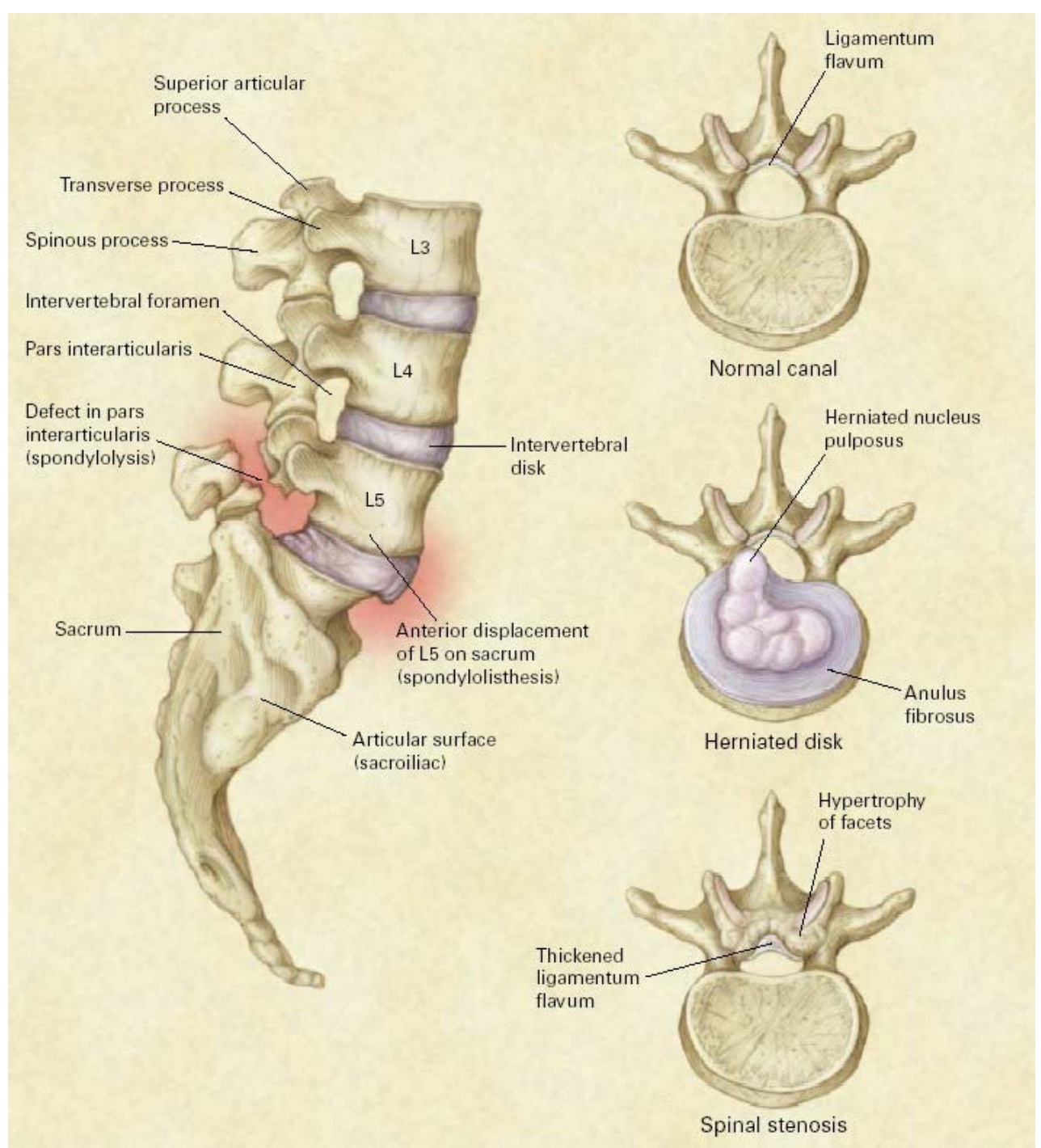


Axial view of lumbar vertebra and disc

Anatomy



Anatomy



Radiological Anatomy

Observe the normal lumbar lordosis of the lumbosacral region



Mechanical causes of low back pain

- Ligament strain
- Muscle strain/sprain
- Joint disruption/degeneration
- Intervertebral disc degeneration/ herniation
- Spondylolisthesis
- Spinal stenosis
- Diffuse idiopathic skeletal hyperostosis
- Kyphosis/scoliosis

Infectious causes of low back pain

- Epidural abscess
- Vertebral osteomyelitis
- Septic diskitis
- Potts disease
- As part of generalized manifestation of certain systemic diseases e.g. Malaria, Endocarditis etc

Neoplastic causes of low back pain

- Metastasis
- Myeloma/lymphoma
- Epidural or intradural tumors

Metabolic causes of low back pain

- Osteoporosis
- Osteomalacia
- Hemochromatosis
- Ochronosis

Inflammatory/rheumatoid causes of low back pain

- Ankylosing spondylitis
- Reactive spondyloarthropathies (Reiter's syndrome)
- Psoriatic arthropathy
- Polymyalgia rheumatica

Referred pain mimicking low back pain

- Abdominal/retroperitoneal visceral diseases
- Pelvic inflammatory diseases
- Malignancies
- Herpes zoster

Other causes

- Paget's disease of bone
- Fibromyalgia
- Psychogenic pain
- Malingering

Aims of assessment:

- To differentiate between benign mechanical back pain and dangerous back pain sources.
 - 95% will be due to mechanical back pain,
 - <5% nerve root irritation from disc prolapse
 - <1 are due to more sinister pathologies

Benign Mechanical Back pain

- Usually worse in the morning then improves with activity, varies with posture/activity
- Usually lower lumbar pain, also buttocks and thighs
- Dull poorly localised pain
- Cause usually cannot be attributed to any specific pathology.

Nerve root pain

- Due to nerve root irritation e.g., from a prolapsed disc
- Shooting pain and paraesthesia down back of thigh sometimes as far as the heel.
- May also affect anterolateral thigh if femoral nerve roots are affected.

Red Flags: Immediate Action

- Age < 20 or >55
- Recent violent trauma
- Constant, progressive with no relief from postural modification
- Severe morning stiffness
- Unable to walk or self care
- Thoracic pain
- No change with 2-4 weeks treatment

Red Flags cont.

- Malignancy elsewhere
- Corticosteroids
- Drug abuse, HIV, Immune suppressed
- Systemically unwell
- Unintentional weight loss
- Fever
- Widespread neurological symptoms (cauda equina syndrome)
- Structural deformity.

I. History:

- Mechanism of injury
- Associated symptoms:
 - Bladder / bowel function
 - Fevers / chills
 - Sleep disturbance
 - Numbness / tingling
- Prior injuries, treatment and outcomes
- Medications
- Family history
- Social history:
 - Job
 - Education
 - Tobacco / Alcohol
 - Illicit drugs

Pain Specifics

- **Quality:** sharp, dull, shooting, burning, etc.
- **Location / Distribution:**
 - Radicular: Dermatomal distribution, dysesthesias
 - Radiating: Non-dermatomal
- **Onset:**
 - Gradual: Degenerative diseases
 - Acute: Disc abnormality, strain, compression fractures
- **Severity / Intensity**
- **Frequency:** Constant vs. Intermittent
- **Duration**
- **Exacerbating and Alleviating Factors**
- **Time of Day:** If mostly nocturnal, consider malignancy

II. Examination:

LOOK

- Ideally with back and legs exposed.
- **Posture:** ?Scoliosis ? Kyphosis
- **Skin:** café-au-lait spots, hairy patches, signs of psoriasis.
- Swelling and lumps?

FEEL

- Check for bone tenderness – this may indicate serious pathology e.g., infection, fracture, malignancy
- With patient leaning forwards check for tenderness between the vertebral spines and paraspinal muscles. E.g., prolapsed disc, mechanical back pain
- Sacroiliac joints
- Palpable steps between adjacent vertebrae may indicate spondylolisthesis

FEEL

- Ask patient to bend forward
- Lightly percuss spine from neck to sacrum
- Significant pain is a feature of infections, fractures and neoplasms
- Beware exaggerated response – may be a nonorganic problem

Move

- **Flexion** – Schober's test <5cm = abnormal
- **Extension** – pain and restricted extension in prolapsed disc and spondylolisthesis
- **Lateral Flexion**
- **Rotation** – seated, movement is thoracic

Abdominal and Cardiovascular examination

- Consider non musculoskeletal causes of back pain

Hip examination

- Check hip joints for pain and limitation – internal rotation is often the earliest sign of hip disease.

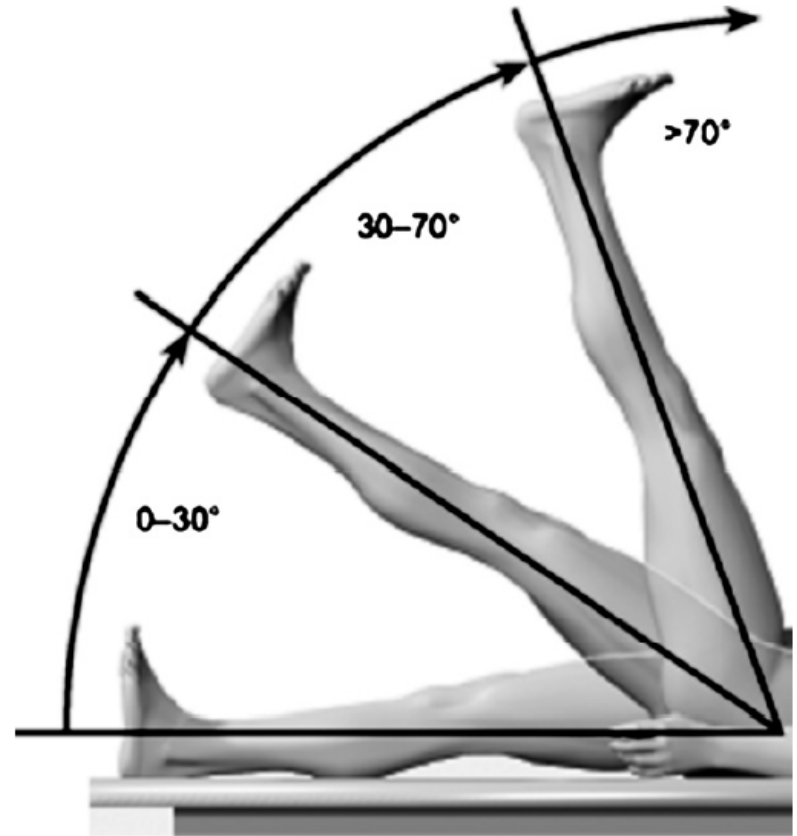
Sacroiliac joint examination

- FABER test. Place foot across knee of opposite leg, apply gentle pressure to knee and opposite ASIS. Pain in sacroiliac area may indicate a problems with the sacroiliac joints.



Straight Leg Raising Test

- Looking for nerve root irritation L5 S1-5
- Patient supine, passively raise leg with knee extended, stop when back or leg pain.
- Positive sign: Pain in the range 30-70 degrees
- <30 or >70 degrees are nonspecific



Variations of Straight leg raising test

Bragard's sign

- After a positive straight leg raising test:
 - a. The elevated extremity is lowered to the point of pain resolution.
 - b. The foot is then dorsiflexed by the examiner.
- If this movement recreates the pain, the test is positive



Variations of Straight leg raising test

Lasegue sign:

- With the patient in the supine position, the symptomatic lower extremity is flexed to 90 at the hip and knee. The knee is then slowly extended, which produces radiating pain.
- Test is positive mostly with L5 and S1 nerve roots compression

Femoral stretch test

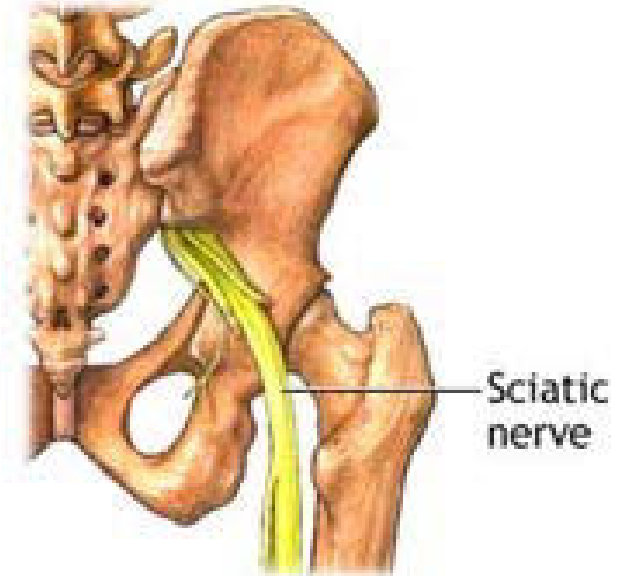
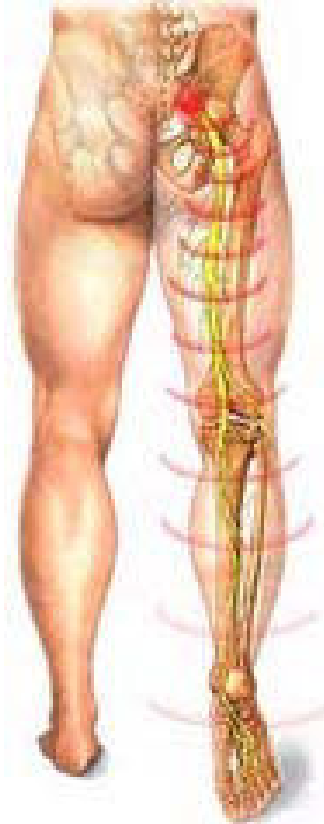
- Looking for femoral nerve root irritation L2-4
- Patient prone, ant thigh fixed to couch, flex each knee
- Pain felt in anterior compartment of the thigh
- Aggravated further by extension of hip

Look for further evidence of neurological involvement

- Deep Tendon Reflex
 - Patella Tendon Reflex(L34)
 - Achilles Tendon Reflex (L5 S1)
- Lower Limb power
- Sensations

SCIATICA

- Pain along lumbar or sacral nerve root with or without neurosensory deficits
- Usually due to herniated disc



Pain from sciatica radiates from the buttock down the leg and can travel as far as to the feet and toes

III: INDIVIDUAL CAUSES

Lumbosacral strain

- Most common cause of low back pain
- Unclear etiology
- Usually stretching or tearing of muscles, tendons, ligaments, or fascia
- From chronic mechanical stress or sometimes mild acute trauma.

Lumbosacral strain

Clinical Features

- Pain usually starts 12-36 hours (about 1 and a half days) after injury
- 70% of patients are 20-40 years old
- Pain in back, buttocks, thighs:
 - aggravated by standing and/or flexion
 - relieved by rest or/and reclining

Lumbosacral strain

Predisposing Factors

- Obesity
- Exaggerated lumbar lordosis
- Forward tipped pelvis
- Weak paraspinal/abdominal muscles/ poor conditioning
- Lower limb length discrepancy
- Poor posture
- Lifting heavy weights

Lumbosacral strain: TREATMENT

Most recover spontaneously within 4 weeks

- Treatment is conservative:
 - Reassure/educate
 - Lifestyle adjustment:
stop smoking, lose weight, adjust posture, firm mattress, chairs with lumbar support
 - Drugs:
Acetaminophen, NSAIDS, muscle relaxers (Norflex, Robaxin)
 - Narcotic analgesics are rarely needed

Lumbar spondylosis

- This is osteoarthritis of the lumbar spine
- Osteoarthritis is also known as degenerative joint disease or “wear and tear arthritis”.
- Progressive loss of cartilage with remodeling of subchondral bone and progressive deformity of the joint (s).
- Cartilage destruction may be a result of a variety of etiologies
- Affects the intervertebral disc or/and the facet joints

Lumbar spondylosis: Clinical features and diagnosis

Pain

- Sources
 - Joint effusion and stretching of joint capsules
 - Torn ligaments
 - Paravertebral muscle spasm
 - Psychological factors
- Characteristics
 - Deep, aching localized to the joint
 - Slow in onset
 - Worsened with activity in initial stages
 - Occurs at rest with advanced disease
 - May be referred
 - Pain may be aggravated with weather changes

Lumbar spondylosis: What to look for in an x-ray

- Subchondral sclerosis
- Joint space narrowing
- Subchondral cysts
- Osteophytes (bony spur)
- Radiographic changes may appear rather late in the disease's progression.



Lumbar spondylosis: Treatment

- Non-pharmacokinetic
- Analgesics
- Acetaminophen
- NSAIDS
- Narcotic analgesics
- Intra-articular steroids
- Chondroprotective agents
- Anti-depressants

Lumbar spondylosis: Treatment

Non-pharmacokinetic treatment

- Reasonable evidence for efficacy
- Exercise – prevent disuse atrophy of muscles
- Physical therapy: Hydrotherapy/heat/cold, paraffin baths
- Weight loss
- Education
- Braces
- Psychological management

Lumbar spondylosis: Treatment

Analgesics

- Acetaminophen at doses of up to 4g per day
- Acetaminophen is superior to placebo but less efficacious in relieving pain than NSAIDS
- Hepatotoxicity may be observed in patients who consume large amounts of alcohol or who have an underlying illness.

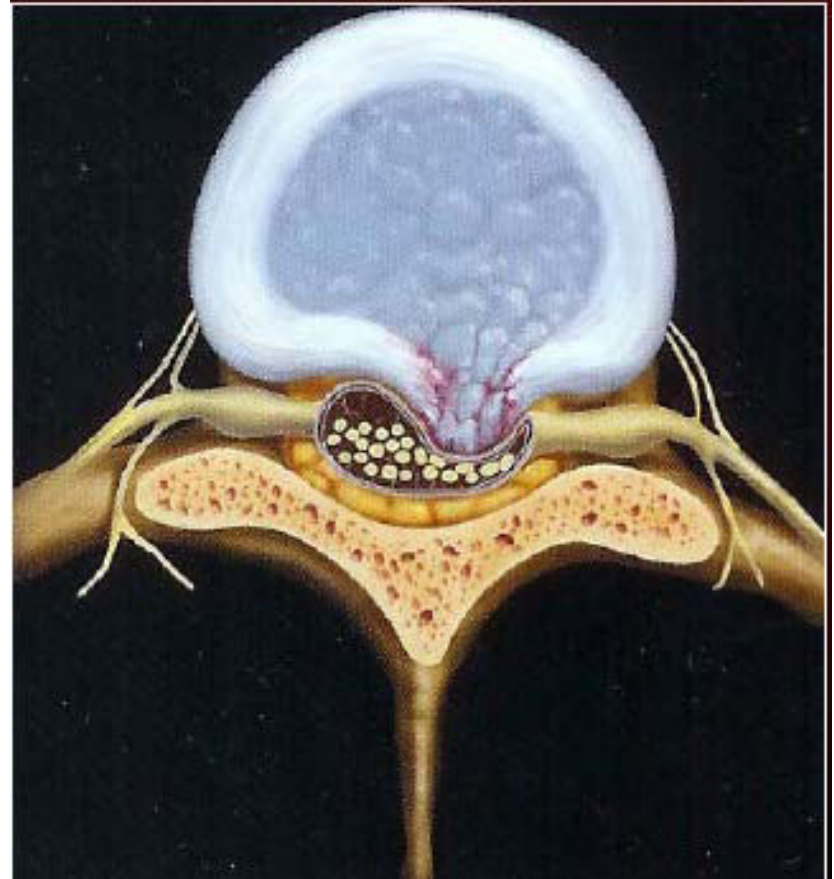
Lumbar spondylosis: Treatment

Opioid analgesics

- Long term usage should typically be avoided
- They may be beneficial as a short-term therapy.
- Can be used synergistically with either NSAIDS or acetaminophen or COX-2 inhibitors.
- In older patients; use caution because of side effects such as confusion, constipation, and sedation.

Prolapsed Intervertebral Disc

- Tears in annulus fibrosis which allows contents of nucleus pulposus to protrude
- Pain due to irritation of nerve roots as well as tear of the annular fibres
- Paravertebral tenderness and muscle spasm.
- May be acute or chronic



Prolapsed Intervertebral Disc

Acute

- causes severe pain
- History of trauma or antecedent flexion/ strain injury
e.g., lifting heavy loads
- Pain typically is of sudden onset, and may radiate to the lower limb
- Pain is worsened by flexion of the spine
- Central disc herniation compresses the cord and can cause caudal equina syndrome, bilateral lower limb weakness, bowel and bladder dysfunction

Prolapsed Intervertebral Disc

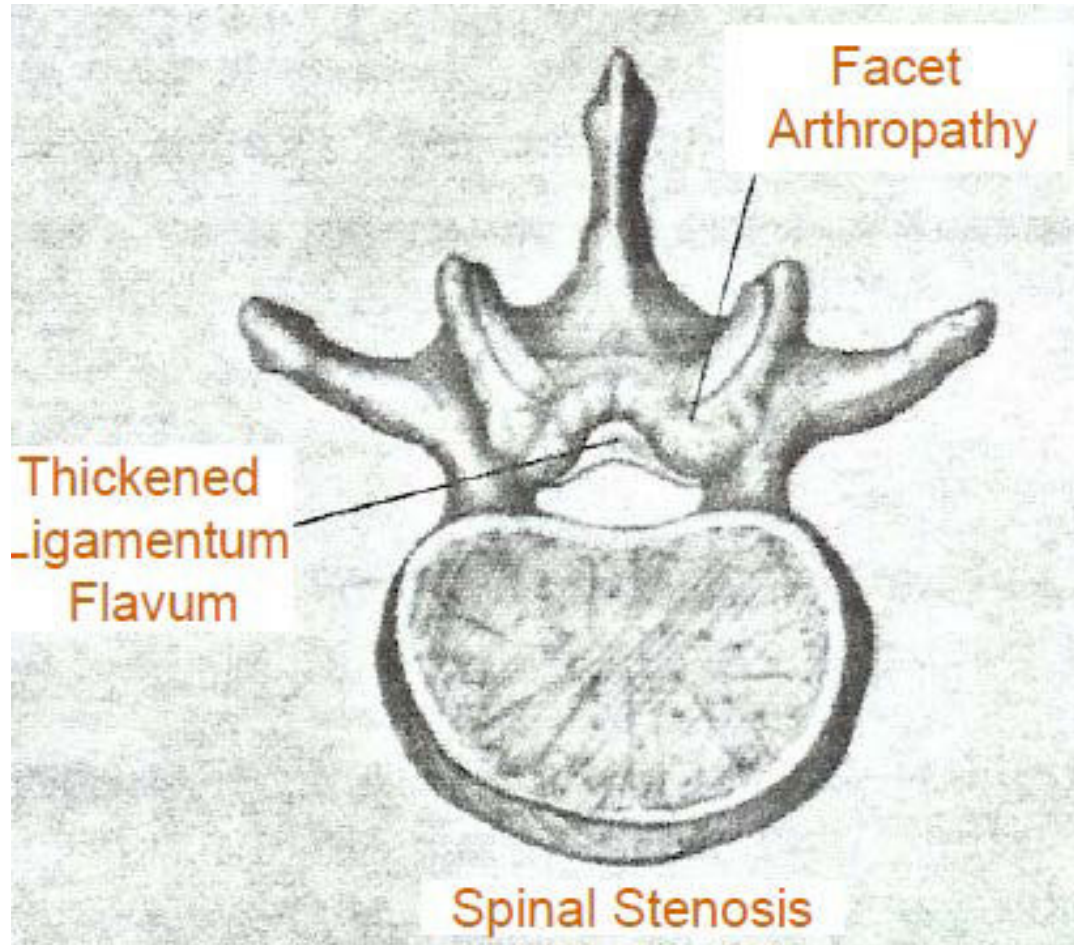
Chronic

- Dull pain; usually confined to leg
- Decreased deep tendon reflexes
- Tenderness with straight leg raise (Reduced SLR test)
- Improvement in 6 weeks - 6 months

Spinal Stenosis

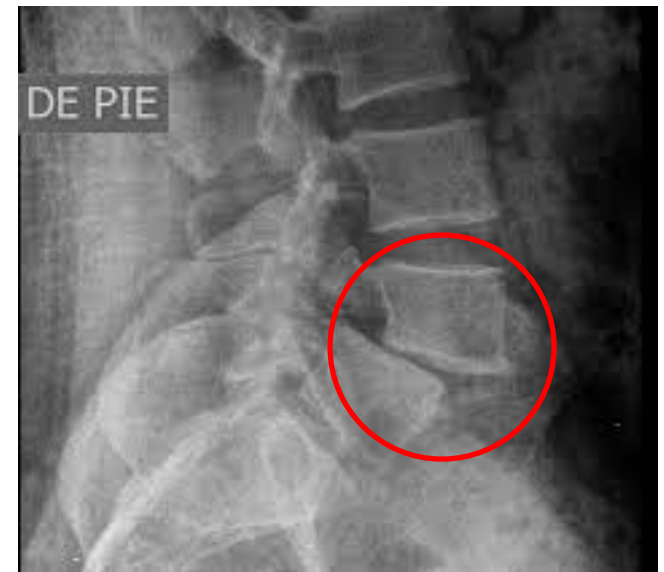
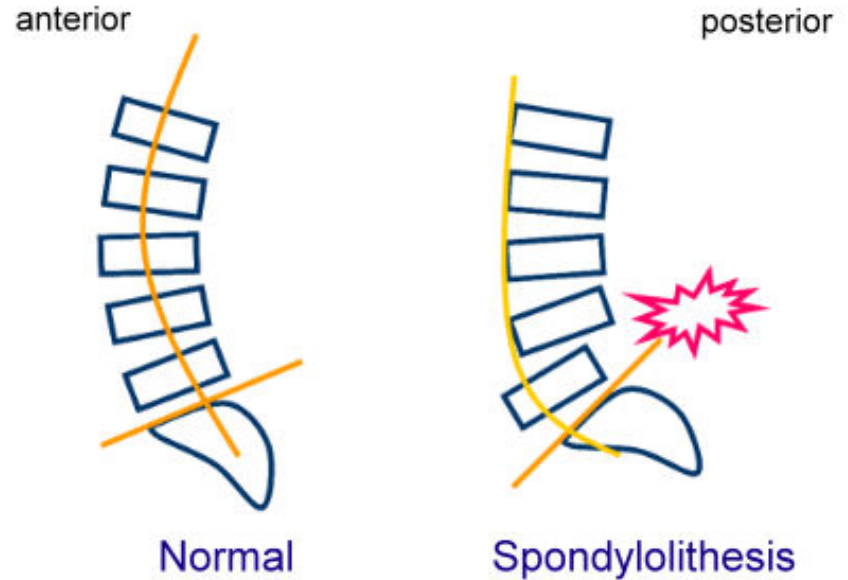
- Due to narrowing of vertebral canal
- Middle/older adults
- Pain is typically worse during the day than at night.
- Aggravated by standing and extension of the spine
- Relieved by rest or by stooping forward.
- Pseudo claudication may be present
- May be associated with facet joints osteoarthritis

Spinal Stenosis



Spondylolistheses

- slippage of one vertebrae over another- usually involves L5-S1
- Frequently due to spondylolysis (fracture of pars interarticularis)



Non-mechanical causes of low back pain: **Neoplasia** (Myeloma/ metastasis/ tumors)

- Unrelenting pain at rest
- Weight loss and weakness
- Previous malignancies

Non mechanical causes of low back pain: **Infection** (vertebral osteomyelitis)

- Pain at rest, tender spinous process, fever
- Leukocytosis, increased ESR, blood culture
- Rule out DM, immunosuppression, drug abuse, systemic infection, surgery

Rheumatological Causes

ANKYLOSING SPONDYLITIS

- Symmetric sacroiliitis and progressive inflammatory arthritis
- HLA B27 antigen present
- Insidious onset: reliefs with exercise
- Early morning pains

Ankylosing Spondylitis

- Stiff/ painful ankylosed sacroiliac joints
- Young males < 40 years
- Decreased spinal mobility/ chest wall expansion
- Physical therapy, Steroids and Analgesics are the mainstay of treatment

Spinal TB

- Spine is the most common site of skeletal tuberculosis
- Most dangerous site too

Spinal TB: Pathology

- Haematogenous
- Starts in vertebral body adjacent to disc
- Bone destruction and caseation follows
- Spreads to adjacent disc space and then to adjacent vertebra
- May also spread to paravertebral tissues (Cold abscess)
- Collapse of vertebra on each other leads to kyphosis and instability



Spinal TB: Causes of cord damage

:

- Pressure from abscess
- Pressure from displaced bones
- Ischaemia from spinal artery thrombosis

Spinal TB: Clinical features

- ▶ Back pain
- ▶ Back deformity
 - Kyphosis
 - Swelling
- ▶ Neurological
 - Paraparesis
 - Paraplegia
 - Paraesthesia
- ▶ Groin swelling (Psoas abscess)
- ▶ ± Long history of ill health (weight loss, cough, anorexia etc)

Spinal TB: X-Ray

Early X-ray features

- Osteoporosis of two adjacent vertebrae
- Narrowing of disc space

Late X-ray features

- Wedge collapse of adjacent vertebrae
- Kyphosis
- Paravertebral shadows: Paravertebral abscess

Healing

- Bone density increases

Other Investigations

- Chest X-ray
- ± Sputum examination
- FBC
- ESR: Increased
- Mantoux test
- CT-Scan
- MRI
- Needle biopsy for histology and bacteriological examination

Spinal TB: Objectives of treatment

- Confirm the diagnosis,
- Achieve bacteriological cure
- Treat compression of the spinal cord and its sequelae
- Treat spinal deformity and its sequelae such as late onset paraplegia.

Spinal TB: X-ray features



Spinal TB: Chemotherapy

- Sufficient for most cases of spinal TB
- Combination chemotherapy which must contain Rifampicin and INH
- Duration for 6-9 months
- In two phases

Spinal TB: Chemotherapy

- **Initial Phase**
 - Isoniazid
 - Rifampicin
 - Ethambutol
 - Pirazinamide
- **Continuation phase**
 - Isoniazid
 - Rifampicin

Spinal support

Chemotherapy is supplemented with spinal support in the form of:

- Braces
- Casts
 - Lumbar jacket for lumbar TB
 - Thoracolumbar jacket for Thoracic TB
 - Minerva jacket for cervical TB
- Duration is usually for about 3 months

Spinal TB: Surgery

- Failure of response to chemotherapy
- Relief of cord compression in patients with persistent or recurrent neurological deficit
- Spinal Instability

Spinal TB: Aim of Surgery

- Debridement
- Fixation

The End

Thank You