Lecture 13

Editing File

Common Spine Disorders

Dr. Khalid Alsaleh

Objectives:

- Degenerative neck or back pain
- Spinal cord or root entrapment (for example, herniated lumbar disc)
- Osteoporotic vertebral fracture
- Spinal deformity (scoliosis, spondylolisthesis)
- Destructive (infectious and tumor related) back pain (for example, tuberculosis, metastasis, certain cancers)

Color Index:

Original text | Doctor's notes | Text book
Important | Golden notes | Extra

Anatomy of the Vertebrae:

Vertebral Structure

- **Body or Centrum**: Weight-bearing part of the vertebra that lies anteriorly.
- **Vertebral arch:** formed from fusion of: 2 Pedicles and 2 Laminae.
- The vertebral arch carries 7 process:
  - 2 Transverse - One spinous - 2 Superior and 2 inferior articular
- **Vertebral foramen**: between the body and arch, through which the spinal cord passes.
- **Intervertebral disc**: Pads of flexible fibrocartilage that separate the vertebrae

Cervical Vertebrae

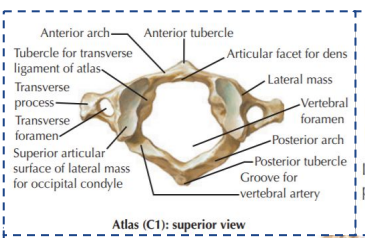
- **Atlanto-occipital joint** → allow you to nod "Yes"
- **Atlantoaxial joint** → allow you to nod "No"
- The vertebral vessels passes through the transverse foramen and the vertebral arteries take part in the formation of the circle of Willis in the brain.
- Only the vertebral vein passes through C7
- Nerve roots exit above the vertebra (C4 nerve exits between C3 and C4)

Thoracic Vertebrae

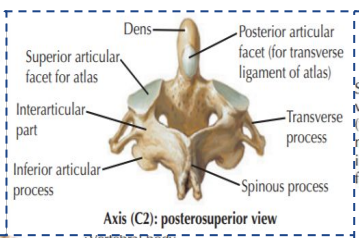
- Most thoracic vertebrae are typical, have bodies, vertebral arches and seven processes for muscular and articular connection.
- It articulates with the ribs which acts as a splint to stabilize the thoracic spine.
- Rarely injured only in high energy trauma or osteoporotic fractures.
- **ROM:** Mainly rotation, very limited extension and flexion. Why? due to the way the thoracic articular facets are oriented (most rigid part of the spine).

Lumbar Vertebrae

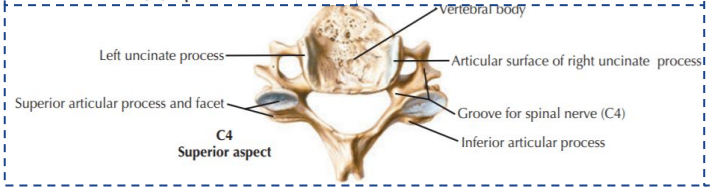
- The **most common region for fractures and disc herniation**.
- Most of the lumbar disc herniation happen posterolateral.
- **ROM**: Flexion and Extension. (again, due to facet orientation that goes in the sagittal plane)
- Defect in the pars interarticularis (connection between pedicle & lamina) → Spondylolysis .



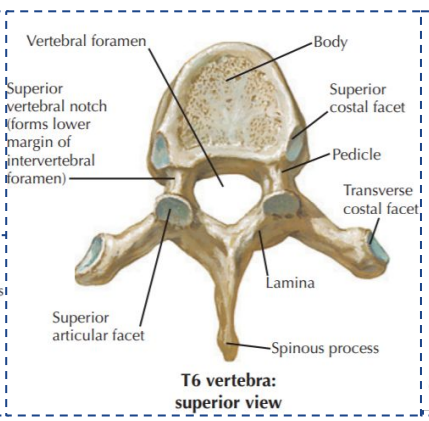
Atlas (C1): superior view



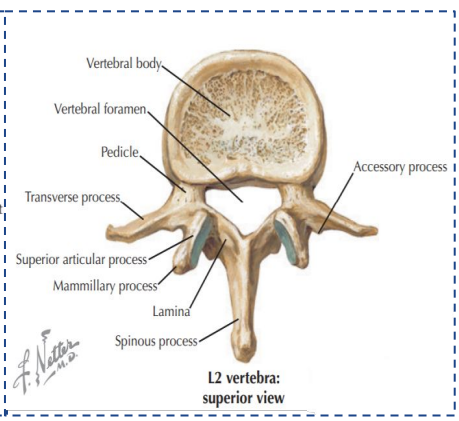
Axis (C2): posterosuperior view



C4
Superior aspect



T6 vertebra: superior view



L2 vertebra: superior view

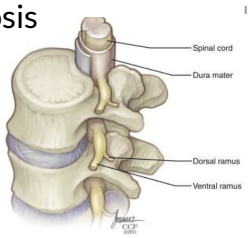
Lower Back Pain Red Flags:

- Age more than 50 (of new onset lower back pain)
- History of malignancy tumour weakening the vertebrae → cord compression or fracture
- History of trauma traumatic Spine Fracture → vertebral angulation, pain, or neural sx
- History of infection weakening bone → disc/vertebral destruction or cord compression
- Urinary retention/fecal incontinence "Cauda equina" (perianal numbness, decreased rectal tone)
- Acute motor deficit. Any acute loss of motor power = emergency surgery rush to the OR as soon as possible 6-12 hours to save it. = patient present with developed disc herniation and foot drop.
- Constitutional symptoms: loss of appetite, loss of weight, fever, night sweat , pain at night.
- IV drug abuse.

Remember that spine fracture can occur without trauma patient can have severe osteoporosis coughs or sneezes (or any minor load) → fracture!

Degenerative Spinal Disorders:

- **Degeneration**: deterioration of a tissue or an organ in which its function is diminished or its structure is impaired.
  - ➔ **Other terms: Spondylosis**[1], degenerative disc disease, facet osteoarthrosis
- **Spondylolysis:** is a fracture or defect in the pars articularis.
- **Spondylolisthesis:** displacement of one vertebra over the other.



Remember!

- ❖ The vertebrae are connected by 3 structures: intervertebral disc (fibrocartilaginous), 2 facet joints (synovial), and ligaments. (the disc and the 2 facet joints are called the 3 joint complex)
- ❖ Degeneration occurs at the disc, osteoarthrosis occurs at the facet

Etiology

Multifactorial in origin

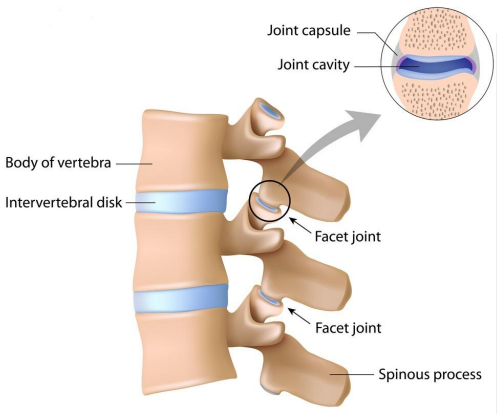
- **Genetic predisposition**
- **Age related**
- **Environmental factors:** smoking, obesity, previous injury, fracture or subluxation, deformity, operating heavy machinery such as a tractor.

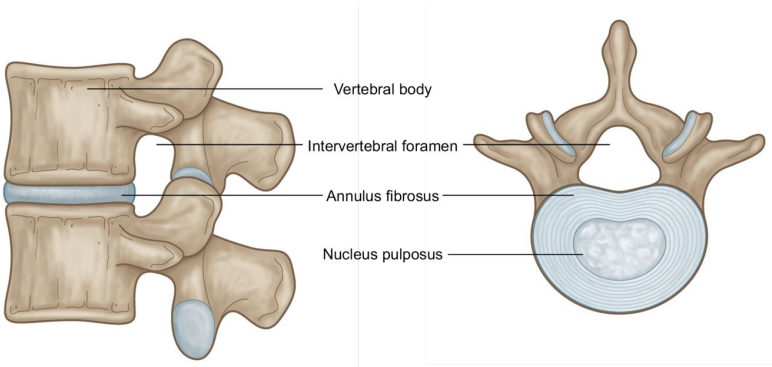
1- **Spondylosis**: an umbrella term used to describe pain from degenerative conditions of the spine.

Degenerative Spinal Disorders:

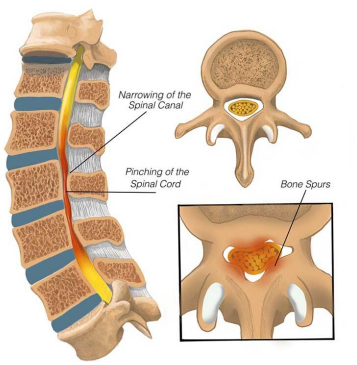
Pathology

Anteriorly **Intervertebral Disc** (C2-S1)	Posteriorly **Facet Joints** (Zygapophysial)
The first component of the 3 joints complex: (motion segment) • **It is primarily loaded in Flexion.** • Composed of "annulus fibrosus" and "nucleus pulposus". • Degeneration of the nucleus: Loss of both: cellular material and hydration → **pain** • Can be asymptomatic, Water content drops disc became hard and black on the X-ray. Disc degeneration will also cause: ➔ Bulging of disc →"Spinal" stenosis. ➔ Loss of height →"Foraminal" stenosis. ➔ Herniation of the nucleus → "Radiculopathy" (e.g. sciatica in the lumbar spine)	They are synovial joints and we have 2 in each motion segment. • **Are primarily loaded in EXTENSION** • Pattern of degeneration similar to other synovial joints: ➔ Loss of hyaline cartilage ➔ Formation of osteophytes ➔ Laxity in the joint capsule [1] Facet joints degeneration will cause: • Hypertrophy, osteophyte formation ➔ Leading to spinal stenosis or foraminal stenosis. • Laxity in the joint capsule: ➔ Leading to instability: degenerative spondylolisthesis [2]

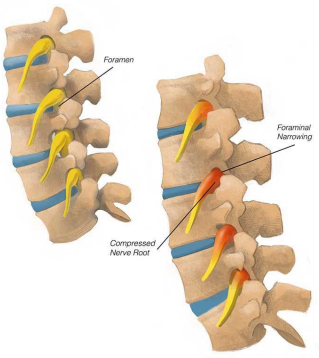




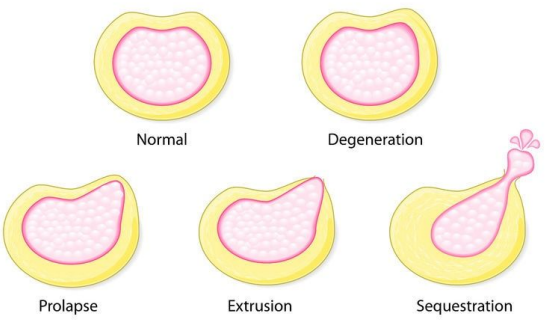
SPINAL STENOSIS



FORAMINAL STENOSIS



DISC HERNIATION



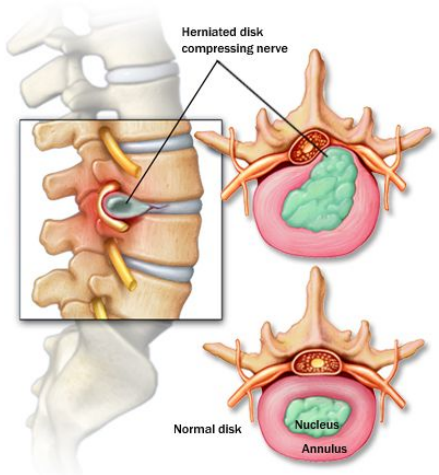
1- It's like any synovial joints in the body the degeneration process leads to loss of joint height, osteophytes formation, redundancy in capsule, inflammatory changes, excessive fluid and eventually instability which cause spondylolisthesis usually anterior posterior slippage "the vertebral above slips anteriorly"

2- Especially at the lumbar vertebrae. Another term is slippage of one vertebra or subluxation of one vertebra or over the other usually in sagittal plane front to back

Degenerative Spinal Disorders: ★

Clinical Presentation

- **Clinical presentation of spinal disorders fall into two main categories**

Mechanical Pain	Neurological Symptoms
Due to joint degeneration or instability. • "Axial pain" in the neck or back (dull, deep, aching pain) - Activity related and **not** present as rest. • **Associated with movement:** 1. Sitting, bending forward **(flexion)**: - From the disc "**Discogenic pain**" - Pain when praying. 2. Standing, bending backward **(extension)**: - From the facet joints "**Facet syndrome**" - Patient presents with the inability to stand or walk for a long time - Both can occur simultaneously  	Due to neurologic impingement of the spinal cord, cauda equina or nerve roots **Spinal Cord:** 1) **Myelopathy: (compression)** • Loss of motor power and balance . • Loss of dexterity [1] - Objects slipping from hands • UMN deficit - Rigidity, hyperreflexia, positive Babinski • Slowly progressive (stepwise) damage [2] 2) **Spinal Cord Injury:** • Spinal stenosis associated with a higher risk of spinal cord injury **Cauda Equina and Nerve Roots:** 1) **Radiculopathy:** • LMN deficit [3] • Commonest is sciatica [4] (lumbar) - Cervical root impingement will present with complaints in the upper limb 2) **Neurogenic Claudication:** • Pain in both legs caused by walking • Pain relieved by sitting • Differentiate from vascular claudication

Bending over relaxes the ligaments and relieves the spinal stenosis. While extending the spine does the opposite.

★ **Table – Differentiating neurogenic and vascular claudication**

Factors	Neurogenic	Vascular
Evaluation after walking	Increased weakness	Unchanged
Palliative factors	Bending over, sitting	Stopping
Provocative factors	Walking downhill Increased lordosis	Walking uphill Increased metabolic demand
Pulses	Present	Absent
"Shopping cart" sign	Present	Absent
van Gelderen bicycle test	No leg pain	Leg pain

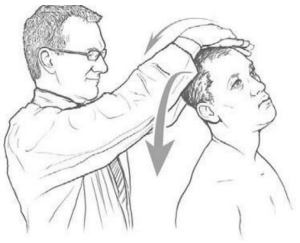
Going downhill is more difficult since you'll need to extend your back for balance, thus worsening the pain,

1- Loss of balance, fine movement such as writing, inability to button his shirt, coffee cup will slip from his hands.
2- Unlike spinal cord injury, myelopathies happen over months causing stepwise pain, numbness and paresthesia.
3- Hyporeflexia, hypotonia, dermatomal pain, motor defect, hypoesthesia, ...
4- Sciatica refers to the symptoms of pain, numbness, tingling, burning sensation or weakness that originate in the lower back, and radiate through the buttock, and continue down the back of the thigh, leg and foot. Sciatica occurs when there is compression, inflammation or injury to the sciatic nerve or to its (spinal nerve) roots L4-S2

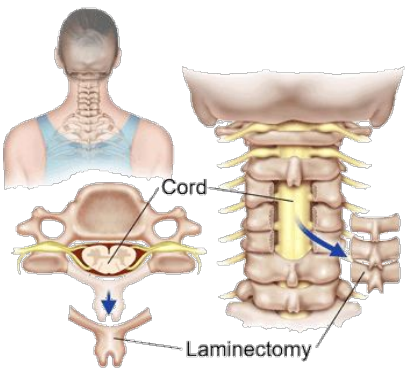
Cervical Spine:

Introduction

- Degenerative changes typically occur in **C3-C7**

Degenerative Cervical Spine		
History		• Presents with axial pain, myelopathy and radiculopathy
Physical Exam		• Stiffness → **loss of ROM** Neurological exam: • Weakness • Loss of sensation • Hyper-reflexia/tonia (UMN) • Special tests: Spurling's sign [1] 
Management	**Conservative**	• First line of treatment for axial neck pain and mild neurologic symptoms (e.g. mild radiculopathy without any motor deficit) • Physiotherapy: - Focus on ROM and muscle strengthening • Non-steroidal anti-inflammatory medications (NSAID) [2] - E.g. Diclofenac, ibuprofen, or naproxen • Neuropathic medication: for radiculopathy pain - E.g. Gabapentin or pregabalin
	Surgical	**Indications:** • Spinal stenosis causing myelopathy (urgent surgery) • Disc herniation causing severe radiculopathy and weakness [3] • Failure of conservative treatment of axial neck pain or mild radiculopathy **Procedures:** • Anterior discectomy and fusion • Posterior laminectomy

Cervical compression



Laminectomy

Anterior discectomy and fusion

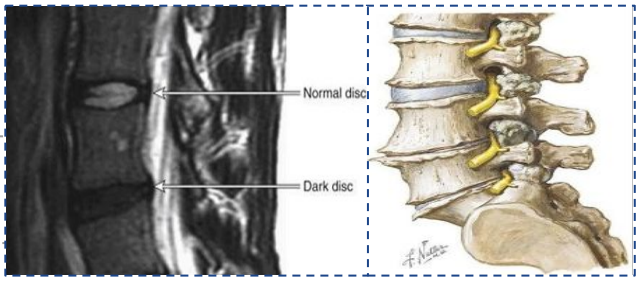
1- The examiner turns the patient's head to the affected side while extending and applying downward pressure to the top of the patient's head. A positive sign is when the pain arising in the neck radiates in the direction of the corresponding dermatome ipsilaterally.
2- Pay attention while prescribing such medications to patients with peptic ulcer, nephropathy, HTN.
3- It will present as **acute** limb weakness.

Lumbar Spine:

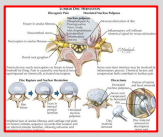
Introduction

- Degenerative changes typically occur in **L3-S1**

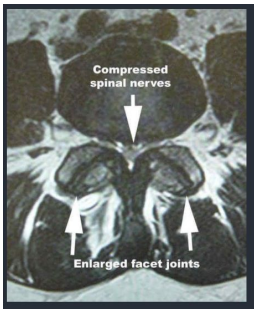
Lumbar Spondylosis

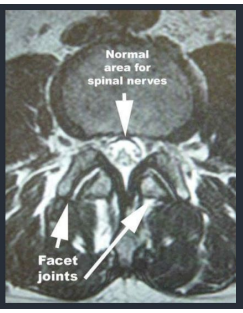


Degenerative Lumbar Spine

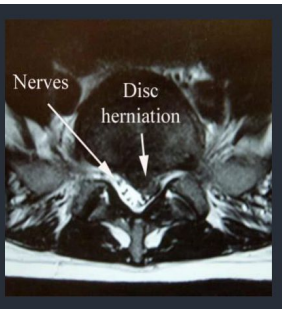
History		• Presents with axial pain, sciatica and neurogenic claudication
Physical Exam		• Stiffness → **loss of ROM** Neurological exam: • Weakness • Loss of sensation • Hypo-reflexia/tonia (LMN) • Special tests: Straight Leg Raise Test (SLRT)  A positive test is reproduction of sciatica . The pain is aggravated with dorsiflexion and relieved with knee flexion.
Management	**Axial Lower Back Pain** (Spondylosis)	**Conservative: (first-line)** • Physiotherapy: - Core muscle strengthening, posture training • NSAIDs **Surgical:** indicated for: • Instability/deformity e.g. high-grade spondylolisthesis • Failure of conservative treatment
	Spinal Stenosis	**Conservative: (first-line)** (Especially in elderly or people who can't undergo surgery) • Activity modification • Analgesics, epidural corticosteroid injection **Surgical:** indicated for: • Acute motor weakness e.g. foot drop • Failure of conservative treatment (minimum 6 months) - **Procedure:** Spinal decompression (laminectomy) **commonest**
	Disc Herniation 	**Conservative:** (**first-line** for mild sciatica with no motor loss) • Short (2-3 days) rest • NSAIDs, epidural corticosteroid injection • Physiotherapy (95% resolves with no surgery in 3 months) **Surgical:** indicated for: • Cauda Equina or motor deficit • Failure of conservative treatment (minimum 2 months) - **Procedure:** Discectomy (only herniated part)

Spinal Stenosis

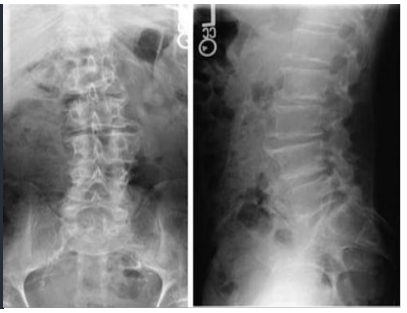




Disc Herniation

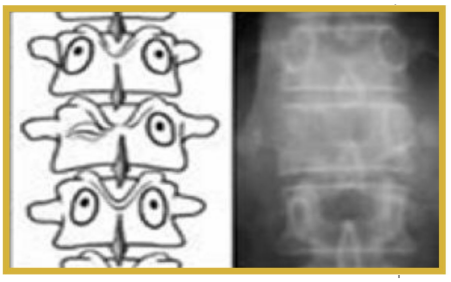


Lumbar Spondylosis



Osteoporotic Vertebral Fractures:

Description

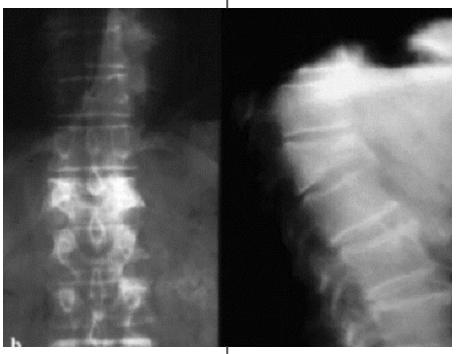


- Pathologic fractures (low-energy fractures)
- Anterior column (±middle column) only compromised (Wedge/Burst Fracture)
- Often missed (common injury in postmenopausal women)
- Repetitive fractures result in kyphotic deformity (hunchback)
- Treat the underlying cause
    - (e.g. osteoporosis). It increases the mortality rate by increasing the rate of DVT and pneumonia
    - Pathological fractures spinal X-ray shows "winking owl sign" (absent pedicles)

Spinal Deformities:

Spinal Deformities

Kyphosis
Sagittal plane



Give the patient anti-osteoporotic medications

Scoliosis
Coronal plane

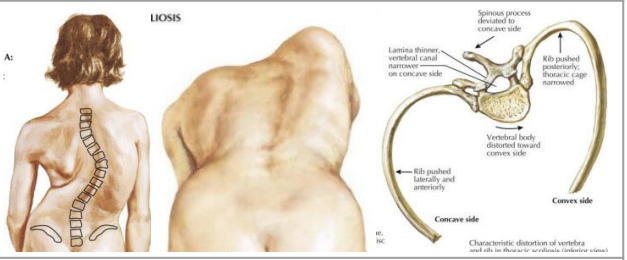
Spondylolisthesis [1]
Translation

1- Only high grade spondylolisthesis causes visible deformity.

Spinal Deformities:

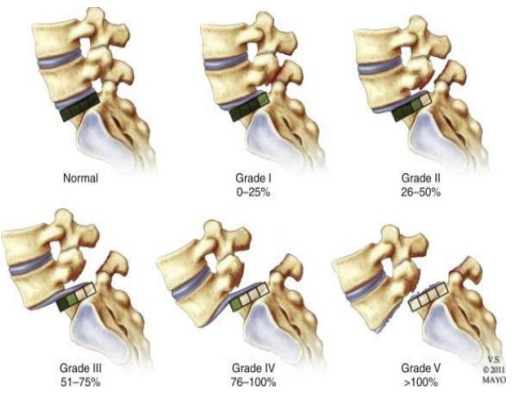
Scoliosis

Types		• **Congenital**: associated with vertebral anomalies
		  - E.g. hemivertebra (they have half vertebra)
		• **Acquired**: secondary to other pathology
		  - E.g. tumors, infection
		• **Idiopathic**: most common is adolescent type
		• **Syndromic:** secondary to other syndromes
		  - E.g. Ehler danlos, marfan, muscular dystrophy

Adolescent Idiopathic Scoliosis	**Description**	• **Three dimensional** deformity of the spine ★ Vertebral **rotation** is the hallmark • Painless deformity (usually noticed by parents/others)
	Examination	• Neurologically normal • Positive Adams test [1] 
	Management	• Depends on age & degree of deformity

Spondylolisthesis

Description		• Translation (displacement/subluxation) of one vertebra over the another (defect in the pars interarticularis) ➔ Most people are asymptomatic
Types		• Degenerative spondylolisthesis (most common) • Isthmic spondylolisthesis ➔ Caused by interarticularis defect (spondylolysis)
Grades	**Grade I**	• 25% displacement
	Grade II	• 50% displacement
	Grade III	• 75% displacement
	Grade IV	• Full displacement
	Grade V	• No contact (Spondyloptosis)
Management		• Conservative treatment first • Surgery is indicated for grade ≥ 3 or failed treatment



1-In " Adam forward bend" test, The patient bends forward, as if they are diving. If the patient has scoliosis, their back often has a prominent line where the spine is, and one side is higher than the other. Patient's back is completely straight if they do not have scoliosis.

Destructive Spinal Lesions:

Description

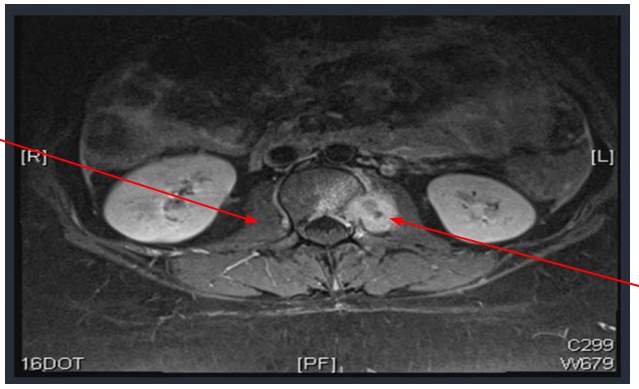
- Present with **pain at rest** or **pain at night**
  - ➔ The lesion then weakens the bone causing more pain (axial pain with movement) which might lead to fractures with minor trauma and loss of function
- Associated with **constitutional symptoms**
- Vertebral body and pedicle are the most common sites of pathology
  - ➔ Because it's highly vascular
- Most common causes are: tumors and infections

Tumors

- **Primary Spinal tumors (rare)**
  - ➔ Benign (e.g. osteoid osteoma)
  - ➔ **Malignant** (e.g. chordoma)
- Management depends on pathology
- **Spinal metastasis (very common)**[1]
  - ➔ Biopsy required if primary unknown (if you suspect lesion → biopsy)
  - ➔ Spinal cord presentation is according to the site of compression (thoracic vs cervical, anterior vs posterior, Brown Sequard syndrome or combined feature...etc.)

Infections

- Most common are TB and Brucellosis
- History of contact with TB patient or raw milk ingestion is indicative
- Potentially treatable diseases once diagnosis is established and antimicrobials administered
- Most indicative feature is fever



Spinal Tuberculosis with psoas abscess: abscess acts just like a tumor and can present like femoral hernia

- ◆ Compresses adjacent structures and spine

1- because the spine is very close to major organs afflicted by tumors

Extra:

Spine

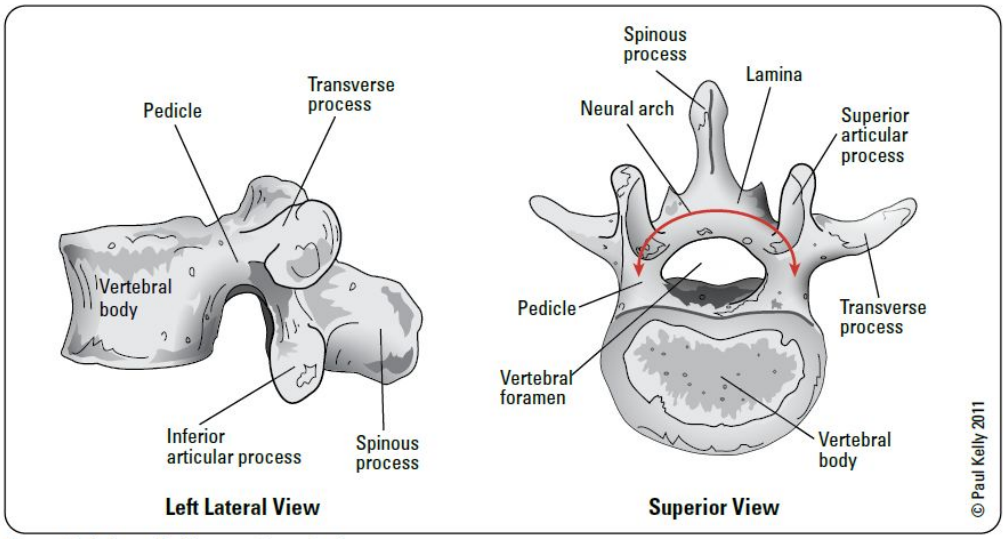


Figure 27. Schematic diagram of vertebral anatomy
Adapted from: Moore KL, Agur AMR. Essential Clinical Anatomy, 3rd ed. Philadephia: Lippincott Williams and Wilkins, 2007. p274

Fractures of the Spine

- see Neurosurgery, NS34

Cervical Spine

General Principles

- C1 (atlas): no vertebral body, no spinous process
- C2 (axis): odontoid = dens
- 7 cervical vertebrae; 8 cervical nerve roots
- nerve root exits above vertebra (i.e. C4 nerve root exits above C4 vertebra), C8 nerve root exits below C7 vertebra
- radiculopathy = impingement of nerve root
- myelopathy = impingement of spinal cord

Special Testing

- compression test: pressure on head worsens radicular pain
- distraction test: traction on head relieves radicular symptoms
- Valsalva test: Valsalva maneuver increases intrathecal pressure and causes radicular pain

Table 14. Cervical Radiculopathy/Neuropathy

Root	C5	C6	C7	C8
Motor	Deltoid Biceps Wrist extension	Biceps Brachioradialis	Triceps Wrist flexion Finger extension	Interossei Digital flexors
Sensory	Axillary nerve (patch over lateral deltoid)	Thumb	Index and middle finger	Ring and little finger
Reflex	Biceps	Biceps Brachioradialis	Triceps	Finger jerk

X-Rays for C-Spine

- AP spine: alignment
- AP odontoid: atlantoaxial articulation
- lateral
  - vertebral alignment: posterior vertebral bodies should be aligned (translation >3.5 mm is abnormal)
  - angulation: between adjacent vertebral bodies (>11° is abnormal)
  - disc or facet joint widening
  - anterior soft tissue space (at C3 should be ≤3 mm; at C4 should be ≤8-10 mm)
- oblique: evaluate pedicles and intervertebral foramen
- ± swimmer's view: lateral view with arm abducted 180° to evaluate C7-T1 junction if lateral view is inadequate
- ± lateral flexion/extension view: evaluate subluxation of cervical vertebrae

Differential Diagnosis of C-Spine Pain

- neck muscle strain, cervical spondylosis, cervical stenosis, RA (spondylitis), traumatic injury, whiplash, myofascial pain syndrome, acute discogenic nerve root entrapment, infection, fracture, neoplasm, pain from soft tissue structure

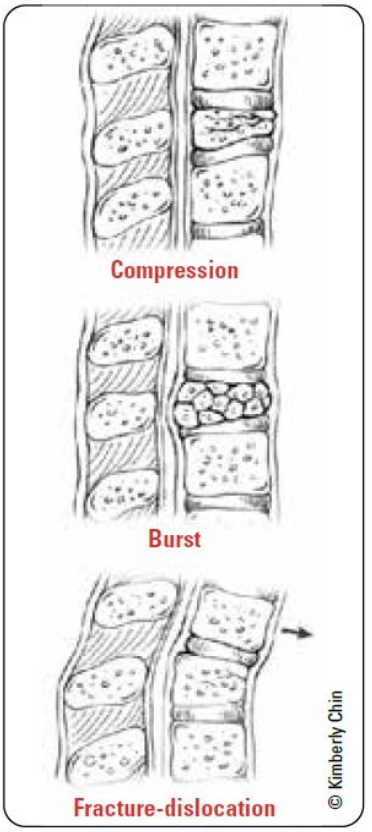


Figure 26. Compression, burst, and dislocation fractures of the spine

Extra:

Thoracolumbar Spine

General Principles

- spinal cord terminates at conus medullaris (L1/2)
- individual nerve roots exit below pedicle of vertebra (i.e. L4 nerve root exits below L4 pedicle)

Special Tests

- **straight leg raise**: passive lifting of leg (30-70°) reproduces radicular symptoms of pain radiating down posterior/lateral leg to knee ± into foot
- **Lasegue maneuver**: dorsiflexion of foot during straight leg raise makes symptoms worse, or if leg is less elevated, dorsiflexion will bring on symptoms
- **femoral stretch test**: with patient prone, flexing the knee of the affected side and passively extending the hip results in radicular symptoms of unilateral pain in anterior thigh

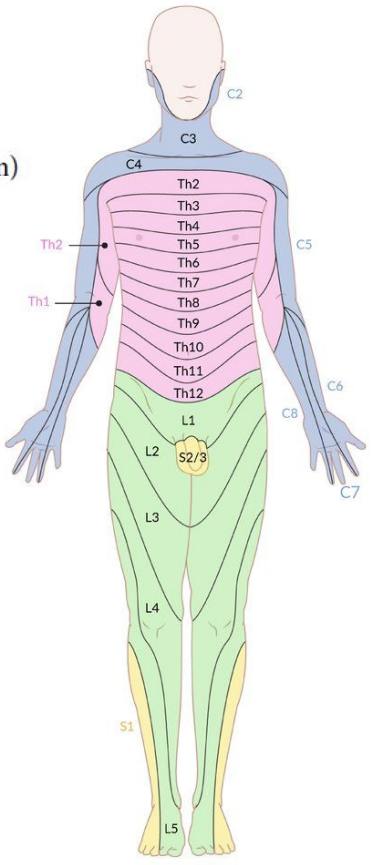
Table 15. Lumbar Radiculopathy/Neuropathy

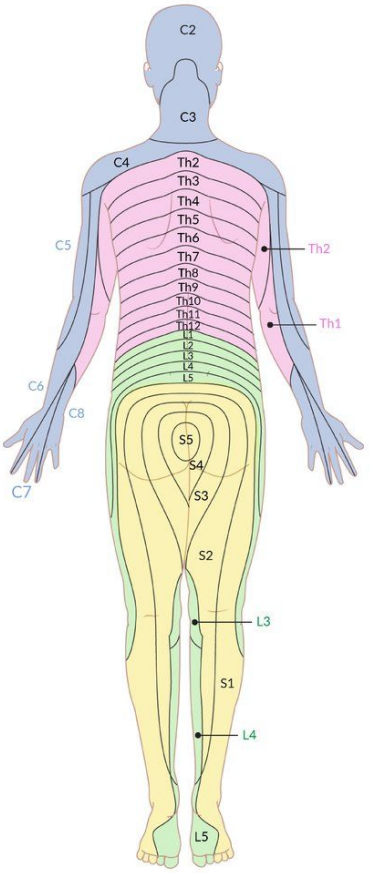
Root	L4	L5	S1
Motor	Quadriceps (knee extension + hip adduction) Tibialis anterior (ankle inversion + dorsiflexion)	Extensor hallucis longus Gluteus medius (hip abduction)	Peroneus longus + brevis (ankle eversion) Gastrocnemius + soleus (plantar flexion)
Sensory	Medial malleolus	1st dorsal webspace and lateral leg	Lateral foot
Screening Test	Squat and rise	Heel walking	Walking on toes
Reflex	Knee (patellar)	Medial hamstring*	Ankle (Achilles)
Test	Femoral stretch	Straight leg raise	Straight leg raise

*Unreliable

Differential Diagnosis of Back Pain

1. mechanical or nerve compression (>90%)
   - degenerative (disc, facet, ligament)
   - nerve root compression (e.g. disc herniation)
   - spinal stenosis (congenital, osteophyte, central disc)
2. others (<10%)
   - neoplastic (primary, metastatic, multiple myeloma)
   - infectious (osteomyelitis, TB)
   - metabolic (osteoporosis)
   - traumatic fracture (compression, distraction, translation, rotation)
   - spondyloarthropathies (ankylosing spondylitis)
   - referred (aorta, renal, ureter, pancreas)





Extra:

DEGENERATIVE DISC DISEASE

- loss of vertebral disc height with age resulting in:
  - bulging and tears of annulus fibrosus
  - change in alignment of facet joints
  - osteophyte formation

Mechanism

- compression and dehydration of disc material over time with age

Clinical Features

- axial back pain
- pain worse with axial loading and flexion
- negative straight leg raise

Investigations

- x-ray, MRI, provocative discography
- imaging only indicated if symptoms persist greater than 6 wk or if red flag symptoms are present

Treatment

- non-operative
  - staying active with modified activity
  - back strengthening
  - NSAIDs
  - **do NOT treat with opioids**; no proven efficacy of spinal traction or manipulation
- operative – rarely indicated
  - decompression ± fusion (in cases of severe or progressive neurological deficit; refractory cases with impaired quality of life)

SPINAL STENOSIS

- narrowing of spinal canal
- congenital (idiopathic, osteopetrosis, achondroplasia) or acquired (degenerative, iatrogenic – post spinal surgery, ankylosing spondylosis, Paget's disease, trauma)

Clinical Features

- ± bilateral back and leg pain
- neurogenic claudication
- ± motor weakness

Investigations

- CT/MRI reveals narrowing of spinal canal

Treatment

- non-operative
  - physiotherapy (flexion exercises, stretch/strength exercises), NSAIDs, lumbar epidural steroids
- operative
  - indication: non-operative failure >6 mo
  - decompressive surgery

Table 16. Differentiating Claudication

	Neurogenic	Vascular
Aggravation	With standing/walking Walking distance variable	Walking/exercise (reproducible)
Alleviation	Change in position (usually flexion, sitting, lying down)	Stop walking/exercise
Time	Relief in ~10 min	Relief in ~2 min

MECHANICAL BACK PAIN

- back dominant pain that does not involve nerve impingement

Clinical Features

- dull backache aggravated by activity and prolonged standing (or sitting, depending on cause and pathology)
- morning stiffness (e.g. if facet OA)
- no neurological signs

Treatment

- symptomatic (analgesics, physiotherapy, weight loss, and exercise program)
- prognosis: symptoms may resolve in 4-6 wk, others become chronic

Cauda equina syndrome and ruptured aortic aneurysms are causes of low back pain that are considered surgical emergencies

Extra:

LUMBAR DISC HERNIATION

- tear in annulus fibrosus allows protrusion of nucleus pulposus, causing either a central, posterolateral, or lateral disc herniation, most commonly at L5-S1 > L4-5 > L3-4
- M:F=3:1
- only 5% become symptomatic
- usually a history of flexion-type injury

Clinical Features

- back dominant pain (central herniation) or leg dominant pain (lateral herniation)
- tenderness between spinous processes at affected level
- muscle spasm ± loss of normal lumbar lordosis
- neurological disturbance is segmental and varies with level of central herniation
  - motor weakness (L4, L5, S1)
  - diminished reflexes (L4, S1)
  - diminished sensation (L4, L5, S1)
- positive straight leg raise
- positive contralateral SLR
- positive Lasegue and Bowstring sign
- cauda equina syndrome (present in 1-10%): surgical emergency

Investigations

- x-ray, MRI, consider a post-void residual volume to check for urinary retention; post-void >100 mL should heighten suspicion for cauda equina syndrome

Treatment

- non-operative
  - symptomatic
    - extension protocol physiotherapy program
    - NSAIDS
- operative
  - indication: progressive neurological deficit, failure of symptoms to resolve within 3 mo, or cauda equina syndrome due to central disc herniation
  - surgical discectomy
- prognosis
  - 90% of patients improve in 3 mo with non-operative treatment

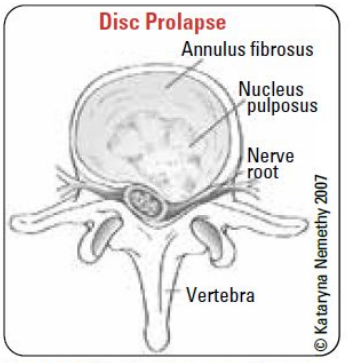


Figure 28. Disc herniation causing nerve root compression

Neurogenic claudication is position dependent; vascular claudication is exercise dependent

MRI abnormalities (e.g. spinal stenosis, disc herniation) are quite common in both asymptomatic and symptomatic individuals and are not necessarily an indication for intervention without clinical correlation

Table 17. Types of Low Back Pain

	Mechanical Back Pain		Direct Nerve Root Compression	
	Disc Origin	**Facet Origin**	**Spinal Stenosis**	**Root Compression**
Pain Dominance	Back	Back	Leg	Leg
Aggravation	Flexion	Extension, standing, walking	Exercise, extension, walking, standing	Flexion
Onset	Gradual	More sudden	Congenital or acquired	Acute leg ± back pain
Duration	Long (weeks, months)	Shorter (days, weeks)	Acute or chronic history (weeks to months)	Constant and severe pain, lasting weeks)
Treatment	Relief of strain, physiotherapy and exercise, weightloss, NSAIDs, acetaminophen	Relief of strain, physiotherapy and exercise, weightloss, NSAIDs, acetaminophen	Relief of strain, physiotherapy (flexion back program), surgical decompression if progressive or severe deficit, NSAIDs, acetaminophen	Relief of strain, physiotherapy (extension back program for disc herniation), surgical decompression if progressive or severe deficit, NSAIDs, acetaminophen

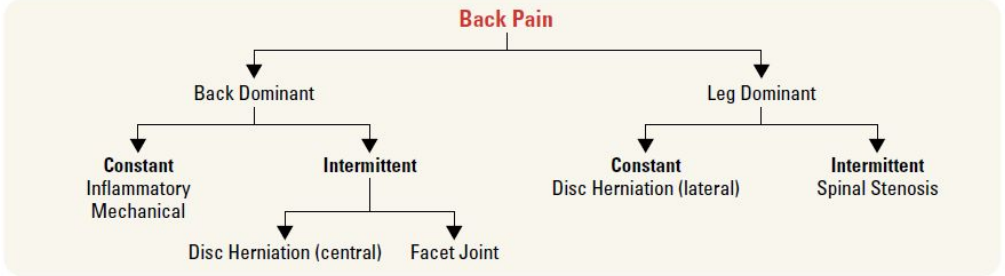


Figure 29. Approach to back pain

Red Flags for

BACK PAIN
Bowel or bladder dysfunction
Anesthesia (saddle)
Constitutional symptoms/malignancy
Khronic disease
Paresthesias
Age >50 yr
IV drug use
Neuromotor deficits

Sciatica
- Most common symptom of radiculopathy (L4-S3)
- Leg dominant, constant, burning pain
- Pain radiates down leg ± foot
- Most common cause = disc herniation

Extra:

SPONDYLOLYSIS

Definition
- defect in the pars interarticularis with no movement of the vertebral bodies

Mechanism
- trauma: gymnasts, weightlifters, backpackers, loggers, labourers

Clinical Features
- activity-related back pain, pain with unilateral extension (Michelis' test)

Investigations
- oblique x-ray: "collar" break in the "Scottie dog's" neck
- bone scan
- CT scan

Treatment
- non-operative
  - activity restriction, brace, stretching exercise

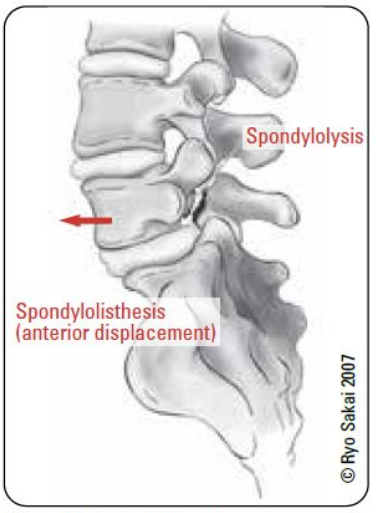


Figure 30. Spondylolysis, spondylolisthesis

ADULT ISTHMIC SPONDYLOLISTHESIS

Definition
- defect in pars interarticularis causing a forward translation or slippage of one vertebra on another, usually at L5-S1, less commonly at L4-5

Mechanism
- degenerative (adults), traumatic, pathological, teratogenic

Clinical Features
- lower back pain radiating to buttocks relieved with sitting
- neurogenic claudication
- L5 radiculopathy
- Meyerding Classification (percentage of slip)

Investigations
- x-ray (AP, lateral, oblique flexion-extension views), MRI

Treatment
- non-operative
  - activity restriction, bracing, NSAIDS
- operative

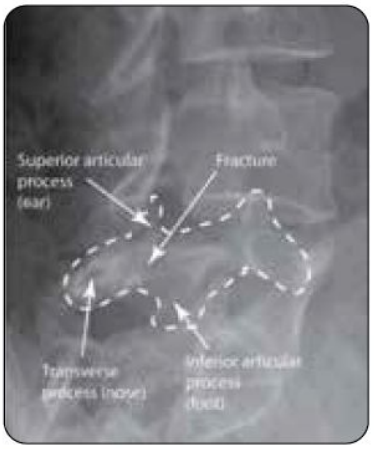


Figure 31. "Scottie dog" fracture

Table 18. Classification and Treatment of Spondylolisthesis

Class	Percentage of Slip	Treatment
1	0-25%	Symptomatic operative fusion only for intractable pain
2	25-50	Same as above
3	50-75	Decompression for spondylolisthesis and spinal fusion
4	75-100	Same as above
5	>100	Same as above

Specific Complications
- may present as cauda equina syndrome due to roots being stretched over the edge of L5 or sacrum

Quiz

MCQ

Q1: A 35 yr old patient's x-ray showed some degeneration at the level of C5 with no red flags which of the following is an indication for surgery?

A. Mild radiculopathy
B. Failure of conservative treatment
C. Myelopathy
D. All of the above

Q2: Nawaf a 40yr old patient came with repetitive pain after walking a certain distance which of the following is more indicative of neurogenic claudication?

A. Pain is alleviated by rest
B. Pain gets worse by going down stairs
C. Pulses are weak in the lower limbs
D. Nawaf starts with an N and Neurogenic also starts with an N

Q3: In Spondylolisthesis above which grade is it an indication for surgery?

A. Grade II
B. Grade III
C. Grade IV
D. Grade V

Q4: A 14 years old female brought by her parents. They are concerned about the abnormality seen in her back. On examination, the only positive thing was a unilateral hump on the right side of her back when she bends forward. What is the most likely diagnosis?

A. Degenerative disc disease
B. Spinal TB
C. Spondylolisthesis
D. Scoliosis

SAQs

A 30 year old female patient presents to your clinic complaining of unilateral pain, burning and numbness in her left buttocks, radiating down the back of her thigh and leg. Which was proven to be sciatica, she does not have any red flags.

1. Name 4 red flags for lower back pain
   (Slide 3)
2. How will you manage this patient?
   Physiotherapy, NSAIDs and surgery if necessary.
3. What are the indications for discectomy?
   Cauda equina, motor deficits and failure of conservative management.

Answers

Q1	Q2	Q3	Q4	Q5
B & C	B	B	D	

THANK YOU

This work was done by:

Omar Alghadir
Amjad Albaroudi

Note Taker:

Omar Alghadir

Reviewer:

Badr Alshehri

Team Leader:

Mohammed Alhuqbani