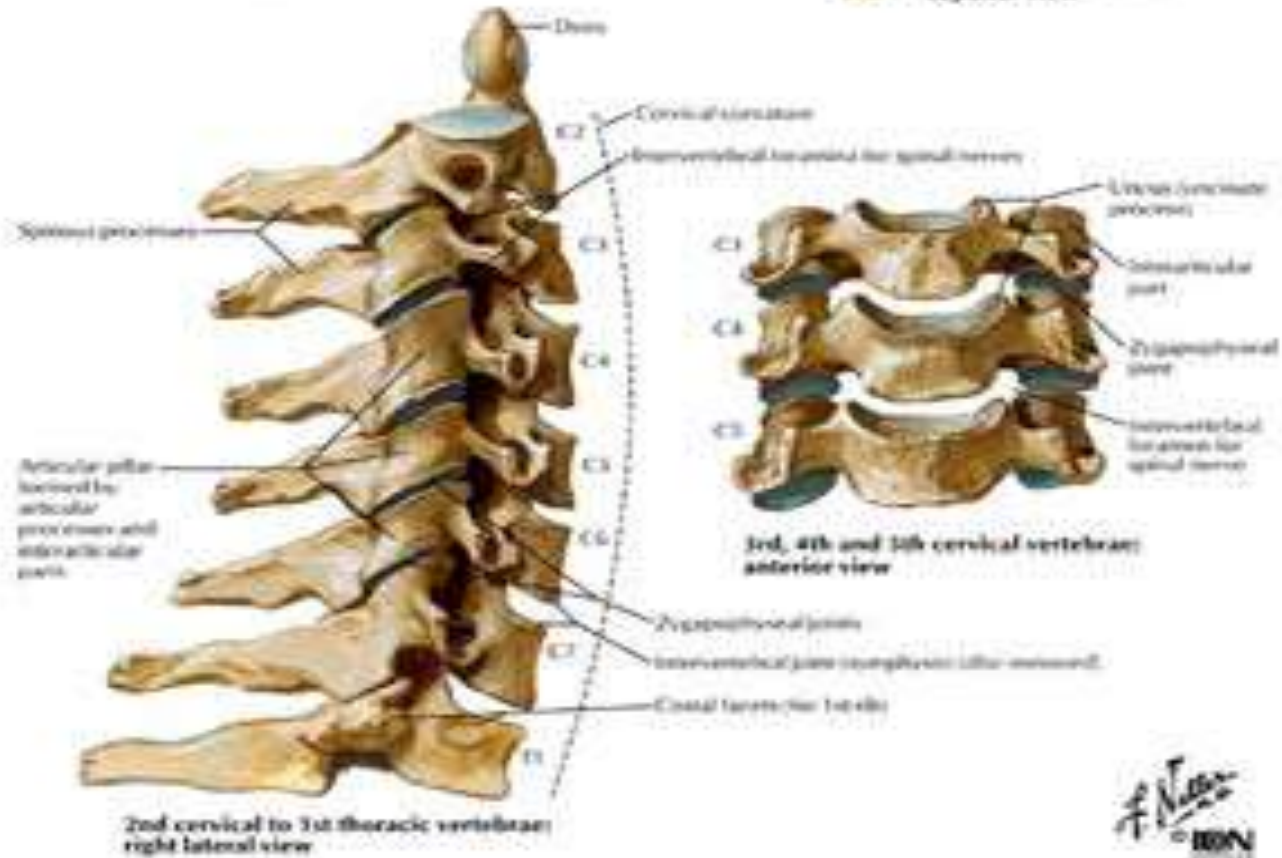
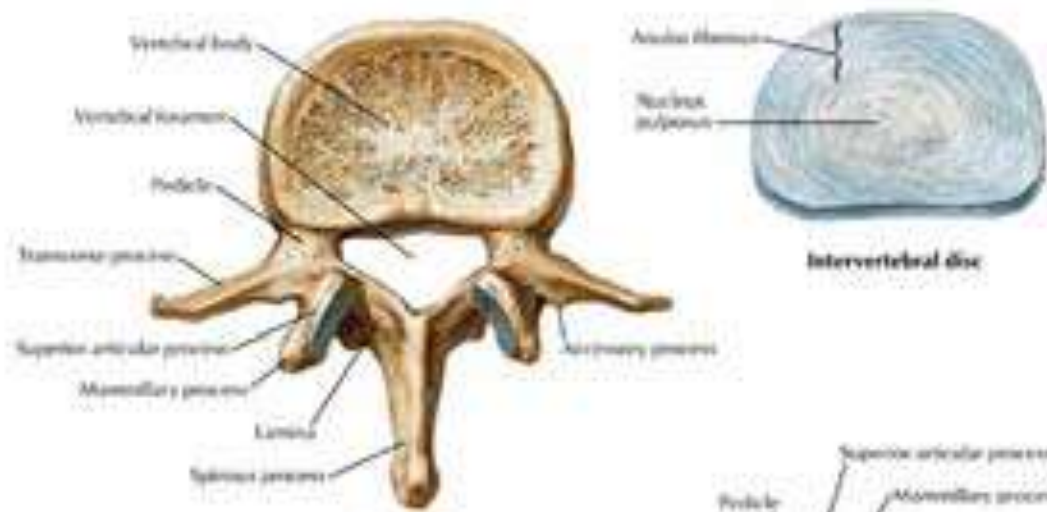


SPINE NEUROIMAGING

**FAKULTAS KEDOKTERAN UNISSULA
SEMARANG**

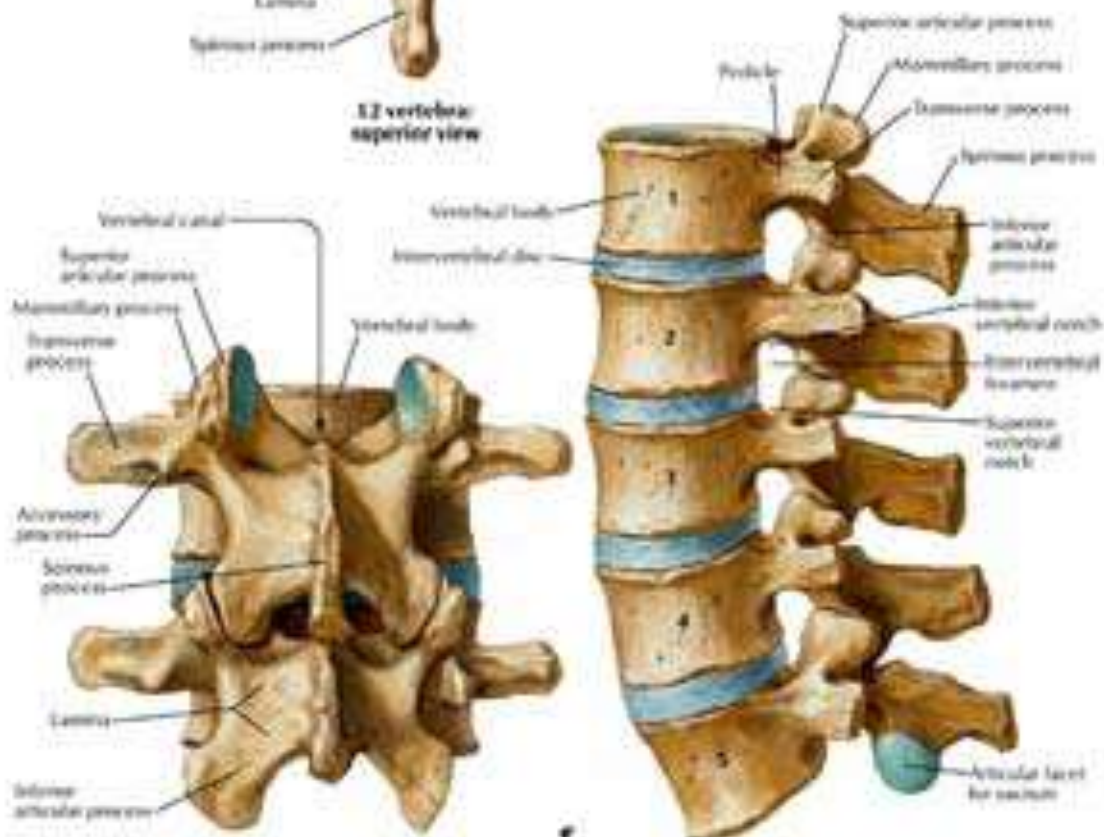
NORMAL





Intervertebral disc

L2 vertebra: superior view



L3 and L4 vertebrae: posterior view

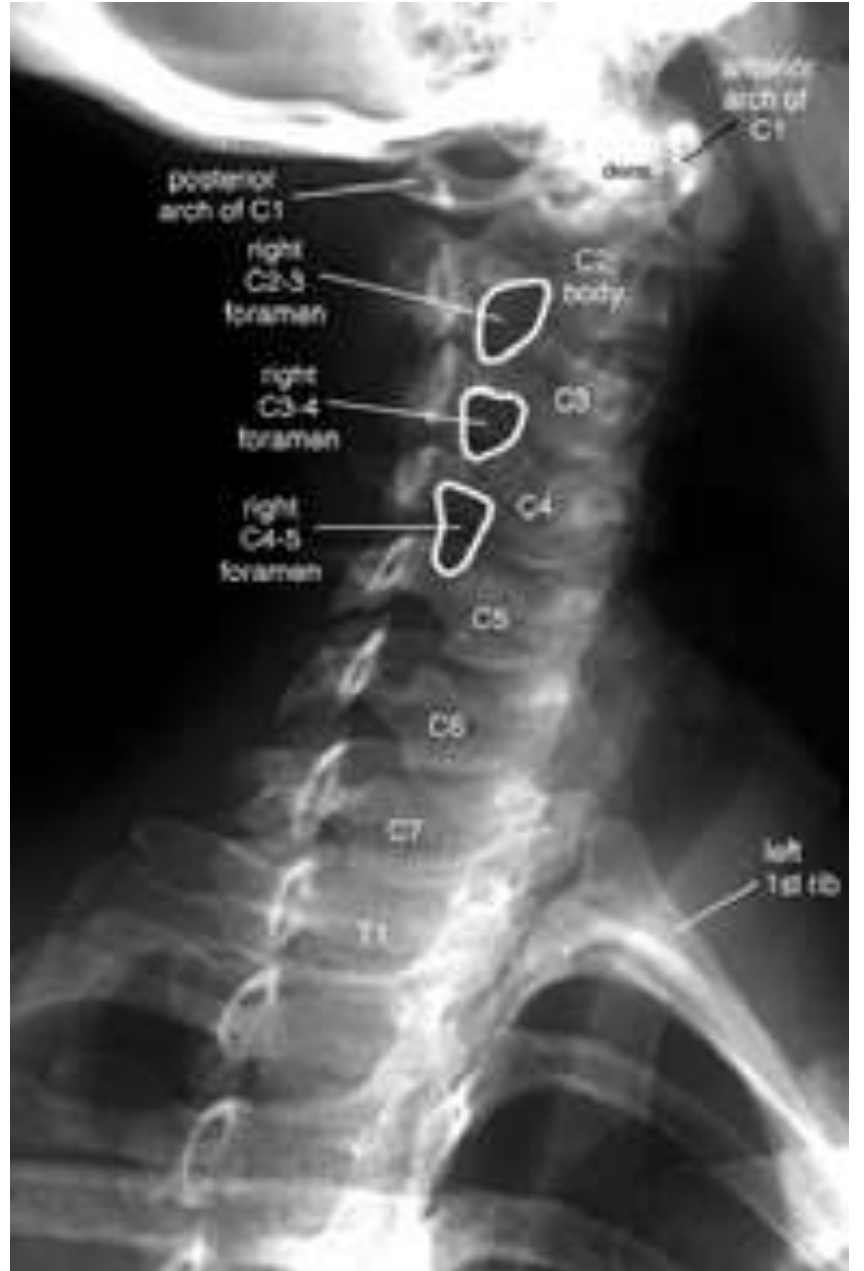
Lumbar vertebrae, assembled: left lateral view

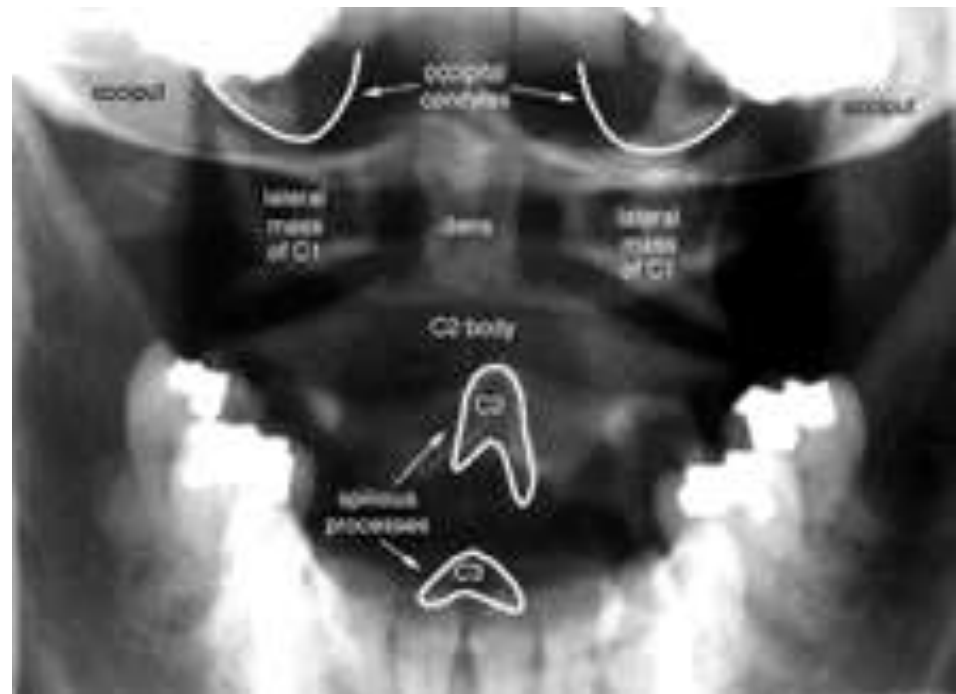


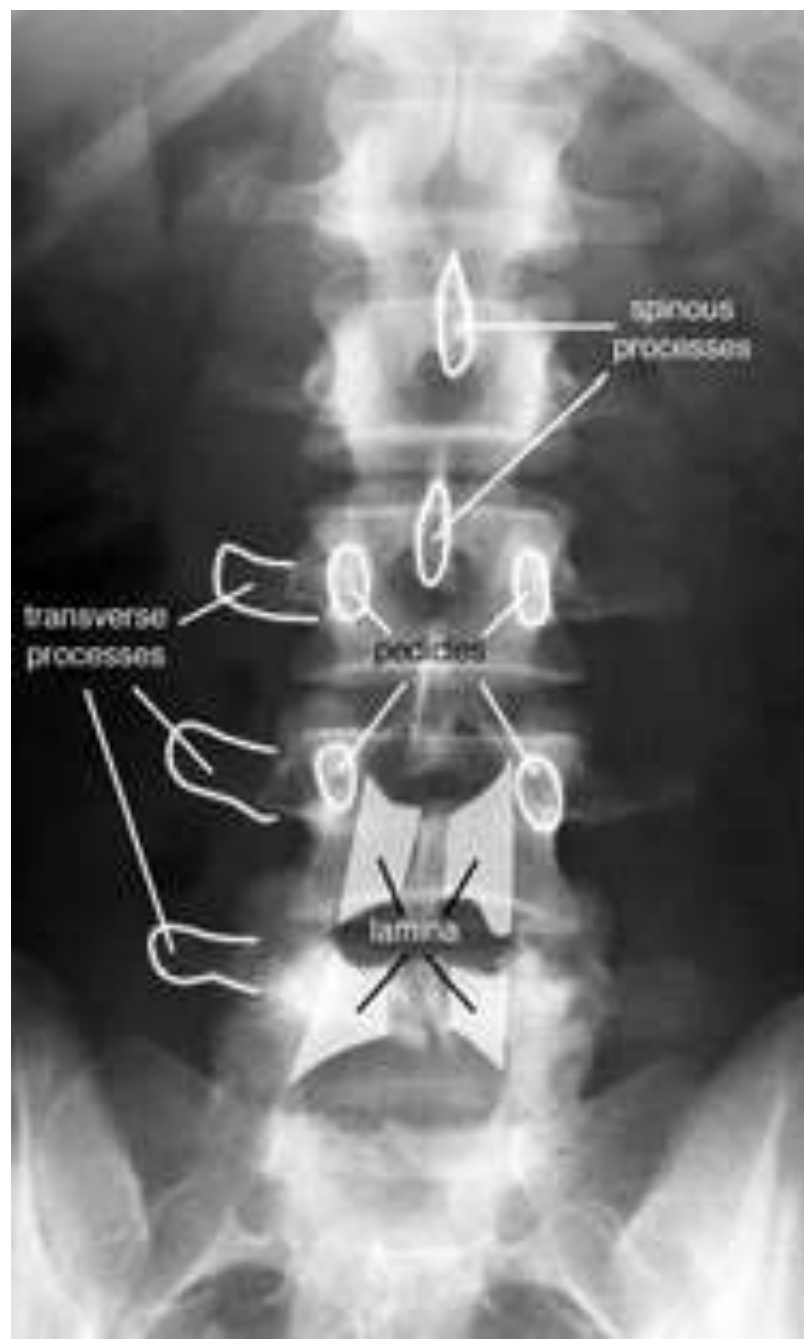
RADIOGRAPHIC ANATOMY

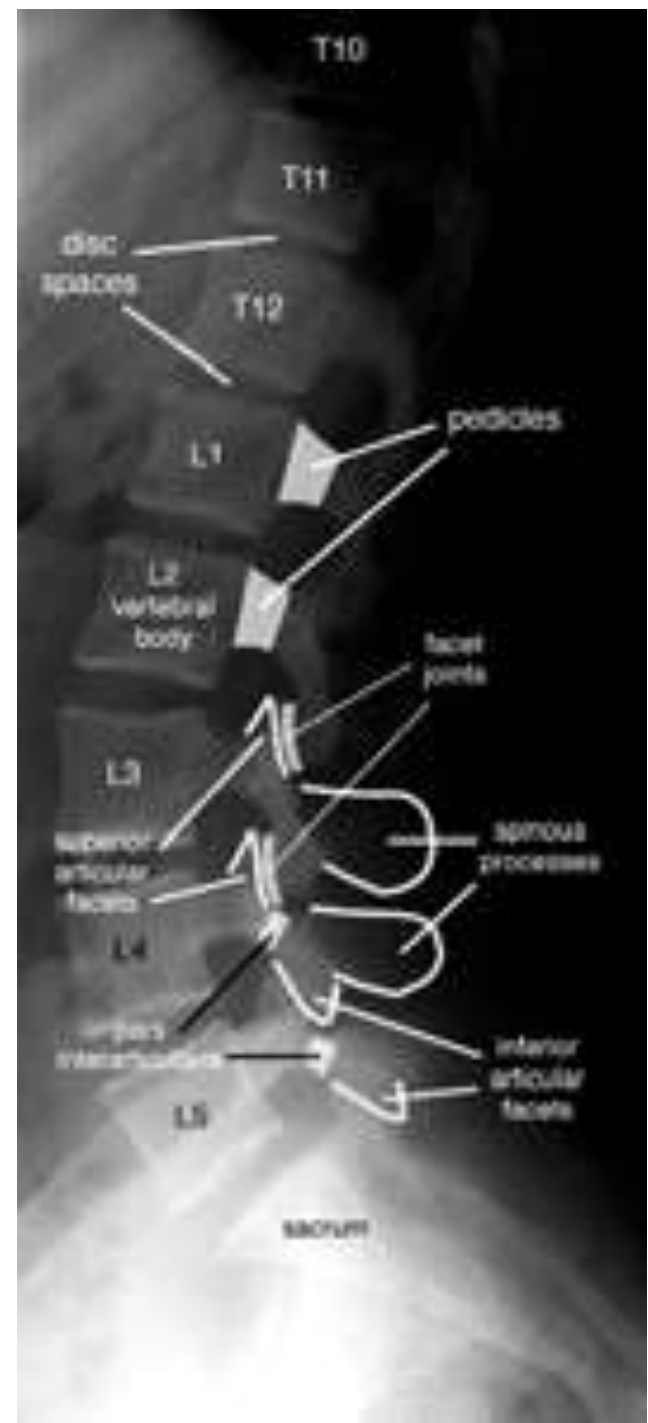
















SPINE PATHOLOGY

- **Trauma**
- **Degenerative disease**
- **Tumors and other masses**
- **Inflammation and infection**
- **Vascular disorders**
- **Congenital anomalies**

EVALUASI TRAUMA SPINE

- **Fracture – plain film / CT**
- **Dislocation – plain film / CT**
- **Ligamentous injury – MRI**
- **Cord injury – MRI**
- **Nerve root avulsion – MRI**

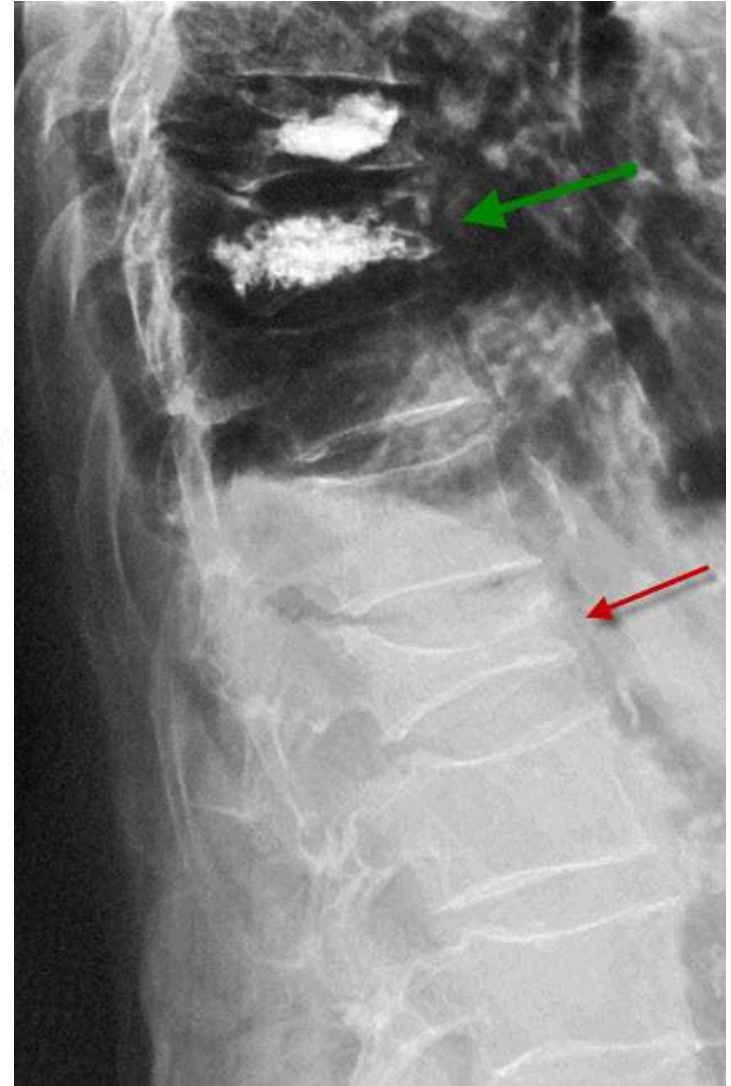
Fraktur Kompresi

- Fraktur kompresi adalah salah satu tipe fraktur yang sering dijumpai pada trauma tulang belakang
- Fraktur ini mengakibatkan tulang vertebra menjadi pipih
- Sering berkaitan dengan keadaan osteoporosis



**Compression
Fracture**

©MMG 2002



SPONDYLOLISTHESIS

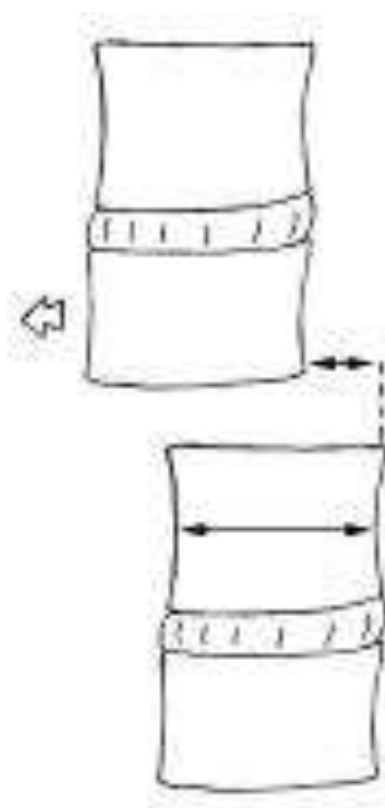
Berasal dari kata Spondylo = spine

Listhesis = slipe/ bergeser

Spondylolisthesis :

pergeseran vertebra dibandingkan dengan vertebra di bagian distalnya.

SKEMA SPONDYLOLISTHESIS



X FOTO PROYEKSI LATERAL

**Anterolisthesis
of C6 on C7**

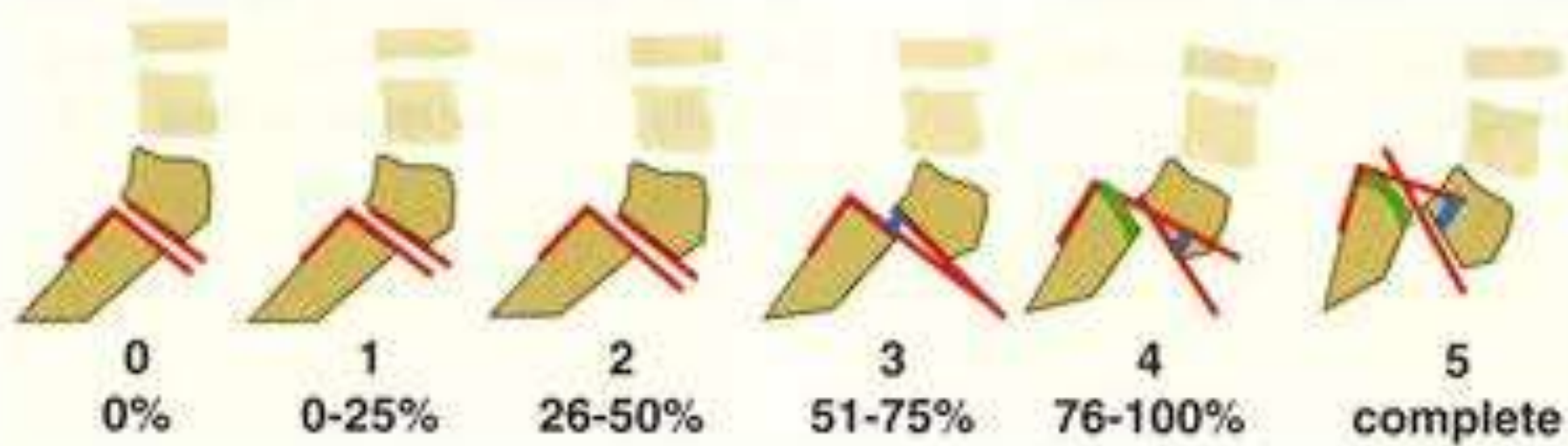


GRADE SPONDYLOLISTHESIS

Grade spondylolisthesis dinilai dari presentase pergesaran vertebra terhadap vertebra di bagian distalnya

- Grade 1 : <25 %
- Grade 2 : 50 %
- Grade 3 : 75%
- Grade 4 : 100 %

By Meyerding

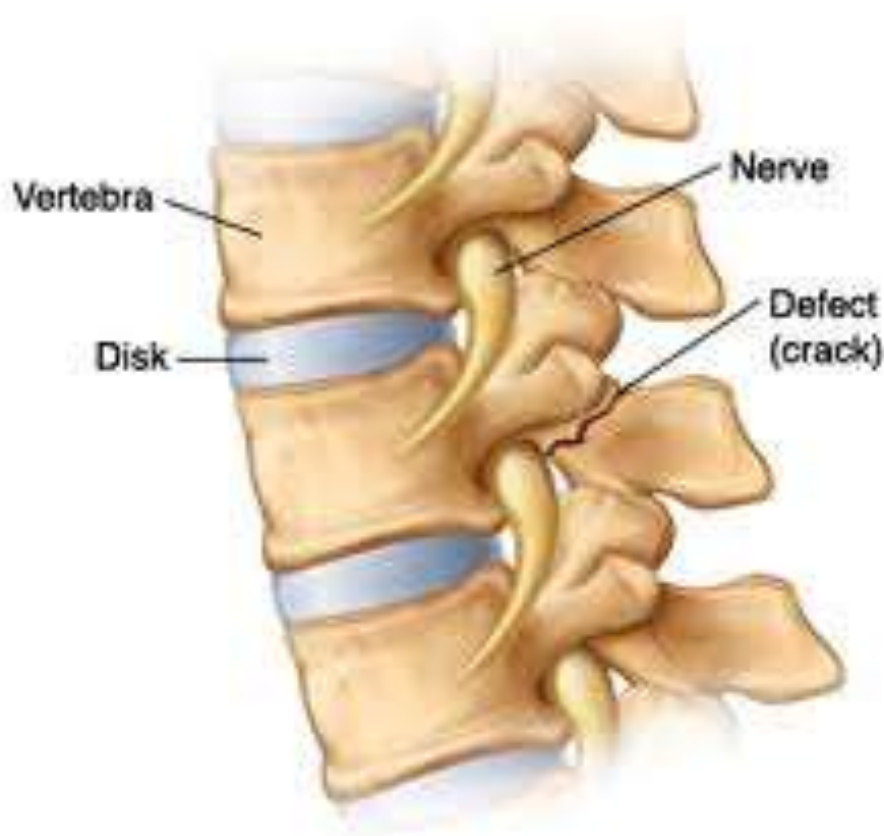


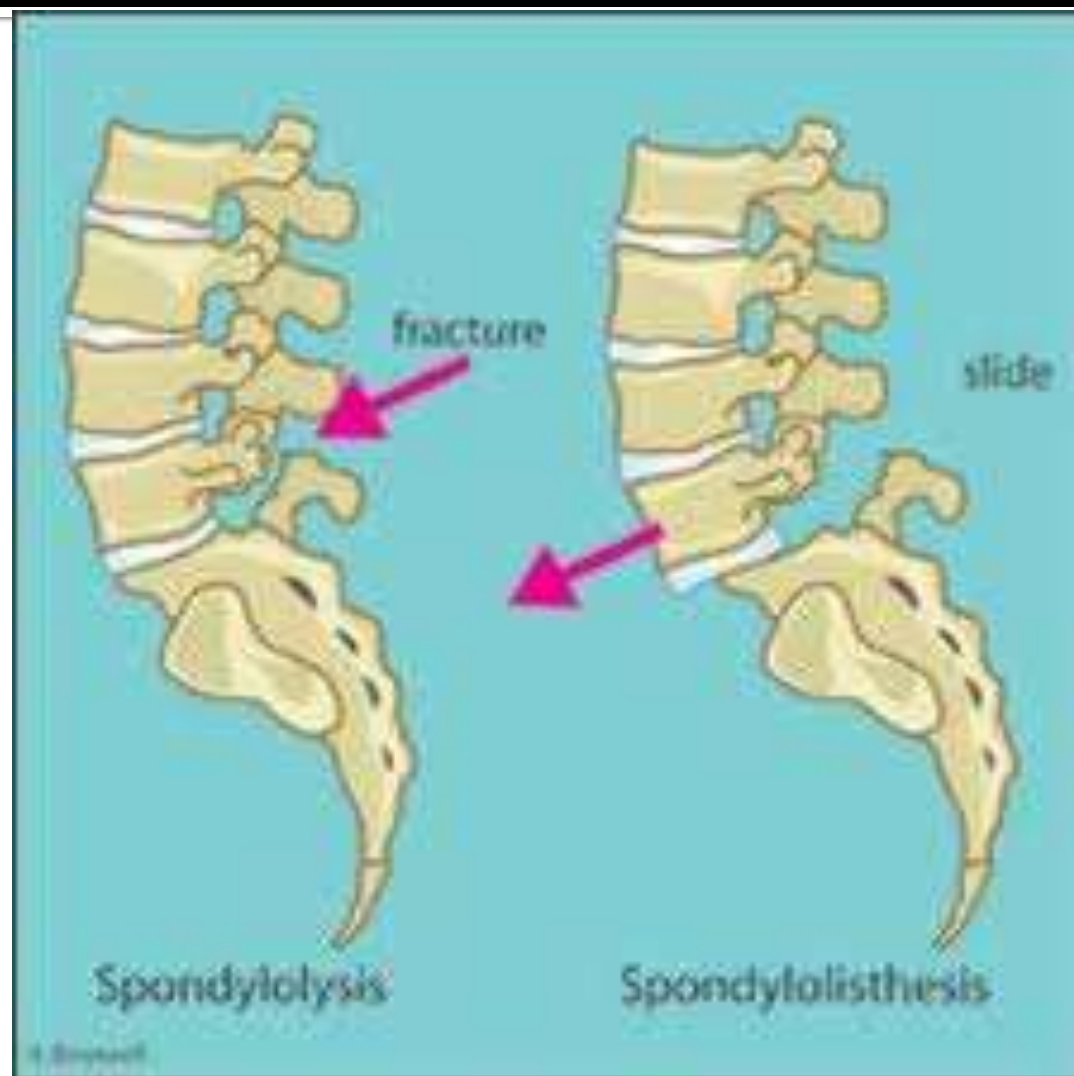
KLASIFIKASI SPONDYLOLISTHESIS

- Kongenital
- Isthmic
- Degeneratif
- Traumatic
- Phatologic

SPONDYLOLYSIS

- Defect pars interarticularis vertebra





X Foto Lateral



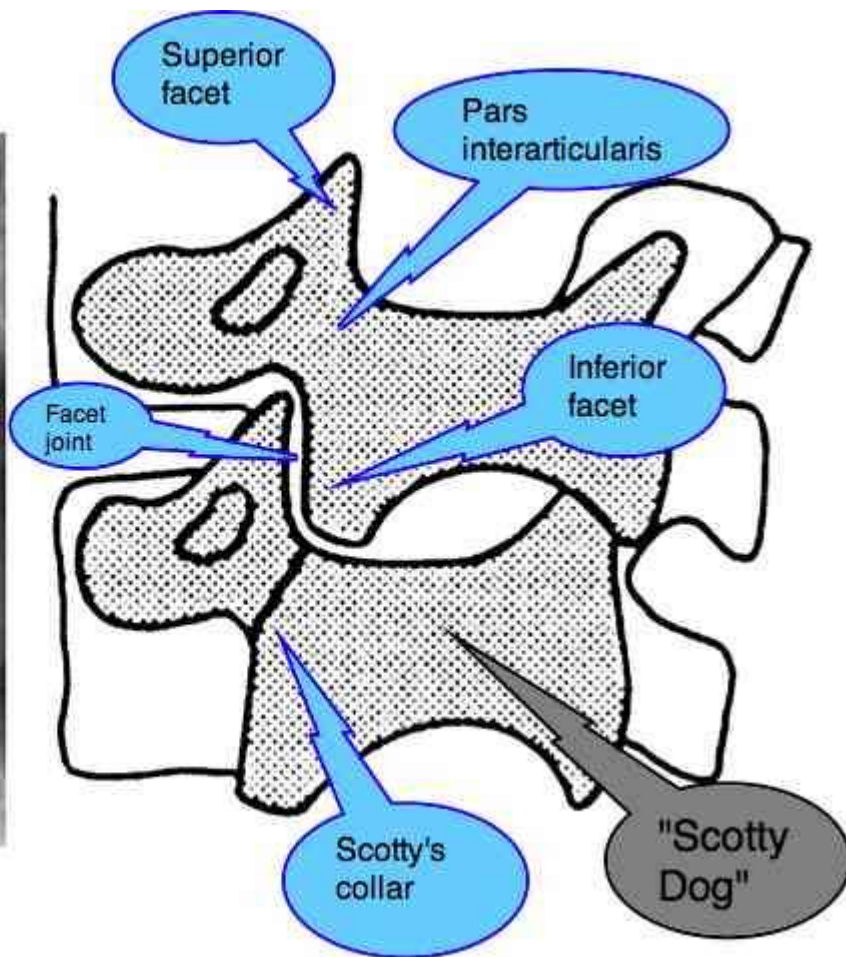
Lateral radiograph of the lumbar spine shows spondylolysis at L5 with spondylolisthesis at L5 through S1

X Foto Lateral

*Spondylolytic
Spondylolisthesis*



X FOTO PROYEKSI OBLIQ



SKOLIOSIS

- Skoliosis : kelengkungan abnormal tulang belakang ke arah samping, yang dapat terjadi dari level servikal, torakal ataupun lumbal.
- Etiologi :
 - Idiopatik
 - Kongenital
 - Gangguan otot & syaraf

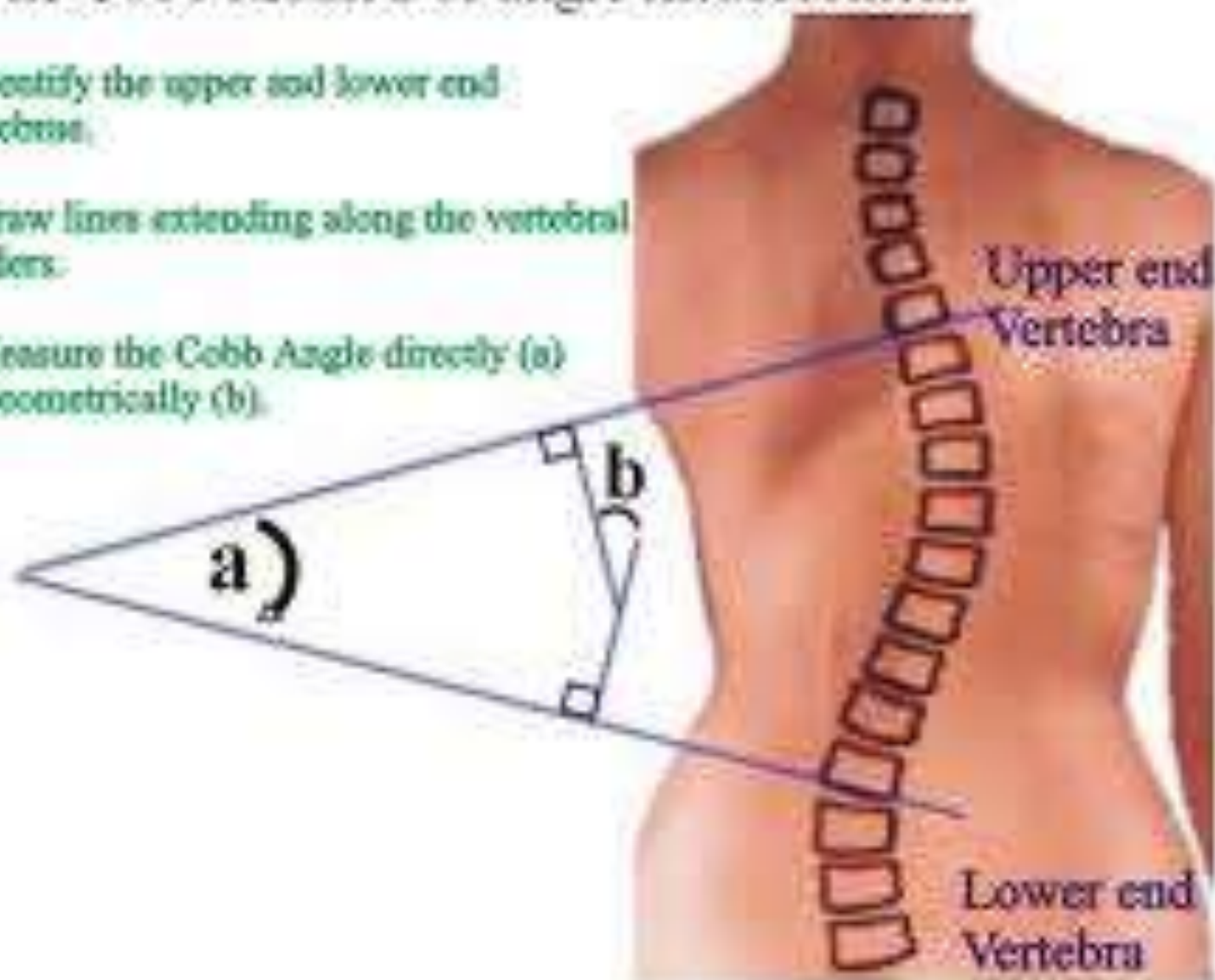
Radiographic assessment of the scoliosis patient

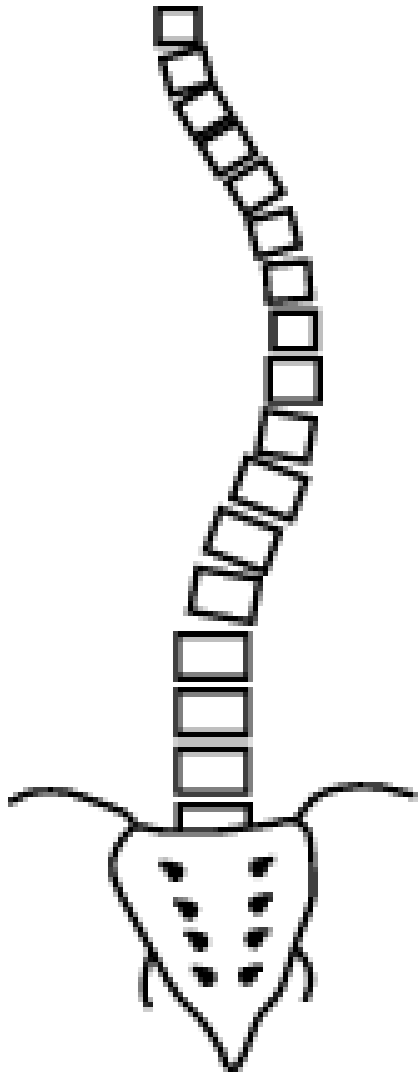
- The radiographic assessment of the scoliosis patient begins with *erect* anteroposterior and lateral views of the entire spine (occiput to sacrum).
- the examination should include a lateral view of the lumbar spine to look for the presence of spondylolysis or spondylolisthesis
- The scoliotic curve is then measured from the AP view. The most commonly used method is the Cobb method.
- The Cobb method has several advantages over other methods, including the fact that it is more likely to be consistent even when the patient is measured by several different examiners.

Scoliosis Radiographs

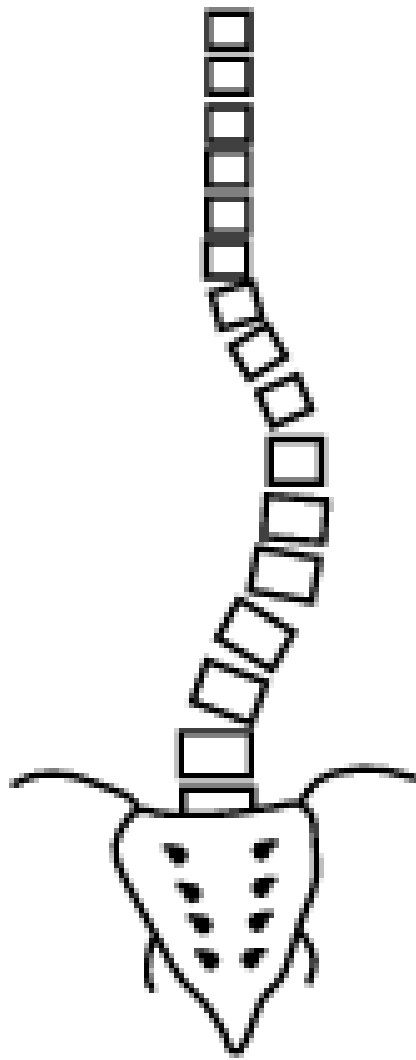
The Cobb Method of angle measurement

1. Identify the upper and lower end vertebrae.
2. Draw lines extending along the vertebral borders.
3. Measure the Cobb Angle directly (a) or geometrically (b).

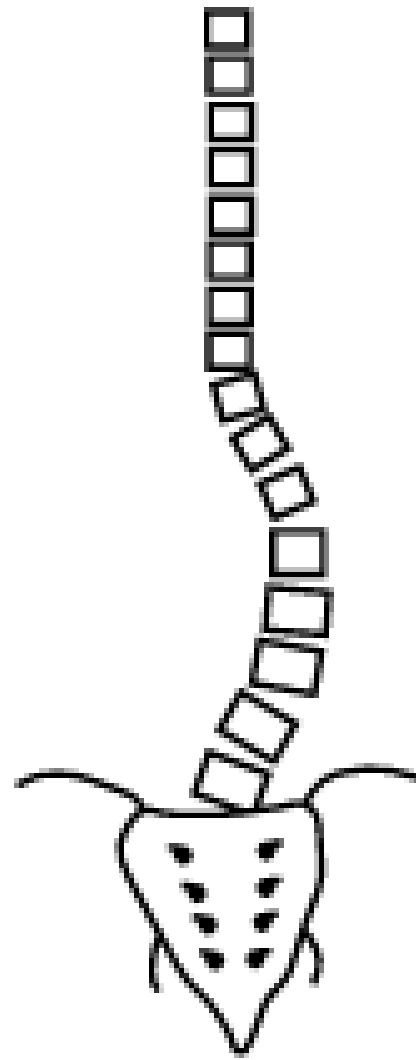




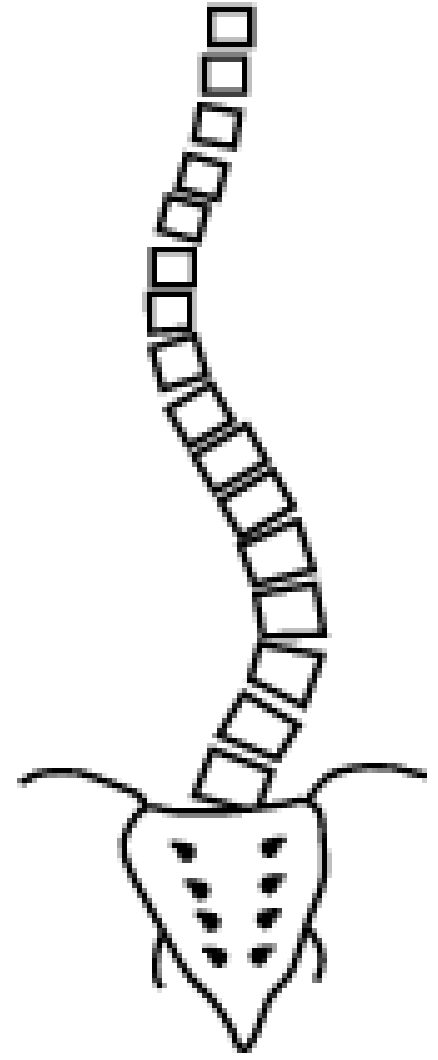
thoracic
curve



thoracolumbar
curve



lumbar
curve

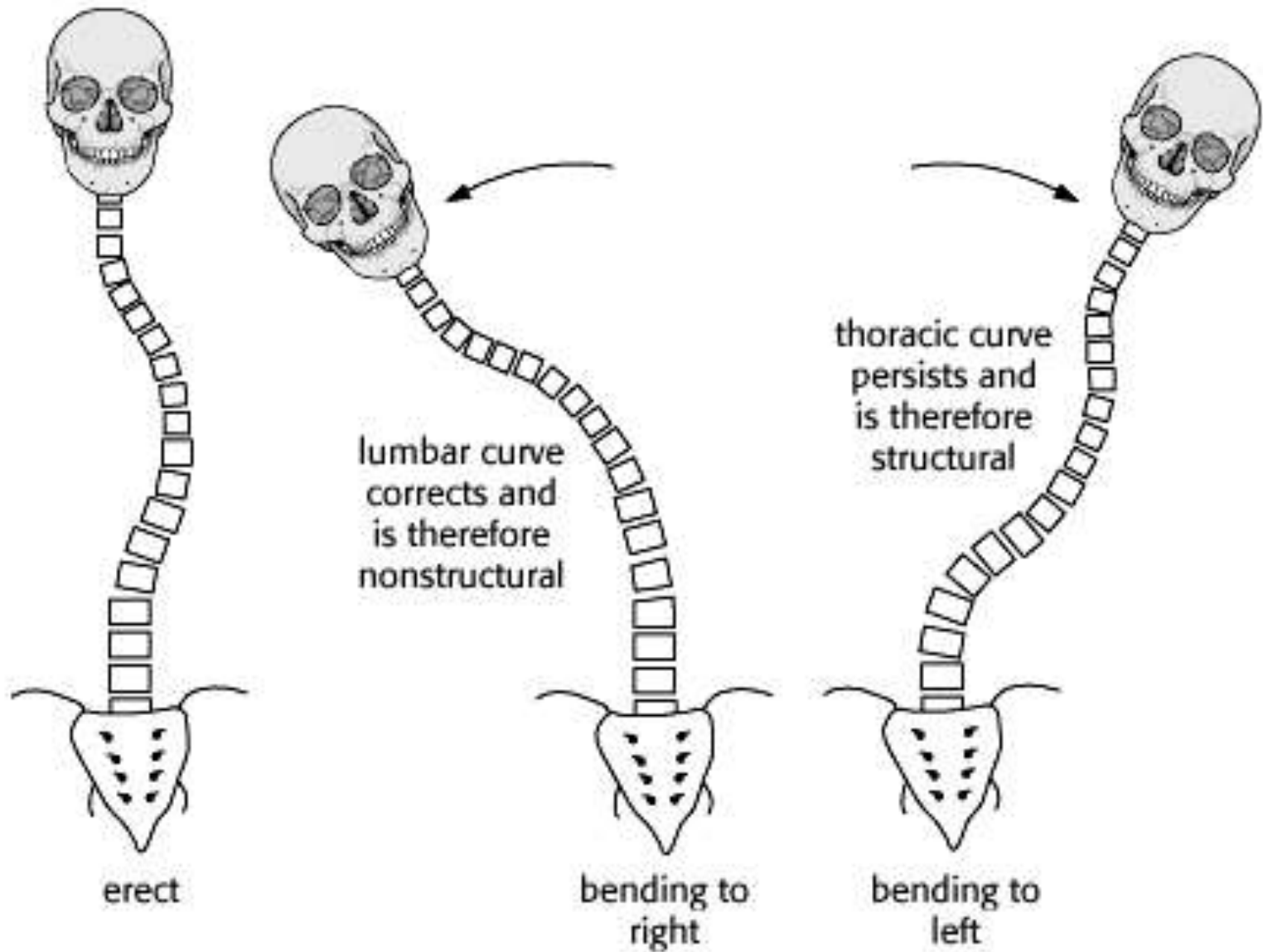


double major
curve

STANDING

R





SPONDYLOARTHRISIS

Spondyloarthritis : suatu kondisi proses degeneratif pada *discus* intervertebralis dan jaringan pengikat persendian antara ruas-ruas tulang belakang.

Spondyloarthrosis

- Discosis (pemipihan, pengerasan disc)
- Terjadi arthrosis (penipisan, pengerasan hyaline cartilage dan erosi facets) → Mulai instabilitas → iritasi jar. Lunak → pseudoradicular pain
- Capsule-ligaments contracture,
- Muscle tight and contracted
- Pembentukan osteofit tepi facets dan Corpus → Penyempitan forament intervertebrale → Iritasi radix → Radicular pain

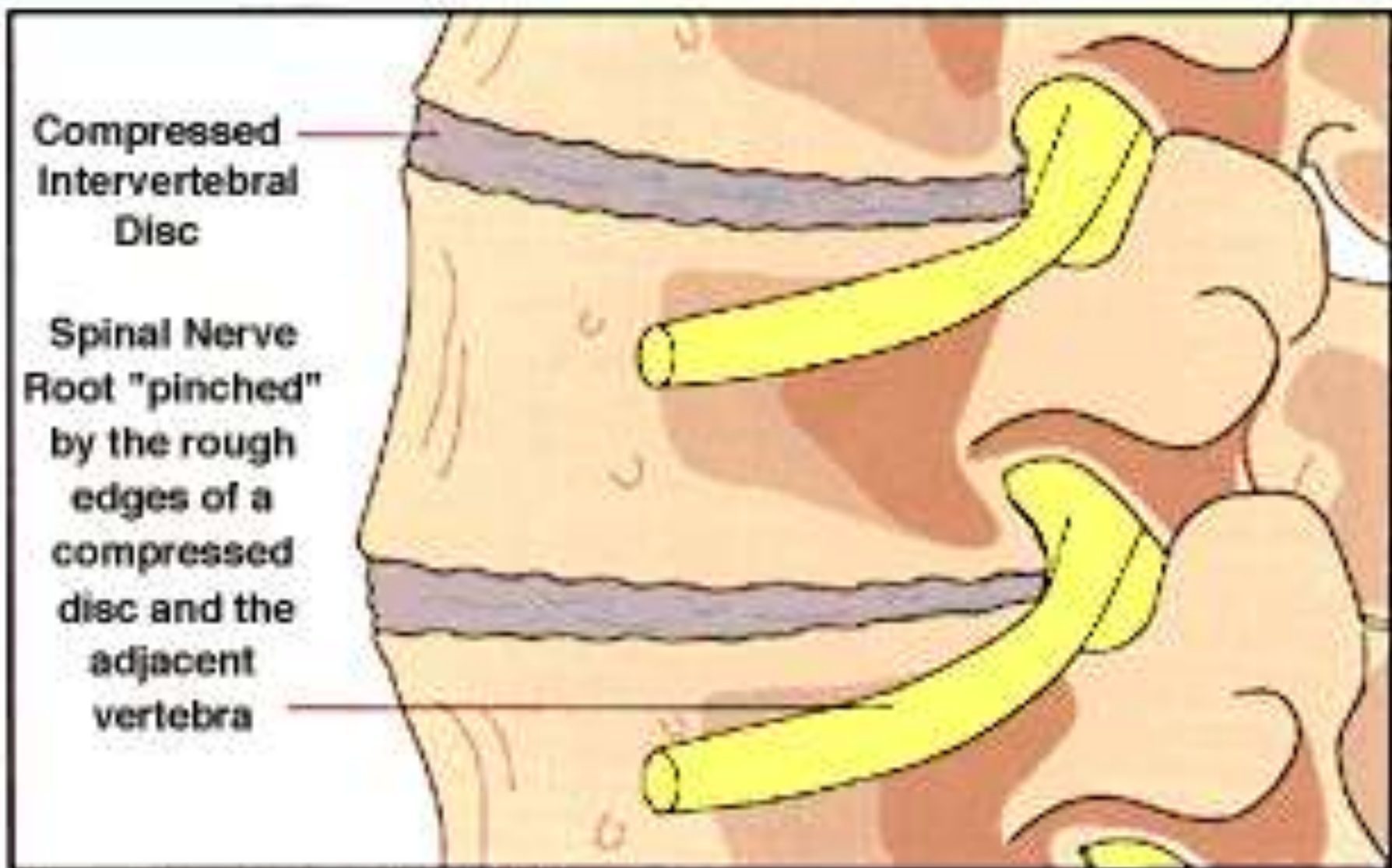
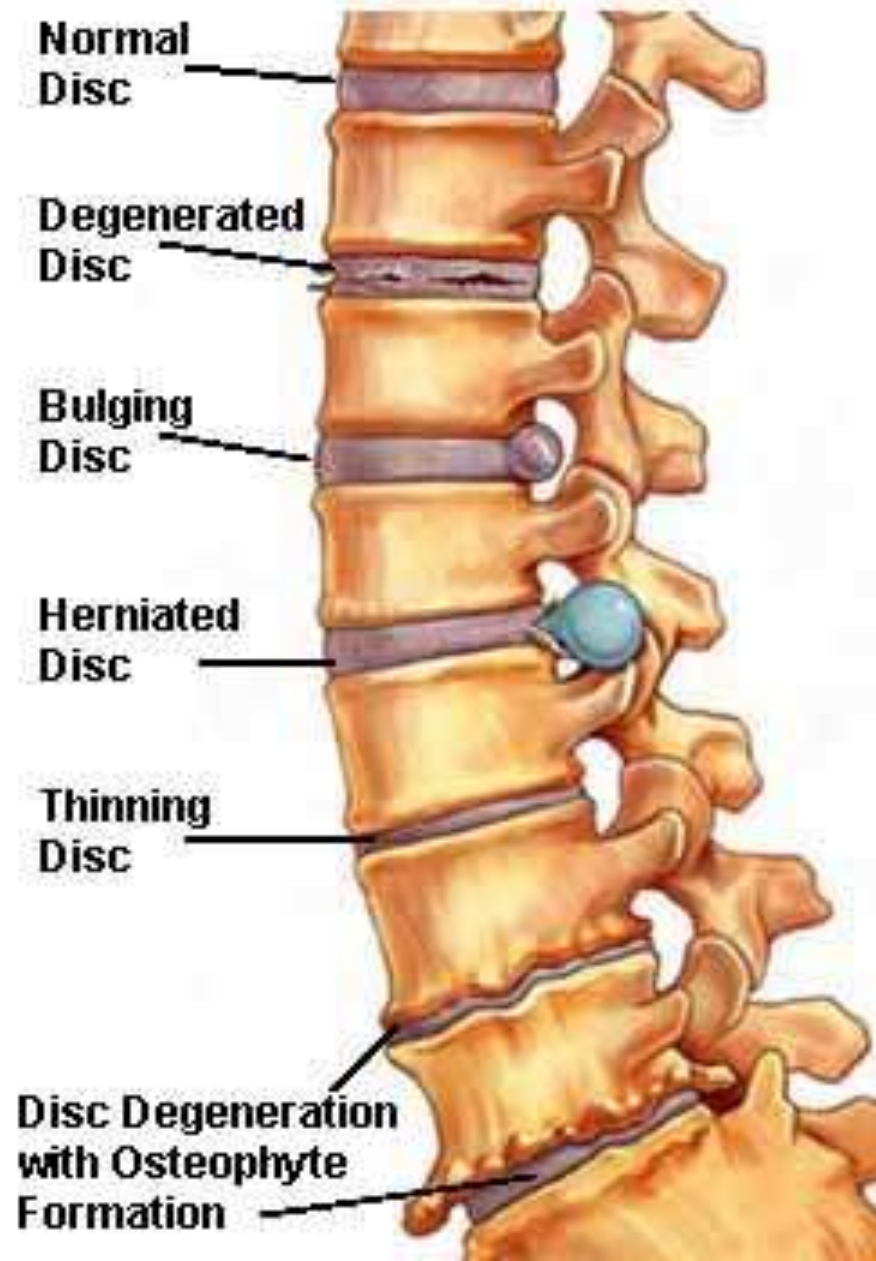


Figure #5: *The "Aging" Spine*

Examples of Disc Problems



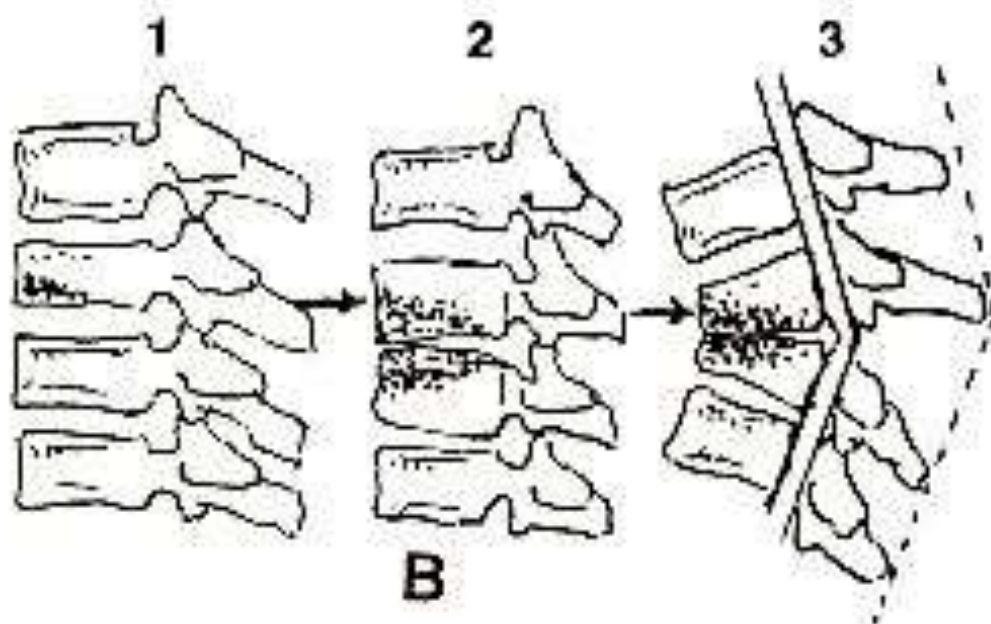
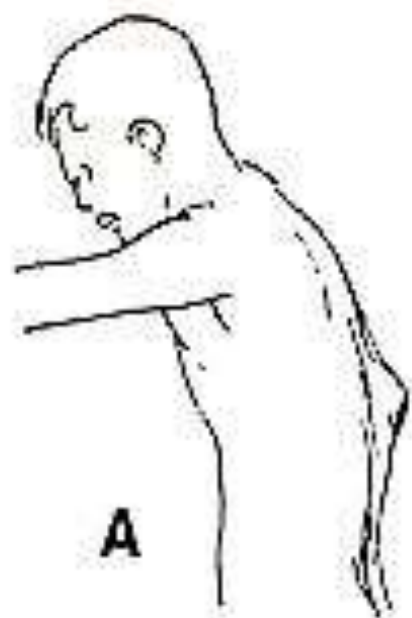
POTT 'S DISEASE

- Pott's disease = spondilitis tuberkulosis
- Merupakan infeksi tuberkulosis ekstrapulmonal yang mengenai satu / lebih tulang belakang
- 40 -50 % terjadi di vertebra torakal bawah
35 – 45 % terjadi di vertebra lumbal
10 % melibatkan servikal

RADIOGRAPHIC POTT'S DISEASE

- Radiographic changes present relatively late.
- Plain radiography demonstrates the following characteristic changes of spinal tuberculosis
- Lytic destruction of anterior portion of vertebral body
- Increased anterior wedging
- Collapse of vertebral body
- Reactive sclerosis on a progressive lytic process
- Enlarged psoas shadow with or without calcification

- Additional findings
- Vertebral end plates are osteoporotic.
- Intervertebral disks may be shrunk or destroyed.
- Vertebral bodies show variable degrees of destruction.
- Fusiform paravertebral shadows suggest abscess formation.
- Bone lesions may occur at more than one level







DAFTAR PUSTAKA

- 1 Stevens JM, Rich PM, Drian A, Dixon K. 2008. The Spine in : Diagnostic imaging Graiger & allissons volume 2, 5th Edition. Livingstone Elsevier. Philadelphia : 1355-1391.
2. Weissleder R, Wittenberg J, Harisinghani MG, Chen JW. 2007. Musculoskeletal Imaging. In: Primer of Diagnostic imaging. Fourth Edition. Mosby Elsevier, Philadelphia :375-427.
3. Weissleder R, Wittenberg J, Harisinghani MG, Chen JW. 2007. Spine. In: Primer of Diagnostic imaging. Fourth Edition. Mosby Elsevier, Philadelphia :584-585.

TERIMA KASIH