

مرکز آموزش مداوم دانشگاه علوم پزشکی دزفول برگزار می کند:

وینار کشوری با عنوان:

دیسک کمر و مراقبت های بعد از آن



بخش اول:

آناتومی ستون فقرات و بررسی دیسک کمر در تصاویر MRI

ارائه دهنده:

دکتر عباس حیدری مقدم – عضو هیات علمی گروه علوم تشریحی



مرکز آموزش مداوم دانشگاه علوم پزشکی دزفول برگزار می کند

دانشگاه علوم پزشکی دزفول

وینار کشوری

گروه هدف: پرستاری

دارای امتیاز آموزش مداوم

دیسک کمر و مراقبت های بعد از آن

زمان

۹:۰۰-۱۲:۰۰

۱۴۰۱/۰۴/۰۷

سخنرانان

خانم نرجس کاظمی

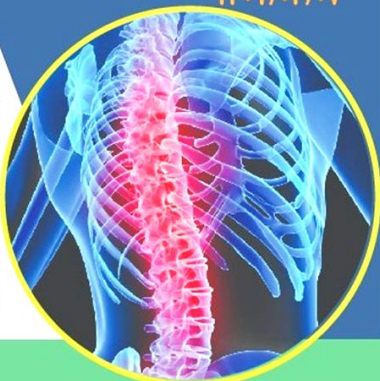
کارشناس ارشد پرستاری

(دبیر علمی برنامه و عضو هیئت علمی)

آقای دکتر عباس حیدری مقدم

دکتری علوم تشریح

(عضو هیئت علمی)



www.ircme.ir

ثبت نام

لینک وینار <https://cmelearn.ir>



آنچه از این بخش انتظار می رود

➤ بررسی مختصر ستون فقرات

➤ بررسی انحنای ستون فقرات و اختلالات مرتبط با آنها

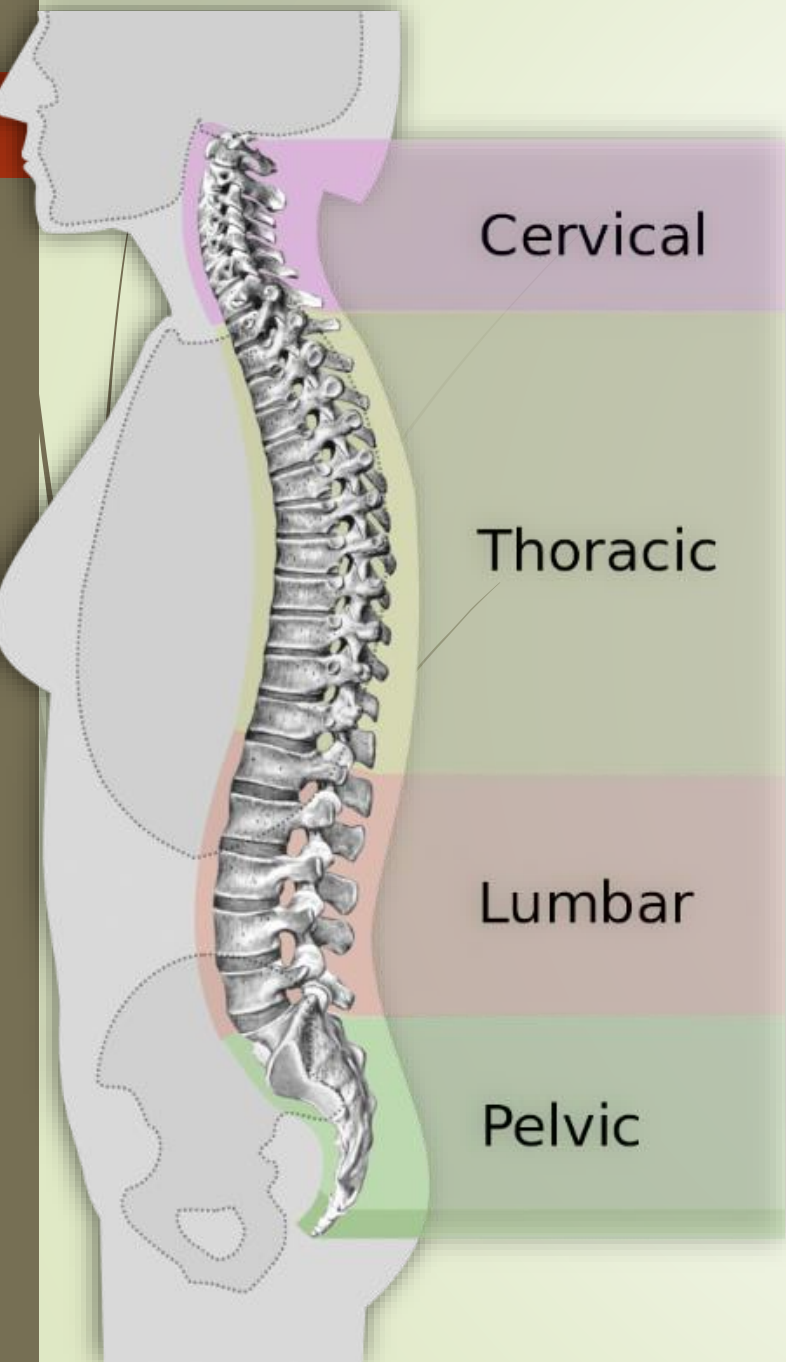
➤ بررسی آناتومی مهره ها

➤ بررسی آناتومی دیسک کمر

➤ بررسی مکان های رایج فتق دیسک

➤ بررسی انواع فتق دیسک

➤ بررسی فتق دیسک و تنگی کانال مهره ای در تصاویر MRI



بررسی مختصر ستون فقرات:

تقسیم بندی مهره ها:

۷ مهره گردنی (Cervical)

۱۲ مهره سینه ای (Thoracic)

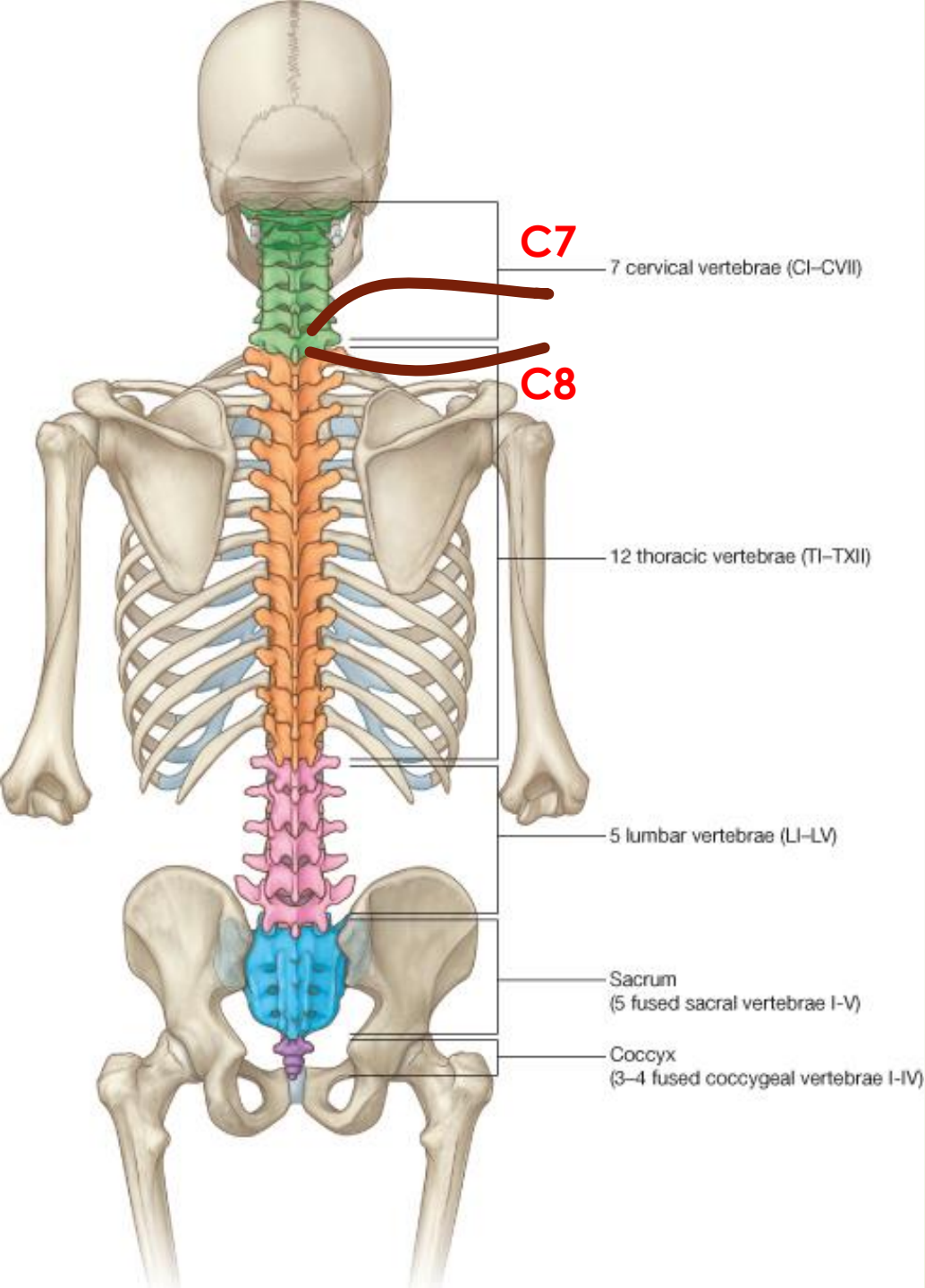
۵ مهره کمری (Lumbar)

۵ مهره خاجی (Sacral)

۳-۴ مهره دنبالچه (Coccyx)

۳۲ مهره

در صورت محاسبه دنبالچه به ۱ مهره:
جمعا ۳۰ مهره و ۳۱ جفت عصب نخاعی

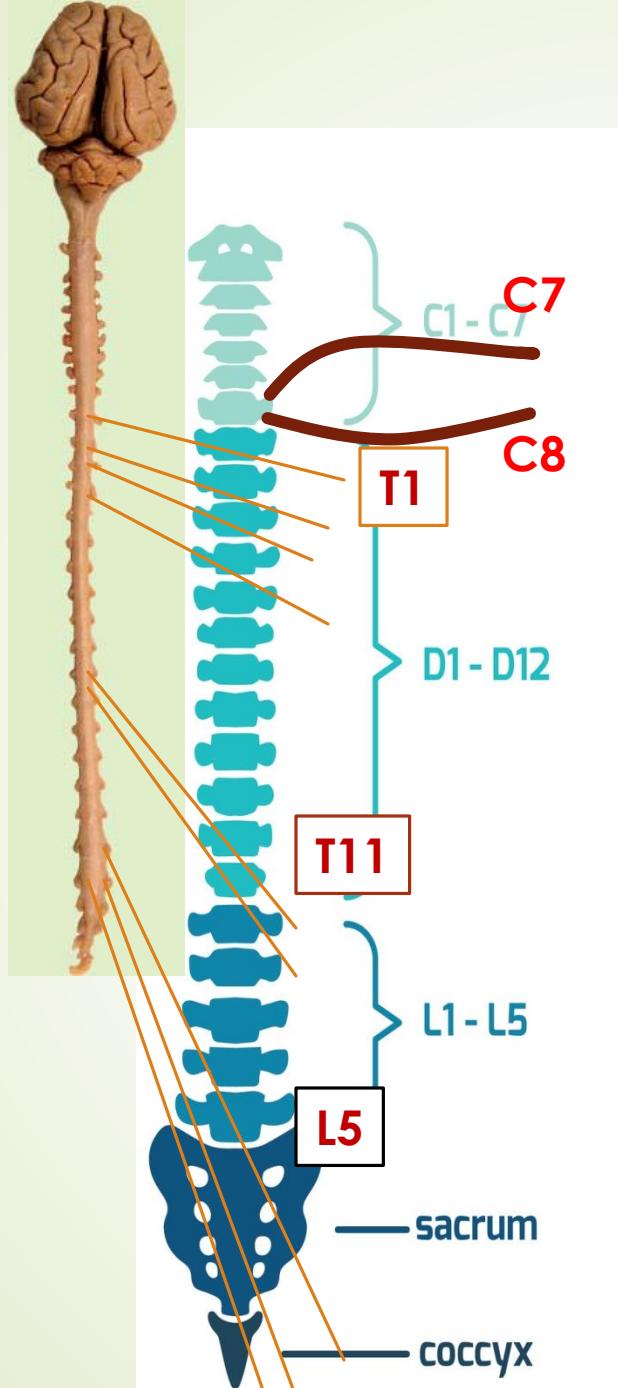


قانون کلی اعصاب نخاعی:

هر عصب از زیر مهره هم نام خود عبور می کند.

➤ **استثناء:** ناحیه گردن (سگمان C1 تا C8)

➤ **بدلیل تفاوت در طول نخاع با ستون مهره ها هر چه به انتهای نخاع نگاه کنیم، رشته ها زاویه بیشتری پیدا می کنند.**



انحنای ستون فقرات

Spinal Curves



Secondary Curve

There are four natural curves in the vertebral column

Thoracic curvature

Primary Curve

Lumbar curvature

Secondary Curve

Sacral curvature

Primary Curve

ADAM.



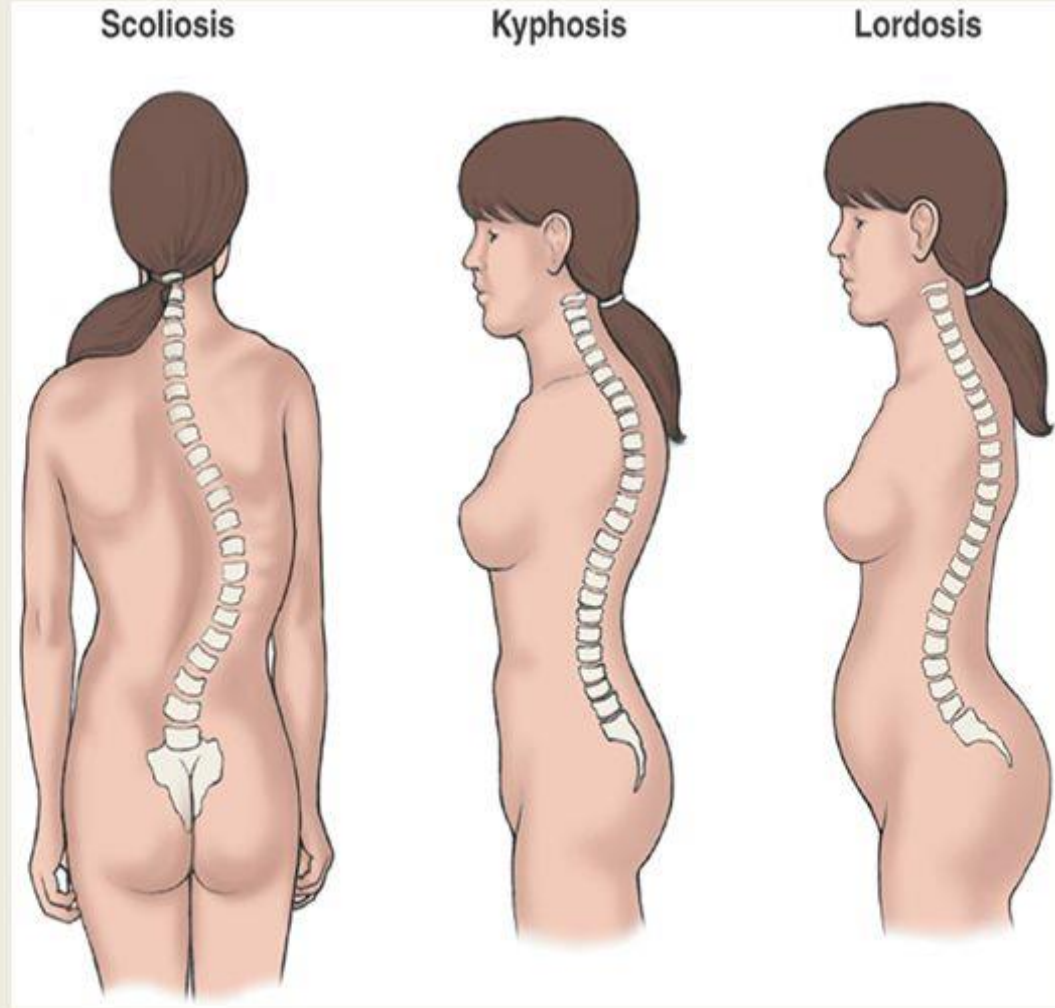
اختلالات ستون فقرات

اسکولیوزیس

کیفوزیس

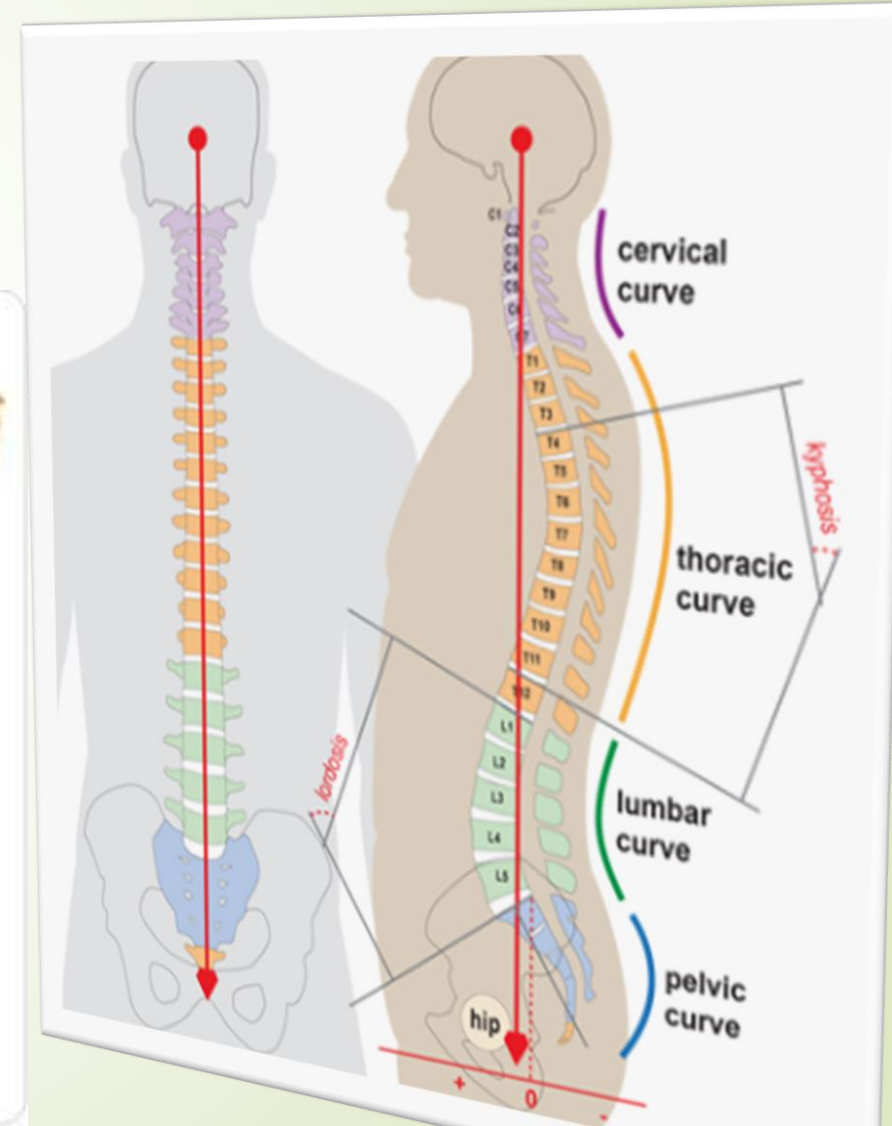
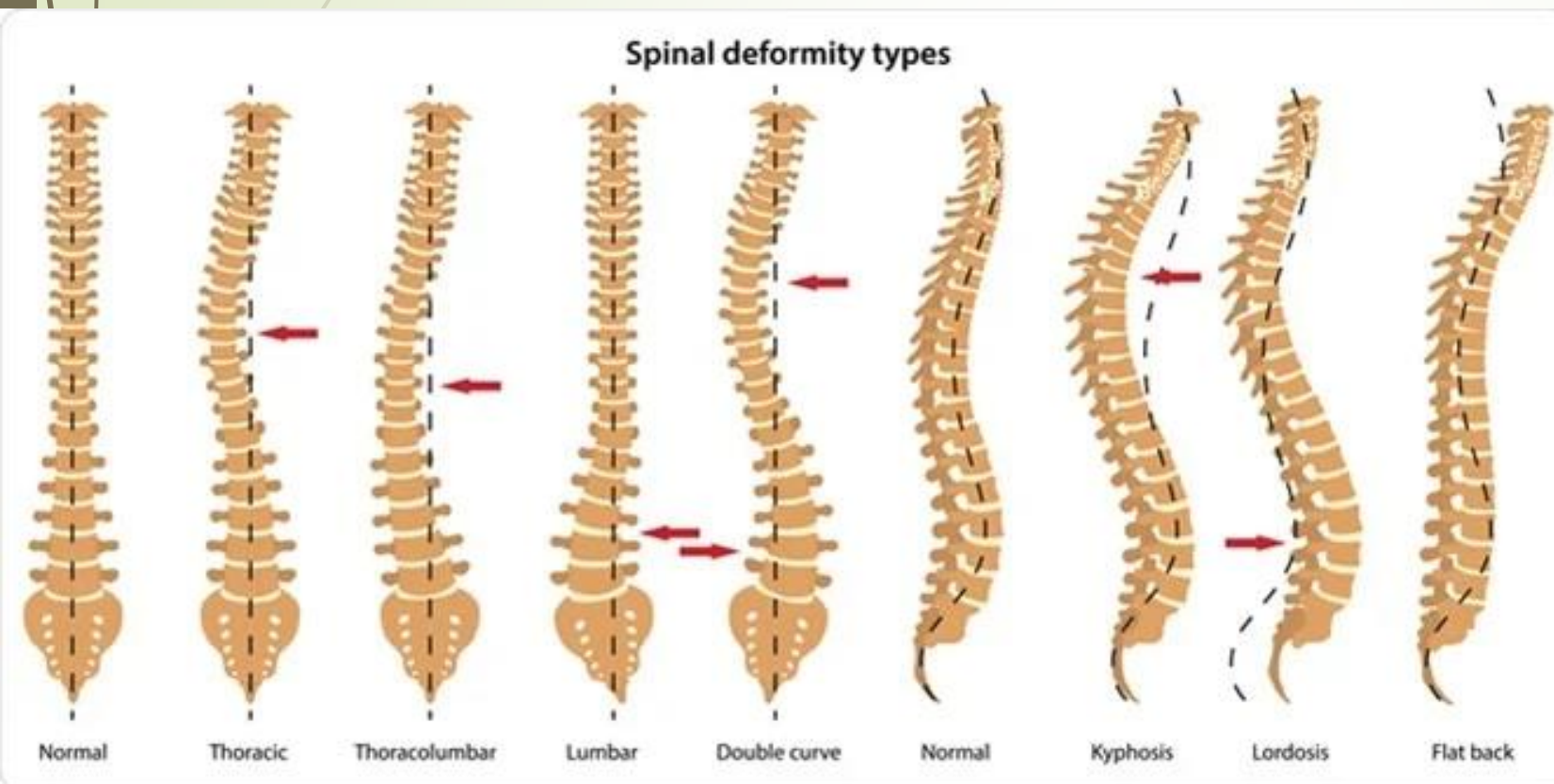
لوردوزیس

کیفو اسکولیوزیس



- Scoliosis: Lateral curve
- Kyphosis: Hunchback
- Lordosis: Swayback

Spine Curvature Disorders



اسکولیوزیس

کیفوزیس

لوردوزیس

کیفو اسکولیوزیس



HEALTHY SPINE

A healthy spine is straight.



SYMPTOMS OF SCOLIOSIS

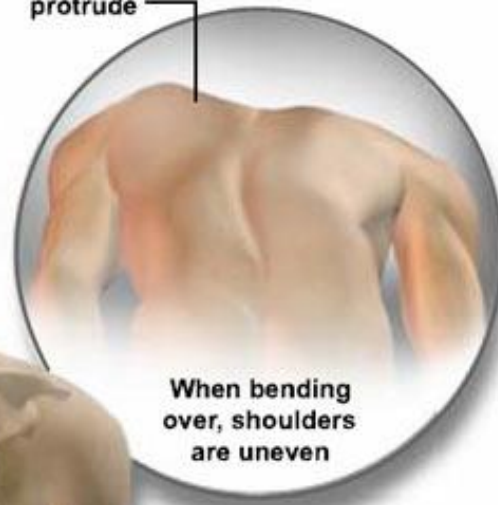
A spine affected by scoliosis curves to the side.

Torso appears to lean

Waist may appear uneven or hips elevated



One or both shoulder blades protrude



When bending over, shoulders are uneven

Misshaped rib cage

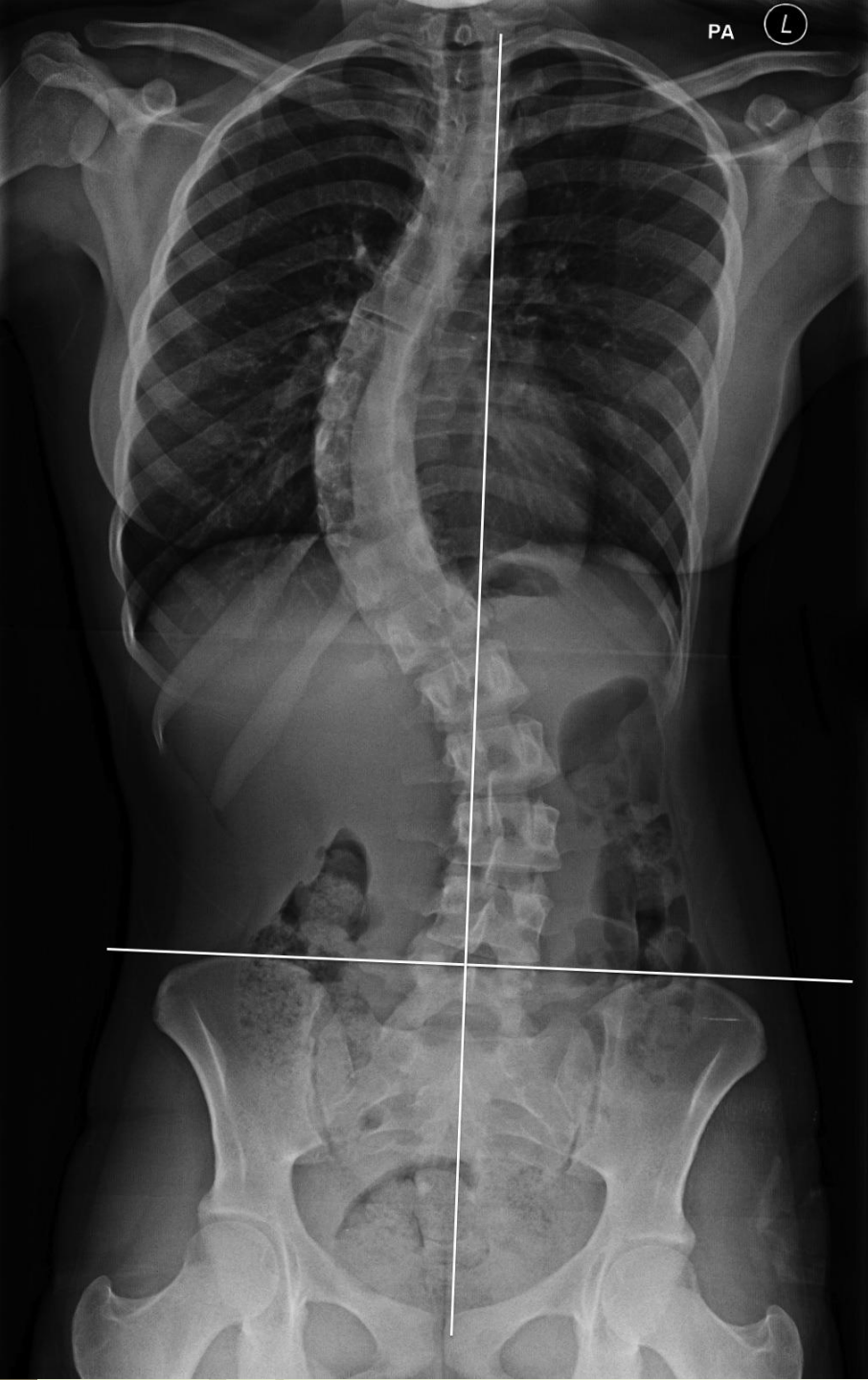
A curvature may be seen in the mid back (thorax) ...

... or it may be seen in the lower back (lumbar).

اسکولیوزیس

انحنای طرفی ستون فقرات



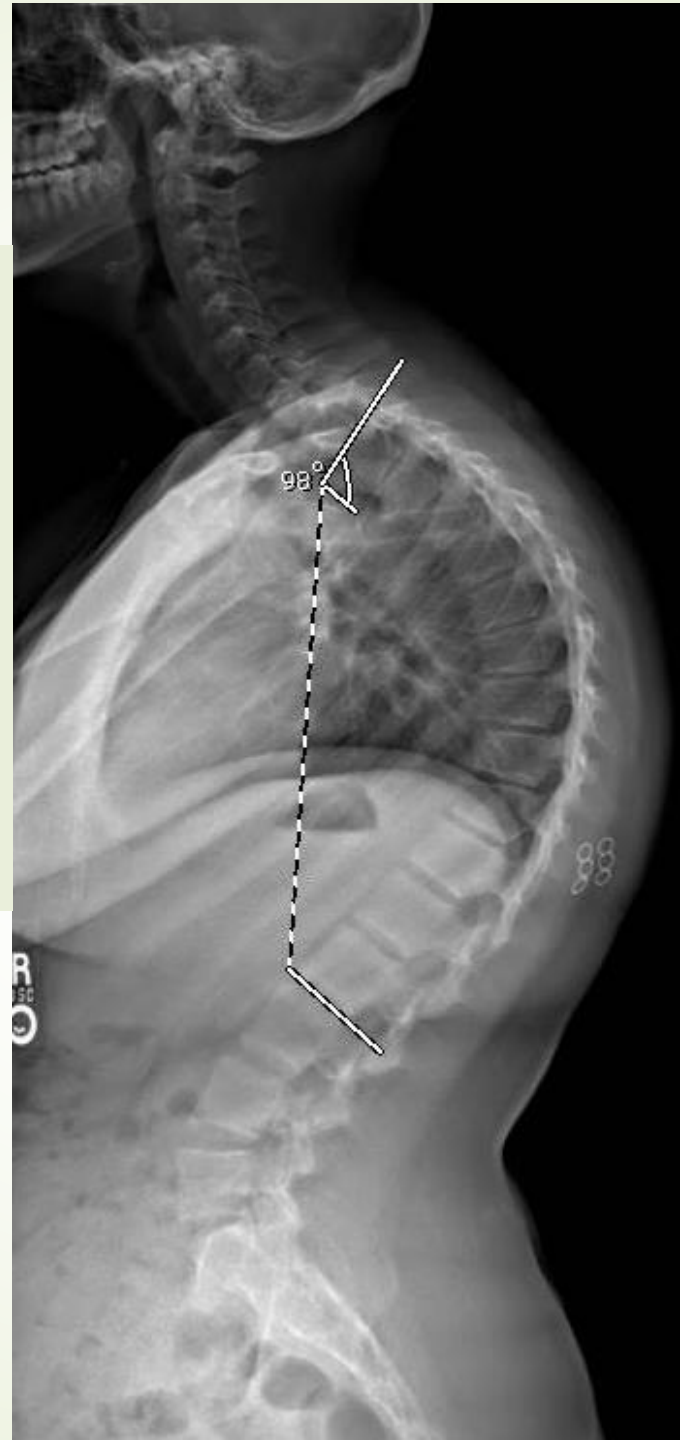
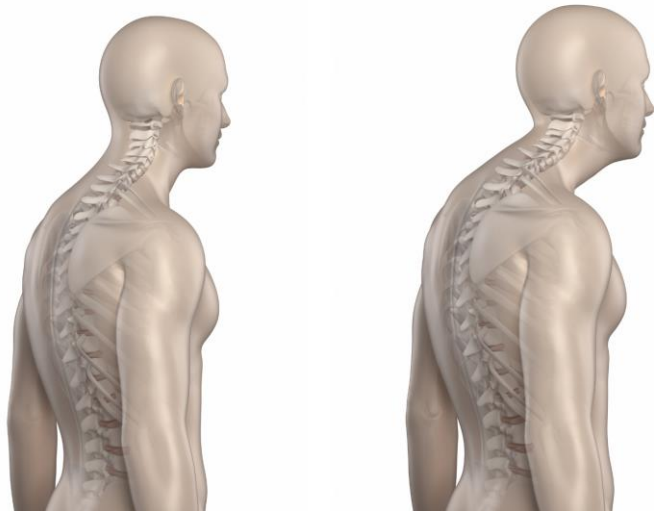


اسکولیوزیس

کیفوزیس

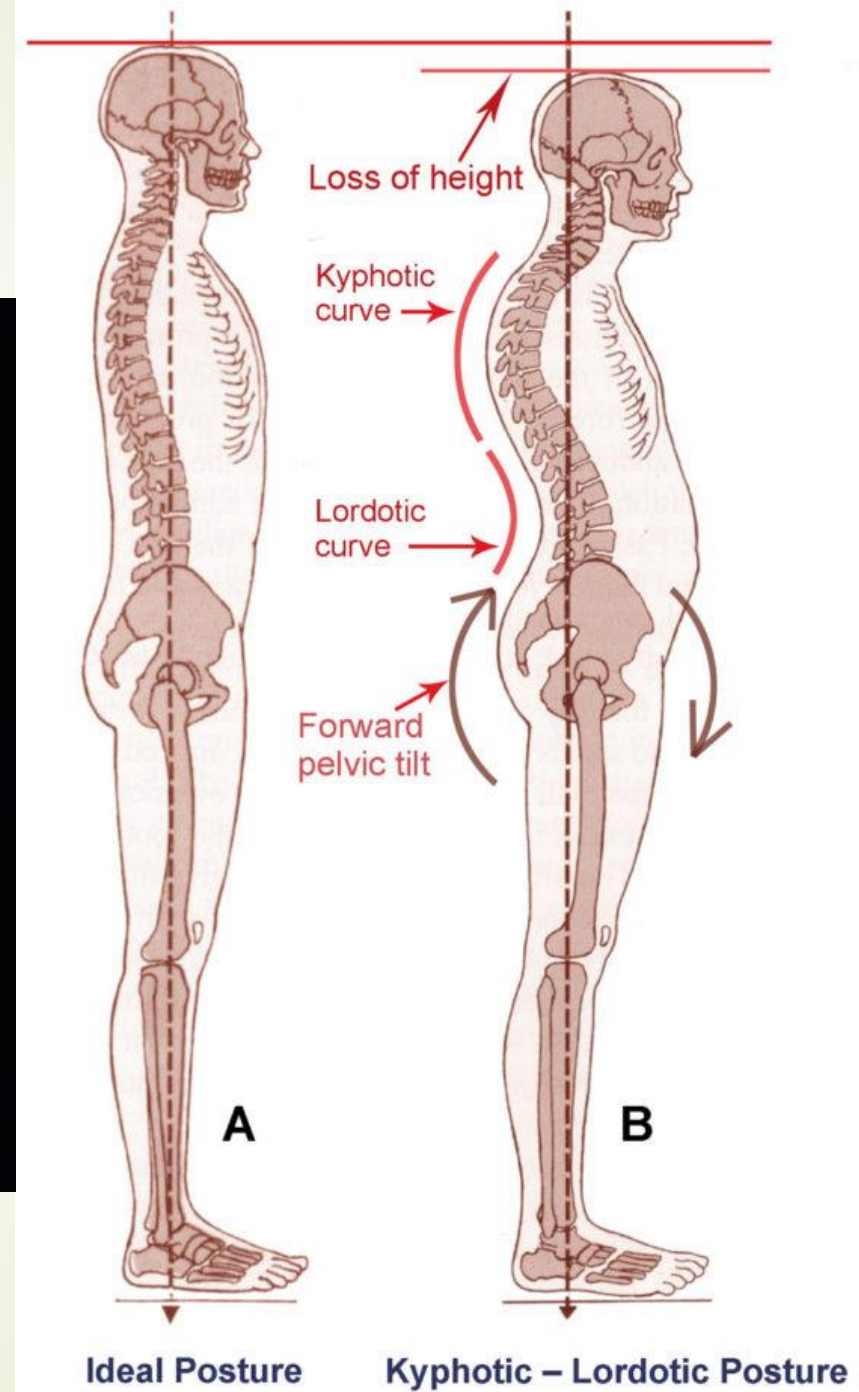
لوردوزیس

کیفو اسکولیوزیس



کیفوزیس

افزایش قوس مهره های پشتی





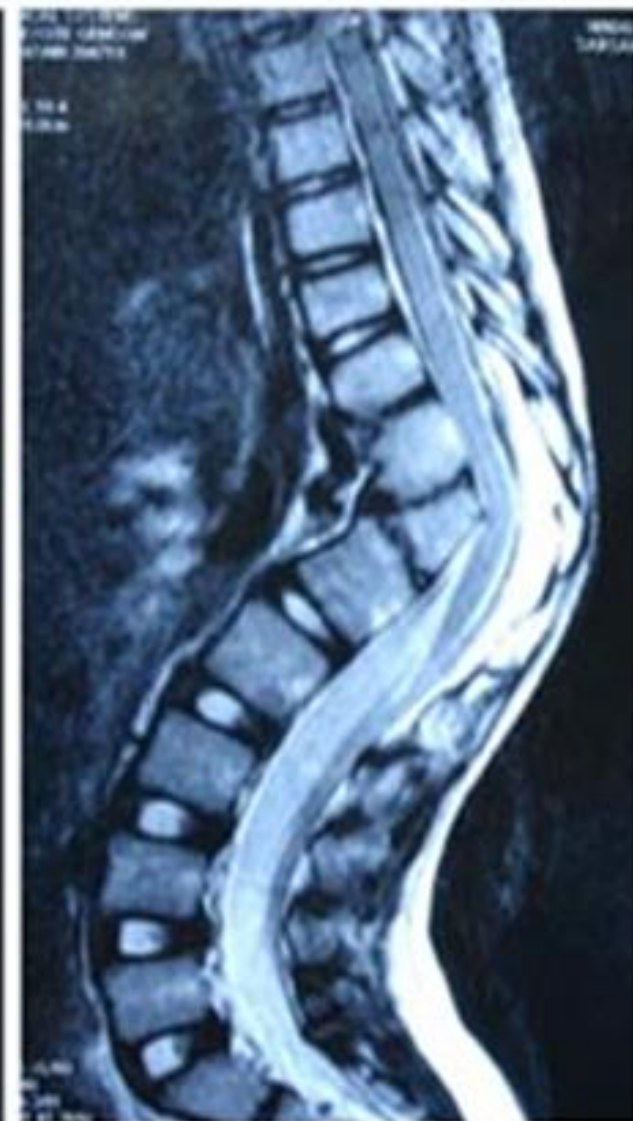
Pre Op Lateral X—Ray



Pre Op CT with Sagittal
Reconstruction



Pre Op CT with 3D
Reconstruction



Pre Op T2W Sagittal MRI
showing cord compression

لوردوزیس

افزایش قوس مهره های کمری

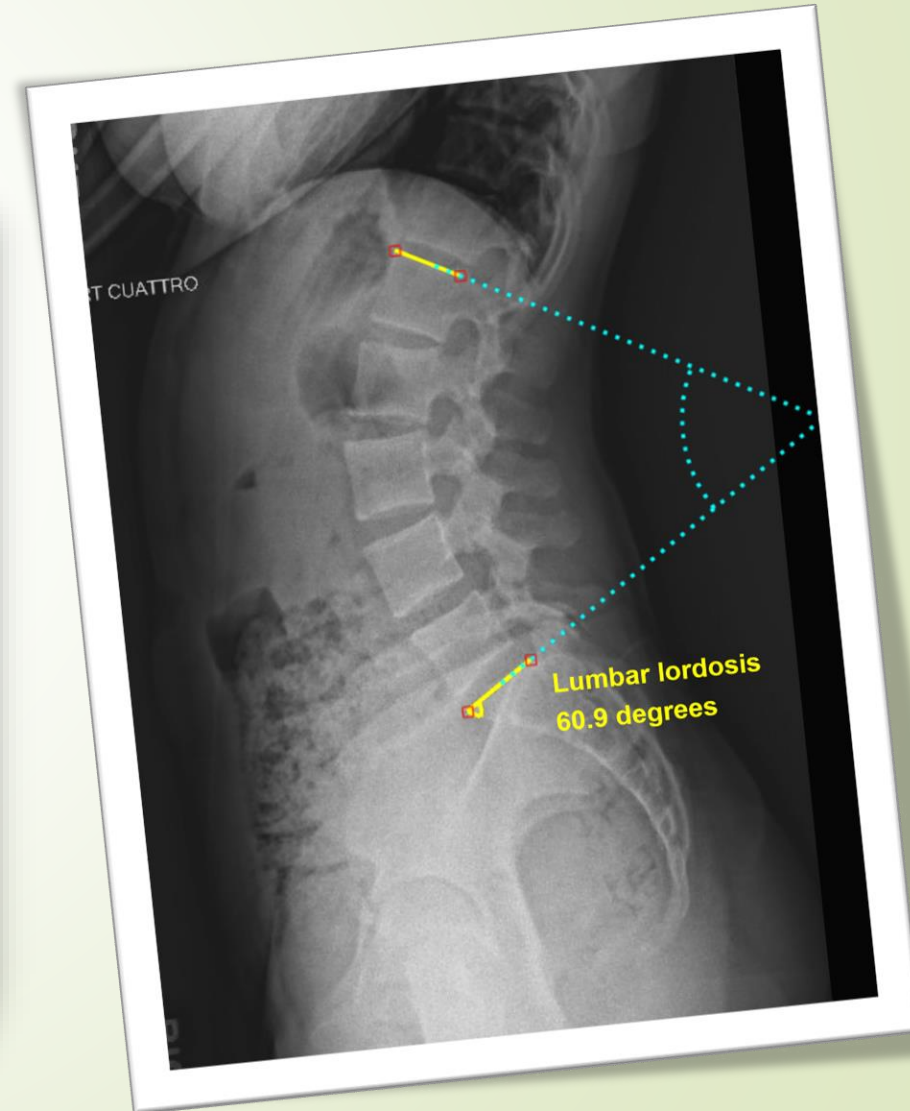
Normal spine



Lordosis of the spine



Exaggerated lumbar curve



آناتومی مهره ها (تیپیک یا معمول)

هر مهره تیپیک یا معمول دارای بخش های مختلفی است از جمله:

- ☐ یک تنه
- ☐ پدیکل یا پایک
- ☐ لامینا یا تیغه

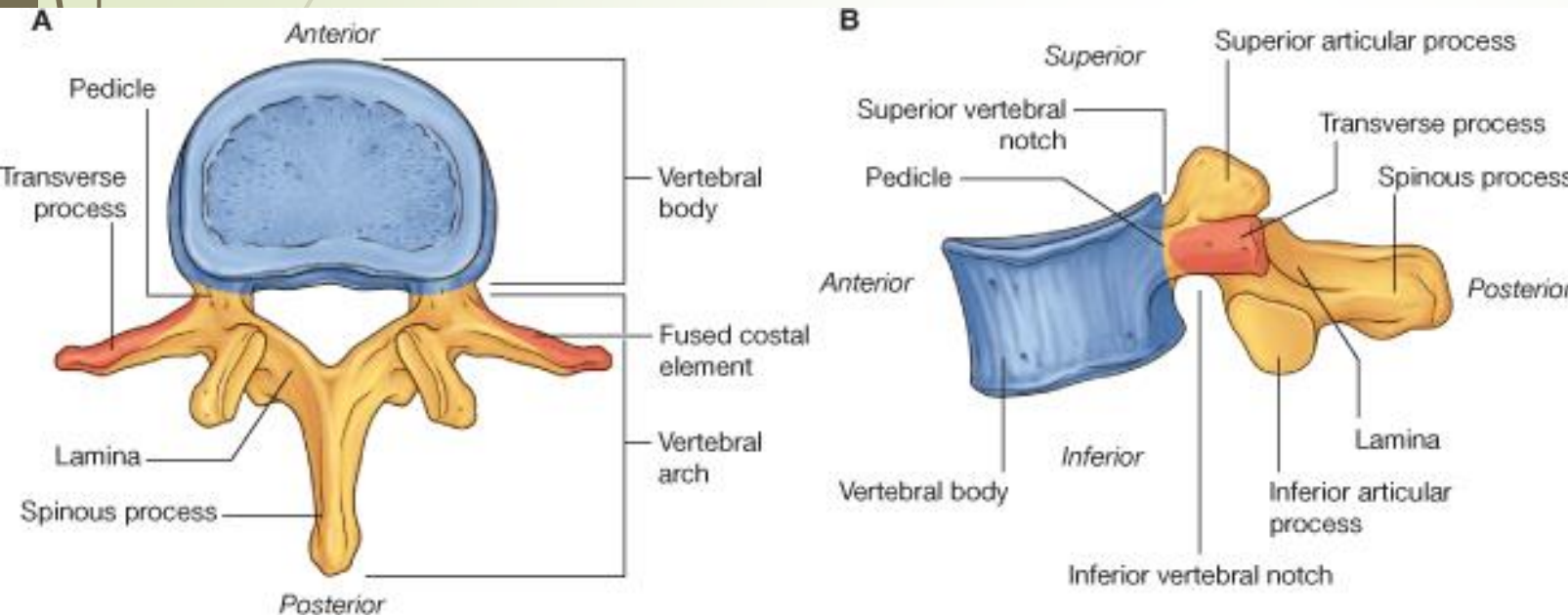
حد فاصل ۳ مورد فوق، کانال مهره ای

زائده خاری

زوائد مفصلی فوقانی و تحتانی

بریدگی های مهره ای فوقانی و تحتانی (عمیق تر)

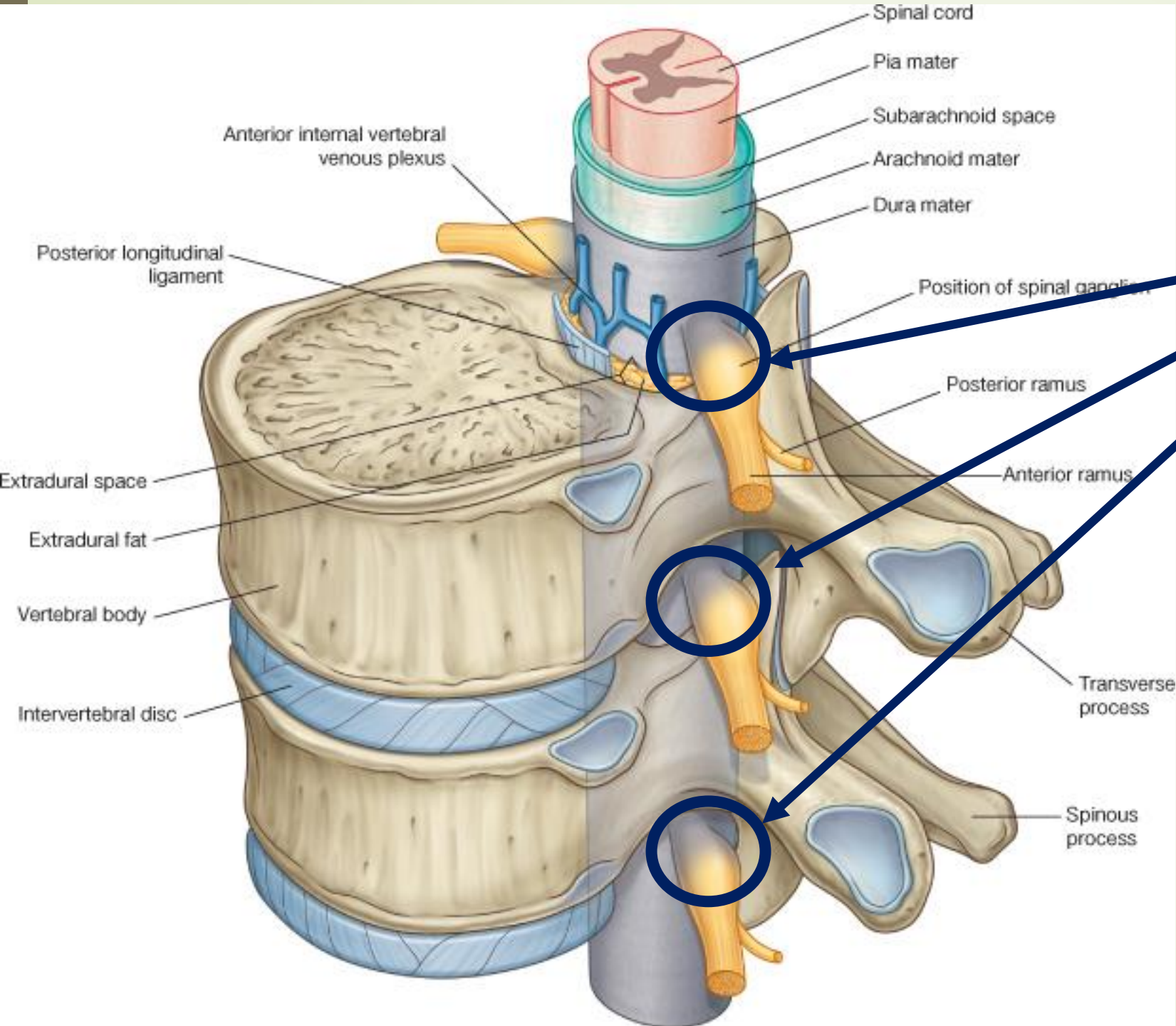
"حد فاصل بین آنها، سوراخ بین مهره ای"



سوراخ بین مهره ای یا

Intervertebral foramen

قرار گیری بریدگی های مهره ای بر روی هم



Spinal cord

Pedicle

Vertebral body

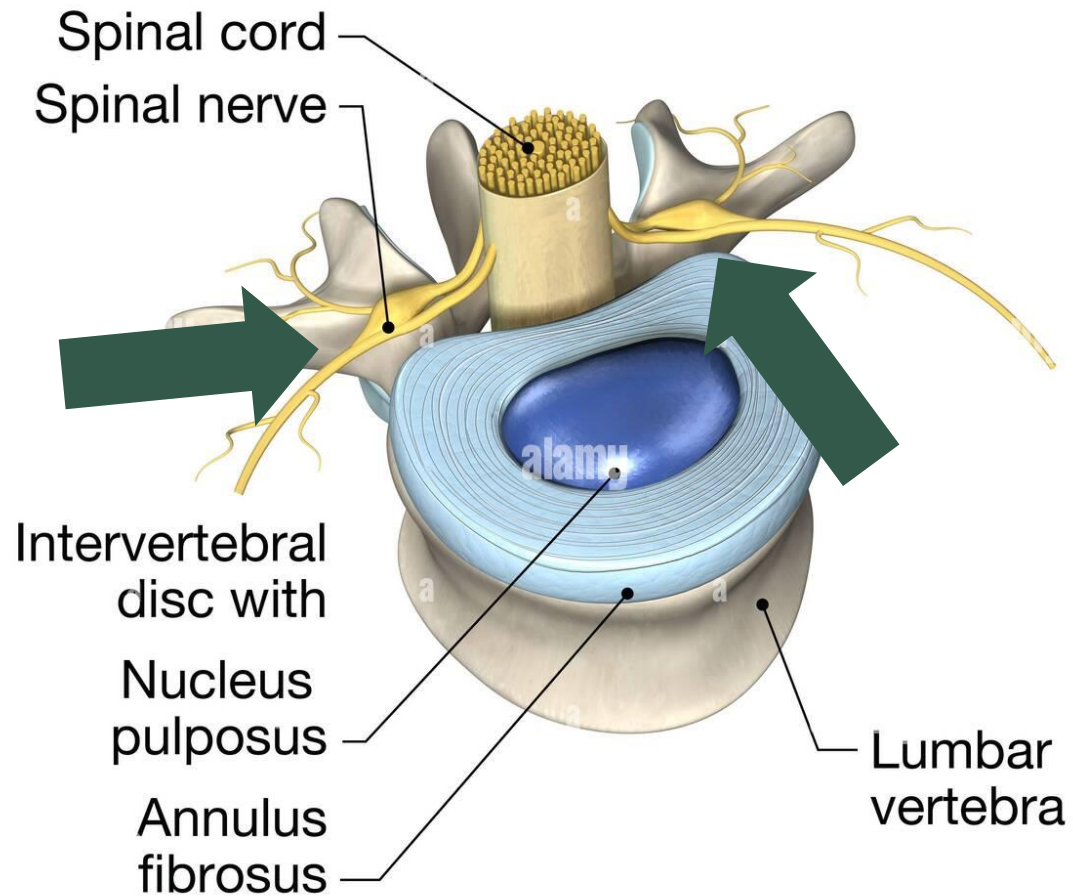
Intervertebral foramen

Transverse process

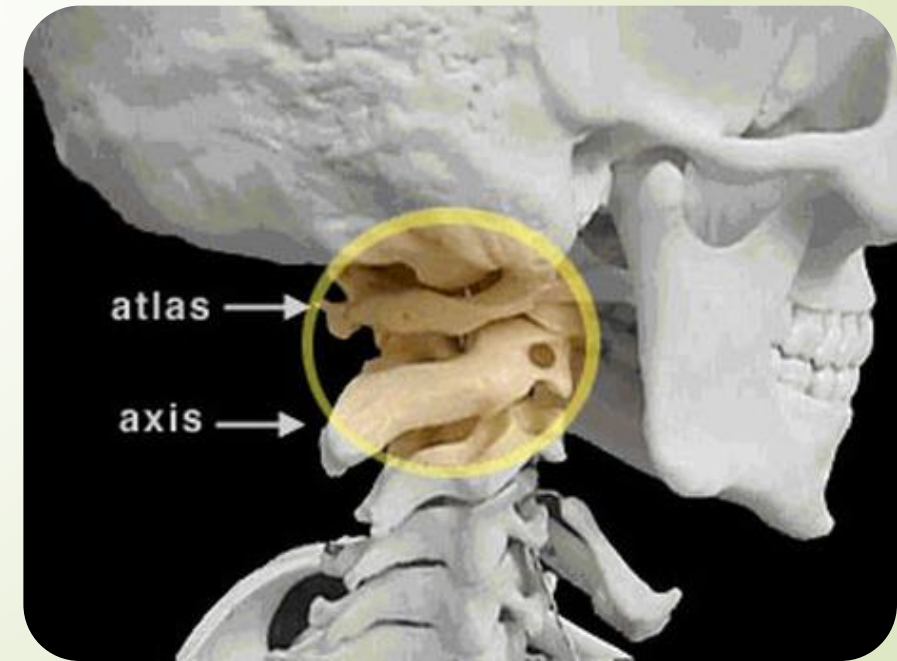
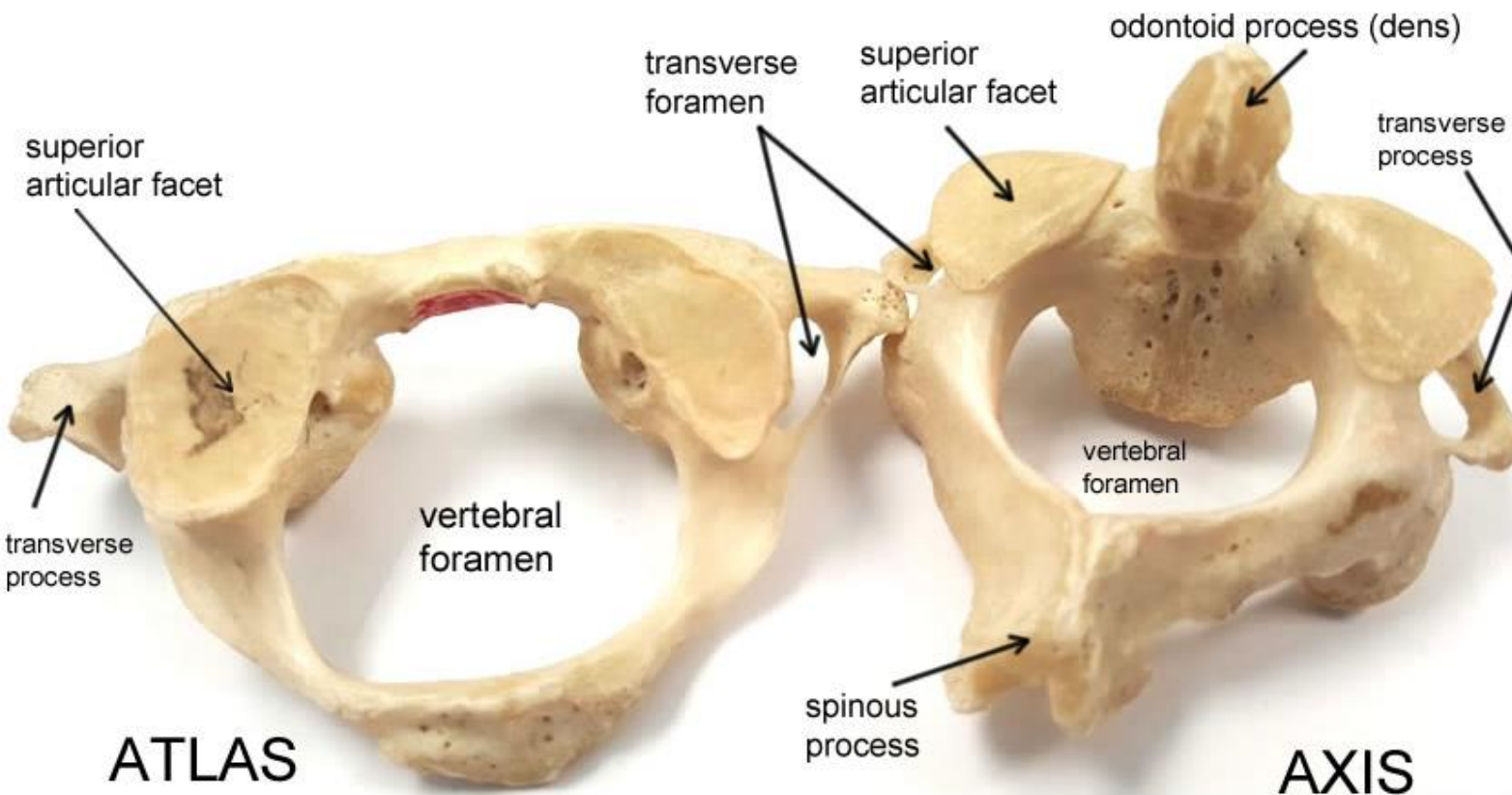
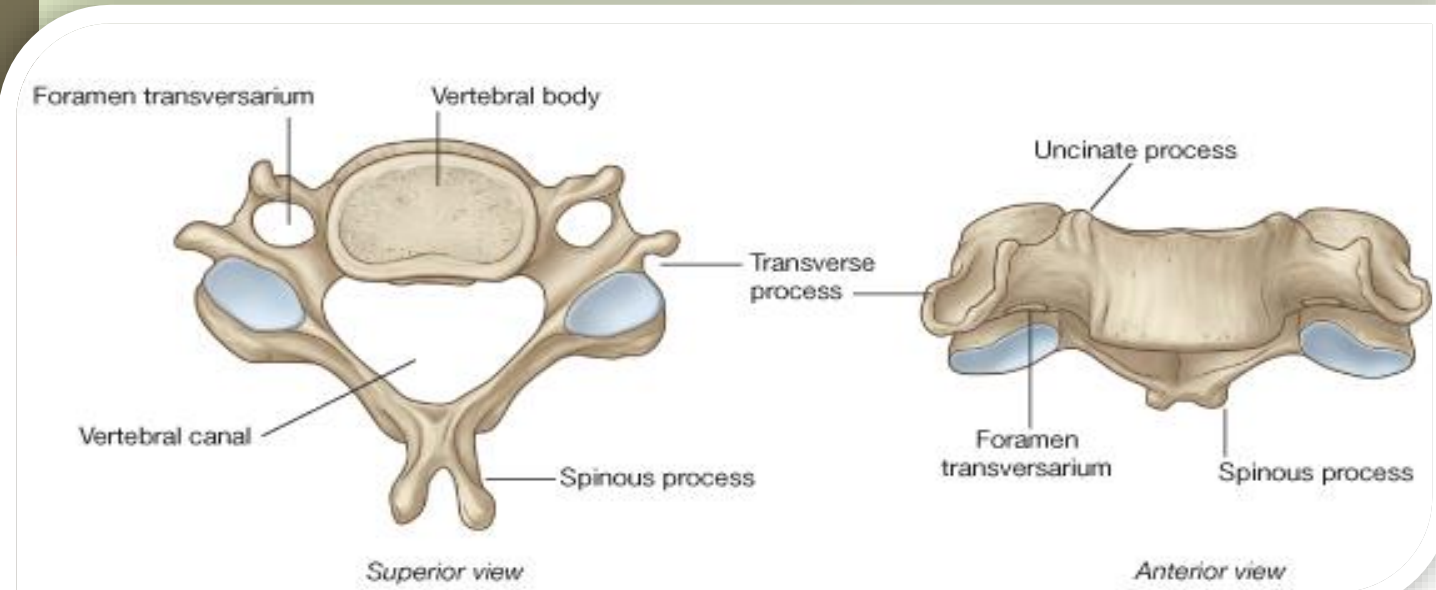
Spinal nerve

Spinous process

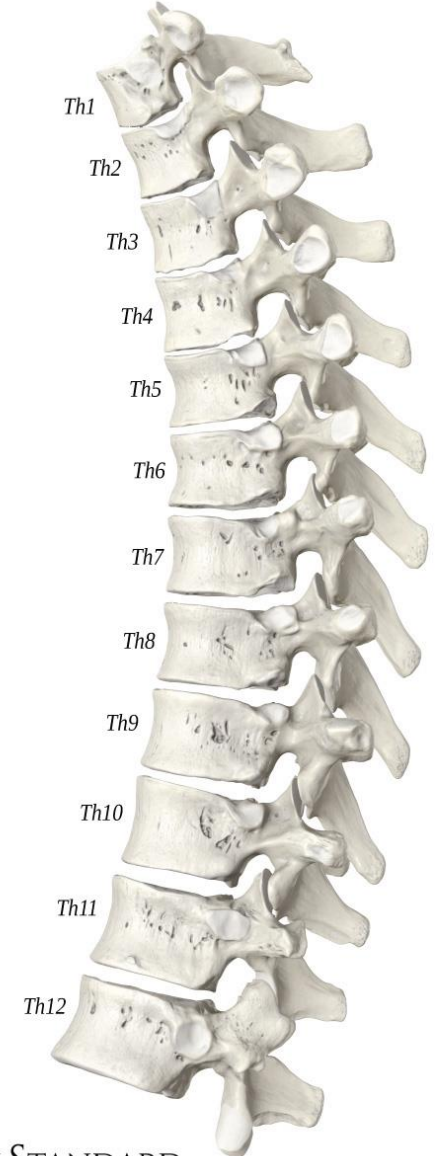
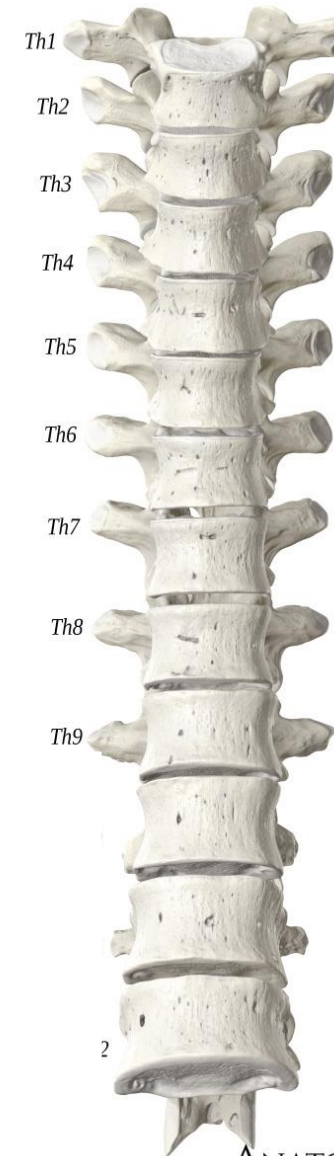
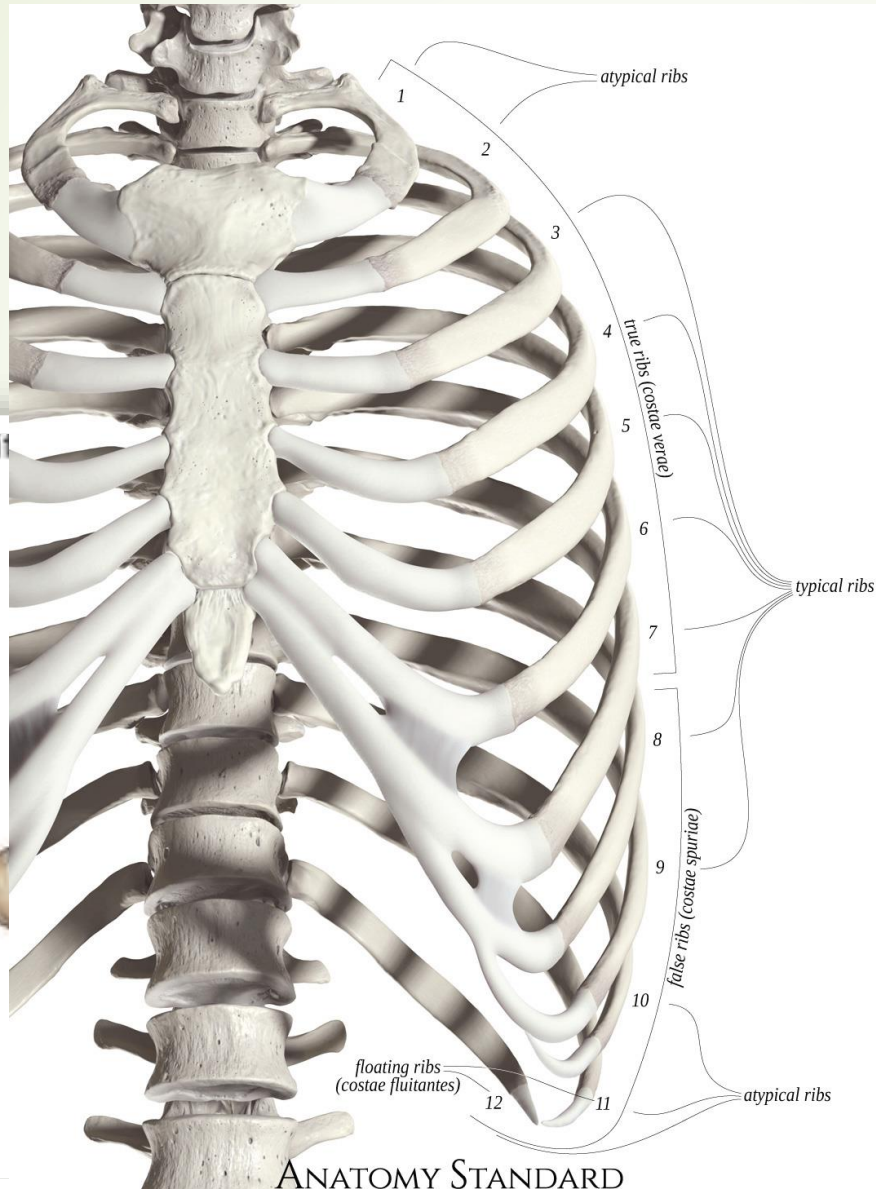
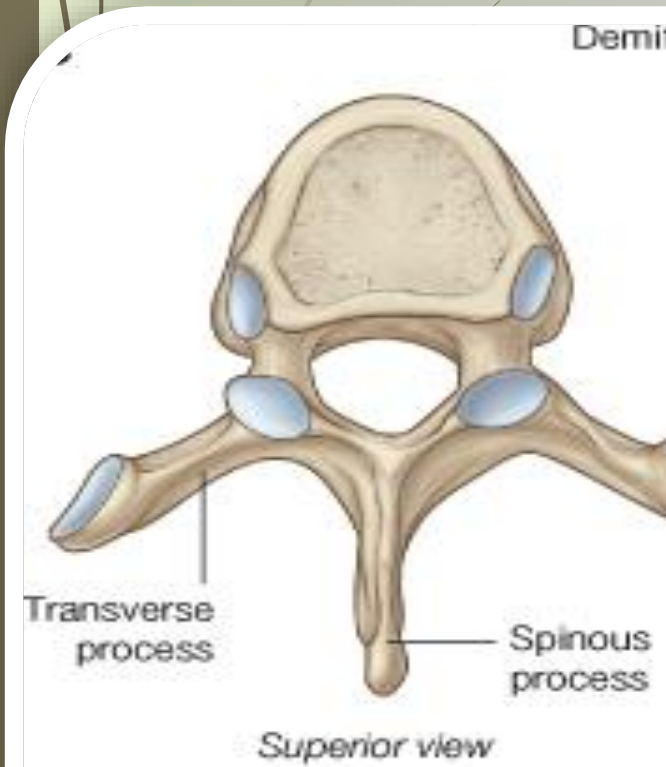
Intervertebral foramen



مهره گردنی (Cervical C1-C7)



مهره سینه ای Thoracic (T1-T12)



مهره کمری (L1-L5) Lumbar

➤ مهره ضخیم تر

➤ بیشترین فشار بر روی این مهره ها

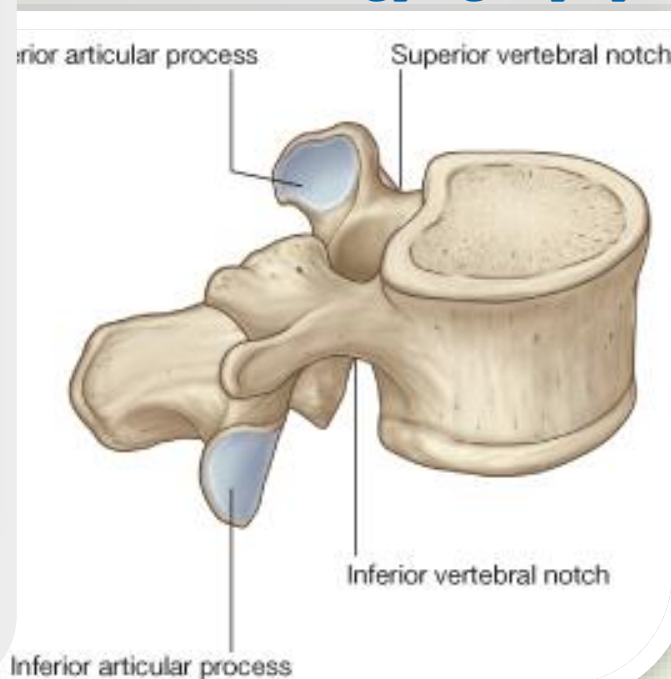
➤ دیسک های قطور بین مهره ای

➤ زوائد خاری به صورت افقی

➤ نبود ویژگی های گردنی (زائده خاری دوشاخ و...)

➤ نبود ویژگی های سینه ای (زائده خاری عمودی و رویه مفصلی) در مهره های کمری

➤ در پایین به مهره خاجی یا ساکروم مفصل می شود



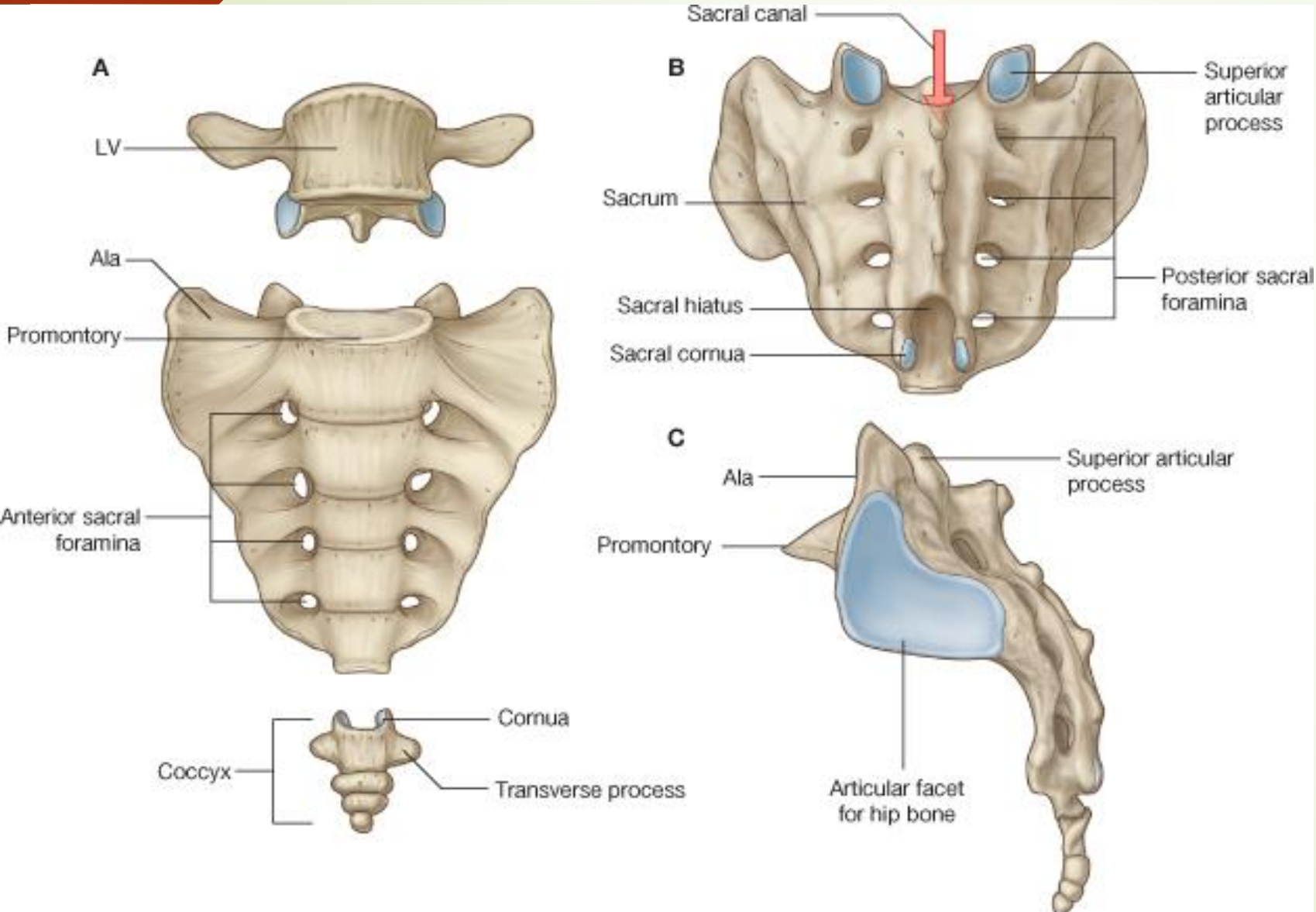
Cervical

Thoracic

Lumbar

Pelvic

ساکروم یا مهره خاجی (Sacrum S1-S5)



در نمای قدامی:

مقعر (دارای سوراخ های قدامی ساکروم)

بال (Ala)

دماغه (Promontory)

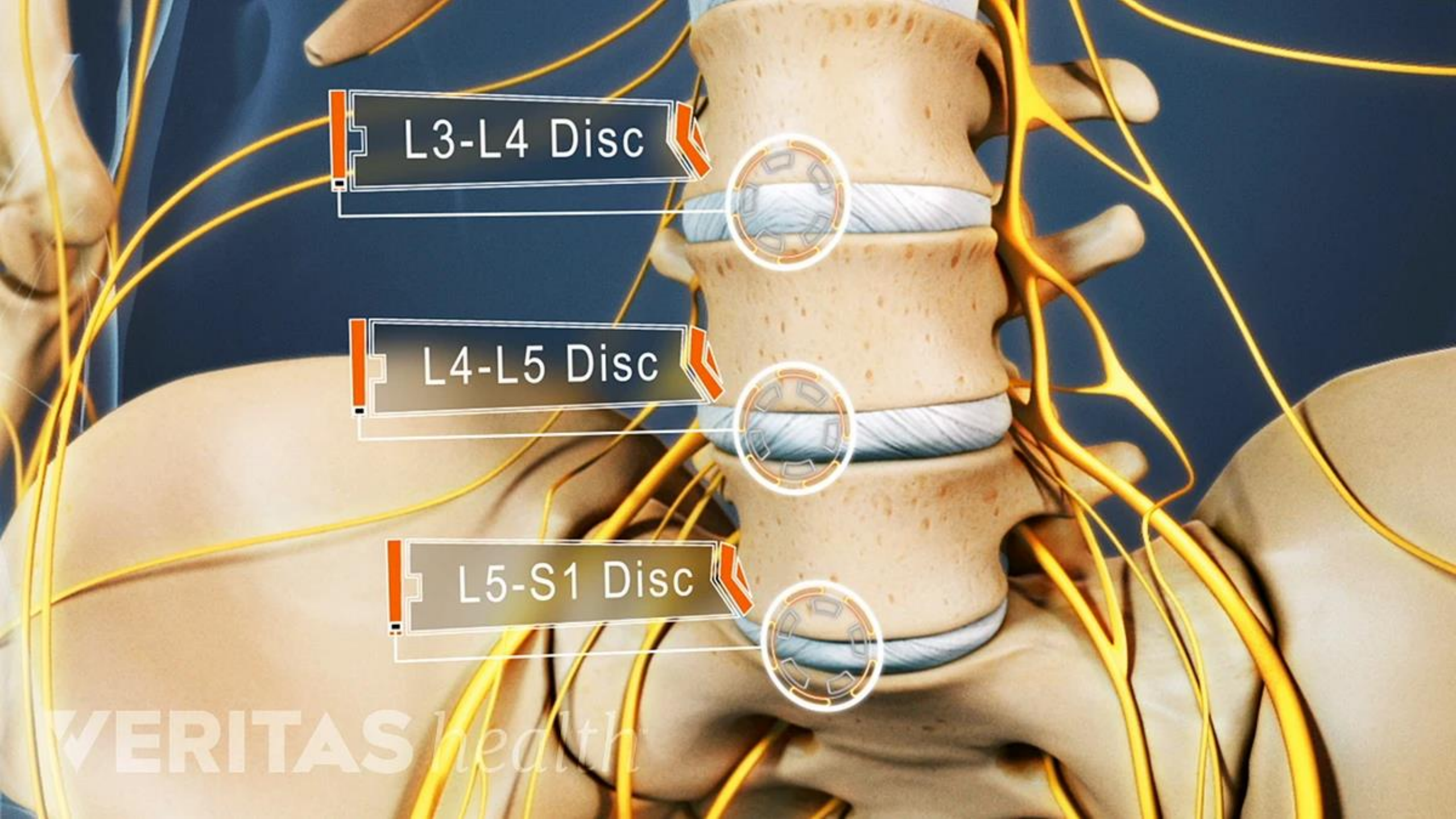
در نمای خلفی:

محدب

دارای سوراخ های خلفی ساکروم

ستیغ های ساکروم

(میانی، داخلی، خارجی)



L3-L4 Disc

L4-L5 Disc

L5-S1 Disc

VERITAS health

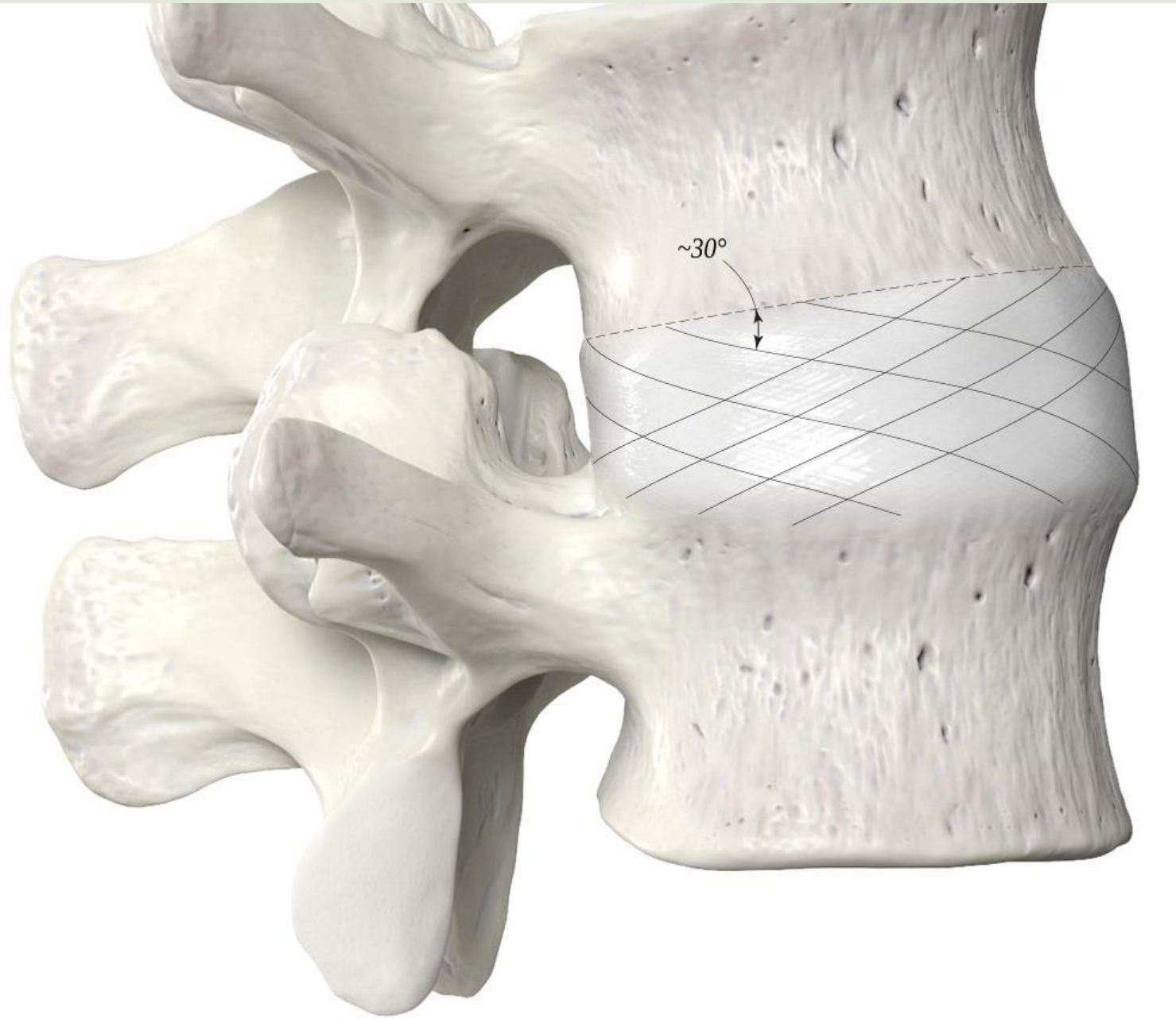
Intervertebral Disc



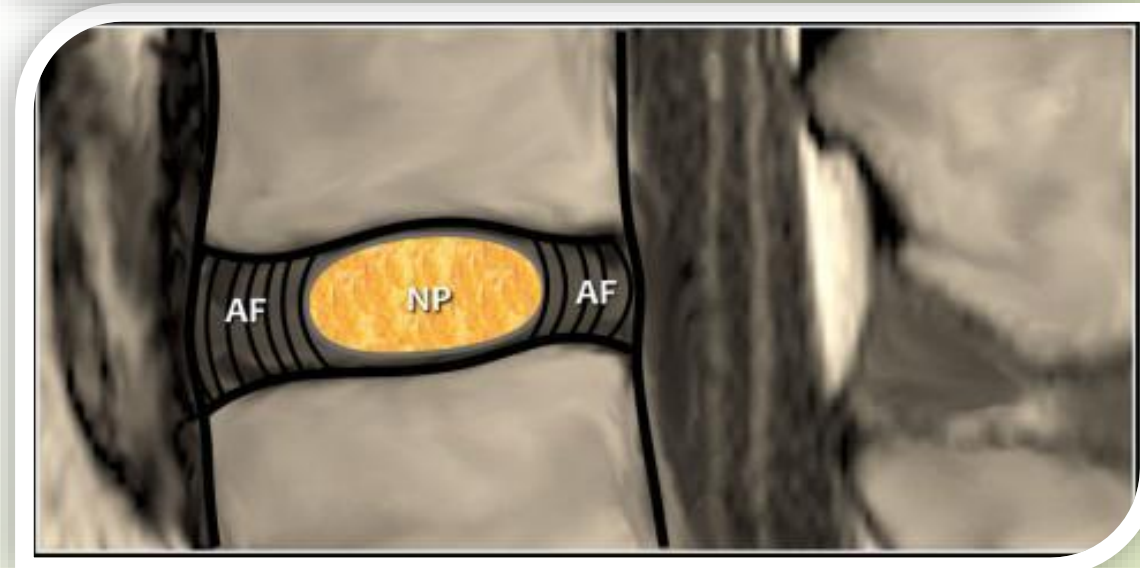
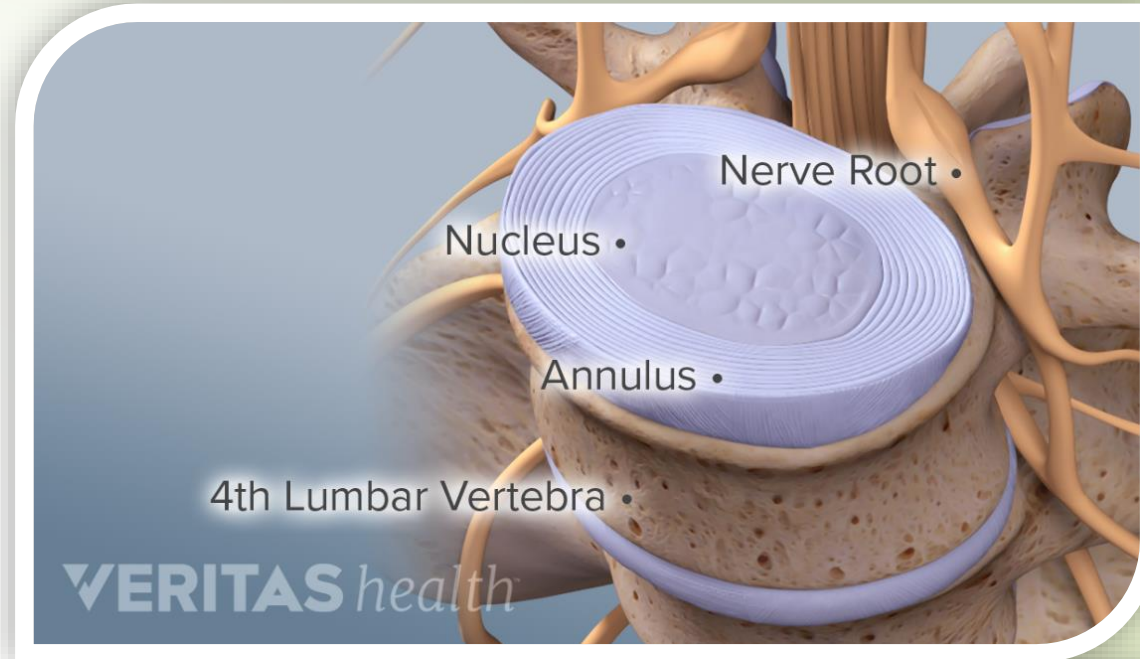
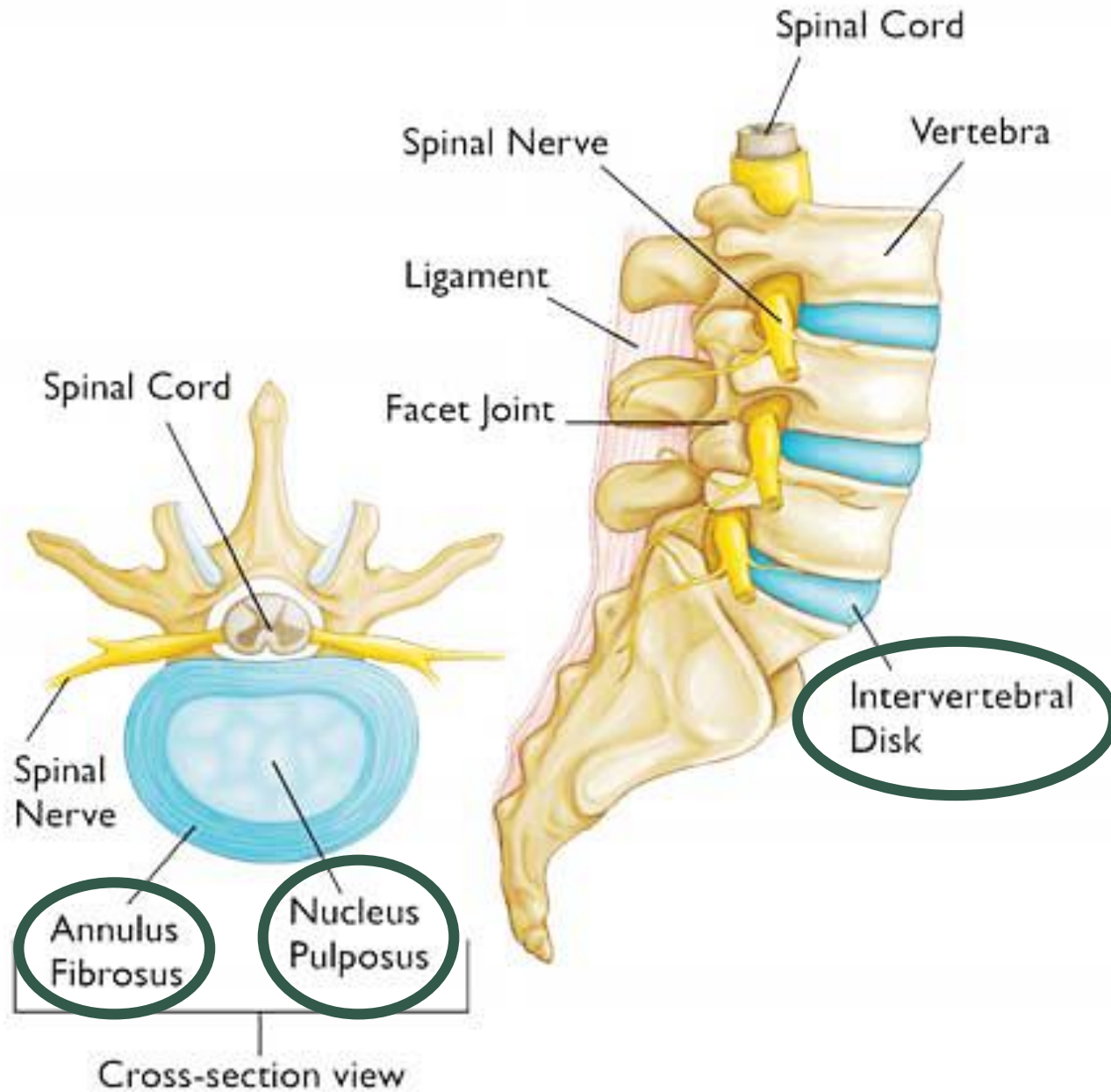
Intervertebral Disc



Intervertebral Disc



Intervertebral Disc



نخاع و اعصاب نخاعی (سیاتیک)

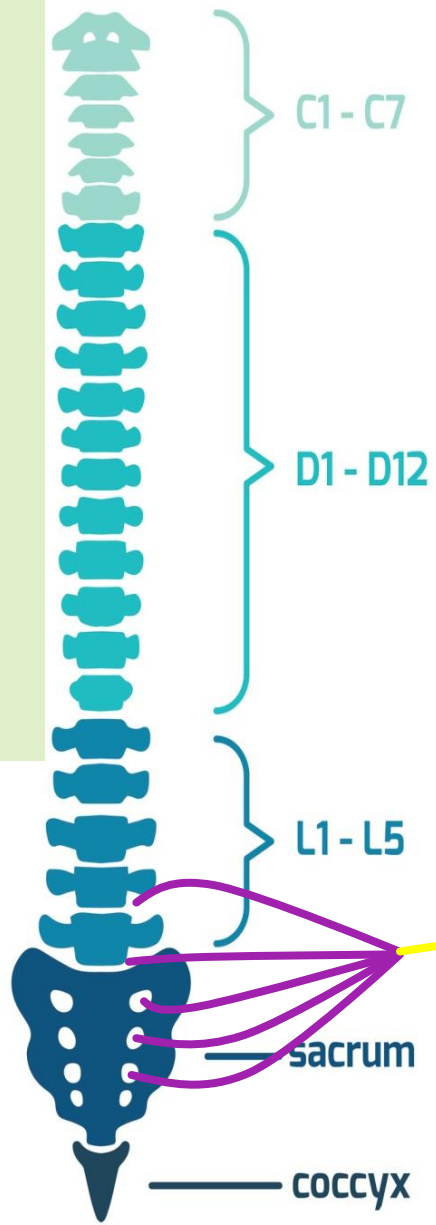
➔ نخاع در کانال مهره ای از بالا تا حد دیسک L1-L2

➔ دارای ۳۱ جفت عصب نخاعی

➔ اعصاب L4-S3 در تشکیل عصب بزرگ سیاتیک نقش دارند.

➔ درد عصب در پشت ران و از زانو به پایین

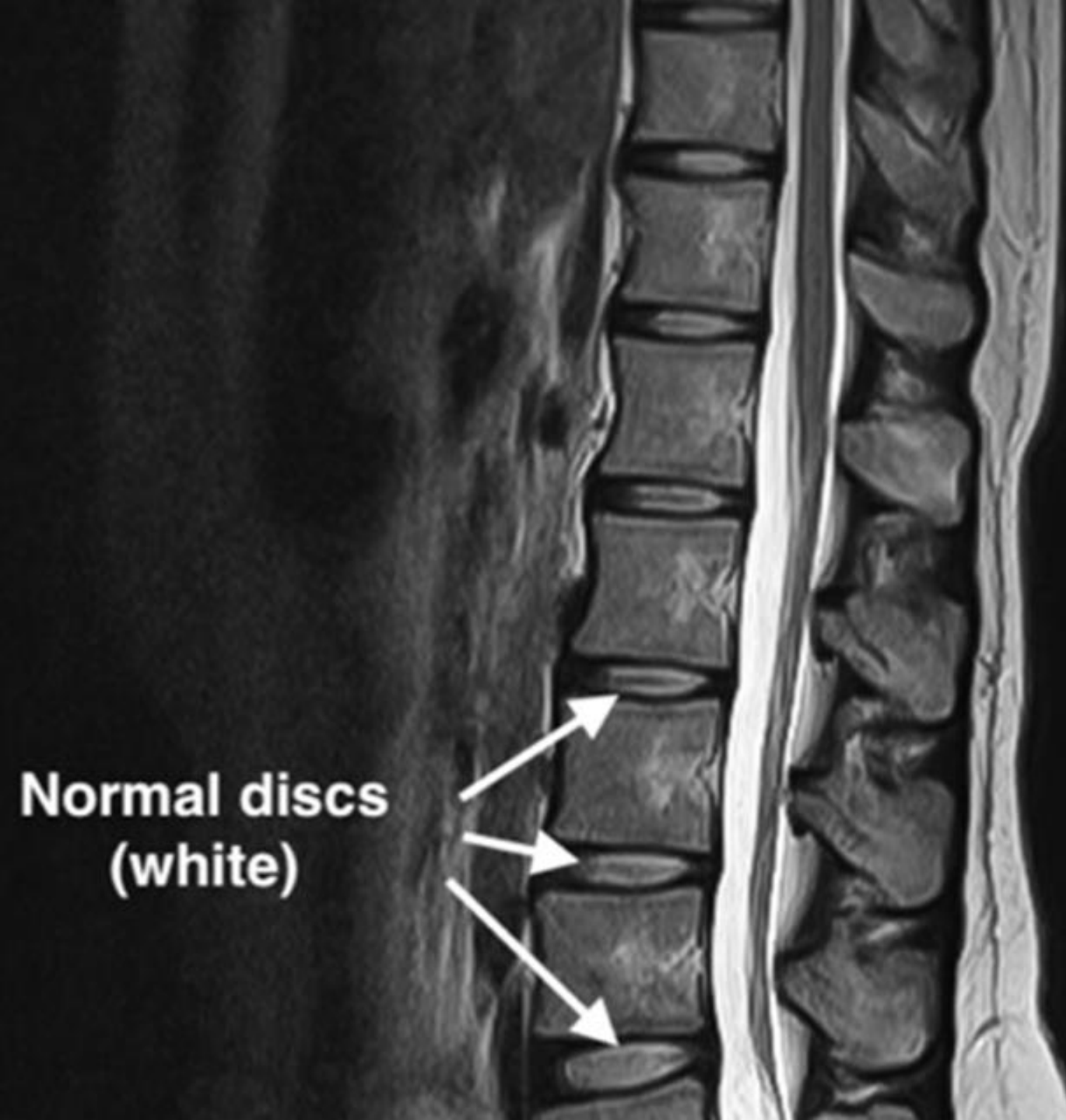
➔ عمدتاً دیسک L4-L5 و L5-S1 درگیر می شود.



Sciatic Nerve

LUMBAR MRI





انواع اختلالات ستون فقرات

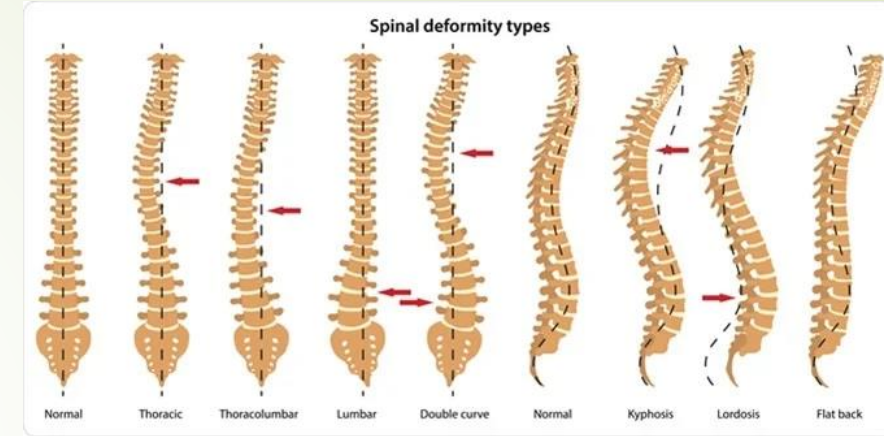
Spinal Disorders types

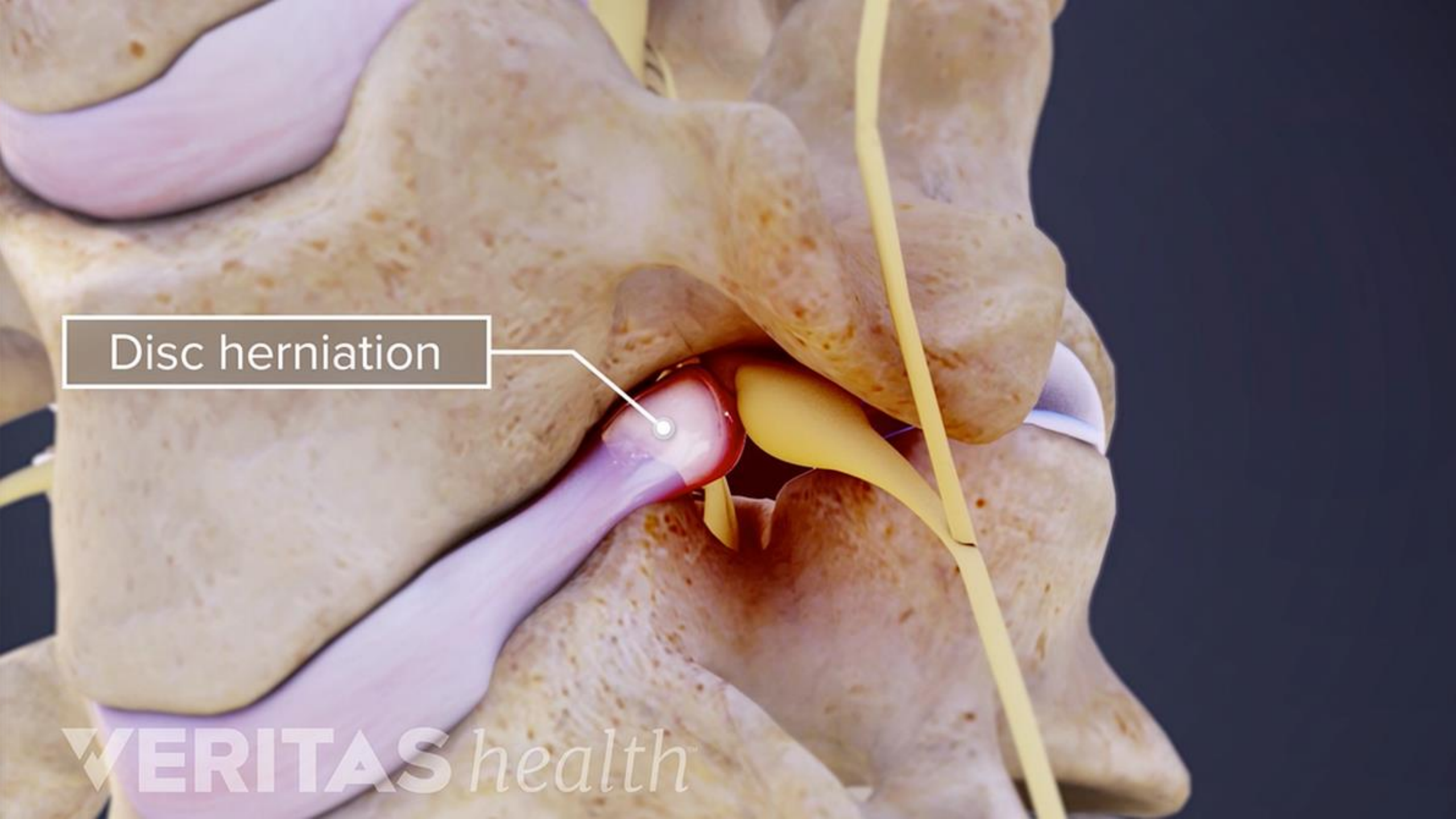
➤ Spine Curvature Disorders

- Lordosis
- Kyphosis
- Scoliosis

➤ Nerve Compression Disorders

- ***Disc herniation***
- *Facet arthrosis*
- *Synovial cysts*
- *Spondylolisthesis and*
- *Epidural lipomatosis*

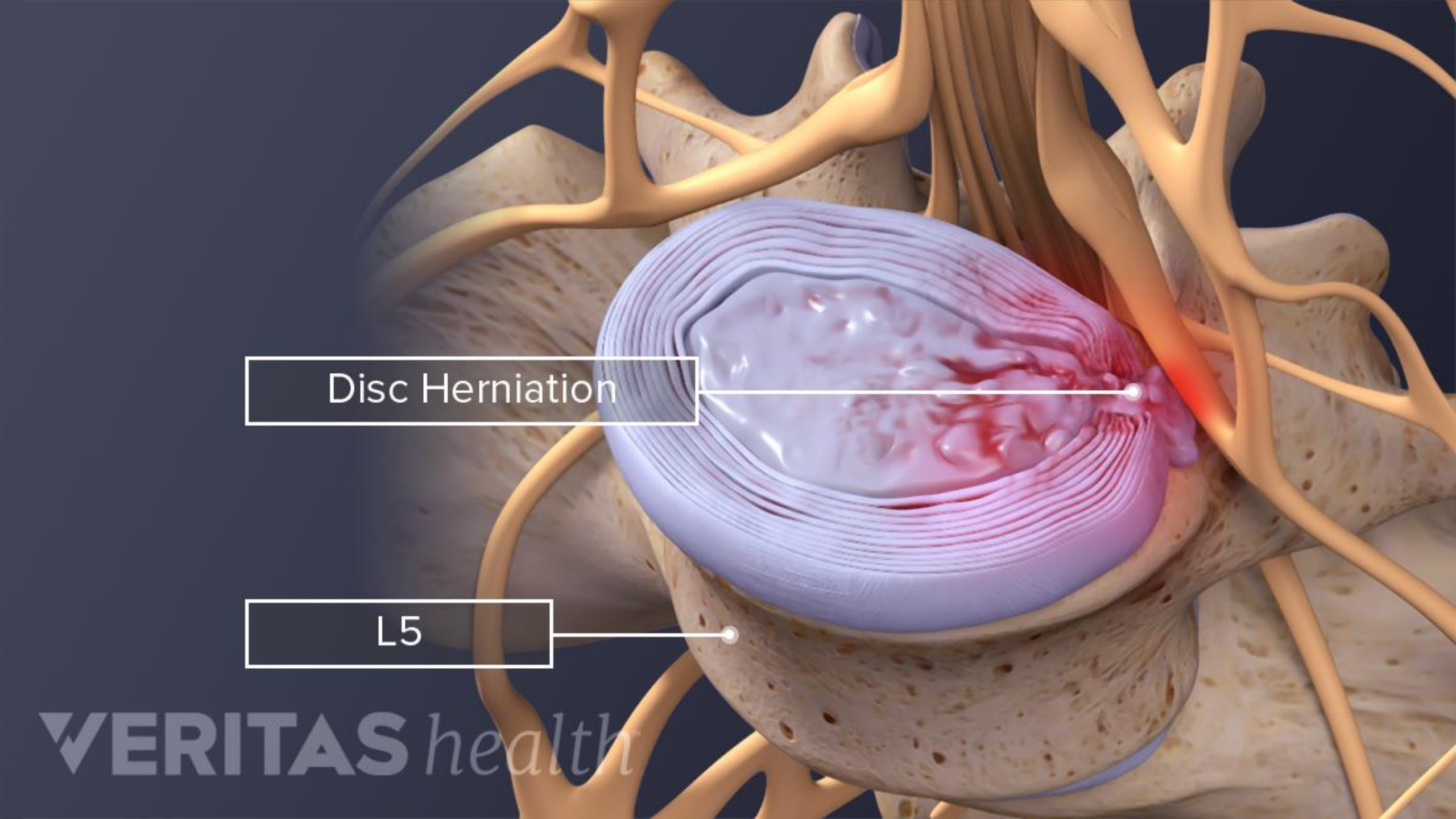




This anatomical diagram illustrates a cross-section of a lumbar vertebra and its associated intervertebral disc. The vertebral body is shown in a light tan color. The intervertebral disc is depicted with a yellow outer annulus fibrosus and a darker, reddish-purple inner nucleus pulposus. A label 'Disc herniation' with a white line points to a specific area where the nucleus pulposus has shifted out of its normal position, pressing against the surrounding structures. The surrounding soft tissue is shown in a light purple color.

Disc herniation

VERITAS health



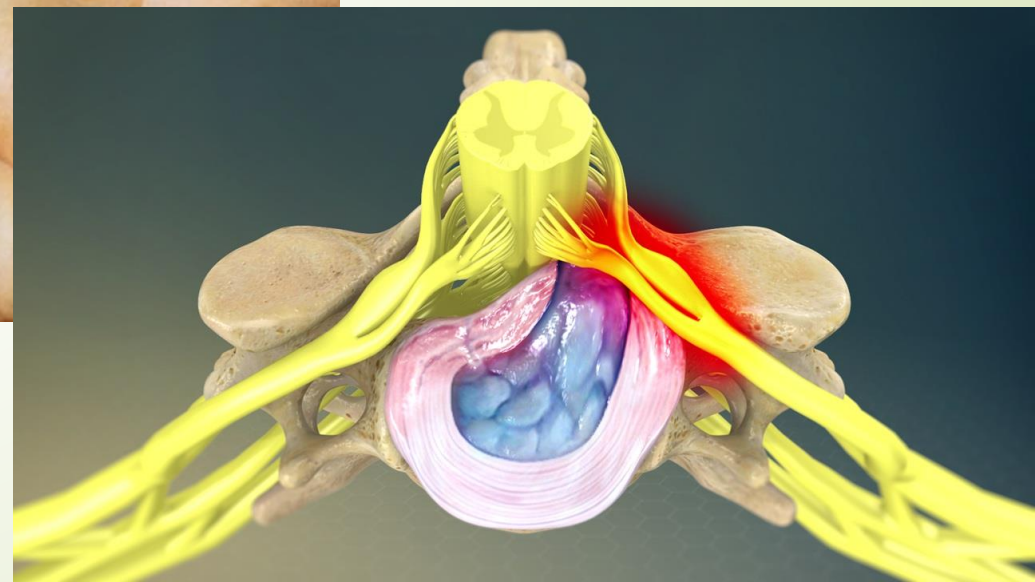
A 3D anatomical illustration of a lumbar vertebra and its associated intervertebral disc. The disc is shown in cross-section, revealing a central nucleus pulposus (light blue) and an outer annulus fibrosus (pinkish-red). A significant portion of the nucleus pulposus has herniated (bulged out) towards the right side of the image, where it is compressing the L5 nerve root. The nerve root is shown as a yellowish structure exiting the vertebral canal. The surrounding bony structures, including the vertebral body and the vertebral arch, are depicted in a realistic, textured manner. The background is a dark blue gradient.

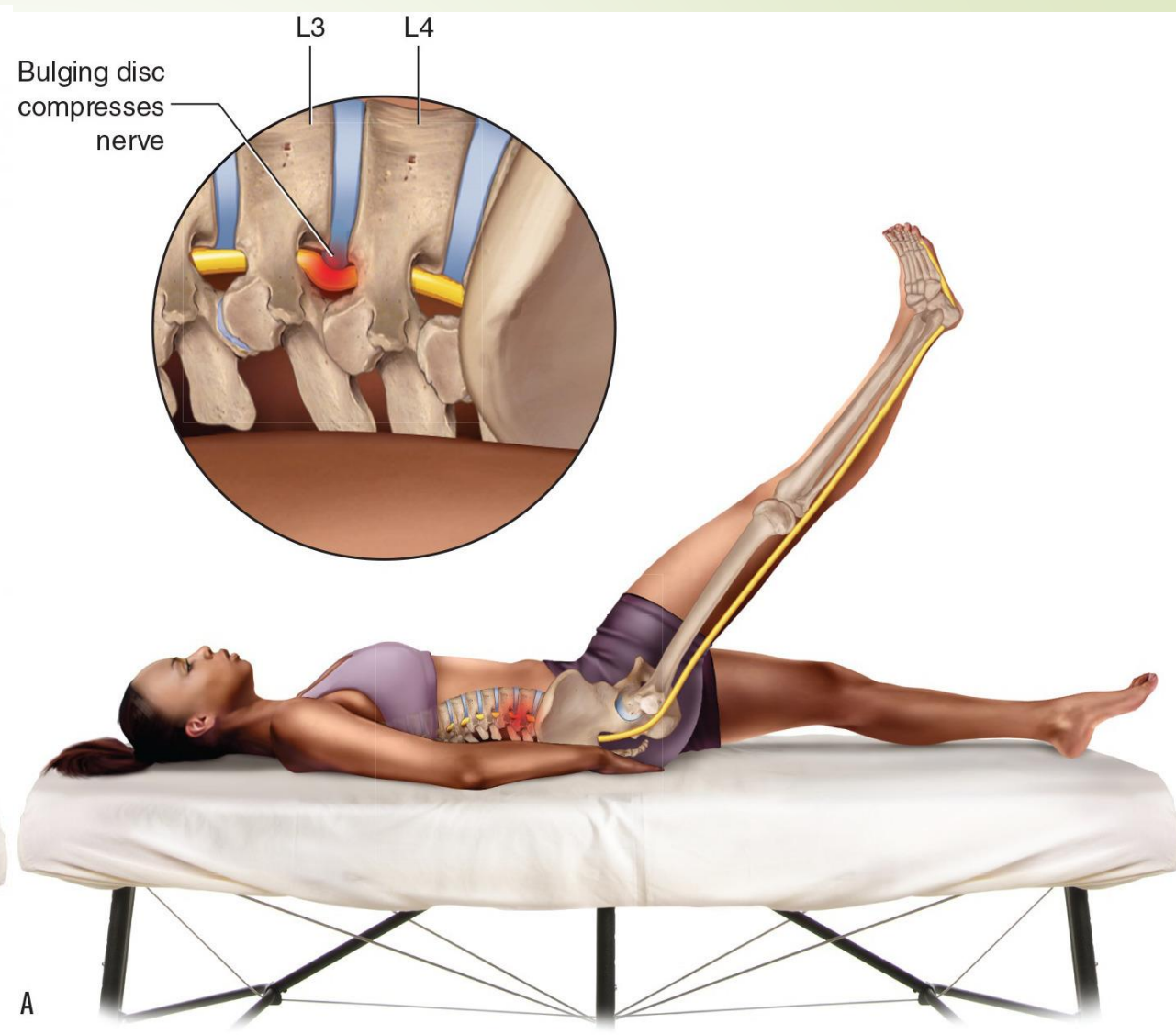
Disc Herniation

L5

Herniated Disc

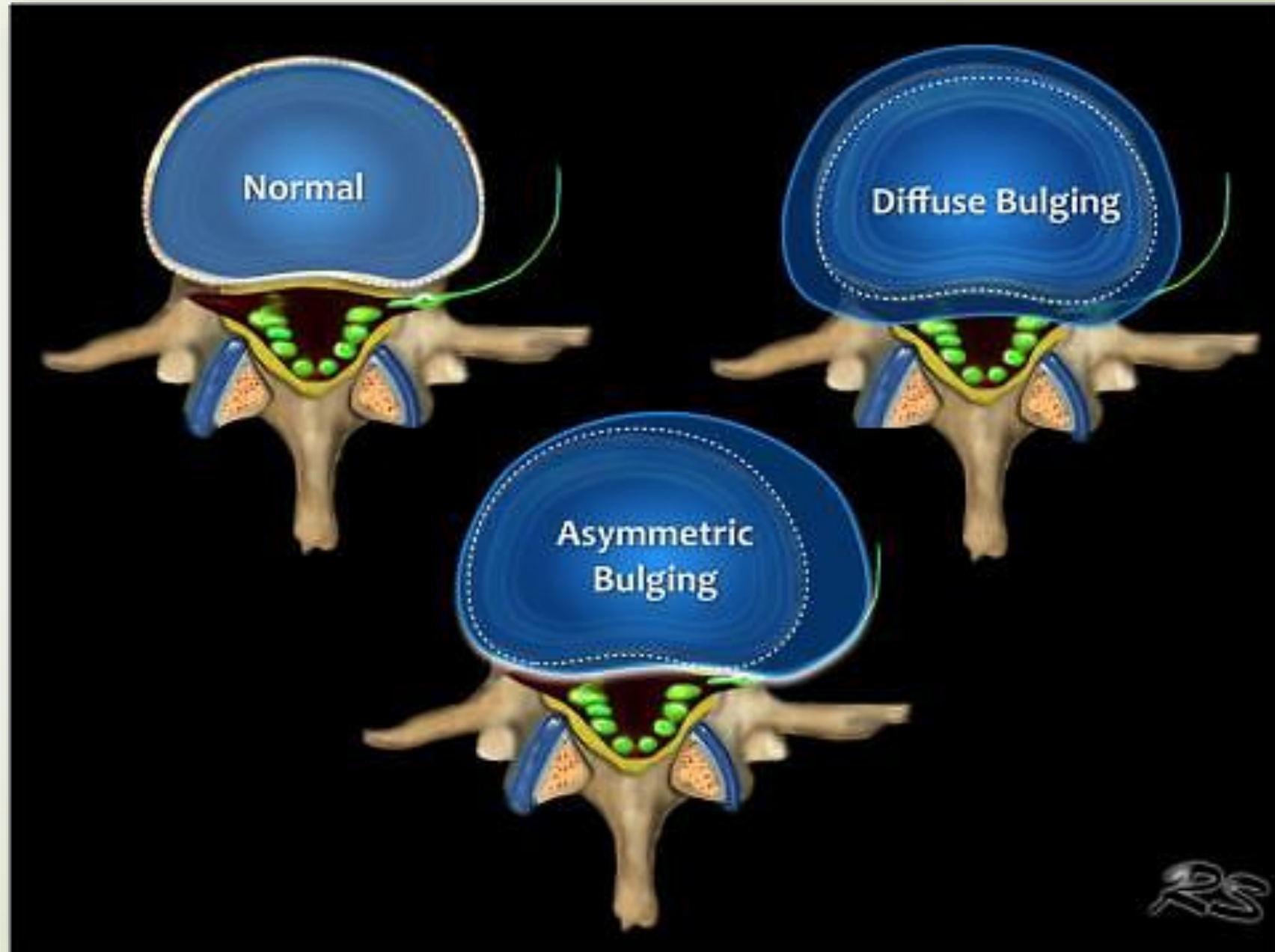
VERITAS *health*





Disc Herniation

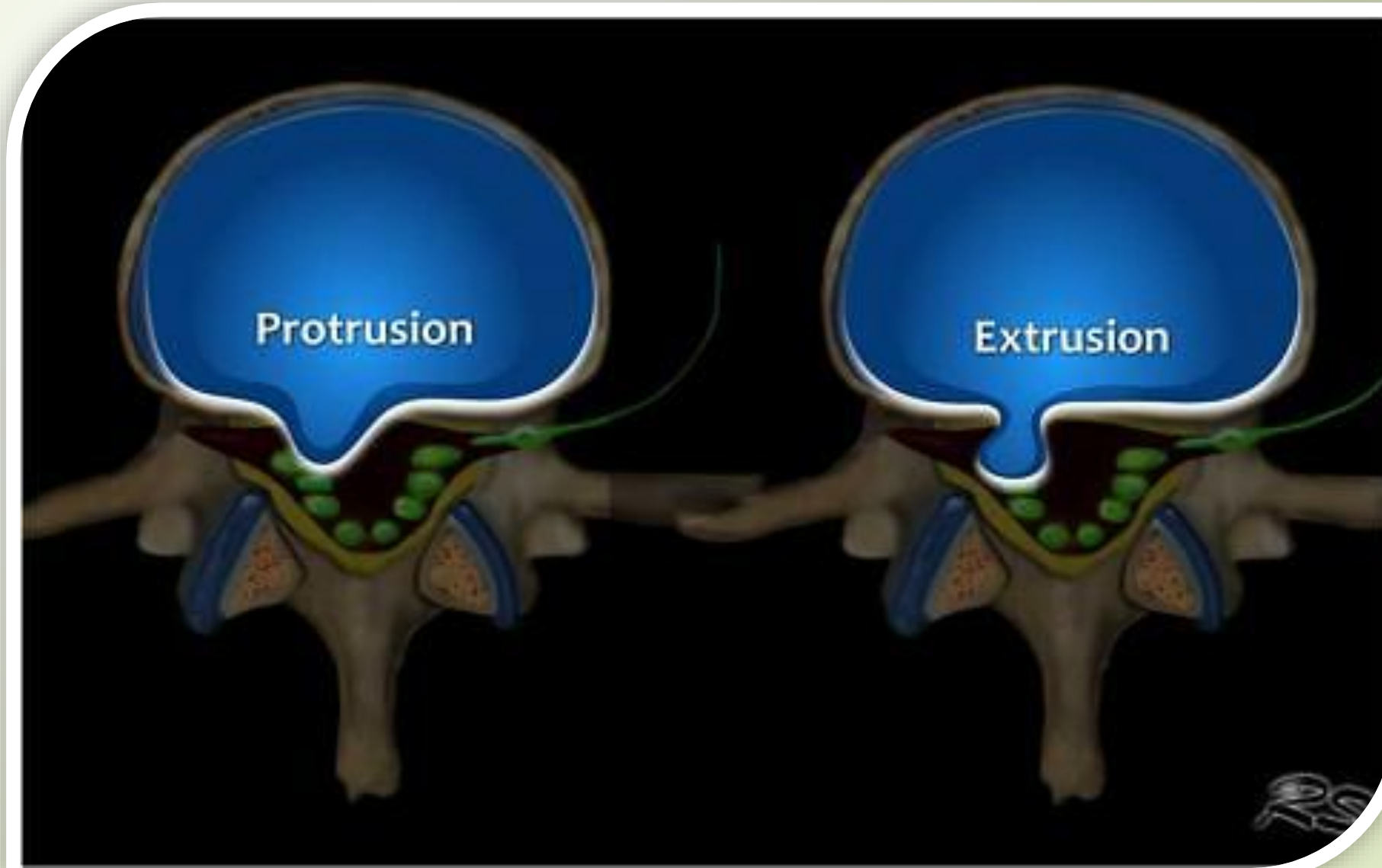
Bulging Disc



Disc Herniation

Protrusion

Extrusion



Disc Herniation

Migration

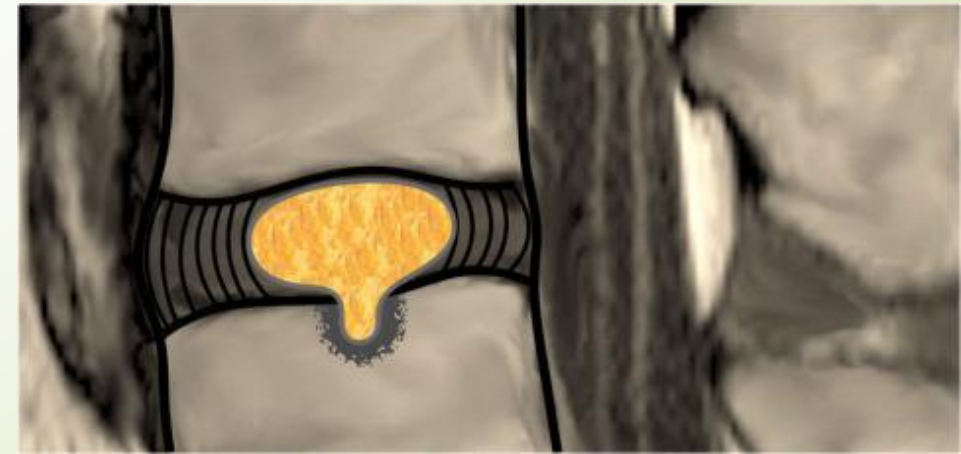
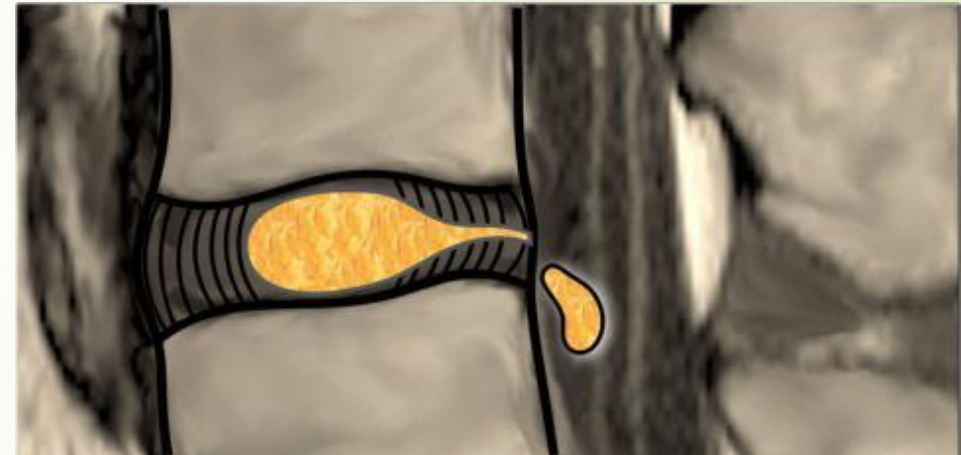
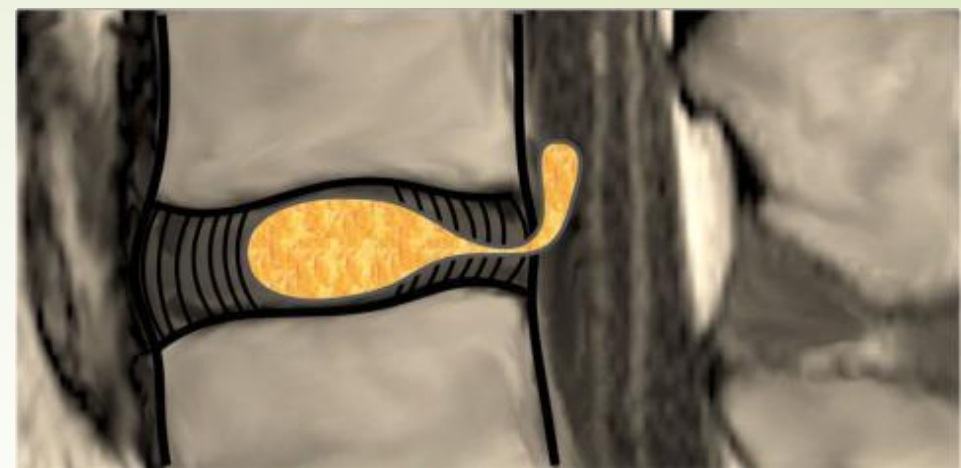
Migration indicates displacement of disc material away from the site of extrusion, regardless of whether sequestered or not.

Sequestration

The term sequestration is used to indicate that the displaced disc material has lost continuity with the parent disc.

Intravertebral herniation

Intravertebral herniation or Schmorl node is herniation of disc material in the vertical direction through a gap in the vertebral end plate.



Localization of Herniated Discs

➤ Central

Since the posterior longitudinal ligament (PLL) is at its thickest in this region, the disc usually herniates slightly to the left or right of this central zone.

➤ Subarticular

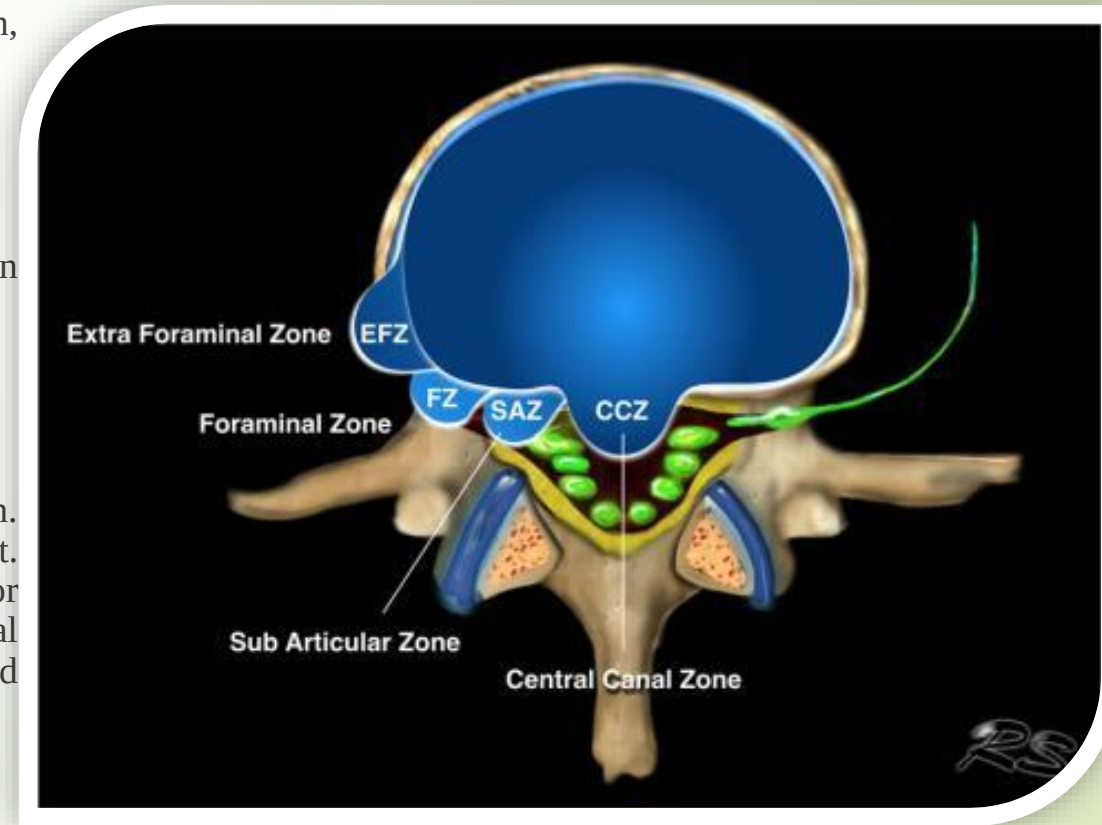
Because the PLL is not as thick in this region, this is the number one region for disc herniations.

➤ Foraminal

It is rare for a disc to herniate into the intervertebral foramen. Only 5% to 10% of all disc herniation occur here or farther out. When herniations do occur in this zone, they are often very troublesome for the patient. This is because a super-delicate neural structure called the 'Dorsal Root Ganglion' (DRG) lives in this zone resulting in severe pain, sciatica and nerve cell damage.

➤ Extraforaminal

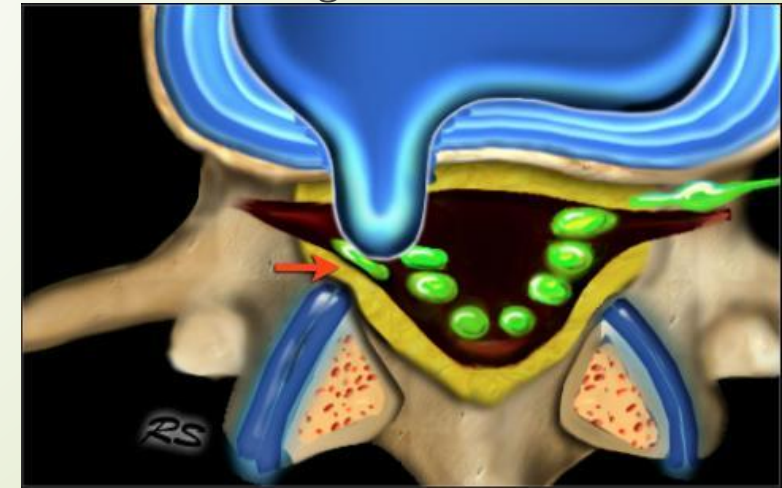
Disc herniations in this region are uncommon.

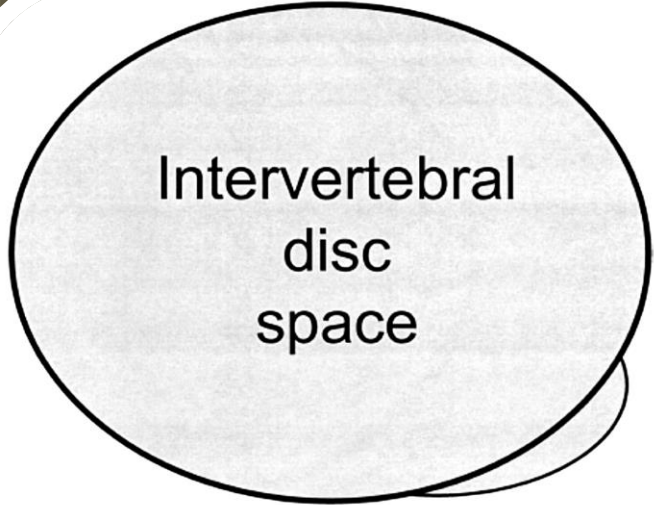


Disc herniation

Systematic approach

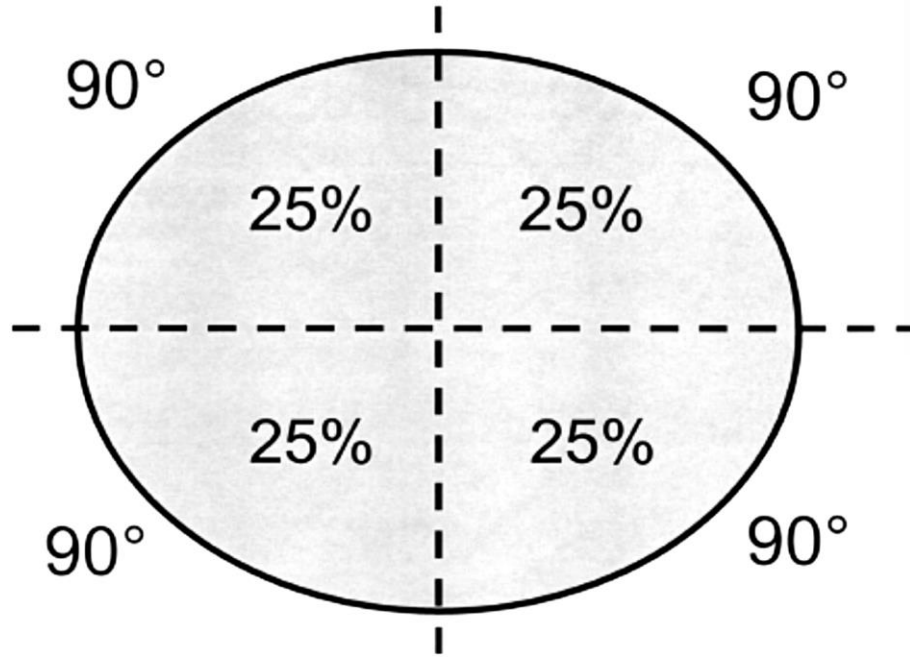
- Disc herniation is displacement of disc material like nucleus pulposus, parts of the annulus fibrosus and cartilage, beyond the limits of the intervertebral disc space.
- It can be focal ($< 90^\circ$), broad-based (90° - 180°) or caused by bulging of the disc ($> 180^\circ$).
- **Protrusion** indicates that the distance between the edges of the disc herniation is less than the distance between the edges of the base.
- **Extrusion** is present when the distance between the edges of the disc material is greater than the distance at the base.





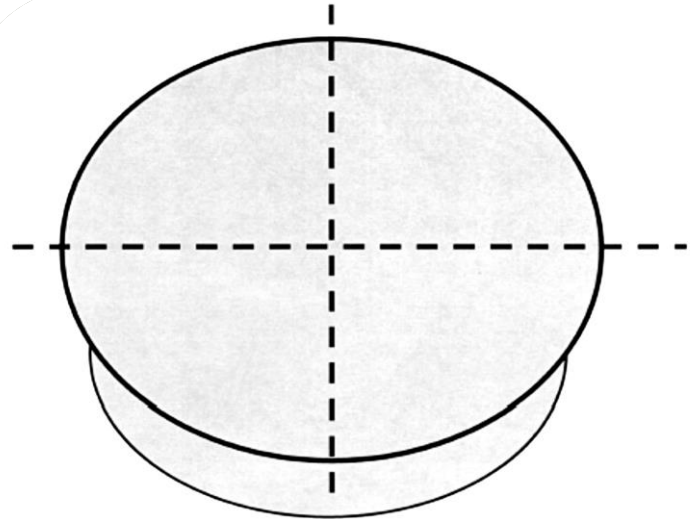
Herniation

Figure 4. The interspace is defined, peripherally, by the edges of the vertebral ring apophyses, exclusive of osteophytic formations. The line drawing schematically illustrates a localized extension of disc material beyond the intervertebral disc space, in a left posterior direction, which qualifies as a disc herniation.



Normal Disc

Figure 5. For classification purposes, the intervertebral disc is considered as a two-dimensional round or oval structure having four 90° quadrants. By convention, a herniation is a "localized" process involving less than 50% (180°) of the disc circumference.



Broad-based Herniation

Figure 7. By convention, a "broad-based" herniation involves between 25% and 50% (90–180°) of the disc circumference.

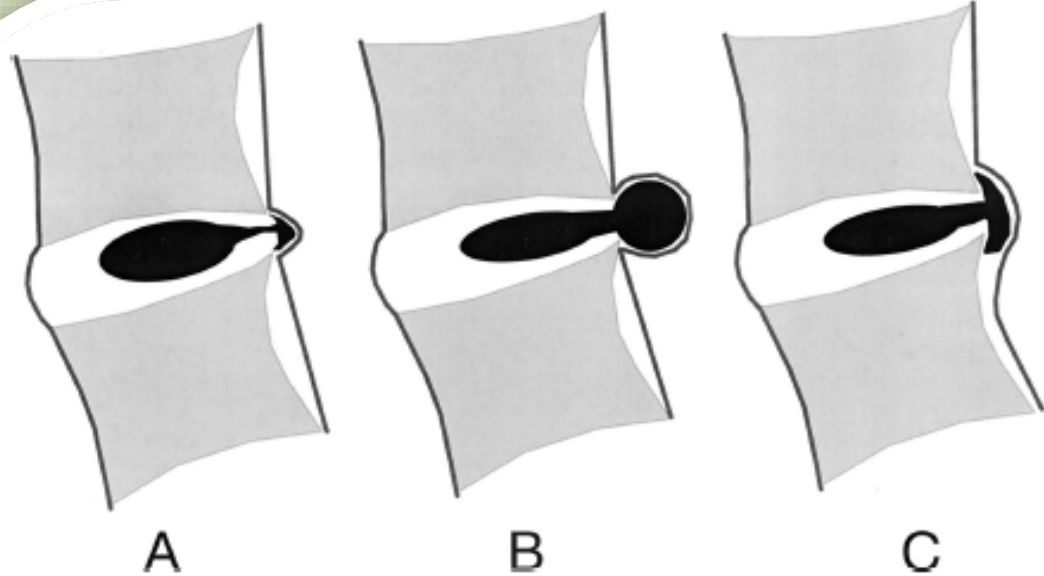


Figure 11. When a relatively large amount of disc material is displaced, distinction between protrusion (**A**) and extrusion (**B** or **C**) will generally only be possible on sagittal magnetic resonance (MR) sections or sagittal computed tomography (CT) reconstructions. **C**, Although the shape of the displaced material is similar to that of a protrusion, the greatest cranio-caudal diameter of the fragment is greater than the cranio-caudal diameter of its base at the level of the parent disc, and the lesion therefore qualifies as an extrusion. In any situation, the distance between the edges of the base, which serves as reference for the definition of protrusion and extrusion, may differ from the distance between the edges of the aperture of the anulus, which cannot be assessed on CT images and is seldom appreciated on MR images. In the cranio-caudal direction, the length of the base cannot exceed, by definition, the height of the intervertebral space. (Reprinted with permission from Milette PC. Classification, diagnostic imaging and imaging characterization of a lumbar herniated disc. *Radiol Clin North Am* 2000; 38:1267–1292.)

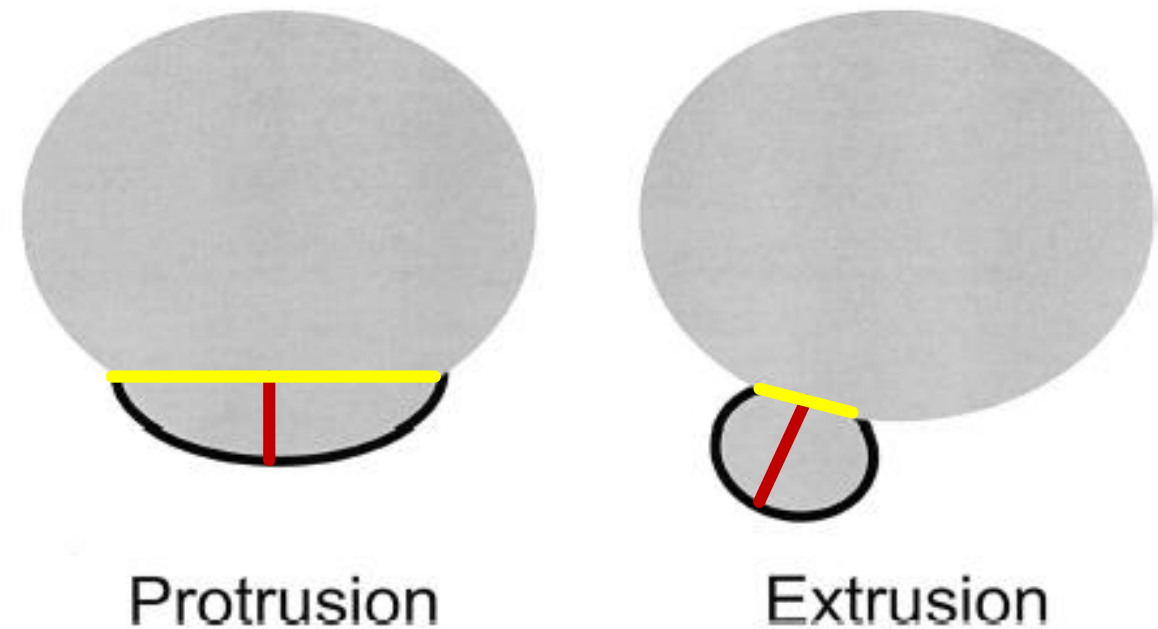
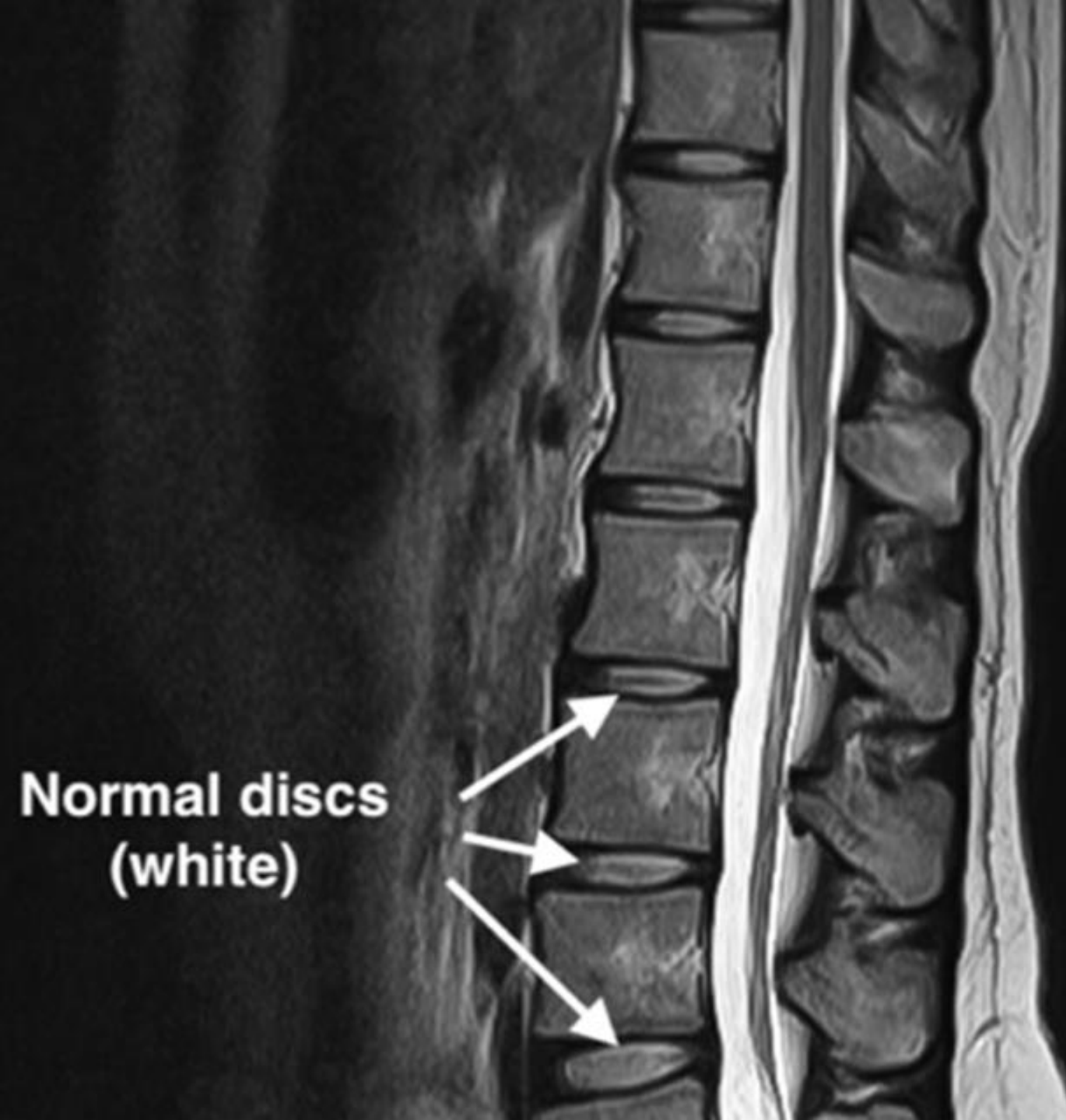
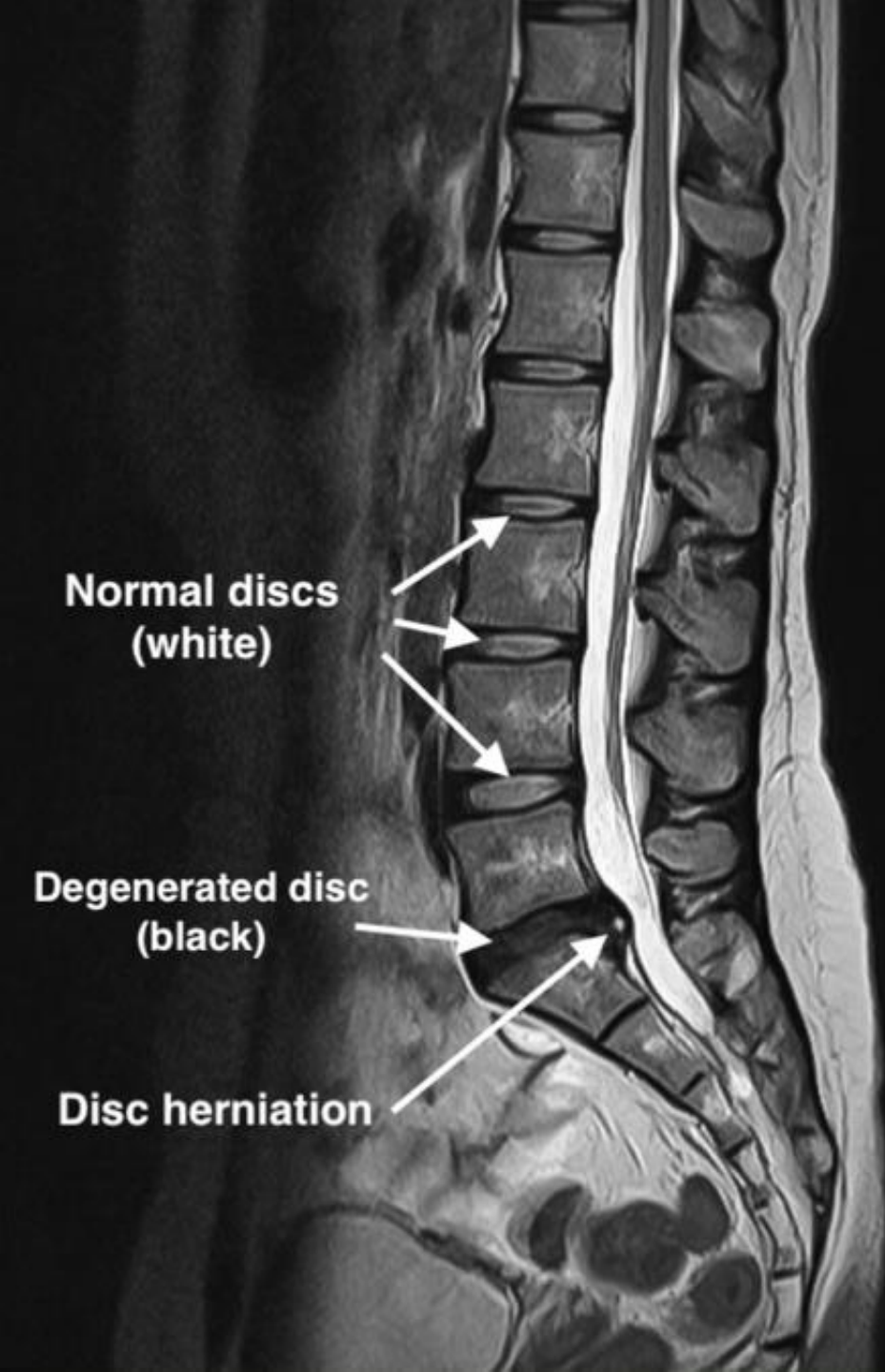


Figure 10. Herniated discs may take the form of protrusion or extrusion, based on the shape of the displaced material (see definitions in text).



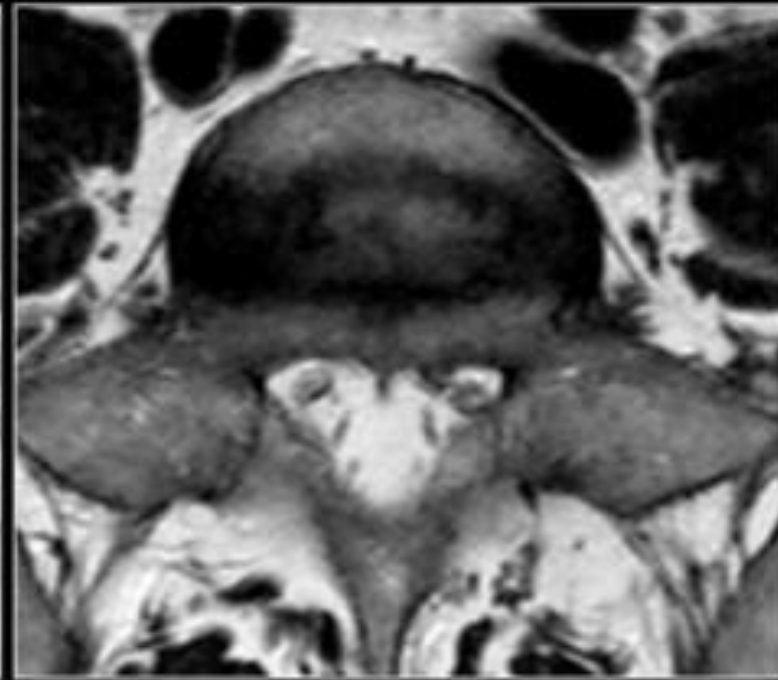
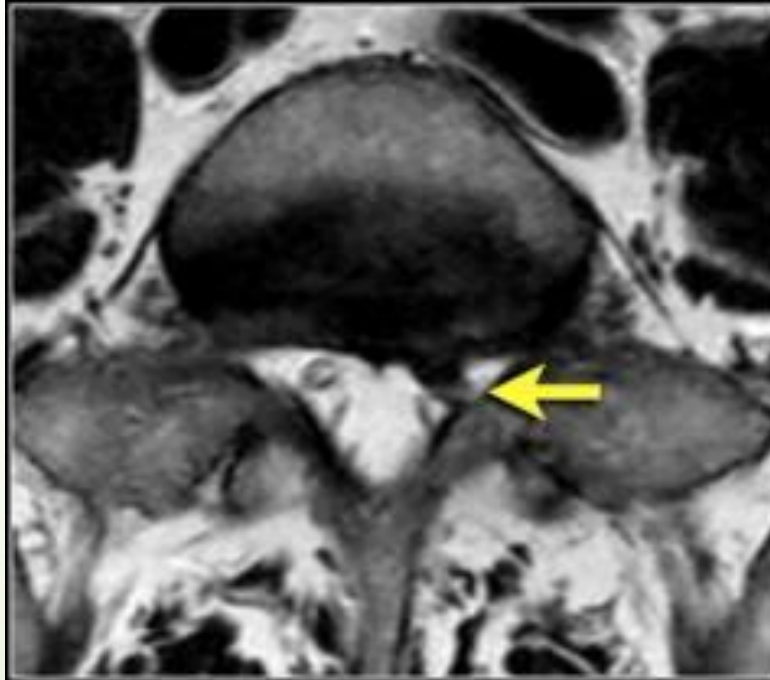
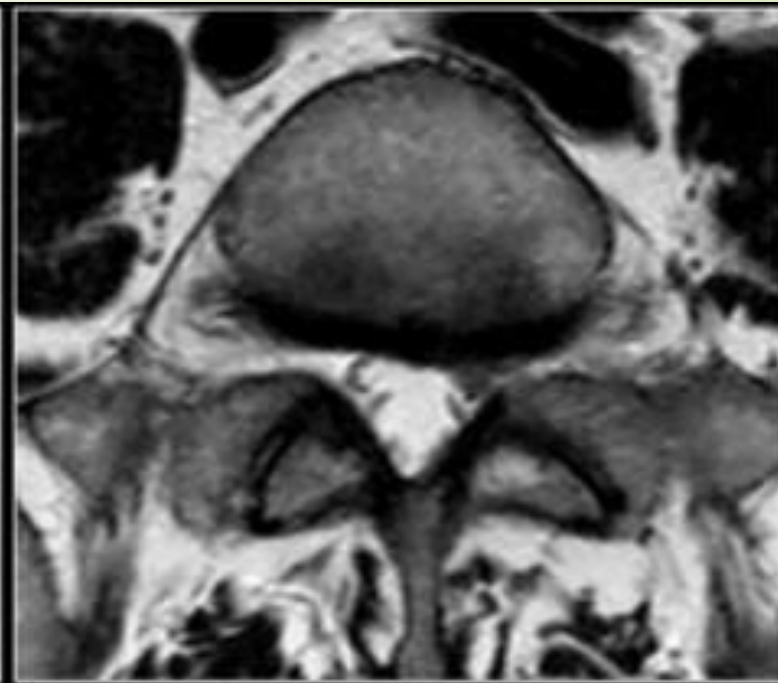
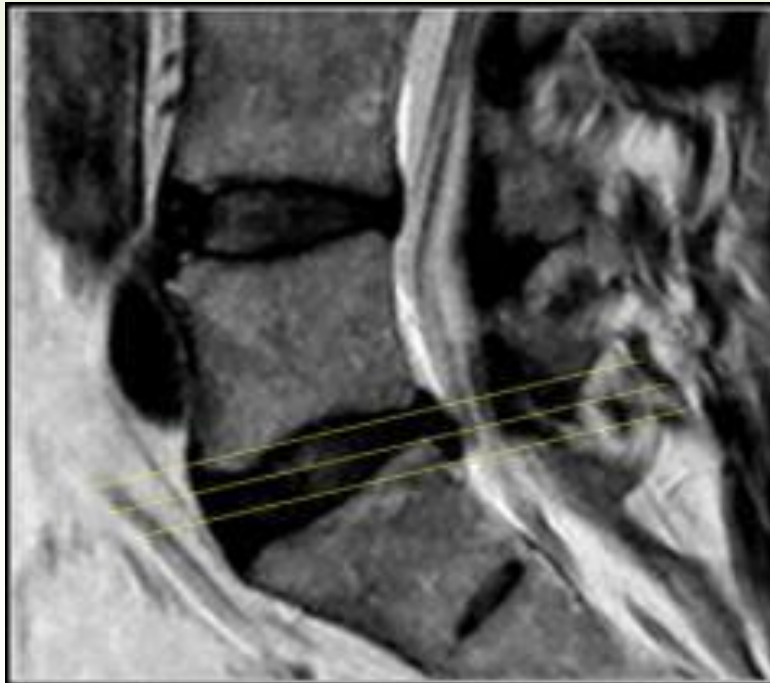


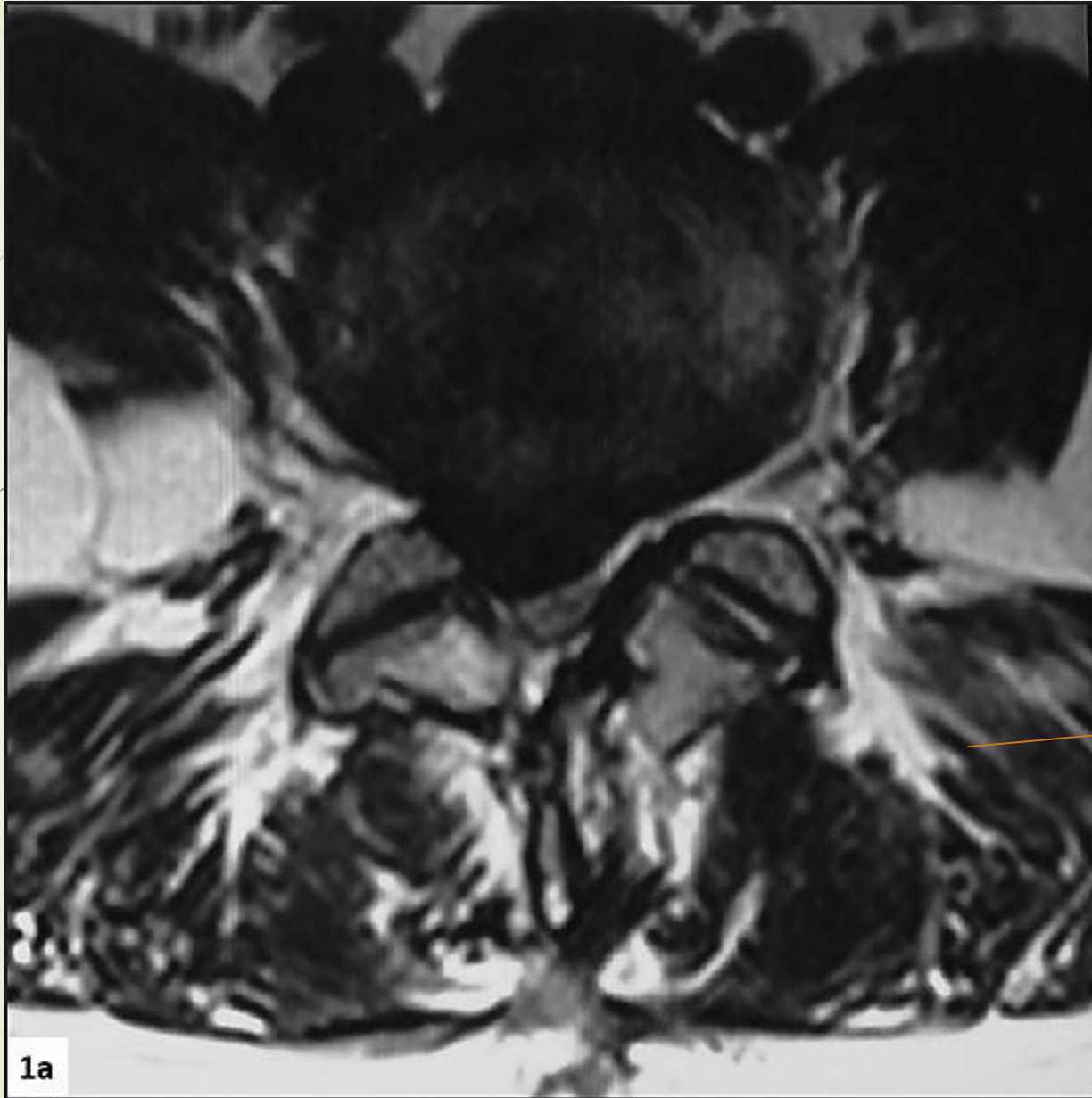


A focal **protrusion** at the L5S1 level

The S1 nerve is compressed

(arrow)





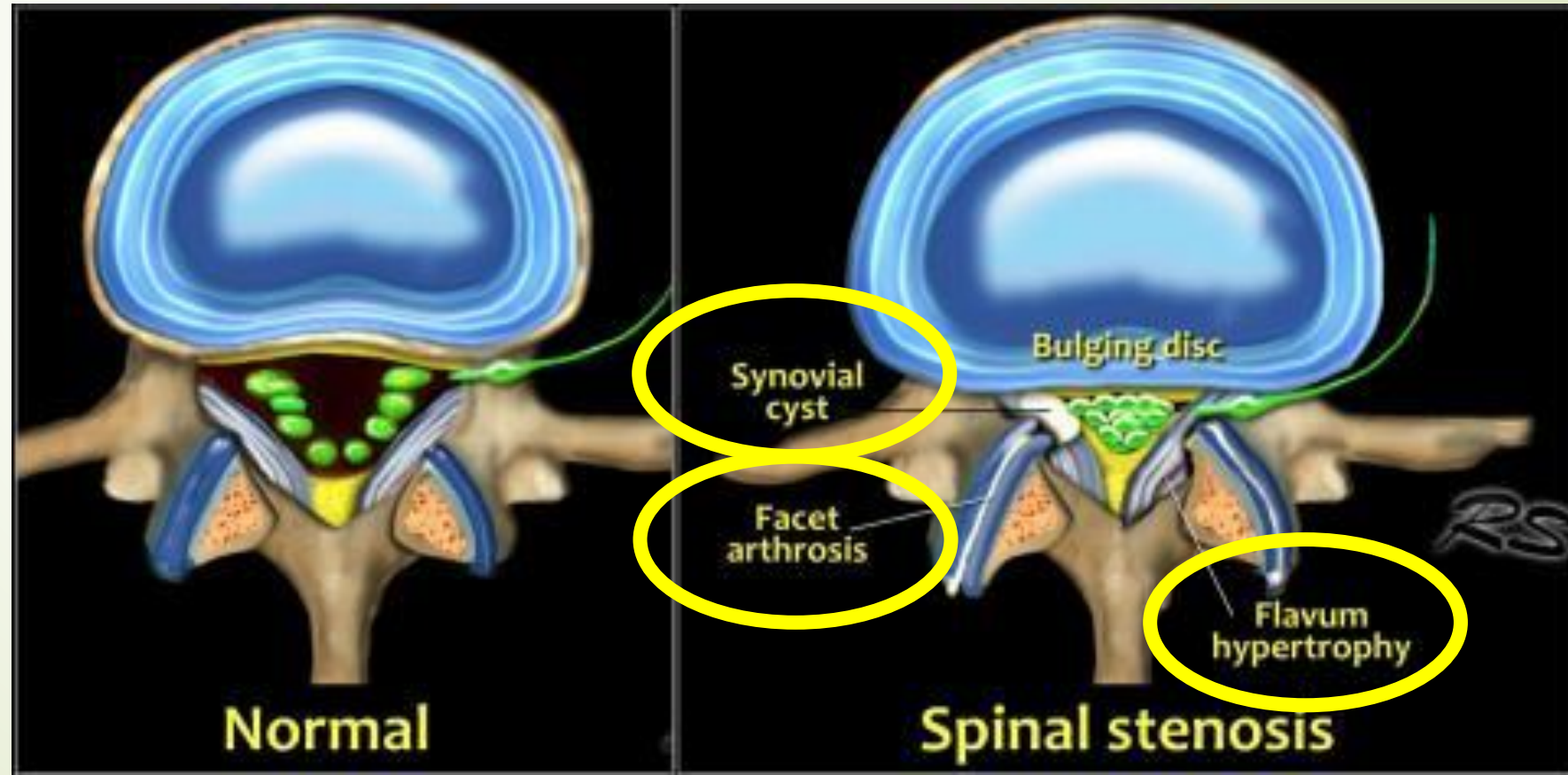


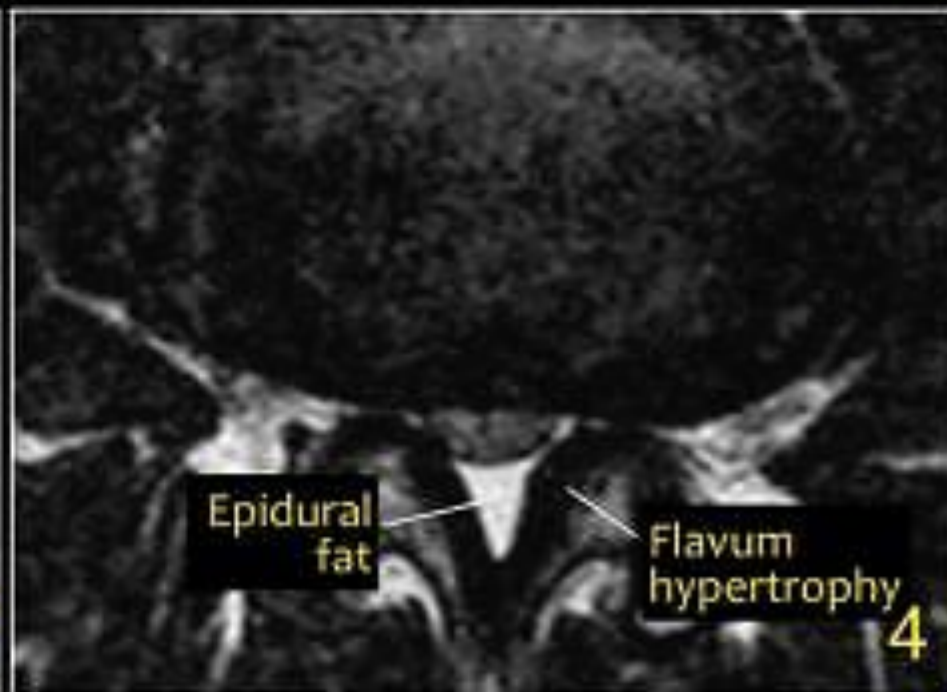
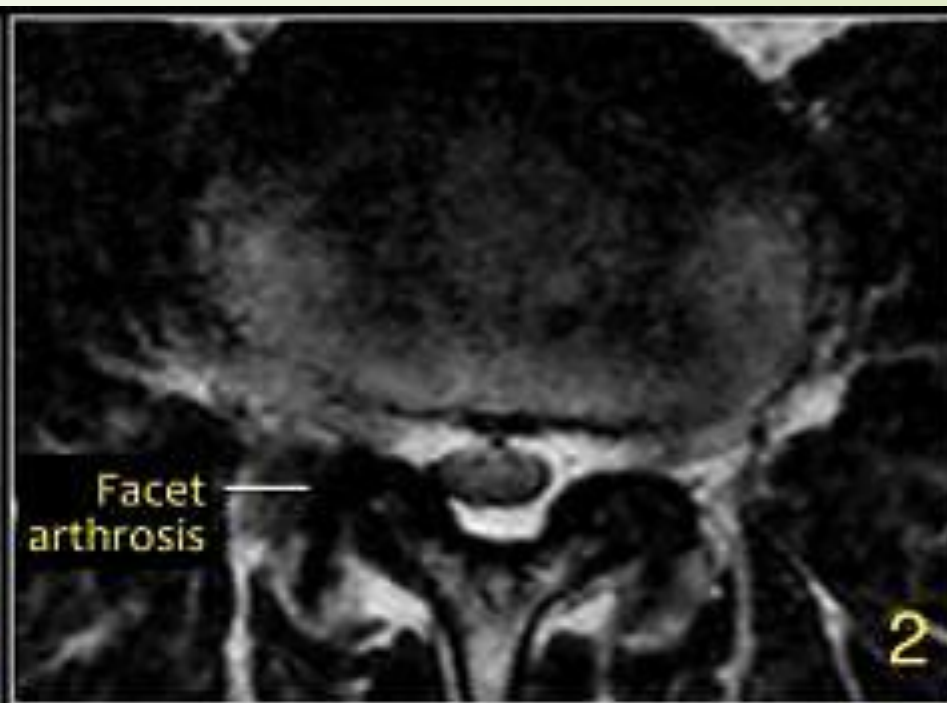
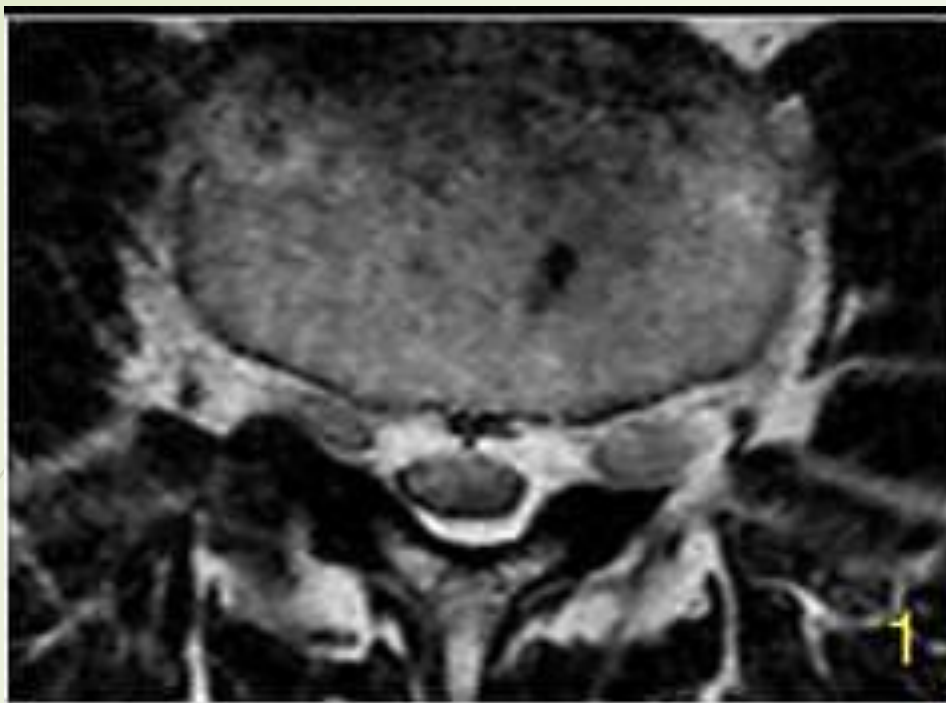
Stenosis of the Spinal Canal

Causes of spinal stenosis:

Most common

Bilateral facet arthrosis in combination with bulging of the disc and hypertrophy of the ligamentum flavum

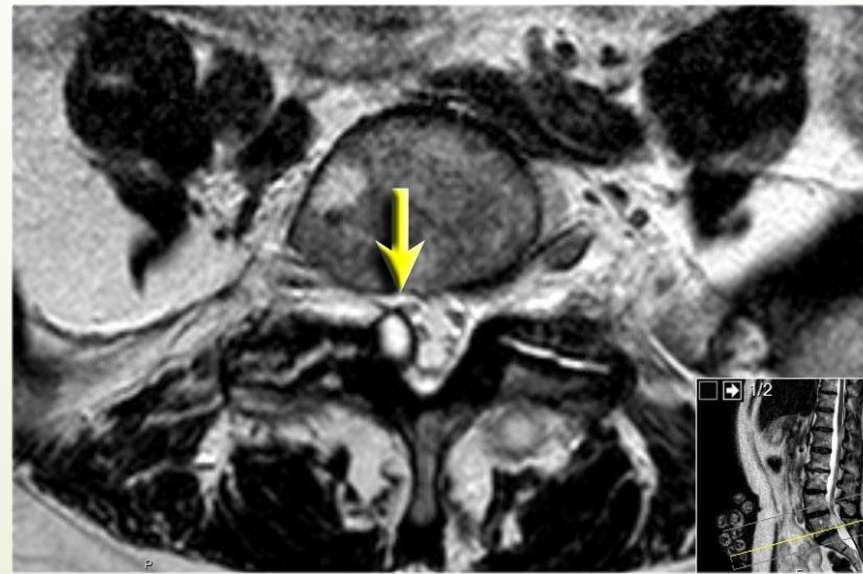
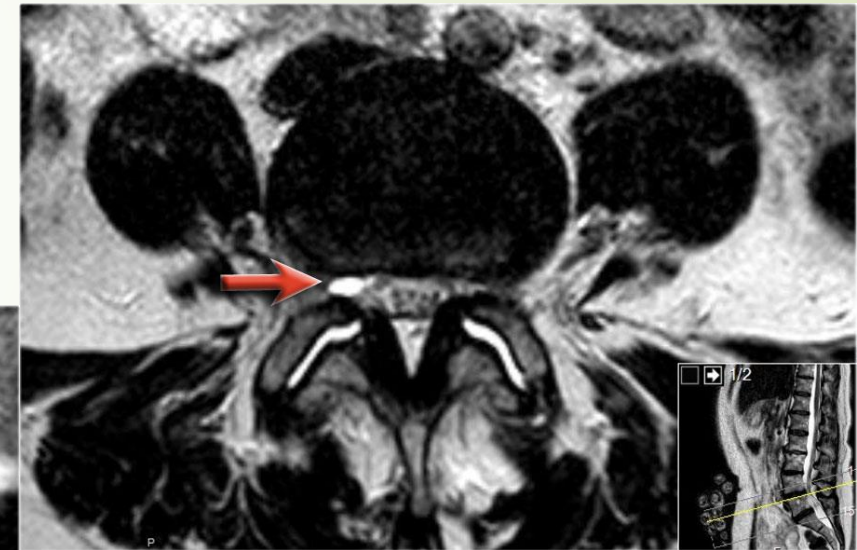
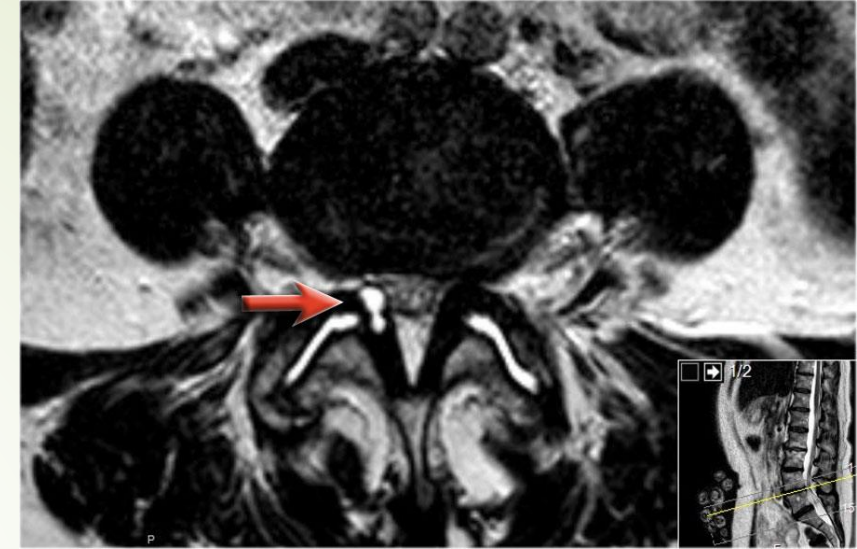


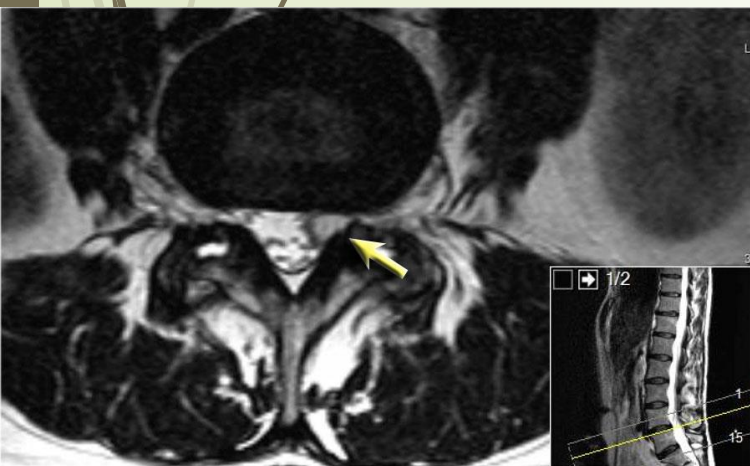
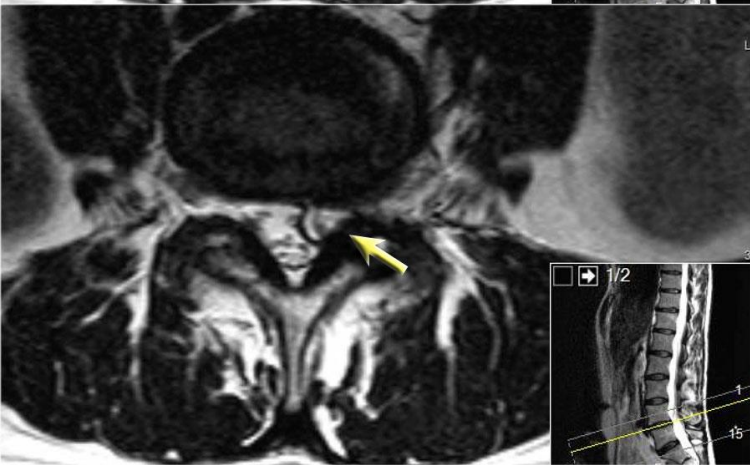
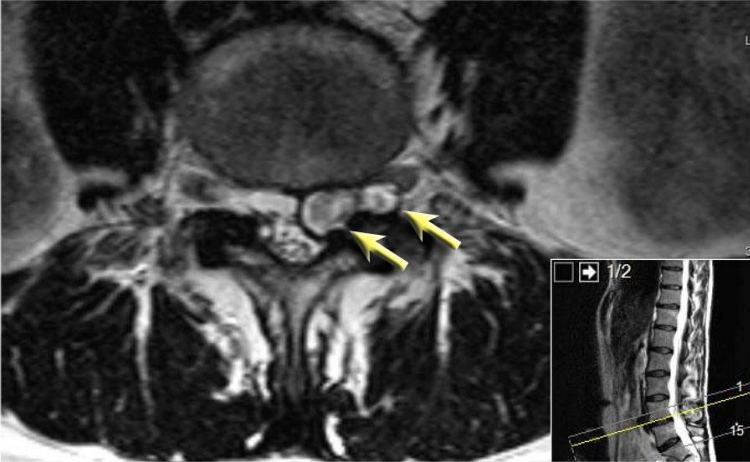


Lateral recess stenosis

➤ Synovial cyst

- Synovial cysts are frequently seen in combination with facet arthrosis.
- Mostly they lead to stenosis of the lateral facet.
- When they are very large they can protrude into the foramen and cause foraminal stenosis.
- Here a patient with severe arthrosis of the facet joints.
- Notice that there are many synovial cysts related to the arthrosis (red arrows).
- At the L5-S1 level a large cyst on the right compresses the S1-nerve (yellow arrow).





Sagittal T2-weighted images of a patient with a **synovial cyst**, that completely fills the **neuroforamen** (arrow).

Notice that at first glance the foramen looks normal, but the **nerve seems to be missing**.

The nerve is compressed by the **cyst**.

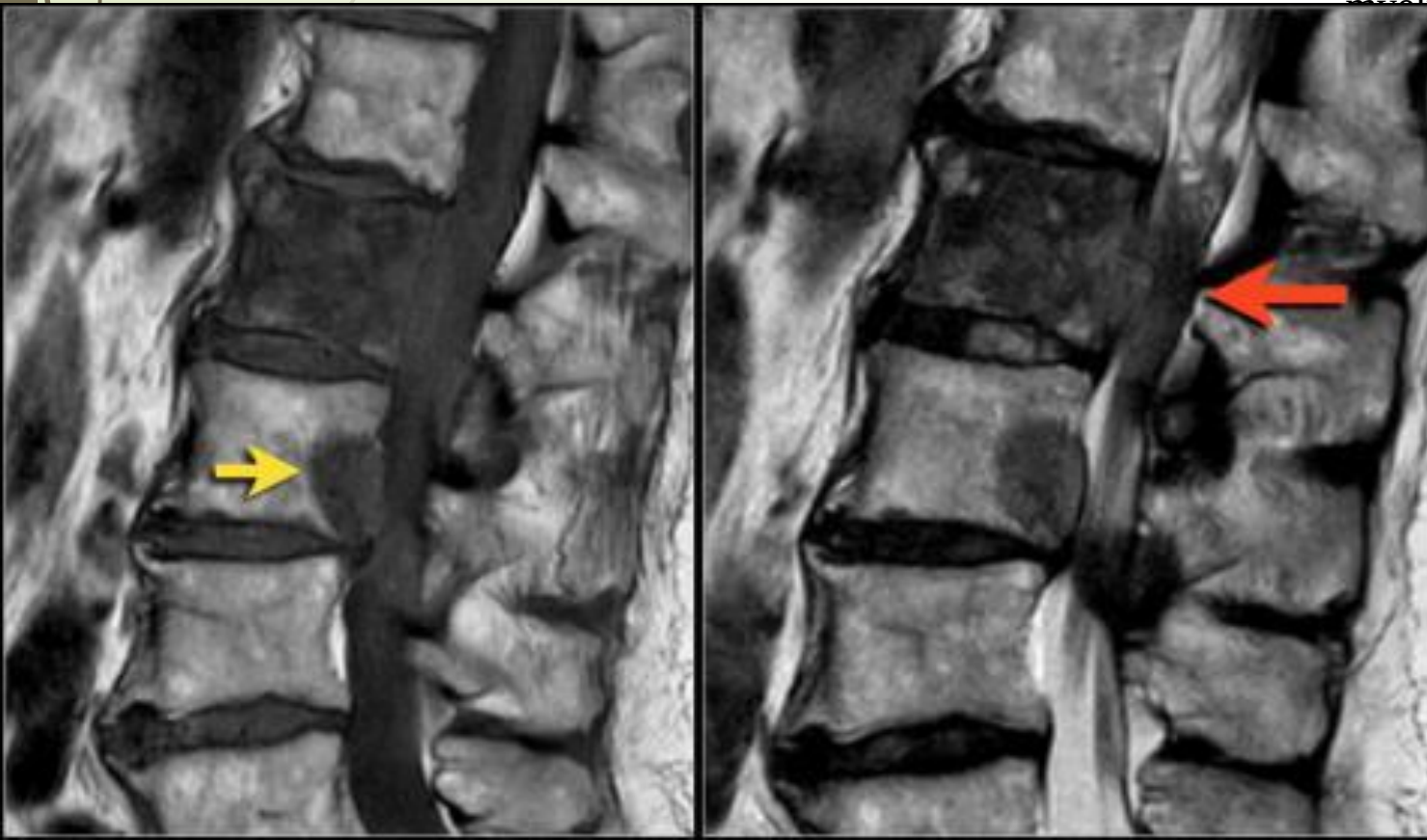


Patient with multiple osseous metastases:

At the level of L1L2 this causes spinal stenosis with compression of the nerves (red arrow).

It is not that common for metastases to cause nerve compression at the lumbar level.

At the thoracic and cervical level metastases frequently cause compression because there is not much CSF surrounding the

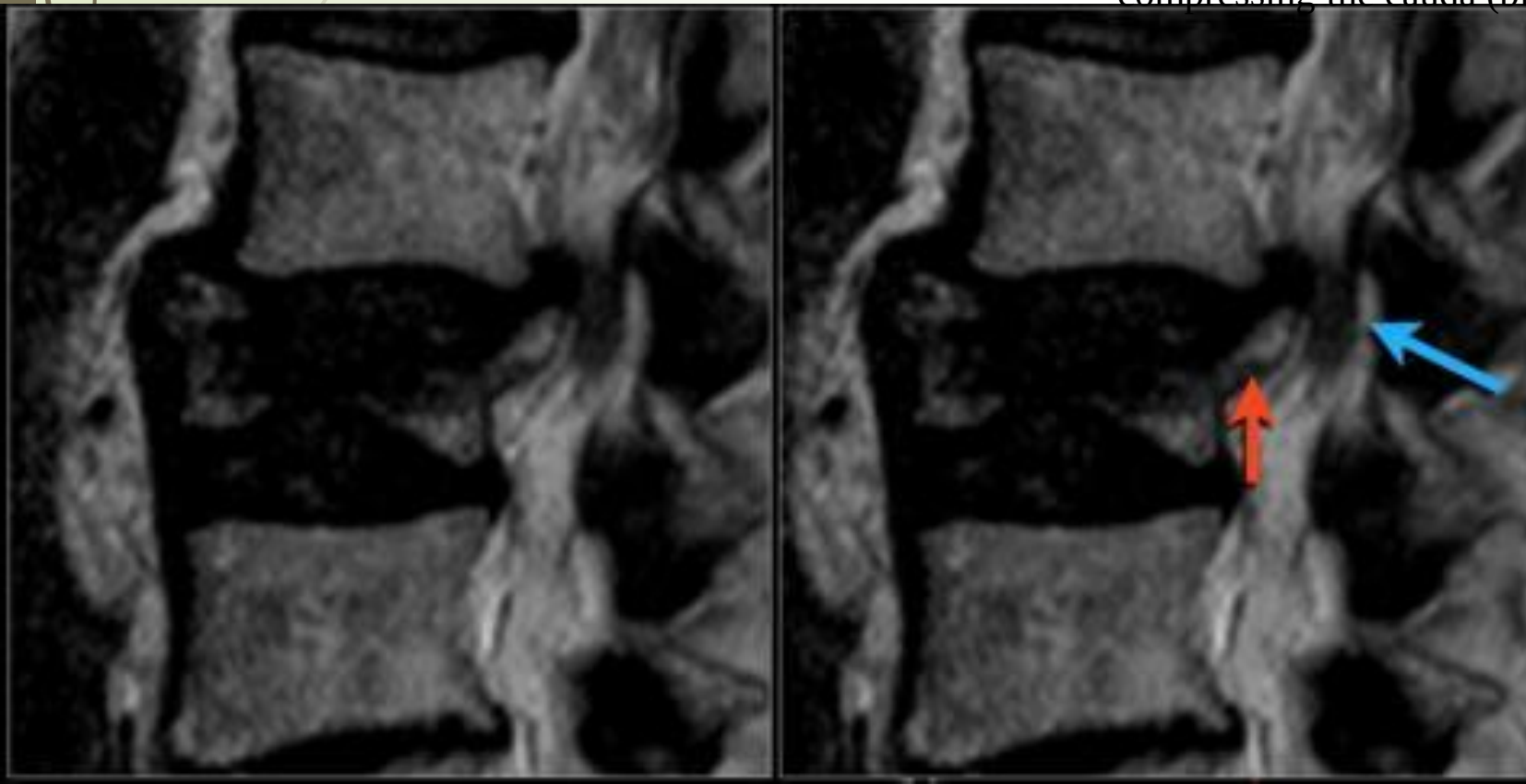


Fractures:

Fractures can cause stenosis of the spinal canal especially when there is displacement of bony structures like in burst fractures and fractures with rotation and translation.

Here a patient with an old burst fracture.

There is retropulsion of the posterosuperior fragment (red arrow) compressing the cauda (blue arrow).



Epidural lipomatosis:

Epidural lipomatosis is excessive amount of fat within the epidural space compressing the thecal sac.

Patients present with symptoms of spinal canal stenosis.

It is seen in patients with **obesity**, like in this case and in patients who are **treated with steroids**.

Continue with the axial images of this patient.



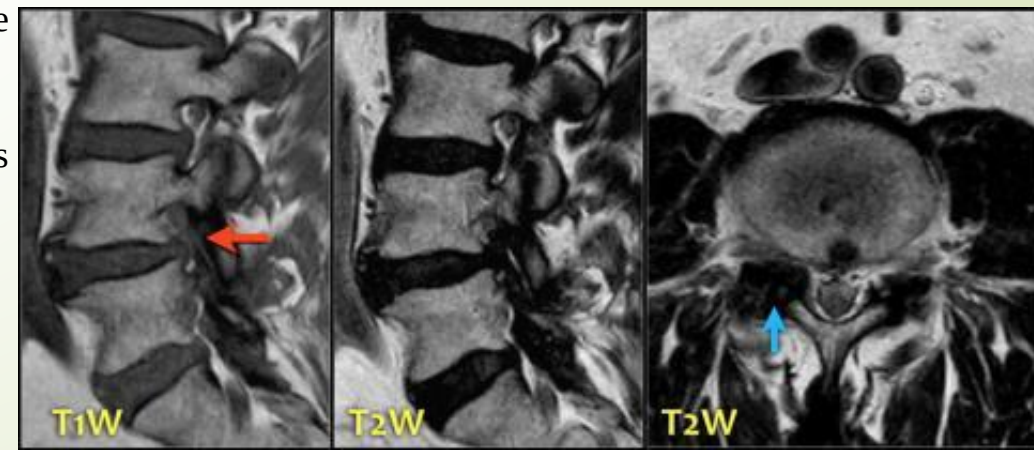
Foraminal stenosis

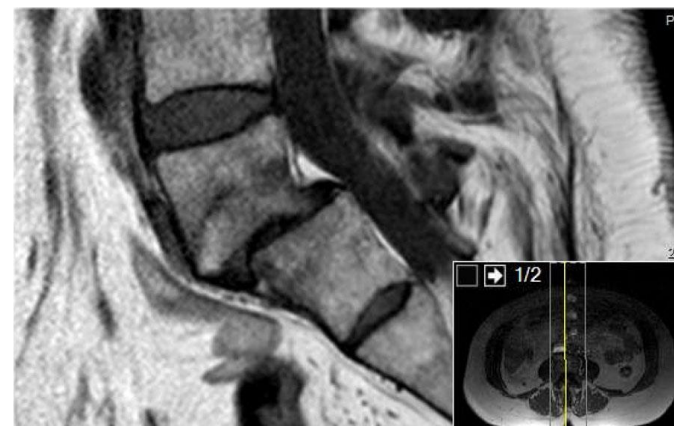
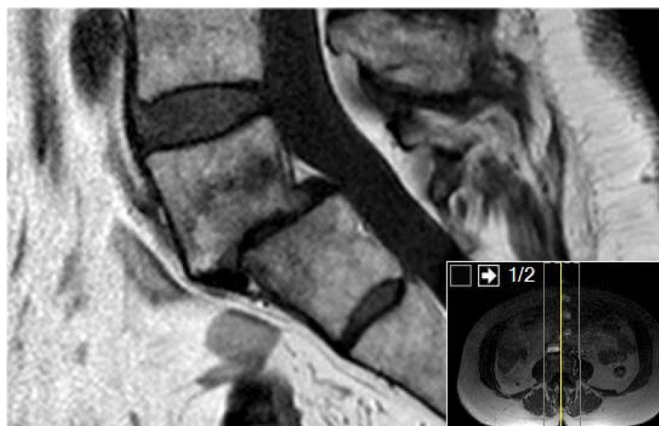
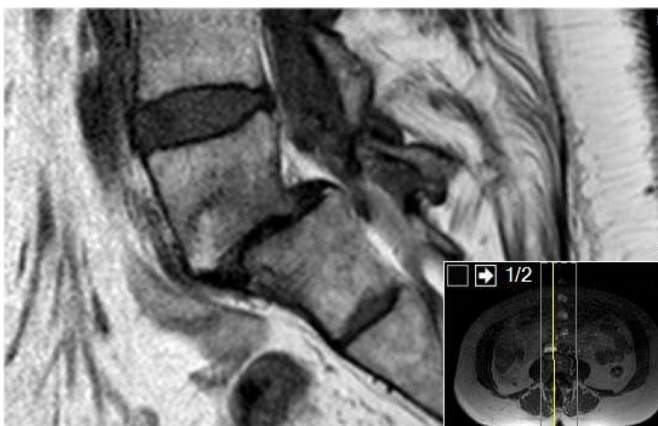
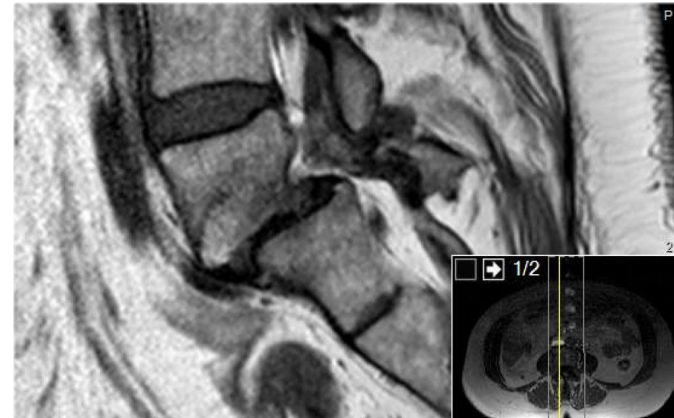
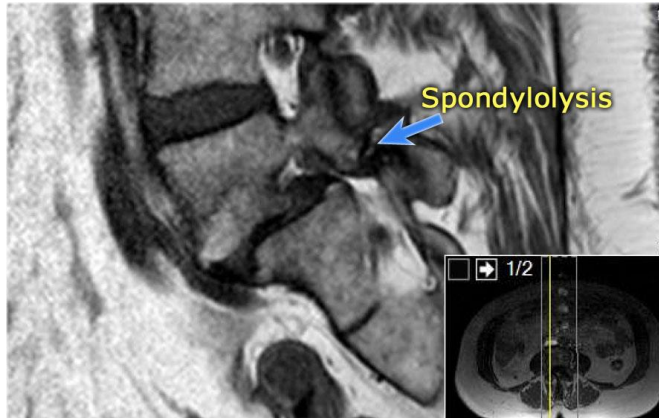
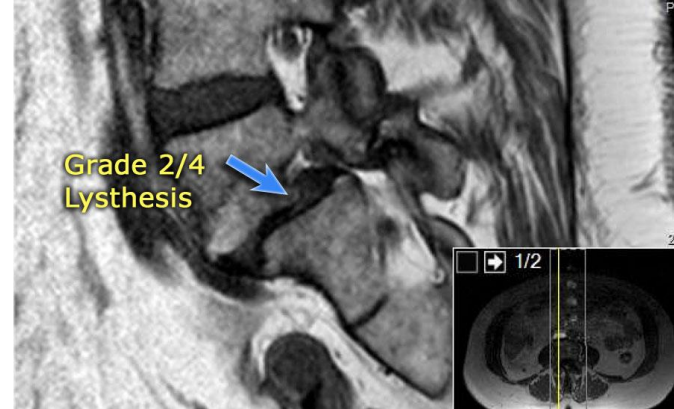
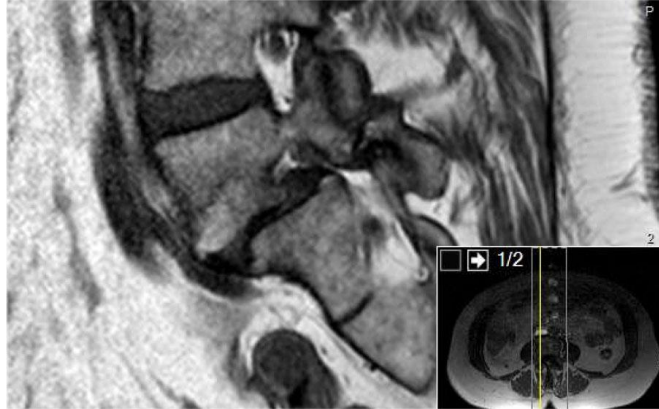
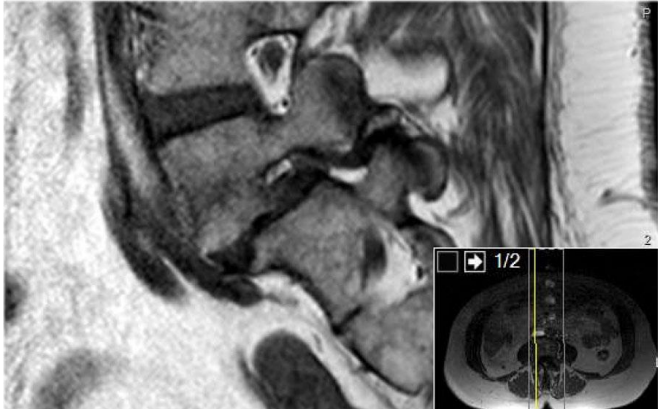
Causes of Foraminal stenosis:

- Facet arthrosis
- Disc herniation with upward migration
- **Spondylolisthesis**
- Stenosis of the neuroforamen is usually the result of a combination of upward disc herniation and facet arthrosis.
- It is also frequently seen in patients with spondylolisthesis.

Spondylolisthesis is a condition in which one vertebra slips forward over the one below it, usually L4 upon L5.

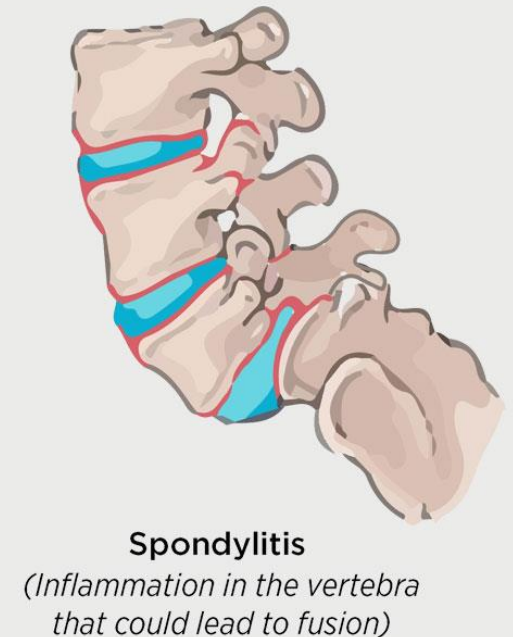
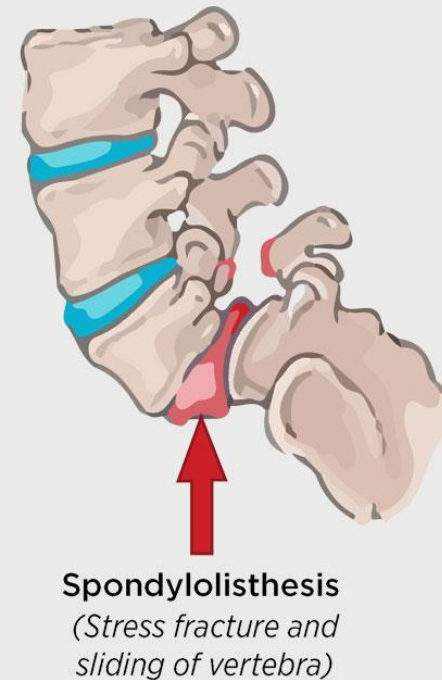
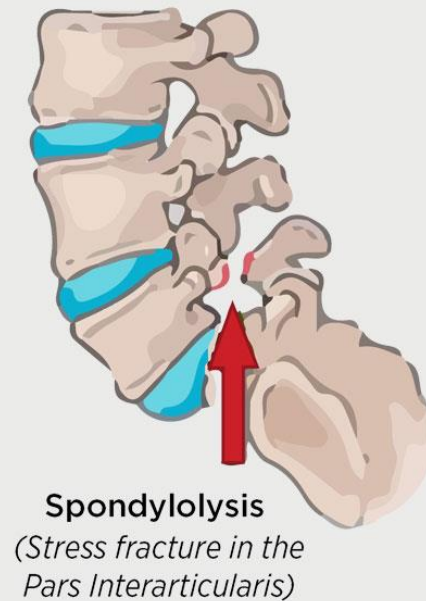
The shift results from either spondylolysis (stress fracture of the pars interarticularis) or facetarthrosis with sliding of the facets.

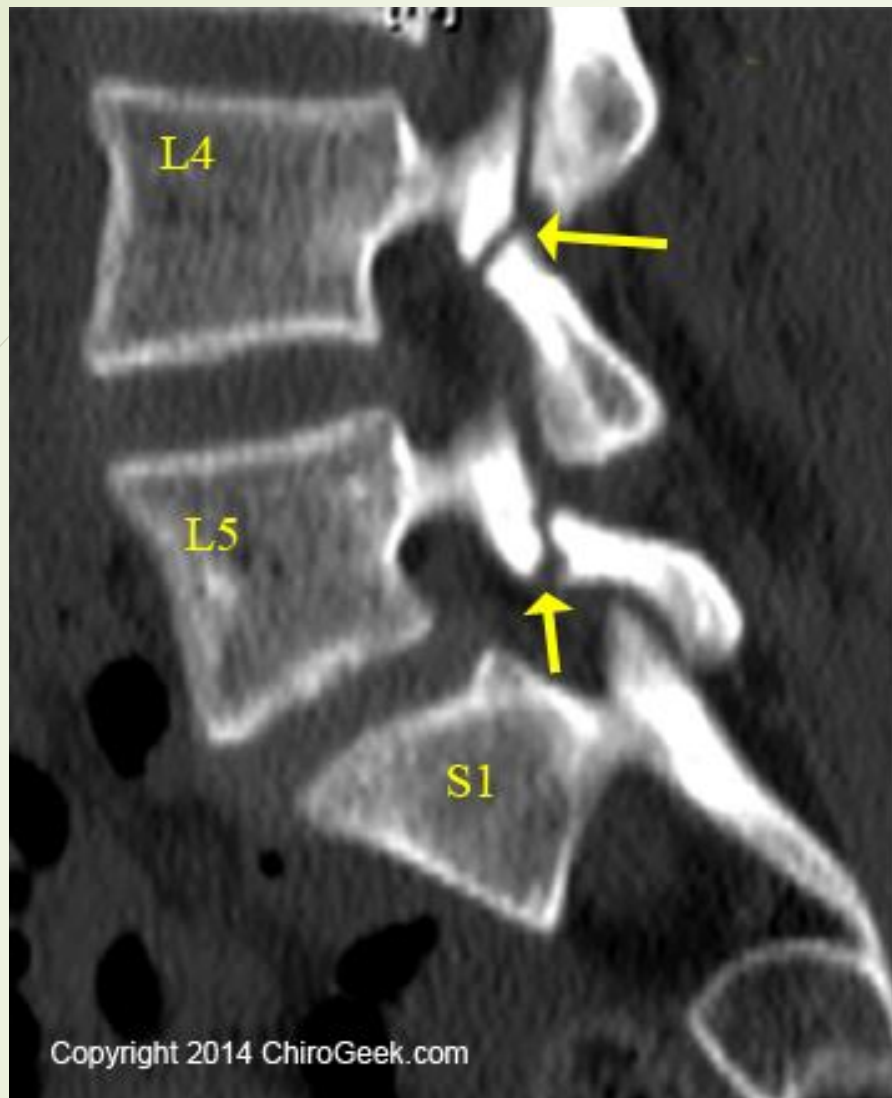




Spondylolisthesis vs spondylosis

- **Spondylolisthesis (plural: spondylolistheses)** denotes the slippage of one vertebra relative to the one below.
- Spondylolisthesis can occur anywhere in the vertebral column but is most frequent in the lumbar spine, particularly when due to spondylolysis at L5/S1 , and when due to degeneration at L4/5.





If such a fracture is present in one or both of the pars interarticulari (plural), yet no slip has occurred, then the condition is called a spondylolysis (figure left), which can be just as painful and debilitating as a spondylolisthesis.

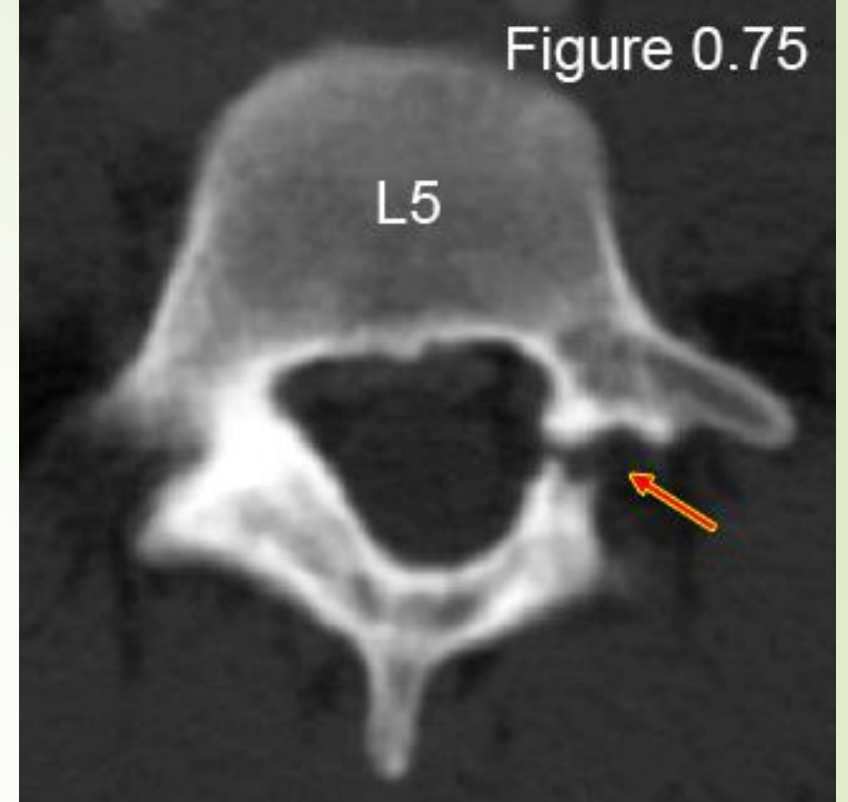
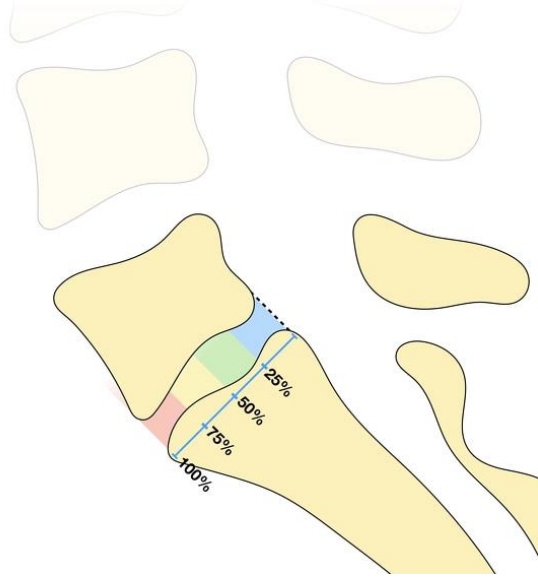


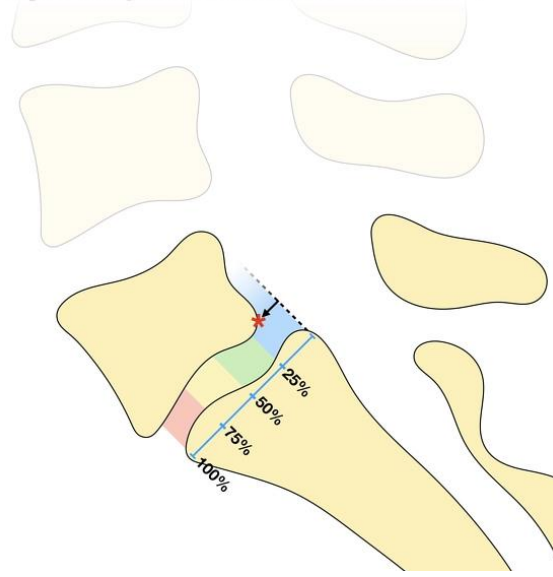
Figure 0.75

This is an axial CT image through the pedicles of L5 which clearly demonstrates a rare unilateral (one-sided) fracture through the pars (red arrow), which did not cause any discernible slip on the sacrum.

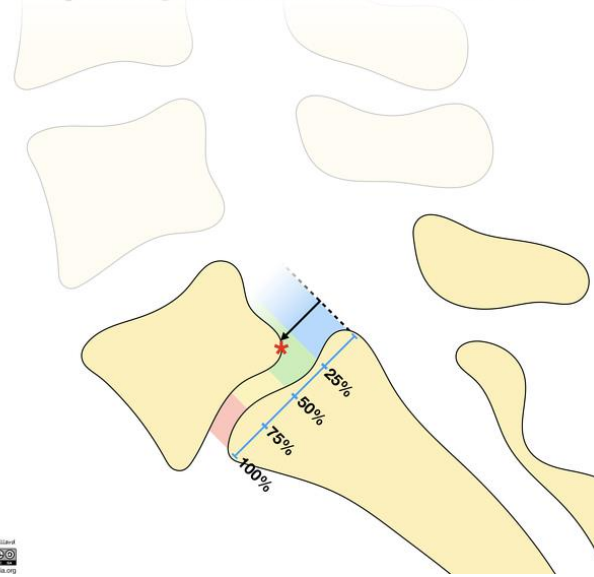
Normal



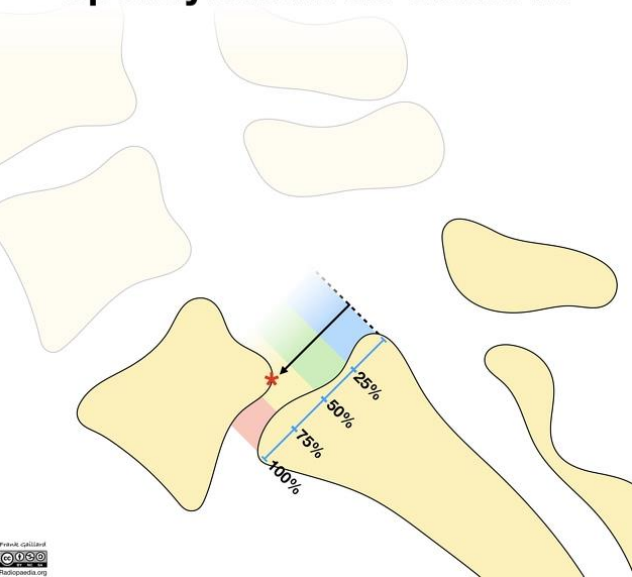
Spondylolisthesis Grade I



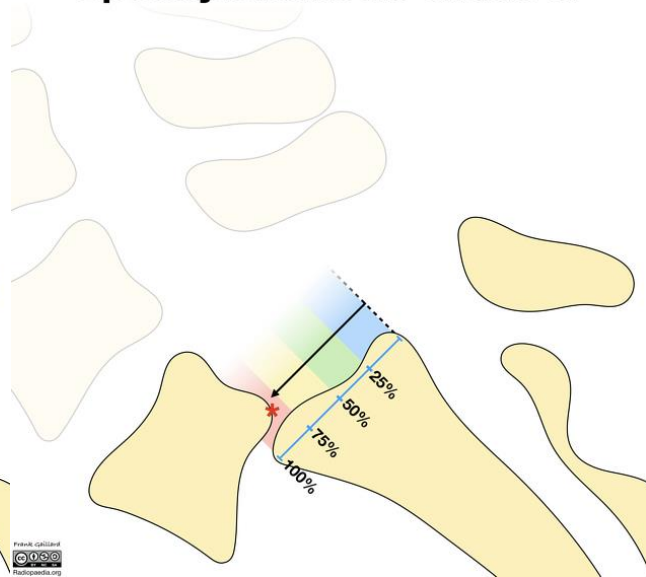
Spondylolisthesis Grade II



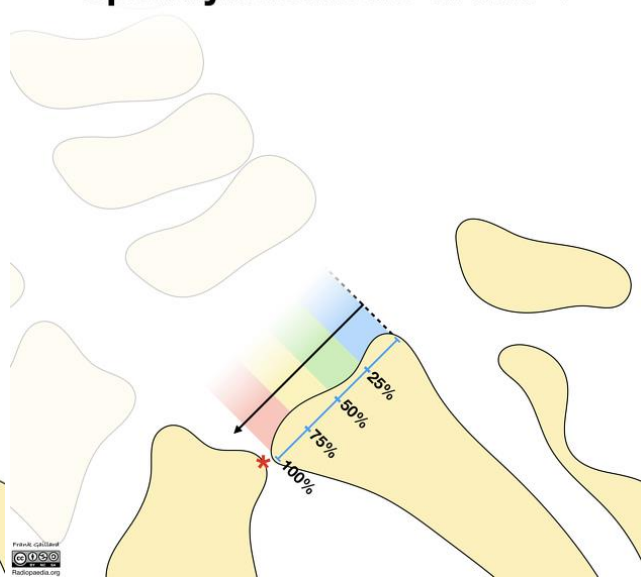
Spondylolisthesis Grade III

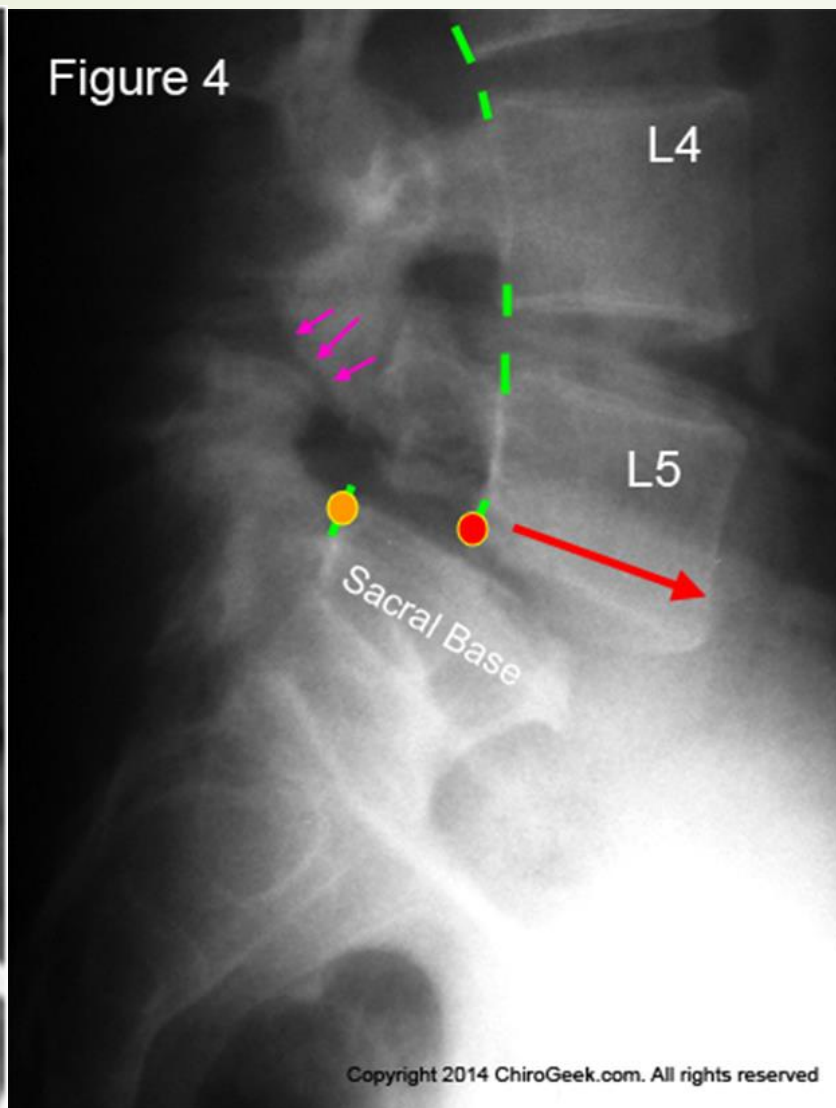
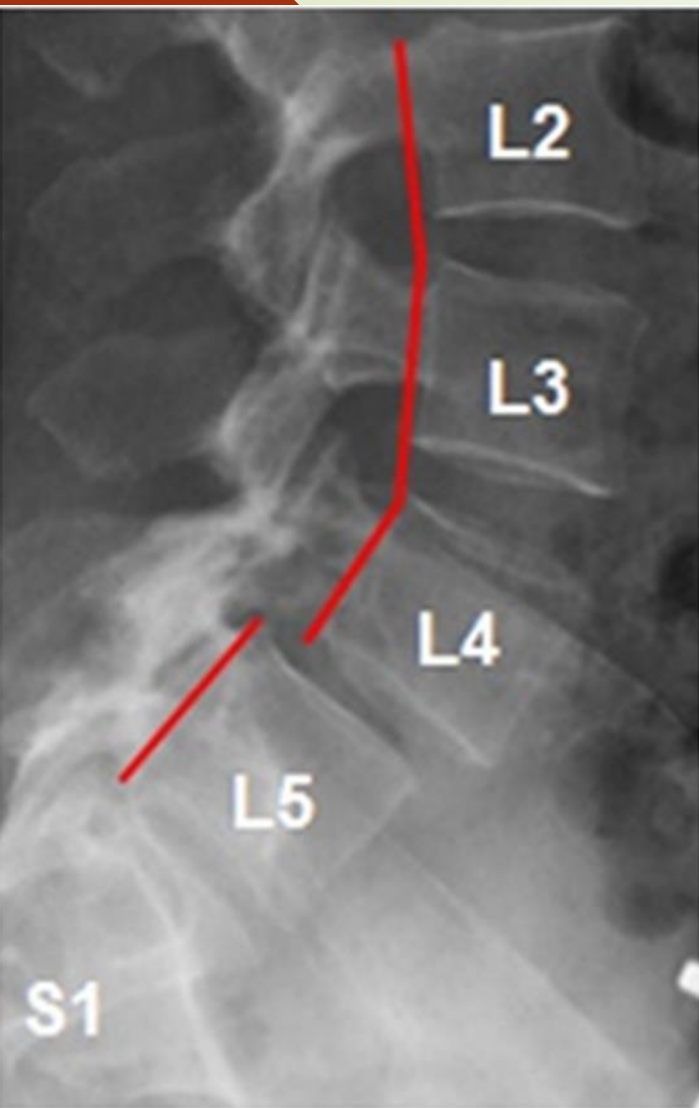


Spondylolisthesis Grade IV



Spondylolisthesis Grade V





Symptoms:

Patients may have back pain that is worse with activity. Many patients have pain or numbness in the legs or buttocks because of the presence of spinal stenosis.

As mentioned, most patients with spondylolisthesis have some degree of spinal stenosis. The spondylolisthesis makes the stenosis more severe.

So many patients with these coexisting conditions have leg discomfort, especially when walking. The symptoms are identical to patients with spinal stenosis.

Patients usually have worsening leg pain after walking a certain distance, and feel some relief when they bend forward on a cart or walker (shopping cart sign).



Diagnosis

Spondylolisthesis is diagnosed with X-rays of the lumbar spine in the standing position. MRI is helpful in evaluating for spinal stenosis.

Note that X-rays show the slipped vertebra but do not show the degree of spinal stenosis.





The END..

THANK
YOU

