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Subject MRI

Semester 6th

Program Radiology.

Date 23-6-2020

Final paper

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Q NO 1

MRI brain:

- * MRI brain is a computer based cross sectional imaging modality which provides both anatomical and physiological information of brain non invasively, without the use of ionizing radiation.
- * Brain is the most frequently imaged organ by MR imaging.
- * Technological developments in computer design and processing speeds as well as hardware developments have enabled significant growth in MR brain imaging.

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Advantage of MRI over CT in brain imaging.

- * MRI does not use ionizing radiation.
- * MRI has a much greater range of available soft tissue contrast and anatomy in greater detail.
- * MRI scanning can be performed in any imaging plane without having to physically move the patient.
- * MRI contrast agents have a considerably smaller risk of causing potentially lethal allergic reactions.

Contrast Media

Gadolinium based contrast enhancement is useful in brain imaging. It is often believed that administration of contrast is indicated for all lesions.

- ① IV Gadolinium: 0.1-0.2 mmol/kg body weight.
- ② given as bolus at the rate of 1 ml/sec or
- ③ as a slow infusion at the rate of 1 ml/6 sec.

MRI sequences:

- * T1 weighted sequence.
- * T2 weighted sequence.
- * PD weighted sequence.
- * Gradient and spin echo sequences.
- * Fat suppression.
- * MRI contrast.

T1 weighted	T2 weighted	Proton density
TR short.	TR Long.	TR Long.
TE short.	TE long.	TE short.

Other sequence (positroning)

- Axial sequence.
- Sagittal sequence.
- Coronal sequence.

- T1: To delineate the anatomy.
- T2: pathologic evaluation.

MRI brain procedure:

INDICATION:

- Headache.
- Trauma.
- Seizure.
- Multiple sclerosis.
- Infarction.

Hemorrhage.

Hearing loss.

visual loss.

visual disturbances.

Mapping of brain function.

Patient Preparation.

Before patient preparation, complete history should be checked.

If indication is unclear the referring physician should be contacted.

All metallic object should be removed from patient body, to ensure that artifacts are not created during scanning.

The patient should be instructed to avoid coughing during or blow the scanning.

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Ensure the IV line prior to the precontrast acquisition. Preferably with 20 or 22 gauge IV canula. patient who present with claustrophobic features may required sedation with diazepam.

Contrast Media.

Gradolinium based contrast

Patient Positioning:

- * Supine with head first
- * Topogram position landmark.

center the FOV on the nasion in the midline.

Routine brain protocols:

Sequence.

- * scout: 3 plane localiser.
- * T2 FSE in axial plane.

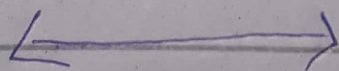
- * T2 FLAIR in axial plane.
- * T1 SE in sagittal and coronal plane.
- * DW EPI based in axial plane.
- * Post contrast T1 SE in axial & coronal planes.

Brain MRI Protocol

- (1) Coronal sequence.
- (2) slice thickness. 2mm.
- (3) 2 sat. slab.
- (4) small. FOV

Contraindication.

- Any electrically magnetically
- (2) intracranial aneurysm clips.
 - (3) Pregnancy.
 - (4) Ferromagnetic surgical clips.
 - (5) Metallic foreign body in eye.



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Q NO 2

Indication for MRI Liver.

- ① Evaluation of diffuse liver disease such as haemochromatosis haemosiderosis fatty infiltration.
- ② Detection of focal hepatic lesion metastasis, focal nodular hyperplasia hepatic adenoma.
- ③ Lesion characterization e.g. cyst focal fat haemangioma hepatocellular carcinoma.
- ④ Clarification of findings from other imaging studies.
- ⑤ Liver iron content determination.
- ⑥ Potential liver donor evaluation.

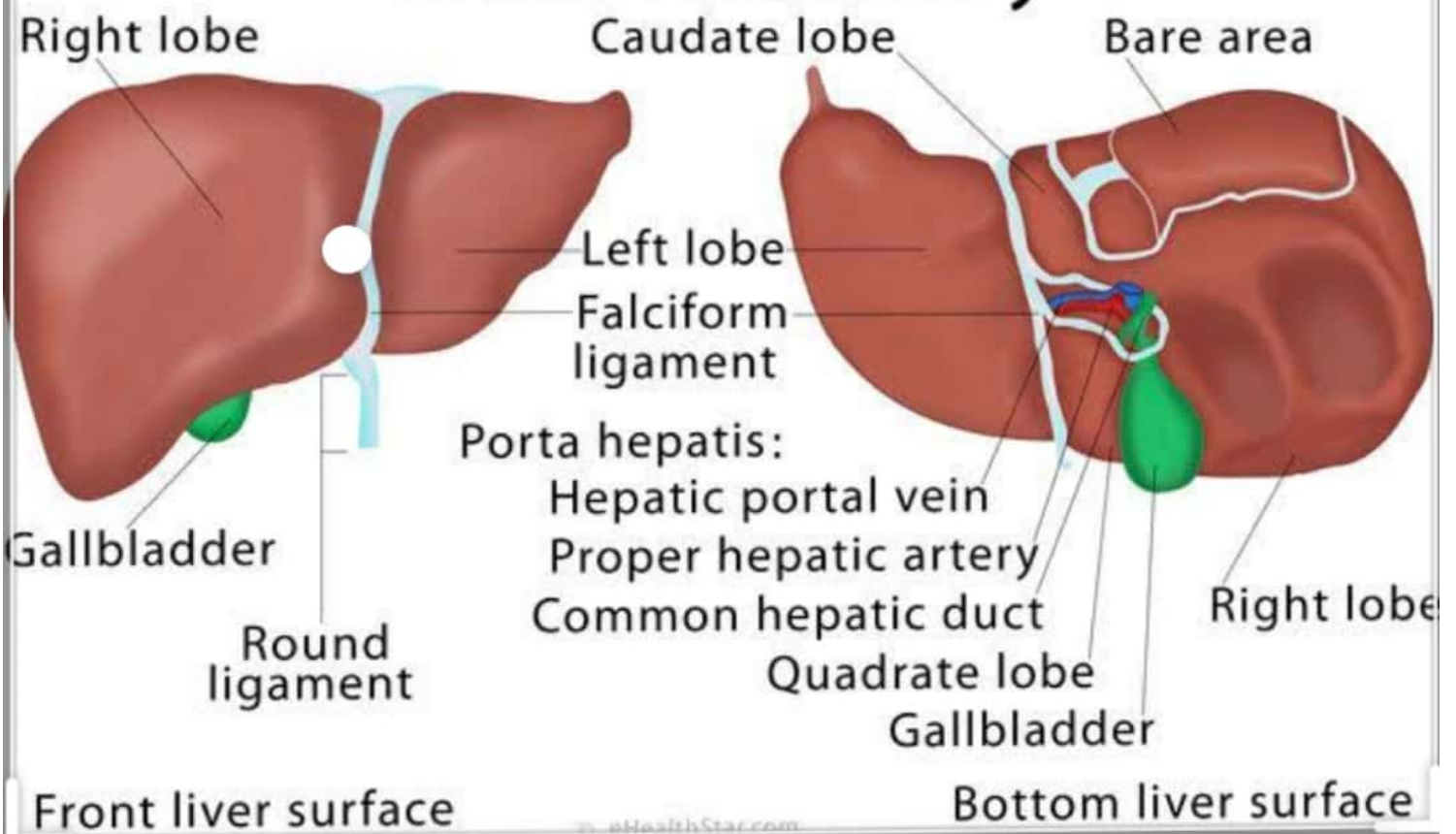
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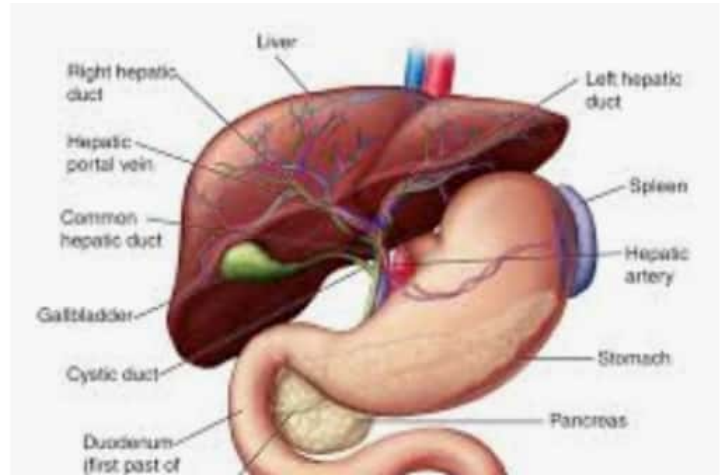
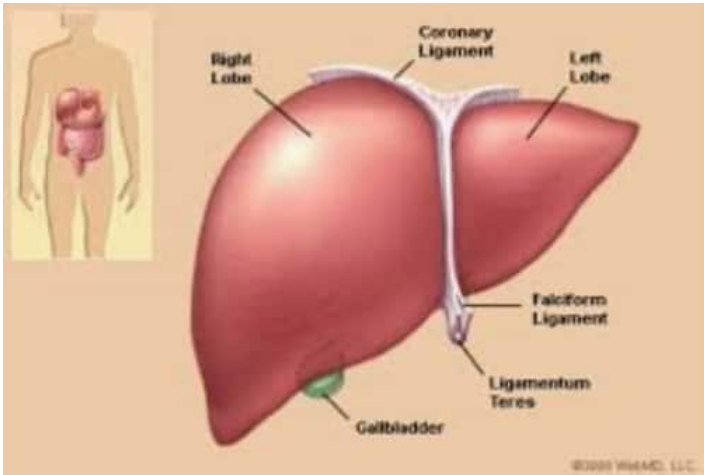
Evaluation of vascular patency.
metal sharpnel or bullet.
evaluation for suspected
metastasis.

Contraindication.

- * Any electrically magnetically activated implant - e.g (cardiac pacemaker, insulin pump biostimulator etc).
- * Intracranial aneurysm clips.
- * Pregnancy.
- * Ferromagnetic surgical clips.
- * Foreign body in the eye.
- * Metal sharpnel or bullet.

Liver Anatomy





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Q NO 34

MRA

MRA stands for magnetic resonance angiography. MRA of brain is used to assess abnormalities in the arterial blood supply system of brain.

3D 3 dimensional time of flight (TOF) - MRA is the most common technique used to assess the arterial blood supply system of brain.

3D TOF provides higher signal to noise and shorter imaging times.

MRA brain is easy to perform and does not required contrast.

MRV:

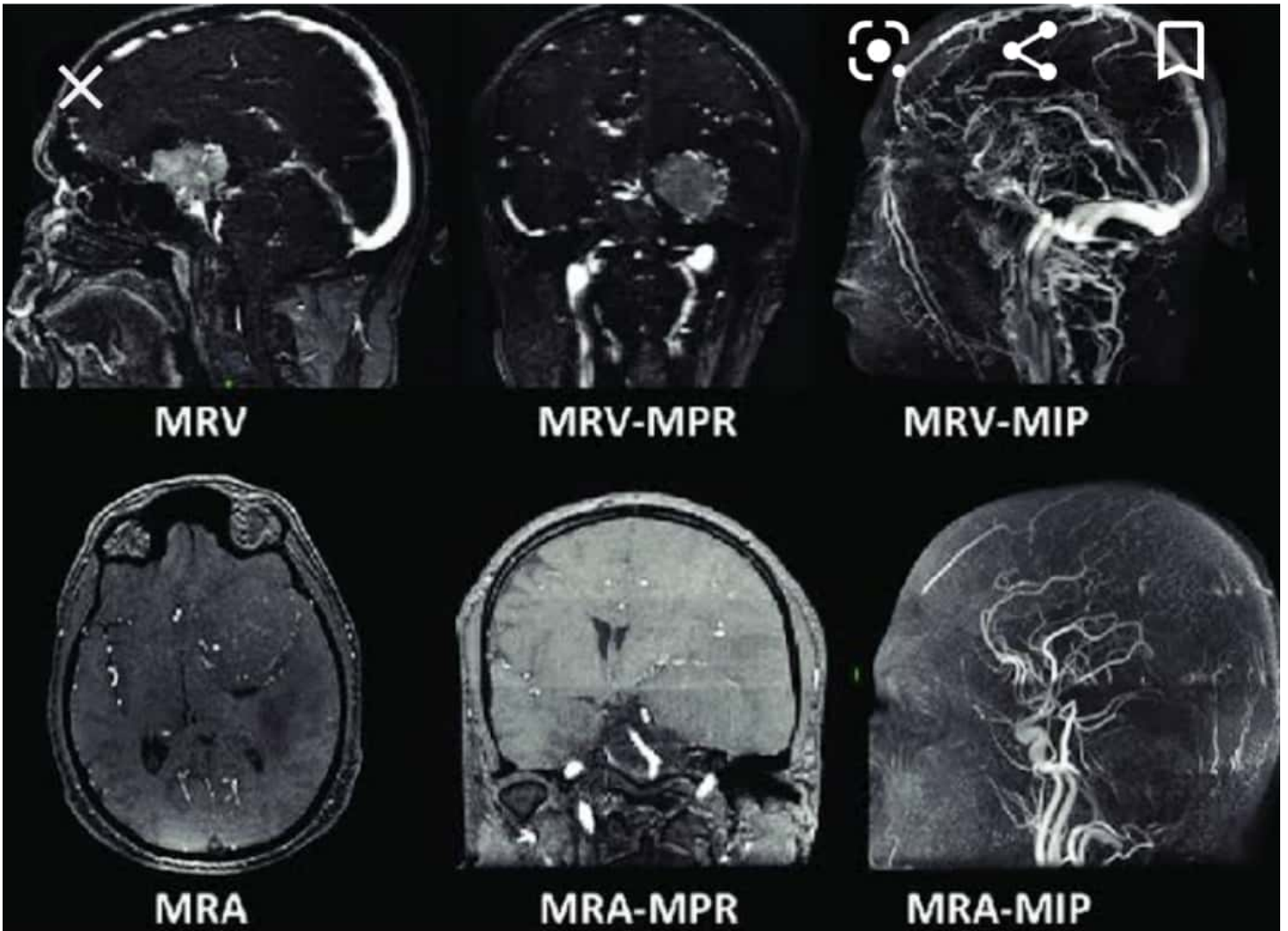
Stands for magnetic resonance venography.

MRV is used to assess abnormalities in venous drainage of the brain.

2 dimensional (2D) time of flight (TOF) MR venography and 3D phase contrast (PC) are the techniques

commonly used to assess the cerebral venous sinuses because they are easy to perform and do not require contrast.





Q105MRI KneePatient Preparation

- * A satisfactory written consent from must be taken from patient before entering the scanner room.
- * Ask the patient to remove all metal objects including keys, coins, wallet, card, jewellery etc.
- * If possible provide a chaperone for claustrophobic patients
- * Explain the procedure to the patient.
- * Instruct the patient to keep still.
- * Note the weight of the patient.

Indications:

meniscal disorders. non-displaced
and displaced tears.

marrow abnormalities.

synovial based disorder.

muscle and tendon disorder

neoplasms of bone.

ligament tears

osteochondral fractures.

osteochondritis

chondromalacia.

Acute trauma.

fracture.

Contraindication.

Any metal e.g.

cardiac pacemaker etc.)

foreign body.

Surgical clips.

Pregnancy.

Positioning:

feet first spine
position the knee.

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- * in the knee coil and immobilise with cushions
- * Center the laser beam localiser over the lower border of patella.

(2) NO 3

MRI spine

Magnetic resonance imaging is a noninvasive test used to diagnose medical conditions. MRI uses a powerful magnetic field radio waves and computer to produce detailed pictures of internal body structures. MRI does not use radiation. MRI images doctors allow to examine the body.

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and detect disease.

The image can be reviewed on a computer monitor.

Currently MRI is the most sensitive imaging test available for the spine.

Slipped disc:

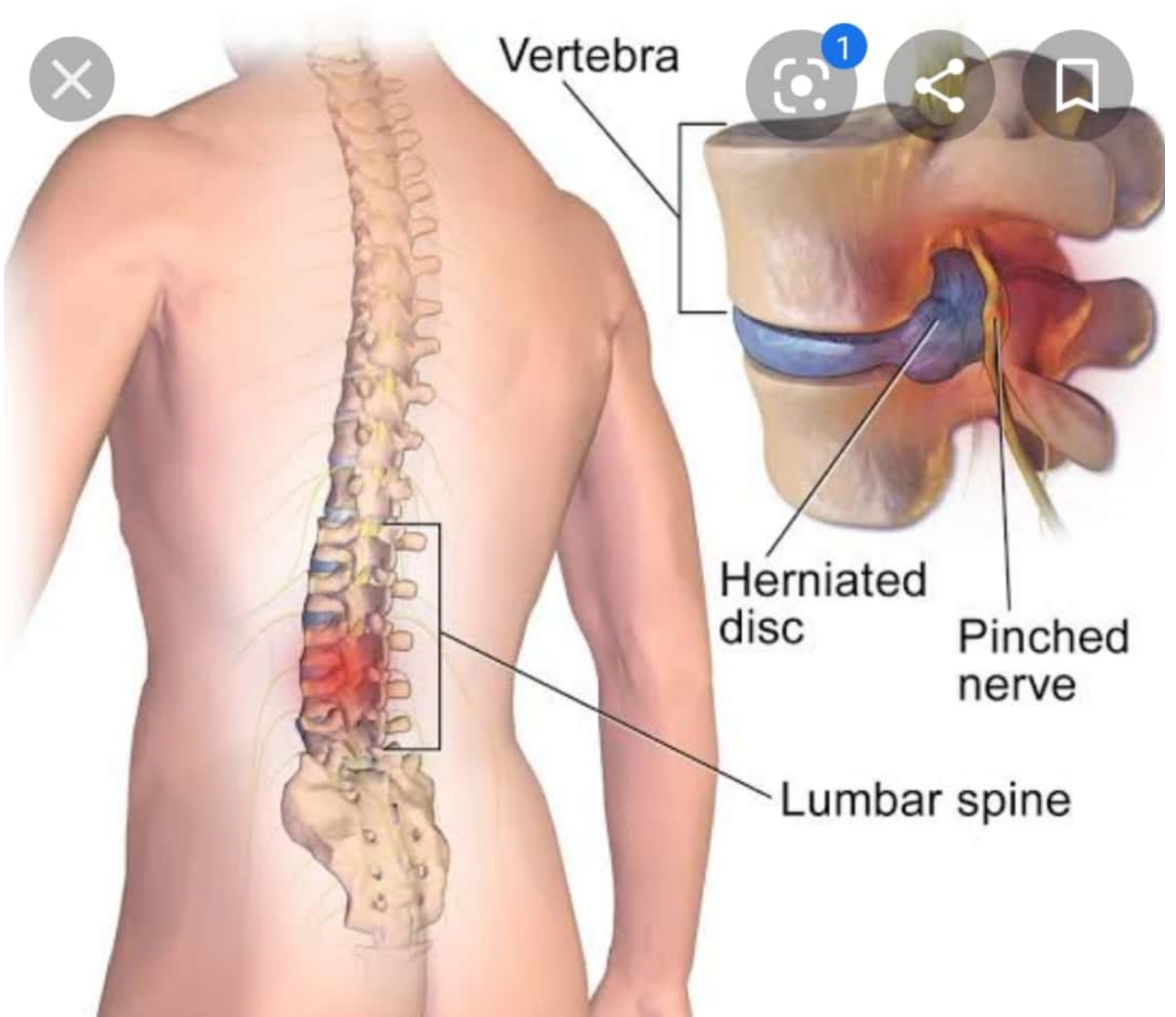
When a soft cushion of tissue between the bones in your spine pushes out. It painfully presses on nerve.

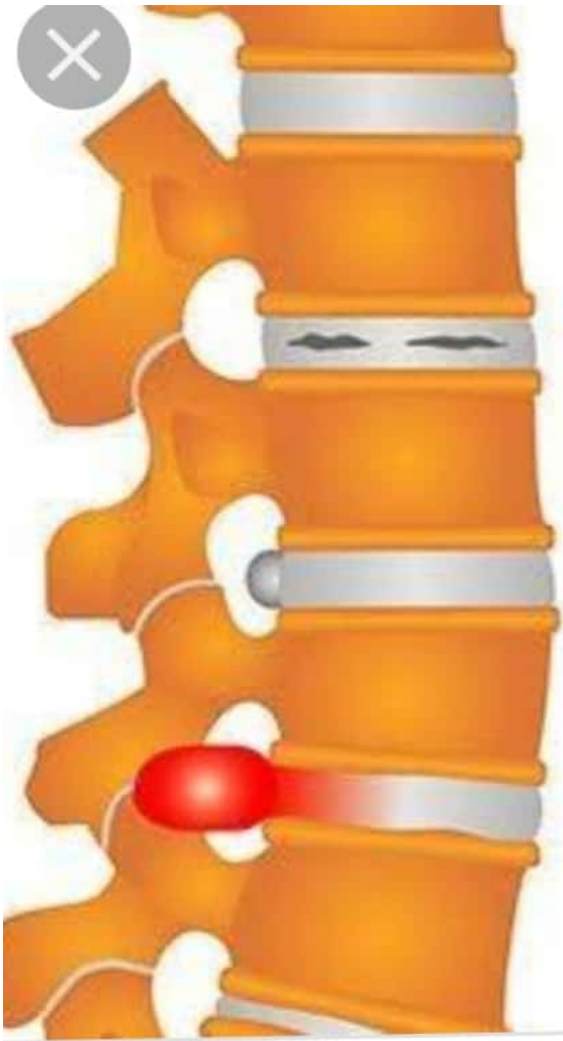
The center of disk called nucleus is soft springy and received the shock of standing walking running etc. The outer ring of disk called annulus.

A slipped disk also called ~~has~~ herniated disc.

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Normal Disc



Degenerative Disc



Bulging Disc



Herniated Disc