

①

Name : Gulalai Zahid
ID # : 15175
Viv : Anatomy
Submitted to : Sir Waqas Ihsan

Question: 1 Structure of Human Ear:

→ Human ear is advanced and sensitive organ of body, the major task of ear are to detect, transmit and transduce sound.

→ Structure of ear consist of;

- (1) External Ear
- (2) Middle Ear
- (3) Inner Ear.

(1) External Ear:

→

The External Ear divides into two parts;

(a) Auricle

(b) external acoustic meatus which ends at the tympanic membrane.

(a) Auricle:

- Auricle is a paired structure found on either side of head.
- Its functionally to capture and direct sound waves towards the external acoustic membrane.
- It is a cartilaginous structure with lobule being the only part not supported by cartilage.

Helix:

- The cartilaginous part of auricle forms an outer curvature called helix.
- Second most curvature run in parallel with helix called anti-helix which divided into

two curvatures ;

- inferior anterior curvature
- superior posterior curvature.

Concha:

- In middle of auricle the is depression called concha.
- It continues with head as the external acoustic meatus.

(a) External Acoustic Meatus:

- It is sigmoid shaped tube that extends from the deep part of concha to tympanic membrane.
- External acoustic meatus does not have straight path and instead travels in an S-shaped curve as follows:
 - * Initially it travels in Superior anterior direction.
 - * It then turns slightly to move Superior posterior.
 - * It ends by running in



inferoanterior direction.

Tympanic Membrane:

- > Tympanic membrane lies at the distal end of external acoustic meatus.
- > It is connective tissue structure covered with skin on outside.
- > The membrane is connected to surrounding temporal bone by fibrocartilage.
- > The translucency of tympanic membrane allows the structure within middle ear to be observed during otoscopy.

Umbo of tympanic membrane:

- > on inner surface → the handle of malleus attaches to tympanic membrane at a point called umbo of tympanic membrane.

5

- > The handle of malleus: continues superiorly and at its highest point, a small projection called lateral process of malleus has been seen.

2) Middle Ear:

- > Middle ear lies within the temporal bone and extends from tympanic membrane to lateral wall of inner ear.

Parts of middle ear:

Tympanic cavity:

- > located medially to tympanic membrane.
- > contains small bones known as auditory ossicles; the malleus, incus, & stapes

6

Epitympanic recess:

- it is space superior to the tympanic cavity.
- Malleus & incus partially extend upwards into the epitympanic recess.

Borders:

Roof:

Roof formed by thin bone from petrous part of temporal bone. It separates middle ear from middle cranial fossa.

Floor:

Called a Jugular wall, it consists of thin layer of bone, separates the middle ear from internal jugular vein.

Lateral Wall:

Made up of tympanic membrane and lateral wall of epitympanic recess.

7

Medial Wall:

formed by lateral wall of internal ear, it consist of prominent bulge produced by facial nerve.

Anterior Wall:

- > A thin bony plate with two openings ; for auditory tube and tensor tympani muscle.
- > It separate middle ear from the internal carotid artery.

Posterior Wall:

- > Mastoid Wall.
- > consist of bony partition b/w the tympanic cavity and mastoid air cells.

Bones of middle Ear:

Bones of middle ear are the auditory ossicles.

- > malleus
- > incus
- > stapes

8

Malleus:

- largest bone
- most lateral of ear bone
- attaching to tympanic membrane via handle of malleus.

Incus:

- consist of body and two limbs articulate with malleus.
- short limb attaches to the posterior wall of middle ear
- long limb attaches to last of ossicles the stapes.

Stapes:

- Smallest bone of human body.
- Join incus to the oval window of inner ear.
- Strirrup shaped, with head, two limbs and base.

9

Mastoid air cells:

- located posterior to epitympanic recess.
- contained within cavity called mastoid antrum.
- mastoid air cell act as a buffer system.

Muscles of middle ear:

- Tensor tympani
- Stapedius muscle is the smallest skeleton muscle of body.

Auditory tube:

- Auditory tube is cartilaginous and bony tube that

(10)

connects the middle ear to nasopharynx.

- It extends from anterior wall of middle ear in an anterior, medioinferior direction opening onto lateral wall of the nasopharynx.

(3) Inner Ear:

- The inner ear is the innermost part of ear, located within the petrous part of temporal bone.
- It lies r b/w middle ear and internal acoustic meatus.

Components of inner Ear:

- (i) Bony labyrinth
- (ii) Membranous labyrinth

(11)

(i) Bony labyrinth

- Consist of a series of bony cavities within the petrous part of Temporal bone.
- It is composed of cochlea, vestibule and semi-circular canals.
- All these structures are lined internally with periosteum and contain a fluid called perilymph.

(ii) Membrane labyrinth:

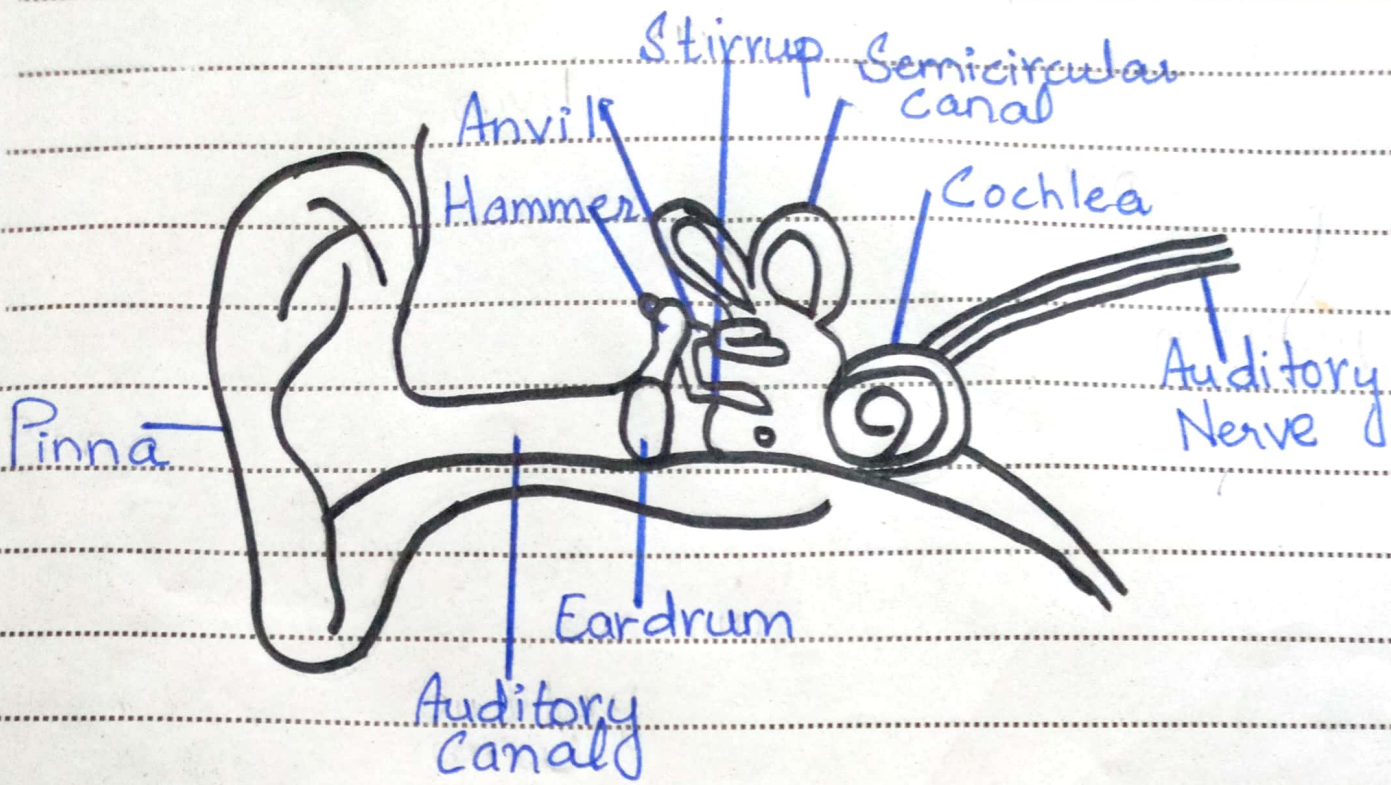
- It lies within bony labyrinth.
- It consist of cochlear lymph, semi-circular ducts, utricle and saccule.
- It is filled with fluid called Endolymph.

(12)

Openings in inner ear:

→ Oval Window: lies b/w middle ear and vestibule.

→ Round Window: separate the middle ear from scala tympani.



Outer Ear Middle Ear Inner Ear

Structure Of Human Ear

13

Question : 2

Submandibular Glands:

Introduction :

- Submandibular Glands is the bilateral salivary glands.
- It is located in face.
- It is second in three salivary glands.
- Their mixed serous and mucous during mastication, important for lubrication of food present inferior to tongue.
- 65-70% saliva in oral cavity is produced by submandibular glands.

Anatomical position:

- Submandibular gland is located within the anterior part of submandibular triangle.

14

3



The boundaries of triangle are;

- Superiorly: Inferior body to mandible.
- Anteriorly: Anterior belly of digastric muscle.
- Posteriorly: Posterior belly of the digastric muscle.

Anatomic Structure:

→ By structure submandibular gland are pair of elongate, flattened hooks which have two sets of arm:
→ superficial
→ deep.

Relation with nerves:

→ Submandibular gland share a intimate anatomical relationship with three principle nerves;

- * Lingual nerve
- * Hypoglossal nerve
- * Facial nerve.



15

Vasculature:

- * submental arteries
- * submental veins.
- * Facial & lingual arteries
- * supply blood.

Clinical significance:

→ The sub-mandibular gland accounts for 80% of all salivary duct calculi possibly due to nature of saliva.

16

Sublingual Glands:

Introduction:

- Sublingual Glands are the smallest of three paired salivary gland and the most deeply situated.
- Both Glands contribute to 3-5% of overall salivary volume.
- It is present inferior to tongue, anterior to submandibular Glands.
- The secretion produced is mainly mucous in nature.
- Approximately 5% saliva entering the oral cavity comes from these Glands.

Anatomical Positions

- Sublingual glands are almond-shaped and lies on the floor of oral cavity.

17

3



- Submandibular glands pass along the medial border of sublingual glands.
- Both sublingual glands unite anteriorly and form a single mass through a horseshoe configuration around the lingual frenulum.
- Its secretion drains into oral cavity by minor sublingual ducts, there are 8-20 ducts per gland.

Vasculature:

- Sublingual and submental arteries which arise from lingual and facial arteries.

Innervation:

- Sympathetic ⇒ superior cervical ganglion.
- Parasympathetic ⇒ superior salivatory nucleus.

Clinical relevance:

- A ranula is a type of mucocele (mucus cyst) that occurs in the floor of the mouth inferior to tongue.
- It is most common disorder associated with sublingual gland due to their higher mucin content in secretion compared to other salivary gland.
- Ranules can be caused by trauma to delicate sublingual gland ducts causing them to rupture with mucin then collecting within the connective tissues to form a cyst.

19

Question: 3

Sialolithiasis:

“
sialon — saliva
lithos — stone
iasis — process

☞ Sialolithiasis also called salivary calculi or salivary stones is a condition where calcified mass forms within a salivary gland usually in duct of submandibular gland.”

80-92% occurs in submandibular.

☞ Inflammation of salivary glands called sialadenitis.

→ Salivary glands stones are twice common in males as in females.

20

Why Stone formation is common in Submandibular Gland:

Reasons:

1- The presence of tense swelling below the body of mandible, which is greatest before or during meal and is reduced in size or absent between meals, is diagnostic of this condition.

2- Stone formation common in Submandibular gland due to anatomy of this duct being long and its flow of saliva against gravity called anti-gravity flow.

(21)

- 3- The increase mucoid nature of secretion.
- 4- High concentration of calcium and phosphate in saliva.
- 5- Longer curve duct.
- 6- Due to pH of saliva (alkaline in submandibular gland.)
- 7- Due to viscosity of saliva (more mucus in submandibular gland).
- 8- Stone formation also occurs due to anatomy of Wharton's duct (the torturous course of Wharton's duct).

(22)

9-

Stones usually diagnosis
by CT, ultrasound or
sialogram.

Question: 4

Vertebrae's (F) Human

Skeleton:

Any bones or segments
composing the spinal column
containing typically of a
cylindrical body and arch
with various processes,
and forming foramen or
opening through which the
spinal cord passes. "

→ 33 in number.

23

Typical Vertebrae:

→ Typical vertebrae have standard structure of a vertebrae and consist of rounded body anteriorly and vertebral arch posteriorly.

→ T₂ to T₈ are typical.

Atypical Vertebrae:

→ Atypical is different structure when compared to the structure of typical vertebrae.

→ 1st, second and seven cervical while 1st, 10th, 11th, 12th Thoracic vertebrae are atypical.

(24)

Structure ² (F) Vertebrae:

All vertebrae basic common structure having anteriorly vertebral body and posterior vertebral arch.

Vertebral Body:

- Body form anterior part of vertebrae.
- It is weight bearing component.
- Superior and inferior aspect of vertebral body are lined with hyaline cartilage.
- Adjacent vertebrae separated by fibrocartilaginous inter-vertebral disc.

Vertebral Arch:

- Vertebral arch form the lateral and posterior aspects.
- Vertebral arch have many bony process for attachment of muscles & ligaments.

25

3

Spinous Processes:

Each vertebrae has a single spinous processes, centered posteriorly at the arch point.

Transverse process:

Each vertebrae has two transverse processes, extend laterally and posteriorly from body.

Pedicles:

Connect vertebral body to the transverse process.

Lamina:

connect transverse & spinous process.

Articular process:

It form joints b/w one vertebrae and its superior & inferior counterparts.

Articular process located at intersection of laminae and pedicles.



Classification of Vertebrae:

1- Cervical Vertebrae:

→ Cervical Vertebrae is Seven in no. Their Main separate features are;

- + Bifid Spinous process
- + Transverse foramina
- + Triangular vertebral foramen.

- Cervical Vertebrae formed the framework of neck region.
- They support the skull.
- small in size.
- presence of foramina in each transverse process.

2- Thoracic Vertebrae:

→ The twelve thoracic vertebrae are medium-sized and increase in size from superior to inferior.

27

- Having heart-shaped bodies
- Each thoracic vertebrae has two demi facets for articulation of head with ribs.

3- Lumbar Vertebrae:

- There are five in number.
- Support the weight of torso.
- Having large vertebral bodies having kidney-shaped.
- No transverse foramin, facet etc
- Short spinous process
- Thicker bodies than T₁-T₁₂.
- Large in size.
- Support the for posterior abdominal wall.

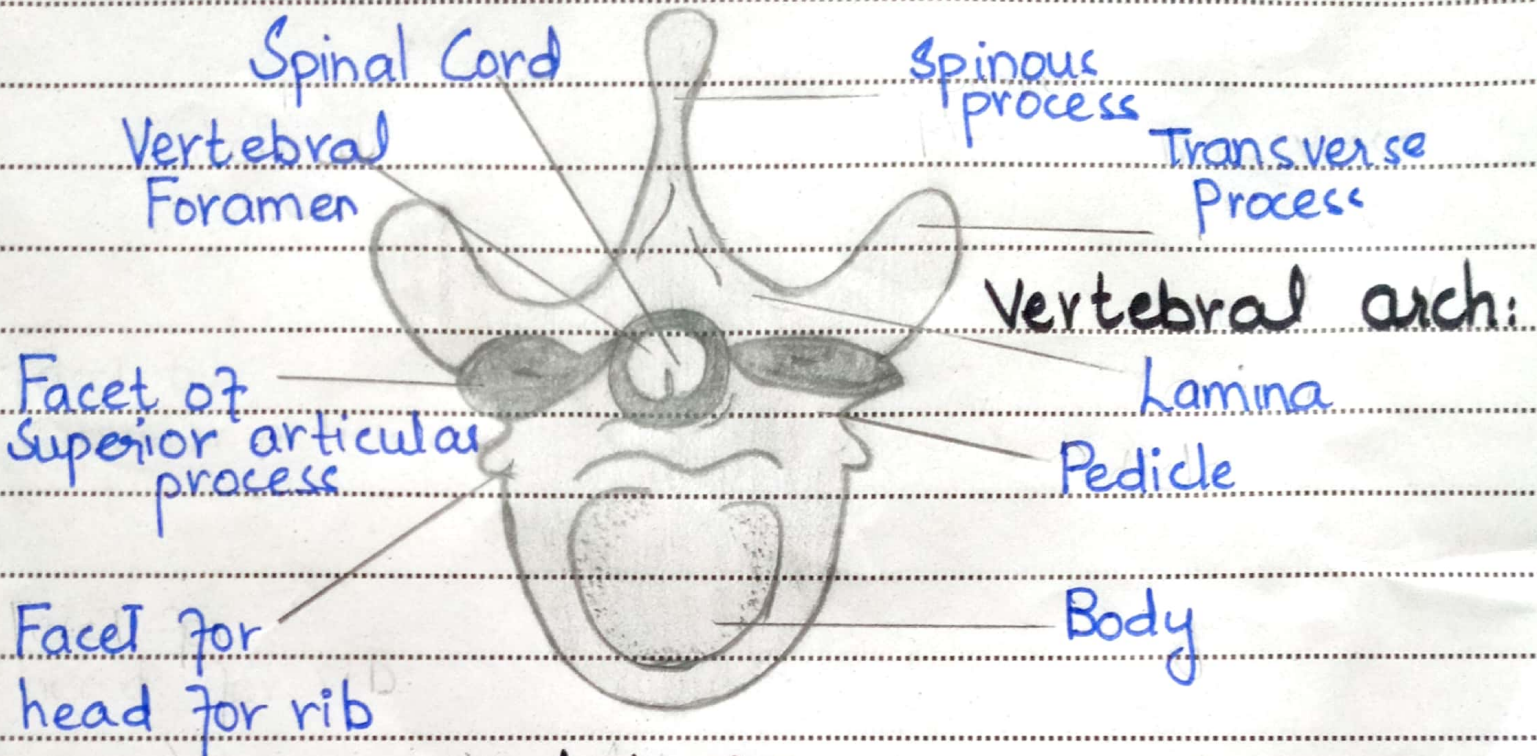
4- Sacrum :

- It is collection of five fused bones.
- Curved more in males than females.
- Protect reproductive, digestive and also urinary organs.
- Articulate laterally with pelvic bone at sacrospinous joint.
- Form posterior wall abdominal and pelvic cavity.
- Immovable

5- Coccyx :

- Fusion of 4 bones.
- Immovable
- Articulate with apex of sacrum.
- No vertebral canal and arches.
- Attach ligaments and constricting muscle to anus.

Posterior



Anterior

29

Question : 5

RADIOLOGY ▶

“ Radiology is the science dealing with x-rays and other high energy radiation, especially the use of such radiation for diagnosis and the treatment of disease. ”

“ Radiology also called diagnostic imaging ; it is a series of different tests that take pictures of various parts of body. Tests are unique because they allows doctors to see inside the body. ”

(30)

Importance (F) Radiology:

“Keep calm
AND LET THE
Radiologist
handle it.”

“Radiologist Be
LIK;

I'm not GOOD
at discussing...!

I'm GOOD at
diagnosing...!”
(Nipa Mendapang)

1 → Radiology is a necessary
component of most medical
evaluations:

2 → Radiology has become essential
for all major medical
condition to treat diseases
accurately.

31

3 → The importance of radiology is oriented towards disease management coupled with massive range of tools and techniques for accurate detection, staging and treatment.

4 → Radiology has emerged as one of key Element among the diagnostic tools in medical field.

5 → It not only aids in observing the effect of treatments but also in anticipating the particular results.

6 → The role of radiology is paramount in medical field.

7→ It replaces the need for surgery and allows physicians to view various organs with the help of a images.

8→ The best radiologist in Amritsar, our in Amandeep hospital use the latest machines for diagnostic images to give doctors a detailed analysis of structural changes taking place in patients' body.

9→ Radiology determines which patient is really sick, what disease they have, how extensive their disease.

10→ Radiology play an important role in defining treatment option, interventional settings and provides definite therapy.



- 11 → Radiology enjoys more comprehensive view of different domains of expertise than any other department in hospital.
- 12 → Radiology come with plenty of technical challenges, it started with x-ray which were discovered by Rontgen in 1895, NOV 8.
- 13 → CT produce a series of 2D or 3D images of anatomy
- 14 → MRI uses powerful magnetic field uses to produced detailed images of organ, tissues, bones etc.
- 15 → Fluoroscopy is the study of moving body structures, enable doctor to look into many system.

34



AS A TECHNOLOGIST;

“ I AM OBSESSED
WITH SEARCHING FOR
THE NEXT KILLER
APP. ”