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Assignment : Anatomy

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Bs. Radiology 4th semester

Q1) Write a note on the Structure of Human Ear?

⇒ ~~The~~ Ear is an advanced and very sensitive organ of the human body.

⇒ The Ear's is to transmit and transduce sound to the brain through the parts of Ear: outer ear, middle ear, and inner ear.

★ Structure of Ear:-

⇒ The Ear consists of three main parts (1) External Ear, (2) Middle ear (3) Internal ear.

⇒ The Internal Ear function for sound preception and equilibrium.

⇒ The external ear collects airborne vibrational waveforms.

⇒ The middle ear converts airborne waveforms into solid forms and transmits those to the internal ear.

⇒ The hearing part of the internal

ear converts solid bone into fluid-borne.

⇒ The equilibrium part translates fluid dynamics into a sense of balance.

\* External Ear:-

The external ear has an auricle and an external auditory meatus.

⇒ Auricle (pinna) and collects air vibrations.

⇒ Helix the elevated margin of the auricle.

⇒ Tragus A projection from the anterior margin of the auricle that extends over the opening of the external acoustic meatus.

⇒ Lobule (earlobe) which does not contain cartilage.

⇒ Concha the deepest depression within the auricle that leads into external meatus.

\* Tympanic Membrane:-

The Tympanic membrane (eardrum) is a thin, fibrous structure that forms the interface between the external and middle ears.

⇒ The tympanic membrane is circular and measures about 1cm in diameter.

⇒ The Tympanic membrane is extremely sensitive to pain.

## \* Middle Ear :-

The middle ear is an air-containing cavity within the petrous part of the temporal bone and lined with a mucous membrane.

→ The middle ear has four main components (1) tympanic cavity (2) auditory ossicles and their muscles (3) ~~auditory~~ auditory tube (4) mastoid area.

### (1) Tympanic cavity :-

The tympanic cavity is a small cavity surrounding the bones of the middle ear. Three small bones that transmit vibrations used in the detection of sound.

### (2) Auditory ossicles :-

The ossicles are three bones in either middle ear that are among the smallest bones in the human body.

→ They serve to transmit sounds from the air to the fluid-filled labyrinth (cochlea).

### (3) Auditory tube :-

The auditory tube or pharyngotympanic tube, is a tube that links the nasopharynx to the middle ear, which is also part of. In adult humans, the Eustachian tube is approximately 35mm (1.4 in) long and 3mm (0.12 in) in diameter.

(4) Mastoid Area:-

The mastoid area process is the portion of the temporal bone of the skull that is behind the ear.

⇒ The mastoid process contains open air containing space.

\* Internal Ear:-

The Internal ear (Labyrinth) is situated in the petrous part of the temporal bone, medial to the middle ear.

\* Bony Labyrinth:-

The bony labyrinth is the rigid, bony outer wall of the inner ear in the temporal bone.

⇒ The consists of three parts: the vestibule, Semicular Canals, and Cochlea.

⇒ These are cavities hollowed out of the substance of the bone, and lined by periosteum.

⇒ Vestibule ⇒ is the central part of the bony Labyrinth in the inner ear.

⇒ Semicular Canals ⇒

Semicular Canals are three tiny, fluid-filled tubes in your inner ear that help you keep your balance.

⇒ They are tiny hairs that line canals.

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⇒ Cochlea ⇒ is a hollow, spiral shaped bone found in the inner ear that plays a key role in the sense of hearing and participates in the process of auditory transduction.

### \* Membranous Labyrinth:-

The membranous Labyrinth is a system of ducts and dilatation located within the bony labyrinth of the internal ear and it contains the receptors for hearing and balance.

⇒ The membranous Labyrinth is composed of two functional parts

⇒ The vestibular Labyrinth and the Cochlear Labyrinth.

### \* Vestibular Labyrinth:-

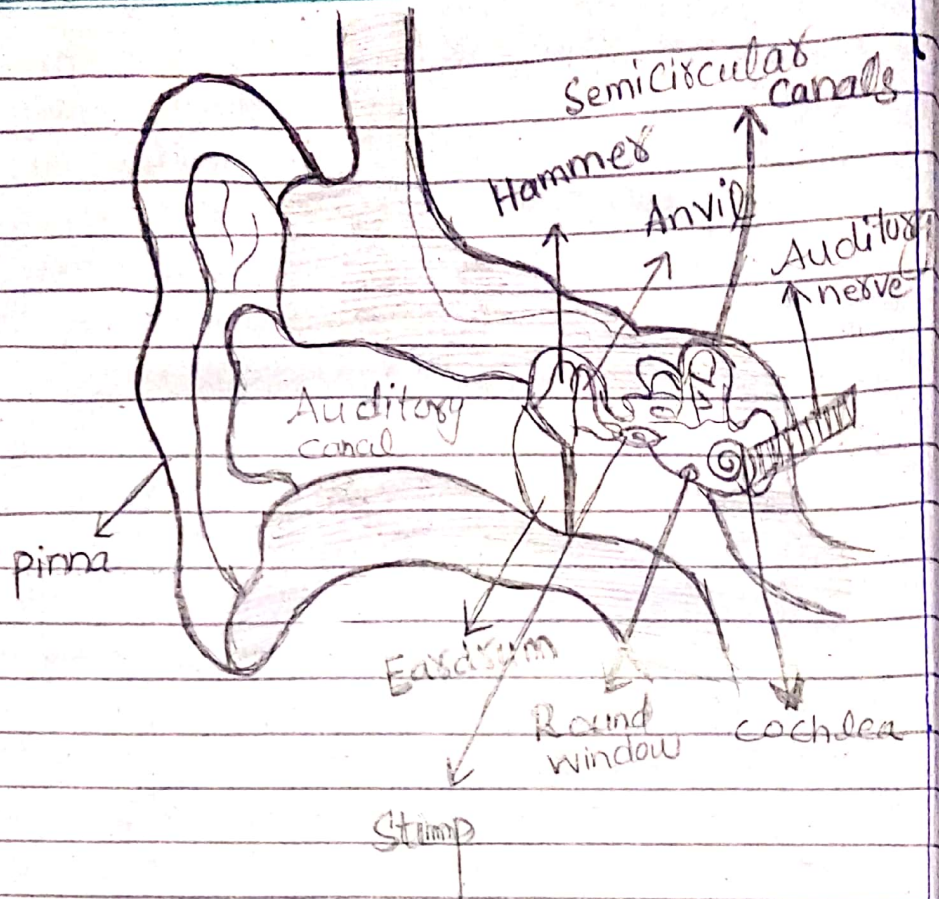
The vestibular Labyrinth is made up of the semicircular canals and the otolith organs ~~cells~~ ~~tissue~~ and contains receptors for vestibular sensations.

⇒ These receptors send vestibular information via the vestibulocochlear nerve to the cerebellum.

### \* Cochlear Labyrinth:-

The Cochlear Labyrinth is the portion of the inner ear that contains the cochlear duct and the perilymphatic space which is located between the bony and membranous parts of the inner ear.

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Q.2) What do u know about Submandibular and Sublingual glands?

\* Submandibular = glands:-

- The Submandibular gland is the second of the three major head salivary glands after and before the Sublingual glands.
- ⇒ It is situated both superiorly and inferiorly to the posterior aspect of the mandible in the submandibular triangle of the neck and makes up part of the floor of the oral cavity.
  - ⇒ Submandibular glands consists of

a mixture of serous and mucous acini. It lies beneath the lower border of the body of the mandible and is divided into superficial and deep parts by the mylohyoid muscles.

→ The deep part of the glands lies beneath the mucous membrane of the mouth on the side of the tongue.

⇒ The submandibular duct emerges from the anterior end of the deep part of the glands and runs forward beneath the mucous membrane of the mouth.

### \* Sublingual glands:-

The sublingual glands are almond-shaped and lie on the floor of the oral cavity.

→ They are situated underneath the tongue, bordered laterally by the mandible and medially by the genioglossus muscle of the tongue.

⇒ The sublingual ducts open into the mouth on the summit of the sublingual folds.

→ The sublingual glands are a pair of major salivary glands located to the tongue, and anterior to the submandibular glands.

→ The secretion produced is mainly mucous in nature, however, it is categorized as a mixed glands.

→ Approximately 5% of saliva entering

the oral cavity comes from the glands.

=> There are 800 to 1,000 minor salivary glands located throughout the oral cavity within the submucosa of the oral mucosa in the tissue of the buccal, labial, and lingual mucosa, the soft palate and lateral part of the hard plate and the floor of the mouth or between muscle fibers of the tongue.

(Q3) What do you know about the vertebra's of the human skeleton. Explain?

\* Vertebra :-

vertebrae are the 33 individual bones that interlock with each other to form the spinal column.

=> The vertebra are numbered and divided into regions, cervical, thoracic, lumbar, sacrum, and coccyx.

=> Only the top 24 bones are movable; the vertebrae in each region have unique features that help them perform their main function.

\* Cervical (Neck) :-

The main function of the cervical spine is to support the weight of the head about 10 pounds. The seven cervical



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- vertebrae are numbered C1 to C7.
- ⇒ The Neck has the greatest range of motion because of two specialized <sup>first</sup> vertebra (C1) is the ring shaped atlas that connects ~~directly~~ to the skull.
  - ⇒ The second vertebra (C2) is the peg-shaped axis, which has a projection called the odontoid that the atlas pivots around.
  - ⇒ This joints allows for side-to-side or "no" motion of the head.

#### \* Thoracic (mid back):-

- The main function of the thoracic spine is to hold the ribcage and protect the heart and Lungs.
- ⇒ The twelve thoracic vertebrae are numbered T1 to T12.
  - ⇒ Range of motion in the thoracic spine is limited.

#### \* Lumbar (low back):-

- The main function of the lumbar spine is to bear the weight of the body.
- ⇒ Five numbered vertebrae are numbered L1 to L5.
  - ⇒ vertebra are much larger in size to absorb the stress of lifting and carrying heavy objects.

## \* Sacrum :-

- The main function of sacrum is to connect the spine to the hip bones (iliac).
- There are five sacral vertebrae, which are fused together.
  - Together ~~ilic~~ with the iliac bones, they form a ring called the pelvic girdle.

## \* Coccyx region :-

- The four fused bones of the coccyx, or tailbone, provide attachment for ligaments and muscles of the pelvic floor.
- ⇒ vertebrae have unique regional features, every vertebra has functional parts.
  - A drum-shaped body designed to bear weight and withstand compression.
  - An arch-shaped bone that protects the spinal cord.

(Q) Why stone formation is more common in the submandibular glands than other salivary glands?

## \* Submandibular Salivary glands :-

- The submandibular salivary gland is a common site of calculus formation.
- This condition is rare in other salivary glands. The presence of a tense

- Swelling below the body of the mandible, which is greatest before or during a meal and is reduced in size or absent between meals, is diagnostic of the condition.
- Stone formation occurs most commonly in the submandibular gland for several reasons.
  - ⇒ The concentration of calcium in saliva produced by the submandibular gland is twice that of the saliva produced by the parotid gland.
  - ⇒ The submandibular gland saliva is also relatively alkaline and mucous.
  - ⇒ The flow of saliva from the submandibular gland is often against gravity due to variations in the location of the duct orifice.
  - ⇒ The orifice itself is smaller than that of the parotid.
- \* Submandibular Gland occurrence:-
- ⇒ Abundant calcium concentration
  - ⇒ Alkaline pH
  - ⇒ Anatomic factors
  - ⇒ Wharton's duct ⇒ Longest
  - ⇒ Two sharp curves
  - ⇒ Small punctum.
- ⇒ The highest incidence of submandibular sialoliths is likely secondary to the thicker, mucoid secretions of the gland as well as the long, and superiorly directed path of the duct along the anterior floor of mouth.

- Wharton's duct has two noteworthy bends areas more likely to develop sialolithiasis.
- Ducts makes an acute turn before emptying into the oral cavity.
- The etiology of sialolithiasis is not clear. A popular theory is that mineralization occurs around a nidus of organic matter and may be initial etiological factor, Bacteria foreign bodies, ductal epithelial cells are collections of mucus are thought the probable sources of this organic matrix.
- The retention in the gland and ductal system is likely due to morphological abnormalities such as ductal stenosis or diverticula.

Q5: Write about the importance of radiology in medical field?

**\* Importance of Radiology:-**

- Radiology is now the key diagnostic tool for many disease and has an important role in monitoring treatment and predicting outcome.
- It has a number of imaging modalities in its armamentarium which have differing physical principles of varying complexity.
- Radiology plays a huge role in disease management by giving physicians more options, tools,

and techniques for detection and treatments. Diagnostic imaging allows for detailed information about structural or disease-related changes.

→ The ability to diagnose during the early stages, patients may be saved.

\* Understanding the role of Radiology:-

⇒ Radiology also called diagnostic imaging, is a series of different tests that take ~~on~~ images of various parts of the body.

→ Many of these tests are unique in that they allow doctors to see inside the body.

→ Different imaging exam can be used to provide this view, including x-ray, MRI and ultrasound, CT scan, nuclear medicine etc.

→ Radiology's role is central to disease management, with a wide choice of tools and techniques available for the detection, staging and treatment.

→ Diagnostic imaging provides detailed information about structural or disease related changes.

→ Early diagnostic saves lives.

→ Without diagnosis there can be no treatment, there can be no cure.

⇒ <sup>radio</sup>logists save lives. Image interpretation is the most visible

## Contribution of radiologists. +

- The population should be informed about the importance of diagnostic imaging."
- Doctors today cannot manage patients without diagnostic imaging.
- Emergency care physicians rely on radiology test results to determine your diagnosis and the course of your treatment.
- Radiologists are the physicians who specialize in interpreting the results of these imaging exams.
- Physicians and other specialists turn to radiologists for consultation on the safest and most effective exams and what the results mean for patients and the treatment options.
- The radiologist is responsible for interpreting the images acquired through a range of techniques and then communicating their analysis to the patient's physician.
- Responsible for interpreting diagnostic images providing indispensable information to treating physicians.