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Bs RADIOLOGY 4TH SEMESTER

ASSIGNMENT ANATOMY

Question No. 1

Write a note on the structure of human ear.

STRUCTURE OF HUMAN EAR:-

Ear consist of three parts.

1. External ear.
2. Middle ear.
3. Internal ear.

1. EXTERNAL EAR:-

External ear is formed by two parts.

1. Auricle or pinna.
2. External auditory meatus

1. AURICLE OR PINNA:-

- Auricle or pinna of the external ear consists of fibrocartilagenous plate covered by connective tissue and skin.
- This plate is characteristically folded

and ridged.

- Skin covering this plate is thin and contains many fine hairs and sebaceous glands.
- On the posterior surface of auricles, many sweat glands are present.

EXTERNAL AUDITORY MEATUS:-

- External auditory meatus starts from the concha and extends inside as a slightly curved canal, with a length about 55mm.
- Meatus consists of two parts.
 - i. Outer cartilaginous part
 - ii. Inner bony part.

CARTILAGINOUS PART:-

- Cartilaginous part is the initial part of external auditory meatus and is made up of cartilage. It is covered by thick skin which consists of stiff hairs. These hairs prevent the entry of foreign particles.
- Large sebaceous glands and ceruminous glands are also present.
- These glands are coiled and tubular in nature and open on the surface of the skin.
- Secretions of ceruminous glands, sebaceous glands and desquamated epithelial cells form the earwax.

2. MIDDLE EAR:-

- Middle ear or tympanic cavity is a small, narrow, irregular laterally compressed chamber situated within the temporal bone. It is also known as tympanum.
- It is separated from external auditory meatus by tympanic membrane.
- Middle ear consists of the following structures:
 1. Auditory ossicles
 2. Auditory muscles
 3. Eustachian tube.

TYMPANIC MEMBRANE:-

- Tympanic membrane is a thin, semitransparent membrane which separates the middle ear from external auditory meatus.
- Tympanic membrane also called eardrum. It is a thin layer of tissue in the human ear that receives sound vibrations from the outer air and transmits them to the auditory ossicles.

1. AUDITORY OSSICLES:-

Auditory ossicles are three miniature bones which are arranged in the form of a chain, extending across the middle ear from the tympanic

membrane

- i. Malleus
- ii. Incus
- iii) Stapes

i. MALLEUS

- Also called hammer.
- Head of malleus is attached to the head of the malleus.
- Neck of malleus is attached to the neck of the malleus.
- Head of malleus is attached to the body of the malleus.
- It is the largest of the three ossicles.

ii. INCUS

- The incus is the middle of the three ossicles.
- The head of the incus is attached to the head of the malleus.
- The body of the incus is attached to the body of the malleus.

iii. STAPES

- Stapes is the smallest of the three ossicles.
- It is the last of the three ossicles.
- It is the last of the three ossicles.
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- It is the last of the three ossicles.

membrane to oval window ossicles are:

- i. Malleus
- ii. Incus
- iii) Stapes

i. MALLEUS:-

- Also called hammer. it has a handle, head and neck.
- Handle is called manubrium and it is attached to tympanic membrane.
- Neck extends from the handle to the head.
- Head or Capitulum articulates with the body of incus.
- It transmits the sound vibrations from the eardrum to the incus.

ii. INCUS:-

- The incus or anvil is a bone in the middle ear. The anvil shaped small bone is one of three ossicles in the middle ear.
- The incus receives vibrations from malleus, to which it is connected laterally, and transmits these to stapes medially.

iii. STAPES:-

- Stapes also called stirrup.
- it is smallest bone in the body.
- it has a head, neck, anterior crus, posterior crus and a footplate.
- Head articulates with incus.

- foot plate fits into oval window.
- foot plate of stapes are put special ^{type} part of joint formation which hold the foot plates.

AUDITORY MUSCLES:-

- Two main muscles which prevent excessive movement of middle ear.
- Tensor tympani
- stapedius.

TENSOR TYMPANI:-

- keep the malleus tense tensor tympani muscle pulls and keep the tympanic membrane stretched or tensed constantly.
- This constant stretching of tympanic membrane is essential for the transmission of sound waves, which may reach any part of tympanic membrane.
- Paralysis of tensor tympani causes hearing impairment.

STAPEDIUS:-

- stapedius is smallest skeletal muscle in human body. with a length of just over 1mm.
- it lies in a bony conical cavity on posterior wall of the tympanic cavity.

EUSTACHIAN

- Eustachian tube connects the middle ear to the nasopharynx.
- its up to the middle ear.
- Eustachian tube is present in the middle ear.
- side

INTERNAL

- Internal ear is the part of the ear that is located inside the skull.
- it is the part of the ear that is located inside the skull.
- So
- ves

COCHLEA

- The cochlea is the part of the internal ear that is responsible for hearing.
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EUSTACHIAN TUBE:-

- Eustachian tube or auditory tube is the flattened canal extending from the anterior wall of middle ear to nasopharynx its upper part is surrounded by fibrocartilaginous plate.
- Eustachian tube connects middle ear with posterior part of nose and forms the passage of air between middle ear and atmosphere so the pressure on both sides of tympanic membrane is equalized.

INTERNAL EAR:-

- Internal ear or labyrinth is a membranous structure enclosed by a bony labyrinth in petrous part of temporal bone.
- it consists of sense of hearing and equilibrium.
- Sense organ for hearing is the cochlea and sense organ for equilibrium is vestibular apparatus.

COCHLEA:-

- The cochlea is a portion of the inner ear that looks like a snail.
- The cochlea represents the hearing part of inner ear and is situated in the temporal bone.
- The cochlea interacts with middle ear via two holes that are closed by membranes.

The Cochlea is made up of three canals wrapped around a bony axis, the modiolus.

These canals are

Scala tympani
Scala vestibuli
Scala media.

All the three compartments are filled with fluid. Scala vestibuli and scala tympani contain perilymph. Scala media is filled with endolymph.

SCALA VESTIBULI:-

- Scala vestibuli lies above the Scala media.
- It arises from oval window which is closed by footplate of apex.
- It communicates with the scala tympani through a small canal called helicotrema.

SCALA TYMPANI:-

- Scala tympani lies below Scala media.
- It is parallel to scala vestibuli and ends at the round window.
- Round window is closed by a strong thin membrane known as tympanic membrane.

SCALA MEDIA:-

Scala media also called Cochlear duct.

- It is a triangular compartment enclosed by basilar and vestibular membrane.
- Scala media is formed by upper outer and lower walls.
- upper wall or vestibular wall is formed by vestibular membrane.
- lower wall is called tympanic wall. it is formed by basilar membrane.
- it is a sensory part of cochlea.

Question No. 2

What do you know about submandibular and sublingual glands?

SUBMANDIBULAR GLAND:-

- Second largest Salivary gland.
- Also called Submaxillary Salivary gland.

LOCATION:-

The submandibular gland are pair of major Salivary glands located beneath the lower jaws, superior to digastric muscles.

SHAPE:-

The submandibular gland is irregular in shape and about the size of a walnut.

The secretion produced is a mixture of both serous fluid and mucus and enters the oral cavity via the submandibular duct or Wharton duct.

Approximately 65 to 70% of saliva in the oral cavity is produced by the submandibular glands even though they are smaller than the parotid gland.

ANATOMICAL STRUCTURE:-

Structurally the submandibular glands are a pair of elongate flattened hanks which have two sets of arms. Superficial and deep. The position of these arms is in relation to mylohyoid muscles which the gland hooks around.

Superficial arm:- this part of gland fills digastric triangles

Deep arm:- it is deep to mylohyoid and superficial to hyoglossus.

INNERVATION:-

- The secretory mechanism of the submandibular gland is regulated directly by the "parasympathetic nervous system" by which it is stimulated and indirectly by "sympathetic nervous system" by which it is inhibited.
- These exact fibres include presynaptic fibres from the facial nerve, via chorda tympani to submandibular ganglion, and postsynaptic fibres from cells in the submandibular ganglion together make up the parasympathetic secretomotor fibres.

Blood Supply:-

It is supplied by facial artery, veins drain into common facial and lingual vein.

SUBLINGUAL GLAND:-

It is smallest of the major salivary glands.

ANATOMICAL POSITION:-

Sublingual gland is situated underneath the tongue, bordered laterally by the mandible and medially by geniohyoid muscle of the tongue.

The glands form a shallow groove on the medial surface of the mandible known as sublingual fossa.

The Submandibular duct and lingual nerve pass alongside the medial aspect of sublingual gland.

It is mixed gland but mucous units predominate.

INNERVATION:-

The sublingual gland receive autonomic innervation through parasympathetic and sympathetic fibres which directly and indirectly regulate salivary secretion respectively. Their innervation is the same as that of the submandibular gland.

Blood Supply:-

Sublingual and submental arteries

Question No. 3

Why stone formation is more common in the submandibular gland than other salivary glands?

ANSWER:-

Stone formation is more common in the submandibular gland

than other Salivary gland because due to the anatomy of this duct being long and its flow of saliva against gravity.

This type of Salivary Secretions from the Submandibular gland are also more mucoid in nature as opposed to the more serous secretions from the parotid gland.

The concentration of Calcium in Saliva produced by submandibular gland is twice than other Salivary gland.

The submandibular gland saliva is also relatively alkaline and mucous.

Question No. 4

What do you know about the vertebrae of the human skeleton. Explain in detail?

VERTEBRAE OF HUMAN SKELETON:-

The vertebral column also called the spine, spinal column or backbone.

Composed of a series of bones called vertebrae.

The vertebral column usually consist of 33 vertebrae placed in series and connected by ligaments and intervertebral disc.

The vertebral column usually consist of 33 vertebrae. 7 cervical, 12 thoracic, 5 lumbar, 5 sacrum and 4 coccyx.

Typical vertebrae are the vertebrae which have standard structure of vertebrae of the vertebral column. Generally the vertebral column contains 33 individual vertebrae 24 presacral vertebrae followed by the sacrum & coccyx. Except for the sacrum and coccyx intervertebral columns occur in between all other vertebrae.

A typical vertebrae are the vertebrae in the vertebral column with different structures when compared to the structure of a typical vertebra. Only cervical, thoracic and lumbar vertebrae contain atypical vertebrae.

STRUCTURE OF VERTEBRAE :-

- All vertebrae share a basic common structure.
- They each consist of an anterior vertebral column and posterior vertebral arch

VERTEBRAL BODY :-

- The vertebral body form the anterior part of each vertebrae.
- It is the weight-bearing component and vertebrae in the lower portion of the column have larger bodies than those in the upper portion.
- The superior and inferior aspects of the vertebral body are lined with hyaline cartilage.
- Adjacent vertebral bodies are separated by a fibrocartilaginous intervertebral disc.

VERTEBRAL ARCH :-

- The vertebral arch forms the lateral and posterior aspect of each

Vertebrae.

- In combination with the vertebral body, the vertebral arch forms an enclosed hole the vertebral foramen.
- The foramina of the all vertebrae line up to form the vertebral canal which encloses the spinal cord.
- The vertebral arches have several bony prominences which act as attachment sites for muscles and ligaments.

SPINOUS PROCESSES:-

each vertebrae has a single spinous process centered posteriorly at the point of the arch.

TRANSVERSE PROCESSES:-

each vertebrae has two transverse processes, which extend laterally and posteriorly from the vertebral body. In thoracic vertebrae, the transverse processes articulate with ribs.

PEDICLES:-

Connect the vertebral body to the transverse processes

LAMINA:- Connect the transverse and spinous processes

CLASSIFICATION OF VERTEBRAE:-

CERVICAL VERTEBRAE:- (7)

- There are Seven Cervical Vertebrae in human body.
- Formed framework of neck region.
- Support Skull
- Small in size
- Presence foramen in each transverse process.

THORACIC VERTEBRAE:-

- The twelve thoracic vertebrae.
- Thoracic vertebrae are medium sized and increase in size from superior to inferior.
- Their specialized function is to articulate with ribs producing the bony thorax.
- Each thoracic vertebra has two demi facets superiorly and inferiorly placed on either side of its vertebral body. The demi facets articulate with the heads of two different ribs.
- On the transverse processes of thoracic vertebrae there is a costal facet for articulation with shaft of a single rib.
- The spinous processes of thoracic vertebrae are oriented obliquely inferiorly and posteriorly.

LUMBAR VERTEBRAE:-

- There are five lumbar vertebrae.
- In most humans which are the largest in the vertebral column.
- They are structurally specialised to support the weight of the torso.
- Lumbar vertebrae have very large vertebral bodies, which are kidney shaped. They lack the characteristic features of other vertebrae with no transverse foramina, costal facets, or bifid spinous processes.

SACRUM VERTEBRAE:-

- Fusion of 5 Sacral Bones
- Immovable.
- Articulates with L5 at lumbosacral joint
- Articulate laterally with pelvic bone at sacroiliac joint
- Formed posterior wall of lower abdominal and pelvic cavity.

Coccyx:-

- Fusion 4 Coccyx bones
- Immovable
- Formed part of pelvic cavity

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Question No 5.

Write about the importance of radiology in medical field.

IMPORTANCE OF RADIOLOGY IN

MEDICAL FIELD:-

Radiology is now the key diagnostic tool for many diseases.

Radiology is extremely important in diagnosing and treating of patient illness.

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

Radiology has one of the key elements among the diagnostic tools in the medical industry. It not only aids in observing the effect of the treatments but also in anticipating the particular result.

In Radiology we use fluoroscopy to allow your doctor to see your organs and tissues working on a video screen similar to watching a movie.

Fluoroscopy helps to diagnose and treat many conditions of the bloodvessel, bones, joints, digestive respiratory and reproductive system etc.

In Radiology MRI is helpful to detect the pathology.

In Radiology x-rays to enable the doctor to have a better view of the patients body internally.

Radiology play a huge role in disease management by giving physicians more options, tools and techniques for detection and treatment.

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

Now Without imaging technique the patient treatment also incomplete.
