

**NAME : HAMID ULLAH**

**ID :14603**

Q1. Write about the structure of Eye. Also name the foramina found in the base of skull.

**ANSWER:**

The **eyeball** is a bilateral and spherical organ, which houses the structures responsible for vision. It lies in a bony cavity within the facial skeleton – known as the bony orbit.

Anatomically, the eyeball can be divided into three parts – the fibrous, vascular and inner layers. In this article, we shall consider the anatomy of the eyeball in detail, and its clinical correlations

### **Structure**

The eyeball can be divided into the fibrous, vascular and inner layers. These layers have different structures and functions. We shall now look at these layers in further detail.

#### **Fibrous Layer**

The fibrous layer of the eye is the outermost layer. It consists of the sclera and cornea, which are continuous with each other. Their main functions are to provide shape to the eye and support the deeper structures.

The sclera comprises the majority of the fibrous layer (approximately 85%). It provides attachment to the extraocular muscles – these muscles are responsible for the movement of the eye. It is visible as the white part of the eye.

The **cornea** is transparent and positioned centrally at the front of the eye. Light entering the eye is refracted by the cornea.

#### **Vascular Layer**

The vascular layer of the eye lies underneath the fibrous layer. It consists of the choroid, ciliary body and iris:

**Choroid** the layer of connective tissue and blood vessels. It provides nourishment to the outer layers of the retina.

**Ciliary body** – comprised of two parts – the ciliary muscle and ciliary processes. The ciliary muscle consists of a collection of smooth muscle fibres. These are attached to the lens of the eye by the ciliary processes. The ciliary body controls the shape of the lens, and contributes to the formation of aqueous humor

**Iris** – circular structure, with an aperture in the centre (the pupil). The diameter of the pupil is altered by smooth muscle fibres within the iris, which are innervated by the autonomic nervous system. It is situated between the lens and the cornea.

#### **Inner Layer**

The inner layer of the eye is formed by the retina; its light detecting component. The retina is composed of two layers:

**Pigmented (outer) layer** – formed by a single layer of cells. It is attached to the choroid, and supports the choroid in absorbing light (preventing scattering of light within the eyeball). It continues around the whole inner surface of the eye.

**Neural (inner) layer** – consists of photoreceptors, the light detecting cells of the retina. It is located posteriorly and laterally in the eye.

Anteriorly, the pigmented layer continues but the neural layer does not – this part is known as the non-visual retina. Posteriorly and laterally, both layers of the retina are present. This is the optic part of the retina.

#### **• Other Structures in the Eyeball**

- Within the eyeball, there are structures that are not located in the three layers. These are the lens and the chambers of the eye.

- **Lens**
- The lens of the eye is located anteriorly, between the vitreous humor and the pupil. The shape of the lens is altered by the ciliary body, altering its refractive power. In old age, the lens can become opaque – a condition known as a cataract.
- **Anterior and Posterior Chambers**
- There are two fluid filled areas in the eye – known as the anterior and posterior chambers. The anterior chamber is located between the cornea and the iris, and the posterior chamber between the iris and ciliary processes.

- **Vasculature**
- The eyeball receives arterial blood primarily via the ophthalmic artery. This is a branch of the internal carotid artery, arising immediately distal to the cavernous sinus. The ophthalmic artery gives rise to many branches, which supply different components of the eye. The central artery of the retina is the most important branch – supplying the internal surface of the retina. Occlusion of this artery will quickly result in blindness.

### ***FORAMINAE:***

Cribriform

Optic canal

Superior orbital fissure

Foramen rotundum

Foramen Ovale

Internal acoustic meatus

Jugular foramen

Hypoglossal canal.

Q2. Write the Names of the muscles of the medial fascial compartment of thigh with their origin and insertion?

### **ANSWER:**

The muscles in the medial compartment of the thigh are collectively known as the hip adductors. There are five muscles in this group; gracilis, obturator externus, adductor brevis, adductor longus and adductor magnus.

All the medial thigh muscles are innervated by the obturator nerve, which arises from the lumbar plexus. Arterial supply is via the obturator artery.

## **Muscles of the Medial Thigh**

### **Adductor Magnus**

The adductor magnus is the largest muscle in the medial compartment. It lies posteriorly to the other muscles.

Functionally, the muscle can be divided into two parts; the adductor part, and the hamstring part.

- **Attachments**

- Adductor part – Originates from the inferior rami of the pubis and the rami of ischium, attaching to the linea aspera of the femur.
- Hamstring part – Originates from the ischial tuberosity and attaches to the adductor tubercle and medial supracondylar line of the femur.

- **Actions:** They both adduct the thigh. The adductor component also flexes the thigh, with the hamstring portion extending the thigh.

- **Innervation:** Adductor part is innervated by the obturator nerve (L2-L4), the hamstring part is innervated by the tibial component of the sciatic nerve (L4-S3).

## Adductor Longus

The adductor longus is a large, flat muscle. It partially covers the adductor brevis and magnus. The muscle forms the medial border of the femoral triangle.

- **Attachments:** Originates from the pubis, and expands into a fan shape, attaching broadly to the linea aspera of the femur
- **Actions:** Adduction of the thigh.
- **Innervation:** Obturator nerve (L2-L4).

## Adductor Brevis

The adductor brevis is a short muscle, lying underneath the adductor longus.

It lies in between the anterior and posterior divisions of the obturator nerve. Therefore, it can be used as an anatomical landmark to identify the aforementioned branches.

- **Attachments:** Originates from the body of pubis and inferior pubic rami. It attaches to the linea aspera on the posterior surface of the femur, proximal to the adductor longus.
- **Actions:** Adduction of the thigh.

### **Innervation:**

Obturator neObturator Externus

This is one of the smaller muscles of the medial thigh, and it is located most superiorly.

- **Attachments:**

- It originates from the membrane of the obturator foramen, and adjacent bone. It passes under the neck of femur, attaching to the posterior aspect of the greater trochanter.

- **Actions:** Adduction and lateral rotation of the thigh.
- **Innervation:** Obturator nerve (L2-L4).

### **Gracilis**

The gracilis is the most superficial and medial of the muscles in this compartment. It crosses at both the hip and knee joints. It is sometimes transplanted into the hand or forearm to replace a damaged muscle.

- **Attachments:** It originates from the inferior rami of the pubis, and the body of the pubis. Descending almost vertically down the leg, it attaches to the medial surface of the tibia, between the tendons of the sartorius (anteriorly) and the semitendinosus (posteriorly).
- **Actions:** Adduction of the thigh at the hip, and flexion of the leg at the knee.
- **Innervation:** Obturator nerve (L2-L4)

Q3. What is the effect of injury of external laryngeal nerve and also write about how to test the integrity of facial nerve.

### **ANSWER:**

The external laryngeal nerve and its relation to the inferior muscle is critical and allow identifying and preserving the integrity of this nerve in most cases. The external branch is susceptible to damage during thyroidectomy or cricothyrotomy, as it lies immediately deep to the superior thyroid artery. The ability to produce the pitched sounds is then impaired along with easy voice fatigability, (usually mono-toned voice).

### **Injury to the superior laryngeal nerve**

Injury to the superior laryngeal nerve can occur as a complication of a thyroidectomy. It will be result in paralysis of the cricothyroid muscle and anesthesia of the region above the level of the vocal folds. It tends to be, however, the external laryngeal branch are that is affected.

Therefore, it would affect only the cricothyroid muscle. The Some patients may not have any significant consequences of this, while others may have difficulty in changing the pitch of their voice or reduced stamina in their voice.

## **Facial Nerve**

The facial nerve supplies motor branches to the muscles of facial expression.

This nerve is therefore tested by asking the patient to crease up their forehead (raise their eyebrows), close their eyes and keep them closed against resistance, puff out their cheeks and reveal their teeth.

Q4. Write about the sutures of skull also write a note on Trigeminal nerve and its branches.

### ***ANSWER:***

#### **Sutures of the Skull**

Sutures are a type of fibrous joint that are unique to the skull. They are immovable, and fuse completely around the age of 20.

Sutures are of clinical importance, as they can be points of potential weakness in both childhood and adulthood. The main sutures in adulthood are:

- **Coronal suture** which fuses the frontal bone with the two parietal bones.
- **Sagittal suture** which fuses both parietal bones to each other.
- **Lambdoid suture** which fuses the occipital bone to the two parietal bones.

In neonates, the incompletely fused suture joints give rise to membranous gaps between the bones, known as fontanelles. The two major fontanelles are the frontal fontanelle (located at the junction of the coronal and sagittal sutures) and the occipital fontanelle (located at the junction of the sagittal and lambdoid sutures).

## ***Trigeminal Nerve:***

The trigeminal nerve, CN V, is the fifth paired cranial nerve.

the anatomical course of the nerve, and the motor, sensory and parasympathetic functions of its terminal branches.

The trigeminal nerve is associated with derivatives of the 1st pharyngeal arch.

The trigeminal nerve originates from three sensory nuclei (mesencephalic, principal sensory, spinal nuclei of trigeminal nerve) and one motor nucleus (motor nucleus of the trigeminal nerve).

The peripheral aspect of the trigeminal ganglion gives rise to 3 divisions: **ophthalmic** (V1), **maxillary** (V2) and **mandibular** (V3).

### ***Branches:***

#### **Ophthalmic Nerve**

Ophthalmic nerve gives rise to 3 terminal branches: frontal, lacrimal and nasociliary, which innervate the skin and mucous membrane of derivatives of the frontonasal prominence derivatives:

- Forehead and scalp
- Frontal and ethmoidal sinus
- Upper eyelid and its conjunctiva
- Cornea (see clinical relevance)
- Dorsum of the nose

## **Maxillary Nerve**

Maxillary nerve gives rise to 14 terminal branches, which innervate the skin, mucous membranes and sinuses of derivatives of the maxillary prominence of the 1st pharyngeal arch:

- Lower eyelid and its conjunctiva
- Cheeks and maxillary sinus
- Nasal cavity and lateral nose
- Upper lip
- Upper molar, incisor and canine teeth and the associated gingiva
- Superior palate

## **Mandibular Nerve**

Mandibular nerve gives rise to four terminal branches in the infra-temporal fossa: buccal nerve, inferior alveolar nerve, auriculotemporal nerve and lingual nerve.

These branches innervate the skin, mucous membrane and striated muscle derivatives of the mandibular prominence of the 1st pharyngeal arch.

Q5. Write a note on Spinal cord with reference to its anatomical position and structure also write a short note on Pharynx with enumeration to its constrictors.

## ***Answer:***

### ***Spinal cord***

The spinal cord is a tubular bundle of nervous tissue and supporting cells that extends from the brainstem to the lumbar vertebrae. Together, the spinal cord and the brain form the central nervous system.

In this article, we shall examine the macroscopic anatomy of the spinal cord – its structure, membranous coverings and blood supply.

### **Anatomical Position and Structure**

The spinal cord is a cylindrical structure, greyish-white in colour. It has a relatively simple anatomical course:

The spinal cord arises cranially as a continuation of the medulla oblongata (part of the brainstem).

It then travels inferiorly within the vertebral canal, surrounded by the spinal meninges containing cerebrospinal fluid.

At the L2 vertebral level the spinal cord tapers off, forming the conus medullaris.

As a result of the termination of the spinal cord at L2, it occupies around two thirds of the vertebral canal. The spinal nerves that arise from the end of the spinal cord are bundled together, forming a structure known as the cauda equina.

During the course of the spinal cord, there are two points of enlargement. The cervical enlargement is located proximally, at the C4-T1 level. It represents the origin of the brachial plexus. Between T11 and L1 is the lumbar enlargement, representing the origin of the lumbar and sacral plexi.

The spinal cord is marked by two depressions on its surface. The anterior median fissure is a deep groove extending the length of the anterior surface of the spinal cord. On the posterior aspect there is a slightly shallower depression – the posterior median sulcus.

## ***Pharynx***

The pharynx is a muscular tube that connects the oral and nasal cavity to the larynx and oesophagus.

It begins at the base of the skull, and ends at the inferior border of the cricoid cartilage

The pharynx (plural: pharynges) is the part of the throat behind the mouth and nasal cavity, and ... They are arranged as an inner layer of longitudinal muscles and an outer circular layer.

## **Circular**

There are three circular pharyngeal constrictor muscles; the superior, middle and inferior pharyngeal constrictors. They are stacked like glasses, which form an incomplete muscular circle as they attach anteriorly to structures in the neck.

The circular muscles contract sequentially from superior to inferior to constrict the lumen and propel the bolus of food inferiorly into the oesophagus.

- **Superior pharyngeal constrictor :**

The uppermost pharyngeal constrictor. It is located in the oropharynx.

Originates from the pterygomandibular ligament, alveolar process of mandible and medial pterygoid plate and pterygoid hamulus of the sphenoid bone.

Inserts posteriorly into to the pharyngeal tubercle of the occiput and the median pharyngeal raphe.

- **Middle pharyngeal constrictor:**

located in the laryngopharynx.

Originates from the stylohyoid ligament and the horns of the hyoid bone.

Inserts posteriorly into the pharyngeal raphe.

- **Inferior pharyngeal constrictor:**

located in the laryngopharynx. It has two components:

Superior component (thyropharyngeus) has oblique fibres that attach to the thyroid cartilage.

Inferior component (cricopharyngeus) has horizontal fibres that attach to the cricoid cartilage.

All pharyngeal constrictors are innervated by the vagus nerve (CN X).