THOMAS ADEWUMI UNIVERSITY

ANA 202: ANATOMY OF FACE AND ORBIT

MR AJIBOYE ADEFIKAYO. A

B.Sc; M.Sc, Ph.D In view (Unilorin)

Face: Introduction

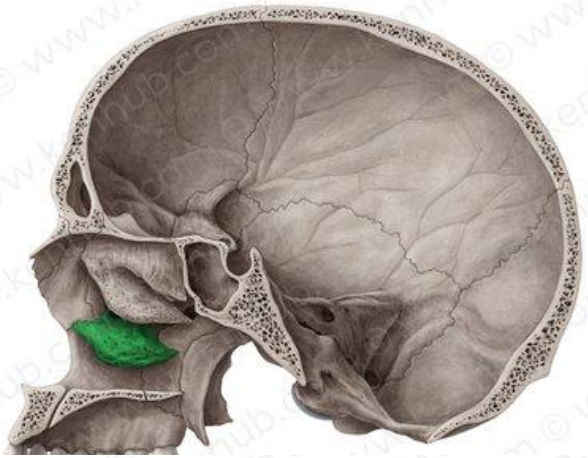
- The human face refers to the area that extends from the superior margin of the forehead to the chin, and from one ear to another.
- The basic shape of the human face is determined by the underlying facial skeleton (i.e. viscerocranium), the facial muscles and the amount of subcutaneous tissue present.
- The face plays an important role in communication and the expression of emotions and mood.

Bones of the Face

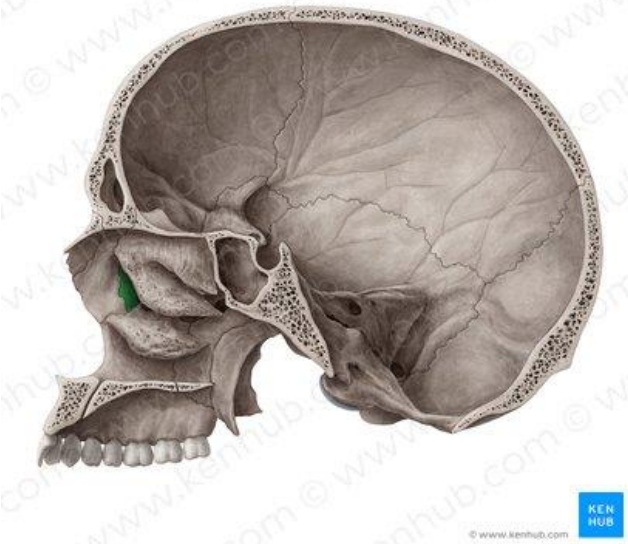
- The facial skeleton is also known as the viscerocranium. It is composed of fourteen bones, six paired and two unpaired bones.
- The bones of the viscerocranium include: Two nasal bones, Two maxillae, Two inferior nasal conchae, Two palatine bones, Two zygomatic bones, Two lacrimal bones, Mandible and Vomer.
- The main function of these bones is to give shape to the human face and to protect the internal structures. In addition, these bones provide openings for the passage of neurovascular structures and bony features for the attachment of facial muscles.

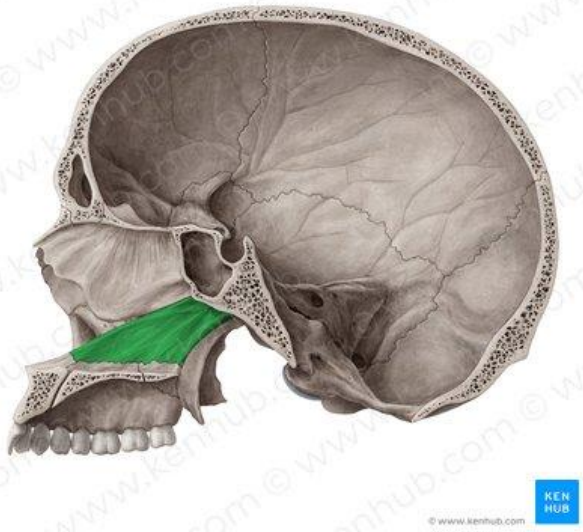
Inferior Nasal Concha

Palatine



Nasal
Zygomatic
Maxillae
Mandible





Lacrimal

Vomer

Muscles of Face

- The facial muscles are also known as the muscles of the facial expression or the mimetic muscles.
- These muscles are a group of approximately 20 superficial skeletal muscles of the face and scalp divided into five different groups according to their location and function.
- These groups include:

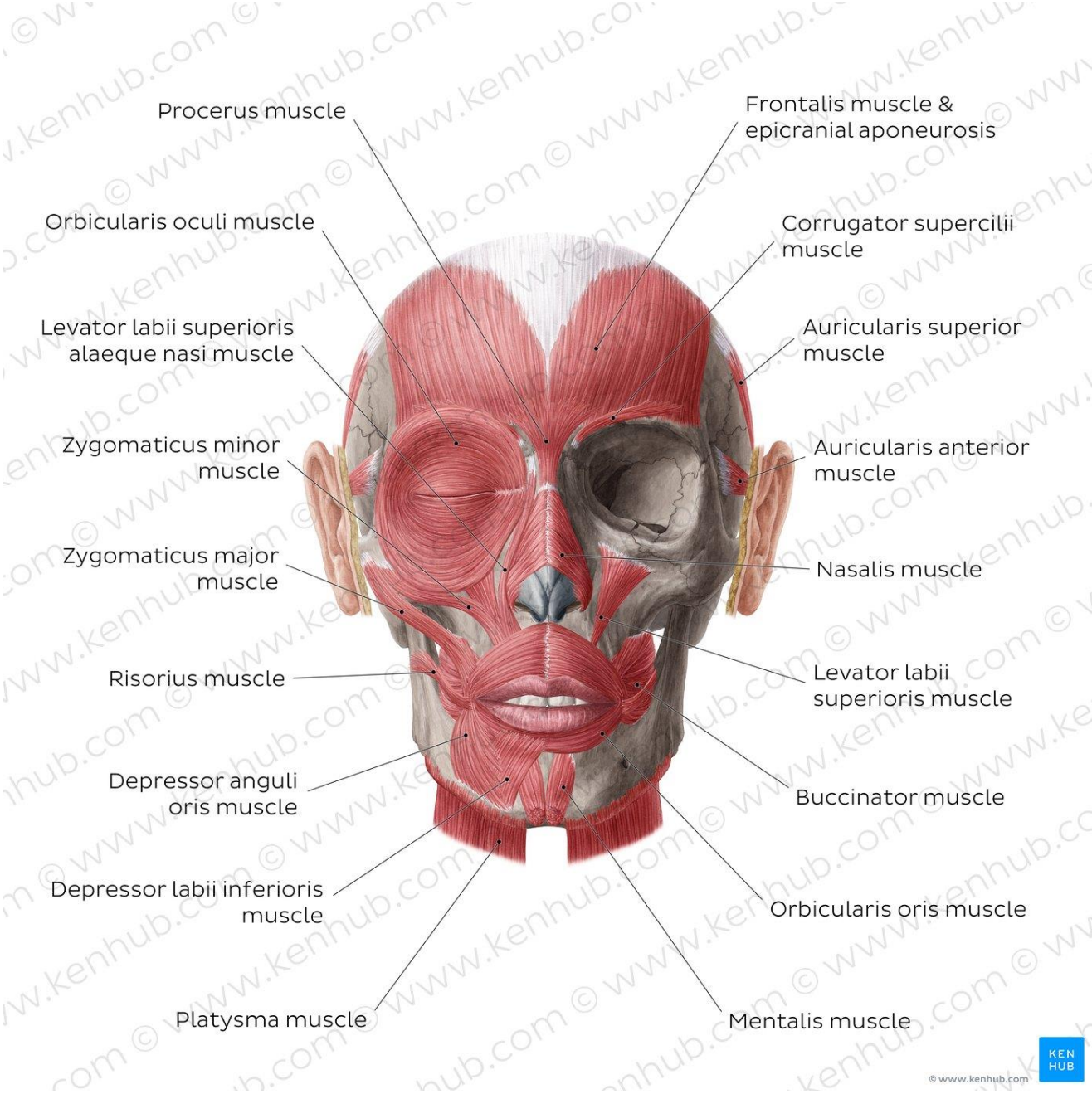
- Nasal group: Nasalis and procerus muscles.
- Orbital group: Orbicularis oculi and corrugator supercilii muscles. They are responsible for opening and closing the eyes and moving the eyebrows.
- Epicranial group: Occipitofrontalis and platysma muscles.

Muscles of Face

- Buccolabial (oral) group: Levator labii superioris, levator labii superioris alaeque nasi, risorius, levator anguli oris, zygomaticus major, zygomaticus minor, depressor labii inferioris, depressor anguli oris, mentalis, orbicularis oris and buccinator muscles. This group is in charge of the shape and movements of the mouth and lips.
- Auricular group: Auricularis anterior, auricularis superior, auricularis posterior muscles. This muscles move the ear lobe/auricle to a certain extent.

Muscles of Face

- All facial muscles originate from the bony and fibrous structures of the skull and insert into the skin.
- The prime function of the facial muscles is to provide a wide range of facial expressions which is important for expressing emotions and mood (e.g. smiling, grinning, frowning).
- In addition, these muscles help in opening and closing the mouth and eyes, and thus protect the delicate structures of the face.


Procerus muscle
Frontalis muscle & epicranial aponeurosis
Orbicularis oculi muscle
Corrugator supercilii muscle
Levator labii superioris alaeque nasi muscle
Auricularis superior muscle
Zygomaticus minor muscle
Auricularis anterior muscle
Zygomaticus major muscle
Nasalis muscle
Risorius muscle
Levator labii superioris muscle
Depressor anguli oris muscle
Buccinator muscle
Depressor labii inferioris muscle
Orbicularis oris muscle
Platysma muscle
Mentalis muscle
© www.kenhub.com
KEN HUB

Regions of Face

- The human face can be divided into three main parts the superior part of the face, middle part of the face, and the inferior part of the face.
- **Superior part of face**

- The superior part of the human face extends from the hairline to the inferior margin of the orbit.
- The lateral margins of this portion extend to the temporal region.
- The superior part of the face can be divided into three separate regions including the frontal, orbital and temporal regions.

Regions of Face

- **The frontal region**, also known as the forehead, is the most superior region of the face that spreads from the hairline to the eyebrows. It is composed mainly of the frontal bone and the overlying muscles including the procerus, occipitofrontalis, depressor supercilii and corrugator supercillii muscles. The muscles are covered by several fat pads and skin.
- **The temporal region** is composed of the frontal, sphenoid and temporal bones. It is covered mainly by the temporalis muscle and overlying skin.

Regions of Face

- **The orbital region** contains the eyes and orbits. Eyes are paired spherically-shaped organs situated in the orbits. The orbit is surrounded by a single muscle known as the orbicularis oculi muscle, while the eyes are enveloped and covered by the eyelids which function to protect the eyes from external factors. The orbicularis oculi muscle closes the eyelids on contraction while the levator palpebrae muscle opens the eyelids. The edges of the eyelids are lined with eyelashes.

Regions of Face

❖ **Middle part of face**

- The middle part of the face region extends from the lower eyelid superiorly to the superior margin of the upper lip inferiorly. This portion of the face is marked by four regions including the nasal, infraorbital, zygomatic and auricular regions.
- **The nasal region** is located in the central portion of the human face and, as its name suggests, it features the nose. The nose is the central pyramid-shaped structure, situated in the midline. The base of the nose is formed mainly by the nasal bone and covered by the nasalis muscle.

Regions of Face

- **The infraorbital region** overlies the maxilla, while the **zygomatic regions** overlie the zygomatic bone. These regions are located lateral to the nose and mark the superior portion of the cheek. The cheek is a prominence that overlies the zygomatic arch and is comprised of muscles and fat. The zygomatic arch is composed of two bones (zygomatic and maxilla). The muscular layer of the cheeks contains several muscles that include the masseter, levator labii superioris alaeque nasi, levator labii superioris, zygomaticus minor, zygomaticus major, risorius, levator anguli oris and buccinator muscles.
- **The auricular region** is the most lateral region of the face. It contains the external ear (auricle). The internal structure of the auricle is made from cartilage and covered by skin. The ears are surrounded by three auricular muscles (anterior, posterior, and superior).

Regions of Face

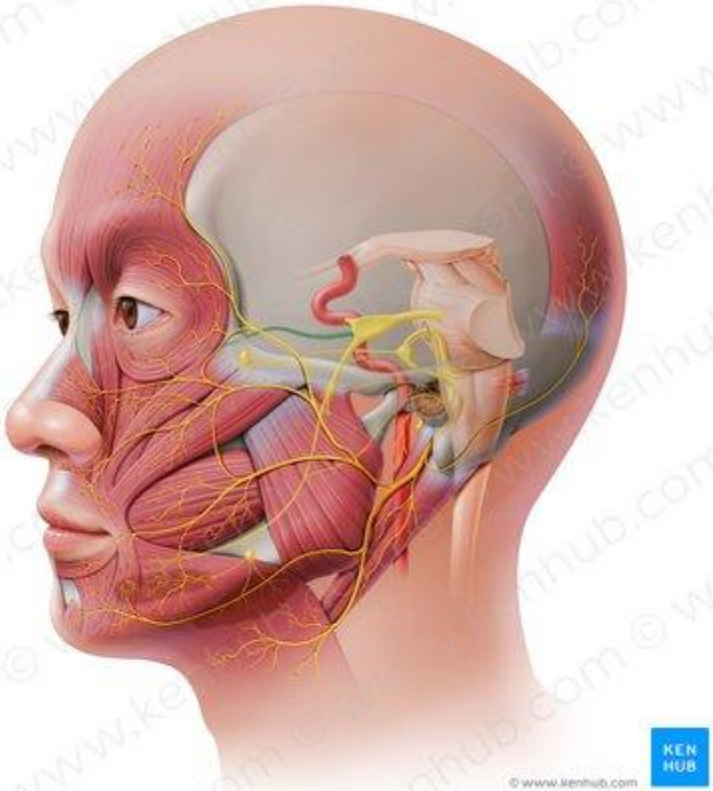
- **The inferior part** of the face is bordered superiorly by the superior margin of the upper lip and inferiorly by the inferior border of the chin. The lateral borders of the inferior part of the face are formed by the angles of the mandible on each side. This part can be divided into oral, mental, buccal and parotideomasseteric regions.
- **The oral region** surrounds the lips, the most prominent structures in the inferior part of the face. They are divided into two parts: the upper lip and lower lip. The upper lip is associated with the maxilla, while the lower lip, with the mandible. The lips are surrounded mainly by the orbicularis oris muscle which functions in altering the shape of the lips when we speak or eat.

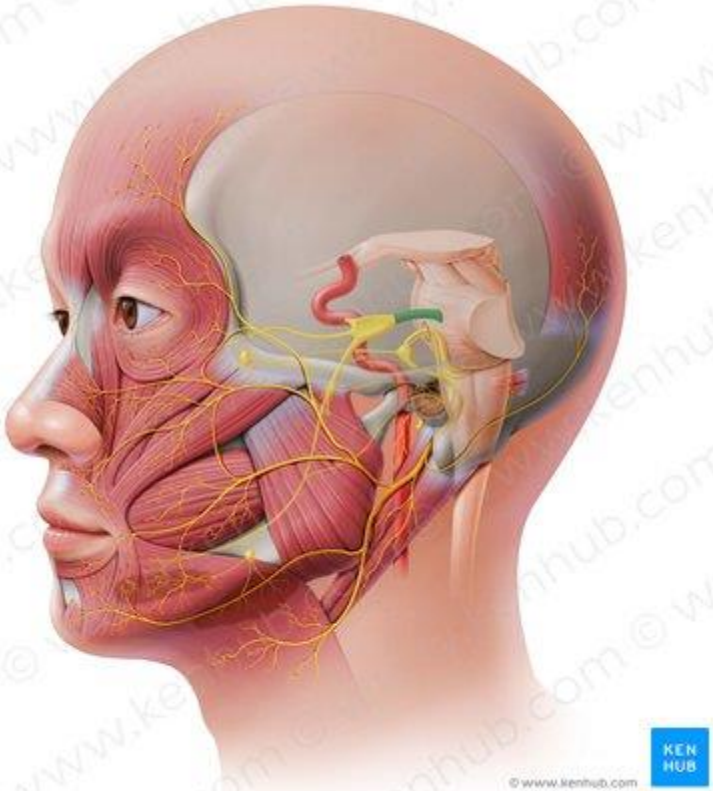
Regions of Face

- **The mental region** is located inferior to the mouth. It features the chin, a central structure that overlies mental protuberance of the mandible.
- **The buccal region** is located just inferior to the infraorbital and zygomatic region, and comprises the inferior portion of the cheek. It mainly refers to the area marked by the buccinator muscle. The inferior border of the buccal region is the jawline, formed by the inferior border of the mandible.
- **The parotideomasseteric region** is located lateral to the buccal region. This region is named after the underlying parotid gland and masseter muscle.

Innervation

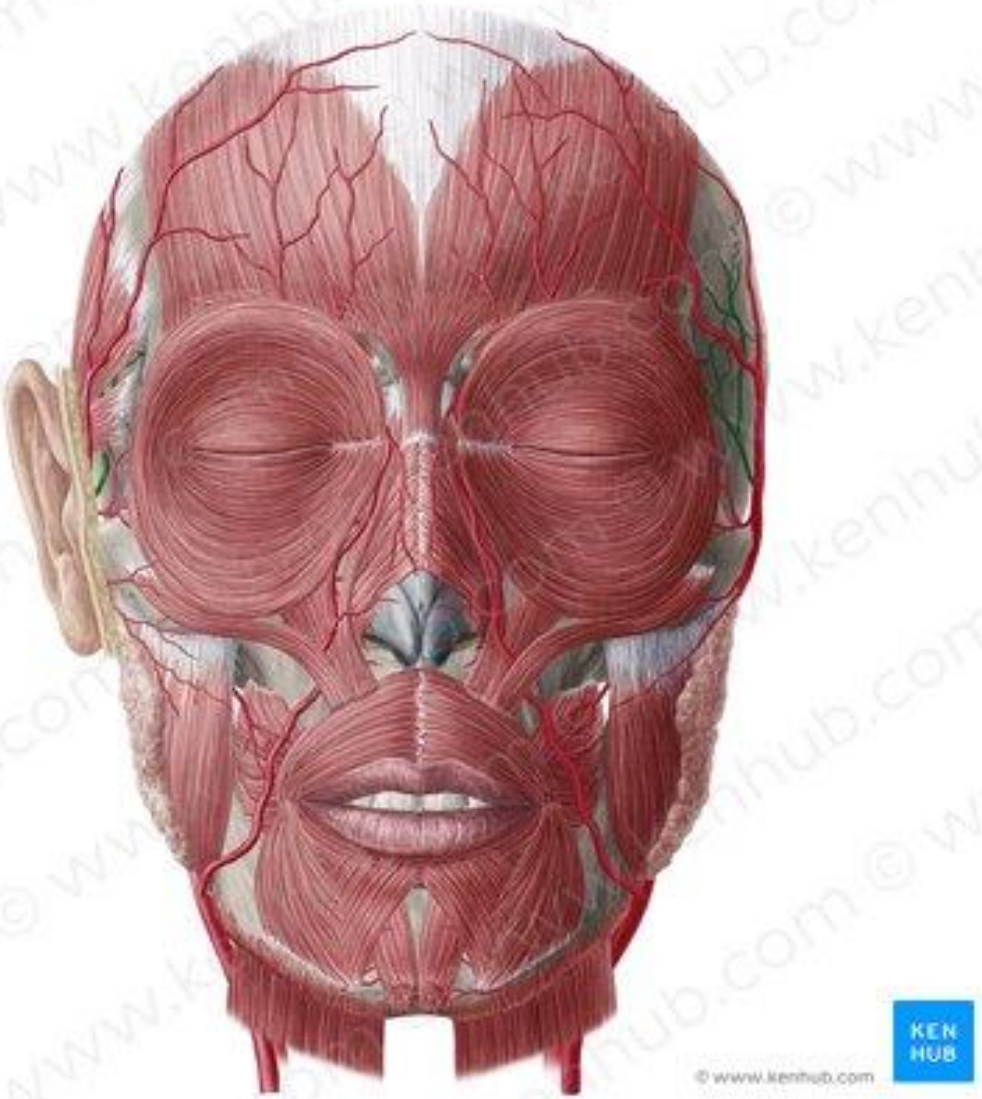
- The three divisions of the trigeminal nerve (CN V) are responsible for the somatic sensation of the entire face according to the three embryological origins.
- The ophthalmic nerve (CN V1) which comes from the frontonasal prominence supplies the anterior scalp, forehead, and nasal dorsum.
- Deriving from the maxillary prominence the maxillary nerve (CN V2) provides mainly the anterior cheek, the lateral face, the upper lip, the side of the nose, and the lower eyelid.
- The mandibular nerve (CN V3) originates from the mandibular prominence and supplies the lower lip,chin, and posterior cheek.


© www.kenhub.com
KEN
HUB


© www.kenhub.com
KEN
HUB

Blood Supply

- The face is richly perfused by a subdermal plexus formed mainly by musculocutaneous arteries coming from the superficial temporal and facial arteries.
- The facial artery branches off the external carotid artery, winds around the inferior border of the mandible and ascends along the side of the nose.
- The superficial temporal artery similarly arises from the external carotid artery and gives off numerous branches which supply different parts of the face including the transverse facial artery and the middle temporal artery.
- The venous blood of the face drains from the subdermal plexus to the deep venous plexus via communicating veins.


© www.kenhub.com
KEN
HUB

Clinical Relations

- ❖ Facial clefts: The pathological traits of facial growth are many and quite frequent. Lasting complications include facial disfigurement, difficulties hearing, speaking, eating, swallowing, and breathing. The most common and well-known facial anomalies, known as facial clefts, are listed below:
- Cleft lip: A partial or complete lack of fusion of the maxillary prominence with the medial nasal prominence on one or both sides. Depending on the severity of the lack of fusion, this can result in a partial or complete, unilateral or bilateral cleft lip.

Clinical Relations

- Cleft palate: Cleft palates are divided into primary and secondary depending on whether they are in front of or behind the incisive foramen respectively. The primary (or anterior) cleft deformities include lateral cleft lip, upper cleft jaw, and a cleft between the primary and secondary palates. Behind the incisive foramen, the clefts can either be of the secondary palate or known as a cleft uvula. Cleft palates result from a lack of fusion between the palatine shelves.
- Oblique facial clefts:When the maxillary prominence fails to merge with the lateral nasal prominence the nasolacrimal duct is exposed.
- Median (or midline) cleft: This type of anomaly occurs with the incomplete fusion of the two medial nasal prominences in the midline. This particular defect can have much more serious consequences than the others, it is associated with cognitive disabilities and brain abnormalities.

The Bony Orbit

- The bony orbits (or eye sockets) are bilateral and symmetrical cavities in the head. They enclose the eyeball and its associated structures.
- we shall look at the:

- borders
- contents
- clinical correlations of the bony orbit.

Borders and Anatomical Relations

- The orbit can be thought of as a pyramidal structure, with the apex pointing posteriorly and the base situated anteriorly. The boundaries of the orbit are formed by seven bones.
- It is also important to consider the anatomical relations of the orbital cavity – this is clinically relevant in the spread of infection, and in cases of trauma.

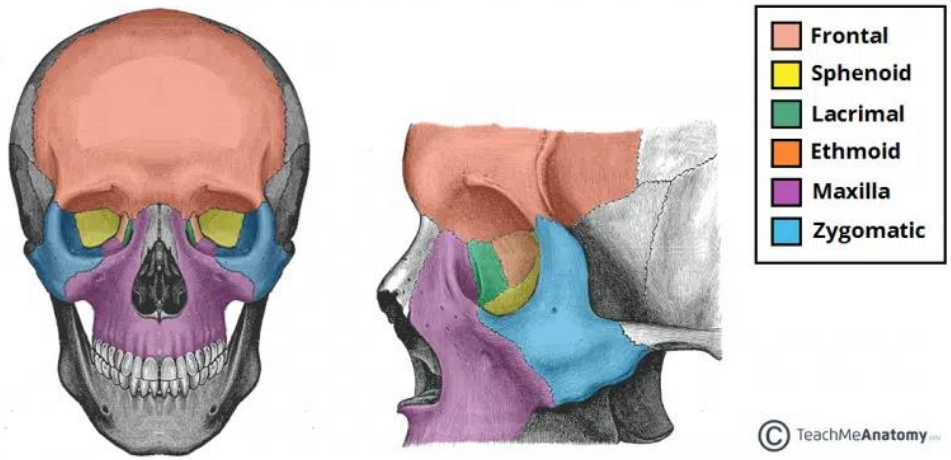
Borders and Anatomical Relations

❖ The borders and anatomical relations of the bony orbit are as follows:

- Roof (superior wall) – Formed by the frontal bone and the lesser wing of the sphenoid. The frontal bone separates the orbit from the anterior cranial fossa.
- Floor (inferior wall) – Formed by the maxilla, palatine and zygomatic bones. The maxilla separates the orbit from the underlying maxillary sinus.
- Medial wall – Formed by the ethmoid, maxilla, lacrimal and sphenoid bones. The ethmoid bone separates the orbit from the ethmoid sinus.

Borders and Anatomical Relations

- Lateral wall – Formed by the zygomatic bone and greater wing of the sphenoid.
- Apex – Located at the opening to the optic canal, the optic foramen.
- Base – Opens out into the face, and is bounded by the eyelids. It is also known as the orbital rim.

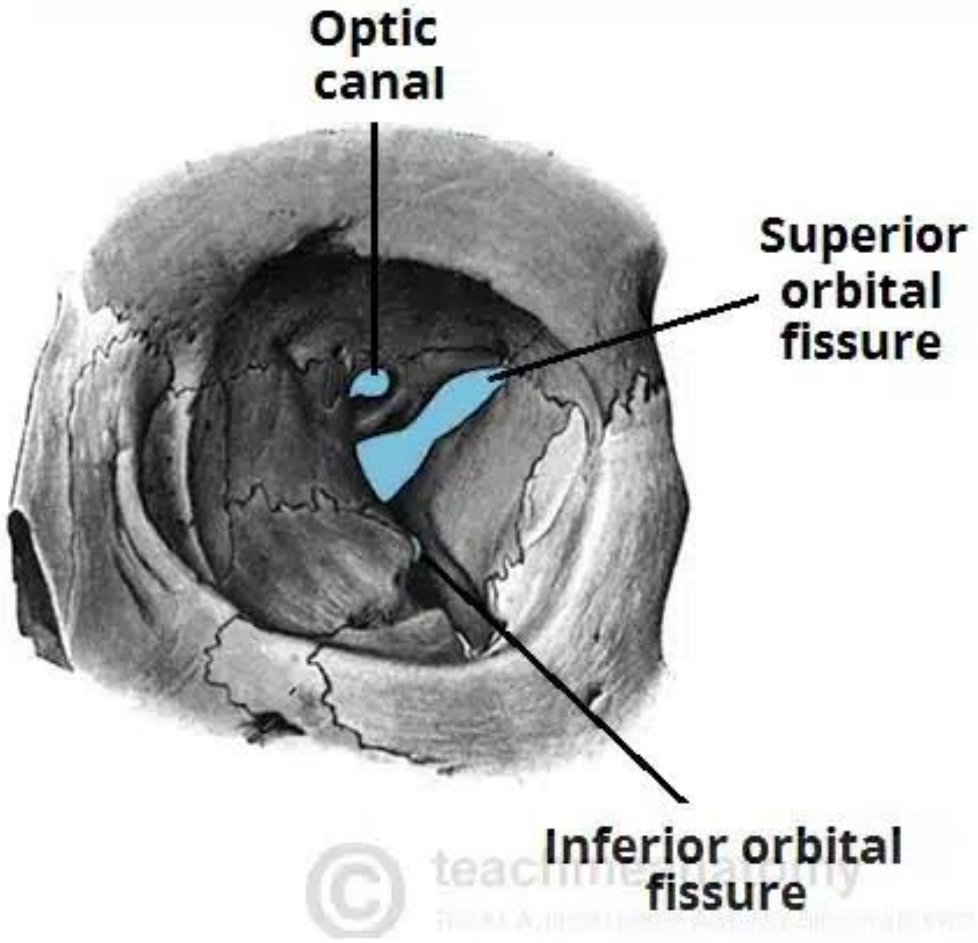


Orbital Contents

- The bony orbit contains the eyeballs and their associated structures:
- Extra-ocular muscles – These muscles are separate from the eye. They are responsible for the movement of the eyeball and superior eyelid.
- Eyelids – These cover the orbits anteriorly.
- Nerves: Several cranial nerves supply the eye and its structures; optic, oculomotor, trochlear, trigeminal and abducens nerves.
- Blood vessels: The eye receives blood primarily from the ophthalmic artery. Venous drainage is via the superior and inferior ophthalmic veins.
- Any space within the orbit that is not occupied is filled with orbital fat. This tissue cushions the eye, and stabilises the extraocular muscles.

Pathways into the Orbit

- **Pathways into the Orbit**
- There are three main pathways by which structures can enter and leave the orbit:
- Optic canal – transmits the optic nerve and ophthalmic artery.
- Superior orbital fissure – transmits the lacrimal, frontal, trochlear (CN IV), oculomotor (CN III), nasociliary and abducens (CN VI) nerves. It also carries the superior ophthalmic vein.
- Inferior orbital fissure – transmits the zygomatic branch of the maxillary nerve, the inferior ophthalmic vein, and sympathetic nerves.
- There are other minor openings into the orbital cavity. The nasolacrimal canal, which drains tears from the eye to the nasal cavity, is located on the medial wall of the orbit. Other small openings include the supraorbital foramen and infraorbital canal – they carry small neurovascular structures.


Optic canal
Superior orbital fissure
Inferior orbital fissure

Clinical Relevance

❖ Fractures of the Bony Orbit: There are two major types of orbital fractures:

- Orbital rim fracture – This is a fracture of the bones forming the outer rim of the bony orbit. It usually occurs at the sutures joining the three bones of the orbital rim – the maxilla, zygomatic and frontal.
- 'Blowout' fracture – This refers to partial herniation of the orbital contents through one of its walls. This usually occurs via blunt force trauma to the eye. The medial and inferior walls are the weakest, with the contents herniating into the ethmoid and maxillary sinuses respectively.

Clinical Relevance

- Any fracture of the orbit will result in intraorbital pressure, raising the pressure in the orbit, causing exophthalmos (protrusion of the eye). There may also be involvement of surrounding structures, – e.g haemorrhage into one of the neighbouring sinuses.


Thank You
For Listening
It's not bye bye, but see you again!
Ajiboye A.A