

وسهلا



أهلا

يُمنع أخذ السلايدات بدون
إذن المحرر واي اجراء
يخالف ذلك يقع تحت طائلة
المسؤولية القانونية
جميع المعلومات للاستخدام
التعليمي فقط

الأستاذ الدكتور يوسف حسين

أستاذ التشريح وعلم الأجنة - كلية الطب - جامعة الزقازيق - مصر

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دكتورة من جامعة كولونيا المانيا

جروب الفيس د. يوسف حسين (استاذ التشريح)

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Skull

- The skull is formed of **22 bones**;

a- 1 movable; the mandible.

b- 21 immovable bones articulating together by **fibrous joints** which are classified into;

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I- 8 Paired bones (right and left)

1- Parietal.

2- Temporal.

3- Zygomatic.

4- Maxillary.

5- Palatine.

6- Lacrimal.

7- Nasal.

8- Inferior concha.

II- 5 single bones

1- Frontal.

2- Occipital.

3- Sphenoid.

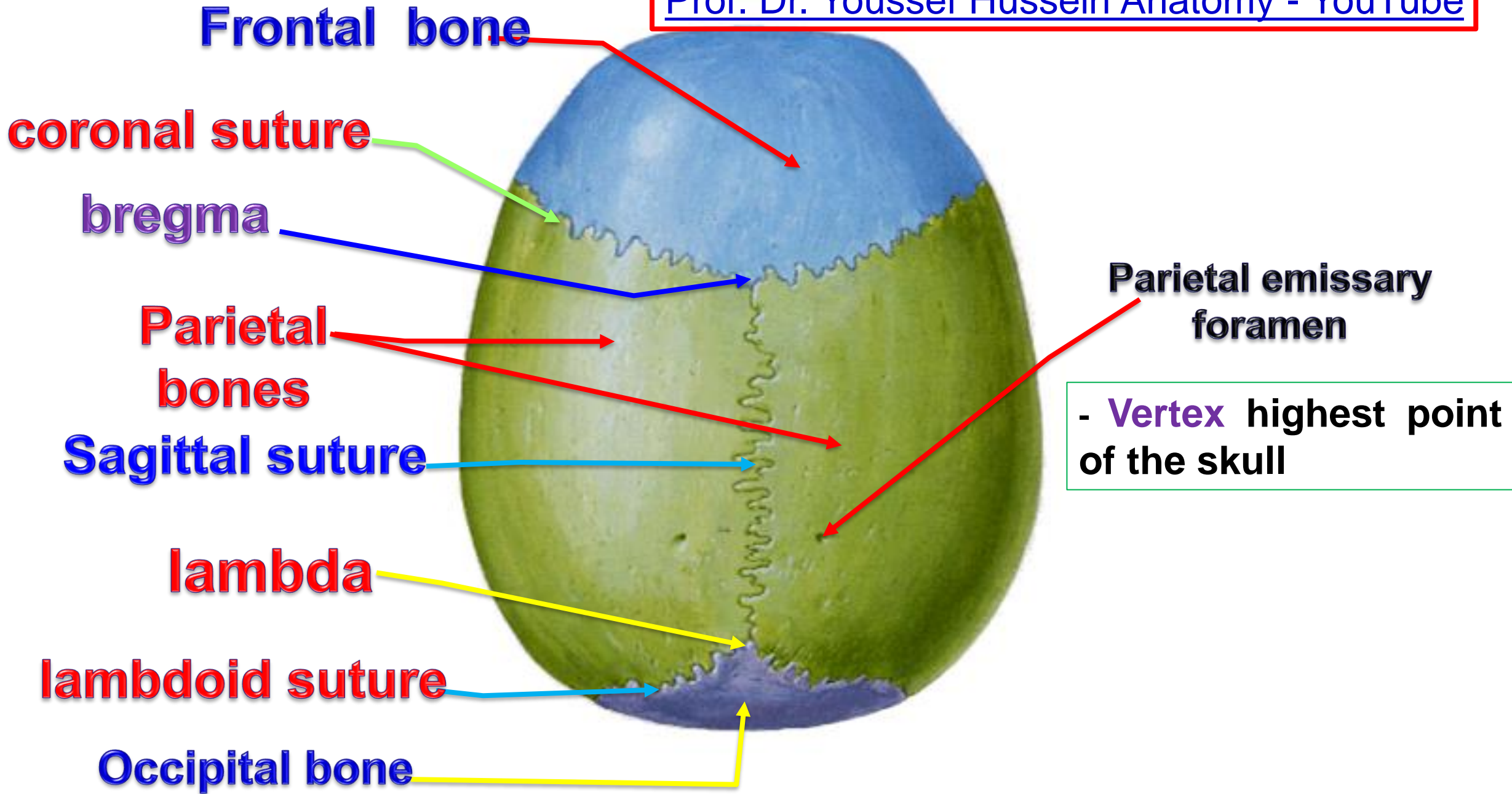
4- Ethmoid.

5- Vomer.

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Norma verticalis

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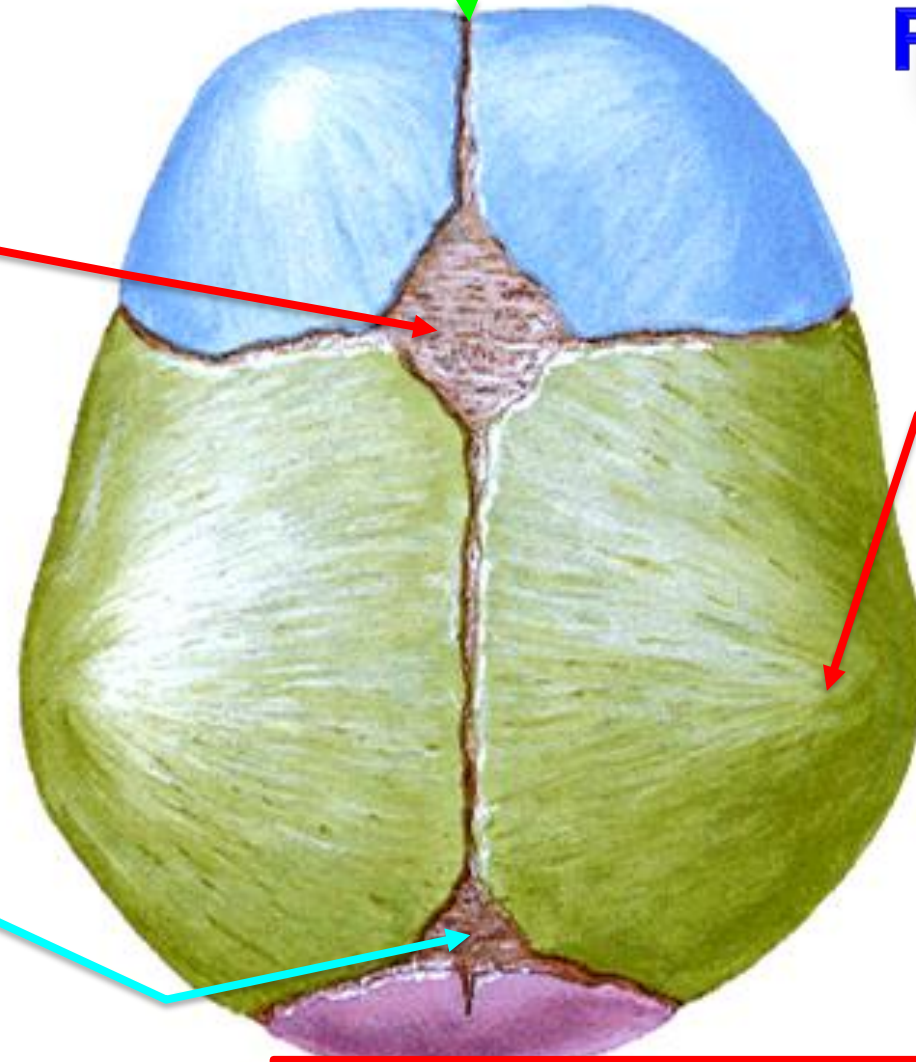
Skull of new born

Fused at the end of (18 months)

Parietal eminence

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Metopic suture



Anterior fontanelle

close at 6th month

Posterior fontanelle

- **Metopic suture:** present in 9% of people.

❖ Norma verticalis

- It is the upper aspect (vault) of the skull.

- It is formed of the following bones, 4 bones [Prof. Dr. Youssef Hussein Anatomy - YouTube](#)

1) Anteriorly, Frontal bone. 2) On each side, two parietal bones. 3) Posteriorly, occipital bone.

** Sutures between the bones;

1- **Sagittal suture** runs in the median plane between the 2 parietal bones.

2- **Coronal suture** runs transversally between the frontal and 2 parietal bones.

3- **Lambdoid suture** runs between the occipital bone and 2 parietal bones.

** Special features,

1- **Bregma**, the meeting between the sagittal and coronal sutures.

– At birth, this area called the **anterior fontanelle**. The anteroposterior extent is about 3 fingers breadth. Normally, it is obliterated **at 18 months**.

2- **Lambda**; the meeting between the sagittal and lambdoid sutures.

- At birth, called **Posterior fontanelle**. It is closed at the **6 months**.

3- **Vertex** is the middle of the sagittal sutures (highest point of the skull).

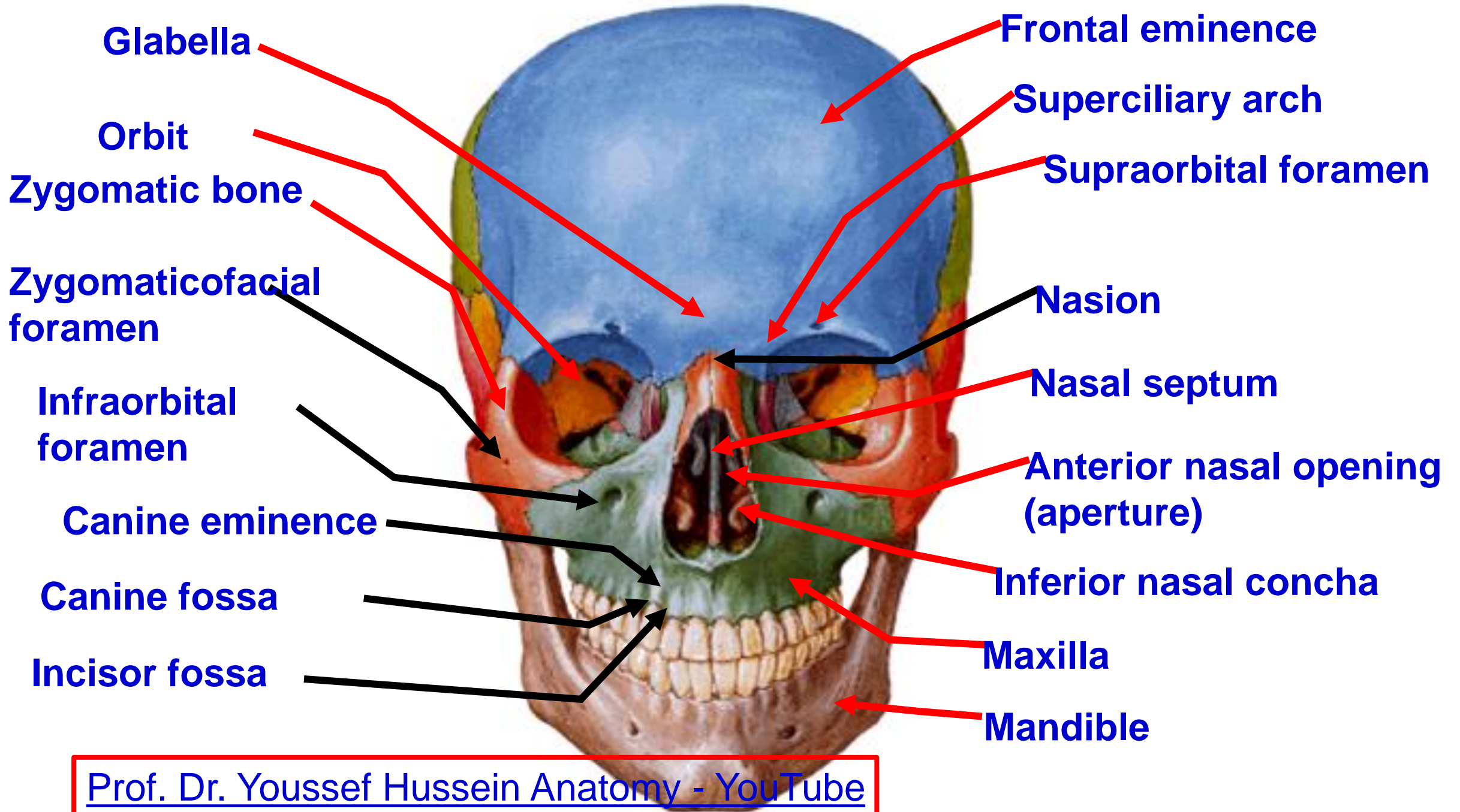
4- **2 parietal eminences**, The most prominent parts of the parietal bones.

5- **Parietal emissary foramen**, one on each sides of the sagittal sutures, transmits an emissary veins connecting the scalp veins (outside skull) with the dural venous sinus (inside skull)

Norma Frontalis

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❖ NORMA FRONTALIS

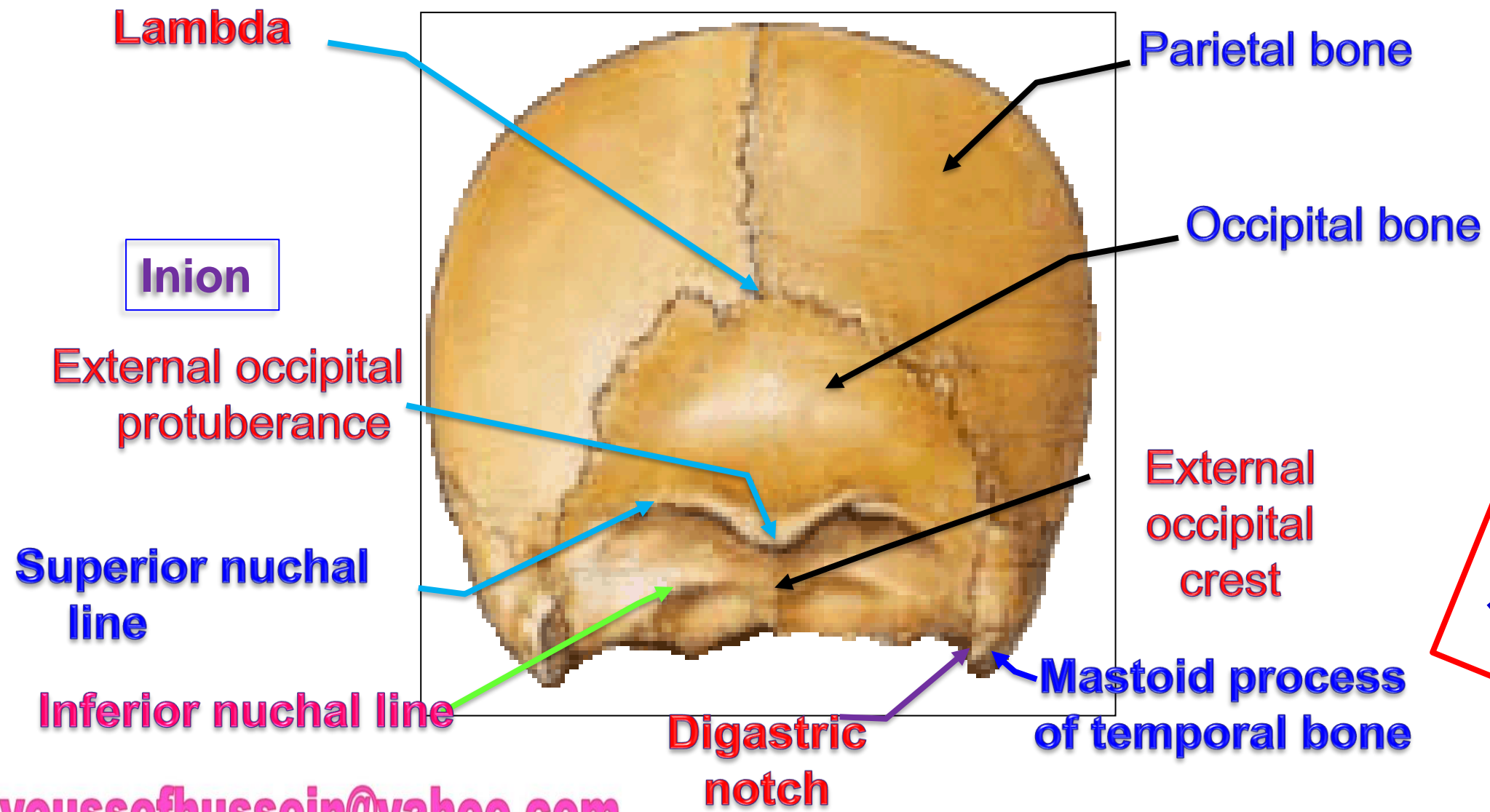
- 1. Frontal eminences** : the most prominent areas on either side of the forehead
- 2. Superciliary arches**: elevated arched ridges **above the medial parts** of the superior orbital margins. They are more prominent in **males**.
- 3. Supraorbital notch (or foramen)**: transmits supraorbital nerve & vessels.
- 4. Glabella**: a median elevation between the 2 superciliary arches above the root of nose.
- 5. Nasion**: the point of meeting of frontonasal and internasal sutures.
6. Nasal septum between two nasal cavities
- 7. Inferior nasal concha** is a separate bone
- 8. Zygomaticofacial foramen**: close to the inferolateral angle of the orbit, transmits zygomaticofacial nerve and vessels.
- 9. Maxilla:**
 - A- Infraorbital foramen in maxilla**: transmits infraorbital nerve & vessels.
 - B- Canine eminence**: a projection produced by the root of canine tooth **النانب**.
 - C- Canine fossa**: a shallow depression **lateral** to the canine eminence.
 - D- Incisor fossa**: a shallow depression **medial** to the canine eminence (above incisor **القاطع**).

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❖ Norma Occipitalis

- It is the posterior aspect of the skull.

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* **Bones forming it,**

- Squamous part of the occipital bone - Two parietal bone - Two Mastoid part of temporal bone

- * **General features;**

1- External occipital protuberance: - A median elevation on the lower part of the occipital bone.

- The most prominent point on the protuberance is called **inion**.

- Its upper part gives origin to **trapezius muscle**.

2- External occipital crest; extends from external occipital protuberance to posterior border of foramen magnum.

3- Superior nuchal line: a line connecting external occipital protuberance with mastoid process.

- Its **medial** 1/3 gives **origin** to the **trapezius** muscle.

- Its **lateral** 1/3 gives **insertion** to the **sternocleidomastoid** muscle.

4- Inferior nuchal line, it extends from middle of external occipital crest and passed parallel and below to the superior nuchal line.

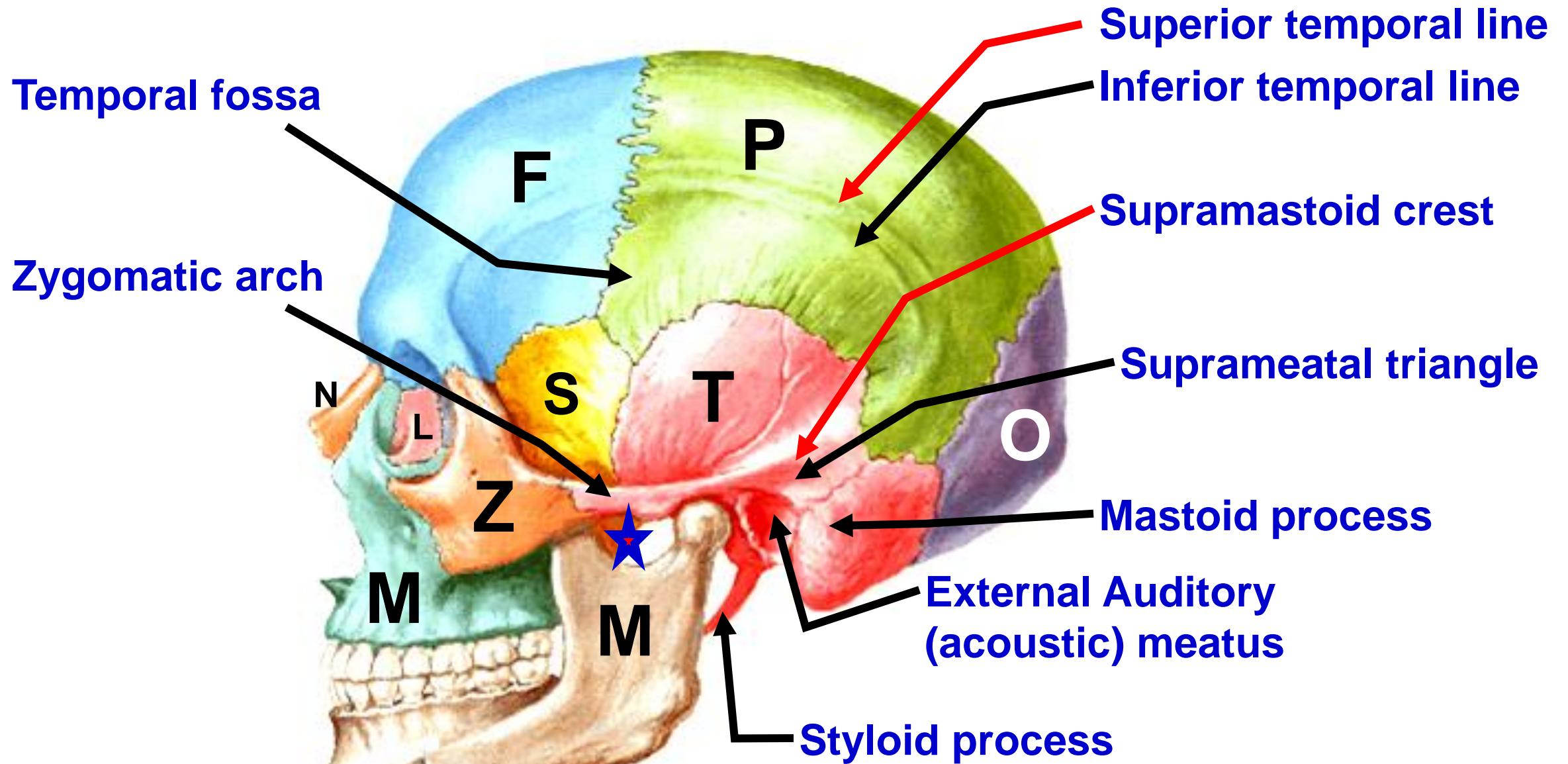
5- Highest nuchal line: an ill-defined line arching upwards and laterally 1 cm above the superior nuchal line on each side.

- Its lateral part gives **origin** to the **occipital belly of the occitipofrontalis muscle**.

Norma Lateralis

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- **Norma lateralis**

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- **Temporal line:**

(a) Superior temporal line → a) Epicranial aponeurosis. b) Temporal fascia.

(b) Inferior temporal line → origin to **temporalis muscle**.

- **Zygomatic arch** it is a boney bridge formed of temporal process of zygomatic bone and zygomatic process of the temporal bone.

- Its lower border and inner surface give origin to the **masseter muscle**.

- **Supramastoid crest:** continuation of the posterior end of the zygomatic process of temporal bones, above the mastoid process, to the superior temporal line

- **Temporal fossa:** space above zygomatic arch, below superior temporal line, gives origin of **temporalis muscle**.

- **Infratemporal fossa** below the zygomatic arch

- **Mastoid process**, a nipple-like process felt subcutaneously deep to lobule of ear

- **Styloid process:** thin long projection anteromedial to mastoid process.

- **External auditory (acoustic) meatus** just below posterior root of the zygomatic process of temporal bone

- **Suprameatal triangle:** triangular area just **above and behind** external auditory meatus

❖ **Supra-meatal triangle:**

** **Surgical importance:**

- 1) It forms the lateral wall of the mastoid (tympanic) antrum.
- 2) A drill hole above the suprimeatal triangle will enter the middle cranial fossa.

❖ **Mastoid process:**

- Its **inner surface** (digastric notch) gives **origin** to the **posterior belly of digastric muscle**
- Its **outer surface** gives **insertion to 3 muscles:**

(a) **Sternocleidomastoid muscle.**

(b) **Splenius capitis muscle.**

(c) **Longissimus capitis muscle.**

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❖ **Styloid process:**

- It gives attachment to **2 ligaments and 3 muscles;**

(1) Stylomandibular ligament

(2) Stylohyoid ligament

(3) Stylohyoid muscle

(4) Styloglossus muscle

(5) Stylopharyngeus muscle

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❖ Pterion

- It is the area of meeting of **4 bones** connected by H- shaped suture:

- 1) Frontal bone.
- 2) Parietal bone.
- 3) Squamous part of temporal bone.
- 4) Greater wing of sphenoid.

- **At birth**, called **Sphenoidal fontanelle** which ossifies at 3 months.

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** **Surface anatomy:** the center of the pterion lies about 1.5 inch behind the frontozygomatic suture and 1.5 inch above the midpoint of the zygomatic arch.

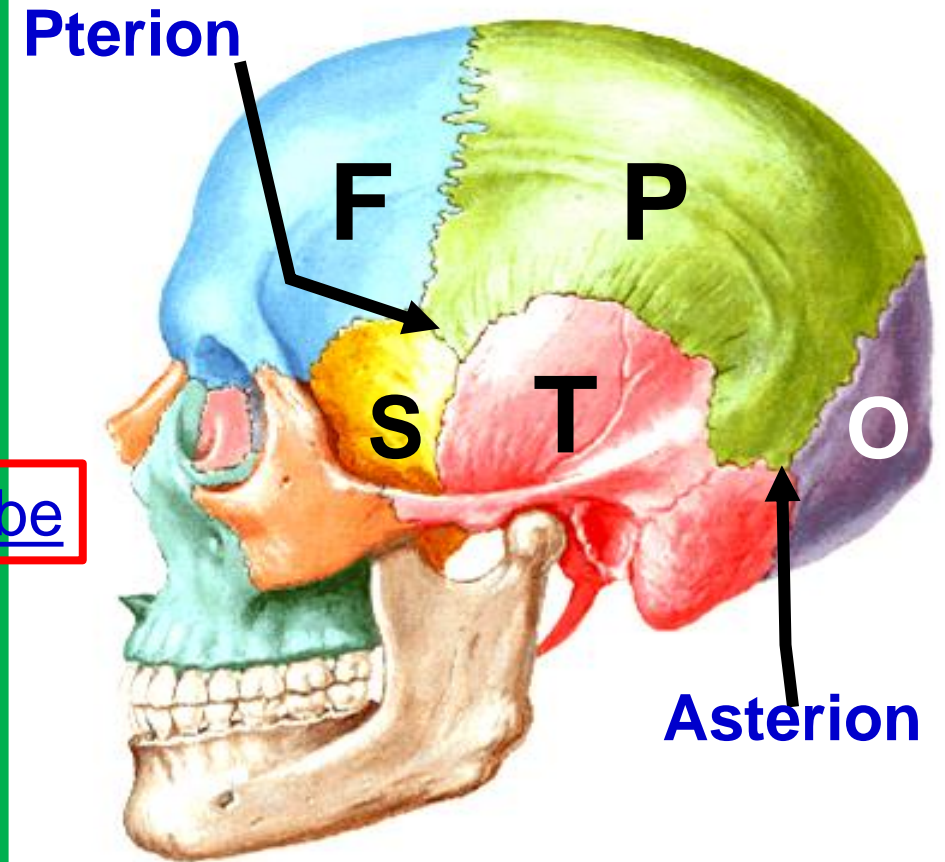
** **Importance:** the center is related internally to anterior branch of the middle meningeal artery.

❖ Asterion

- It is the point of meeting of **3 bones** 1) Parietal bone. 2) Occipital bone. 3) Mastoid part of temporal bone.

- **At birth**, **mastoid) fontanelle** which ossifies at 3 months.

- **It is related internally to the highest point of transverse sinus.**

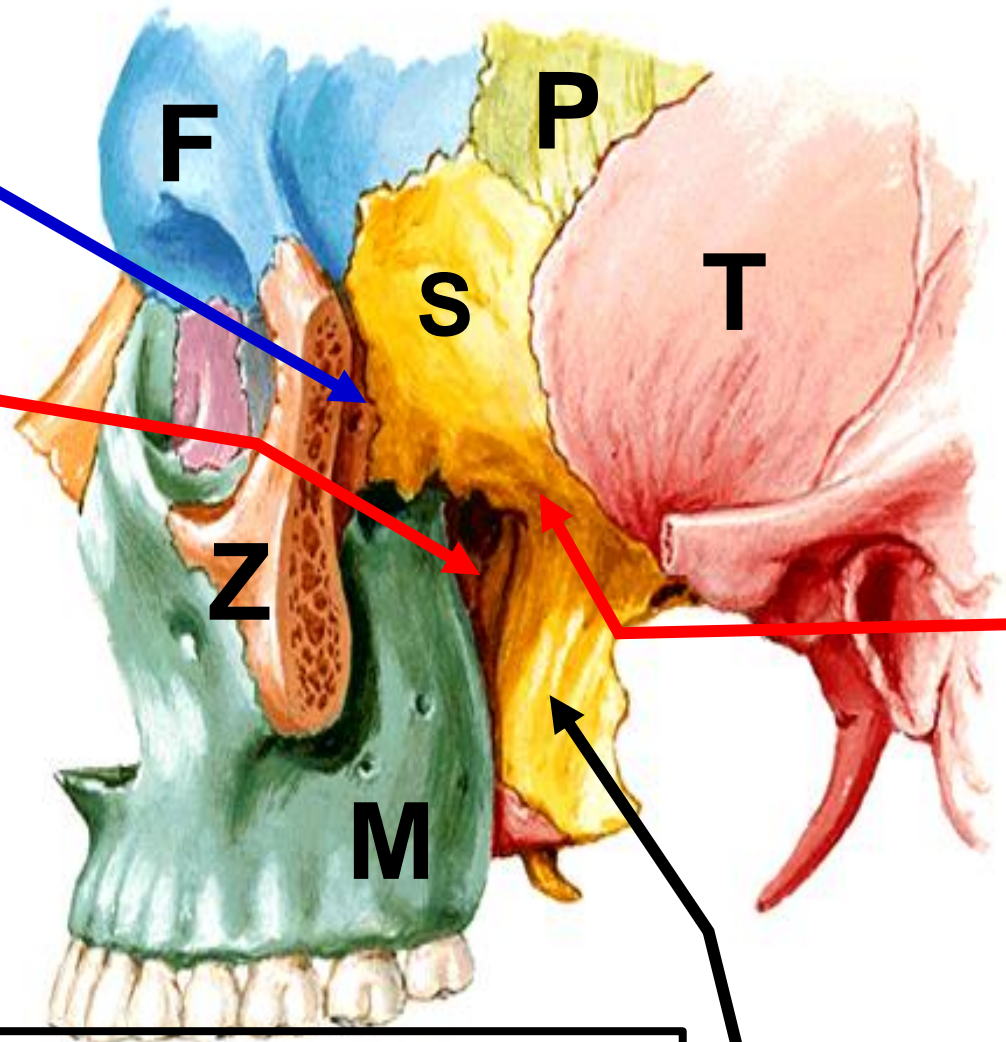


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Inferior orbital fissure

Pterygomaxillary fissure is door of pterygopalatine fossa

- **Infratemporal fossa** is exposed by removal of zygomatic arch and mandible
- **Pterygopalatine fossa:** medial to pterygomaxillary fissure and behind the apex of orbit.



Infratemporal surface of greater wing of sphenoid (roof)

Lateral pterygoid plate of sphenoid bone (medial wall)

**** Communications of infratemporal fossa: it communicates with:**

- 1- **Temporal fossa** through the gap deep to the zygomatic arch.
- 2- **Orbit** through the **inferior orbital fissure**.
- 3- **Pterygopalatine fossa** through the **pterygomaxillary fissure**.
- 4- **Middle cranial fossa** through **foramen ovale and foramen spinosum**.

Norma Basalis externa

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Alveolar arch

Hard palate
(Palatine process
of maxilla)

Hard palate
(Horizontal
palate of palatine
bone)

Maxillary
tuberosity
origin to superficial
head of medial
pterygoid muscle.

Posterior free border
of hard palate

Posterior nasal spine origin to musculus
uvulae

Incisive fossa

Greater palatine foramen

Lesser palatine foramen

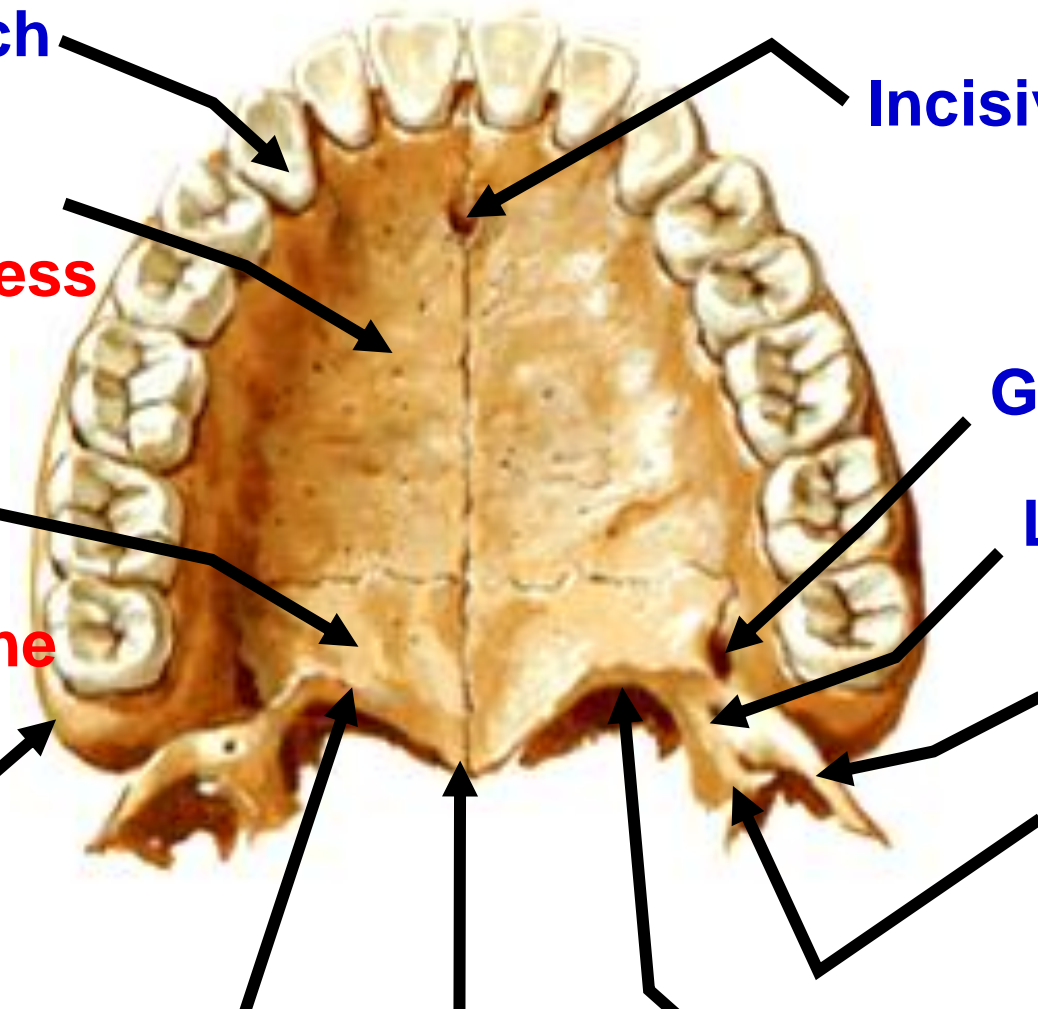
Lateral pterygoid plate

Medial pterygoid plate

Posterior nasal opening

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❖ Anterior part of norma basalis

- **Alveolar arch**: carries the sockets for the upper 16 teeth.
- **Maxillary tuberosity**: **posterior end of the alveolar arch** → origin to the **superficial head of the medial pterygoid muscle**.
- **Posterior free border of hard palate**: → palatine aponeurosis of soft palate.
- **Posterior nasal spine**: → origin to **musculus uvulae**.
- **Incisive fossa** : behind the incisors for the passage of greater palatine nerve and vessels and long sphenopalatine nerves
- **Greater palatine foramen**: lies medial to the last molar socket, → greater palatine nerve and vessels.
- **Lesser palatine foramina** behind the greater → lesser palatine nerve and vessels.

Pterygoid hamulus

Maxillary tuberosity origin to **superficial head of medial pterygoid muscle.**

Infratemporal surface of greater wing of sphenoid gives origin to **the upper head of lateral pterygoid muscle**

Lateral pterygoid plate

- Its **lateral surface** gives origin to **lower head of lateral pterygoid muscle.**

- Its **medial surface** gives origin to **deep head of medial pterygoid muscle**

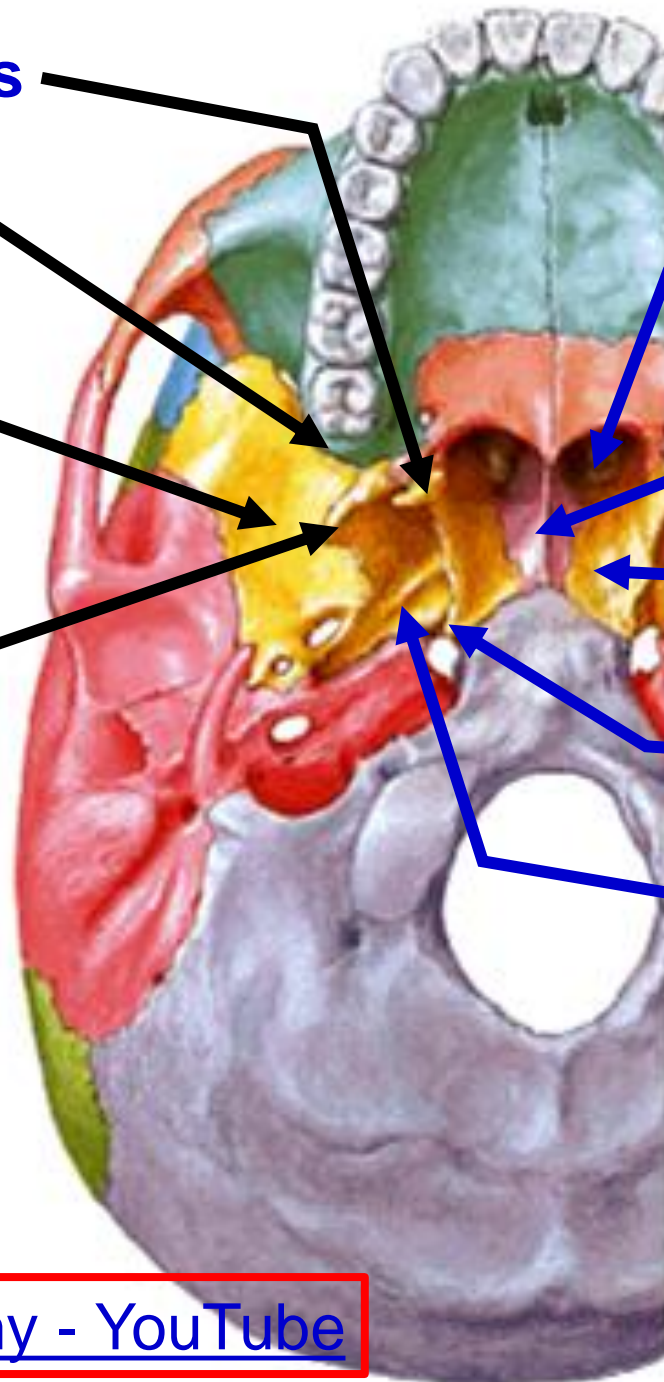
Posterior nasal opening

Vomer

Medial pterygoid plate

Pterygoid tubercle

Scaphoid fossa



- **Posterior nasal opening:** separated from each other by **vomer**

- **Lateral pterygoid plate**

- **Medial pterygoid plate**

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- **Pterygoid fossa** between lateral and medial pterygoid plates

- **Medial pterygoid plate of sphenoid bone:**

- The **upper end of the posterior border** divides into

- 1) Laterally **Scaphoid fossa**, it gives origin to **tensor palate muscle**.

- 2) Medially **Pterygoid tubercle**. It lies in front of foramen lacerum.

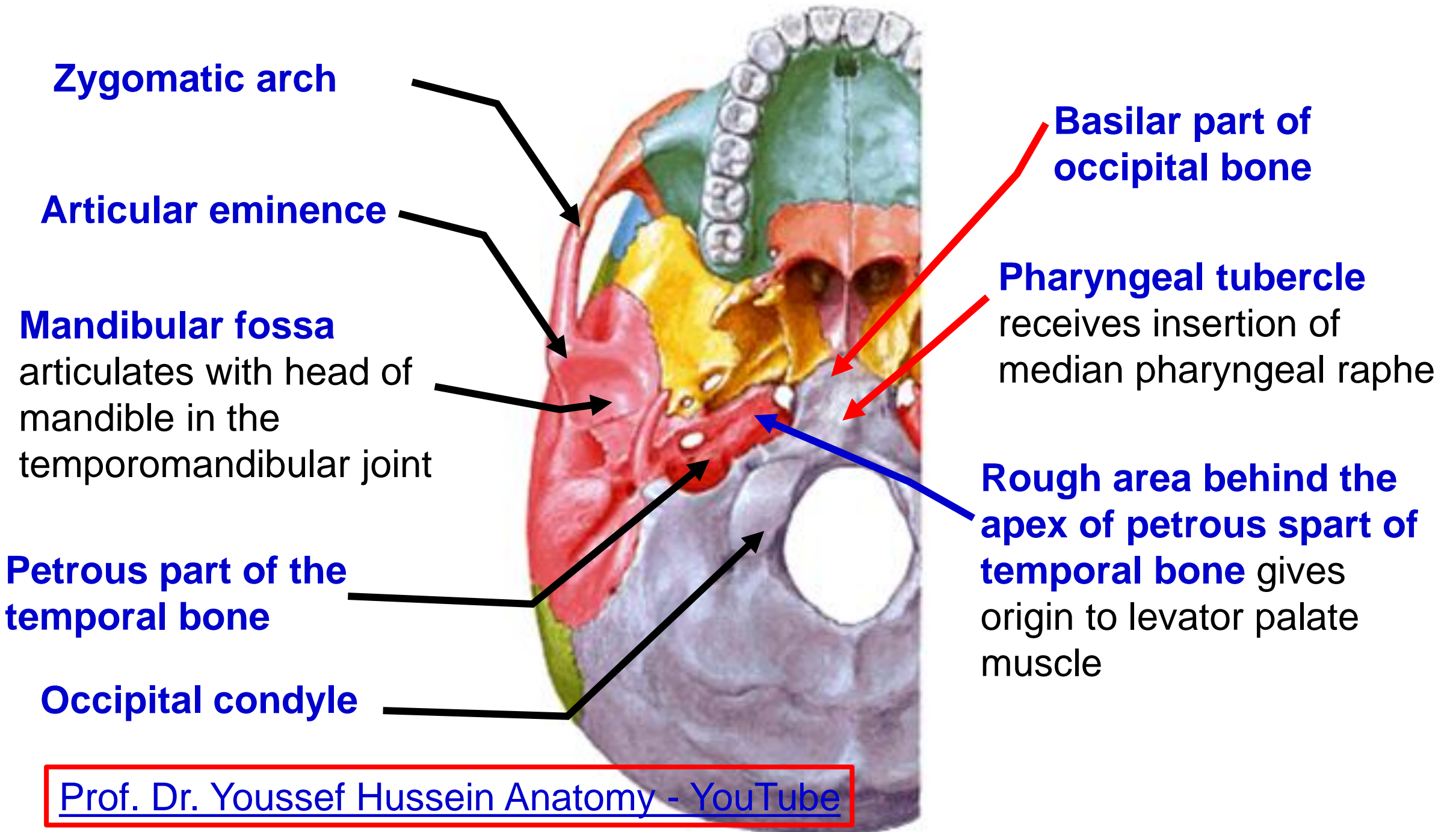
- Above the tubercle lies the posterior end of **pterygoid canal**.

- The **lower end of the posterior border** end in **pterygoid hamulus** (hook) which is related to the tendon of tensor palati muscle.

- The **pterygoid hamulus** gives attached to:

1. Upper end of **pterygomandibular ligament**.

2. Origin of upper fibers of **superior constrictor muscle of pharynx**.



Zygomatic arch

Articular eminence

Mandibular fossa

articulates with head of mandible in the temporomandibular joint

Petrous part of the temporal bone

Occipital condyle

Basilar part of occipital bone

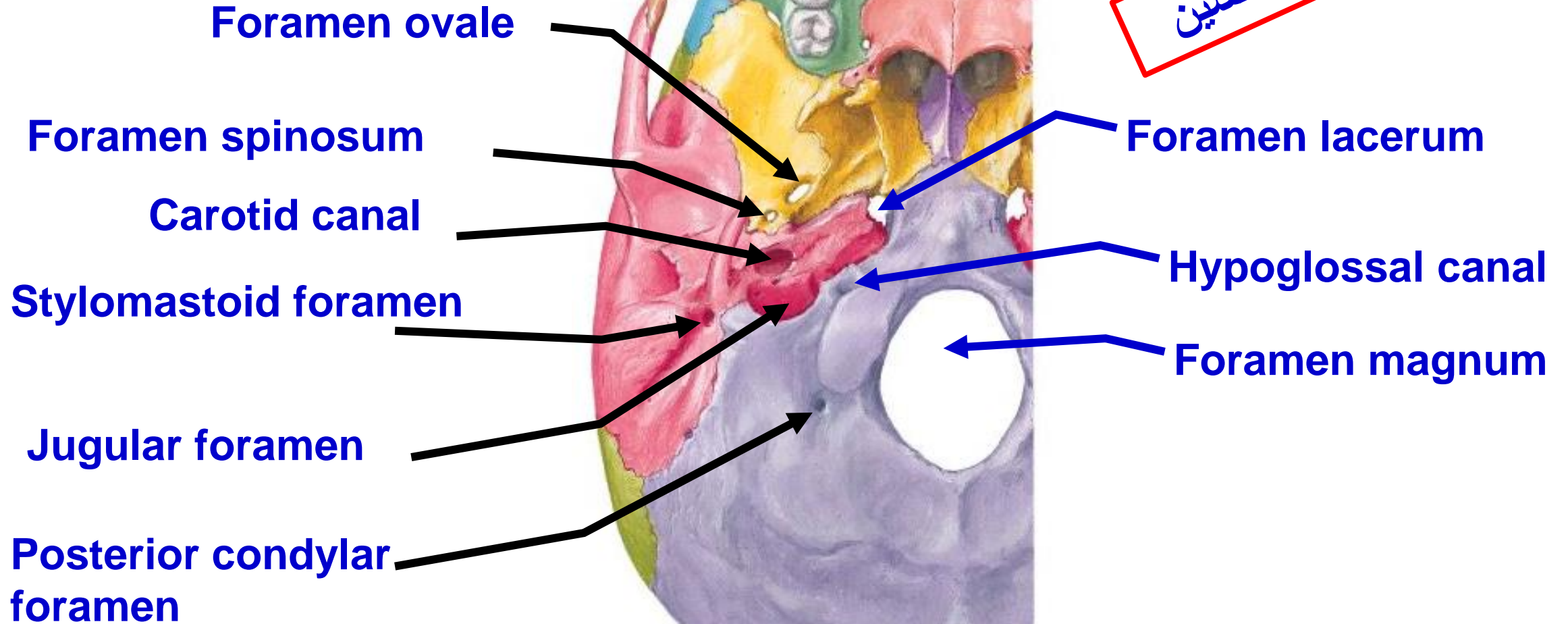
Pharyngeal tubercle

receives insertion of median pharyngeal raphe

Rough area behind the apex of petrous part of temporal bone

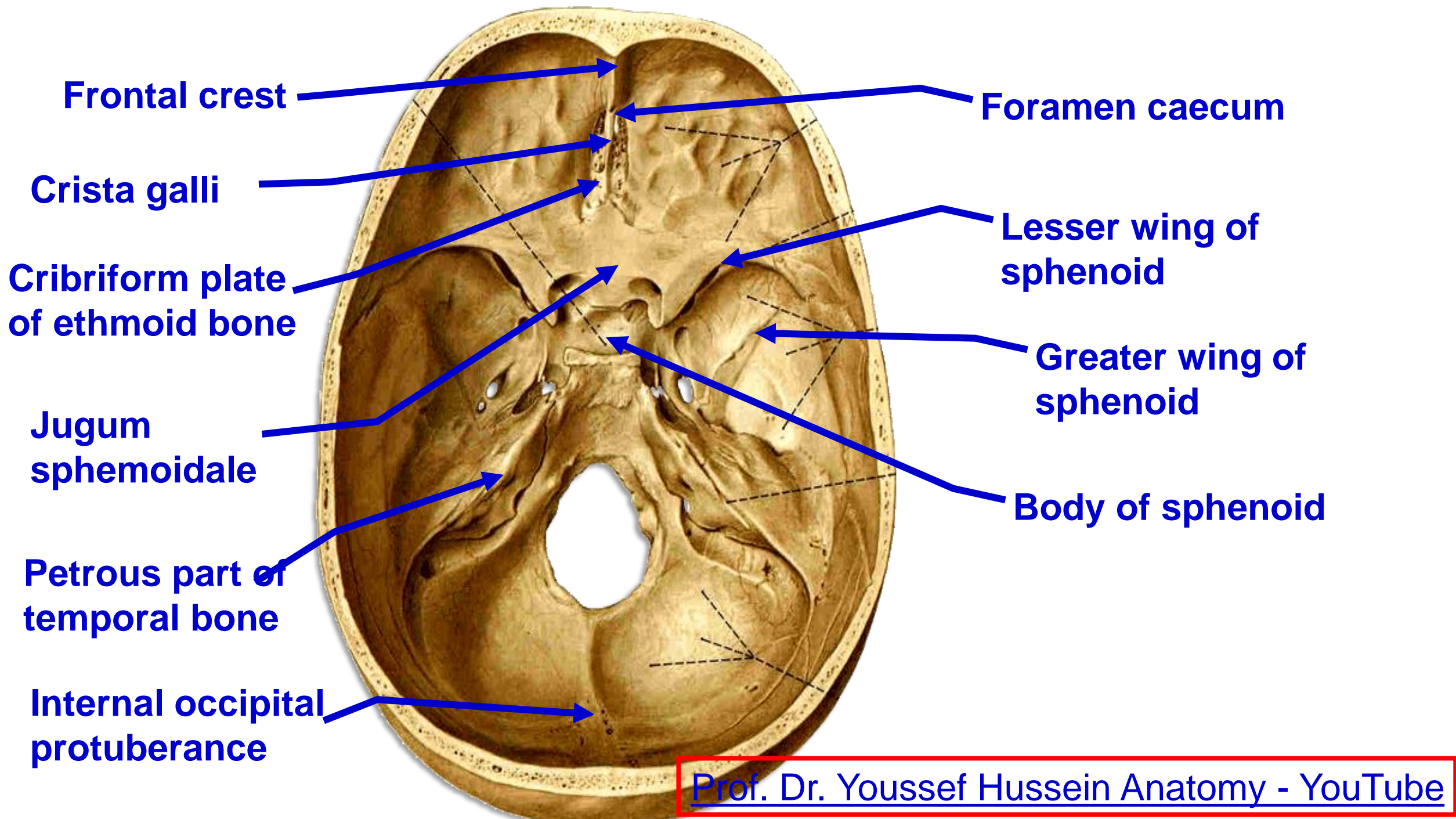
gives origin to levator palate muscle

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Norma Basalis interna

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Frontal crest

Crista galli

**Cribriform plate
of ethmoid bone**

**Jugum
sphenoidale**

**Petrous part of
temporal bone**

**Internal occipital
protuberance**

Foramen caecum

**Lesser wing of
sphenoid**

**Greater wing of
sphenoid**

Body of sphenoid

- **Anterior cranial fossa**

(1) **Frontal crest:** a median bony projection.

(2) **Cribriform plate of ethmoid passage of** Olfactory nerves

(3) **Crista galli:** a median bony projection from cribriform plate of ethmoid

(4) **Jugum sphenoidal:** is the anterior part of the body of sphenoid behind the cribriform plate of ethmoid.

(5) **Lesser wing of sphenoid:** extends laterally from the jugum sphenoidal. Its posterior free margin is grooved by the **sphenoparietal sinus**.

(6) **Anterior clinoid process** medial end of the lesser wing.

Middle cranial fossa

Sulcus chiasmaticus
(Optic groove)

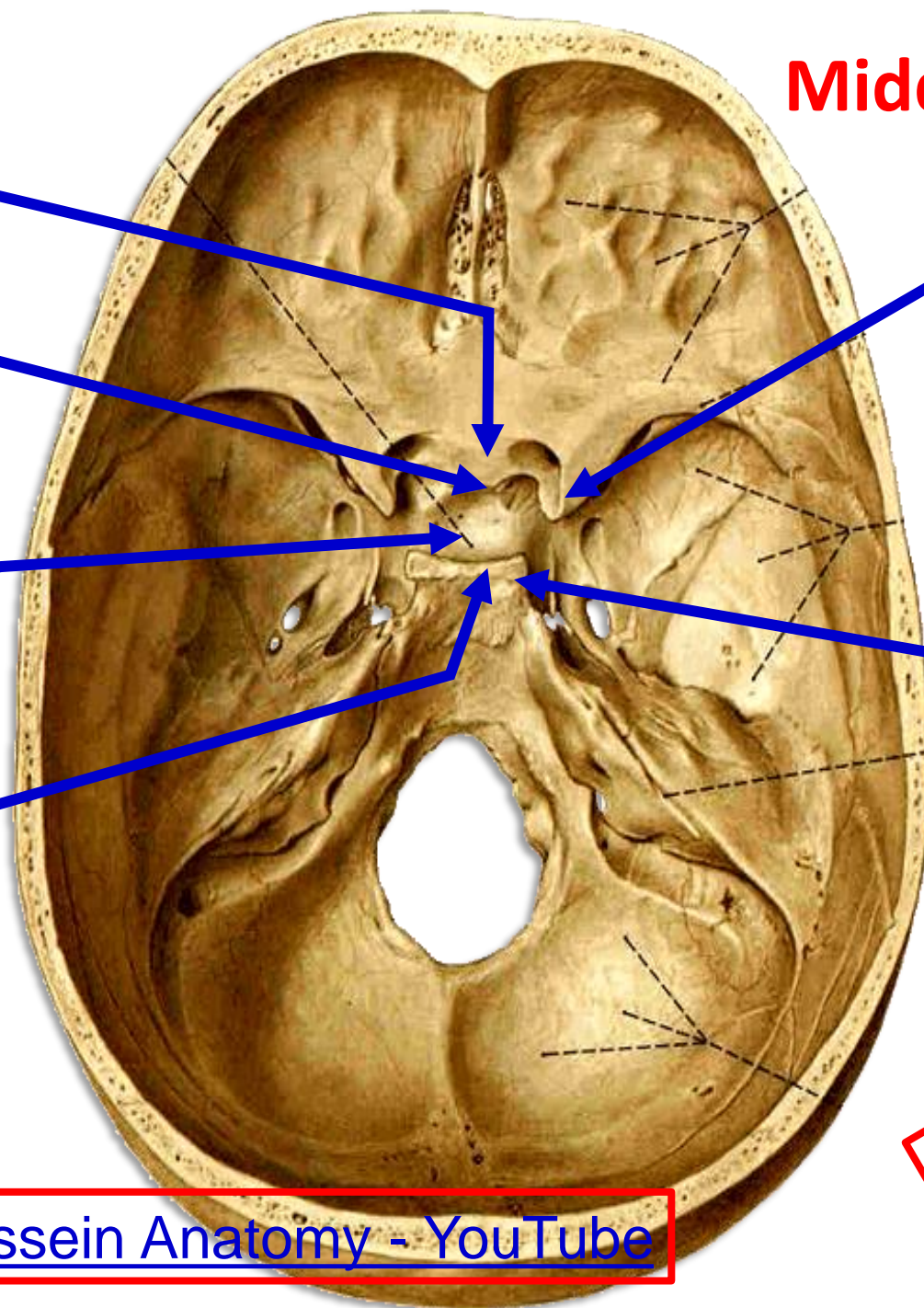
Tuberculum selle

Hypophyseal fossa
Sella turcica
(pituitary gland)

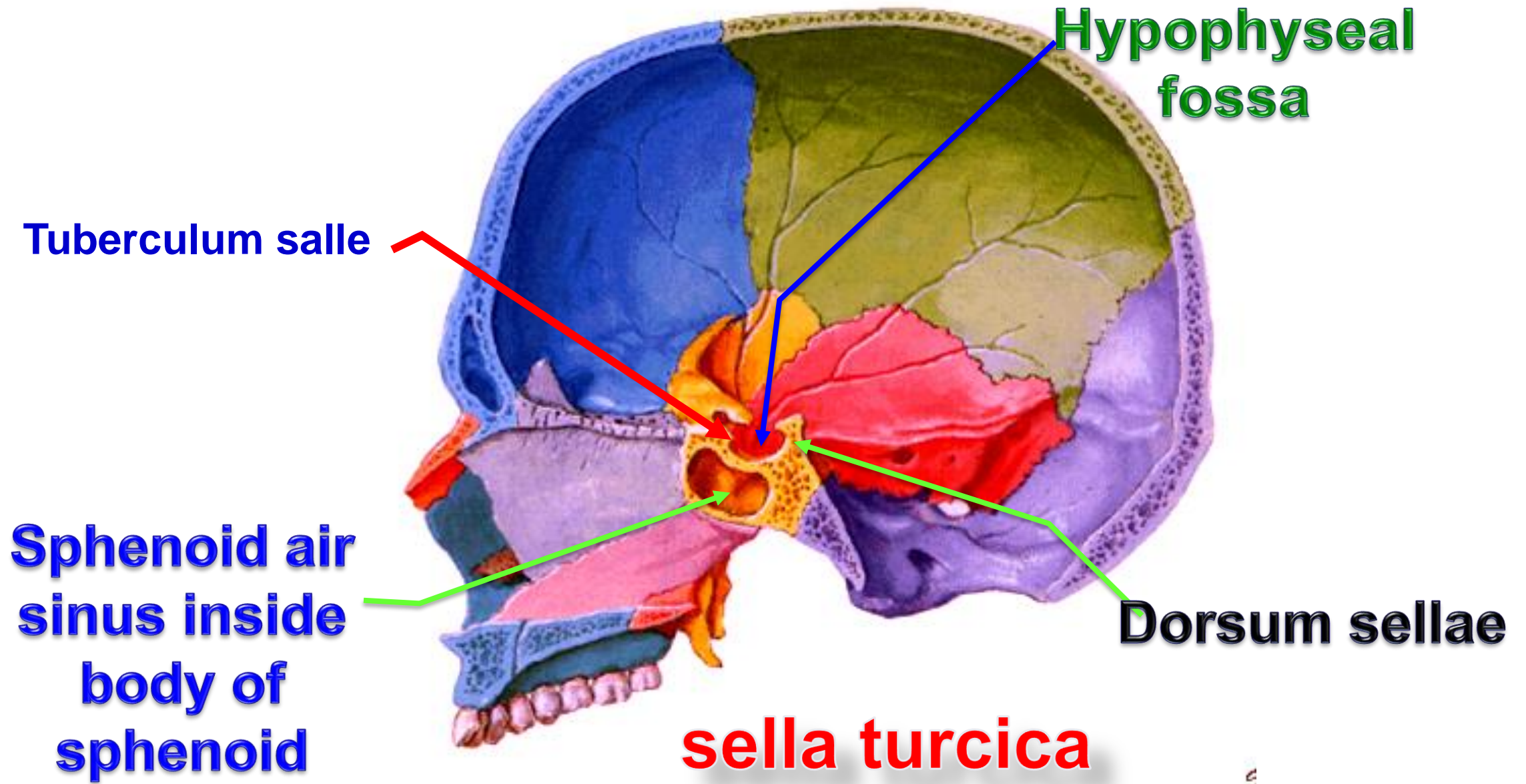
Dorsum selle

Anterior clinoid
process

Posterior clinoid
process



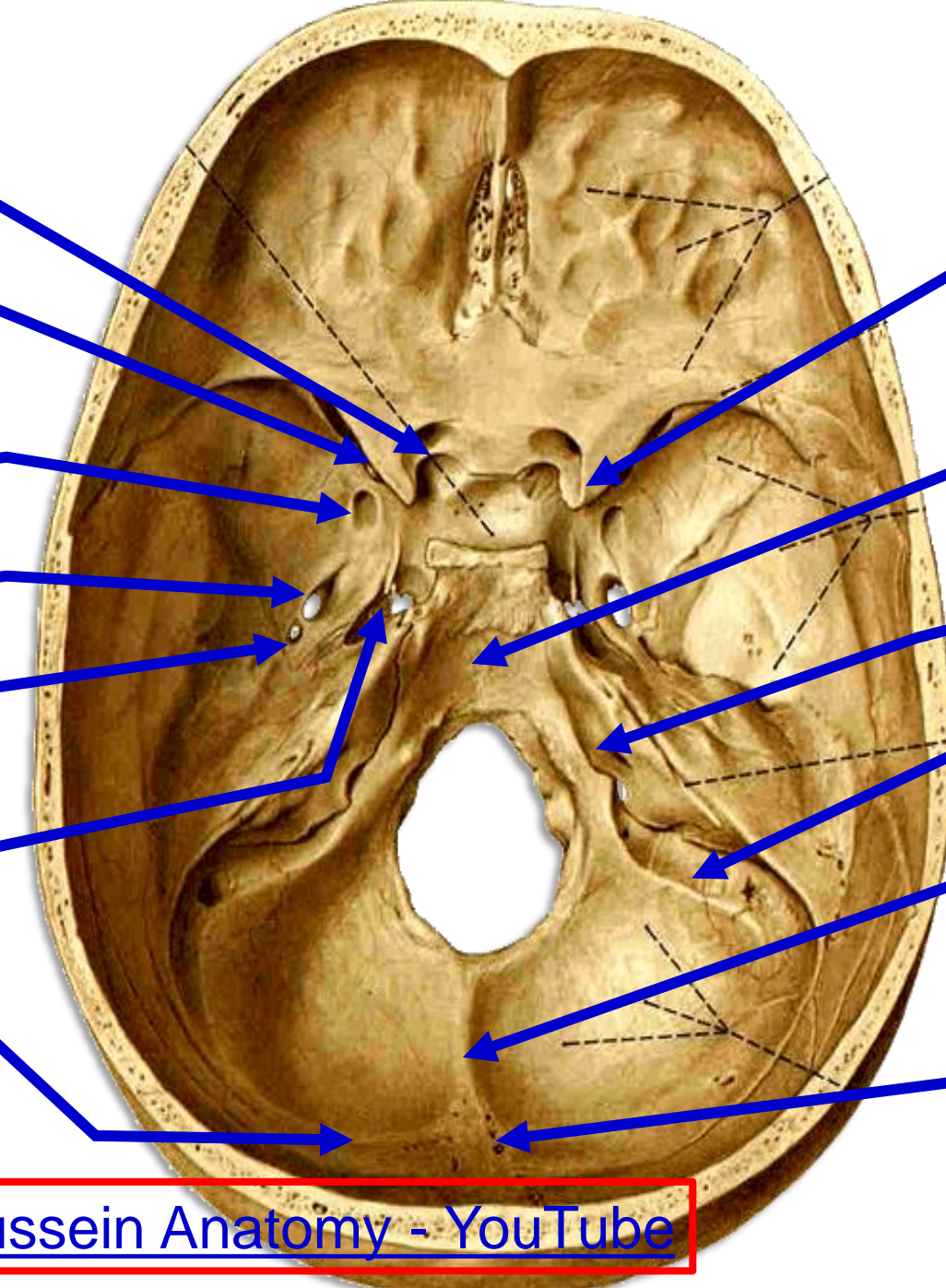
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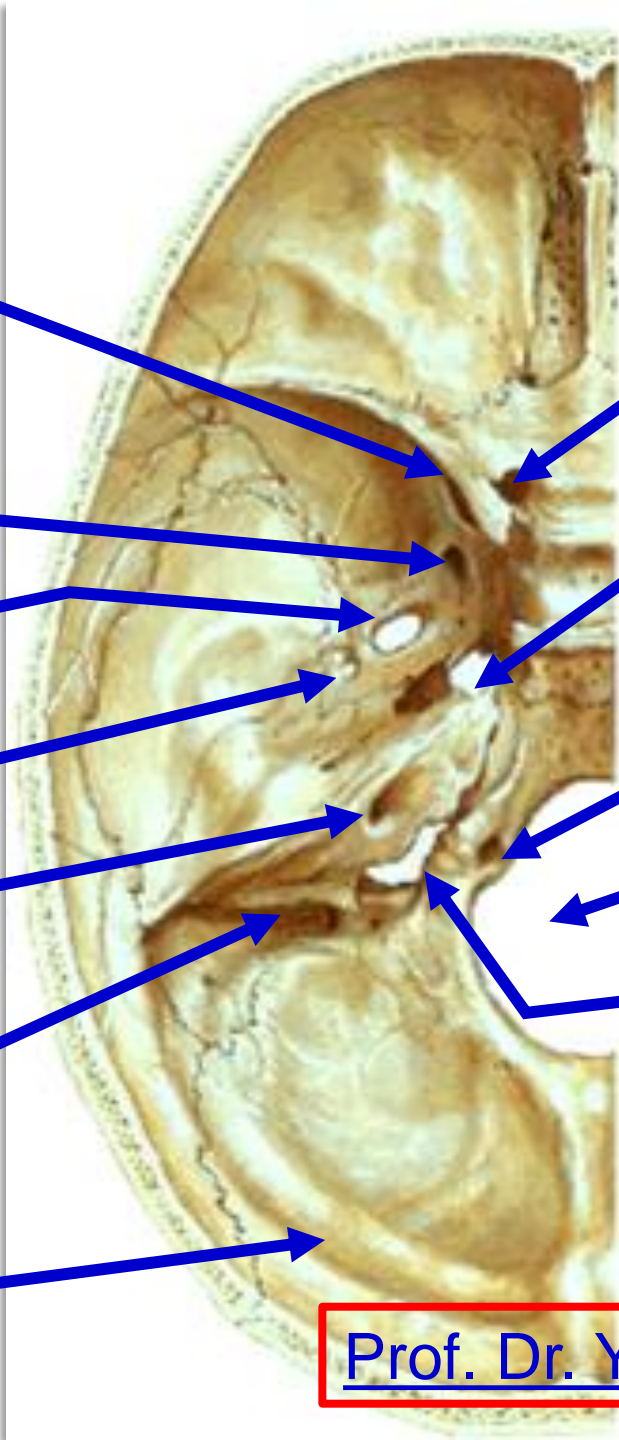


Foramen of the skull

- Optic canal**
- Superior orbital fissure**
- Foramen rotundum**
- Foramen ovale**
- Foramen spinosum**
- Foramen lacerum**
- Groove for Transverse sinus**

- Anterior clinoid process**
- Clivus**
- Jugular foramen**
- Groove for Sigmoid sinus**
- Internal occipital crest**
- Internal occipital protuberance**





Superior orbital fissure

Foramen rotundum

Foramen ovale

Foramen spinosum

Internal auditory meatus

Groove for sigmoid sinus

Groove for T. sinus

Optic canal

Foramen lacerum

Hypoglossal canal

Foramen magnum

Jugular foramen

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Groove for superior petrosal sinus

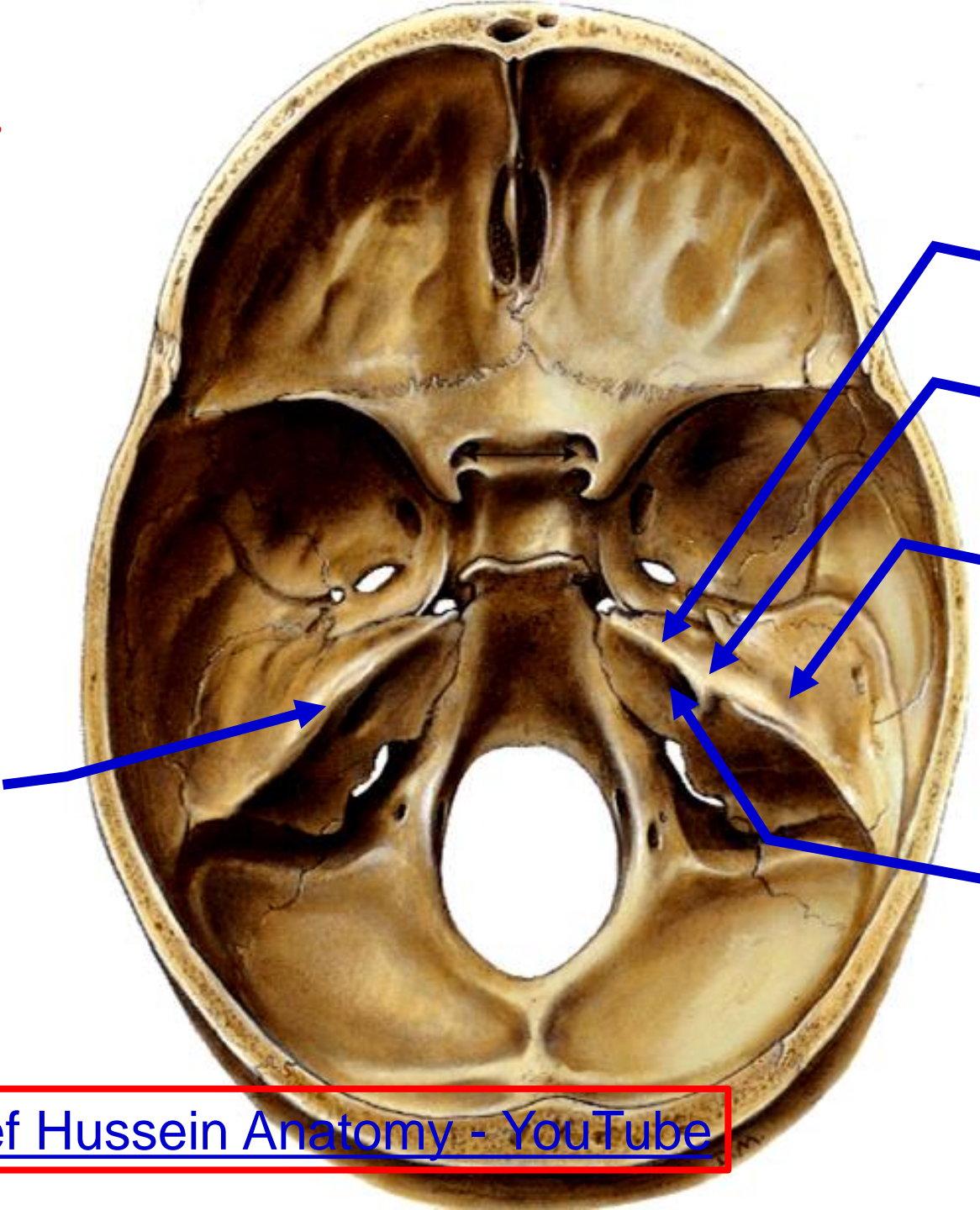
Trigeminal impression

Arcuate eminence

Tegmen tympani

Internal auditory meatus and facial canal

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- **Petrous part of temporal bone (its anterior surface):** shows the following features

(a) Trigeminal impression: a depression at the apex of the petrous temporal. It lodges the trigeminal ganglion.

(b) Arcuate eminence: an elevation posterolateral to the trigeminal impression. *It produced by superior semicircular canal of internal ear.*

(c) Tegmen tympani: is the thin bone anterolateral to the arcuate eminence. *It forms the roof of the tympanic cavity.*

(d) Hiatus and groove for greater petrosal nerve: lateral to the trigeminal impression and ends at the **foramen lacerum**. (branch of facial nerve)

(e) Hiatus and groove for lesser petrosal nerve: lateral to those of greater petrosal nerve, parallel to them.

Foramen	Position	structures passing
Optic canal	at the apex of the orbit	(1) optic nerve (2) Ophthalmic artery.
Superior orbital fissure	Between the roof and the lateral wall of the orbit.	(Live Free To See No Insult At All); (1) Lacrimal nerve (2) Frontal nerve (3) Trochlear (4) Superior division of oculomotor (5) Nasociliary nerve
<a data-bbox="135 882 1434 948" href="https://www.youtube.com/watch?v=Prof.Dr.YoussefHusseinAnatomy">Prof. Dr. Youssef Hussein Anatomy - YouTube		(6) Inferior division of oculomotor (7) Abducent nerve (6 th cranial nerve).
		Inferior orbital fissure

- **Foramen ovale:** The following structures passing through it;
 - 1) **M**andibular nerve.
 - 2) **L**esser superficial petrosal nerve.
 - 3) **A**ccessory meningeal artery.

- **Foramen spinosum:**

- 1) Middle meingeal artery and
- 2) Nervus spinosus.

- **Stylomastoid foramen:** between the styloid & mastoid processes.

- 1) Facial nerve.
- 2) Stylomastoid artery (branch of posterior auricular artery)

- **Carotid canal:**

- (1) Internal carotid artery.
- (2) Sympathetic plexus around the artery
- (3) Emissary vein

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- **Foramen lacerum** : at the apex of petrous part of temporal bone.

- (1) Internal carotid artery.
- (2) Sympathetic plexus around the artery.
- (3) Emissary vein.

- **Jugular foramen:**

- 1) Internal Jugular vein
- 2) The 9th, 10th and 11th cranial nerves

- **Anterior condylar foramen (hypoglossal canal);**

- 1) Hypoglossal nerve (12th cranial nerve).
- 2) Meningeal branch of ascending pharyngeal artery.

- **Posterior condylar foramen** emissary vein.

- **Foramen magnum** : The following structures passing through it

- 1) Lower end of the medulla oblongata.
- 2) Meninges.
- 3) Spinal roots of accessory nerve
- 4) Spinal arteries
- 5) Vertebral arteries
- 6) Vertebral plexus of veins.

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Internal auditory meatus, on the posterior surface of the petrous temporal bone.

It transmits 1) Facial nerve (the 7th cranial nerve), 2) Vestibulo-cochlear nerve (the 8th cranial nerve), and (3) Internal auditory vessels.

- **Hidden foramina of the base:**

- 1) **Palatovaginal canal;** midway between the vomer and vaginal process of medial pterygoid plate.

- - It transmits the pharyngeal branch of the sphenopalatine ganglion.

- 2) **Pterygoid canal:** opens into the aspect of foramen lacerum above the pterygoid tubercle. It transmits the nerve of pterygoid canal (**Vidian nerve**)

- 3) **Bony opening of Eustachian tube** **at posterior end of scaphoid fossa and medial to spine of sphenoid** contains cartilaginous part of the tube.

- 4) **Squamotympanic fissure**, between the tympanic plate of temporal bone and floor of the mandibular fossa, for the passage of .

- **Chorda tympani** nerve (branch of facial nerve)

- **Anterior tympanic artery** (branch of maxillary artery)

- **Pterygo-palatine fossa**

* **Site**; It lies medial to the pterygomaxillary fissure and behind the apex of orbit.

* **Content of the pterygopalatine fossa:**

(1) Terminal part of maxillary artery.

(2) Maxillary nerve.

(3) Sphenopalatine ganglion suspended from the nerve.

* **Foramina and fissures opening in the pterygopalatine fossa :**

(1) **Foramen rotundum** to middle cranial fossa: transmitting maxillary nerve from cranial cavity to fossa.

(2) **Pterygoid canal** (above pterygoid tubercle): transmitting the nerve and artery of the pterygoid canal.

(3) **Palatovaginal canal** (between the vaginal process of the medial pterygoid plate and ala of the vomer) transmitting the pharyngeal branch of the sphenopalatine ganglion to the pharynx.

(4) **Sphenopalatine foramen** to the nasal cavity: transmitting the short and long sphenopalatine nerves of the ganglion to the pharynx.

(5) **The inferior orbital fissure**: connecting the fossa with the orbit.

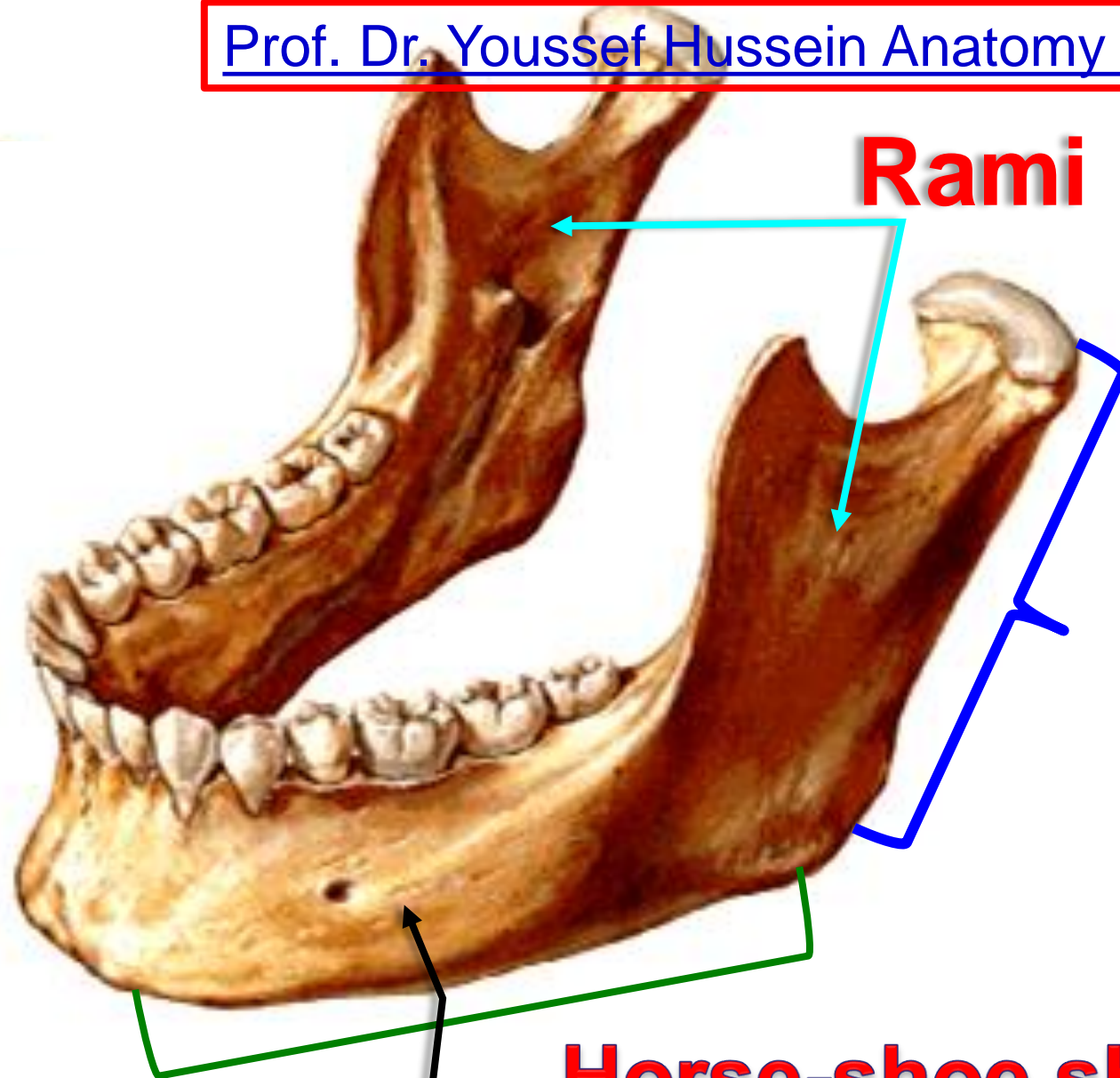
(6) **Greater palatine and lesser palatine canals**: transmitting the greater and lesser palatine nerve and vessels to the palate.

(7) **Pterygomaxillary fissure**: connecting the pterygopalatine fossa to the infratemporal fossa and transmitting maxillary nerve and artery,



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Rami

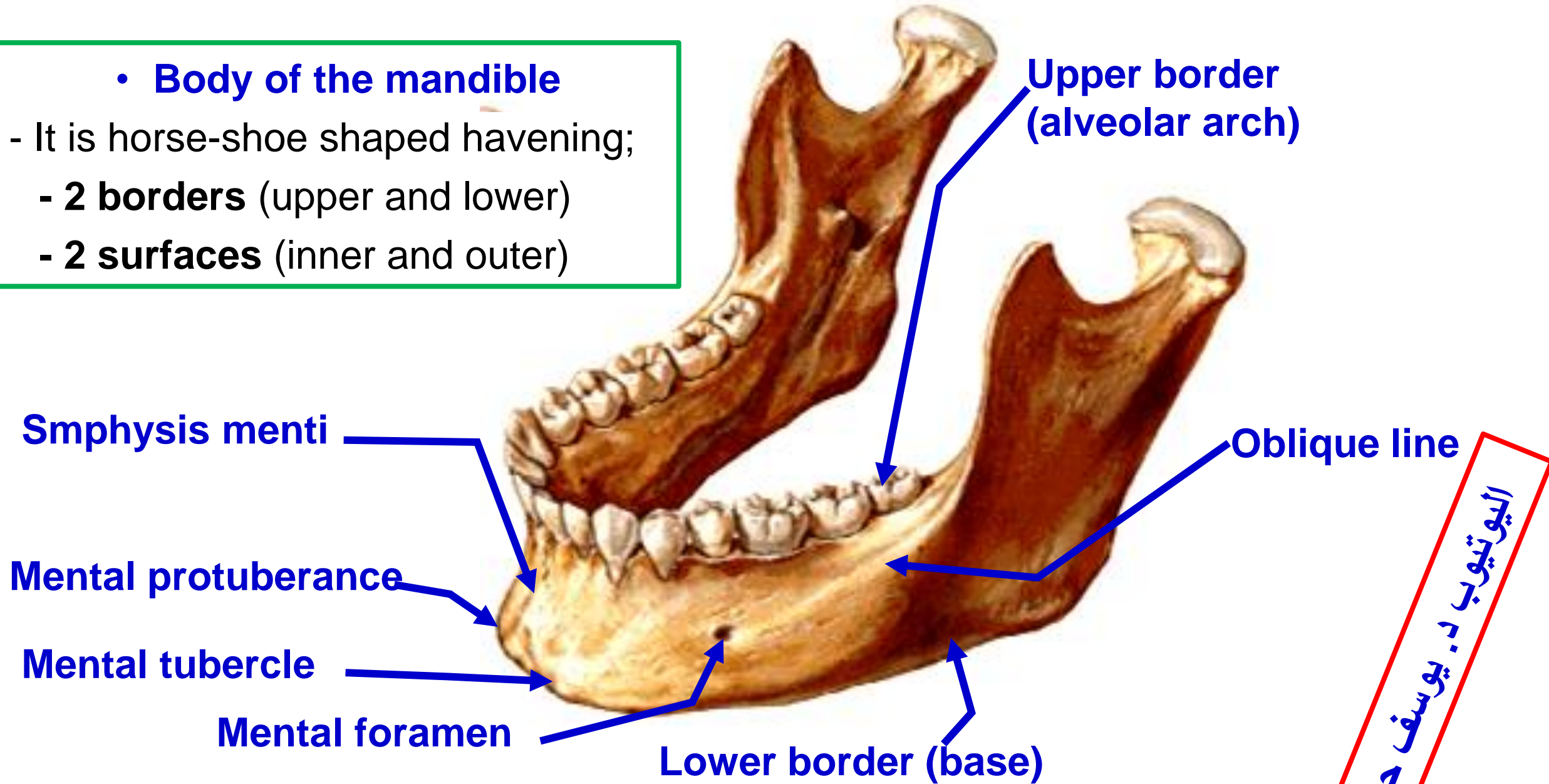
Body

Horse-shoe shaped body

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- **Body of the mandible**

- It is horse-shoe shaped having;
- **2 borders** (upper and lower)
- **2 surfaces** (inner and outer)

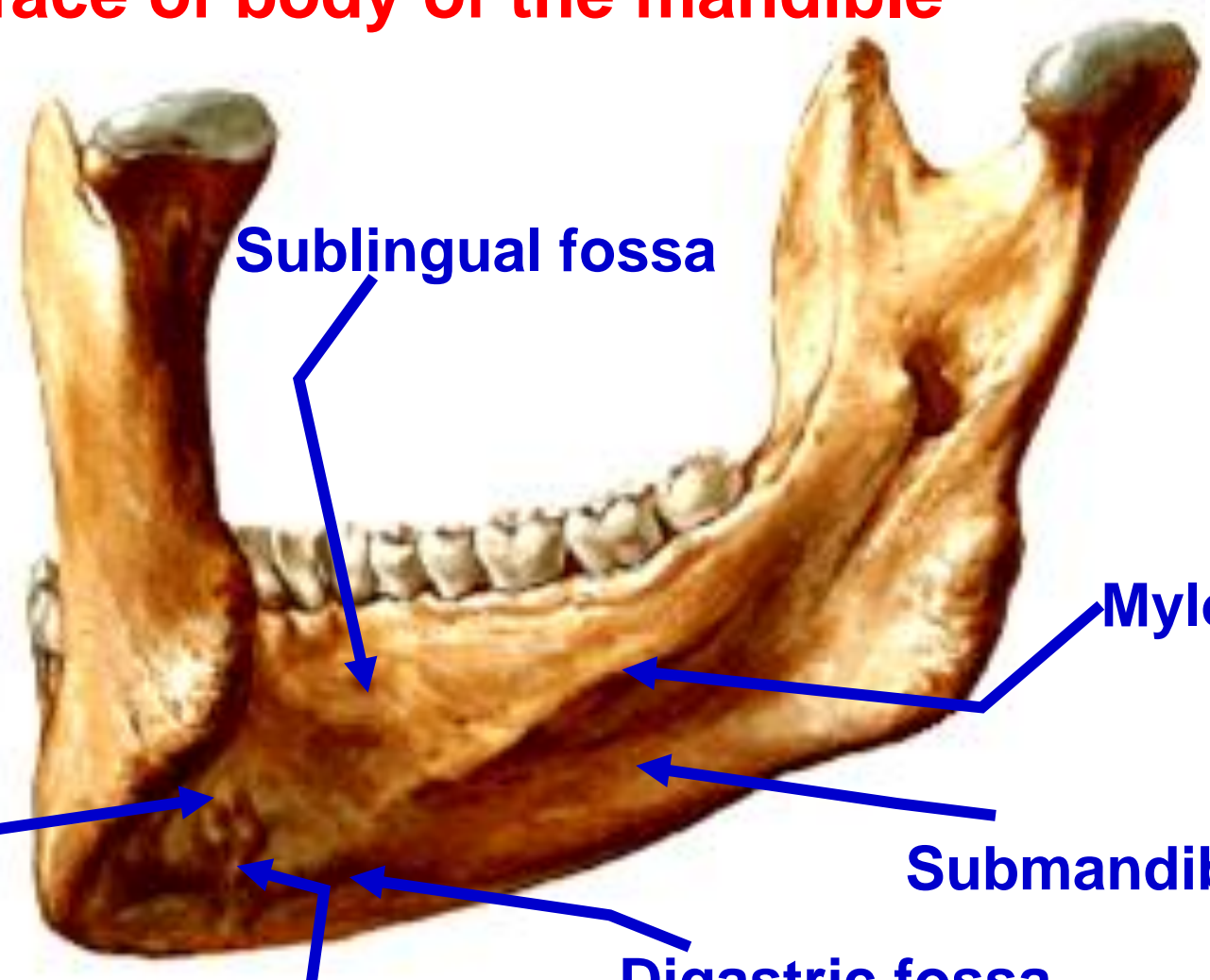


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❖ Inner surface of body of the mandible

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Sublingual fossa

Mylohyoid line

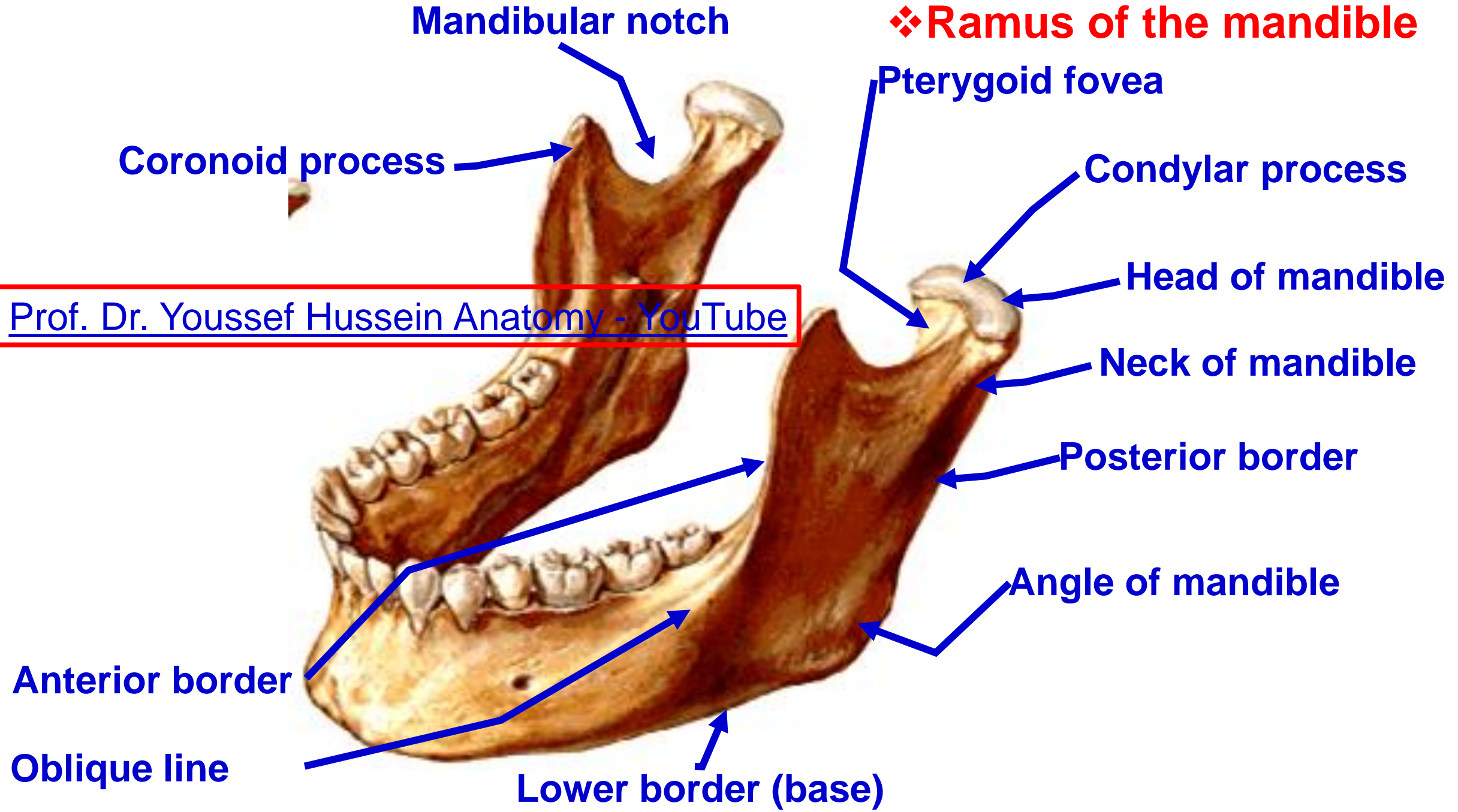
Submandibular fossa

Digastric fossa

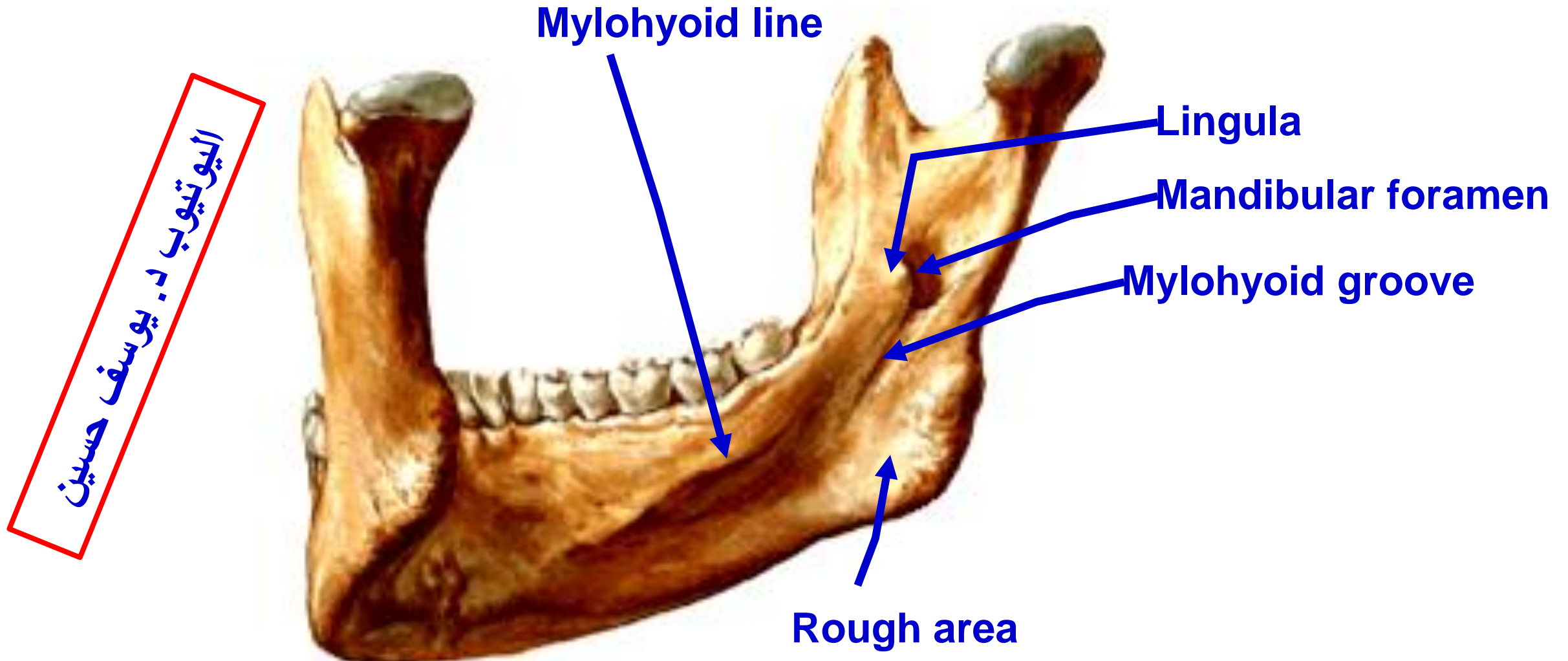
Superior genial tubercle

Inferior genial tubercle

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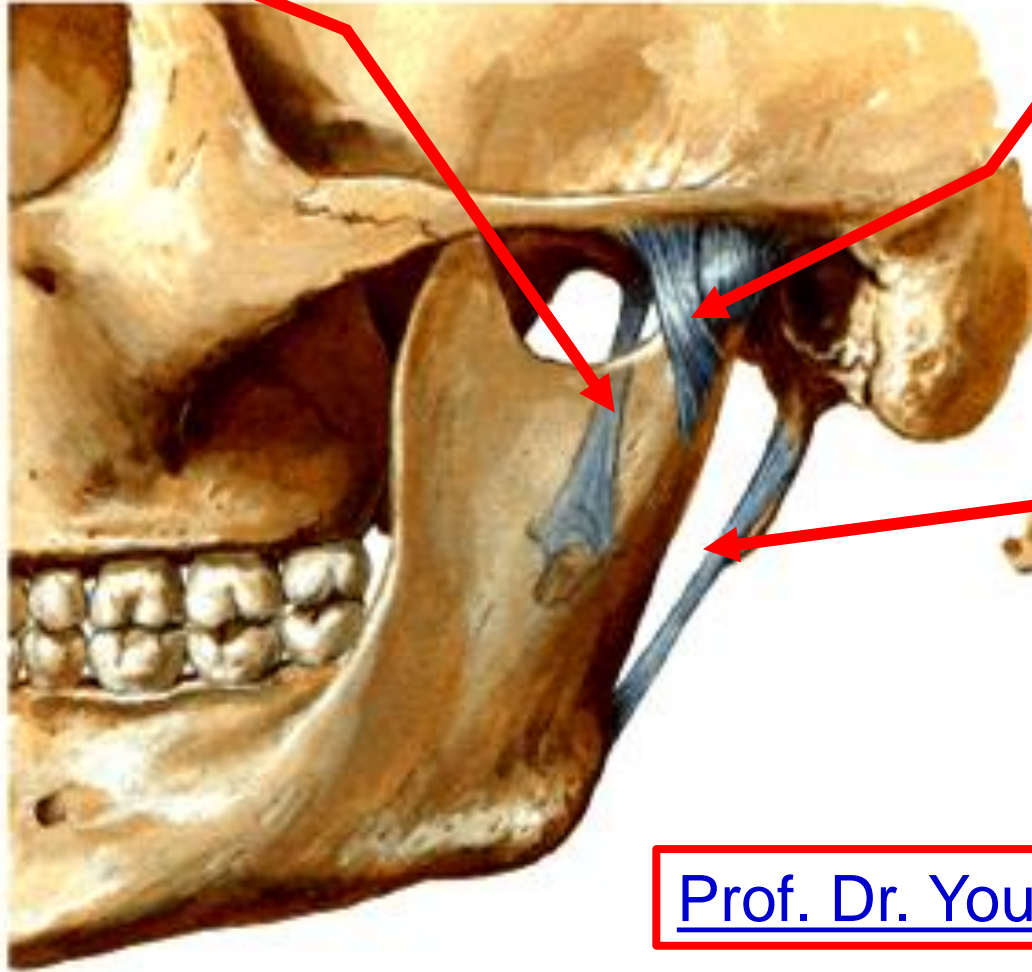


❖ Inner surface of Ramus of the mandible



Sphenomandibular ligament from spine of sphenoid to lingula

Tempromandibular ligament from articular eminence to lateral side of neck



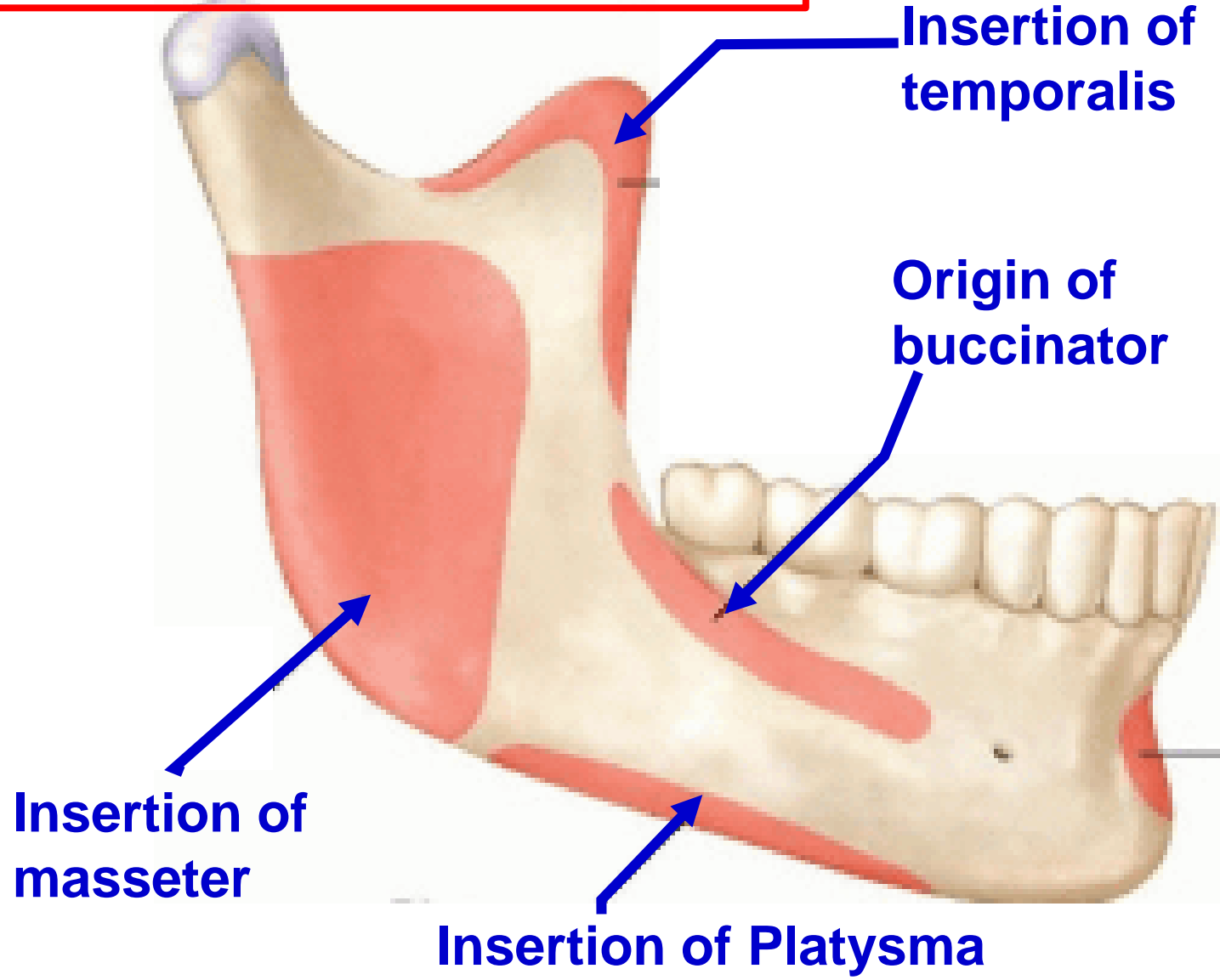
Stylomandibular ligament from styloid process to angle

Pterygomandibular ligament; from pterygoid Hamulus to posterior end of mylohyoid line

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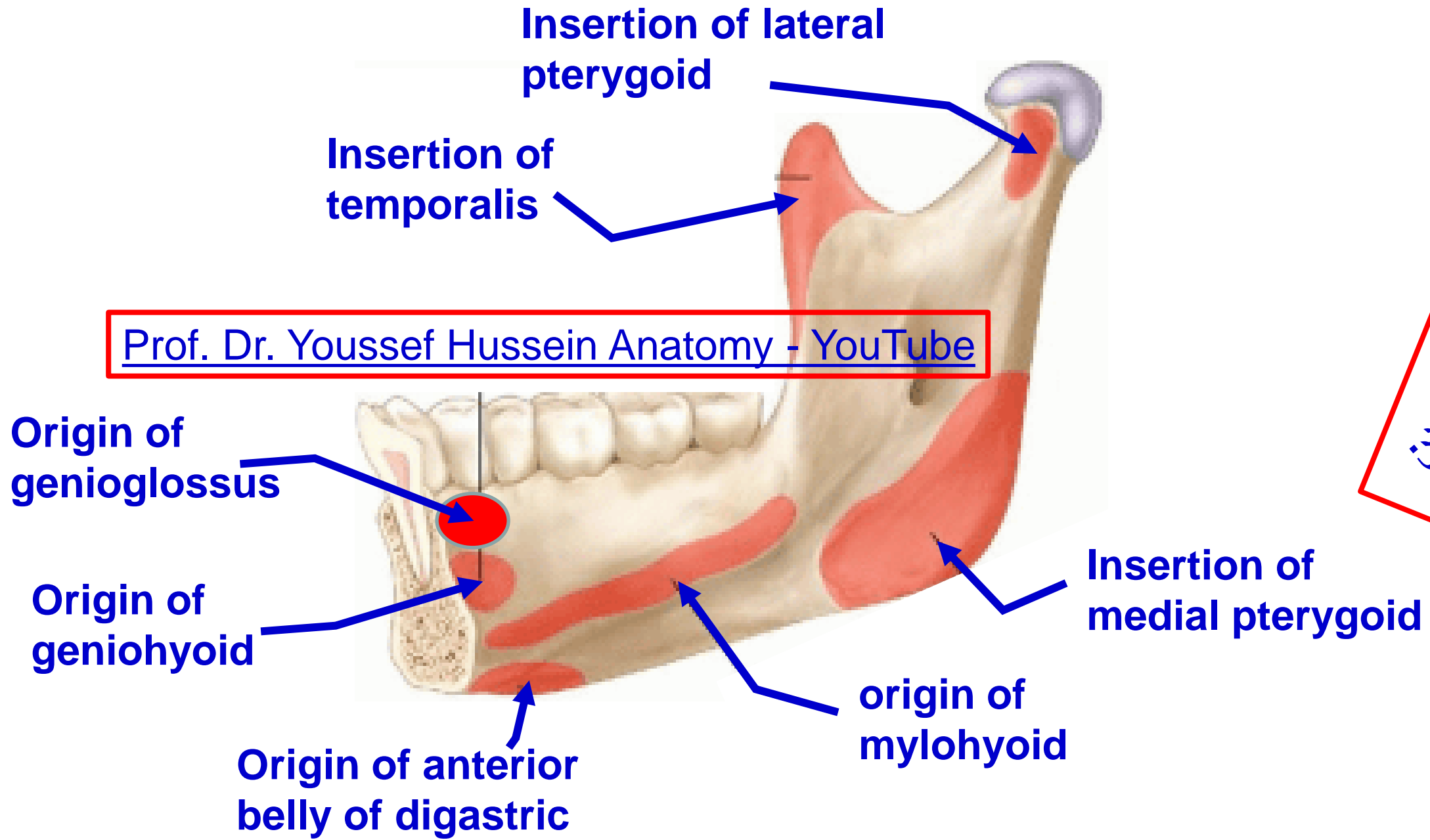
Ligaments related to mandible

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Muscles attached to mandible (outer)



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Muscles attached to mandible (inner)

**** Nerves related to the mandible**

A- 2 Nerves related to the foramina;

1. Inferior alveolar nerve enters the mandibular foramen.
2. Mental nerve emerges from the mental foramen.

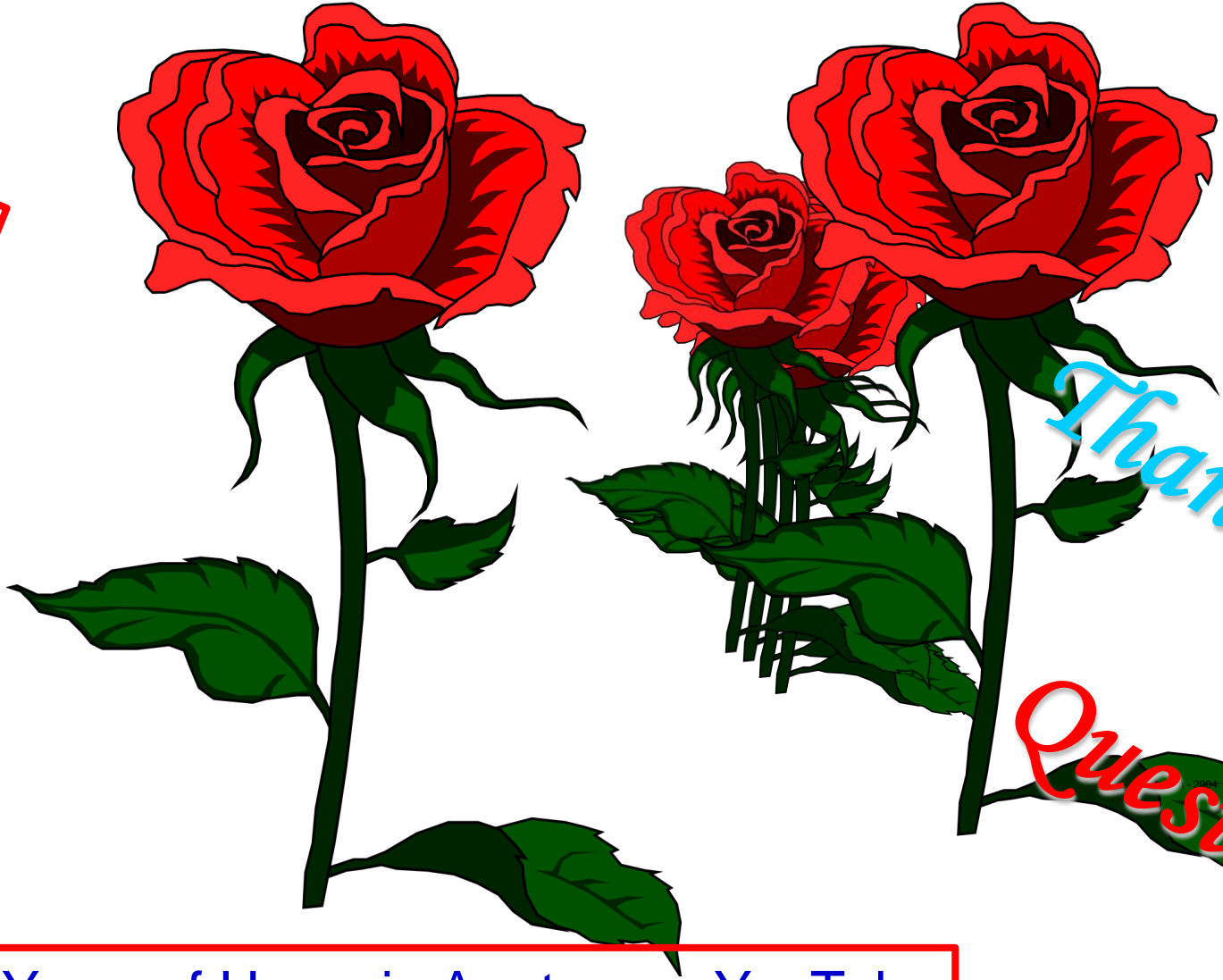
B- 2 Nerves related to the grooves,

- 1- Nerve to mylohyoid, in the mylohyoid groove.
- 2- Lingual nerve runs forwards along groove on the medial aspect of the last molar tooth.

**** Glands related to mandible,**

- 1. Submandibular salivary gland**, related to the submandibular fossa.
- 2. Sublingual salivary gland**, related to the sublingual fossa.
- 3. Parotid gland** related to the posterior border of the ramus.

https://www.youtube.com/channel/UCVSNqbibj9UWYaJdd_cn0PQ



يُمنع أخذ السلايدات بدون
إذن المحرر واي اجراء
يخالف ذلك يقع تحت
طائلة المسؤولية القانونية

Thank You

Questions

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