



Musculoskeletal System

Doctor 2019 | Medicine | JU

4

Anatomy

Writer

Majdoleen Hamed

**Scientific
correction**

Bayan Zaben

**Grammatical
correction**

Doctor

Heba kalbouneh



Scalp

Before you start please revise the bony land marks that mentioned in the beginning of the lecture

Dr. Heba Kalbouneh
Associate Professor of Anatomy and Histology

Scalp (فروة الرأس)

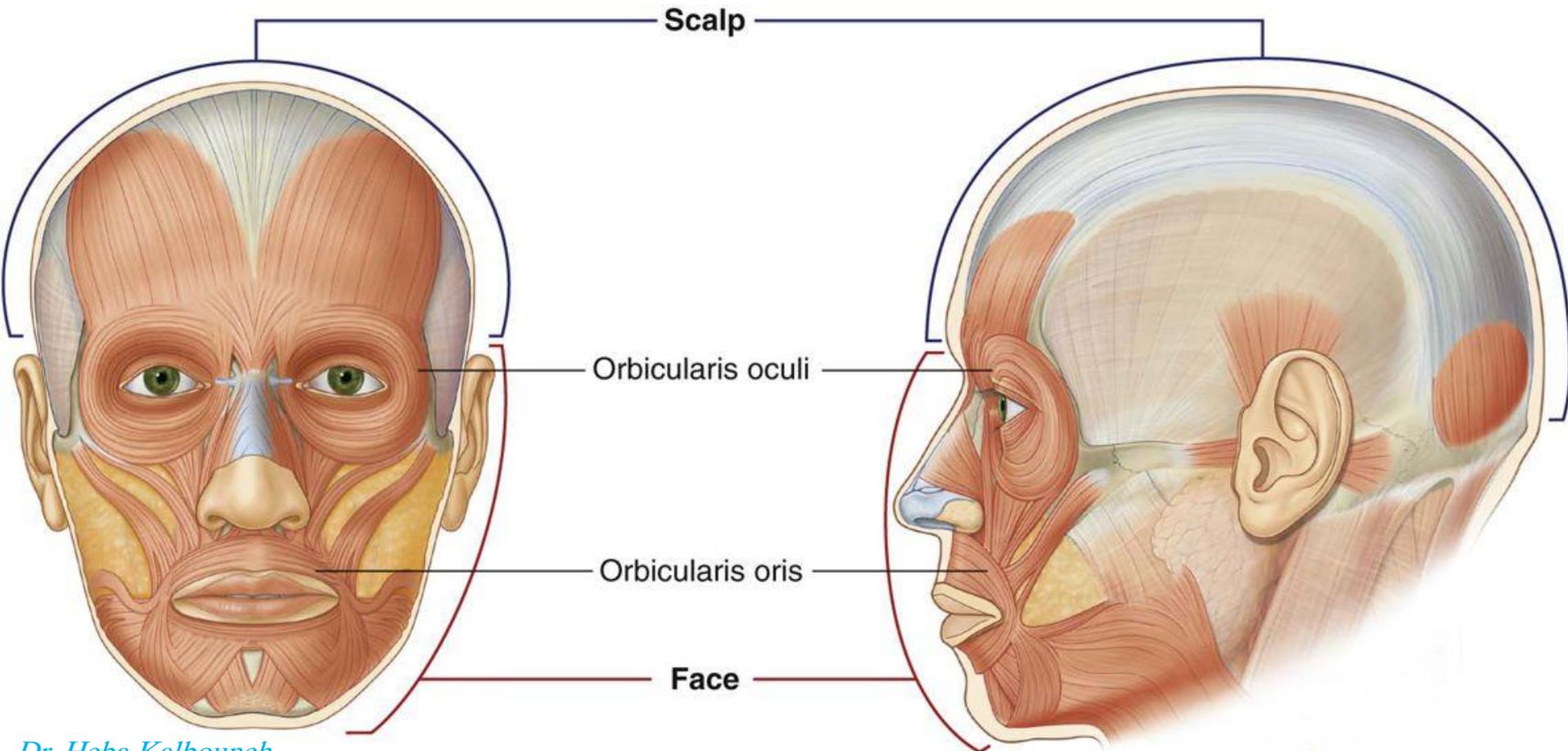
- It is the soft tissue that covers the skull cap **(hairy area of the head)**
- Extension:

Front: superciliary arch

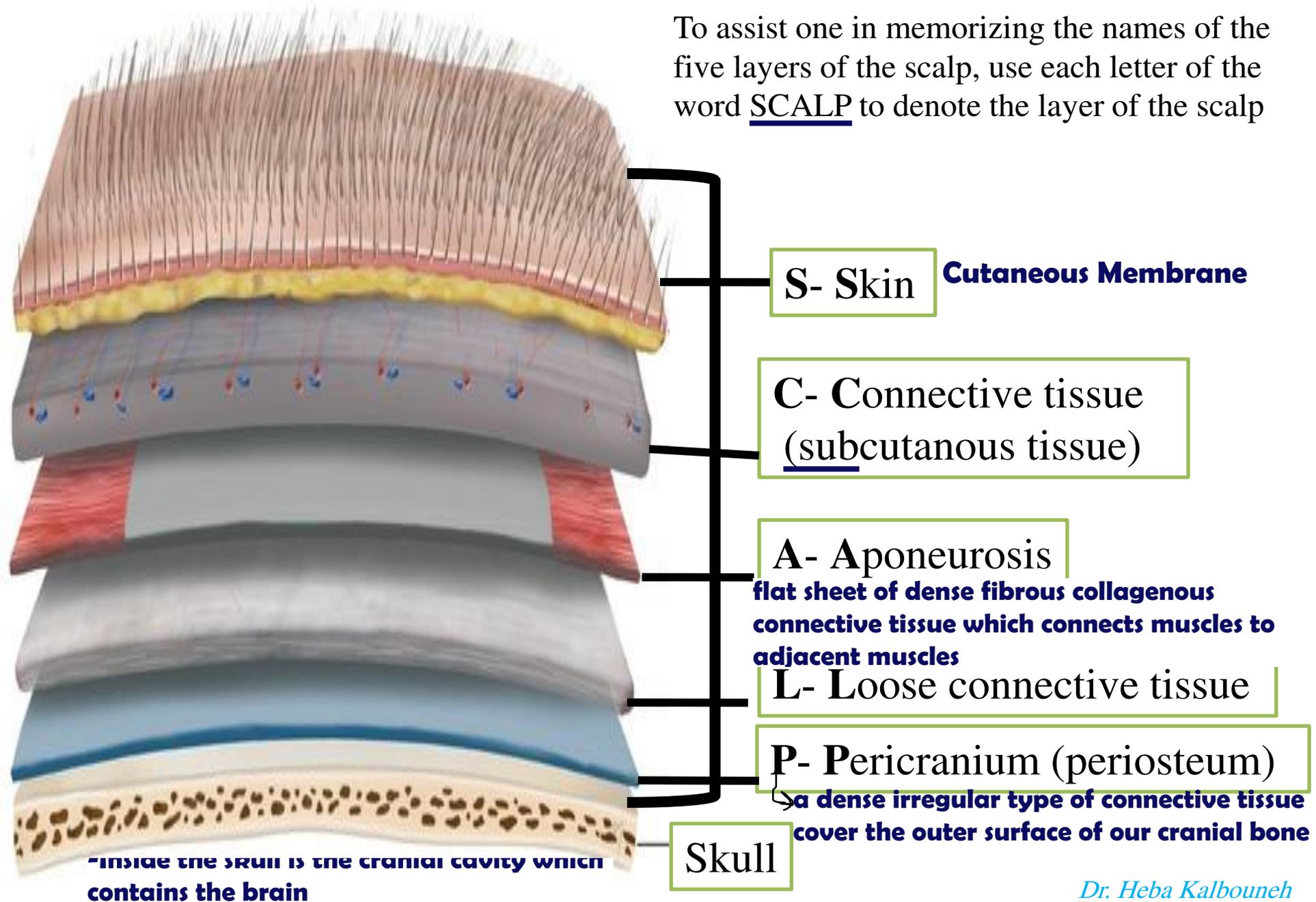
Back: superior nuchal line

Sides: zygomatic arch

Highest point of the scalp is called **Vertex**

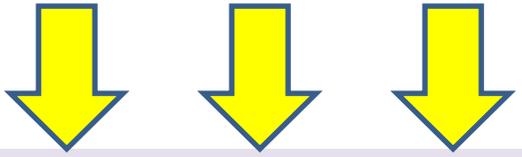


To assist one in memorizing the names of the five layers of the scalp, use each letter of the word SCALP to denote the layer of the scalp



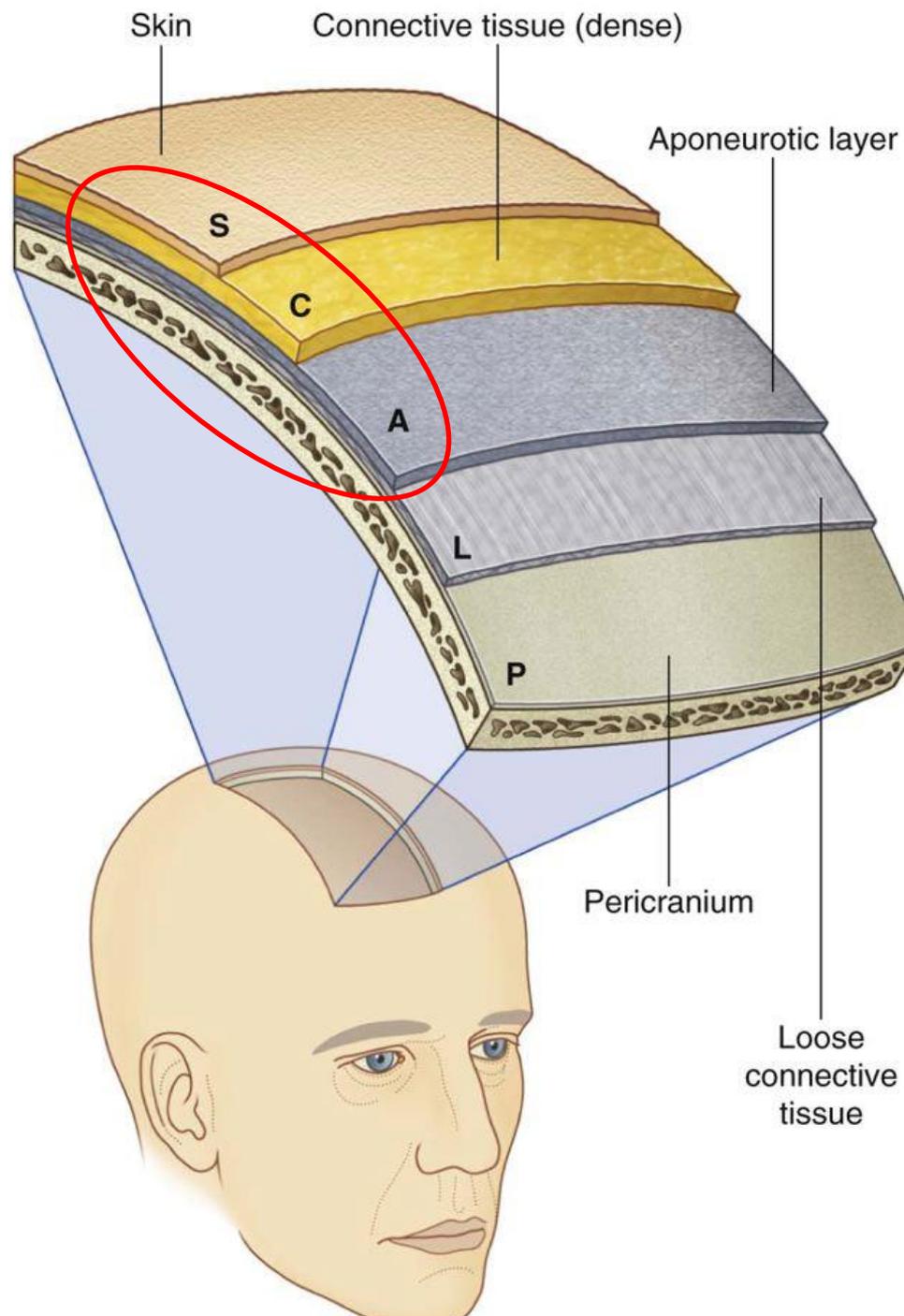
The SCALP consists of five layers:

- S- Skin
- C-Connective tissue (dense)
- A-Aponeurotic layer
- L-Loose connective tissue
- P-Pericranium



The first three of which are intimately bound together and move as a unit

They move on the periosteum of the cranial bones



fleshy part of muscle

S- Skin
C- Connective tissue

A- Aponeurosis
appears whitish in color
because has collagen type I

L- Loose connective tissue

P- Periosteum

Skull bone

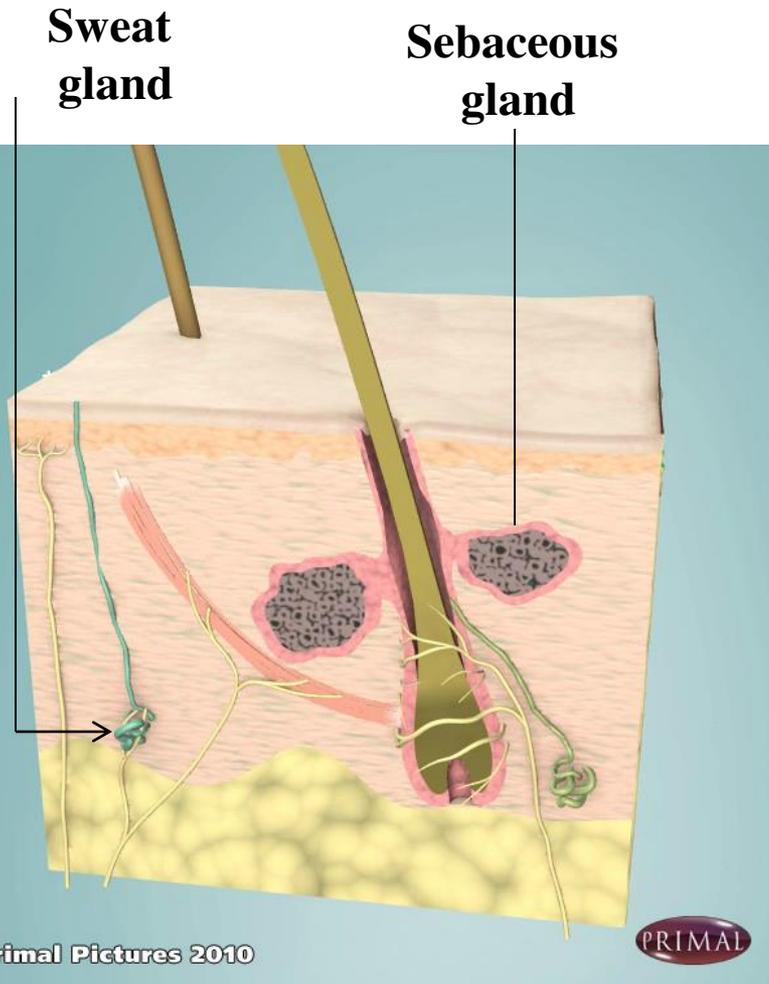
Dura mater

Brain

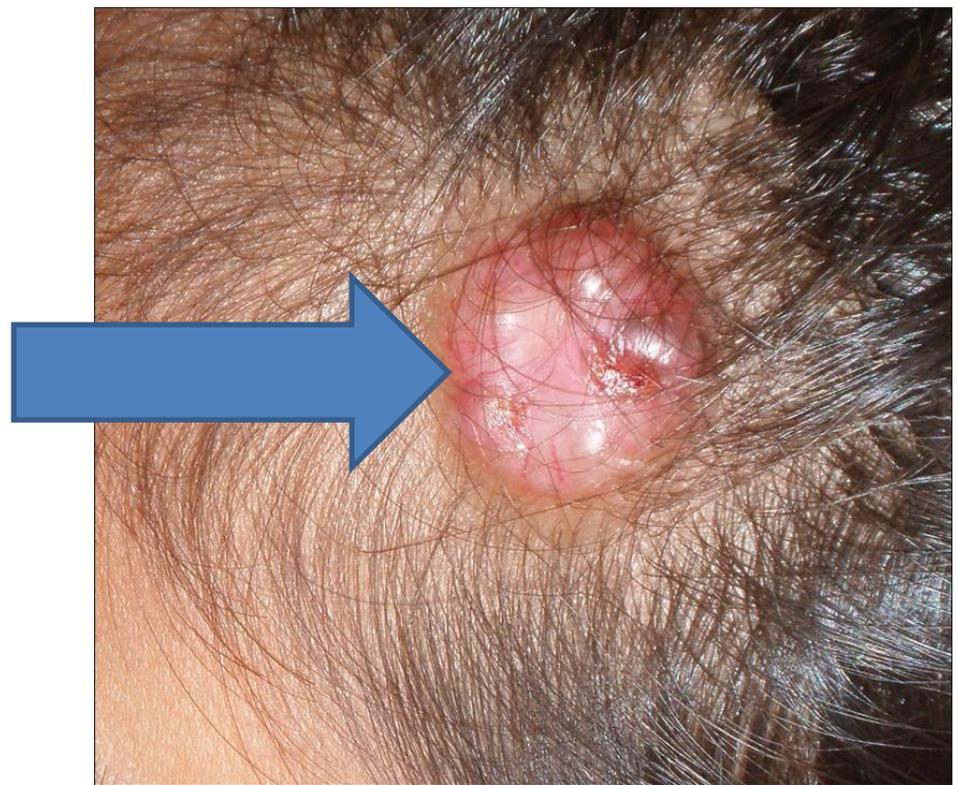
-The brain is surrounded by 3 layers of connective tissue called meninges, the outermost layer is called dura mater.

1- Skin

✓ Rich in **hair follicles, sebaceous glands and eccrine sweat glands**



Scalp is a common site for sebaceous cysts



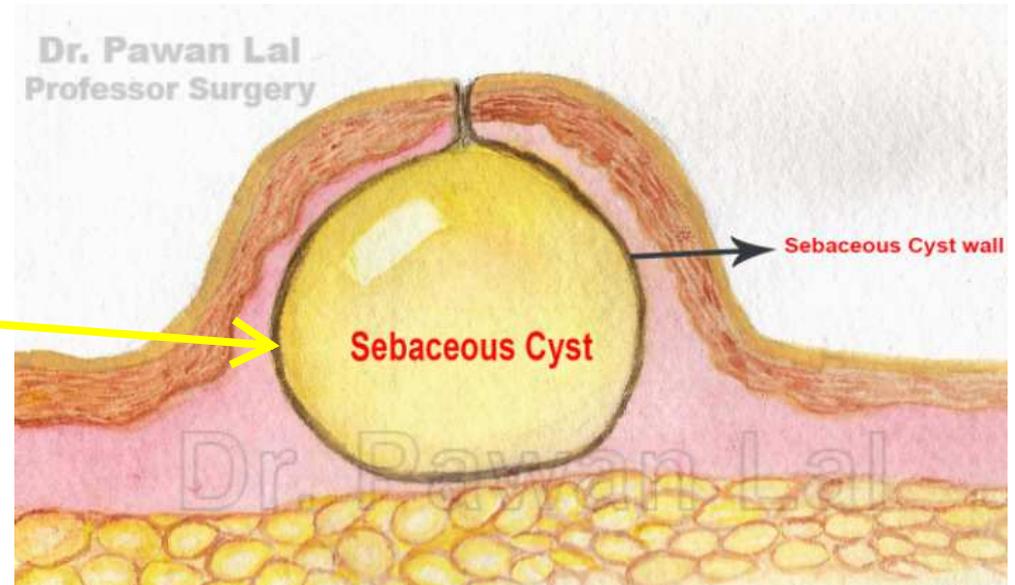
Sebaceous glands have a ducts open in hair canal (follicle) and these ducts secrete a SEBUM (oily material) in order to lubricate the hair and the surface of the skin

**so oily hair/skin caused by excessive secretion of sebum from sebaceous glands
BUT in low secretion of sebum caused a dry skin/hair**

Scalp is a common site for sebaceous cysts, Why?

because if you have over production of sebum from sebaceous glands this will block there hair canal so the sebum will be collected below the level of the skin and this will result formation a cysts

-Accumulation of the oily material



2- Connective tissue

Made of fibrous septa which unite the skin to the underlying aponeurosis

Contains numerous blood vessels, nerves,
and fat (a dense type that isn't affected
by obesity)

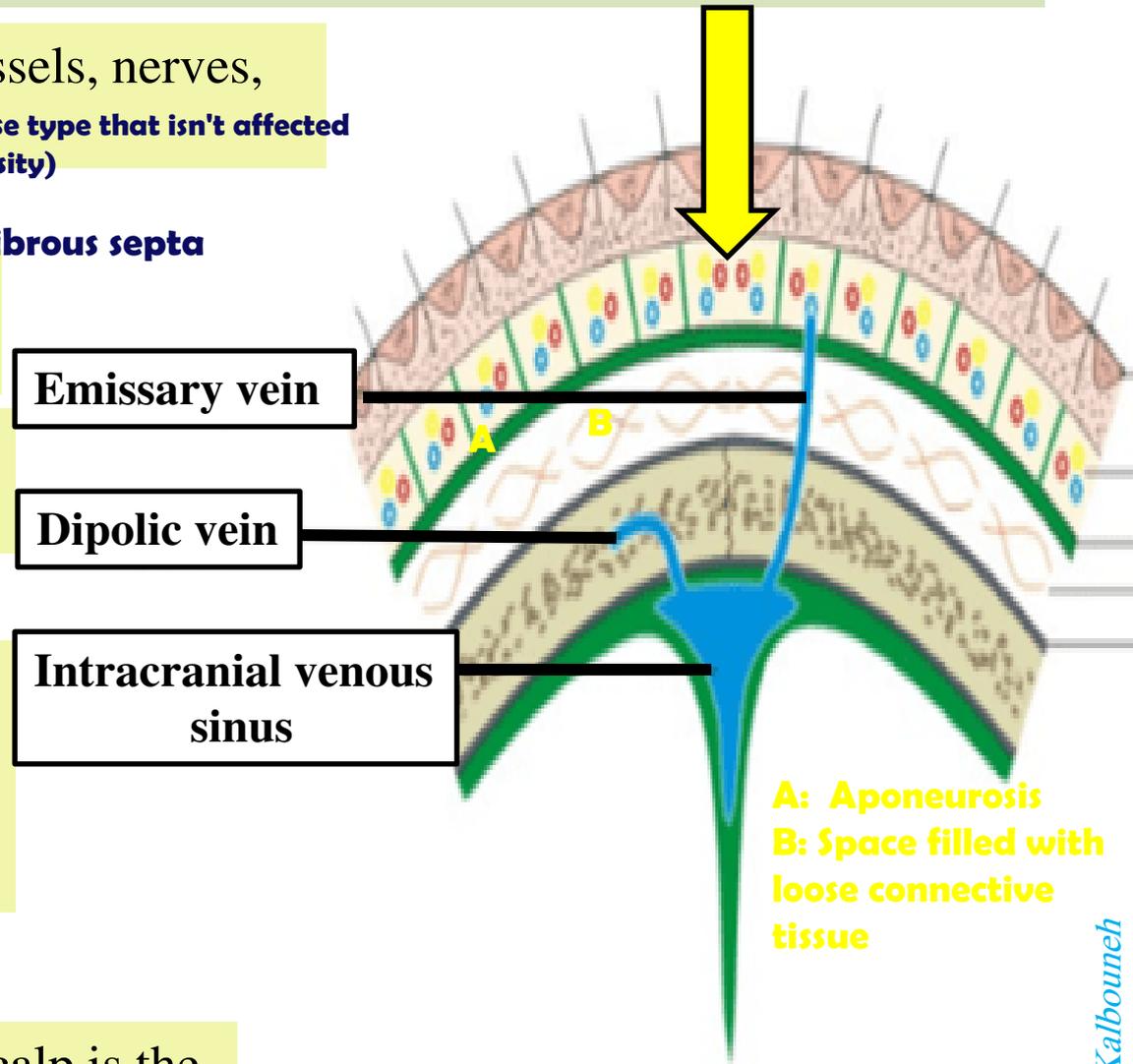
Also because of the fibrous septa

Thus wounds of the scalp bleed profusely but heal very rapidly

It is often difficult to stop the bleeding of a scalp wound

The blood vessels do not retract and close when lacerated because the connective tissue in which they are found holds them open

Local pressure applied to the scalp is the only satisfactory method of stopping the bleeding

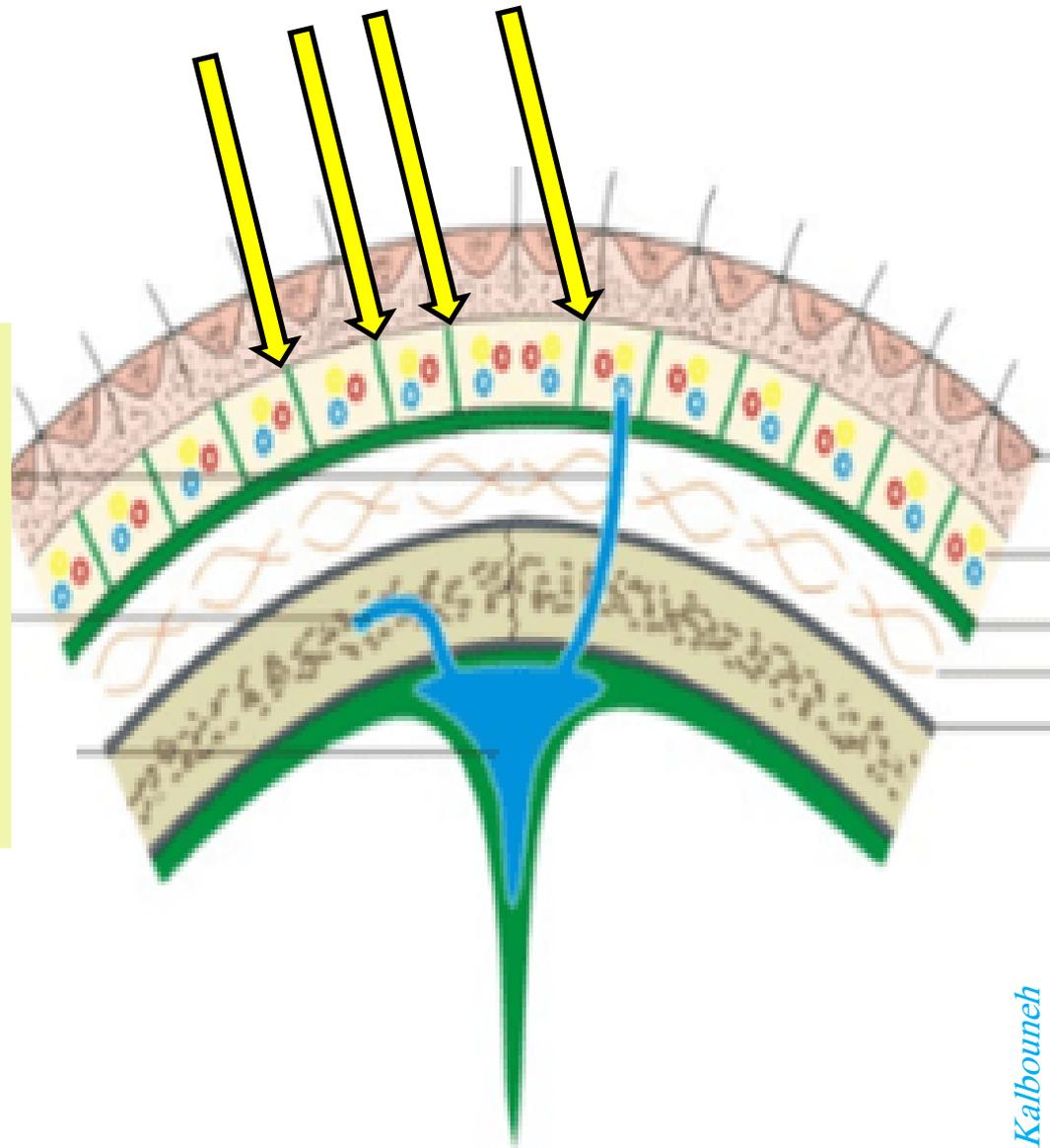


A: Aponeurosis
B: Space filled with loose connective tissue

Fibrous septa



- 1- Unite the skin to the underlying aponeurosis of the occipitofrontalis muscle
- 2- Divide the connective tissue layer into small compartments
- 3- Hold the cut blood vessels open (in case of scalp wound)



- When a blood vessel is lacerated, the normal physiological response is : contraction, retraction and blood clot formation, BUT the fibrous septa here holds the cut blood vessel open -> that's why the wound of the scalp bleed profusely
- Infection in this layer (connective tissue)of the scalp is localized due to the fibrous septa

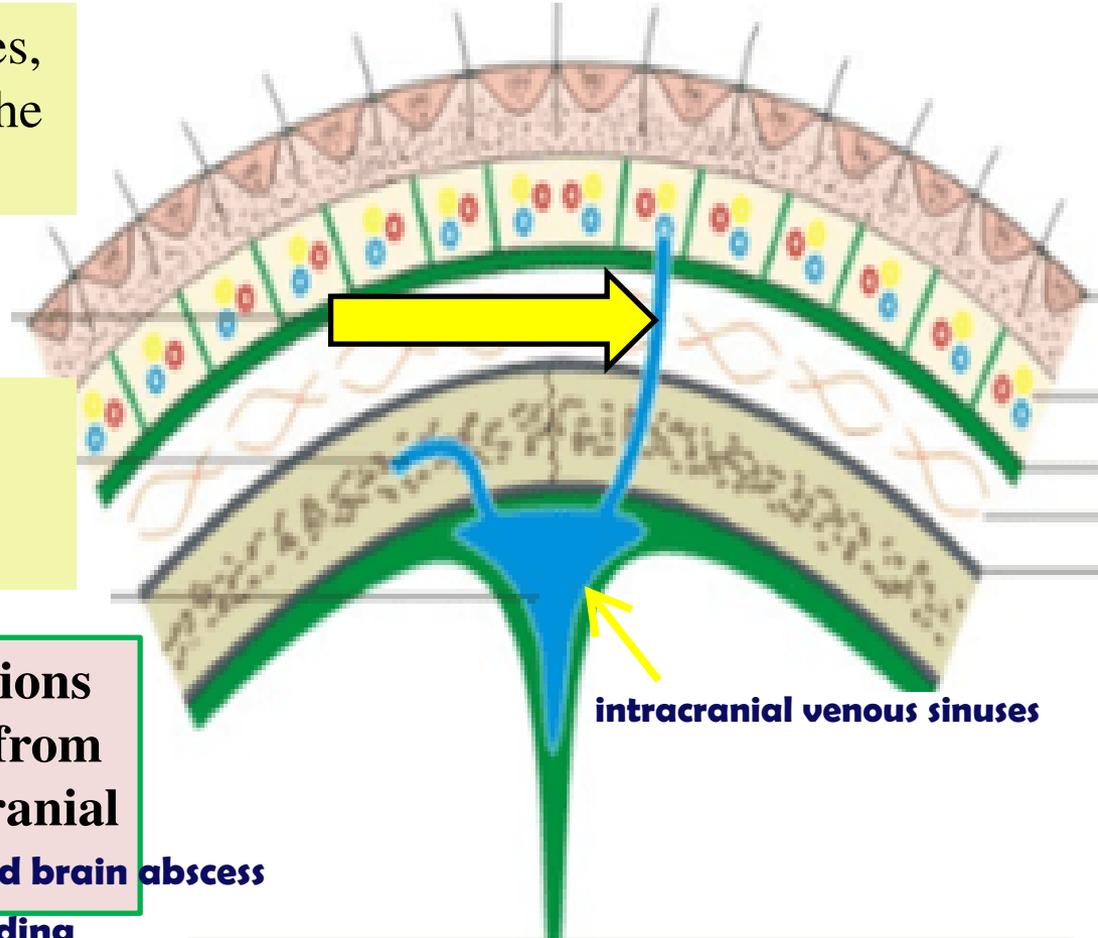
Emissary veins -connects an extracranial vein with an intracranial vein within the cranial cavity but outside the brain
-don't have a valves(valveless) that's mean its allow a bidirectional movement of the blood(from intracranial to extracranial and vice versa)



Emissary veins: are devoid of valves, connect the veins of the scalp with the intracranial venous sinuses



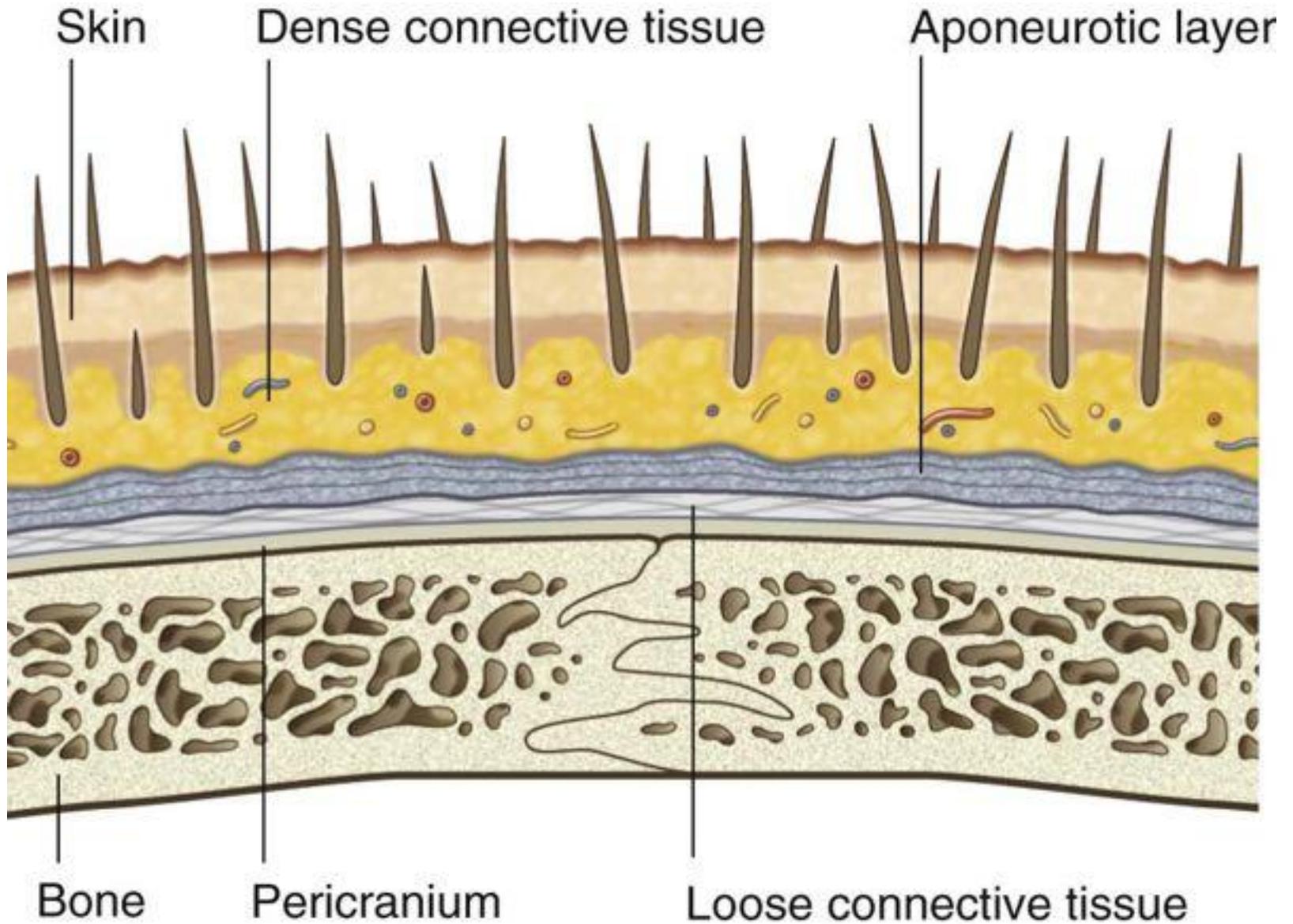
- 1- Equalize the pressure between intracranial and extracranial veins
- 2- Selective cooling of the head



!!!!!!! Serve as routes where infections are carried into the cranial cavity from the extracranial veins to the intracranial veins, which will cause brain abscess

and meningitis (infection of meninges surrounding the brain) but this is rare because it has to be in the area that drains with emissary veins

Emissary veins connect the veins outside the cranium to the venous sinuses inside the cranium

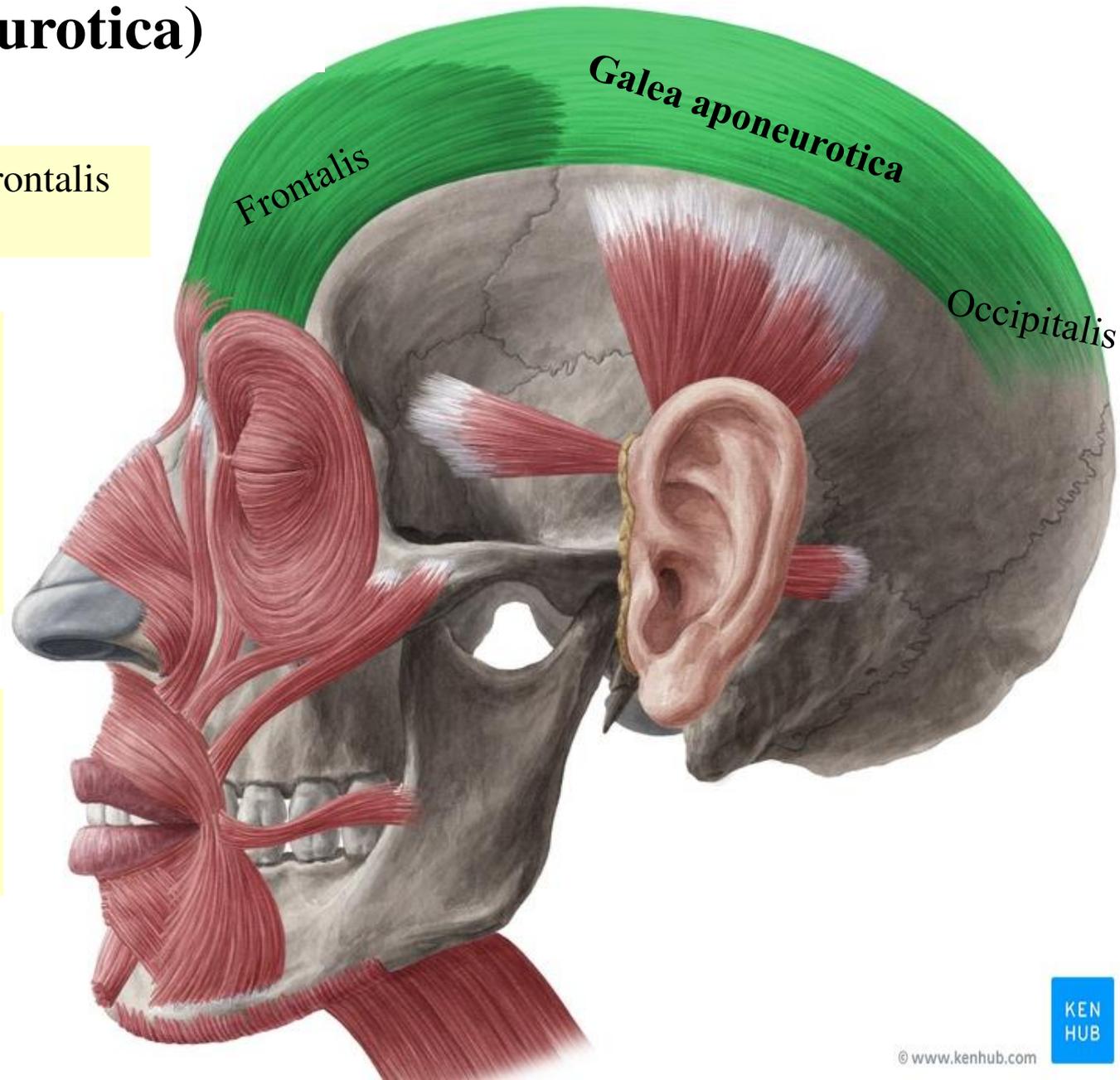


3- Epicranial aponeurosis (Galea aponeurotica)

Consists of the occipitofrontalis muscle

Occipitofrontalis has a frontal belly anteriorly and an occipital belly posteriorly and an aponeurotic tendon connecting the two

The lateral margins of the aponeurosis are attached to the temporal fascia



Laterally, the aponeurosis of this muscle is attached to the superior temporal line

Muscles of the Scalp

Occipitofrontalis

Origin:

Frontal belly: skin of the eyebrows

Occipital belly: highest nuchal line/
superior nuchal line

Insertion:

Epicranial aponeurosis

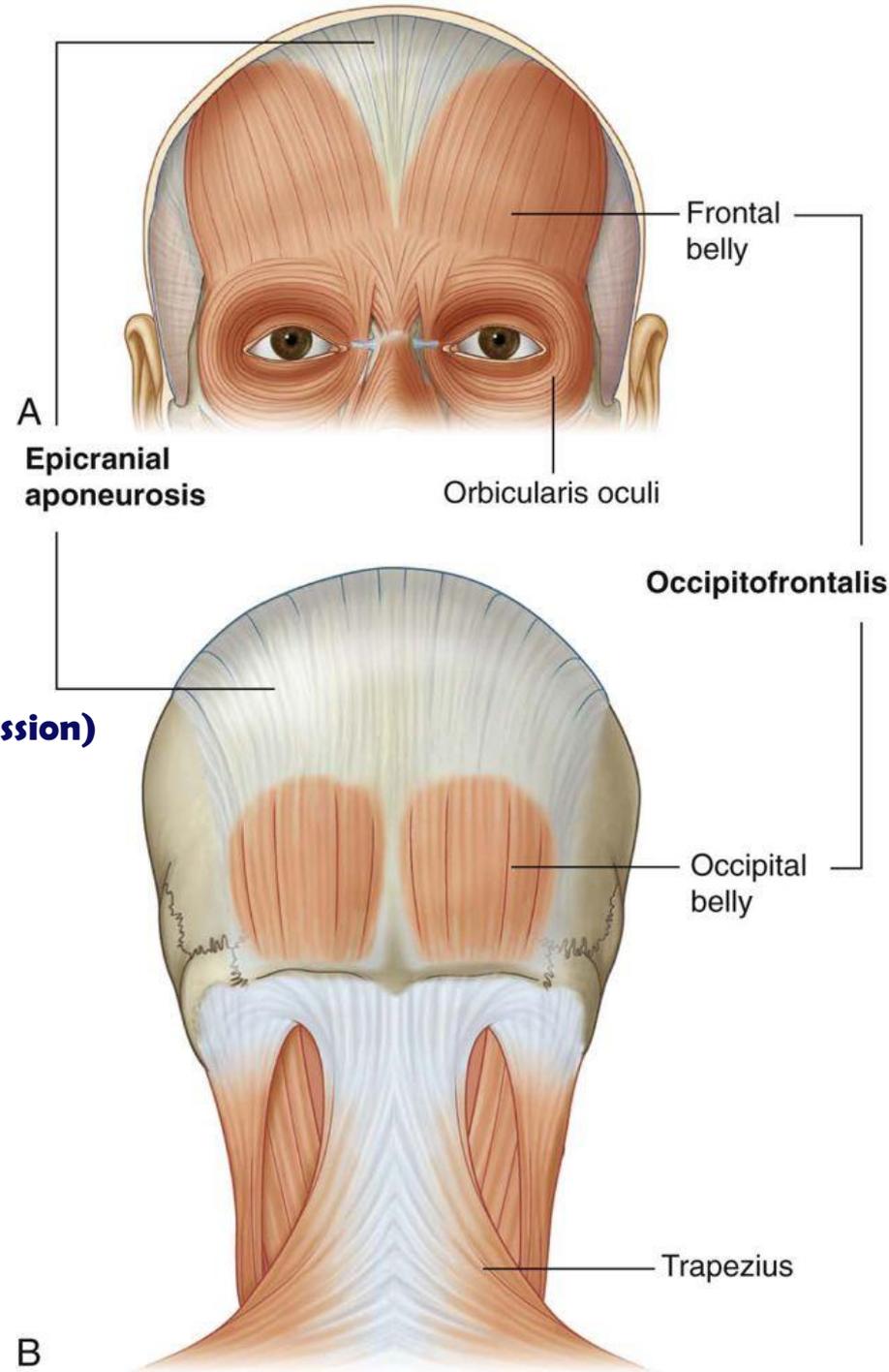
Nerve supply:

Facial nerve (**supplied all the muscles of facial expression**)
(temporal and posterior auricular
branches)

Action:

Moves scalp on skull

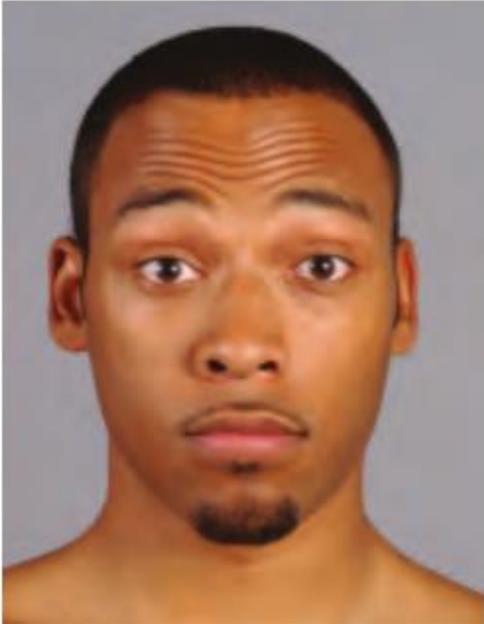
The frontal bellies of the occipitofrontalis
raises the eyebrows in expressions of
surprise or horror (wrinkling of forehead).



Frontalis muscle & Galea aponeurotica

-Contraction of muscles attached to the skin moves the skin producing facial expressions

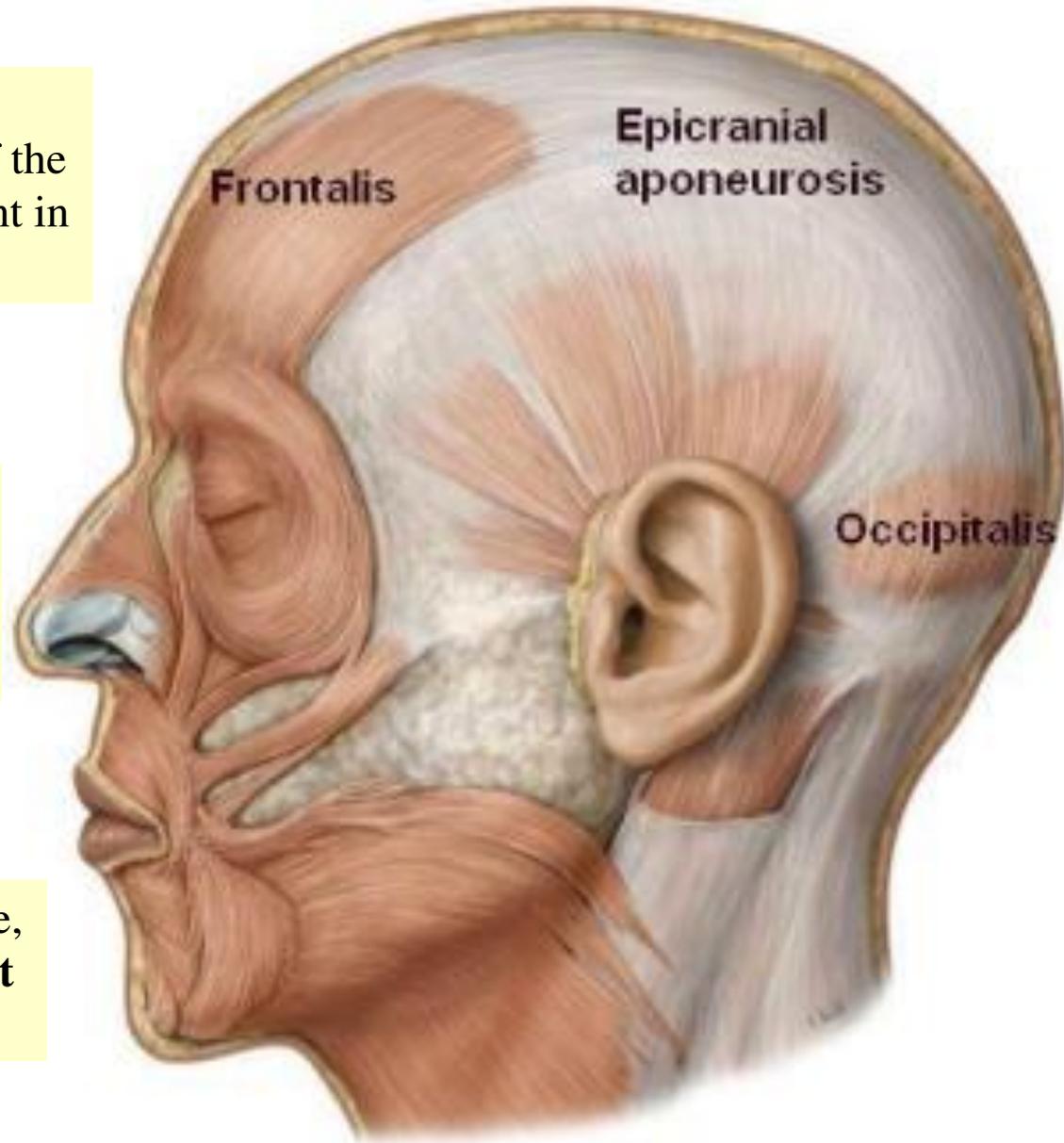
Contraction of this muscle produces transverse wrinkles



The tension of the epicranial aponeurosis, produced by the tone of the occipitofrontalis muscles, is important in all deep wounds of the scalp.

The aponeurosis connects the frontalis and occipitalis muscles. If it is cut coronally, contraction of the muscle usually gapes the wound

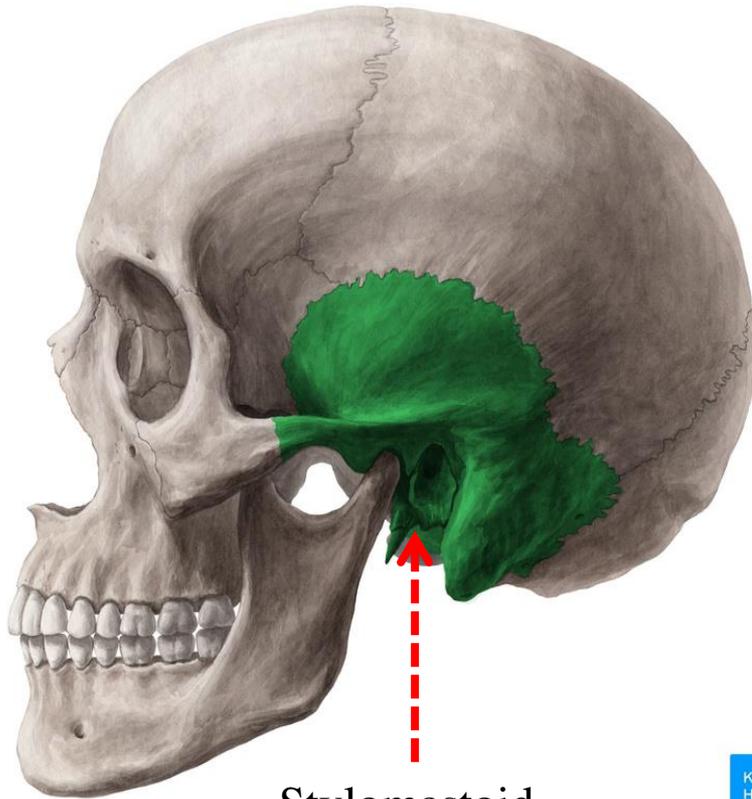
For satisfactory healing to take place, the opening in the aponeurosis **must be closed with sutures**



The stylomastoid foramen

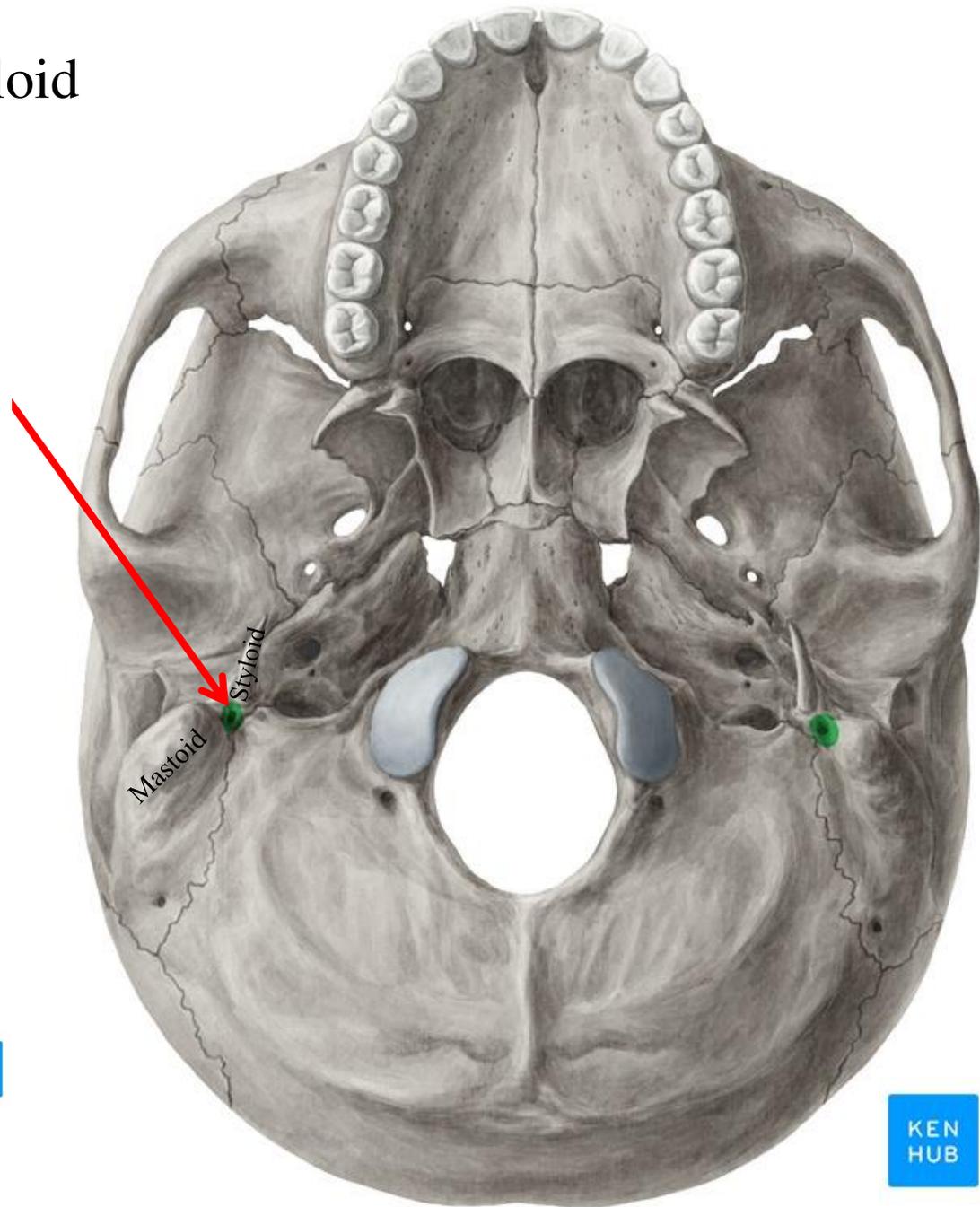
In the interval between the styloid and mastoid processes

-The facial nerve emerges from the cranial cavity from the stylomastoid foramen



Stylomastoid foramen

© www.kenhub.com



KEN HUB

© www.kenhub.com

Facial Nerve

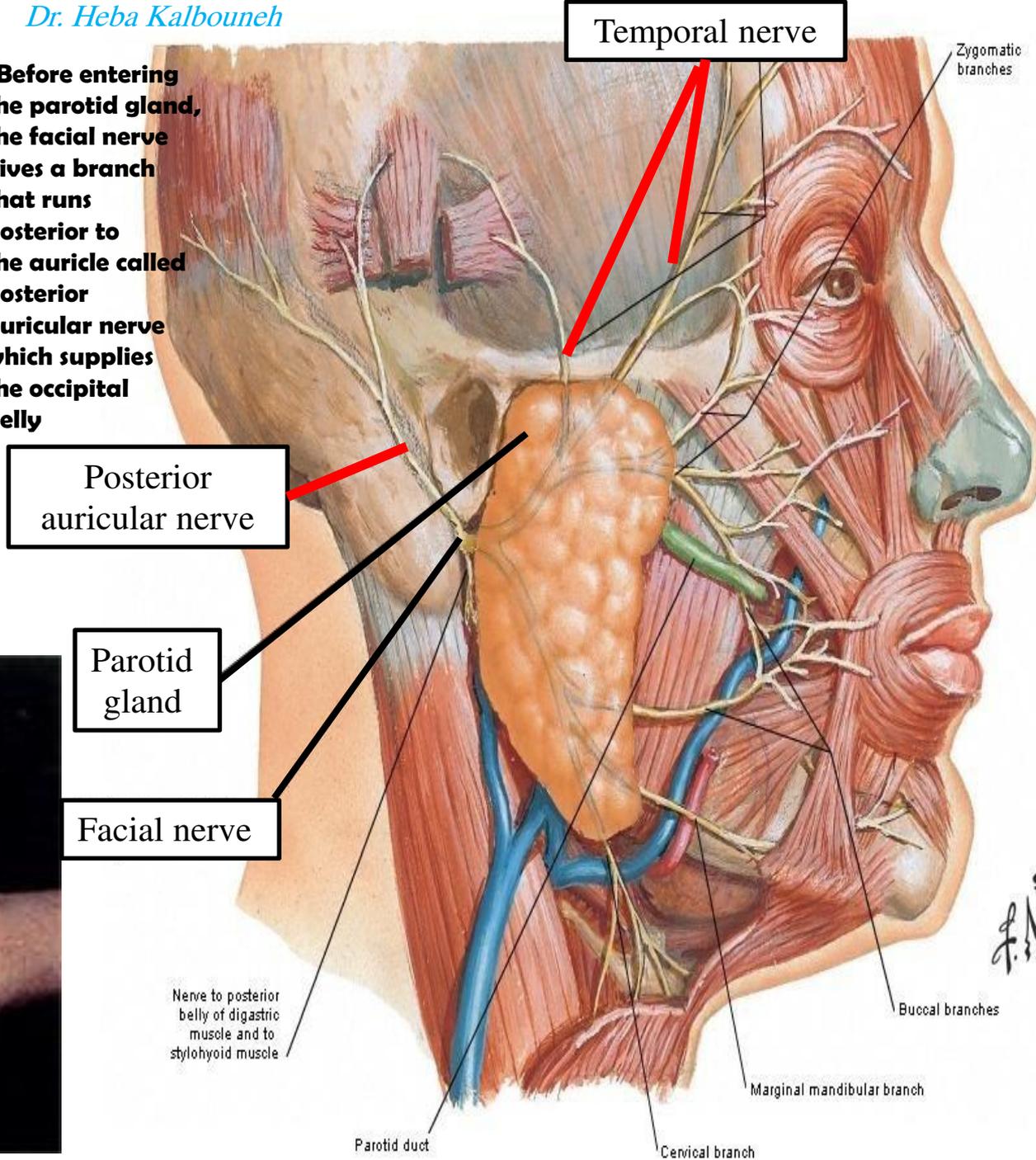
As the facial nerve runs forward within the substance of the parotid salivary gland it divides into its five terminal branches:

- 1- The temporal *(supplied the frontal belly)*
- 2- The zygomatic
- 3- The buccal
- 4- The mandibular
- 5- The cervical

MOTOR

Dr. Heba Kalbouneh

-Before entering the parotid gland, the facial nerve gives a branch that runs posterior to the auricle called posterior auricular nerve which supplies the occipital belly



4- Loose areolar tissue

(Spaced filled with loose connective tissue)

The subaponeurotic space is the potential space beneath the epicranial aponeurosis and is filled with loose areolar tissue

-Since the 4th layer of the scalp is a space, infection in this layer is diffused not localized

-Bleeding in the 4th layer of the scalp will diffuse in the space, but this diffusion is limited posteriorly (occipital belly is attached to the superior nuchal lines) and laterally (aponeurosis is attached to the superior temporal line) but not anteriorly (no bony attachment, so the blood passes and fills the upper and lower eyelids)

Remember the attachment of Epicranial aponeurosis layer!!!
Frontalis muscle has no anterior bony attachment



Blood accumulates in this layer spreads over the entire extent of the aponeurosis reaching the eyelid and presents as a **black eye**



Blow on the skull

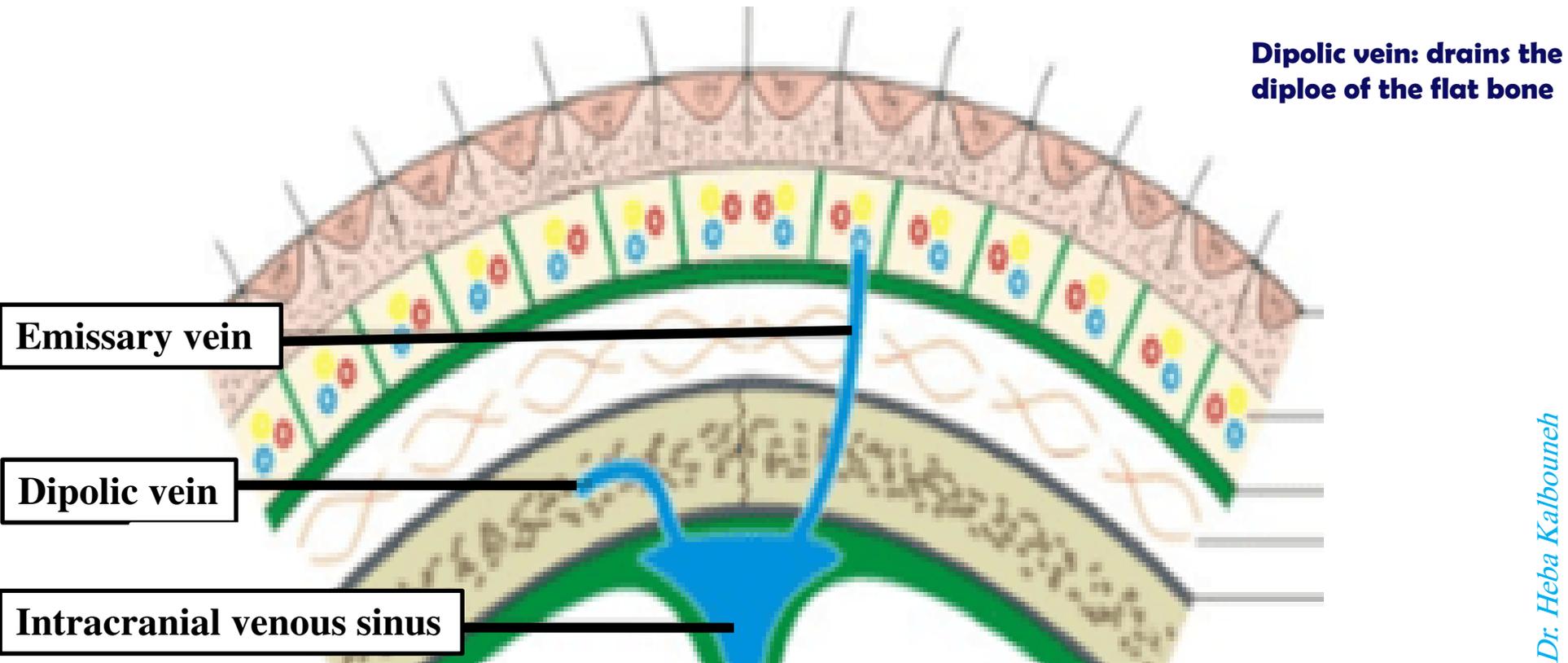
Hemorrhage in the 4th layer of the scalp may cause raccoon eye

The subaponeurotic space contains **emissary veins**

This layer is called the **dangerous area of the scalp**

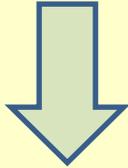
Infections in the subaponeurotic space can spread to intracranial venous sinuses through emissary veins (valveless)

Infection spreads by the emissary veins (valveless) to the skull bones, causing osteomyelitis **of the flat bone through the dipolic vein.**



5-Pericranium

- Is the periosteum covering the outer surface of the skull bones.
- Removable, except in the area of sutures
- The periosteum on the outer surface of the bones becomes continuous with the periosteum on the inner surface of the skull bones at the sutures.



THEREFORE if there is any fluid collection beneath the pericranium (Cephalhaematoma/ subperiosteal hematoma) it will take the shape of the related bone



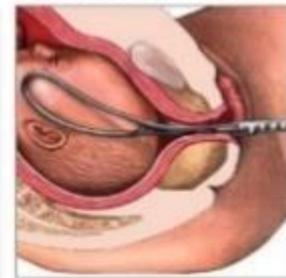
-Happens to the newborn because of the use of certain tools during delivery, which may cause bleeding of one of the periosteal vessels

-within 3 months the blood will be completely absorbed



Vacuum-assisted birth

Forceps-assisted birth



Past papers

Q1: Which of the following structures pass through jugular foramen?

- a. Vagus nerve
- b. Hypoglossal nerve
- c. Internal jugular artery
- d. All of the above

ANSWER: A

Q2: Which of the following is false about scalp?

- a. Injuries in the 2nd layer cause profuse bleeding
- b. 2nd layer is called the dangerous layer of the scalp
- c. Skin, subcutaneous tissue and aponeurosis move as a single layer
- d. Gaps form when there's a cut in aponeurosis

ANSWER: B

Q3: Vestibulocochlear nerve leaves cranial cavity through:

- a. Carotid canal
- b. Internal acoustic meatus
- c. Superior orbital fissure
- d. Jugular foramen

ANSWER: B

Q4: Which of the following is not a branch of the facial nerve?

- a. The temporal branch
- b. The cervical branch
- c. The mandibular branch
- d. The maxillary branch

ANSWER: D

Q5: To enter the cranial cavity, olfactory nerves pass through part of which bone?

- a. Ethmoid bone
- b. Sphenoid bone
- c. Parietal bone
- d. Temporal bone

ANSWER: A

Q6: Superior orbital fissure is found between:

- a. Body of the sphenoid and the lesser wing
- b. The lesser and greater wings of sphenoid
- c. Petrous part of the temporal bone and occipital bone
- d. Anterior and posterior clinoid processes

ANSWER: B

Q7: 'Raccoon eyes' are characteristic for haemorrhage in which layer of the scalp?

- a. 1st layer
- b. 2nd layer
- c. 3rd layer
- d. 4th layer

ANSWER: D

Q8: Which of the following structures is not found in the mandible?

- a. Mental spines
- b. Crista galli
- c. Mylohyoid groove
- d. Lingula

ANSWER: B

Q9: The nerve that supplies the skin over the back of the skull is a branch of:

- a. Posterior ramus of the 2nd cervical nerve
- b. Cervical plexus
- c. Mandibular nerve
- d. Facial nerve

ANSWER: A

Q10: The parietal bone articulates with the temporal bone at:

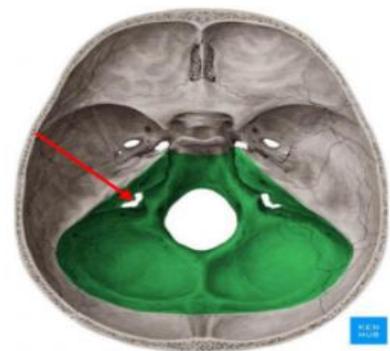
- a. Sagittal suture
- b. Lambdoid suture
- c. Squamous suture
- d. Coronal suture

ANSWER: C

Q11: Which of the following passes through the structure indicated by the red arrow?

- a. Hypoglossal nerve
- b. External jugular vein
- c. Glossopharyngeal nerve
- d. b+c

ANSWER: C



Q12: Which of the following nerves isn't a cranial nerve?

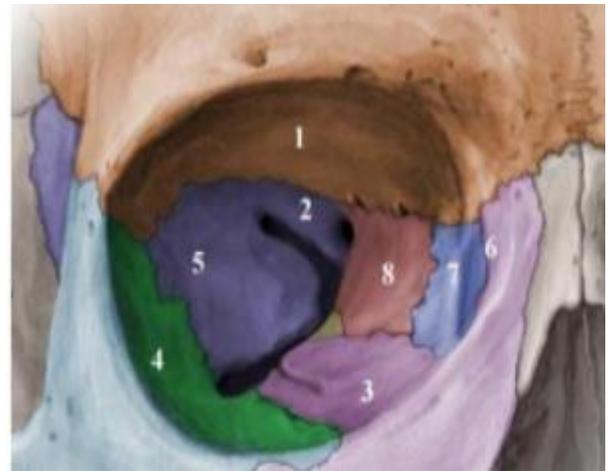
- a. Great auricular nerve
- b. Hypoglossal nerve
- c. Abducent nerve
- d. Trochlear nerve

ANSWER: A

Q13: Which of the following is wrong?

- a. Number 7 is lacrimal bone
- b. Number 6 is frontal process of maxilla
- c. Number 8 is orbital plate of ethmoid
- d. Number 5 is orbital plate of zygomatic

ANSWER: D



Q14: Branches of the following nerve pass through all of the following except:

- a. Foramen lacerum
- b. Superior orbital fissure
- Foramen ovale
- d. Foramen rotundum

ANSWER: A



Q15: A fracture in the cribriform plate of ethmoid can lead to the loss of which of the special senses?

- a. Taste
- b. Vision
- c. Hearing
- d. Olfaction

ANSWER: D

Q16: Which of the following is true regarding scalp?

- a. If the cut is superficial to the aponeurosis it will not gape
- b. The skin and connective tissue move on the aponeurosis
- c. The subcutaneous tissue is the most dangerous area of the scalp
- d. It is easy to stop the bleeding of a scalp wound

ANSWER: A