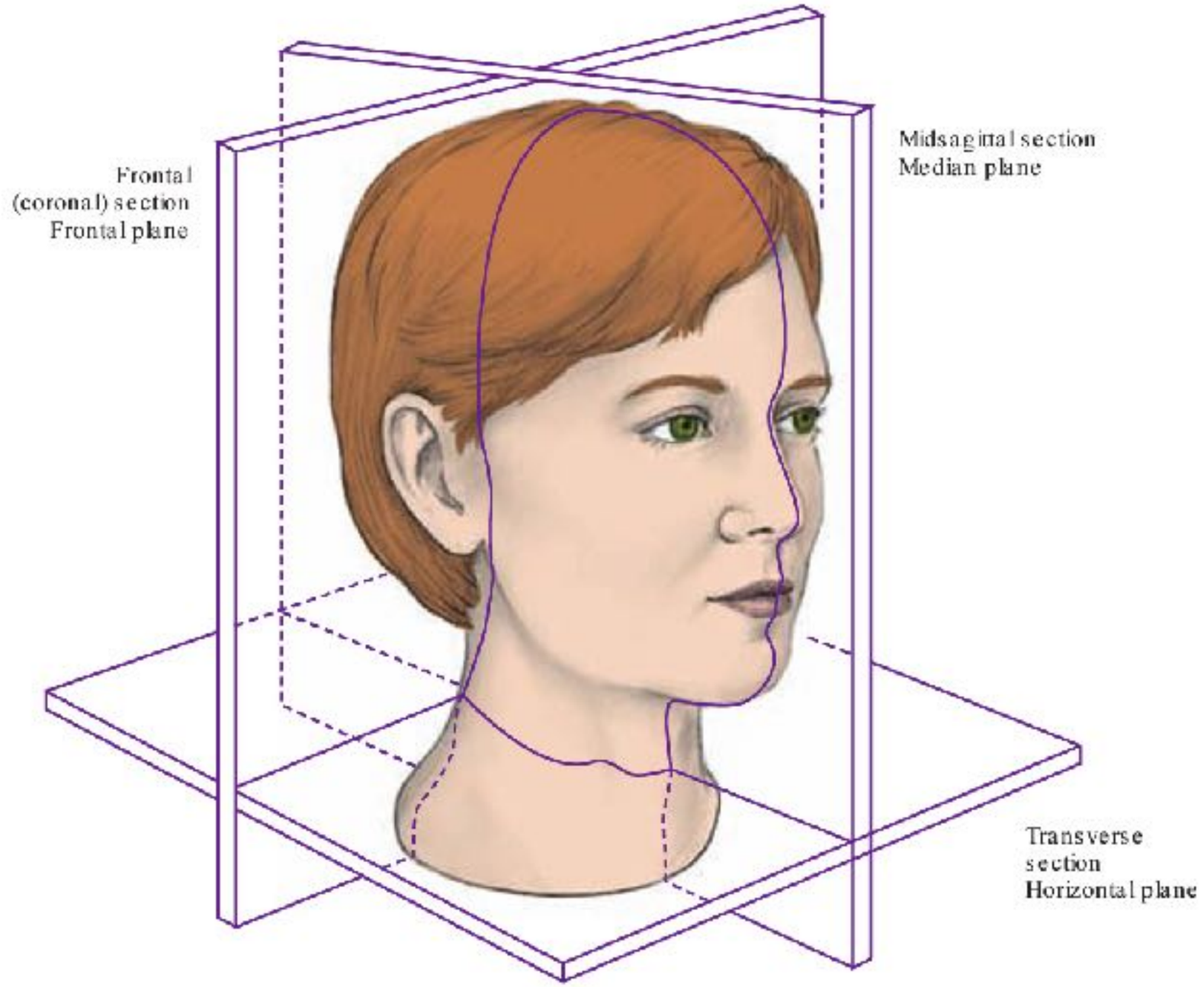
Head & Neck Anatomy

Anatomy of the Scalp

م.د. أحمد تركي هاني
MBChB. MSc. PhD.

Overview



Head and neck in anatomic position with the midsagittal, transverse, and frontal sections and related planes noted.

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The head and neck **region** of the body contains many important structures compressed into a relatively small area.

The **skull**, with the enclosed brain and meninges, forms most of the head.

The **special senses** (the eye, ear, olfactory area, taste receptors) lie within the skull bones or in the cavities bounded by them.

The brain gives rise to 12 pairs of **cranial nerves**, which leave the brain and pass through foramina and fissures in the skull.

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Clinical importance for the dentists

This will help **determine** whether any abnormalities or lesions exist and possibly indicate their cause and amount of involvement.

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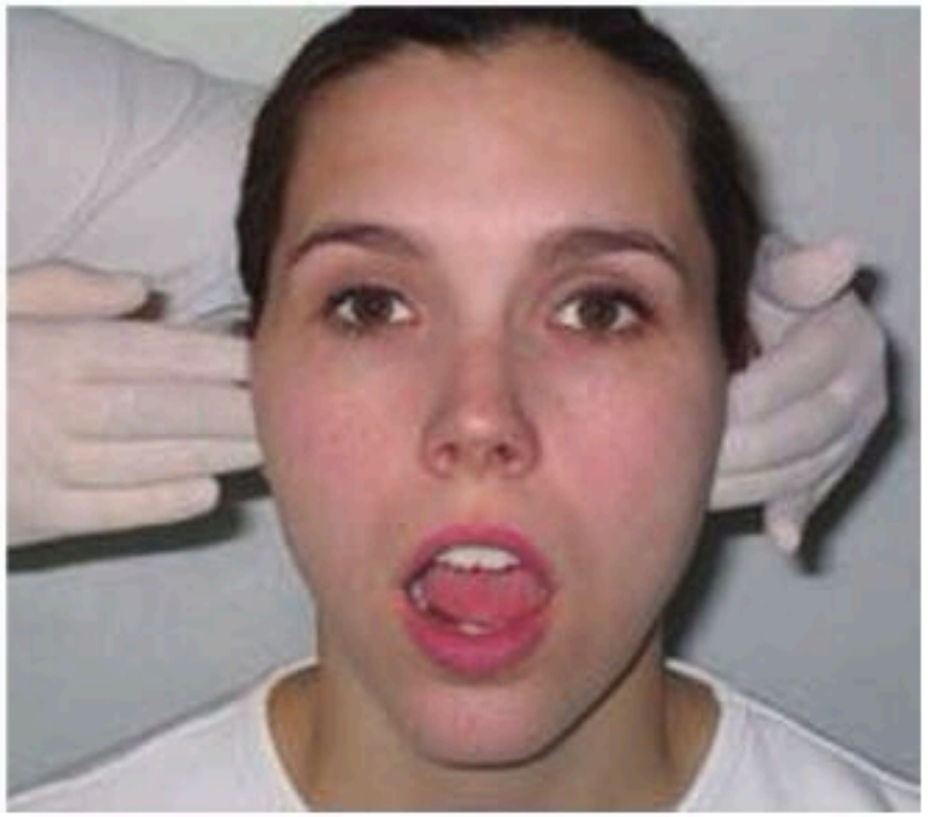
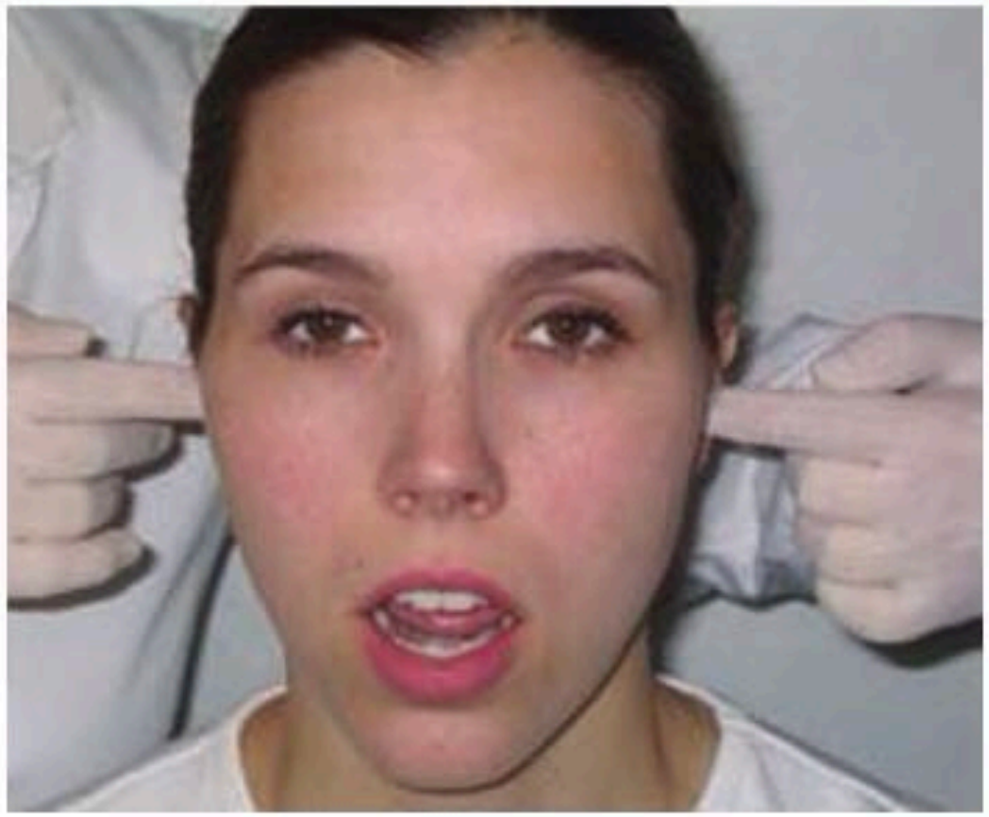
A dental professional must understand the normal anatomy of the **TMJ** to understand the various disorders associated with it.





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This knowledge also allows for correct placement of the syringe and its anesthetic agent, potentially **avoiding** complications.

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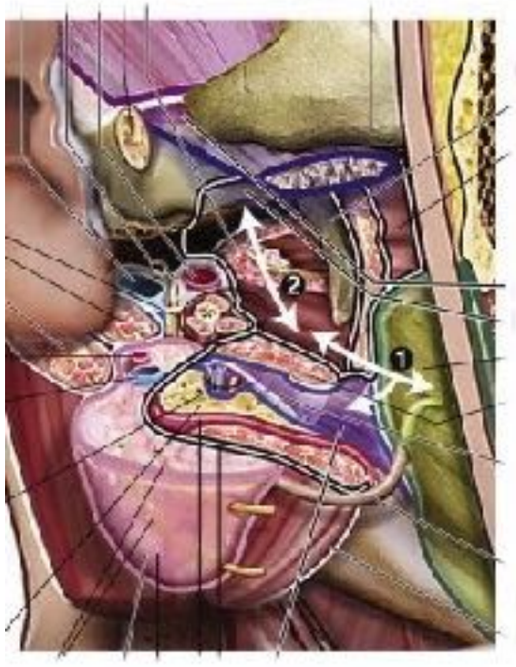
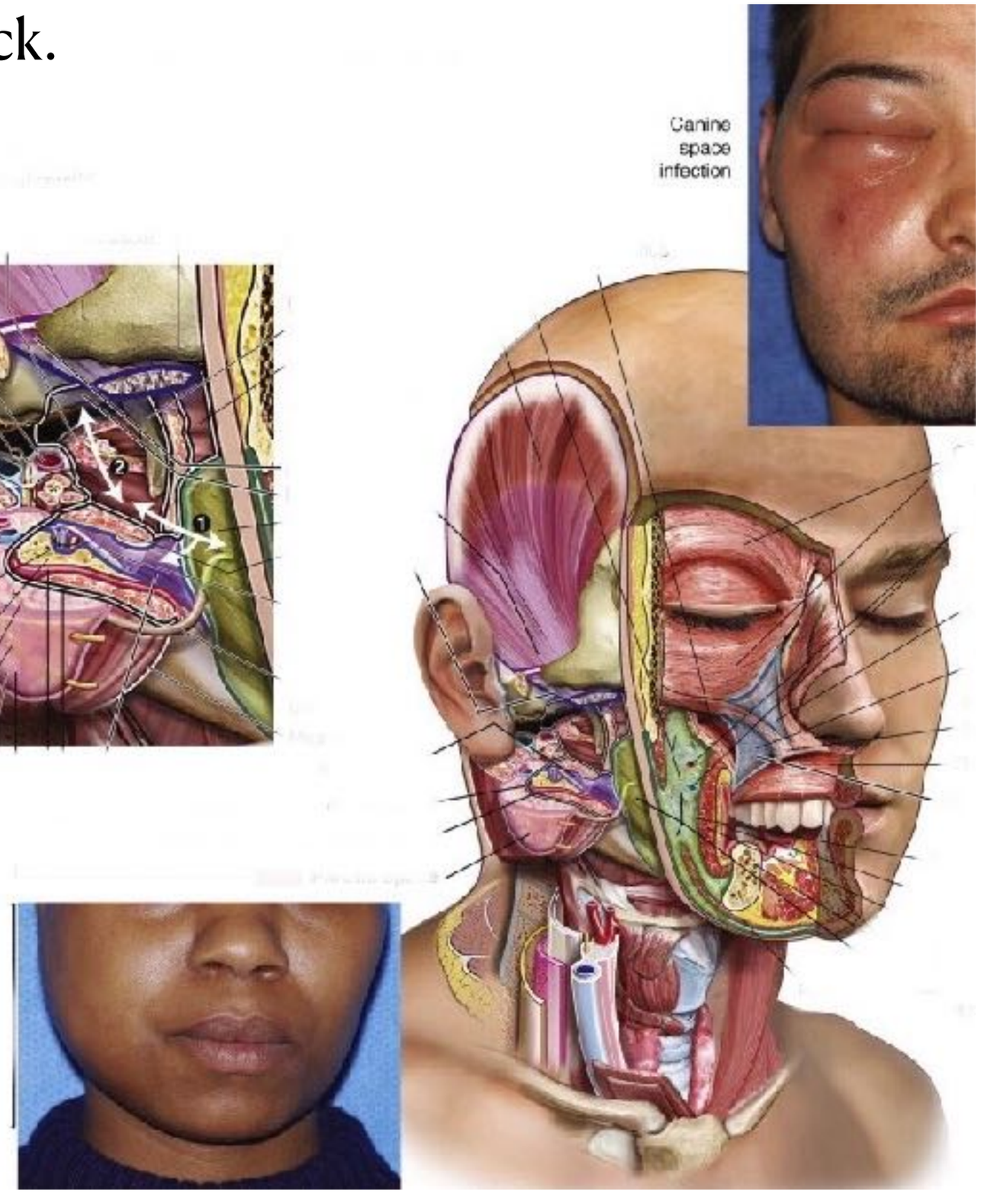
It is important to know the source of the infection as well as the areas to which it could **spread** by way of certain anatomic features of the head and neck.





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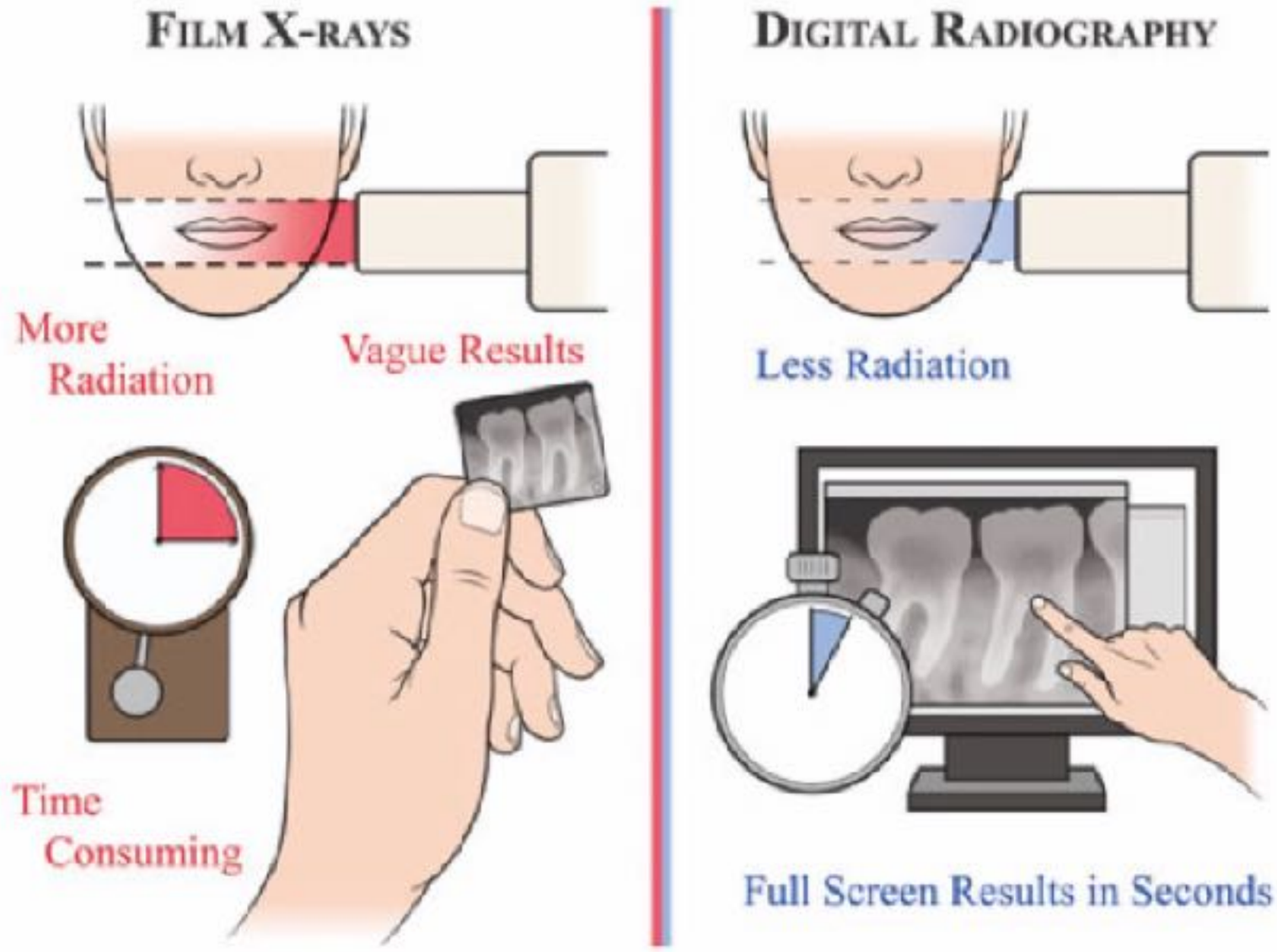
Understanding of anatomy is important in the mounting and analysis of the **radiographic** films.



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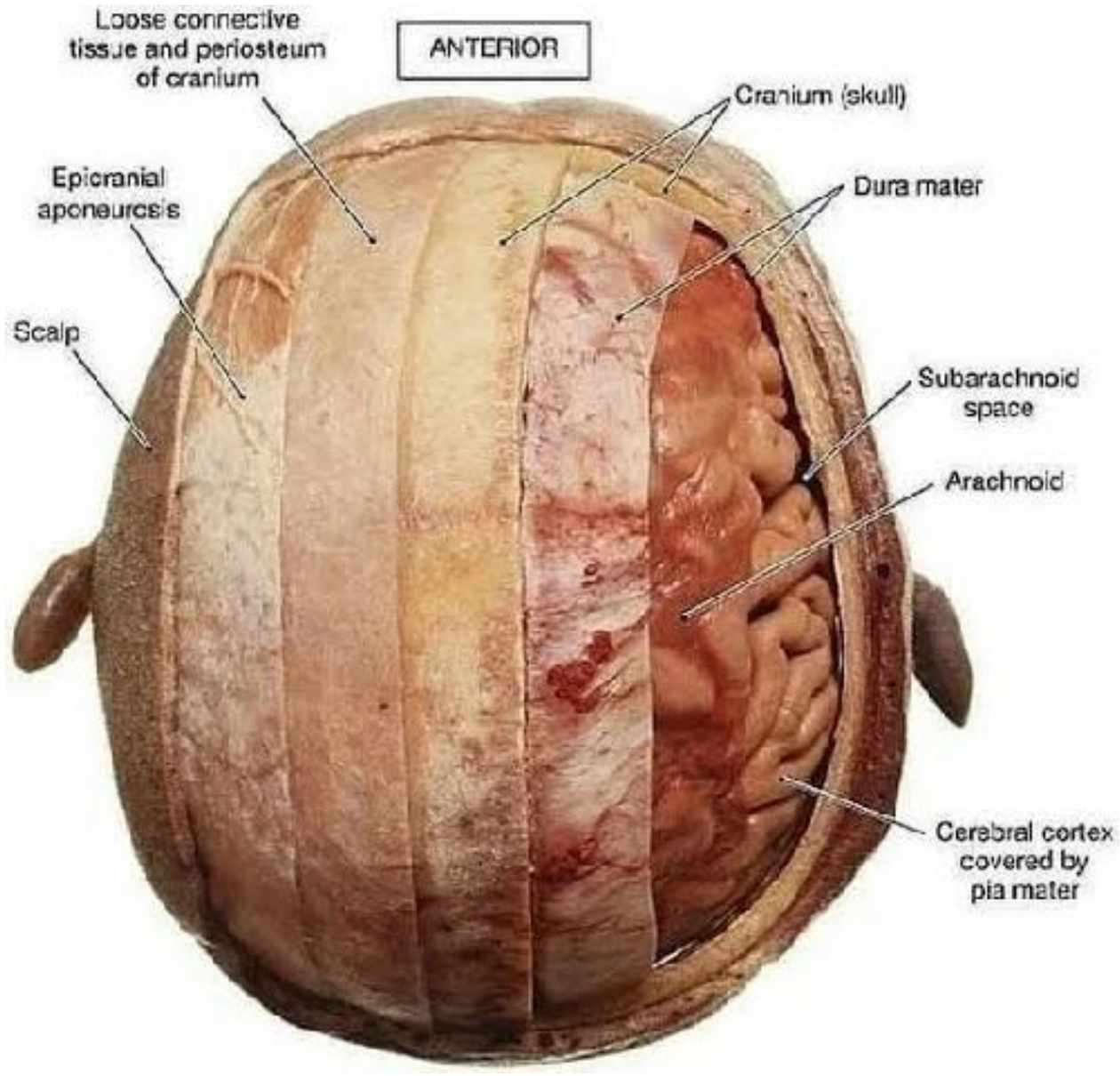
Anatomy of the Scalp

The scalp is a **vital** region with complex layers, muscles, nerves, and blood supply.

Its anatomy is important for both **sensory** functions and the **protection** of the skull and brain.



Understanding the scalp's structures and functions is essential for **diagnosing** and treating various clinical conditions, from infections to traumatic injuries.

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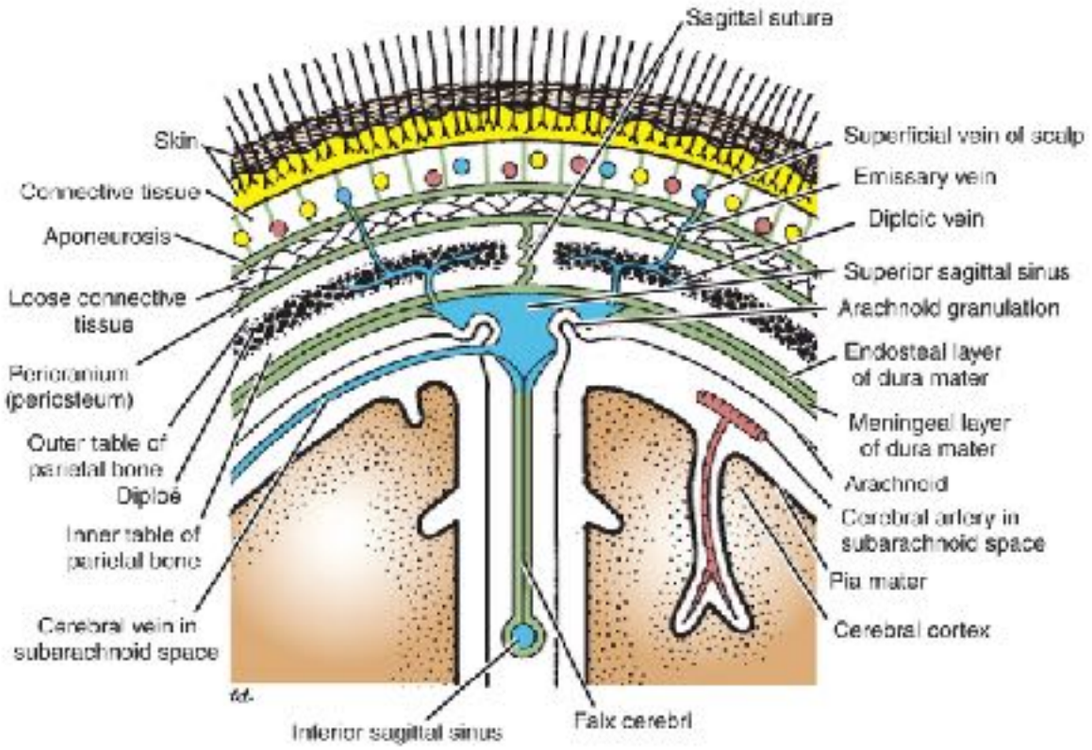
Layers of the scalp

The scalp is divided into five distinct layers, often remembered by the acronym **SCALP**:

- **S**: **Skin
- **C**: **Connective Tissue
- **A**: **Aponeurosis
- **L**: **Loose Connective Tissue
- **P**: **Pericranium



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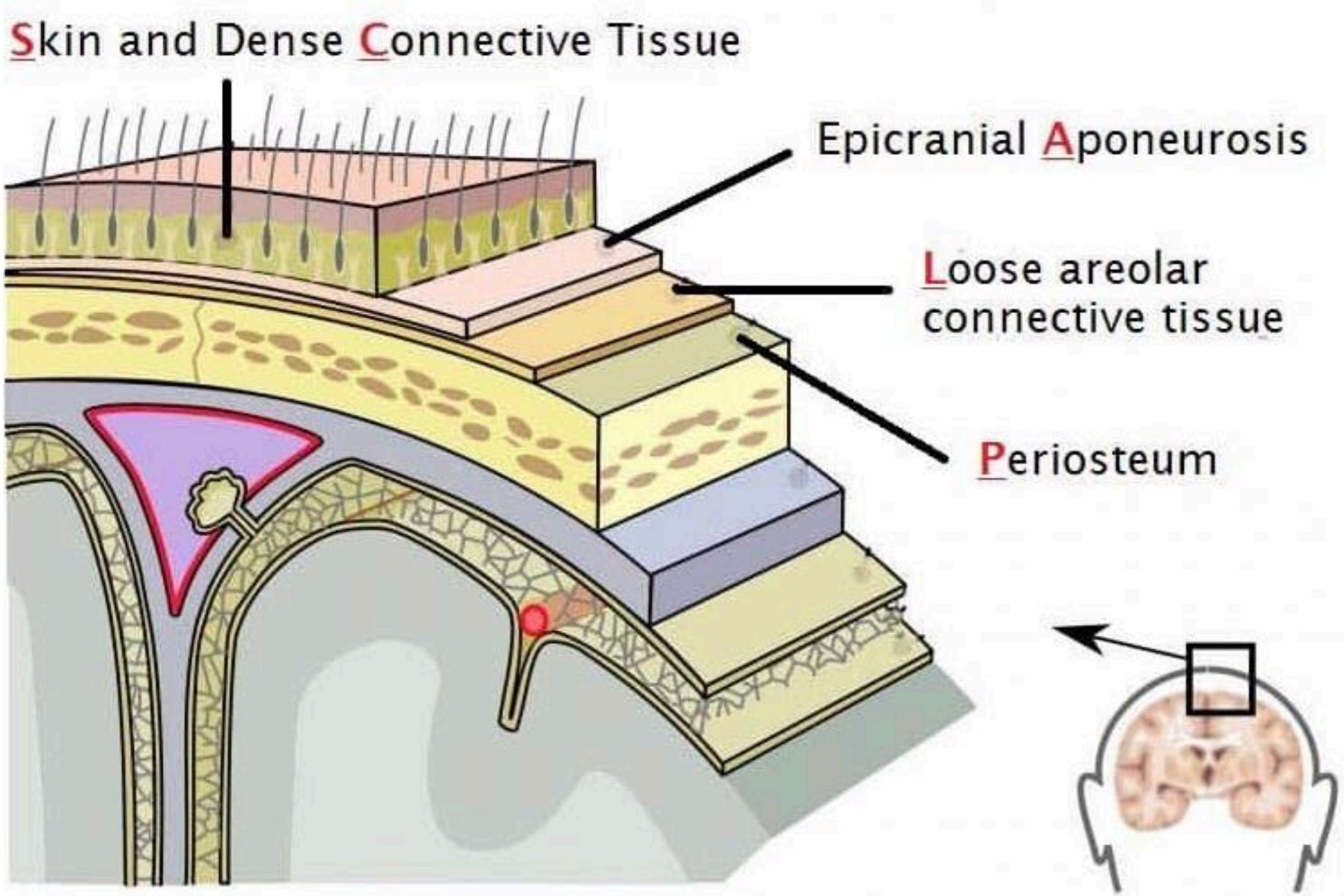

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Skin (S):

- The outermost layer consists of hair follicles, sebaceous glands, sweat glands, and sensory receptors.
- The skin of the scalp is **thicker** than that of other regions of the body, providing protection.

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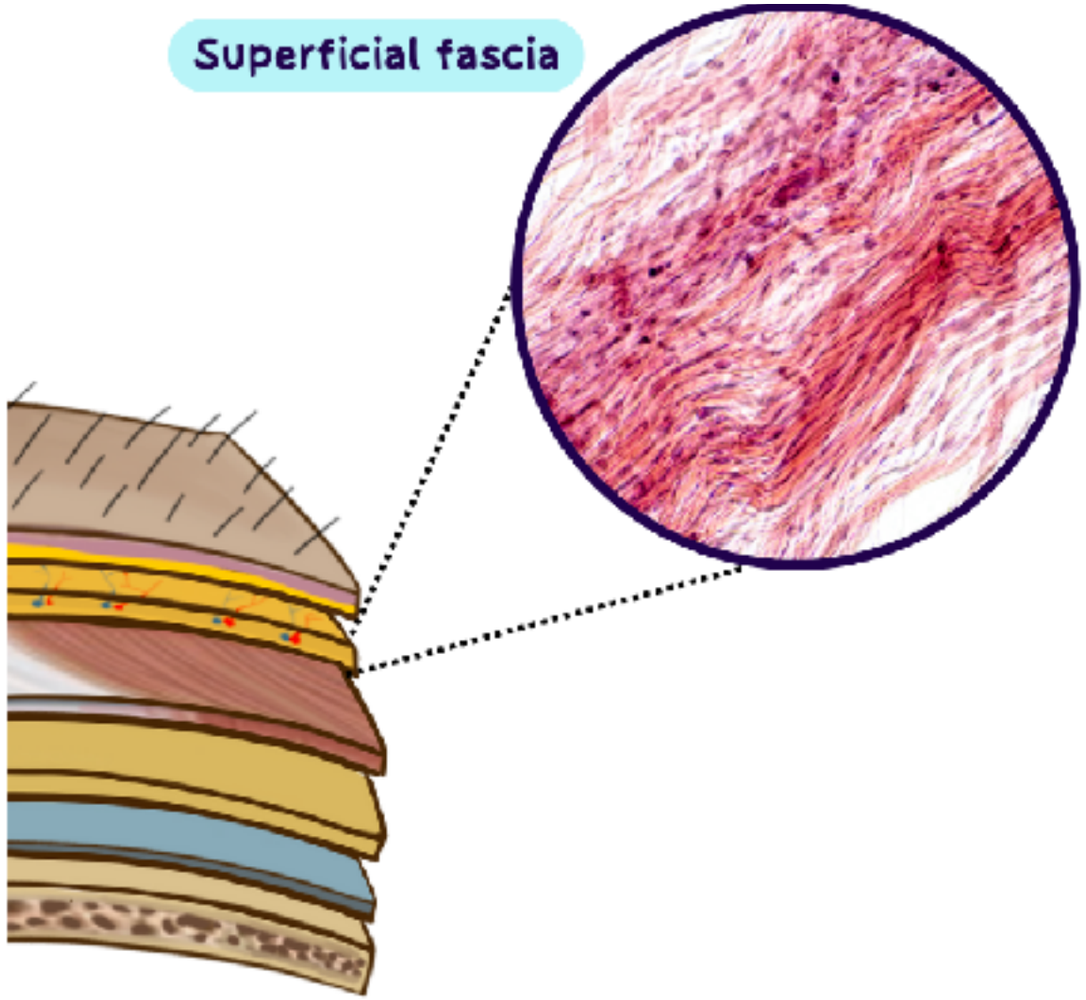
Connective Tissue (C):

- This layer is rich in blood vessels and nerves, providing the scalp with its **vascular and sensory** supply.
- It is also dense and acts like a **cushion**.



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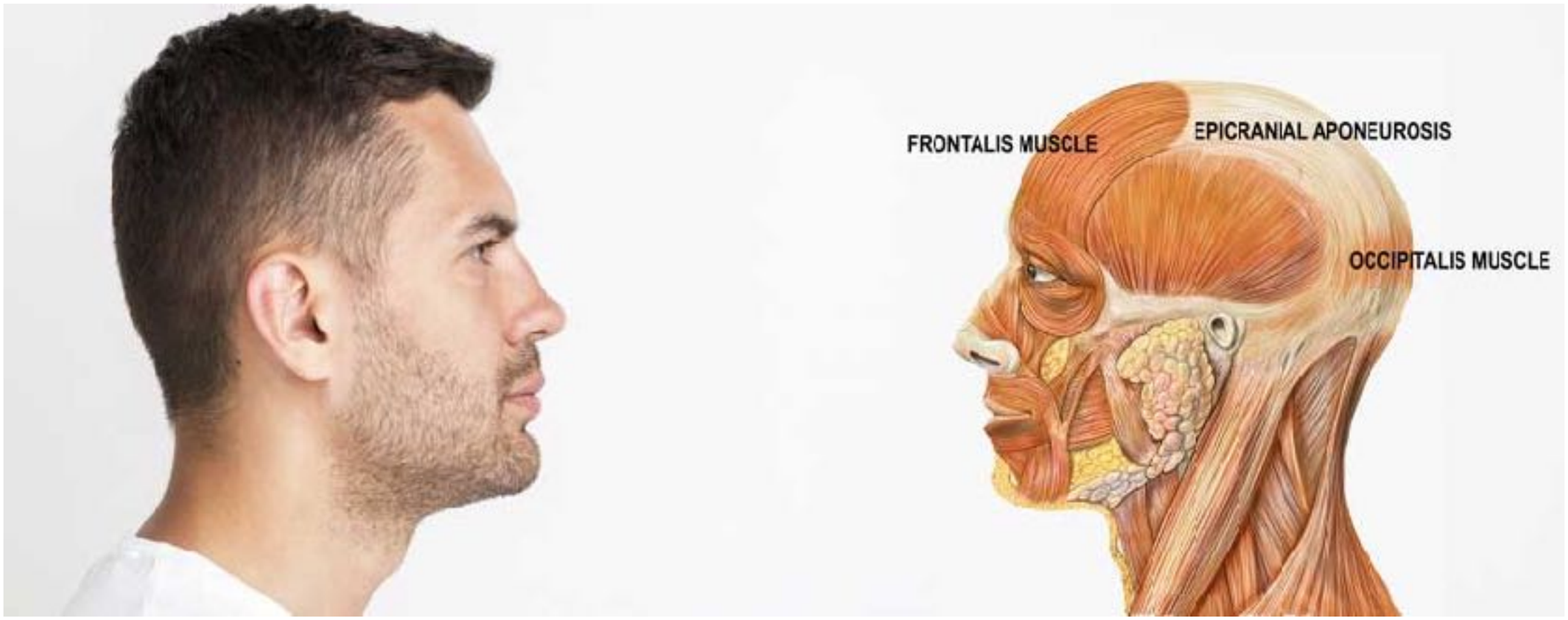
Aponeurosis (A):

- This is a broad, fibrous sheet (galea aponeurotica) that **connects** the frontalis and occipitalis muscles.
- It plays a role in the **movement** of the scalp and helps **support** the hair follicles.



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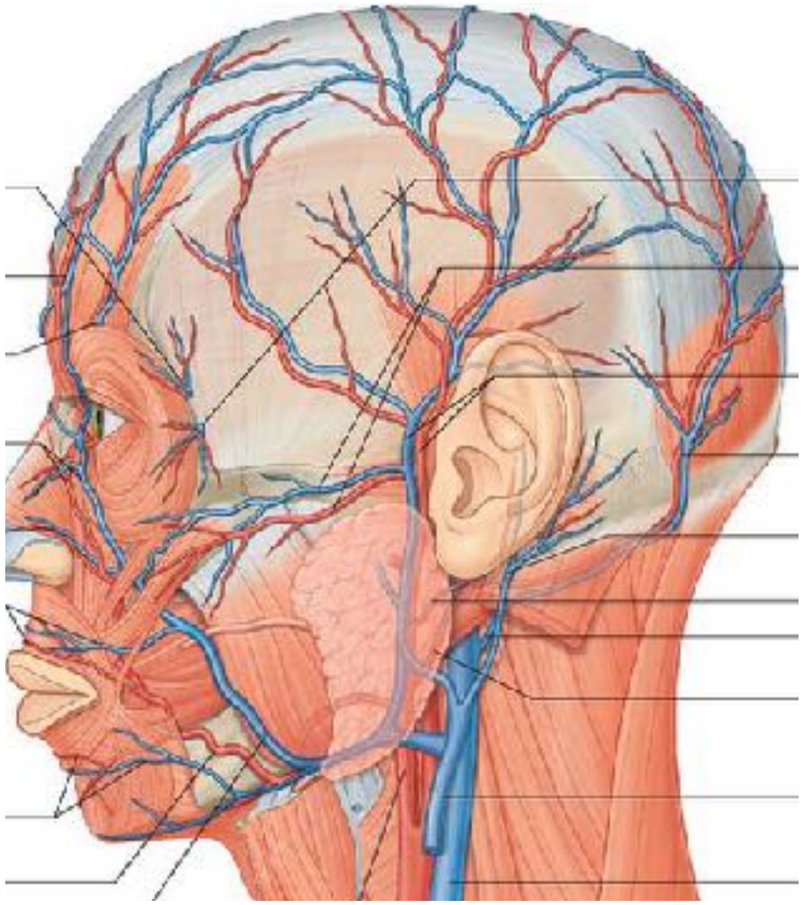
Loose Connective Tissue (L):

- This layer allows the skin and aponeurosis to move **independently** of the underlying structures.
- It contains vessels and nerves but also acts as a **"plane" for mobility**, making it clinically important in the **spread of infections**.



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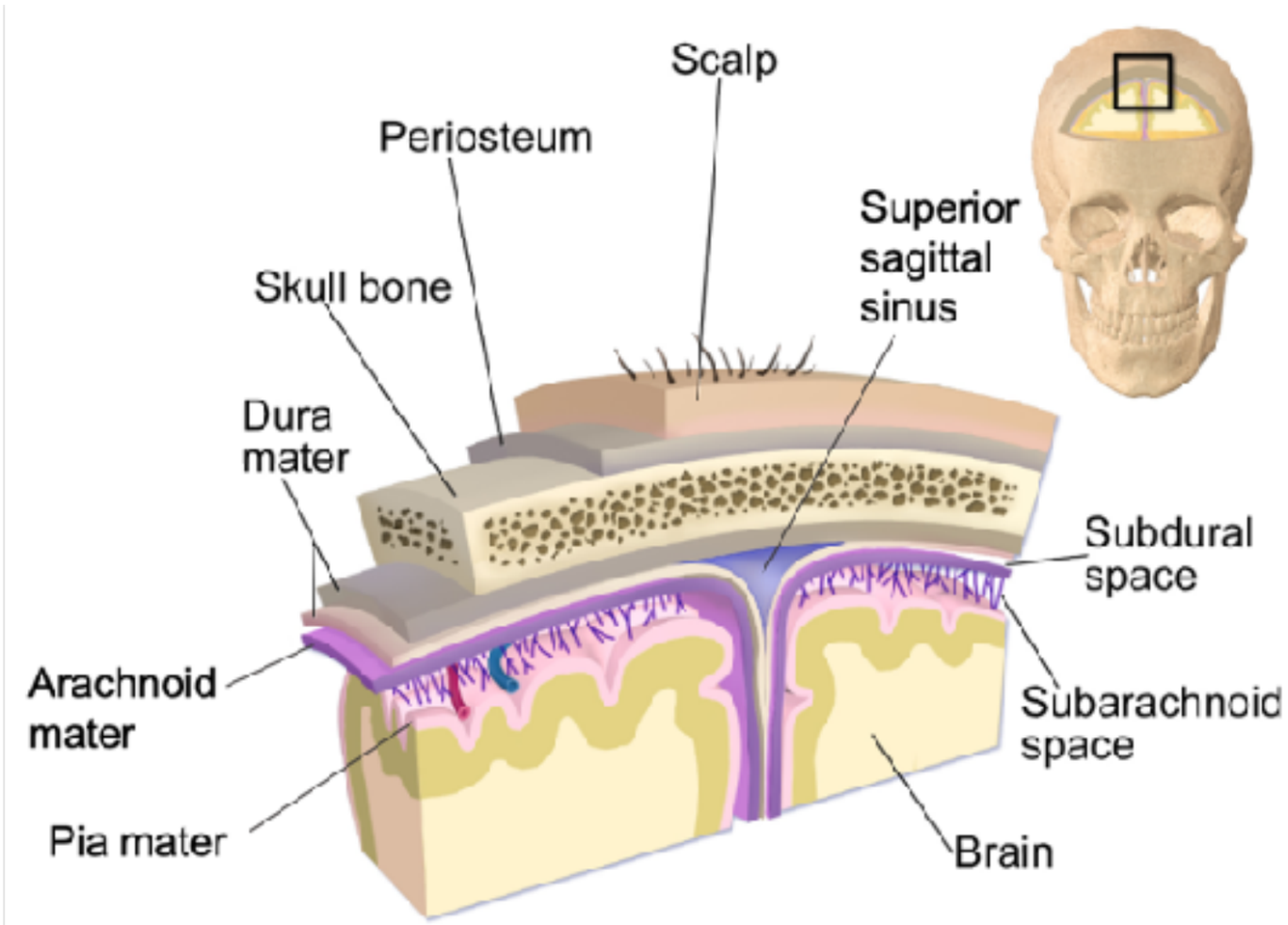
Pericranium (P):

- The deepest layer that **adheres** tightly to the outer surface of the skull bones.
- It is a layer of connective tissue that serves as the **periosteum** (membrane covering bones) of the skull.



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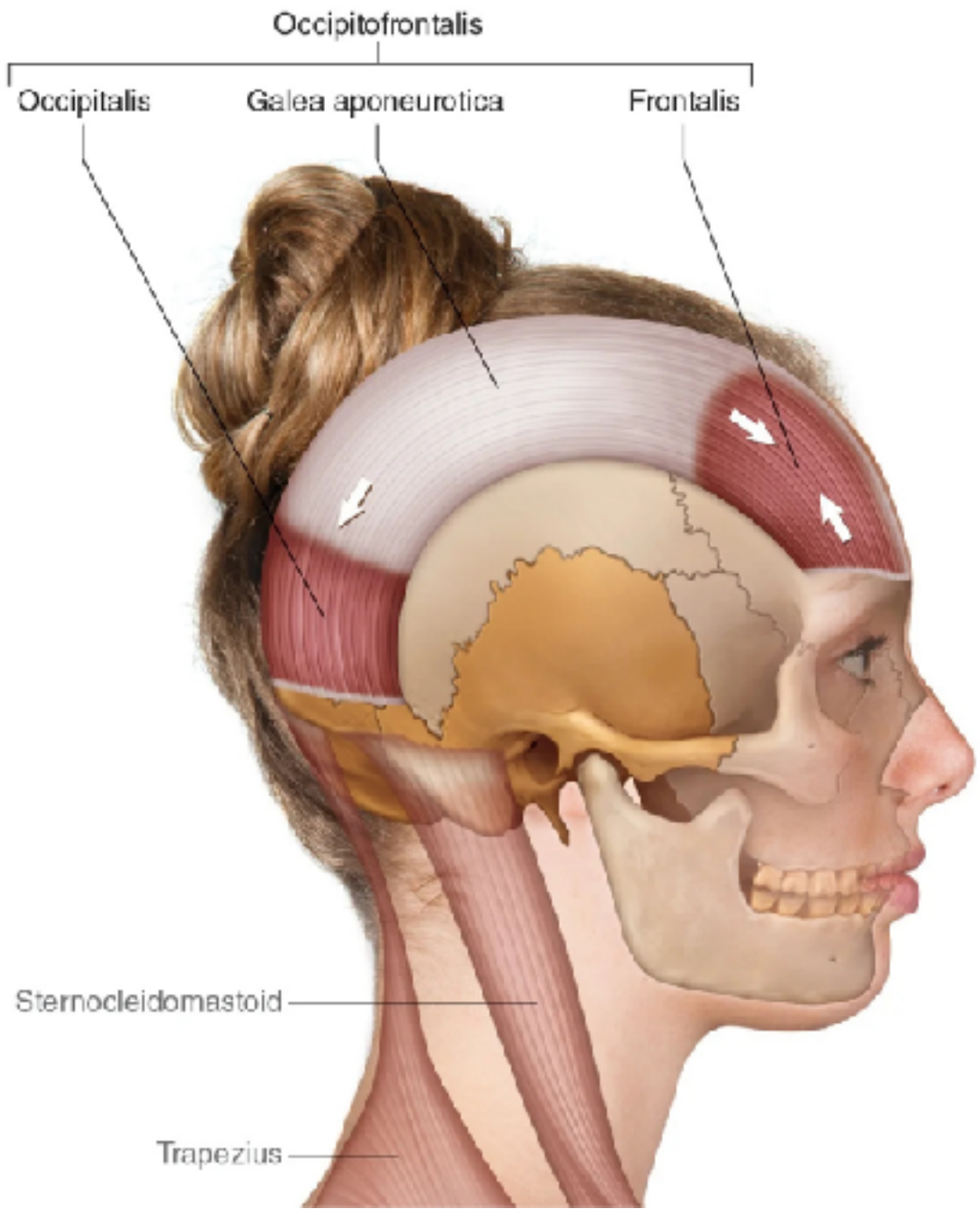
Muscles of the Scalp

The muscles of the scalp are primarily involved in **facial expression** and movement of the scalp.



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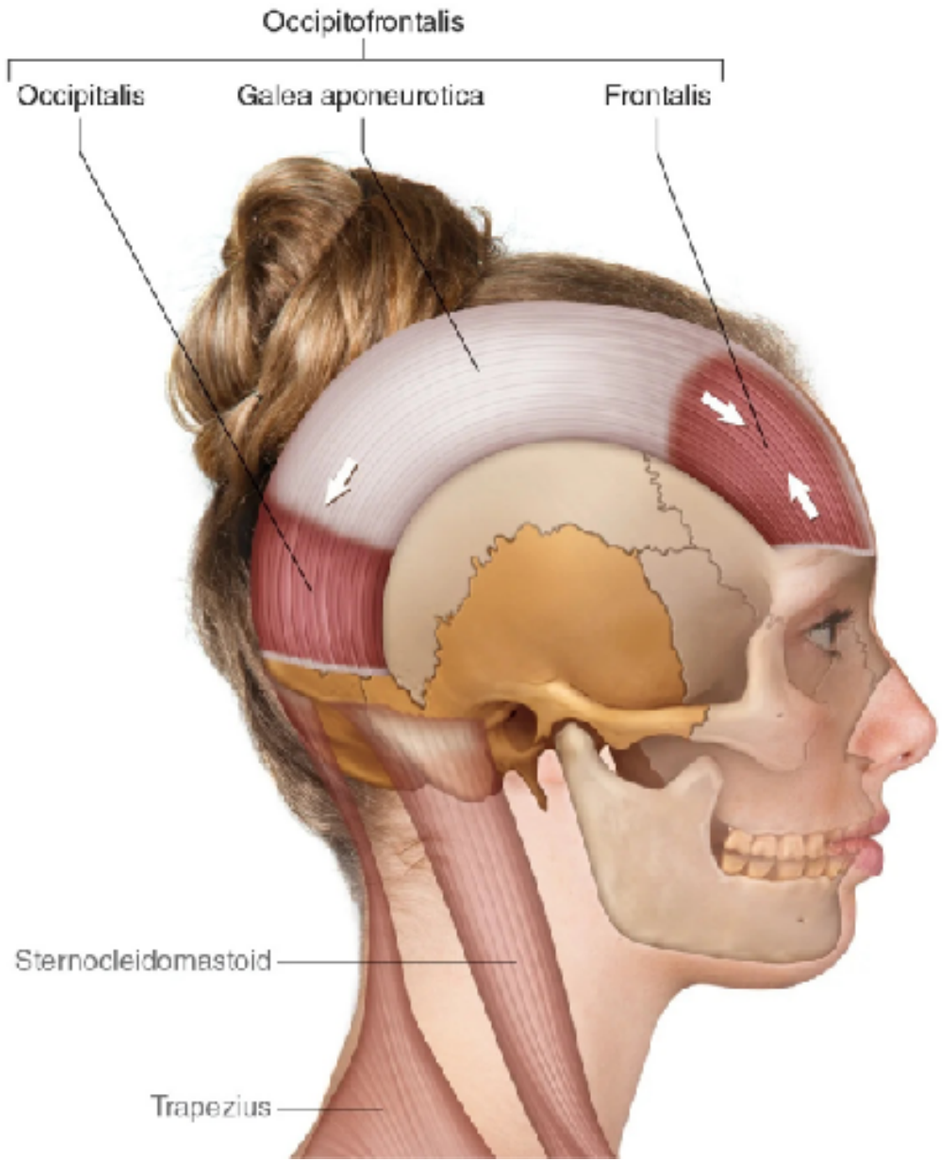
Frontalis (frontal belly of occipitofrontalis):

- Origin: Galea aponeurotica
- Insertion: Skin of the forehead and eyebrows
- Action: Raises the eyebrows and wrinkles the forehead (used in facial expressions of **surprise**).



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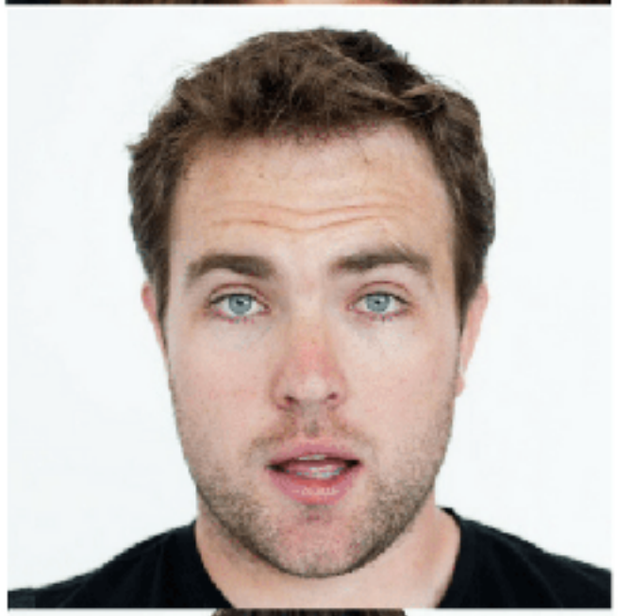

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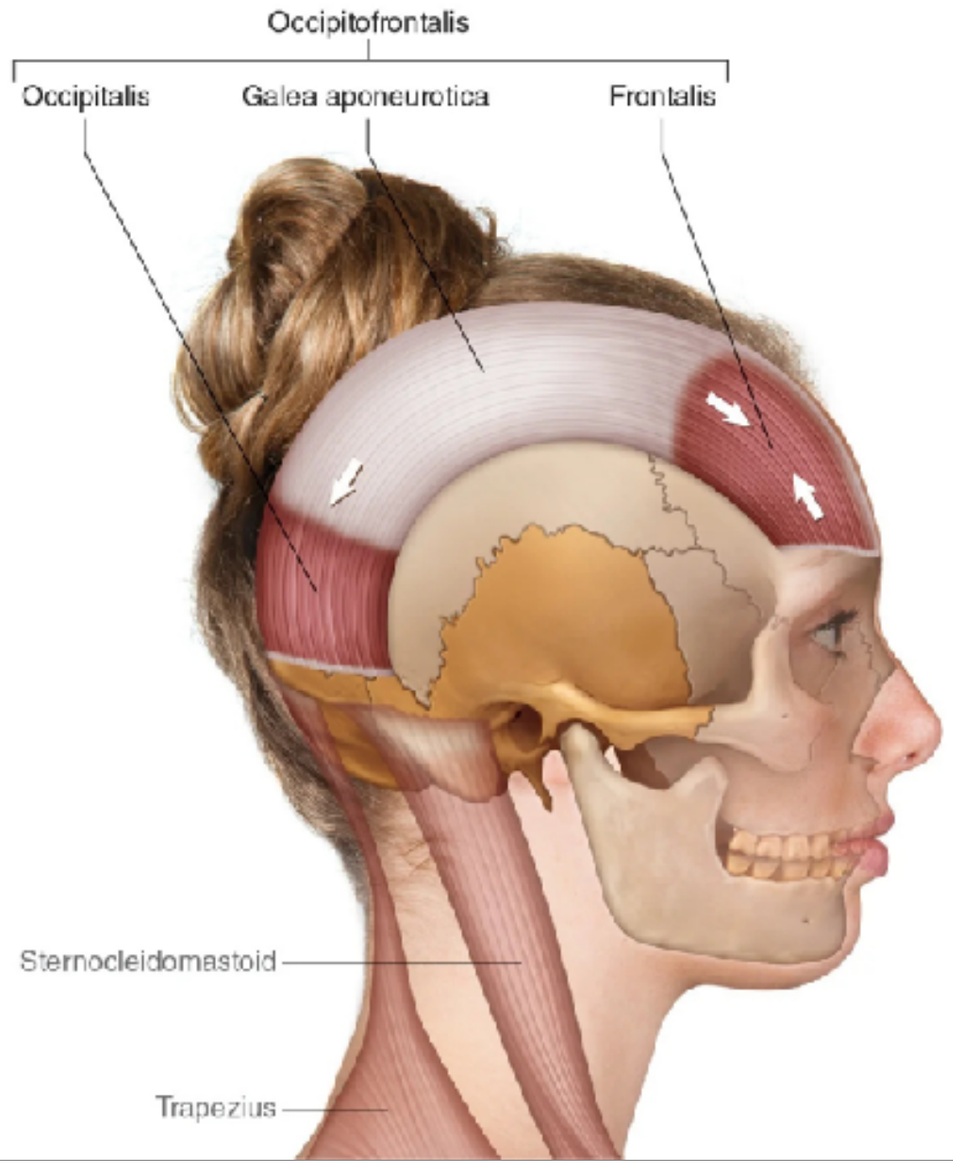
Occipitalis (occipital belly of occipitofrontalis):

- Origin: Occipital bone
- Insertion: Galea aponeurotica
- Action: Pulls the scalp posteriorly (used in facial expressions of **tension**).



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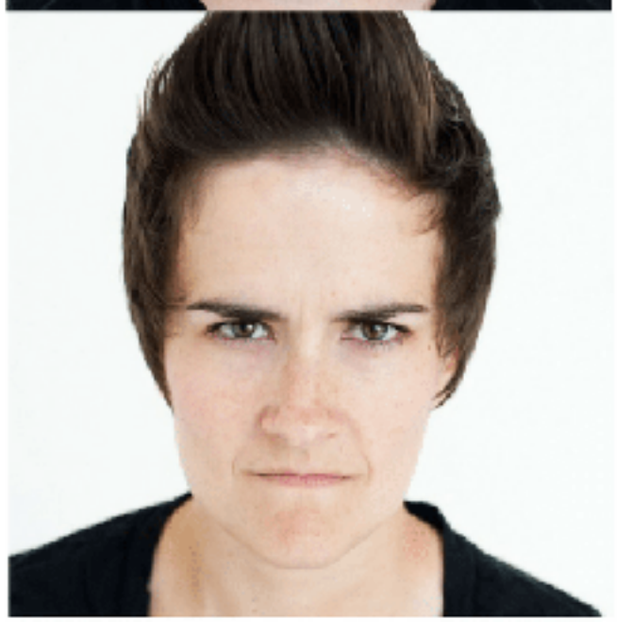

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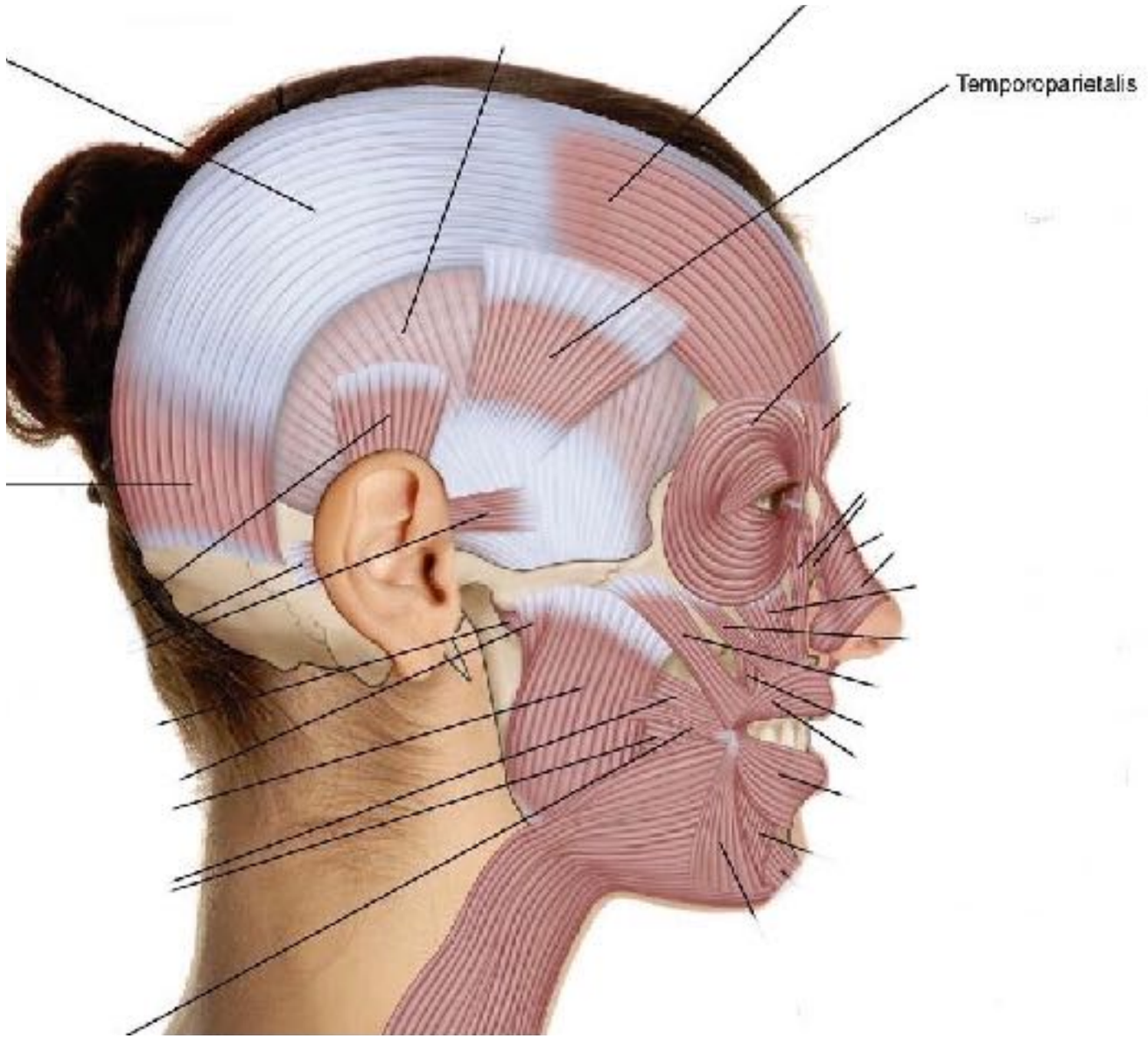
Temporoparietalis:

- Origin: Fascia over the temporal bone
- Insertion: Galea aponeurotica
- Action: Assists in movements of the **ear and scalp**.



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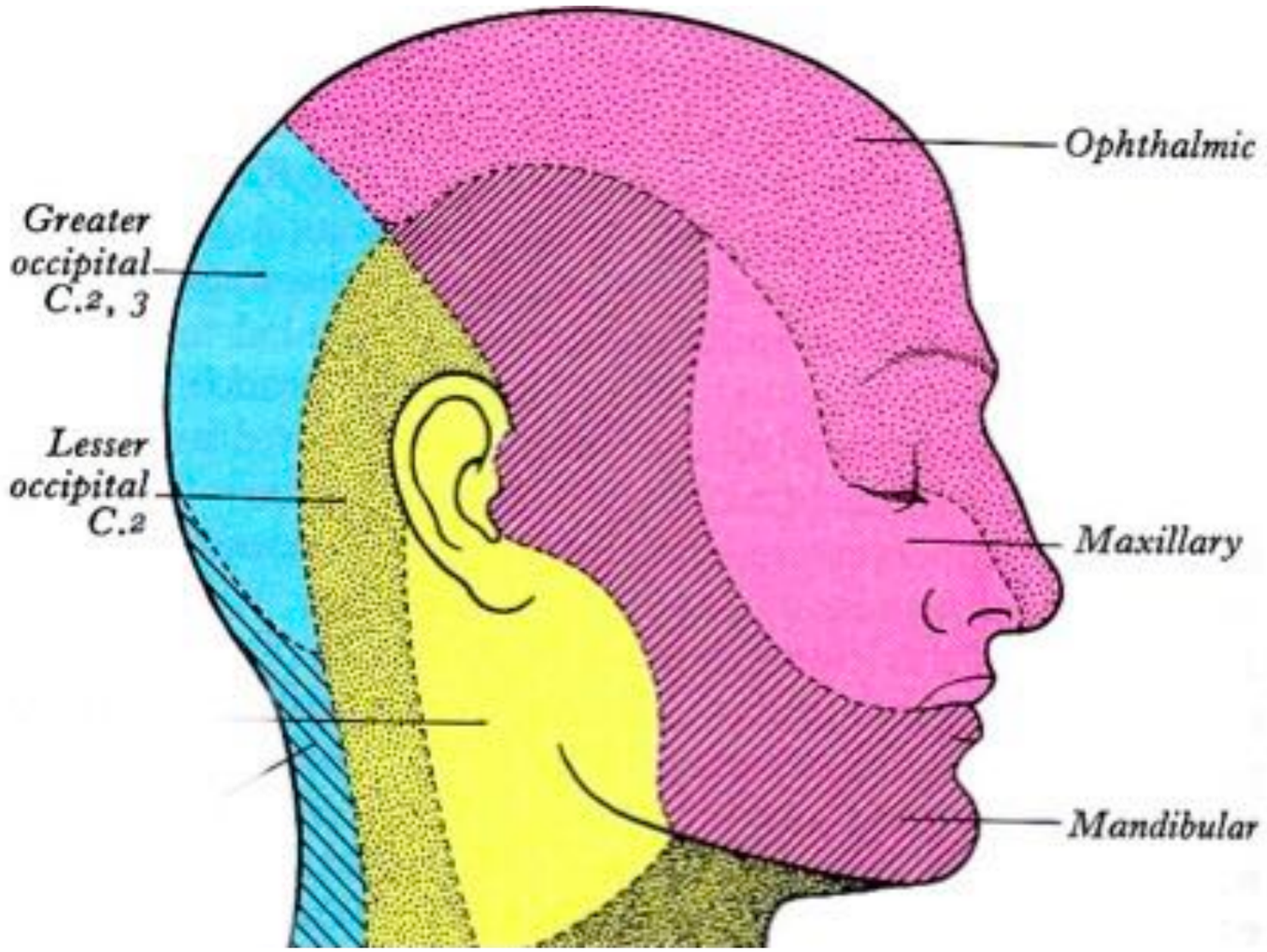
Sensory Nerve Supply of the Scalp

The scalp receives sensory innervation from both **cranial nerves** and **cervical nerves**.

The nerves that supply sensation to the scalp include:



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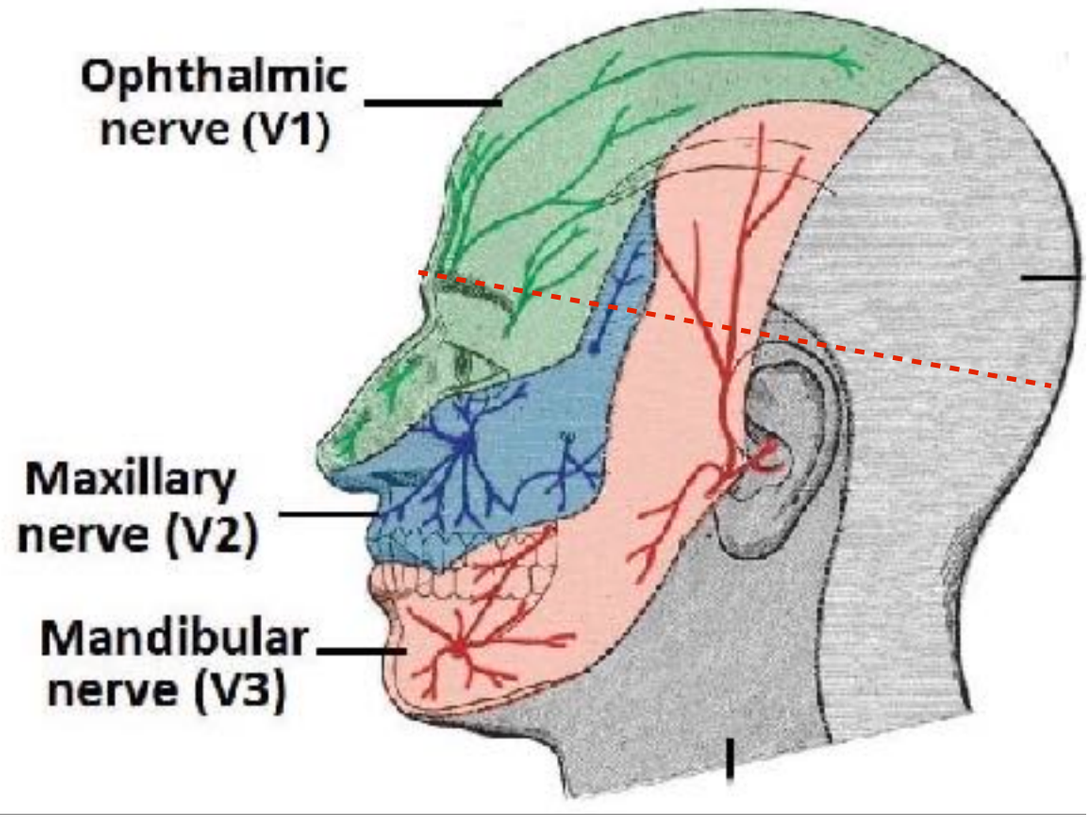
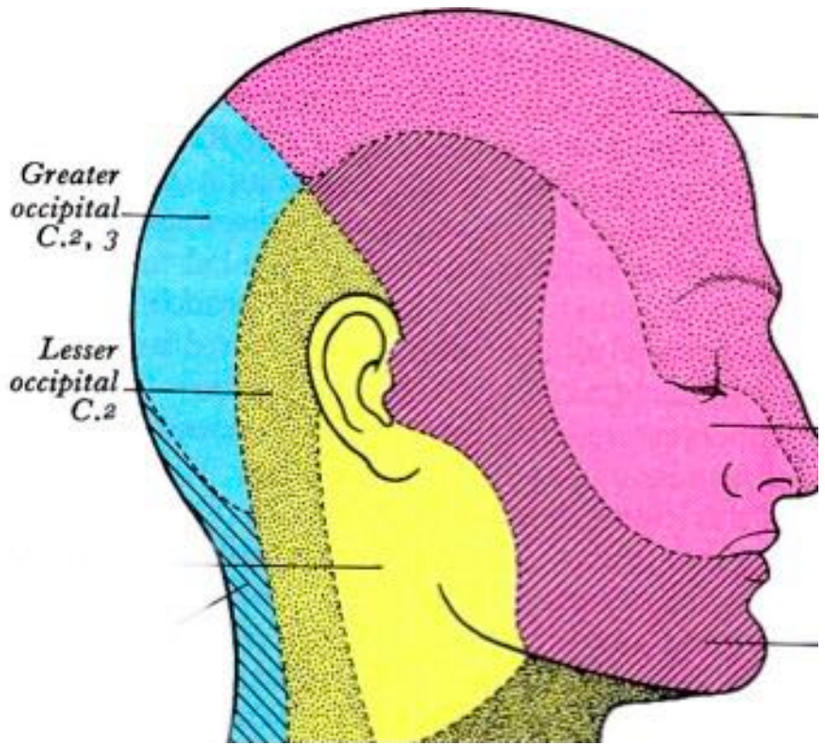
Trigeminal Nerve (CN V):

- **V1 (Ophthalmic branch):** Supplies the anterior part of the scalp **above the forehead**.
- **V2 (Maxillary branch):** Supplies the region around the temple and **lower forehead**.
- **V3 (Mandibular branch):** Supplies the area near the ear and **lower parts** of the scalp.



Cervical Nerves:

- **Greater Occipital Nerve (C2):** Provides sensation to the **posterior** scalp.
- **Lesser Occipital Nerve (C2):** Supplies the skin **behind the ear**.
- **Third Occipital Nerve (C3):** Innervates the upper part of the neck and some areas of the **posterior** scalp.



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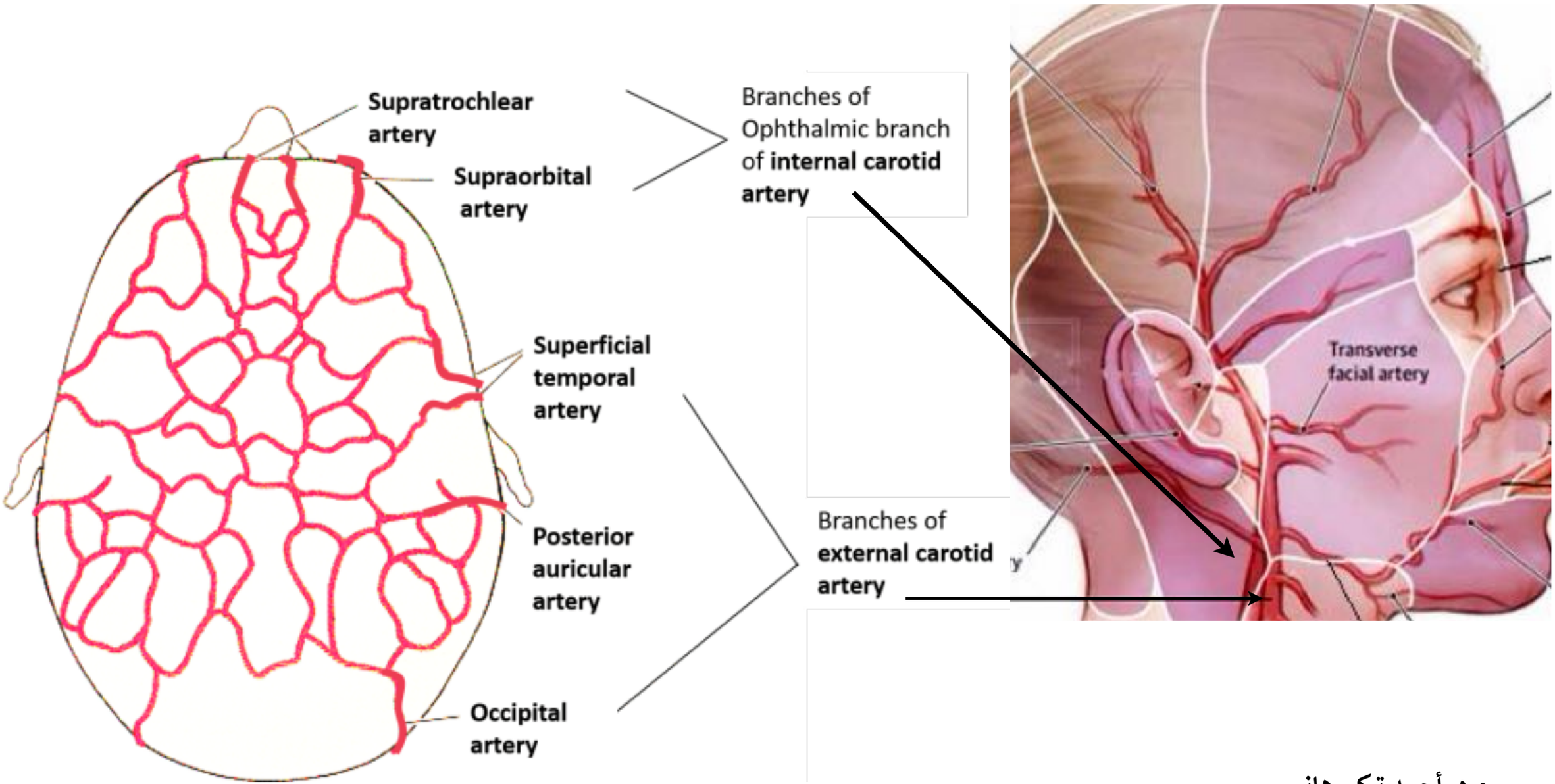
Arterial Supply of the Scalp

The arterial blood supply to the scalp is provided by branches of the **external carotid artery**.

These arteries form an extensive network across the scalp.



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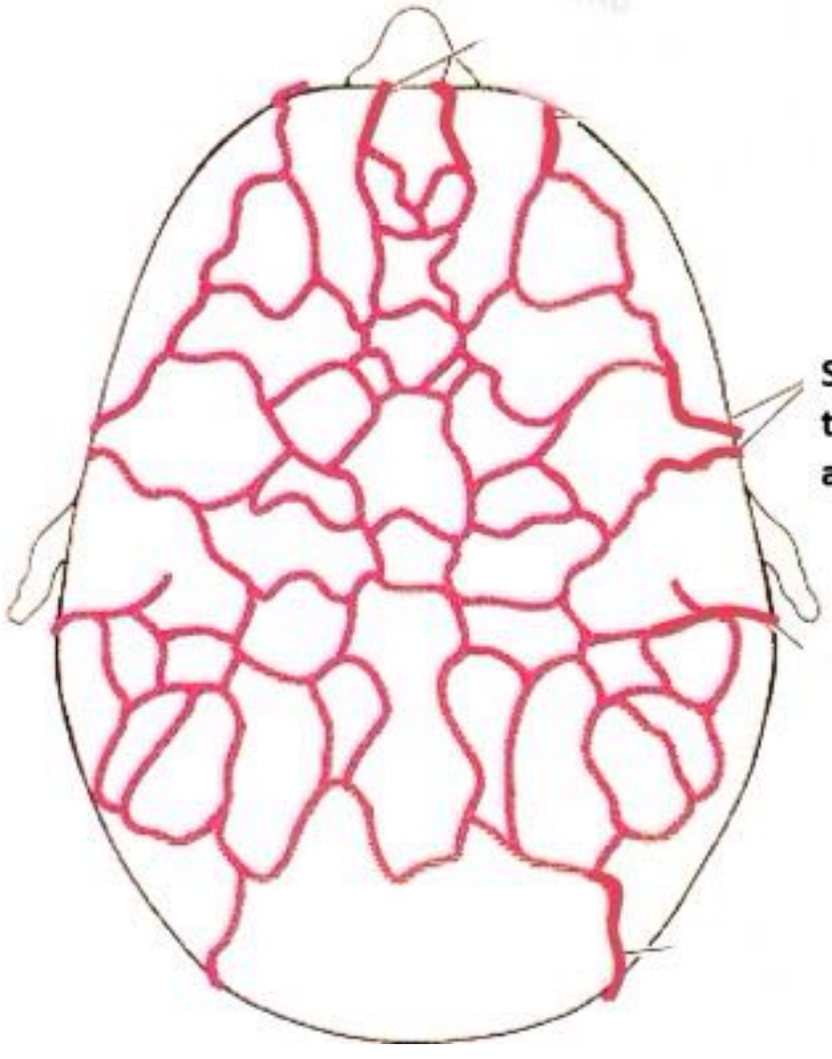
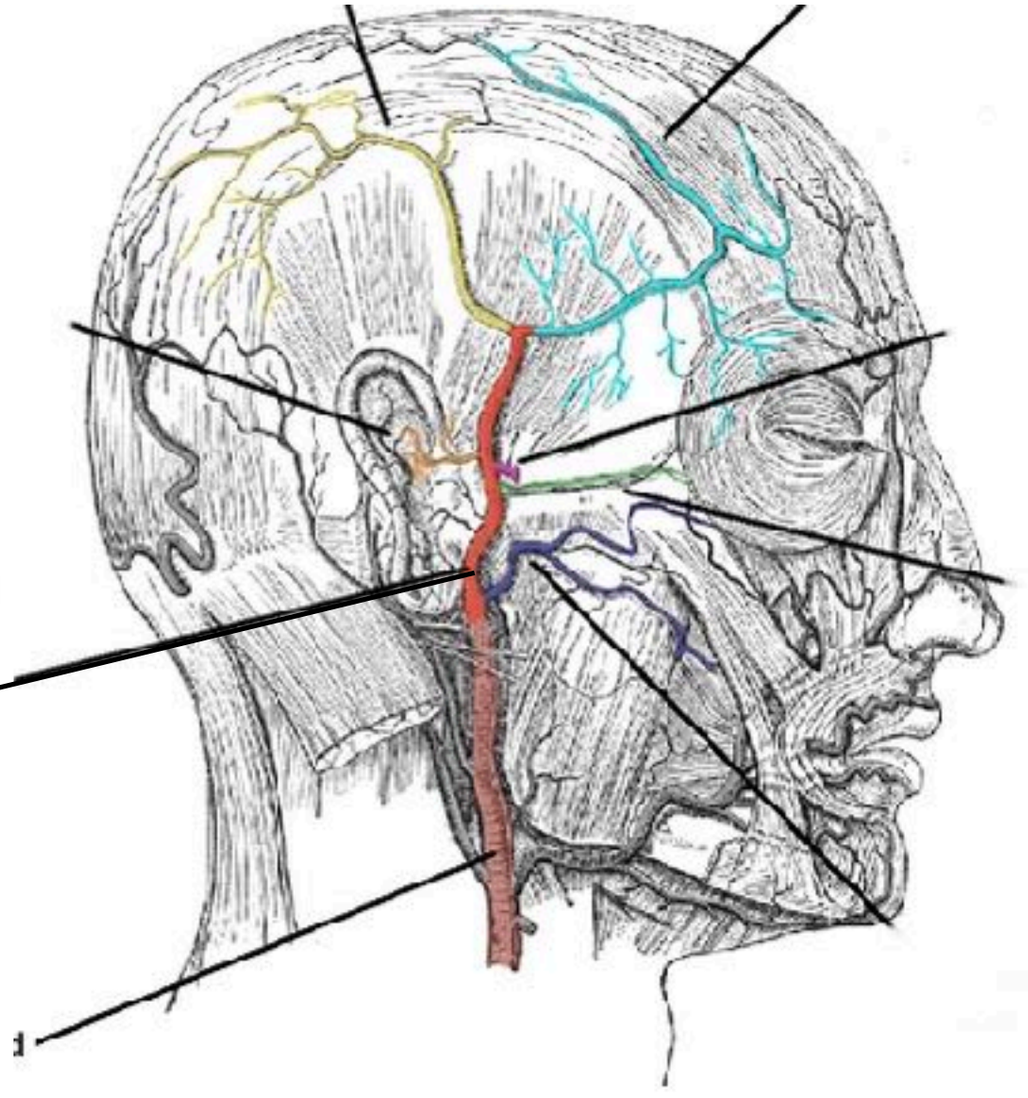
Superficial Temporal Artery:

- Branch of the **external** carotid.
- Supplies the **anterior** scalp, forehead, and part of the ear.





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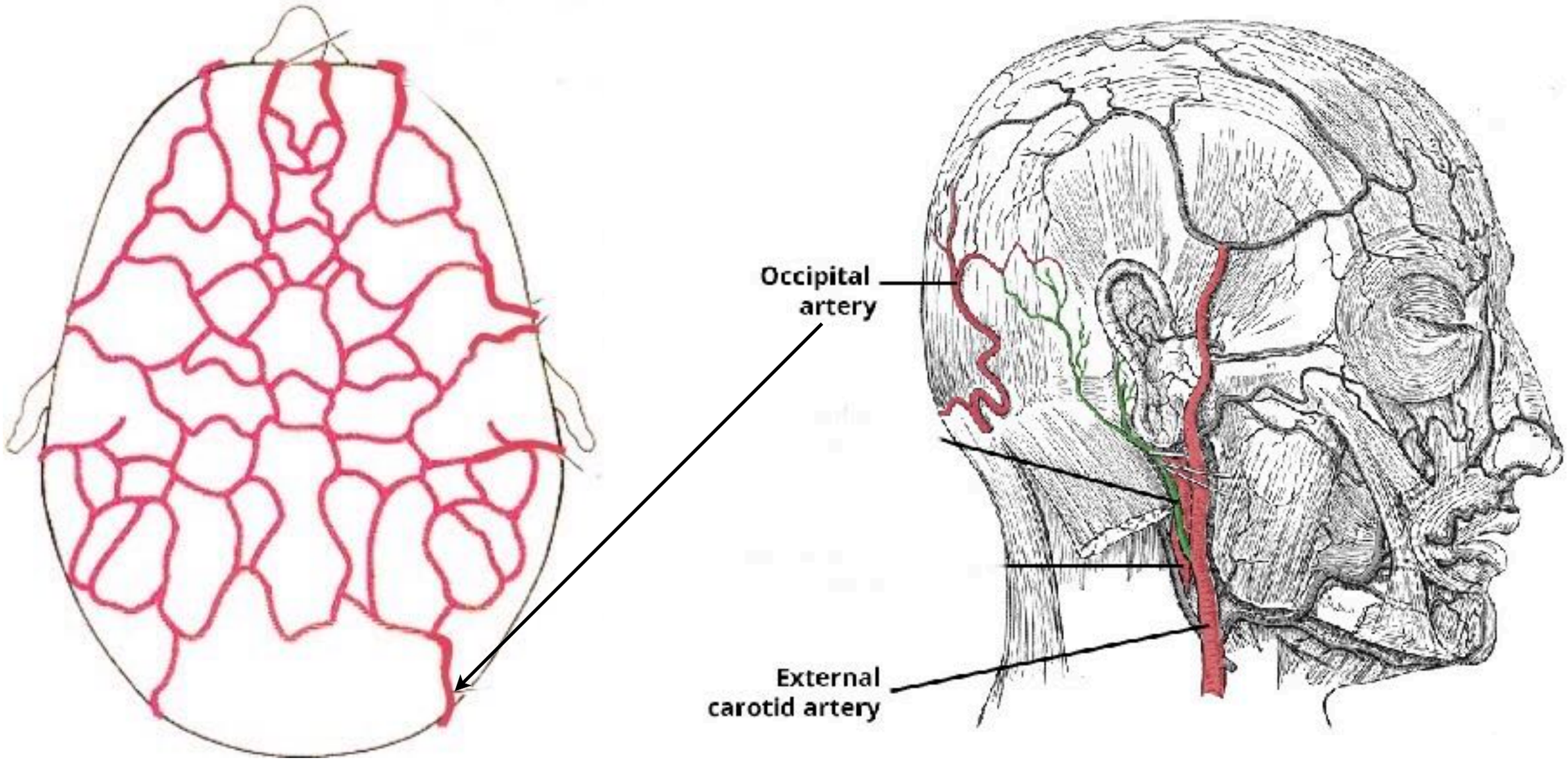
Occipital Artery:

- Branch of the **external** carotid.
- Supplies the **posterior** scalp and neck region.



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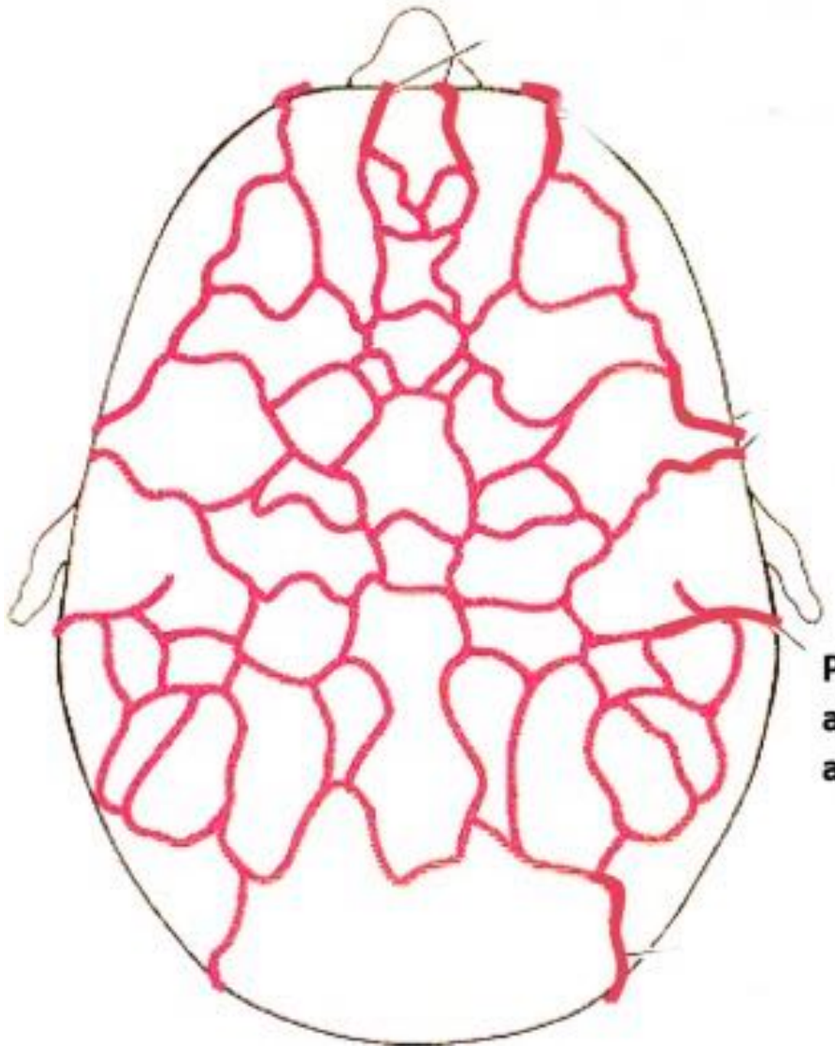
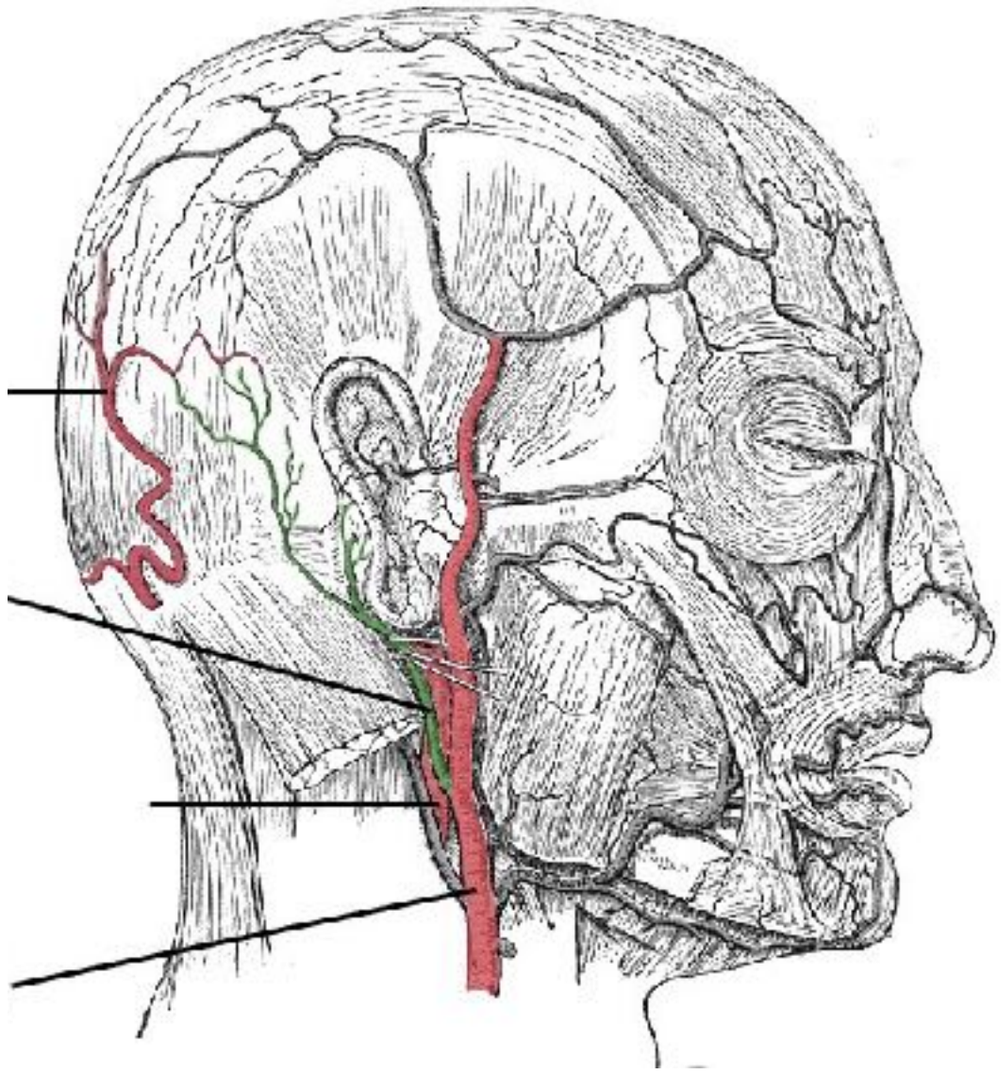
Posterior Auricular Artery:

- Also branches from the **external** carotid.
- Supplies the area **around the ear**.



Posterior auricular artery



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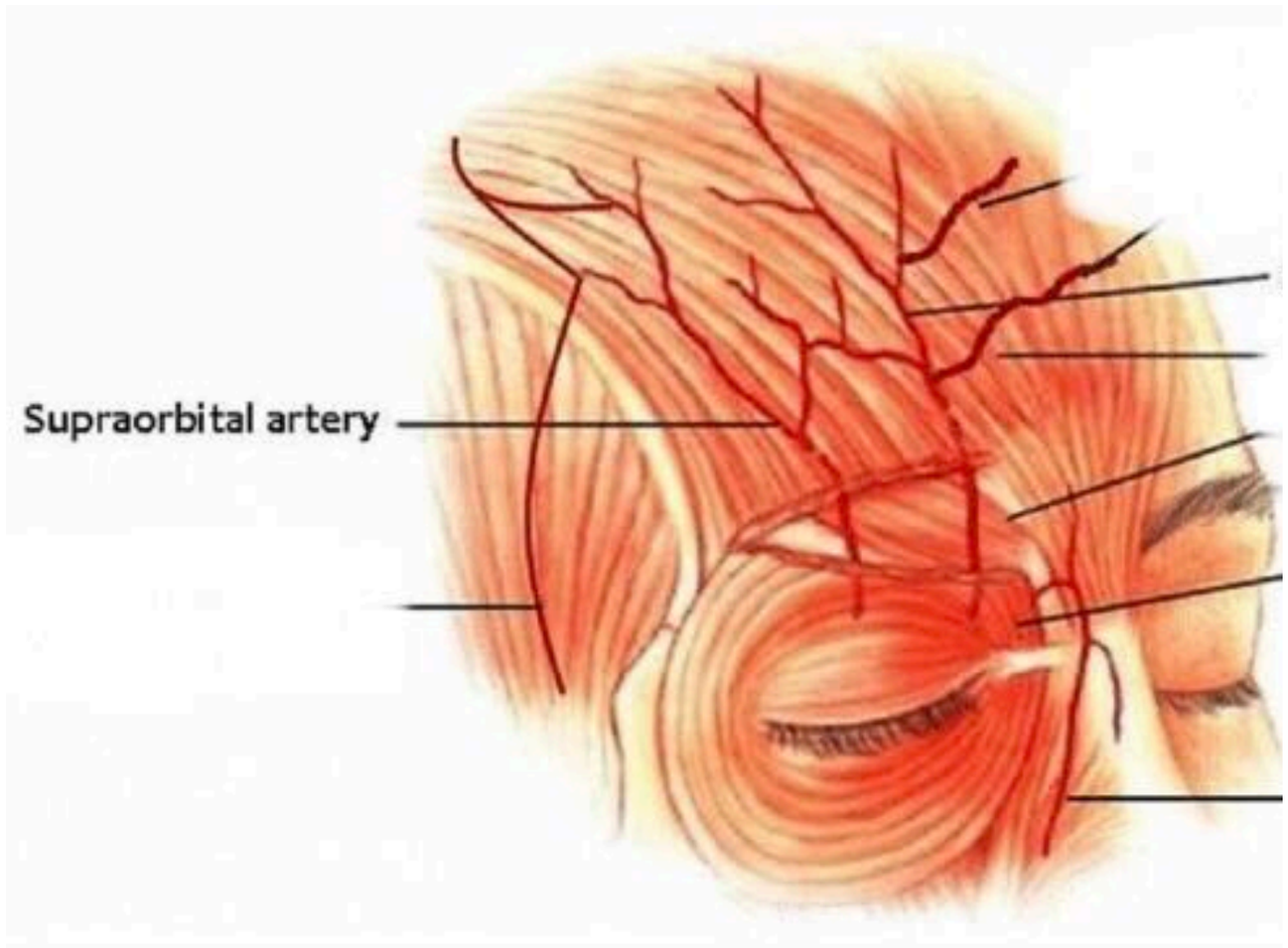
Supraorbital Artery:

- Branches from the ophthalmic artery (which is a branch of the **internal** carotid).
- Supplies the **forehead** and scalp.



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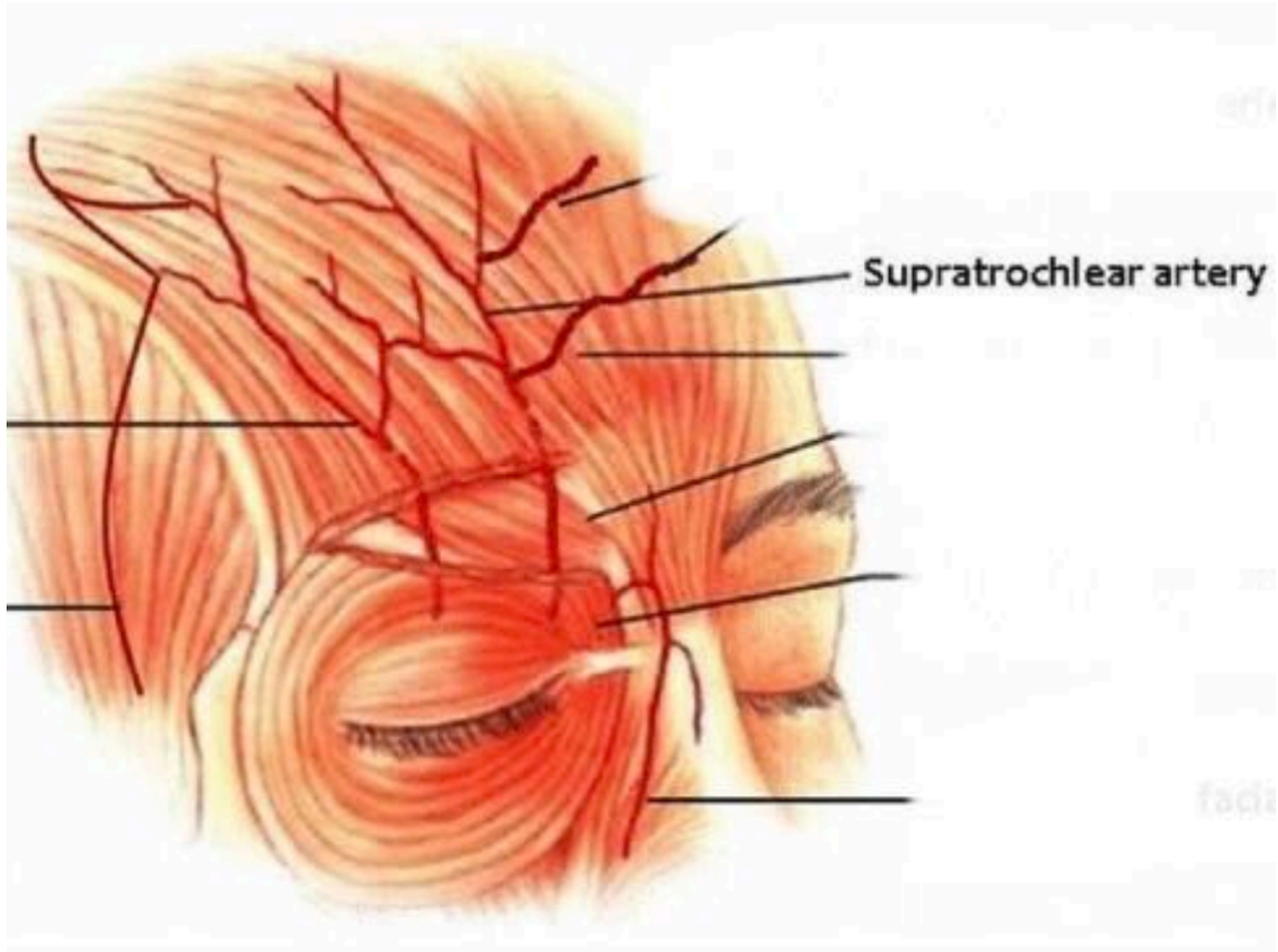
Supratrochlear Artery:

- Also arises from the **ophthalmic** artery.
- Supplies the region above the **nose** and forehead



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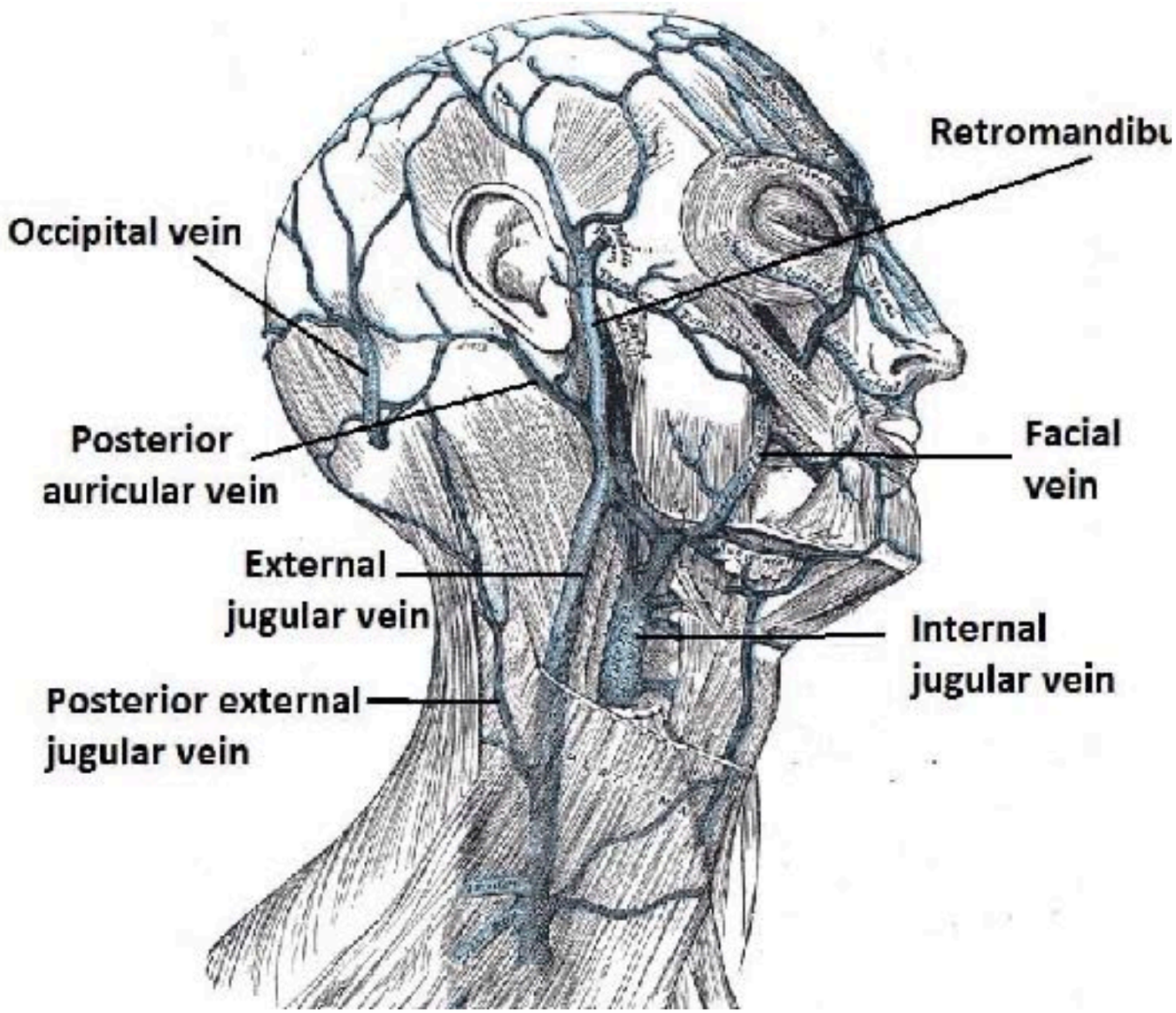
Venous Drainage of the Scalp

The veins of the scalp drain into the **external jugular vein** and the **internal jugular vein**, through an interconnected **network**.



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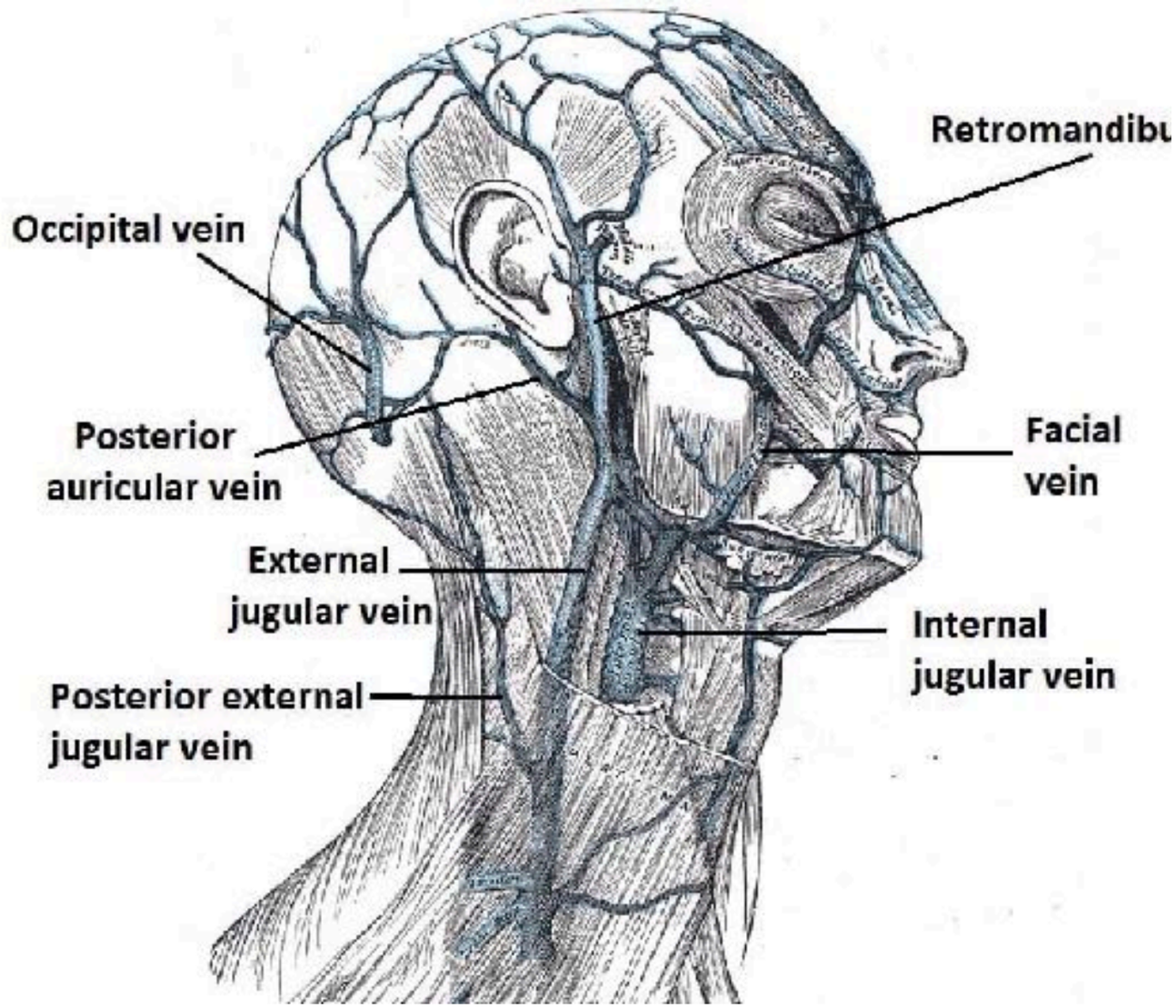
Superficial Temporal Vein: Drains into the external jugular vein.

Occipital Vein: Drains into the internal jugular vein via the posterior auricular vein.

Supratrochlear and Supraorbital Veins: Drain into the facial vein, which eventually drains into the internal jugular vein.



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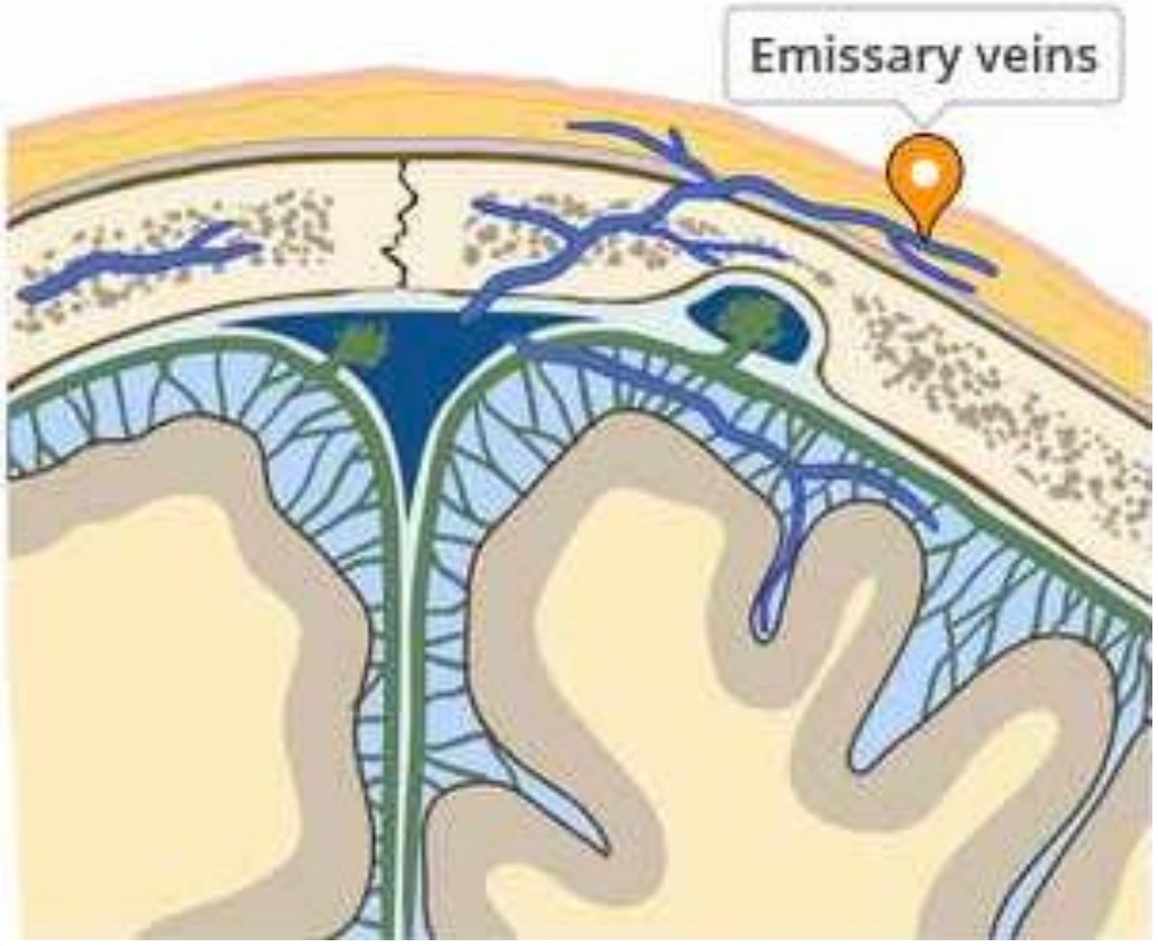
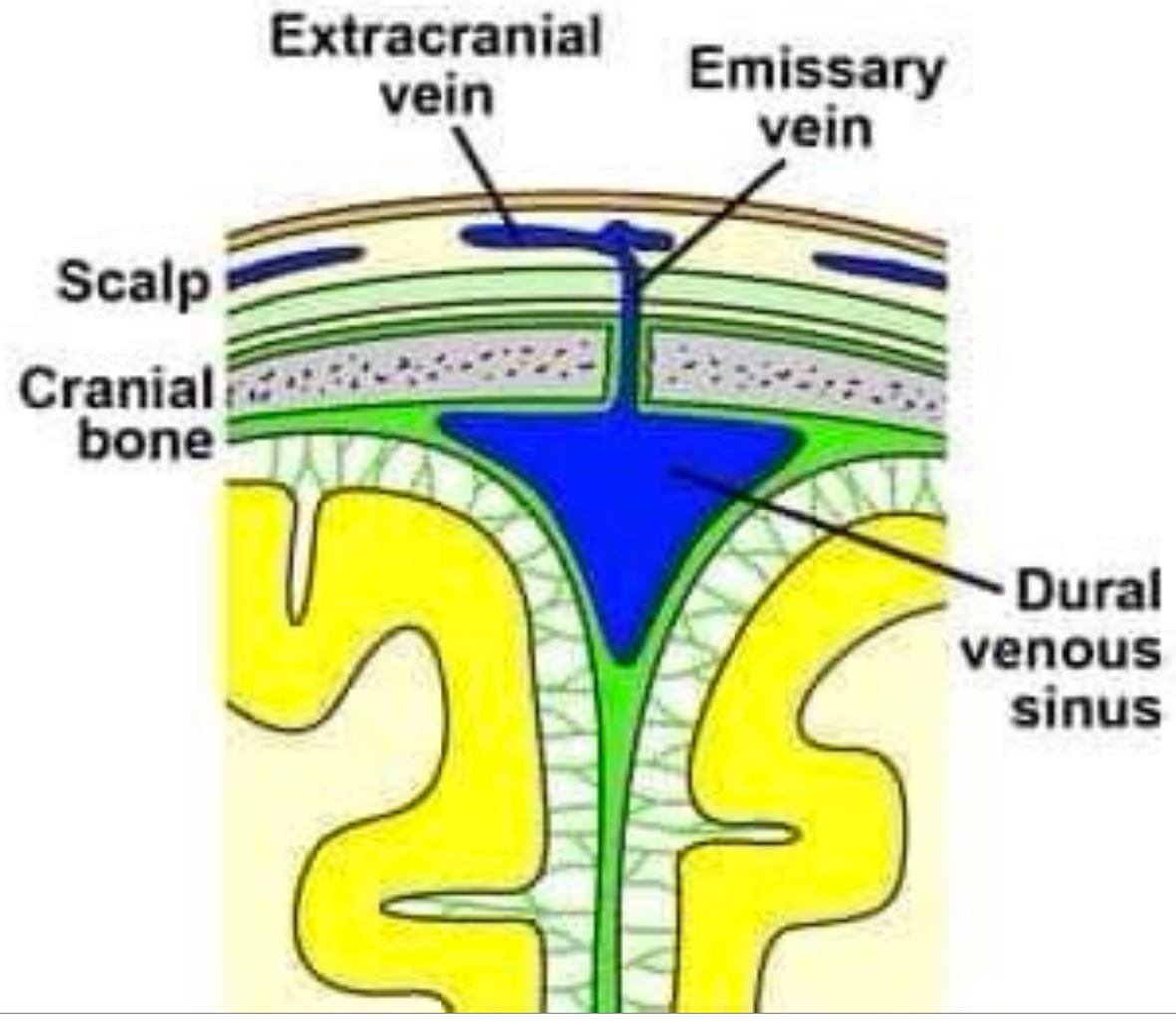
Emissary Veins:

These veins are important as they connect the scalp's venous system to the **dural** venous sinuses.

They can be pathways for the **spread** of infection between the scalp and intracranial structures.

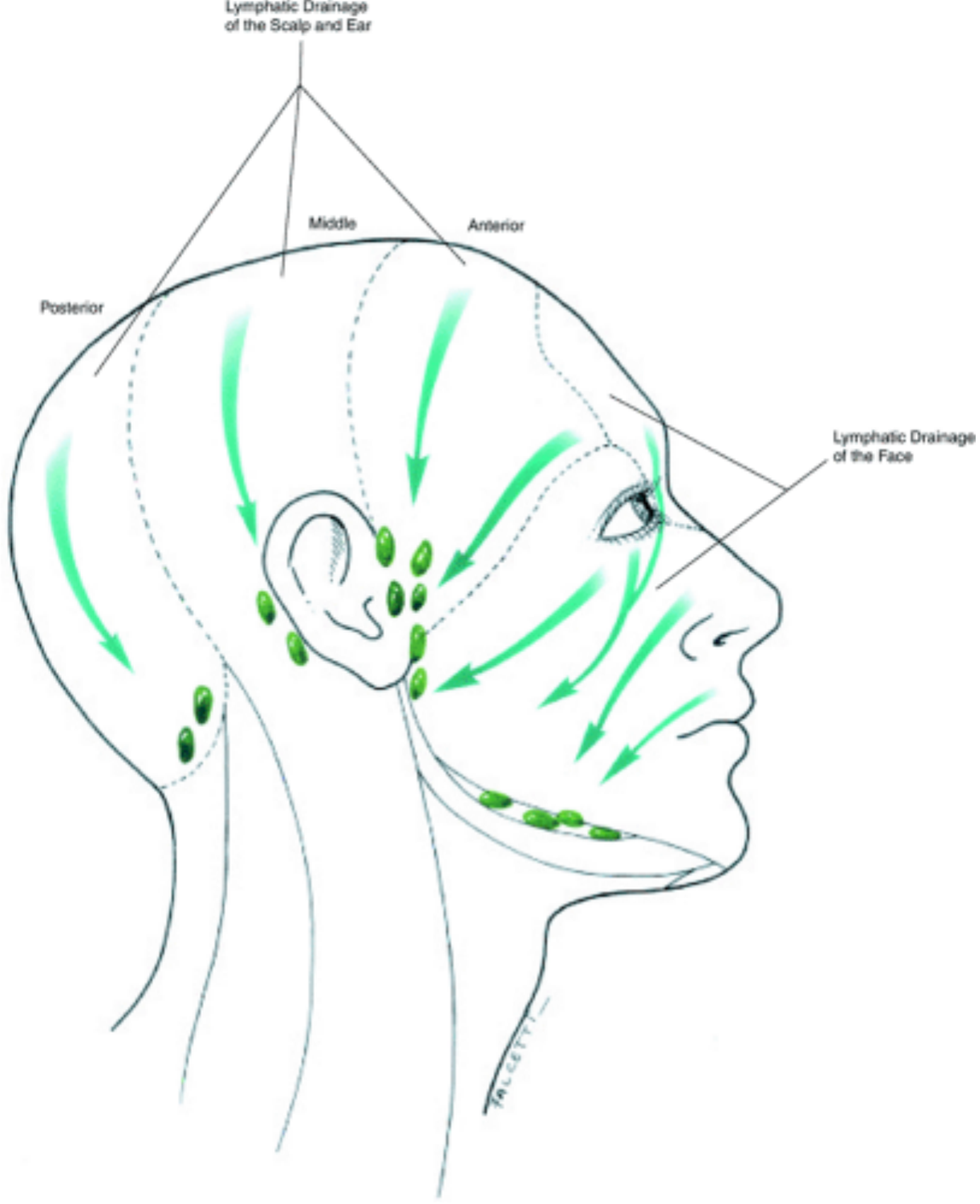




Lymph Drainage of the Scalp

Lymphatic drainage of the scalp helps in the removal of waste products and **immune** surveillance.

The lymphatic drainage is divided into several **regions**:



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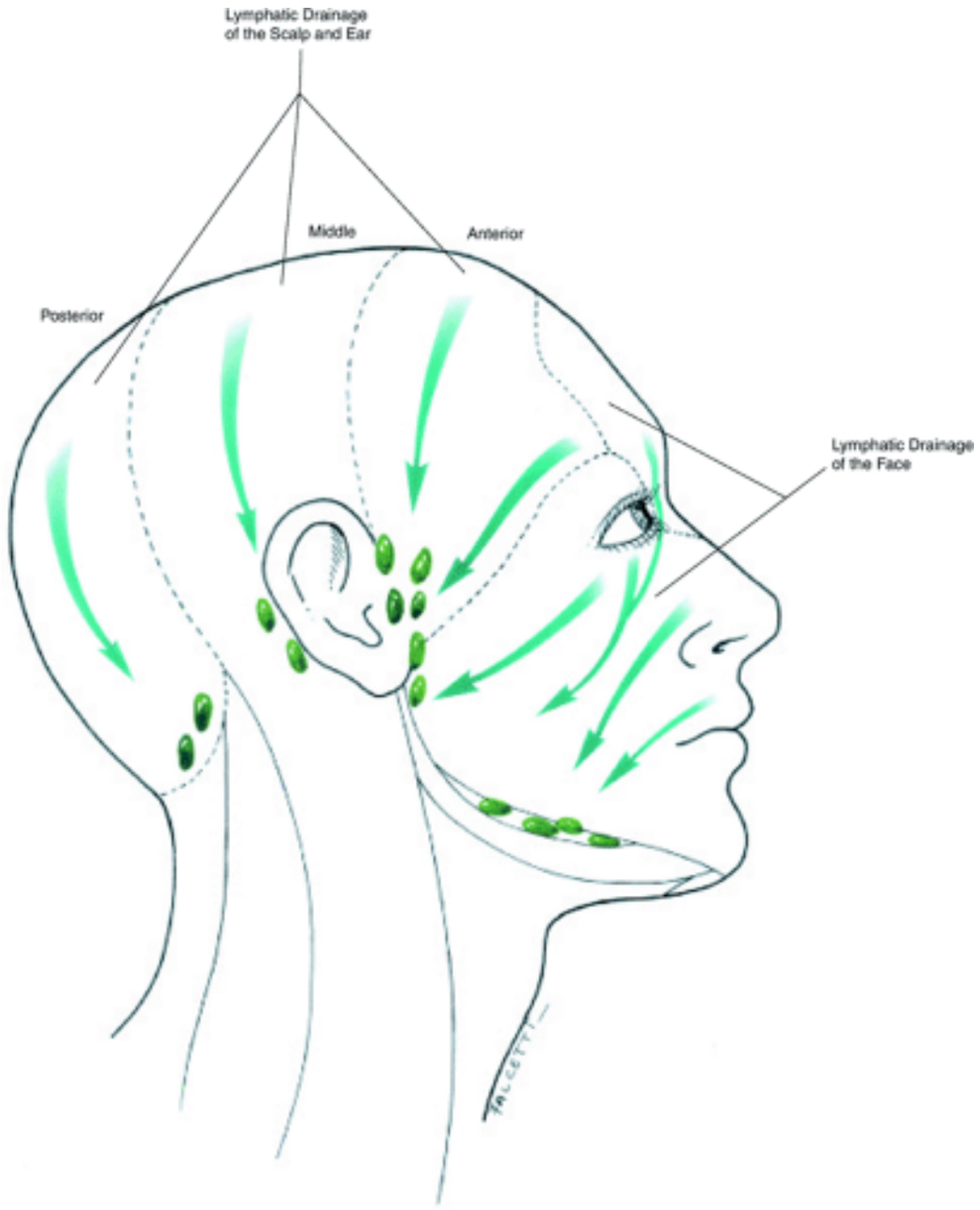
-**Anterior Scalp (Forehead and face):** Drains into **preauricular**, **parotid** and **submandibular lymph nodes**.

-**Parietal Scalp (Middle region):** Drains into **posterior auricular (mastoid) lymph nodes**.

-**Posterior Scalp (Occipital region):** Drains into **occipital lymph nodes**.



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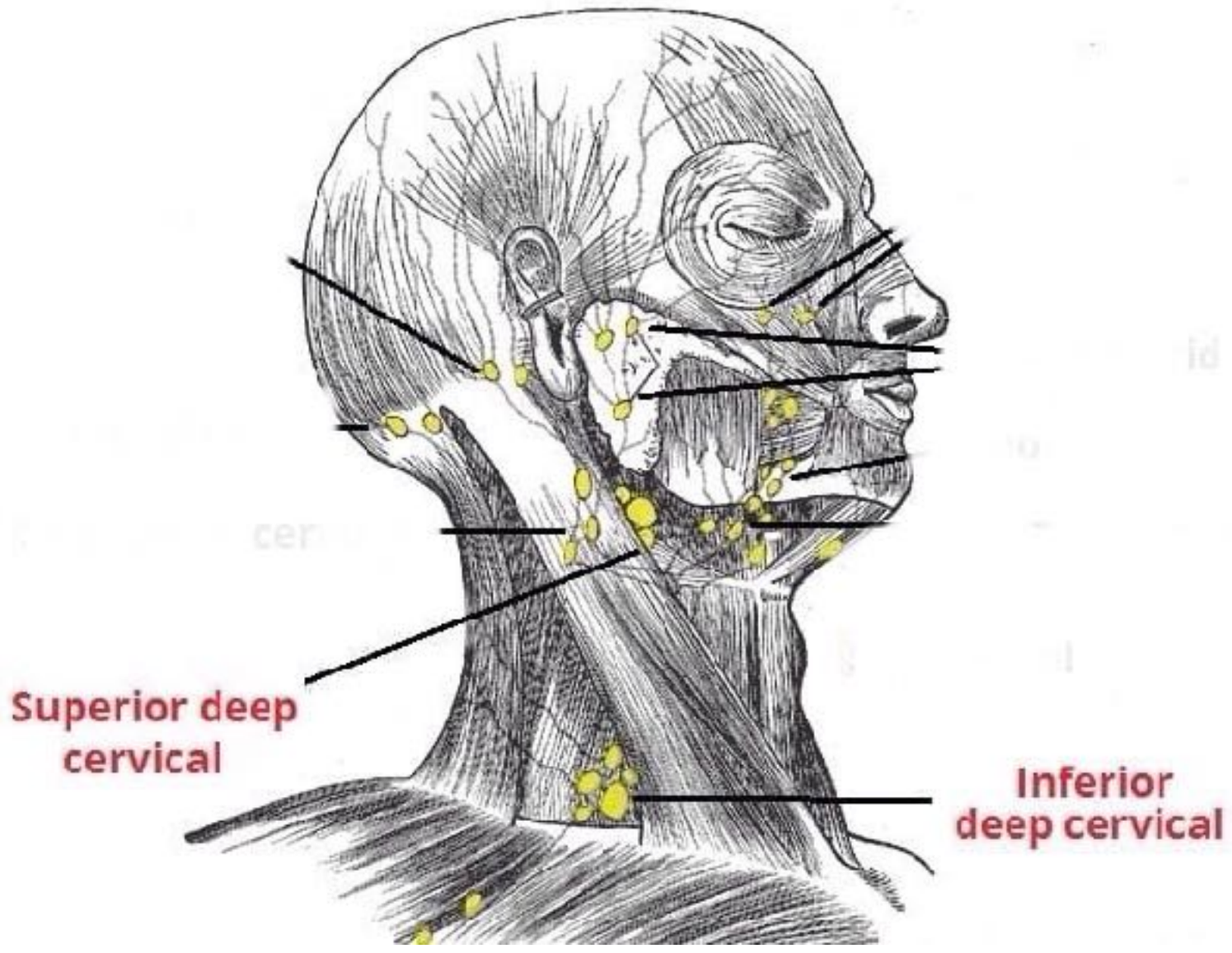
-Cervical Lymph Nodes:

Lymph from the scalp can also drain into the **deep cervical nodes**.



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Scalp Infections:

- **Cellulitis:** Infections of the scalp, often caused by bacteria, can spread quickly due to the abundant blood supply and loose connective tissue.
- **Scalp Abscesses:** Accumulation of pus due to infection, often requiring drainage.

Abscesses

Cellulitis

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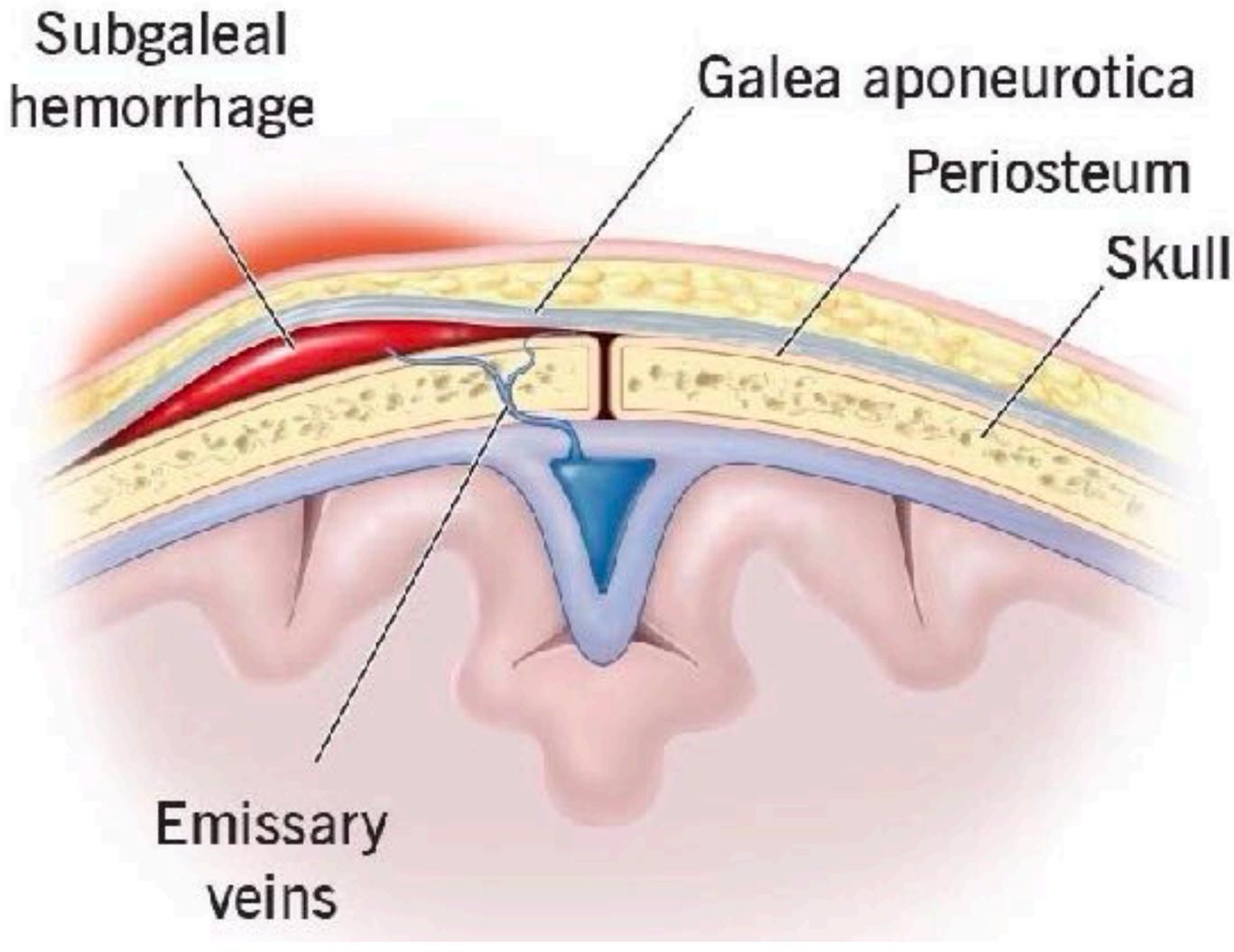
MBChB. MSc. PhD.

Scalp Hematoma:

- A collection of blood between the periosteum and the skull, often caused by trauma.
- It can be a sign of a more serious head injury.



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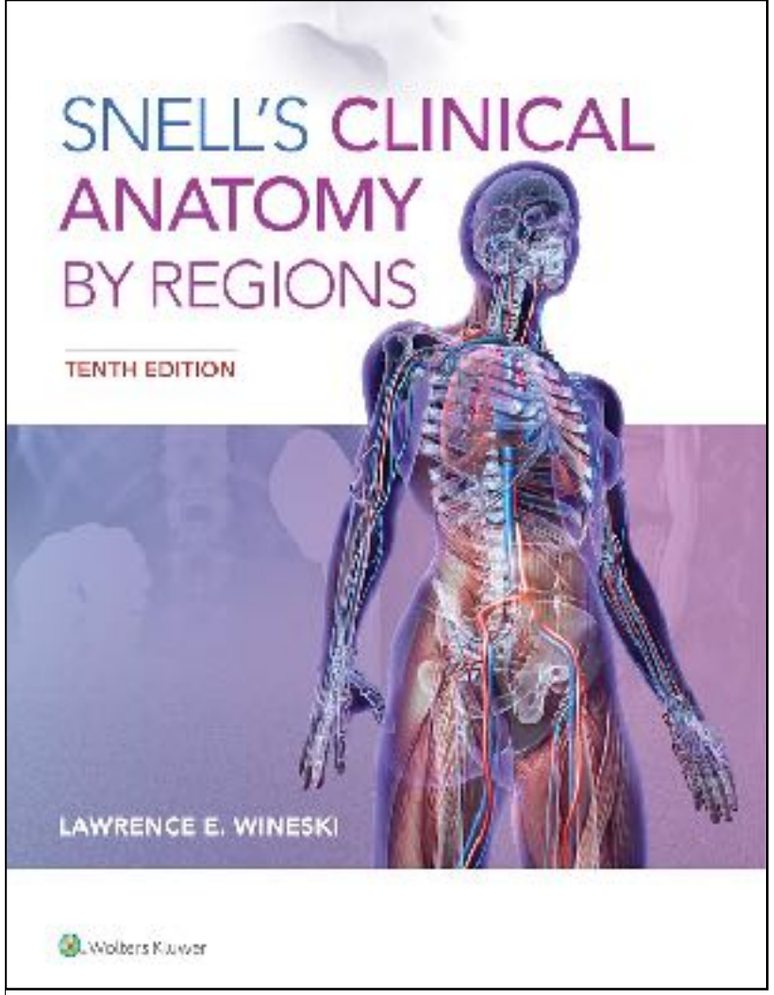

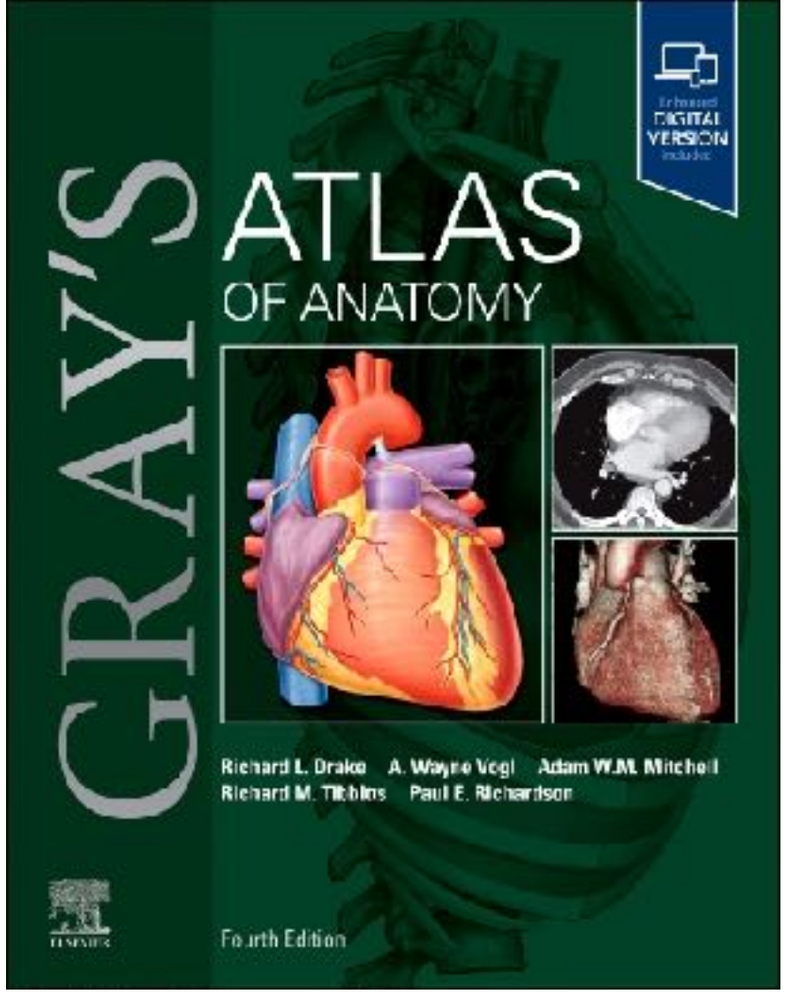

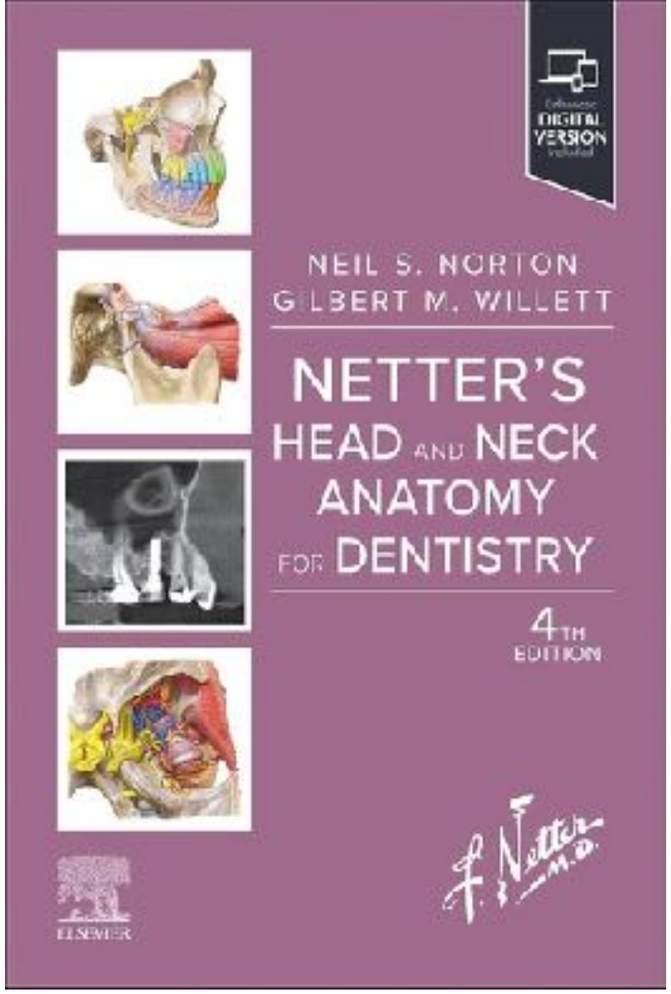

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