

"Scalp"

» Extent of the Scalp

- Extends:

-> Anteriorly: from the superciliary arches

-> Posteriorly: to the external occipital protuberance and superior nuchal lines

-> Laterally: to the temporal lines

» Layers of the Scalp

- Mnemonic: SCALP — first letters of each layer
- Note: First three layers (SCA) are tightly bound together and move as a unit

1) Skin

- Thick and hair-bearing
- Contains numerous sebaceous glands

2) Connective Tissue (Dense Fibrofatty Layer)

- Located beneath the skin
- Contains fibrous septa that unite the skin to the underlying epicranial aponeurosis
- Contains numerous blood vessels
- Arterial supply: from both external and internal carotid arteries
- Free anastomoses occur between these arteries

3) Aponeurosis (Epicranial Aponeurosis)

- Thin, tendinous sheet
- Unites:
 - > Occipital bellies of occipitofrontalis muscle
 - > Frontal bellies of occipitofrontalis muscle
- Lateral margins attached to temporal fascia

- Subaponeurotic space (potential space):
- > Located deep to the epicranial aponeurosis
- > Limited anteriorly and posteriorly by the origins of the occipitofrontalis muscle
- > Extends laterally to the attachment of the aponeurosis to the temporal fascia

4) Loose Areolar Tissue

- Occupies the subaponeurotic space
- Loosely connects the epicranial aponeurosis to the skull's periosteum (pericranium)
- Plane of movement of the scalp
- > When scalp moves, the first three layers (SCA) slide over this layer relative to the underlying periosteum
- Contains:
 - > A few small arteries
 - > Important emissary veins:

- Valveless
- Connect superficial veins of the scalp to diploic veins of skull bones
- Intracranial venous sinuses

5) Pericranium

- Periosteum covering outer surface of skull bones

- Continuous with:

-> Periosteum on inner skull surface (endosteum)

-> At sutures between individual skull bones

» Muscles of the Scalp

> Occipitofrontalis (Epicranius)

- Sole skeletal muscle in the scalp

- Composed of:

-> Paired frontal bellies

-> Paired occipital bellies

-> Connected by the epicranial aponeurosis

> Function:

- Responsible for movement of the scalp
- On contraction: first three layers (SCA) move as a unit
- Loose areolar tissue (4th layer) allows aponeurosis to move over pericranium

> Facial expression:

- Frontal bellies can raise the eyebrows in expressions of surprise or horror

MUSCLE	ORIGIN	INSERTION	NERVE SUPPLY	ACTION
Scalp Muscle				
Occipitofrontalis Occipital belly Frontal belly	Highest nuchal line of occipital bone Skin and superficial fascia of eyebrows	Epicranial aponeurosis	Facial nerve	Moves scalp on skull and raises eyebrows

» Sensory Nerve Supply of the Scalp

> Location of Sensory Nerves

- Main trunks lie in the dense connective tissue layer (C layer) of the scalp.

> Classification of Nerves

- Two main groups:

- 1) Branches of the trigeminal nerve – located anterior to the ear
- 2) Branches of cervical spinal nerves – located posterior to the ear

> Trigeminal Nerve Branches (Anterior to the Ear)

i) Supratrochlear Nerve

- Branch of the ophthalmic division of the trigeminal nerve
- Course:
 - > Winds around the superior orbital margin
 - > Passes backward close to the median plane
 - > Reaches nearly as far as the vertex of the skull

- Supplies: Scalp

ii) Supraorbital Nerve

- Branch of the ophthalmic division of the trigeminal nerve

- Course:

-> Winds around the superior orbital margin

-> Ascends over the forehead

- Supplies: Scalp as far backward as the vertex

iii) Zygomaticotemporal Nerve

- Branch of the maxillary division of the trigeminal nerve

- Supplies: Scalp over the temple

iv) Auriculotemporal Nerve

- Branch of the mandibular division of the trigeminal nerve

- Course:

- > Ascends over the side of the head

- > Originates from in front of the auricle

- Supplies: Skin over the temporal region

- > Cervical Spinal Nerve Branches (Posterior to the Ear)

- i) Lesser Occipital Nerve (C2)

- Branch of the cervical plexus

- Course:

- > Ascends along the posterior edge of the sternocleidomastoid muscle

- Supplies:

- > Scalp over the lateral part of the occipital region

- > Skin over the medial surface of the auricle

ii) Greater Occipital Nerve

- Branch of the posterior ramus of the second cervical nerve (C2)

- Course:

→ Ascends over the back of the scalp

- Supplies: Skin as far forward as the vertex of the skull

» Arterial Supply of the Scalp

- General Features

- Scalp has a rich blood supply to nourish hair follicles
- Smallest cut bleeds profusely due to extensive vascular network
- Arteries run in the dense connective tissue layer (C layer) of the scalp
- Arteries usually follow the course of cutaneous nerves

- Form a freely anastomosing network

> Arteries (From Anterior Midline Laterally)

1) Supratrochlear Artery

- Branch of the ophthalmic artery (from internal carotid artery)

- Ascends over forehead with the supratrochlear nerve

2) Supraorbital Artery

- Branch of the ophthalmic artery
- Ascends over forehead with the supraorbital nerve

3) Superficial Temporal Artery

- Smaller terminal branch of the external carotid artery
- Ascends in front of auricle with the auriculotemporal nerve

- Divides into:

- > Anterior branch - supplies frontal region

- > Posterior branch - supplies temporal region

4) Posterior Auricular Artery

- Branch of the external carotid artery

- Ascends behind the auricle

- Supplies scalp above and behind the auricle

5) Occipital Artery

- Branch of the external carotid artery

- Ascends from apex of posterior triangle with the greater occipital nerve

- Pierces trapezius muscle

- Supplies scalp over back of head up to the vertex of skull

» Venous Drainage of the Scalp

i) Superficial Temporal Vein

- Unites with maxillary vein in the parotid gland
- Forms the retromandibular vein

ii) Posterior Auricular Vein

- Unites with posterior division of retromandibular vein below parotid gland
- Forms the external jugular vein

iii) Occipital Vein

- Drains into the suboccipital venous plexus
- Plexus lies beneath floor of the upper posterior triangle
- Drains into vertebral veins or internal jugular vein

> Special Feature

- Veins of the scalp freely anastomose

- Connected to:

- Diploic veins of skull bones
- Intracranial venous sinuses
- Via valveless emissary veins

» Lymphatic Drainage of the Scalp

> Anterior Scalp & Forehead

- Drains into submandibular lymph nodes

> Lateral Scalp (above ear)

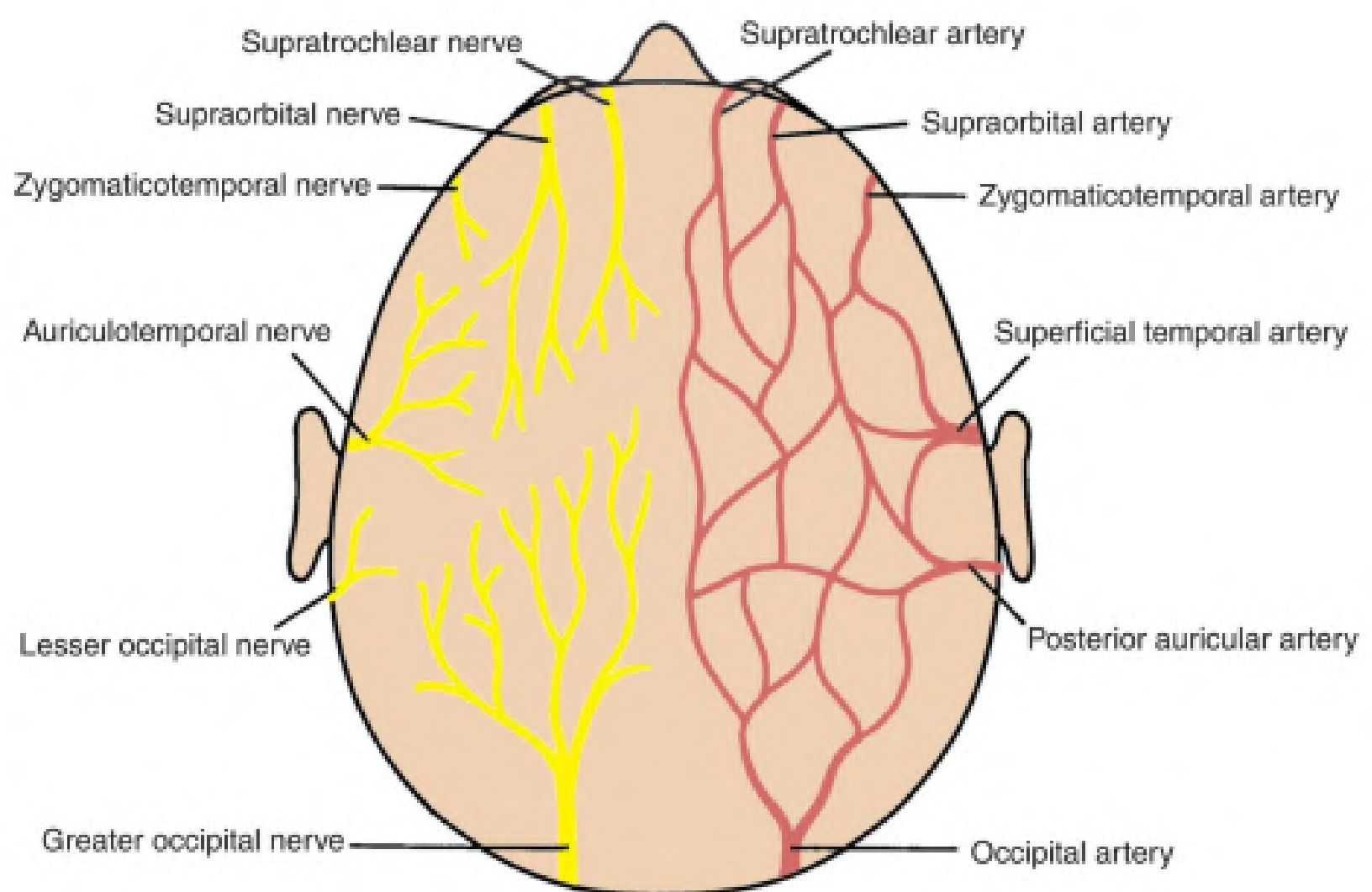
- Drains into superficial parotid (preauricular) lymph nodes

> Scalp above and behind the ear

- Drains into mastoid (posterior auricular) lymph nodes

> Posterior Scalp

- Drains into occipital lymph nodes



"Clinical Notes"

» Scalp Structure – Clinical Significance

- S, C, A layers (skin, connective tissue, aponeurosis) are tightly bound together
- Separated from periosteum by loose areolar tissue (L layer)
- Scalp skin has numerous sebaceous glands:
- Prone to infection/damage by repeated hair treatment
- Common site for sebaceous cysts

» Scalp Lacerations

- Scalp has rich blood supply → even small wounds bleed profusely
- Bleeding difficult to control because:
 - Arteries in C layer are anchored to fibrous septa
 - Cannot retract to allow clotting

-> Local pressure is the most effective method to stop bleeding

- Trauma (e.g., windshield injury):

-> Large scalp flaps can be avulsed

-> Due to good vascularity, reattachment via vascular suturing may prevent necrosis

» Gaping of Deep Wounds

- Due to tension of epicranial aponeurosis (from occipitofrontalis muscle)
- If aponeurosis is cut, wound gapes open
- Requires sutures for proper healing

» Blunt Force Wounds

- Scalp may split on impact with skull
- Wound resembles incised wound due to gaping from aponeurosis pull
- Important in forensic examination

» Life-Threatening Scalp Hemorrhage

- All scalp arteries ascend from face and neck

- Emergency control:

-> Tie a tourniquet around head above ears and eyebrows

-> Insert a pen/stick and rotate to apply pressure

» Scalp Infections

> Localized Infection

- Usually localized & painful due to dense fibrous tissue in C layer

> Spread via Emissary Veins

- Valveless emissary veins allow infection to spread to:

-> Skull bones → causing osteomyelitis

-> Intracranial venous sinuses → causing venous sinus thrombosis

» Blood/Pus Collection Sites

- In L (loose areolar tissue) layer:

-> Can spread widely over skull

- Limited by:

-> Orbital margin (anterior)

-> Nuchal lines (posterior)

-> Temporal lines (lateral)

- In subperiosteal space:

-> Limited to one bone only due to periosteal attachment to sutures