SCALP

May be defined as soft tissue covering of the skull including skin.

Extent: Anteriorly- up to the region of eyebrows up to supraorbital margin.

Posteriorly- Up to ext. occ. protuberance and superior nuchal lines.

Laterally- up to superior temporal line

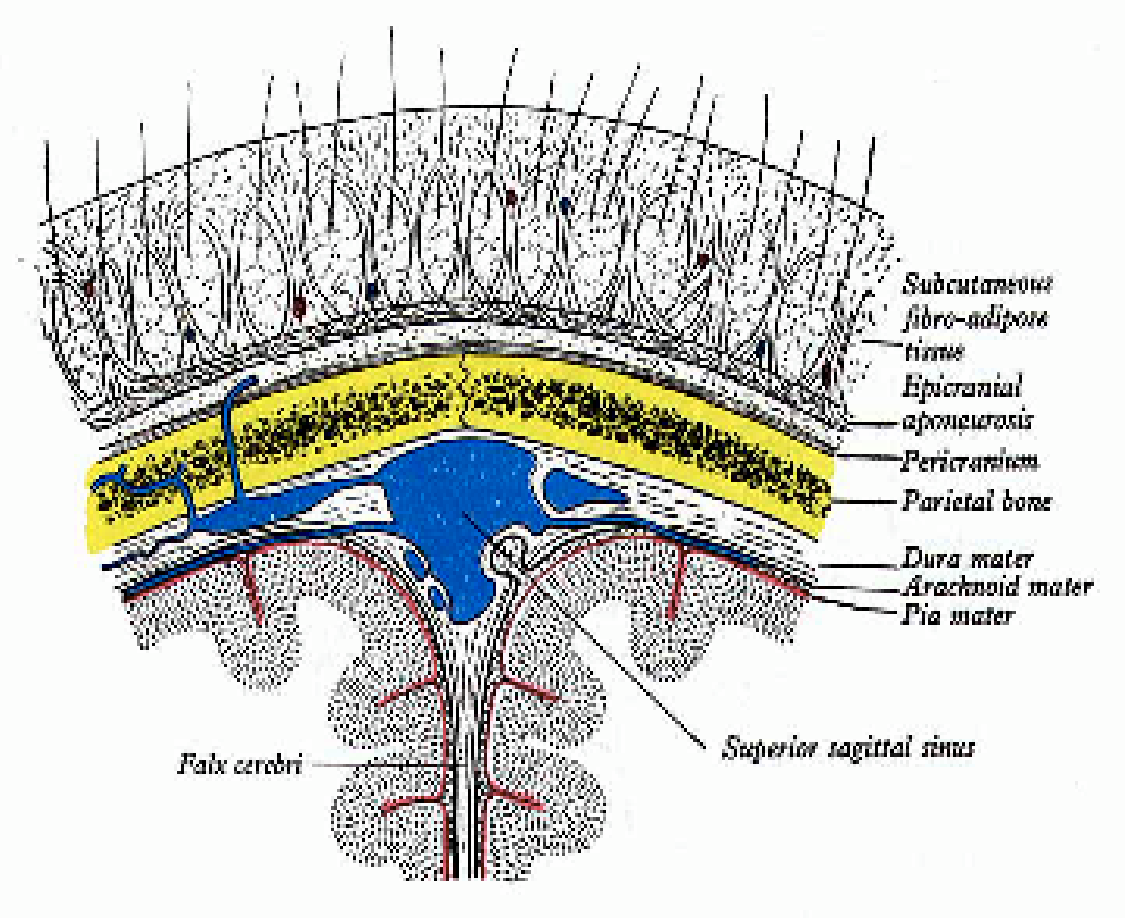
S Skin

C Connective tissue (Dense)

A Aponeurotic (epicranial aponeurosis)

L Loose connective tissue

P Pericranium



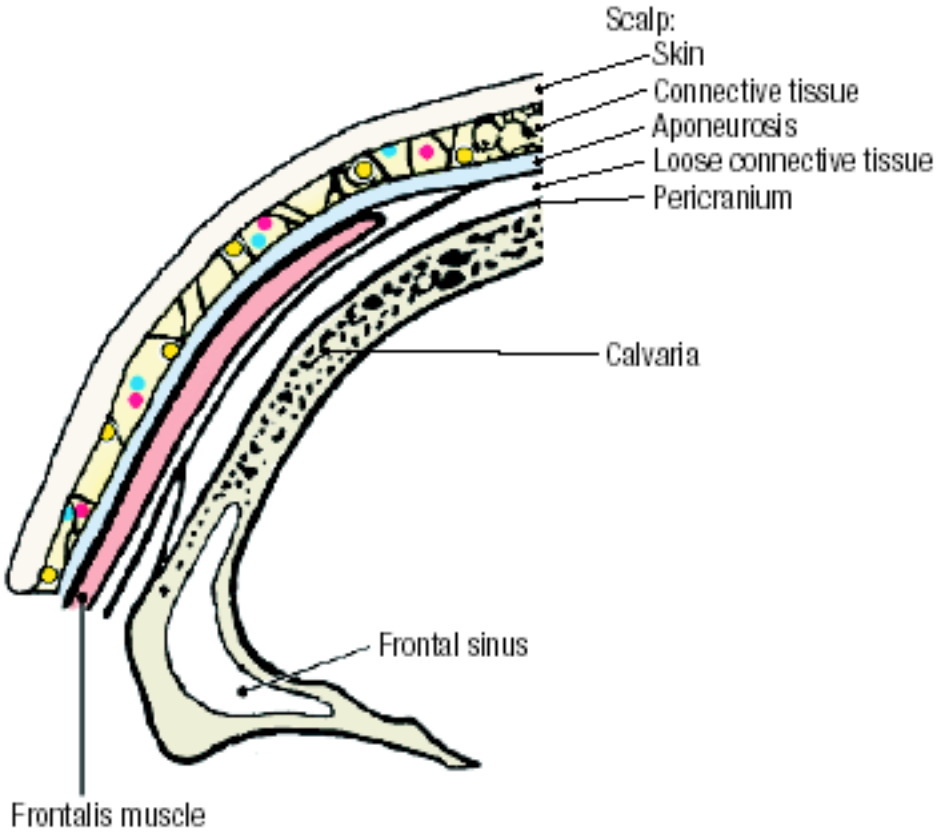


Figure 7.11. Layers of the scalp.

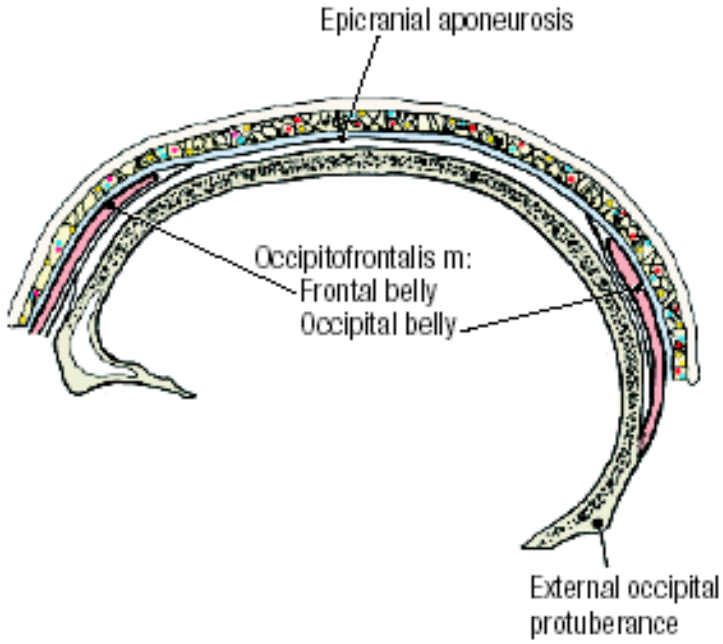


Figure 7.14. The occipitofrontalis muscle in sagittal section.

Skin: Thin epidermis, thick dermis

Epidermo-dermal junctions contain hair follicles

Numerous sebaceous glands

Richly vascularised, sensitive to touch, pain and temp.

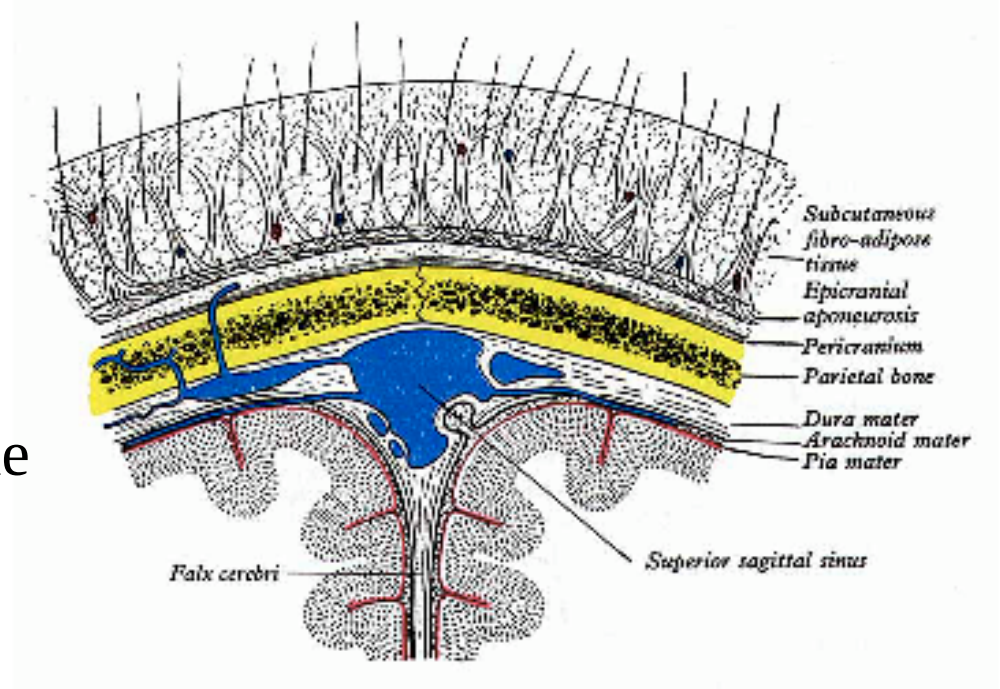
Connective tissue layer:

Collagen bundles

form caverns, also

adherent to vessels

Neurovascular plane



Musculo-aponeurotic layer: Broad musculo-fibrous layer having two muscular bellies- Occipital and frontal.

Frontal- No bony attachment, fibres 8-10 cm long

Fibres continue with facial muscles (Procerus, corrugator supercilli, Orbicularis oculi)

Bellies anteromedially blend with each other, posteriorly diverge.

N. supply- Temporal br. of facial nerve

Action- raise the eyebrows (surprise, horror, fright)

Throwing forehead into transverse wrinkles.

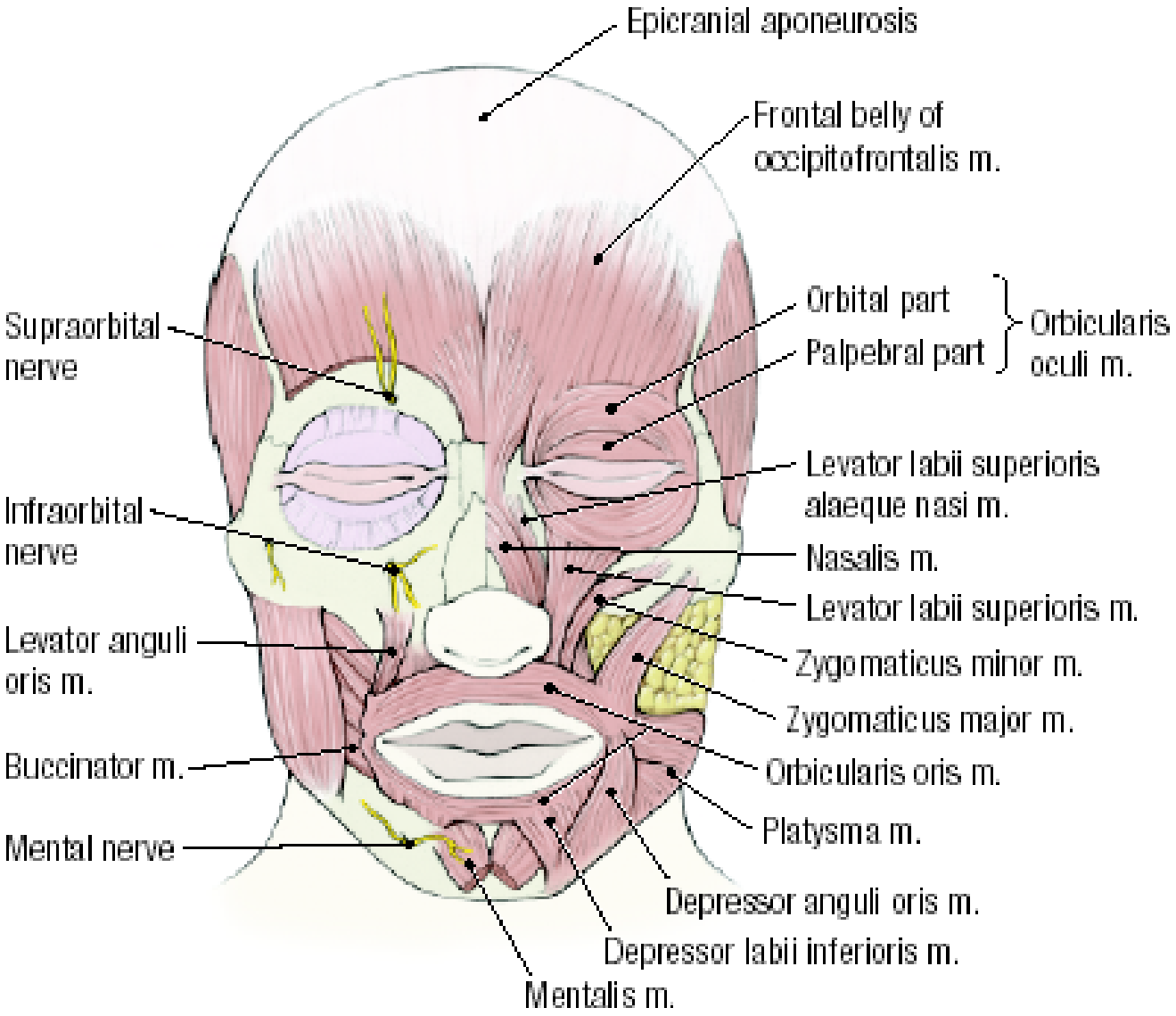


Figure 7.09. Muscles of the face.

Occipital belly-

Origin from lateral two third of highest nuchal line and mastoid part of temporal bone.

Smaller fibres of 3-4 cm length

N. supply- Posterior auricular br. of facial nerve

Action- draws scalp backwards

Galea aponeurotica-

Attatched to superior temporal lines

Loose areolar tissue-

Reticular and elastic fibres

Allows the first three layers to glide over it

Large intercommunicating spaces

Pericranium-

Periosteum on the outer surfaces of bones

Continuous with endosteum through the sutures

Loosely attached over the skull bones except in the temporal fossa

Applied Anatomy

Sebaceous cysts in the skin

2nd layer- Inflammation painful but self limiting

Profuse bleeding/Heals well

3rd layer- Wounds gape if there is a transverse cut

4th layer- Dangerous layer

Easily separated from other layers

Inflammation- less painful, spreads fast and throughout the layer

Black eye-accumulation of pus/blood in this layer trickles down till the attachments of 3rd layer.

Emissary veins pass through this layer on their way to the sinuses

5th layer- Safety valve haemotoma/ Cephalo- haemotoma

CLINICAL CORRELATION

Scalp

The connective tissue layer of the scalp contains collagen fibers that attach to the external surface of the blood vessels. When a blood vessel of the scalp is cut, the connective tissue holds the lumen open, resulting in profuse bleeding.

If an infection occurs in the scalp, it can spread within the connective tissue layer. Therefore, this layer has been called the "dangerous area." From the "dangerous area," the infection may pass into the cranial cavity through emissary veins.

CLINICAL CORRELATION

Subdural Hematoma

As a complication of head injury, cerebral veins may bleed into the potential space between the dura mater and the arachnoid mater. When this happens, the blood accumulates between the dura mater and arachnoid mater (a "subdural space" is created), and this condition is called a subdural hematoma.

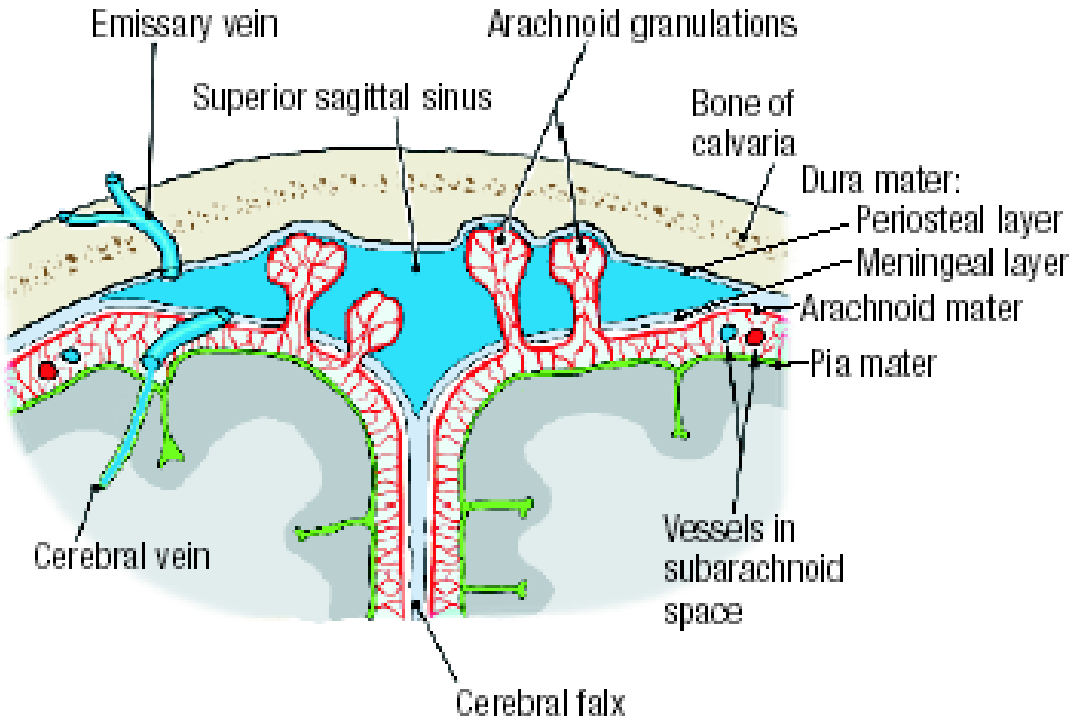


Figure 7.20. Coronal section through the superior sagittal sinus.

Nerve supply

- Motor (Facial nerve)
  - Temporal branch
  - Post. auricular
- Sensory (trigeminal nerve; C_2, C3, Cervical spinal nerves)
  In front of ear - trigeminal nerve; behind ear- cervical nerves
  - Supratrochlear
  - Supraorbital
  - Zygomatico-temporal
  - Auriculo-temporal
  - Posterior – C2, C3
  - Postero superior part - Greater occipital, Third occipital
  - Antero inferior part - Greater auricular, Lesser occipital

SENSORY NERVES	BLOOD VESSELS

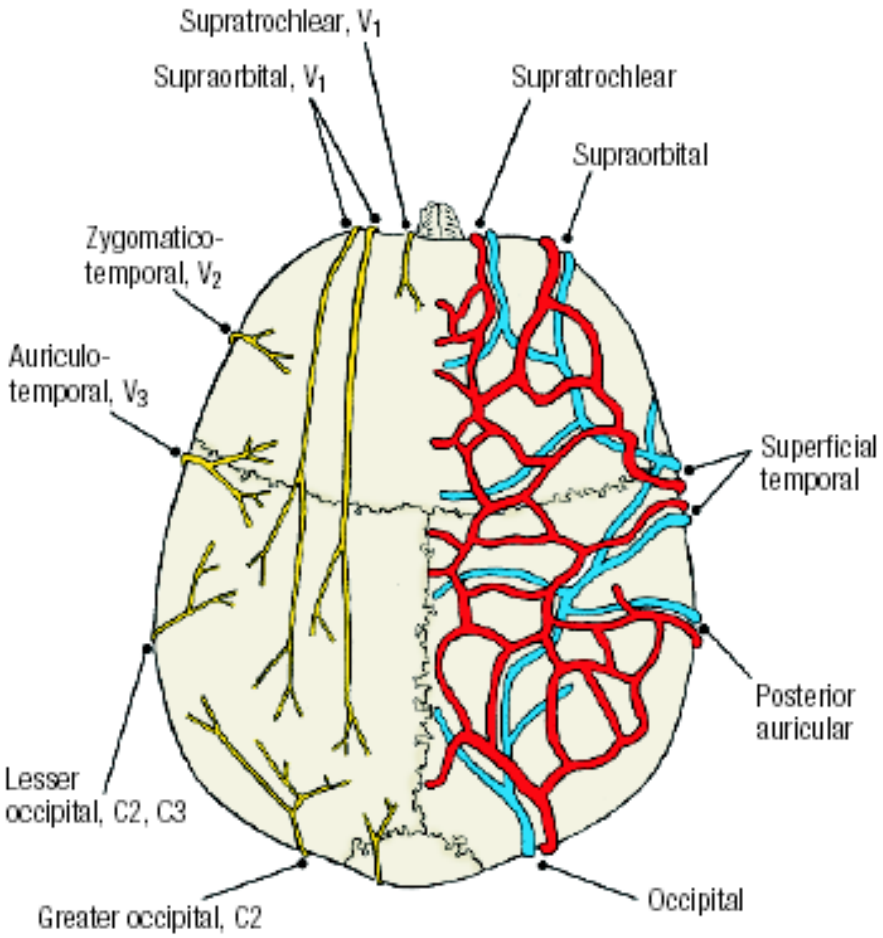


Figure 7.15. Sensory nerves and blood vessels of the scalp.

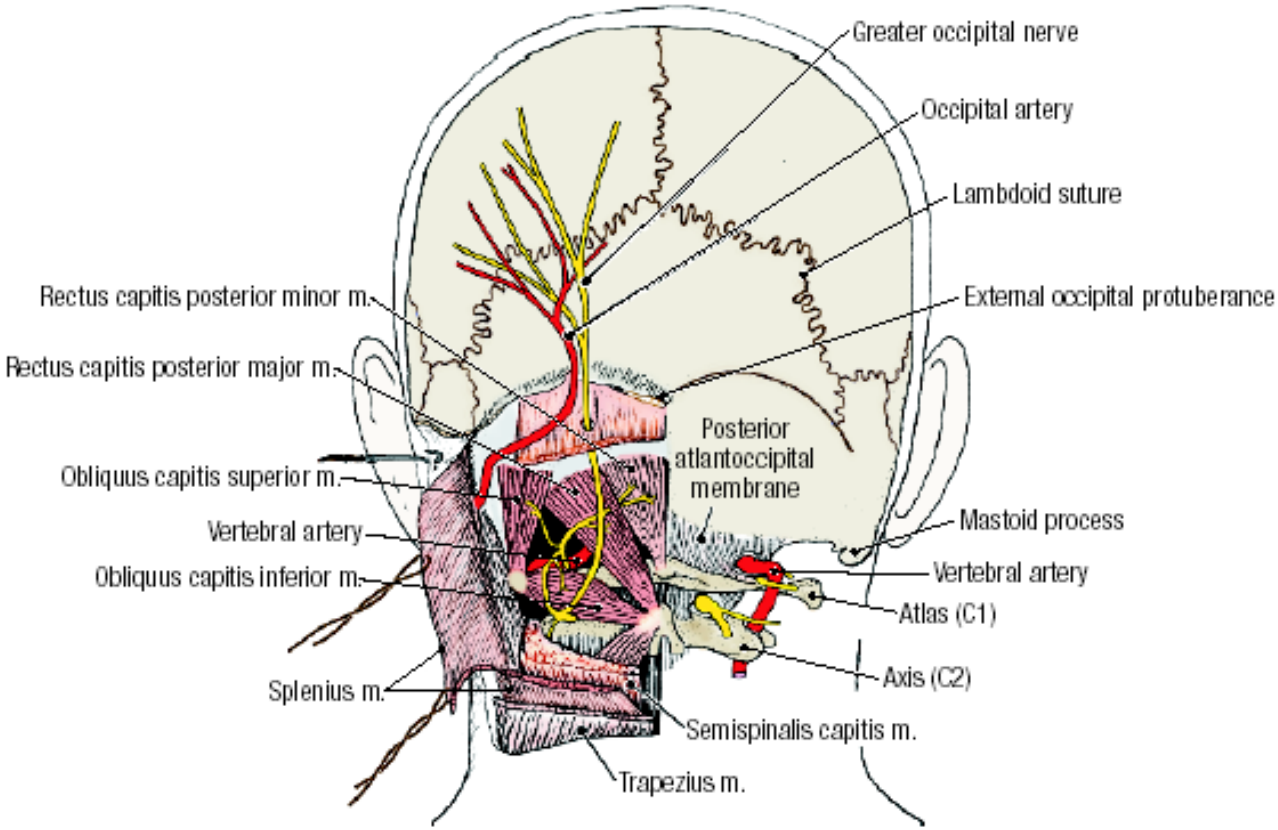
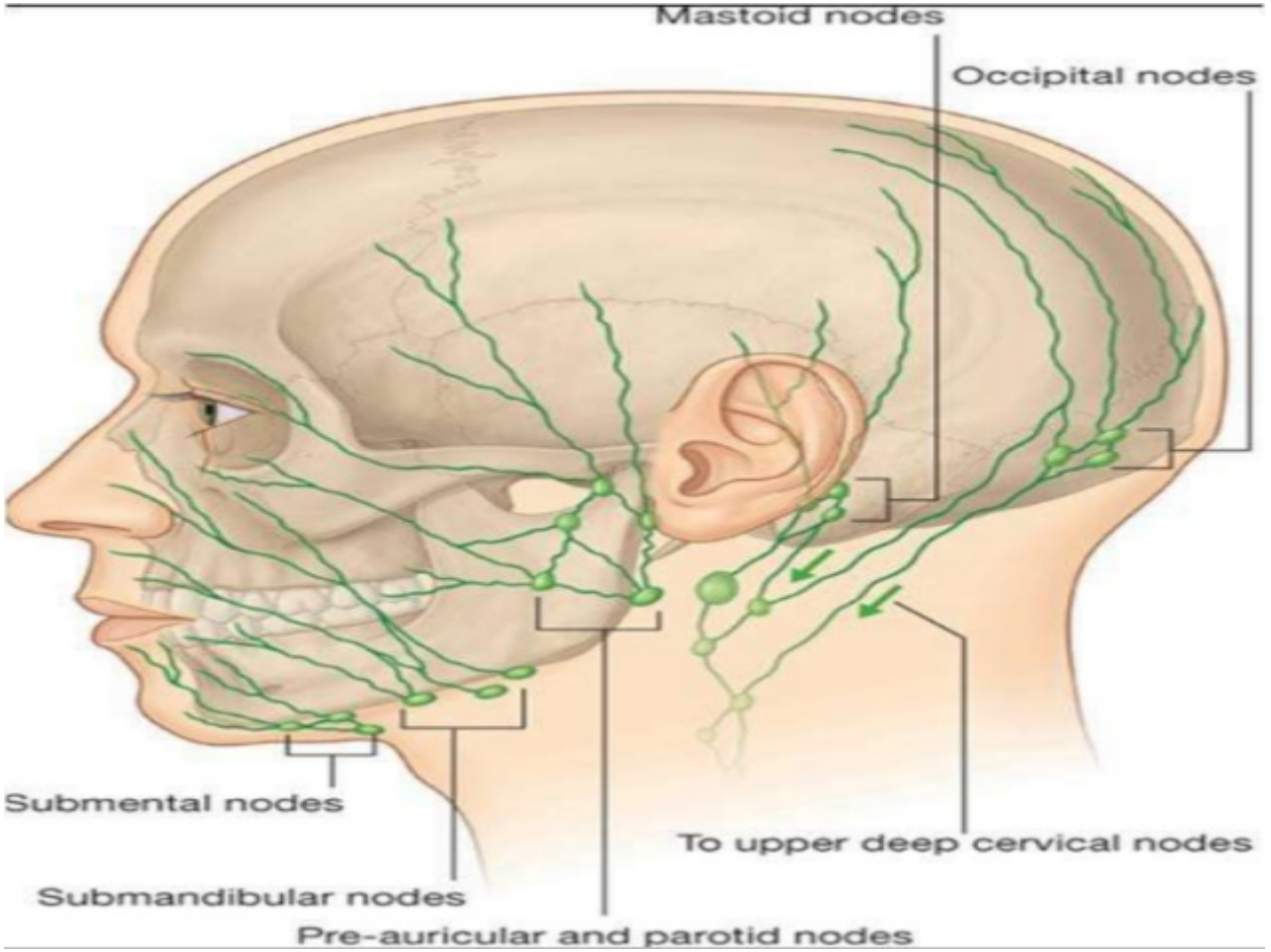


Figure 7.16. Muscles that must be removed to cut an occipital wedge.

Lymph Drainage of SCALP

- It also follows same pattern of Arteries of SCALP.
- Lymph Nodes for Drainage of SCALP
  - Occipital Node
  - Cervical Node
  - Mastoid Node
  - Parotid Node
  - Pre-auricle Node
  - Sub-Mandibular Node


Mastoid nodes
Occipital nodes
Submental nodes
Submandibular nodes
Pre-auricular and parotid nodes
To upper deep cervical nodes

Muscles of facial expression

- Embryologically - Mesoderm of 2nd branchial arch
- Morphologically – Remnants of panniculus carnosus
- Functionally – Regulators of three openings

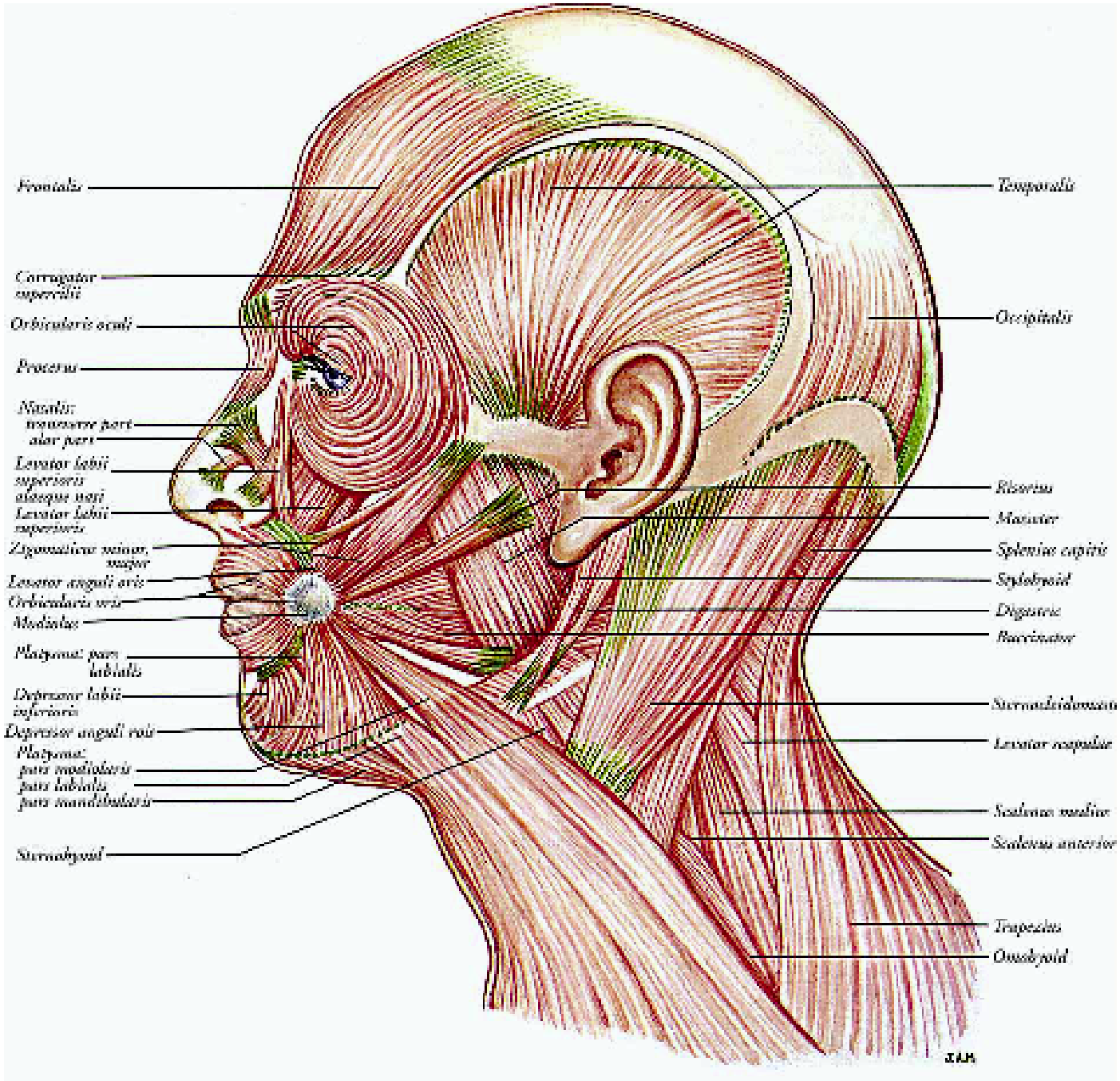
  Every opening has single sphincter (circular) and variable number of dilators (radial)

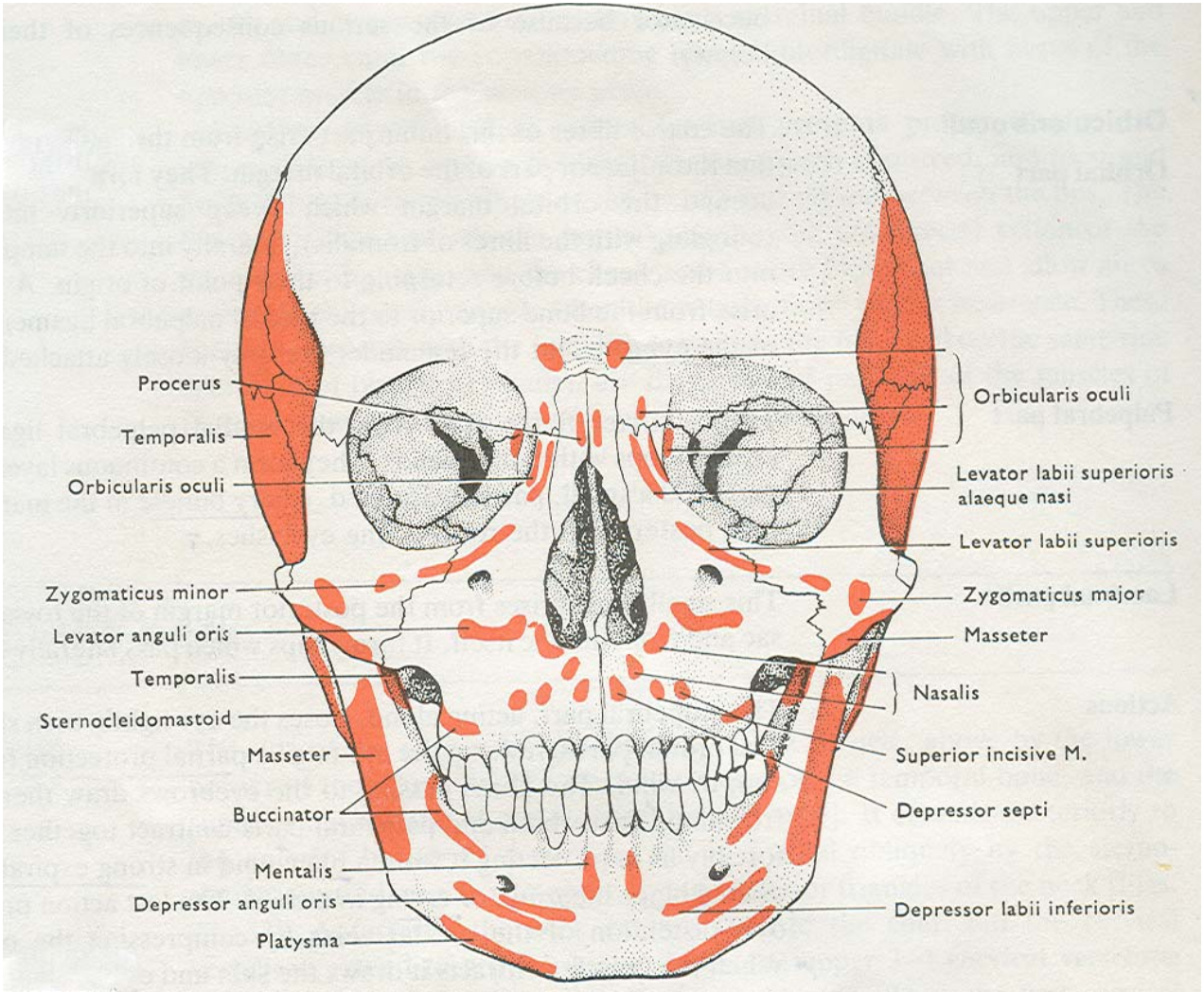
Muscles of facial expression

- Muscles of eyelids – Orbicularis oculi
  Corrugator supercilli
  Levator palpabrae sup.
- Muscles of nose – Procerus
  Compressor naris
  Dilator naris
  Depressor septi
- Muscles of neck – Platysma

Muscles of facial expression

- Muscles around mouth –
  - Orbicularis oris
  - Levator labii superioris et alaque nasi
  - Levator labii superioris
  - Levator anguli oris
  - Zygomaticus minor
  - Zygomaticus major
  - Depressor anguli oris
  - Depressor labii inferioris
  - Mentalis
  - Risorius
  - Buccinator


Frontalis
Corrugator supercilii
Orbicularis oculi
Procerus
Nasalis: transverse part
alar part
Levator labii superioris alaeque nasi
Levator labii superioris
Zygomaticus minor, major
Levator anguli oris
Orbicularis oris
Mentalis
Platysma: pars labialis
Depressor labii inferioris
Depressor anguli oris
Platysma: pars mandibularis
pars labialis
pars mandibularis
Sternohyoid
Temporalis
Occipitalis
Risorius
Masseter
Splenius capitis
Sphlohyoid
Digastric
Buccinator
Sternocleidomastoid
Levator scapulae
Scalenus medius
Scalenus anterior
Trapezius
Omohyoid
J.A.M.

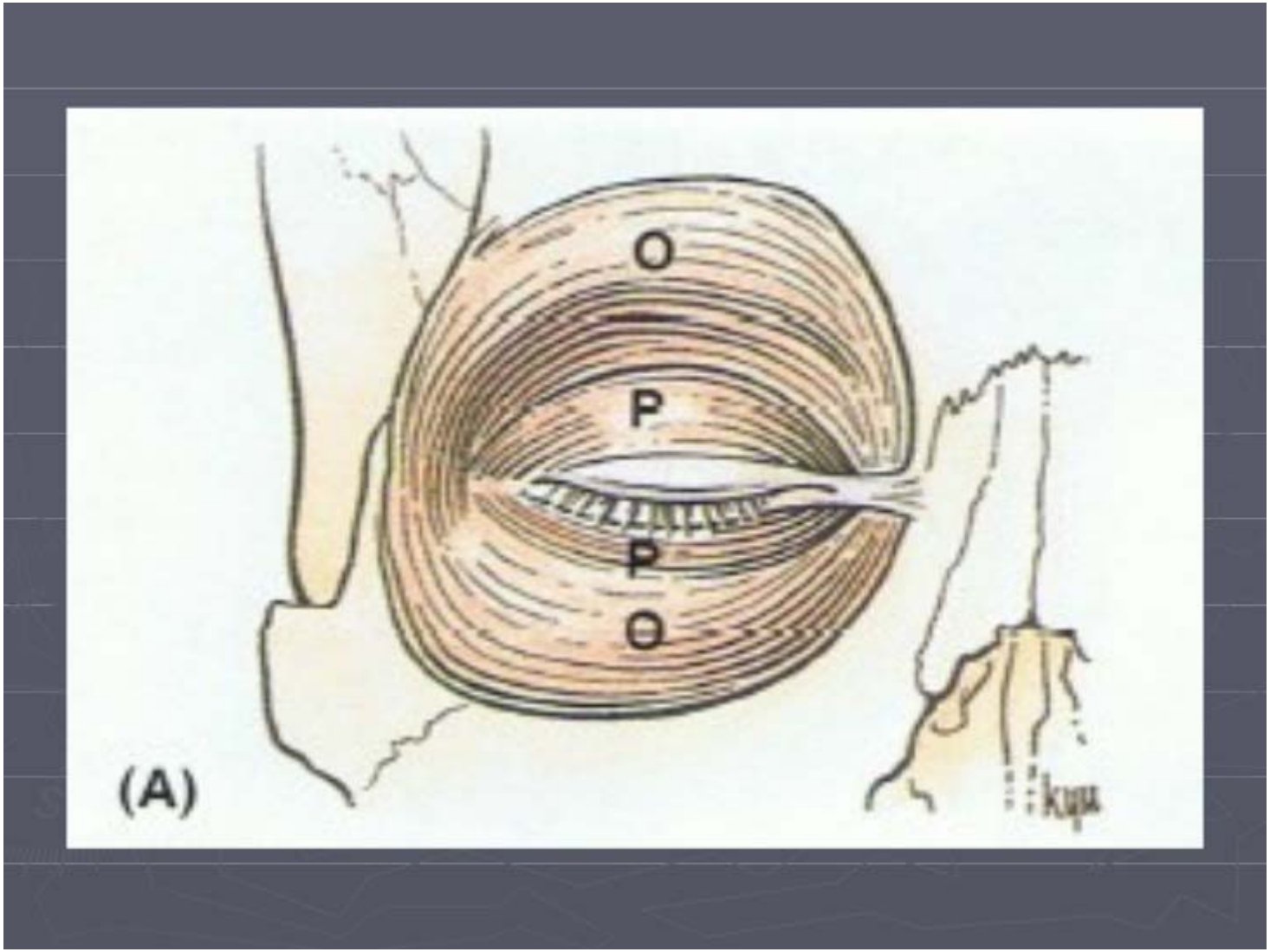

Procerus
Temporalis
Orbicularis oculi
Zygomaticus minor
Levator anguli oris
Temporalis
Sternocleidomastoid
Masseter
Buccinator
Mentalis
Depressor anguli oris
Platysma
Orbicularis oculi
Levator labii superioris alaeque nasi
Levator labii superioris
Zygomaticus major
Masseter
Nasalis
Superior incisive M.
Depressor septi
Depressor labii inferioris

Common Facial Expressions

- Surprise/horror – Frontal belly of occipitofrontalis
- Winking – Orbicularis oculi
- Frowning – Corrugator supercilii, Procerus
- Anger – Dilator naris, Depressor septi
- Sadness – Depressor labii inferioris, Depressor anguli oris
- Smiling/laughing – Zygomaticus major
- Grief – Depressor anguli oris
- Doubt – Mentalis, Depressor labii inferioris
- Grinning – Risorius

Orbicularis Oculi

- Origin
  Orbital part – medial palpebral ligament
  adjacent orbital margin
  Palpebral part – medial palpebral ligament
  Lacrimal part – posterior margin of lacrimal fossa
  sheath of lacrimal sac
- Insertion – skin
  lateral palpebral raphe
  upper and lower tarsal plates
- Action – Closing of eyes
  Protection from sunlight/danger/expiratory efforts
  Promotes the flow of tears towards lacrimal canaliculi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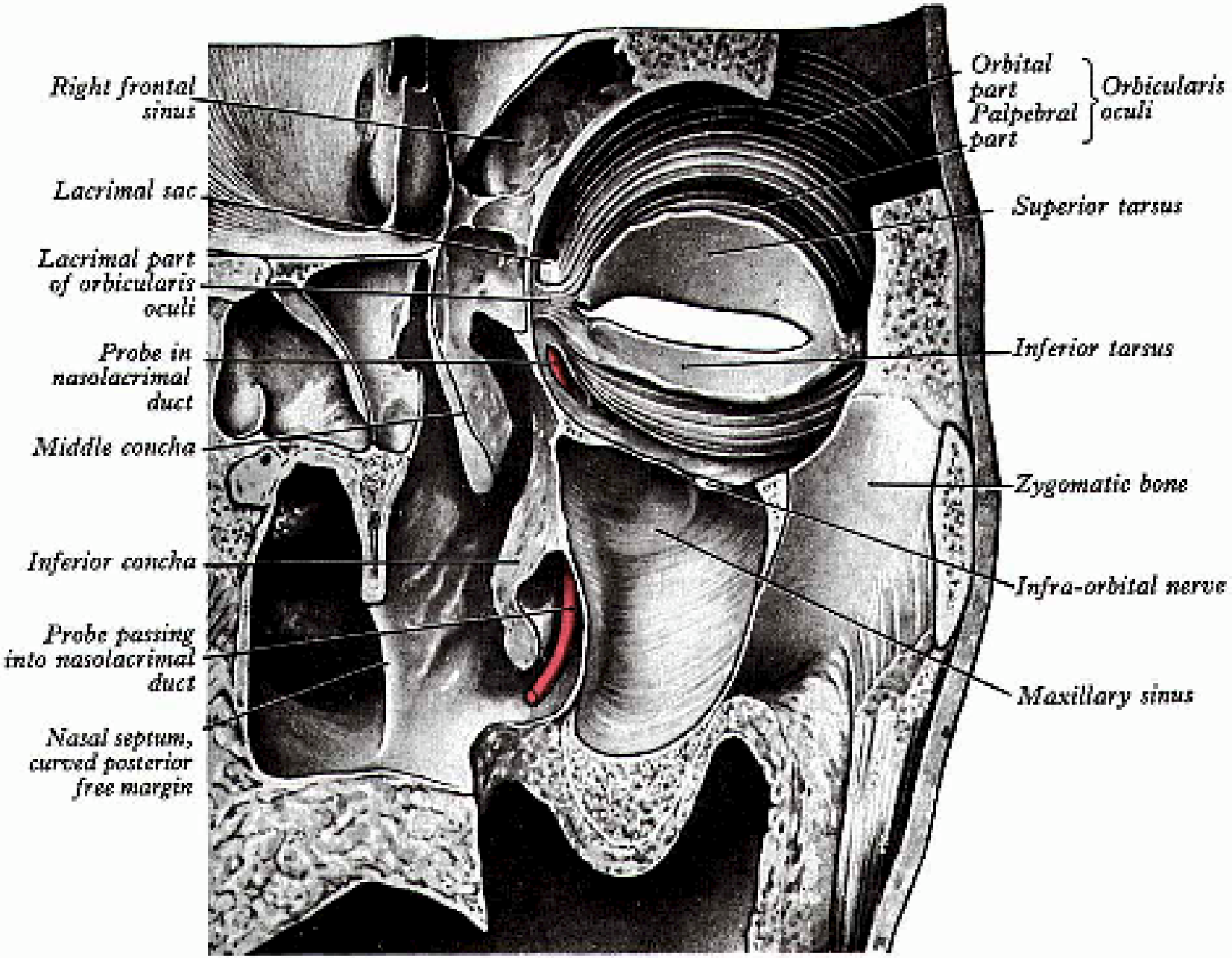
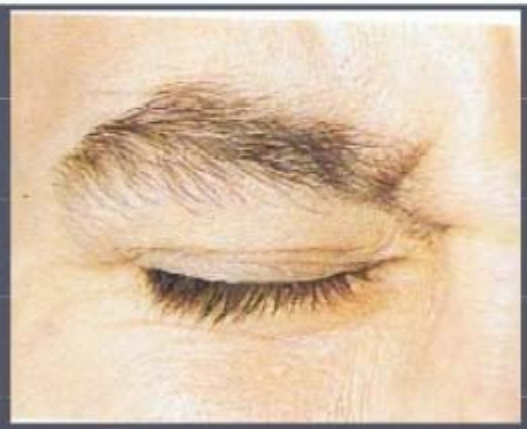
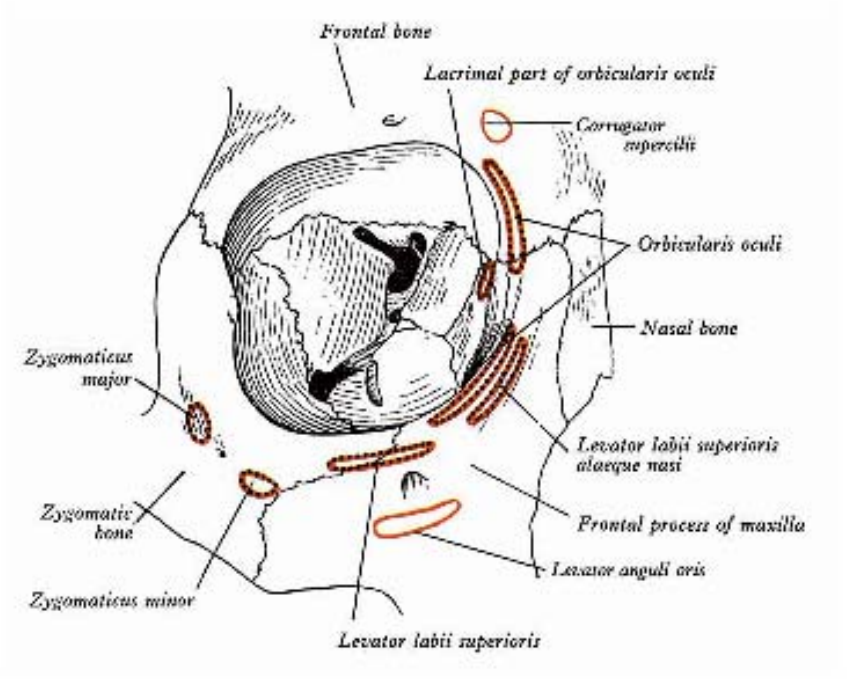
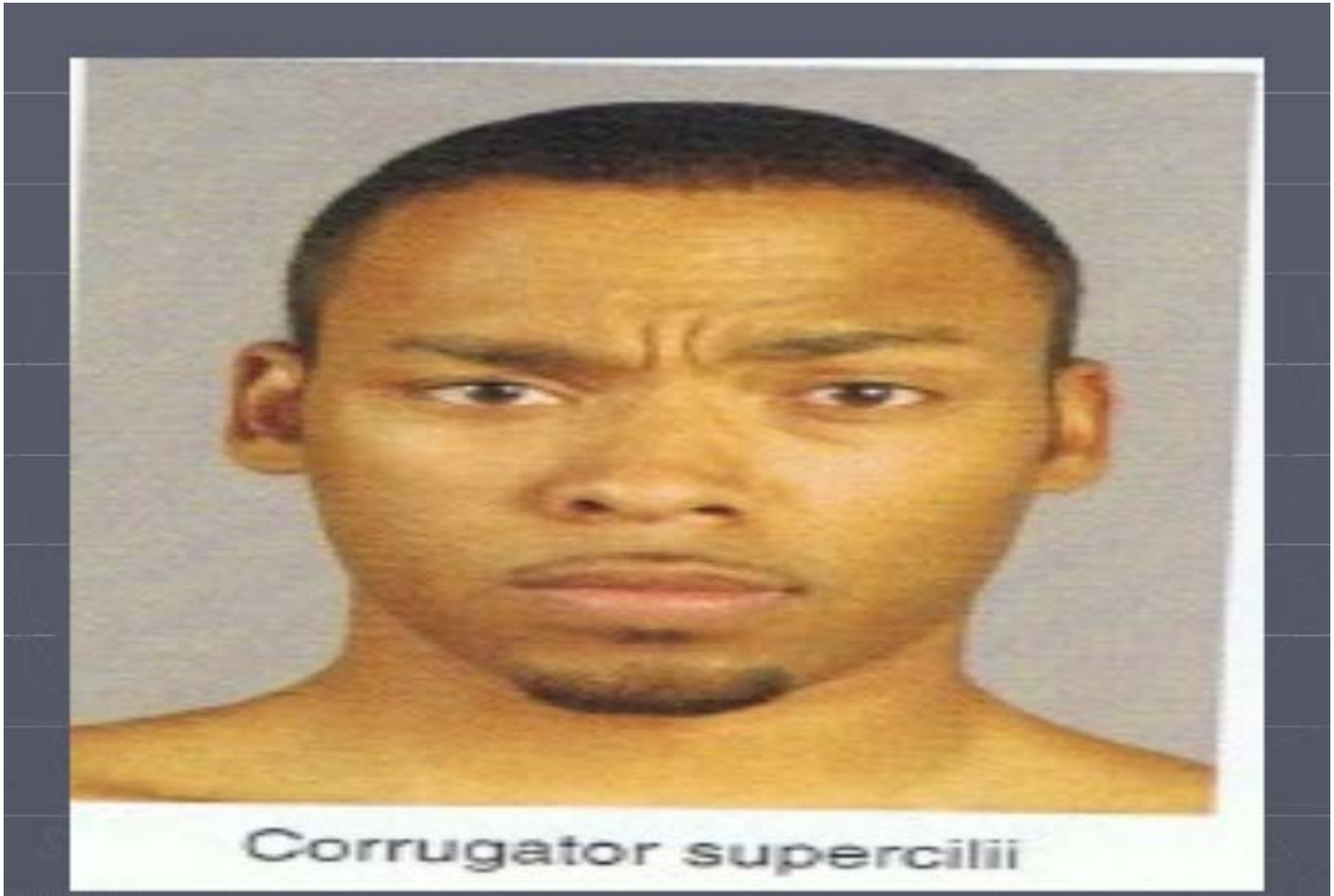

Right frontal sinus
Lacrimal sac
Lacrimal part of orbicularis oculi
Probe in nasolacrimal duct
Middle concha
Inferior concha
Probe passing into nasolacrimal duct
Nasal septum, curved posterior free margin
Orbital part
Palpebral part
Orbicularis oculi
Superior tarsus
Inferior tarsus
Zygomatic bone
Infra-orbital nerve
Maxillary sinus

Actions

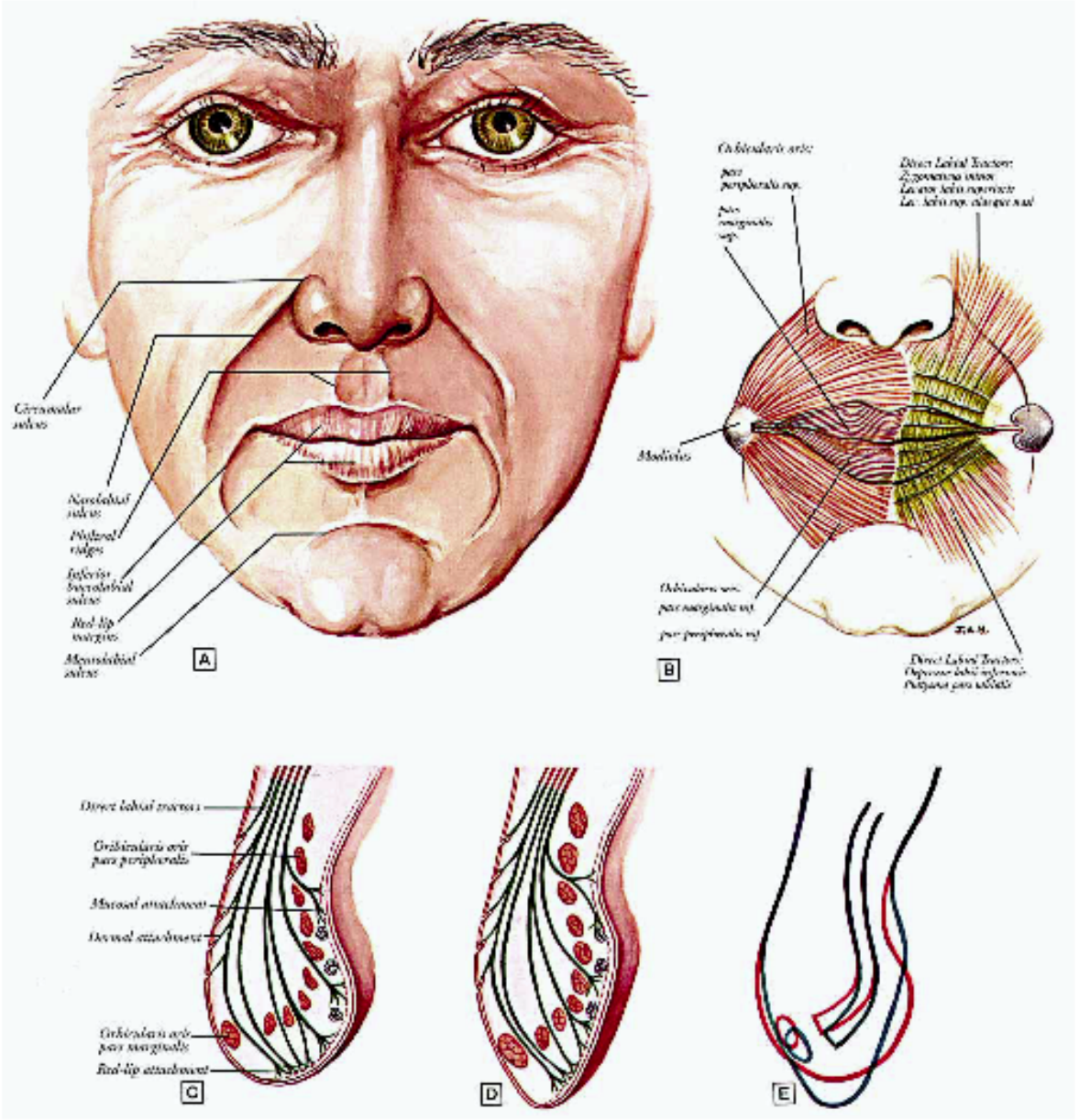
- Palpebral fibres- close lids gently
- Orbital part – lowers the eyebrow
- Together they close eyelids forcibly




Frontal bone
Lacrimal part of orbicularis oculi
Corrugator supercilii
Orbicularis oculi
Nasal bone
Zygomaticus major
Levator labii superioris alaeque nasi
Zygomatic bone
Frontal process of maxilla
Levator anguli oris
Zygomaticus minor
Levator labii superioris



Corrugator supercilii


Circumoral sulcus
Nasolabial sulcus
Palpebral ridges
Inferior buccolabial sulcus
Red-lip margins
Mentolabial sulcus
A
Orbicularis oris: pars peripheralis sup.
Pars marginalis sup.
Levator labii superioris
Levator labii sup. alaeque nasi
Modiolus
Orbicularis oris: pars marginalis inf.
pars peripheralis inf.
Depressor labii inferioris
Platysma pars labialis
B
Direct labial muscles
Orbicularis oris pars peripheralis
Mucosal attachment
Dermal attachment
Orbicularis oris pars marginalis
Red-lip attachment
C
D
E

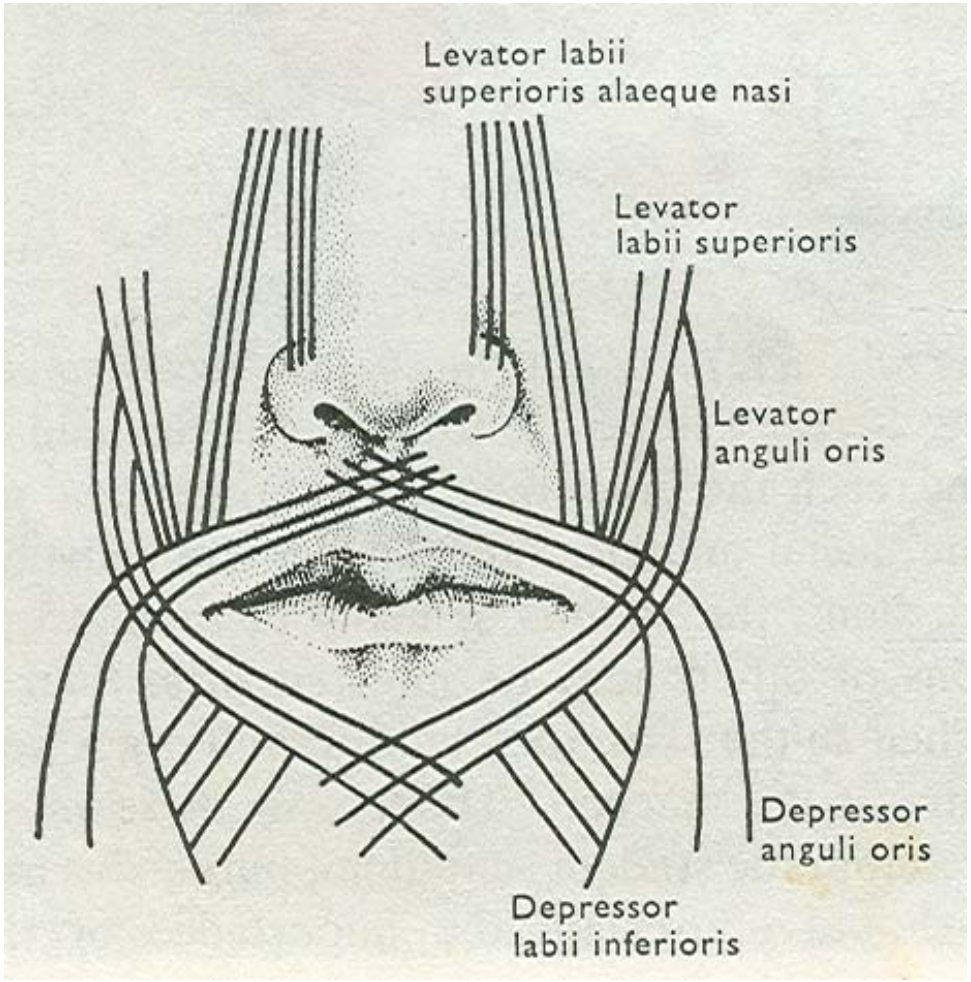
Orbicularis Oris

- Interlacing fibres which converge on the mouth
- Other muscles fibres mingle and sweep in curves through the lips
- Buccinator fibres also converge
- Origin

  Intrinsic part – very thin sheet

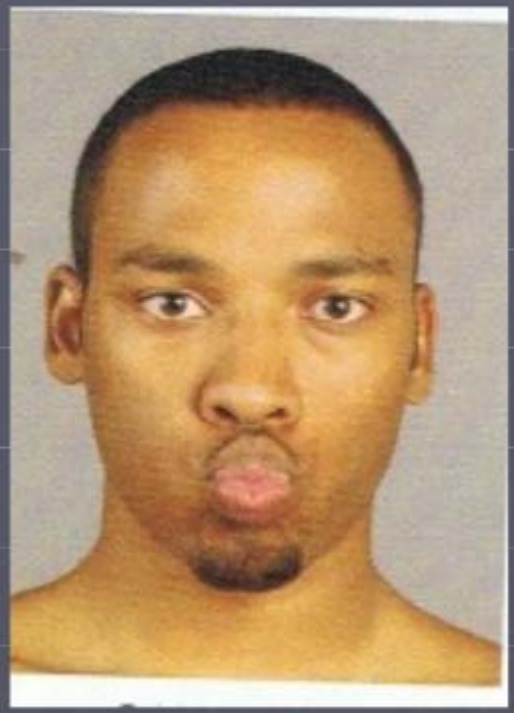
  Superior part from maxilla

  Inferior part from mandible
- Insertion – Angle of mouth


Levator labii
superioris alaeque nasi
Levator
labii superioris
Levator
anguli oris
Depressor
anguli oris
Depressor
labii inferioris

Orbicularis oris

- Intrinsic fibres – from mandible & maxilla near midline . Deepest fibres
- Extrinsic fibres – form bulk , most come from buccinator .
- Action – narrowing of mouth



Platysma

Origin - Upper part of pectoral fascia

Deltoid fascia

Insertion – Base of mandible

Skin of lower face/lip

Action – Releases pressure on veins

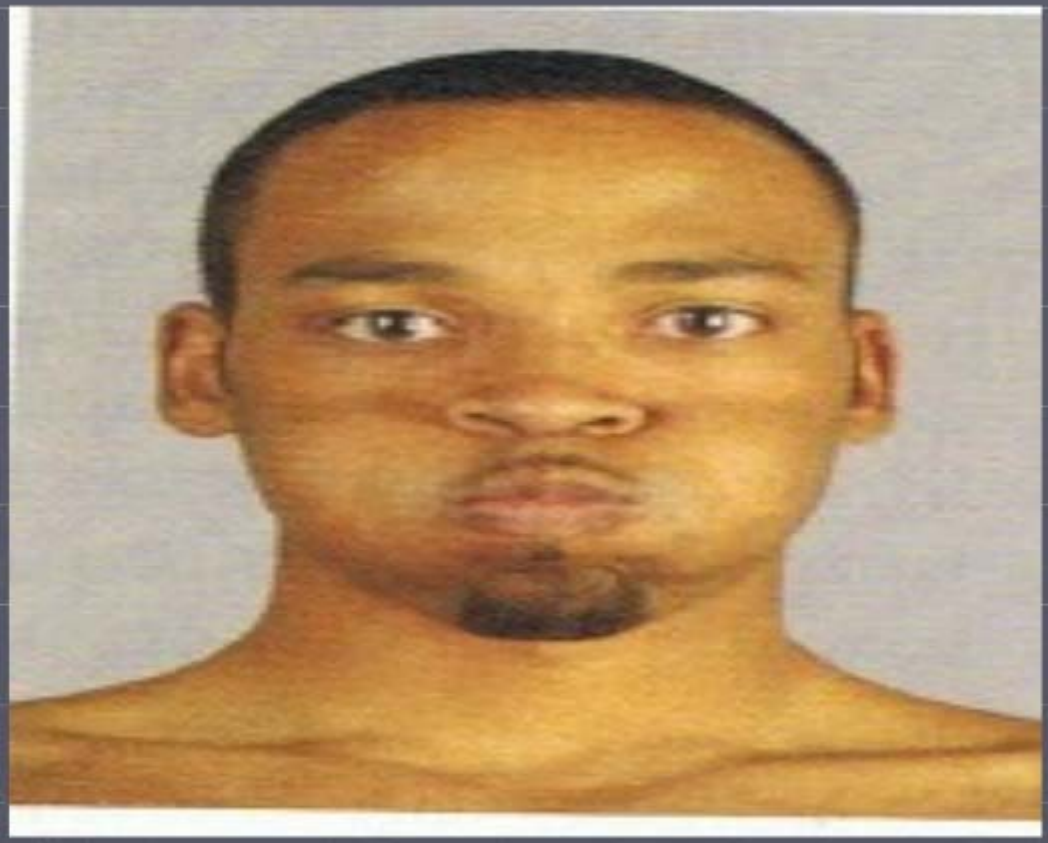
Pull angle of mouth downwards

Buccinator

- Thin flat rectangular muscle
- Origin – alveolar processes of maxilla and mandible opposite molar teeth , pterygomandibular raphae
- Insertion – modiolus (knot of muscles lateral to angle of mouth , resp. for dimples)

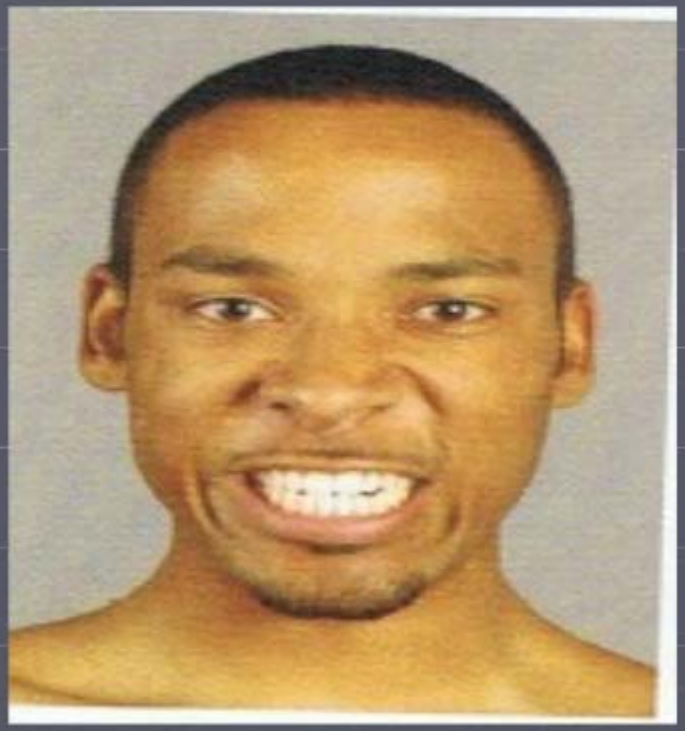
Actions

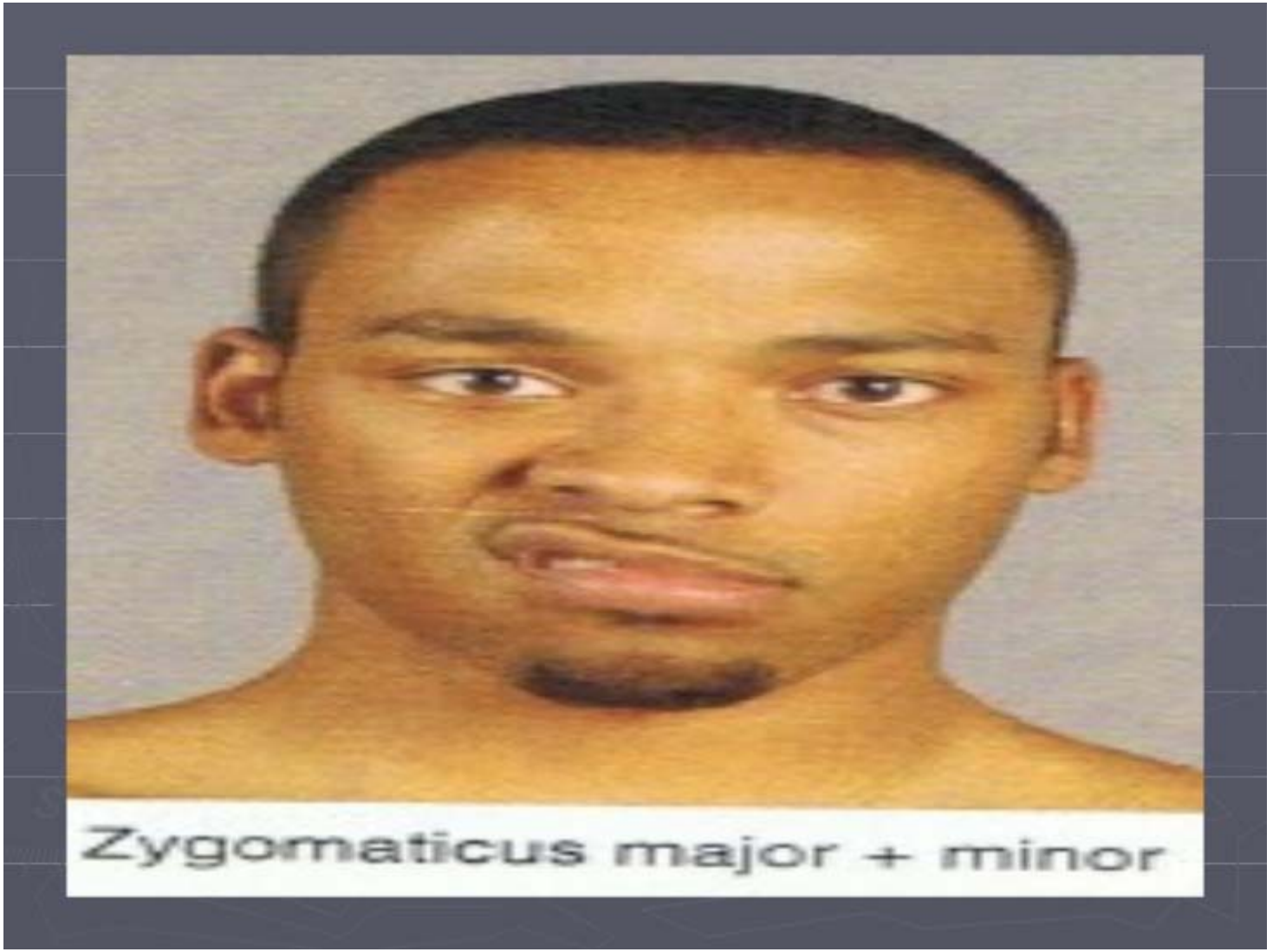
- Accessory muscle of mastication
- Return bolus of food from cheek pouch to molars
- keeps the cheek taut so prevents it from folding & get injured during chewing
- Forcible expulsion of air from mouth



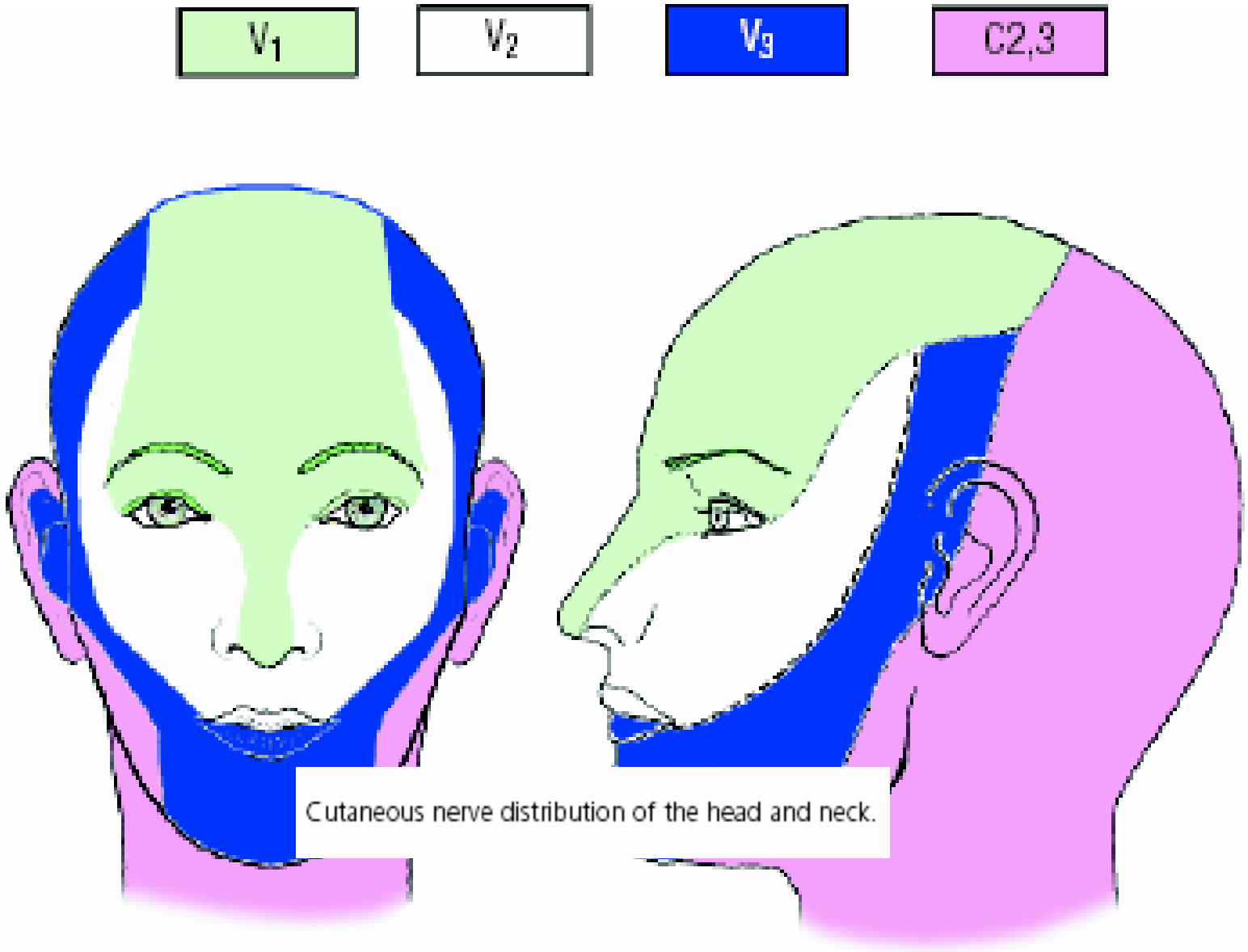
Dilator muscles of mouth

- Levator labii superioris aleque nasii
- Levator labii superioris
- Levator anguli oris
- Zygomaticus minor & major
- Depressor anguli oris
- Depressor labii inferioris




Zygomaticus major + minor

Depressor anguli oris



Cutaneous nerve distribution of the head and neck.

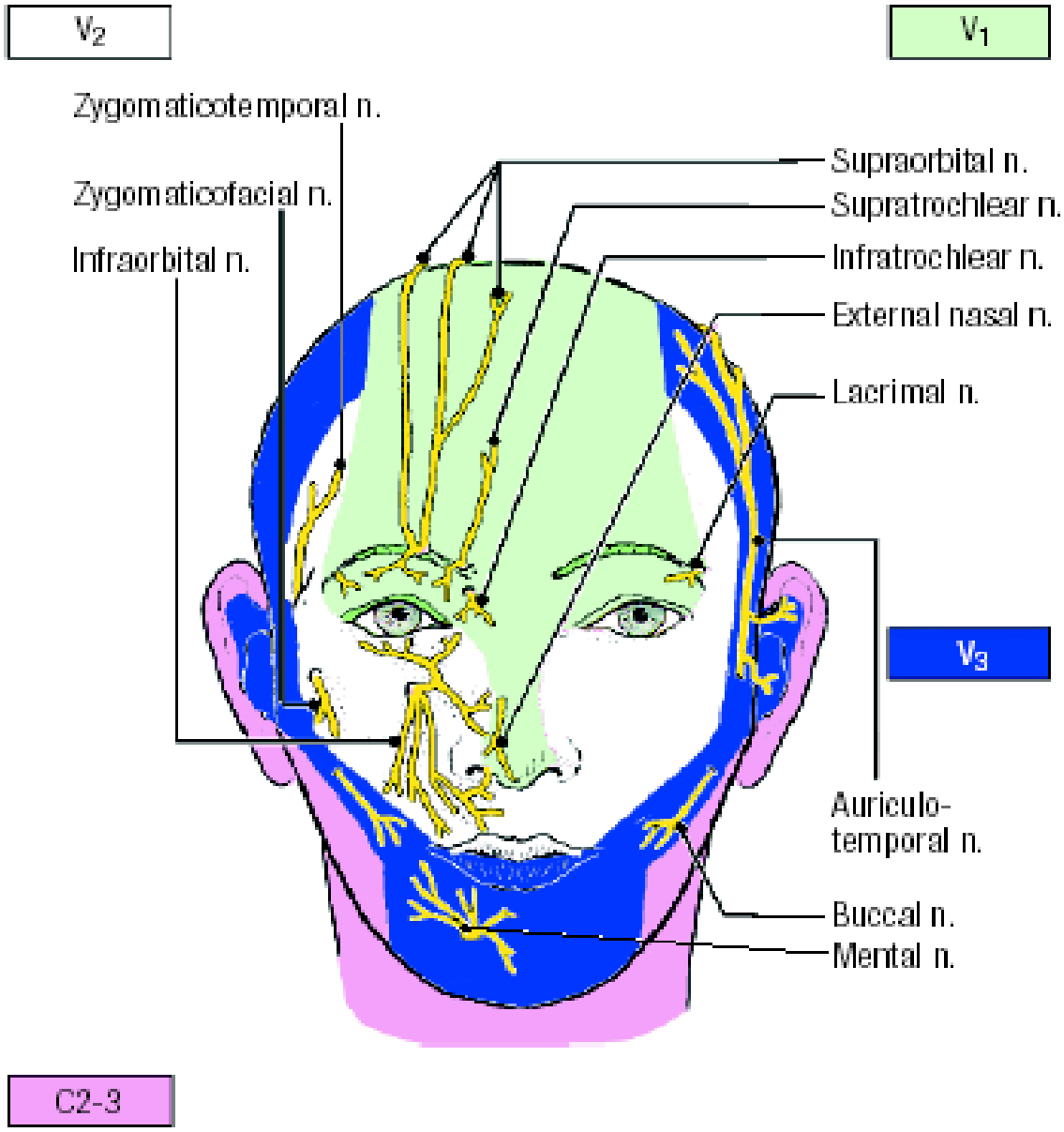
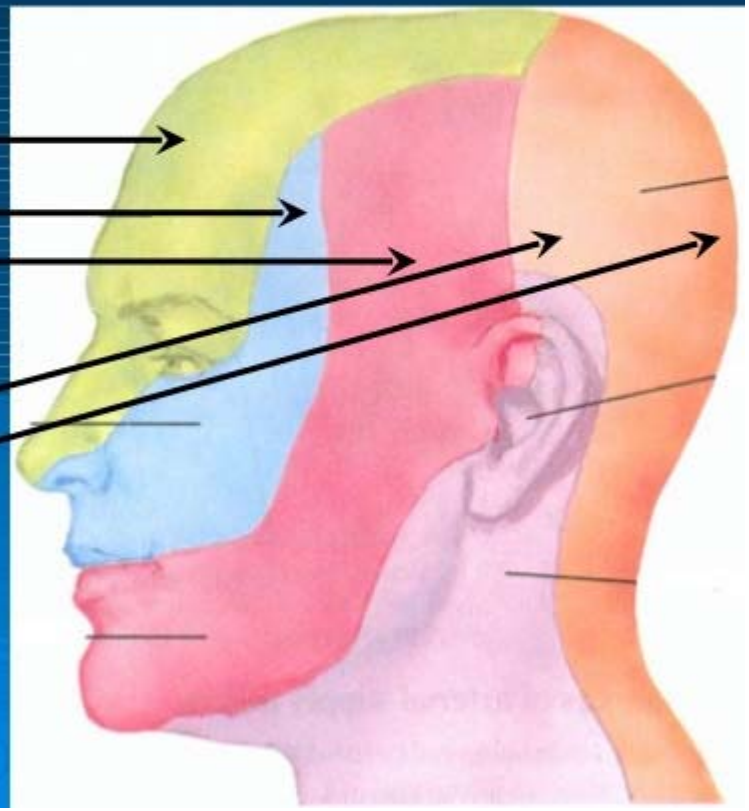
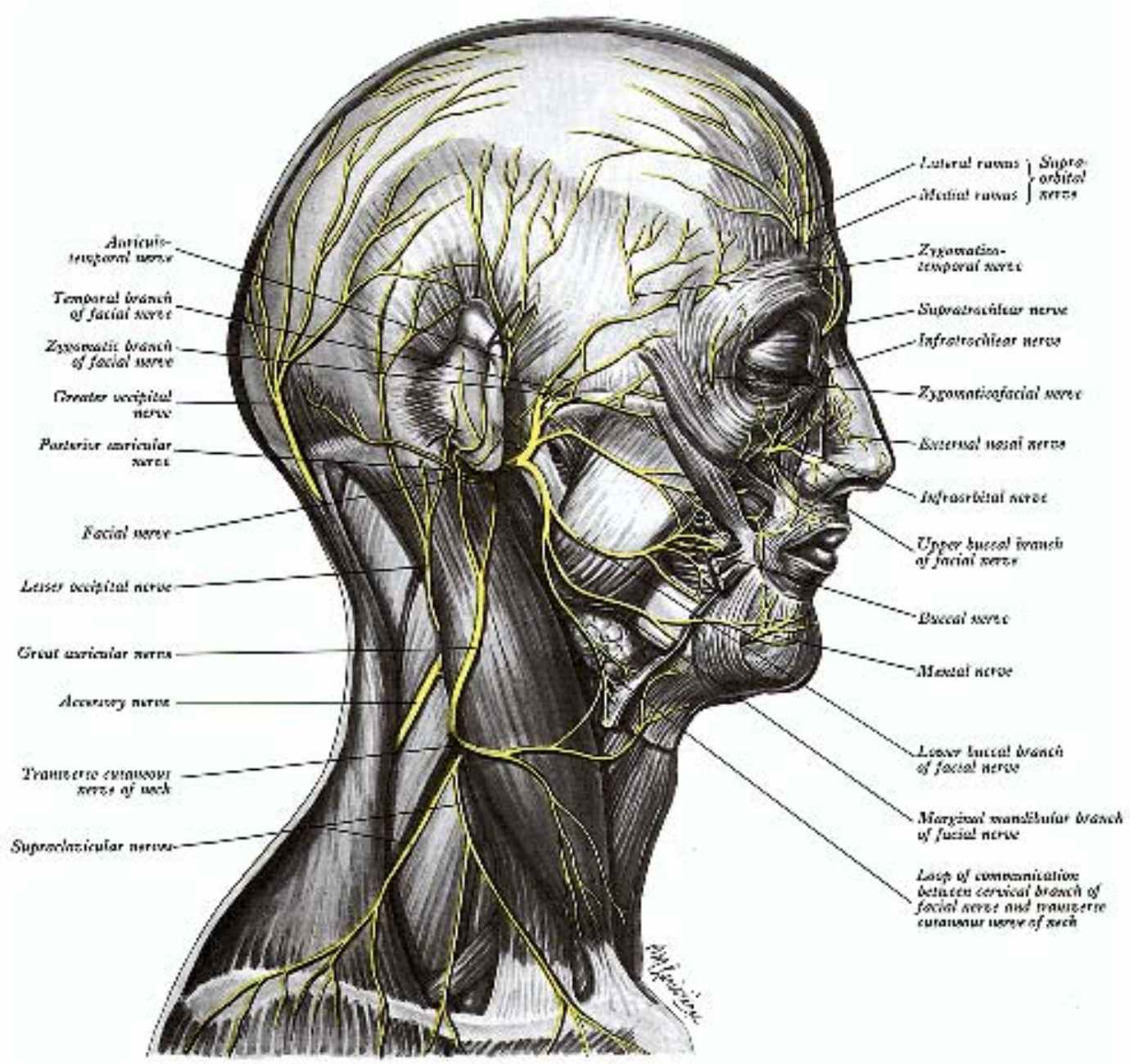


Figure 7.10. Sensory nerves of the face.

CUTANEOUS INNERVATION OF FACE

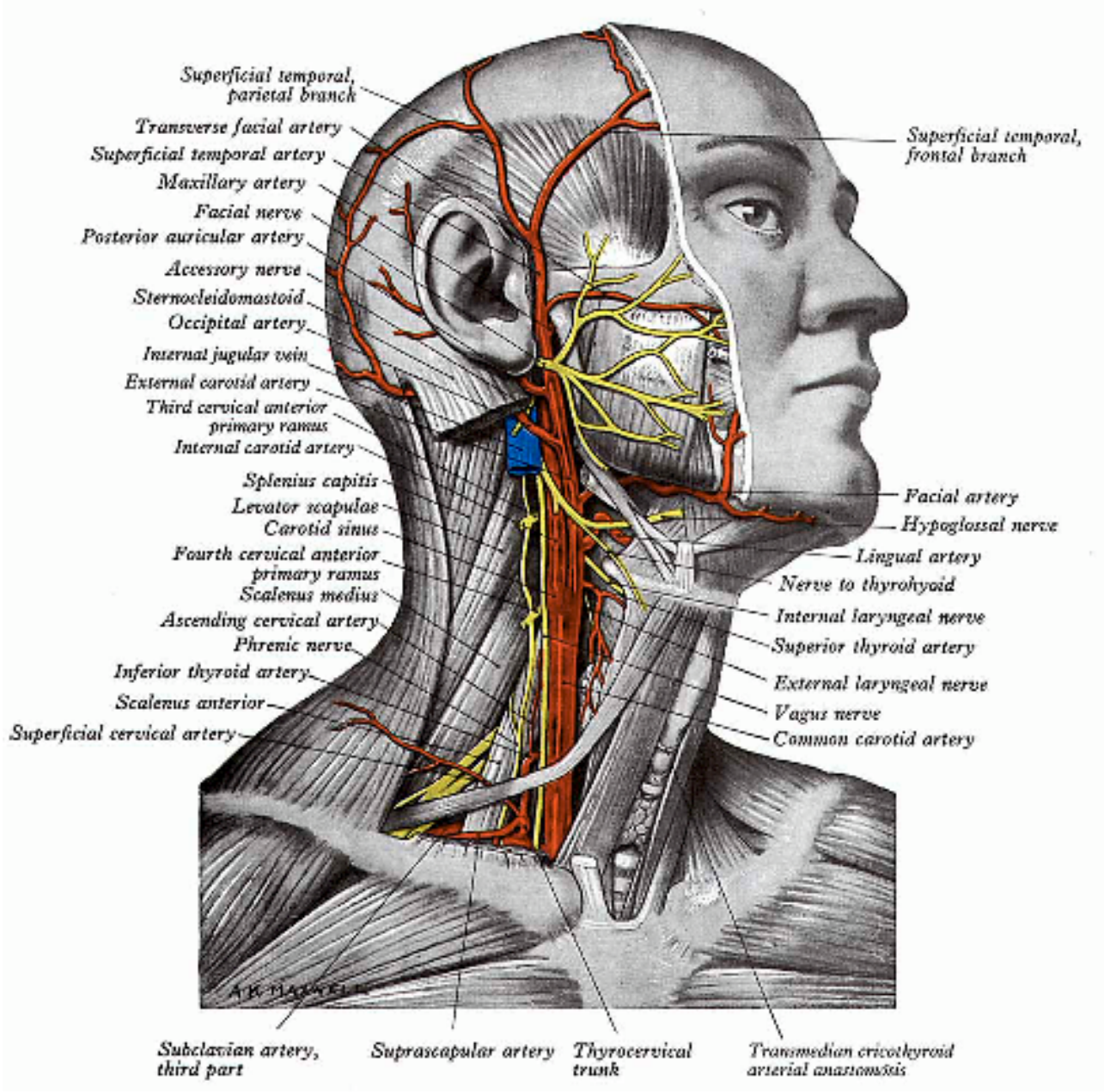
- **Branches of trigeminal nerve (CN V):**
  - Ophthalmic (V_1)
  - Maxillary (V_2)
  - Mandibular (V_3)
- **Cervical plexus branches (C2)**
  - Lesser occipital
  - Great auricular
- **Greater occipital nerve (dorsal ramus of C2)**

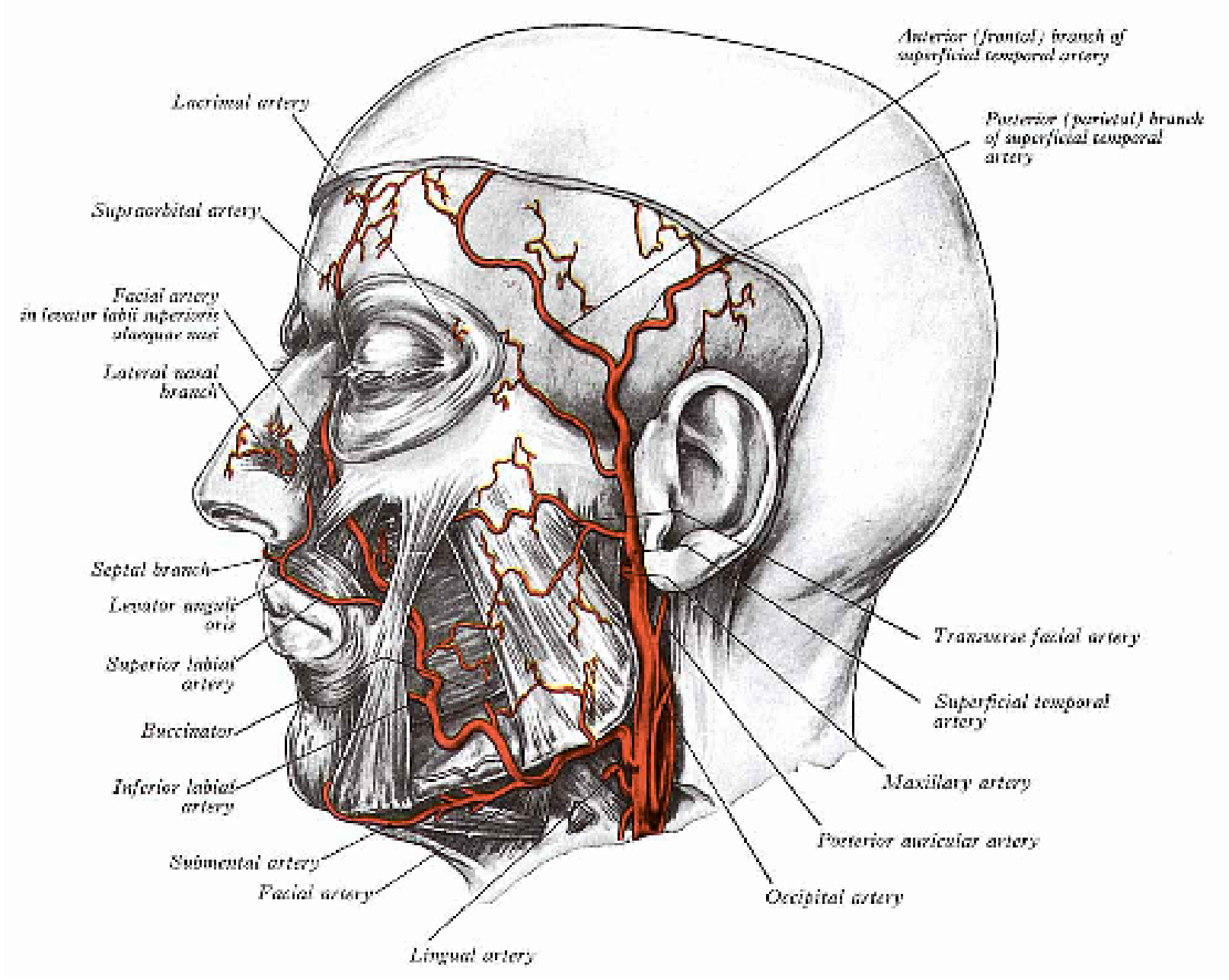



Auriculo-temporal nerve
Temporal branch of facial nerve
Zygomatic branch of facial nerve
Greater occipital nerve
Posterior auricular nerve
Facial nerve
Lesser occipital nerve
Great auricular nerve
Accessory nerve
Transverse cutaneous nerve of neck
Supraclavicular nerves
Lateral ramus
Medial ramus
Supra-orbital nerve
Zygomatico-temporal nerve
Supratrochlear nerve
Infratrochlear nerve
Zygomaticofacial nerve
External nasal nerve
Infraorbital nerve
Upper buccal branch of facial nerve
Buccal nerve
Mental nerve
Lower buccal branch of facial nerve
Marginal mandibular branch of facial nerve
Loop of communication between cervical branch of facial nerve and transverse cutaneous nerve of neck

Arterial supply

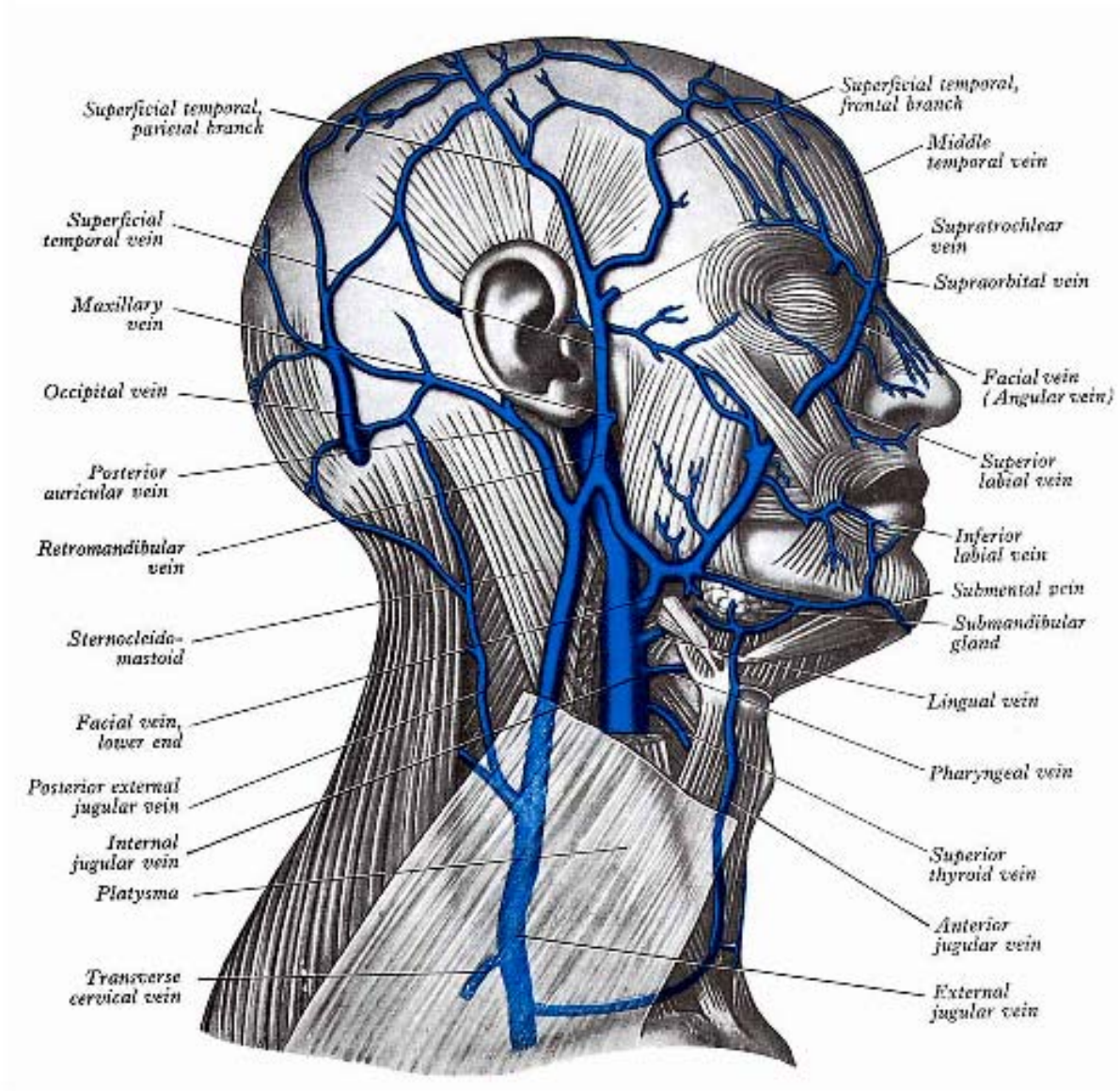
- Facial a. – superior & inferior labial a. , lateral nasal a. , angular a.
- Superficial temporal a. – gives transverse facial a.
- Supra orbital & supra trochlear a. - branches of ophthalmic a.

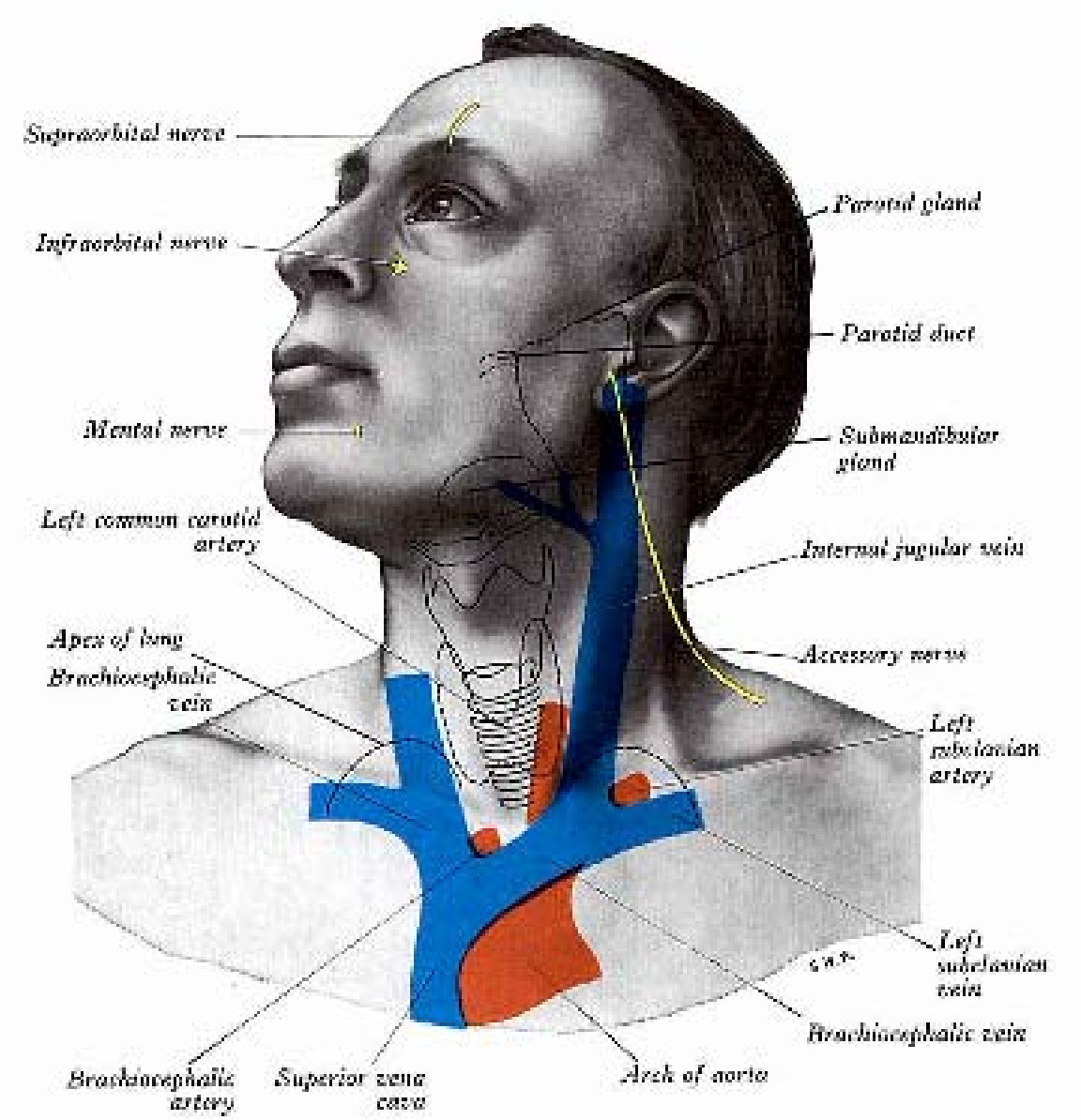

Superficial temporal, parietal branch
Transverse facial artery
Superficial temporal artery
Maxillary artery
Facial nerve
Posterior auricular artery
Accessory nerve
Sternocleidomastoid
Occipital artery
Internal jugular vein
External carotid artery
Third cervical anterior primary ramus
Internal carotid artery
Splenius capitis
Levator scapulae
Carotid sinus
Fourth cervical anterior primary ramus
Scalenus medius
Ascending cervical artery
Phrenic nerve
Inferior thyroid artery
Scalenus anterior
Superficial cervical artery
Superficial temporal, frontal branch
Facial artery
Hypoglossal nerve
Lingual artery
Nerve to thyrohyoid
Internal laryngeal nerve
Superior thyroid artery
External laryngeal nerve
Vagus nerve
Common carotid artery
Subclavian artery, third part
Suprascapular artery
Thyrocervical trunk
Transmedian cricothyroid arterial anastomosis


Anterior (frontal) branch of superficial temporal artery
Lacrimal artery
Posterior (parietal) branch of superficial temporal artery
Supraorbital artery
Facial artery in levator labii superioris alaeque nasi
Lateral nasal branch
Septal branch
Levator anguli oris
Superior labial artery
Buccinator
Inferior labial artery
Submental artery
Facial artery
Lingual artery
Transverse facial artery
Superficial temporal artery
Maxillary artery
Posterior auricular artery
Occipital artery

Veins of face

- Supra orbital & supra trochlear veins join & form angular v. , continues as facial v.
- Retromandibular v.- formed by joining of superficial temporal v. & max. v.
- Dangerous area of face


Superficial temporal, parietal branch
Superficial temporal vein
Maxillary vein
Occipital vein
Posterior auricular vein
Retromandibular vein
Sternocleido-mastoid
Facial vein, lower end
Posterior external jugular vein
Internal jugular vein
Platysma
Transverse cervical vein
Superficial temporal, frontal branch
Middle temporal vein
Supratrochlear vein
Supraorbital vein
Facial vein (Angular vein)
Superior labial vein
Inferior labial vein
Submental vein
Submandibular gland
Lingual vein
Pharyngeal vein
Superior thyroid vein
Anterior jugular vein
External jugular vein


Supraorbital nerve
Infraorbital nerve
Mental nerve
Left common carotid artery
Apex of lung
Brachiocephalic vein
Brachiocephalic artery
Superior vena cava
Arch of aorta
Parotid gland
Parotid duct
Submandibular gland
Internal jugular vein
Accessory nerve
Left subclavian artery
Left subclavian vein
Brachiocephalic vein

Facial lacerations

- No deep fascia
- Loose SC tissue
- Lacerations gape widely
- Bruising & inflammation causes large swellings
- Wrinkles occur perpendicular to muscle fibres

Paralysis of facial muscles

- Injury to 7 nerve

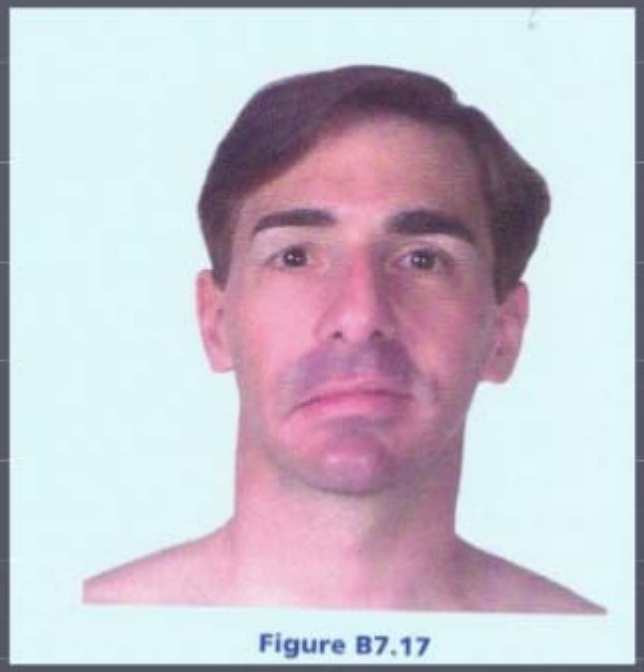


Figure B7.17

Applied Anatomy For Orbicularis Oculi

- If any injury to the nerve which supplies that muscle, it will lead to paralyses of that muscle. This causes the dropping of lower eyelid , called as "Ectropion'' and
- Spilling of tears , called as "Epiphora".

- Some times there will be radiating wrinkles at the angle of the eye during strong closure. This called as "Crow's Feet"

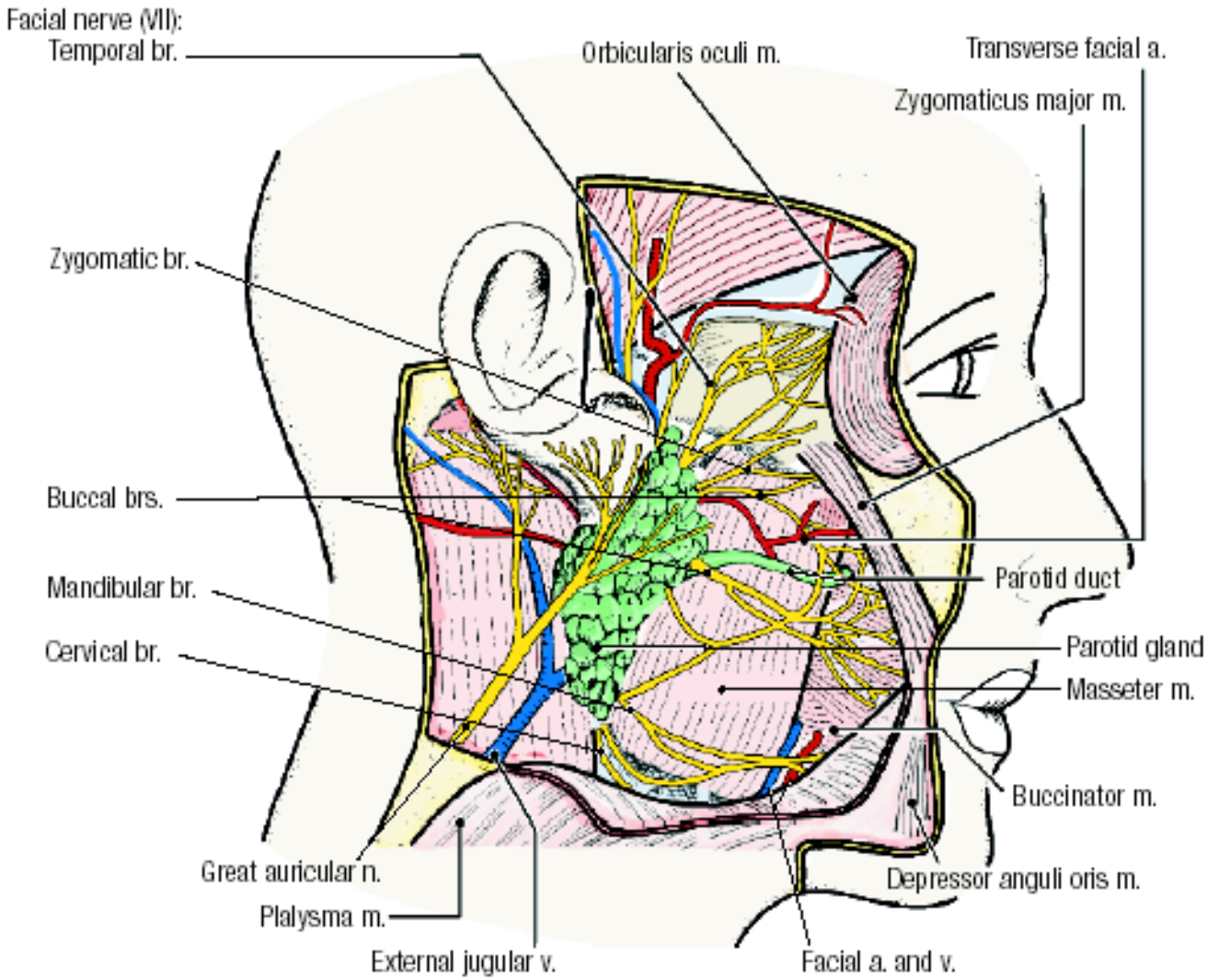


Figure 7.08. Dissection of the lateral aspect of the face.