

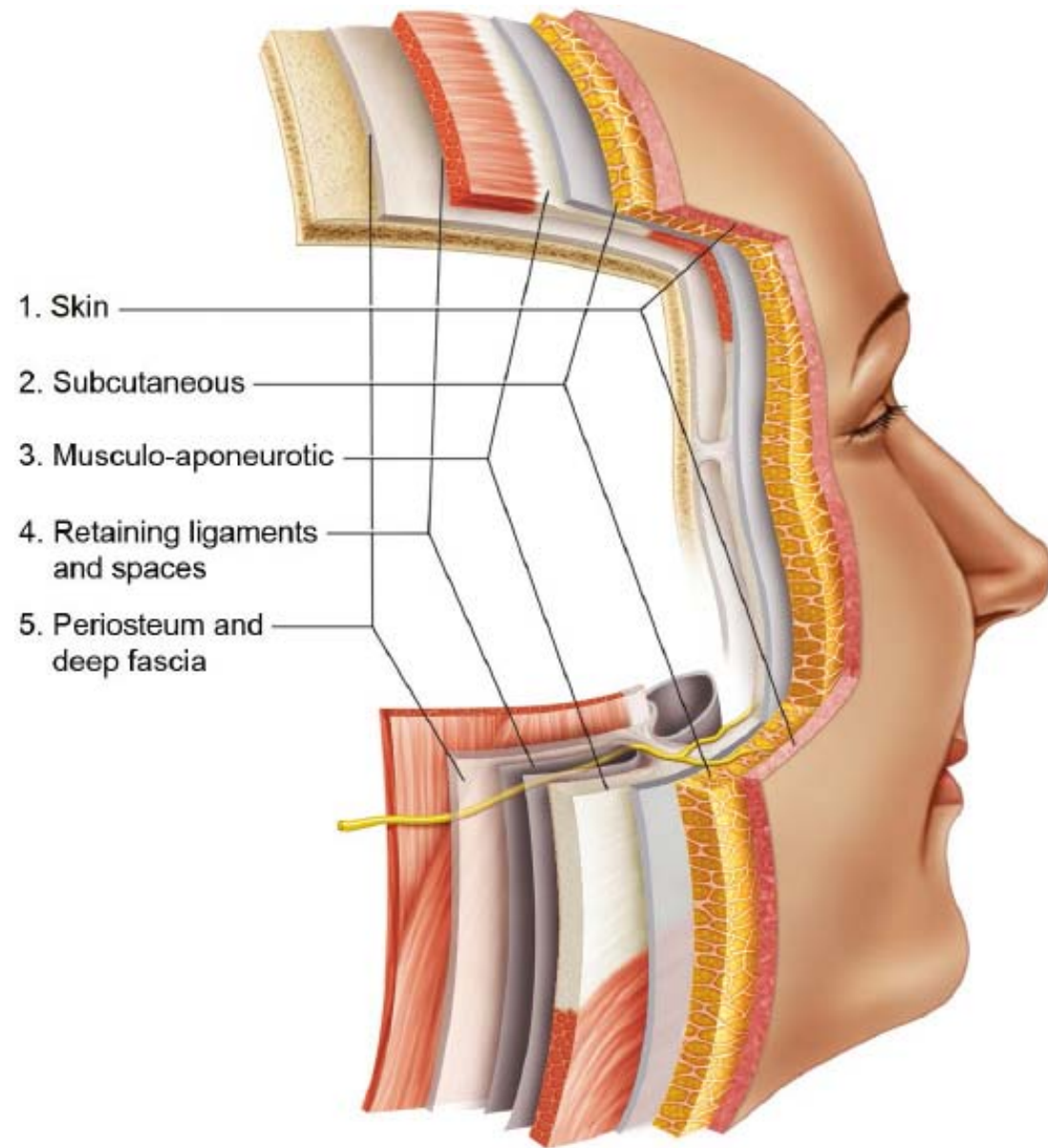
# Face, Scalp, and Cervical Plexus

# Lecture Objectives

- Review the general anatomical features of **the face and scalp**.
- Describe blood supply, innervation, and lymphatic drainage of the face and scalp.
- Make a list of contributing roots to **cervical plexus**.
- Discuss the general arrangement.
- Describe the location of this plexus.
- Make a list of the outcoming nerves.
- Follow the branches to their target organs.
- Make a list of the cutaneous nerves.
- Follow the cutaneous branches to their destinations.

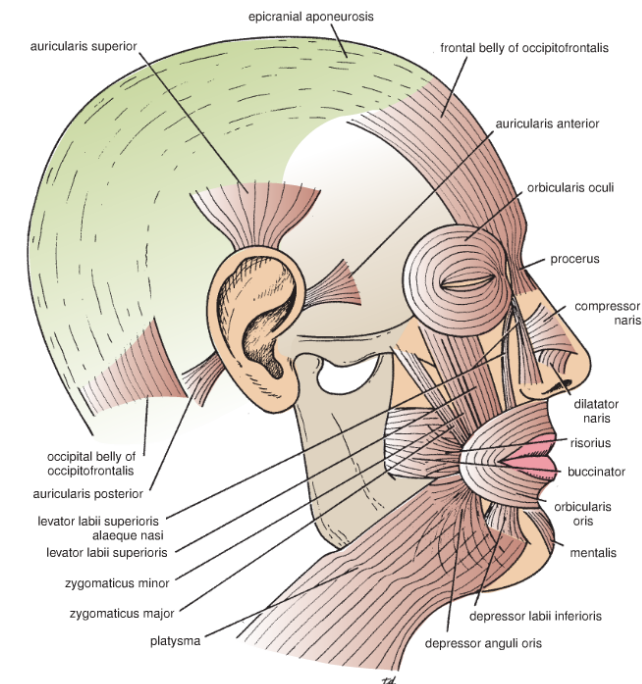
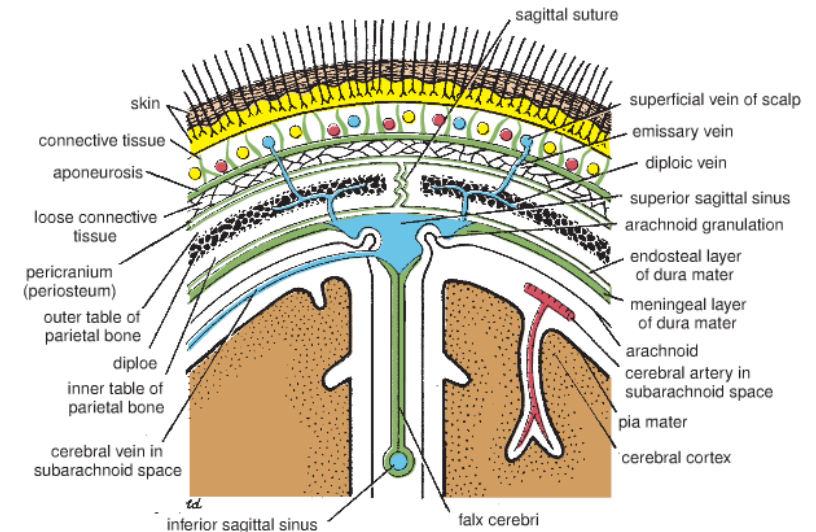
# Facial Layers

- Skin (Layer 1)
- Subcutaneous layer (Layer 2)
  - Superficial fat compartments
- Superficial musculo-aponeurotic system (SMAS) (Layer 3)
- Retaining ligaments and deep compartments (Layer 4)
  - Deep fat compartments
- Deep fascia &/or periosteum (Layer 5)



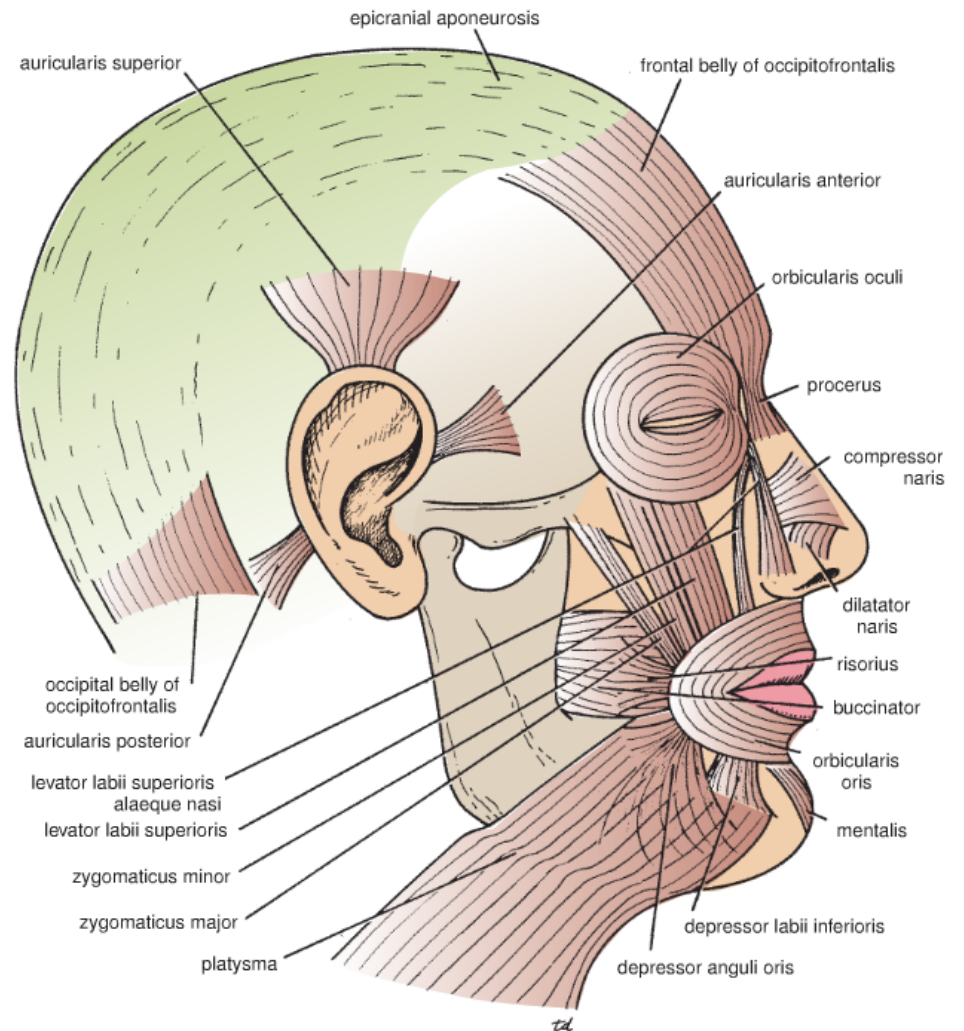
# Layers of the Scalp

- Layers of scalp
  - Skin
  - CT (subcutaneous layer)
    - Rich in BVs, lymphatics and nerves
  - Aponeurosis of **occipitofrontalis muscle**
  - Loose CT
    - Allows movement of above layers
  - Periosteum
- Muscles of the External Ear
  - **Auricularis anterior, posterior & superior**

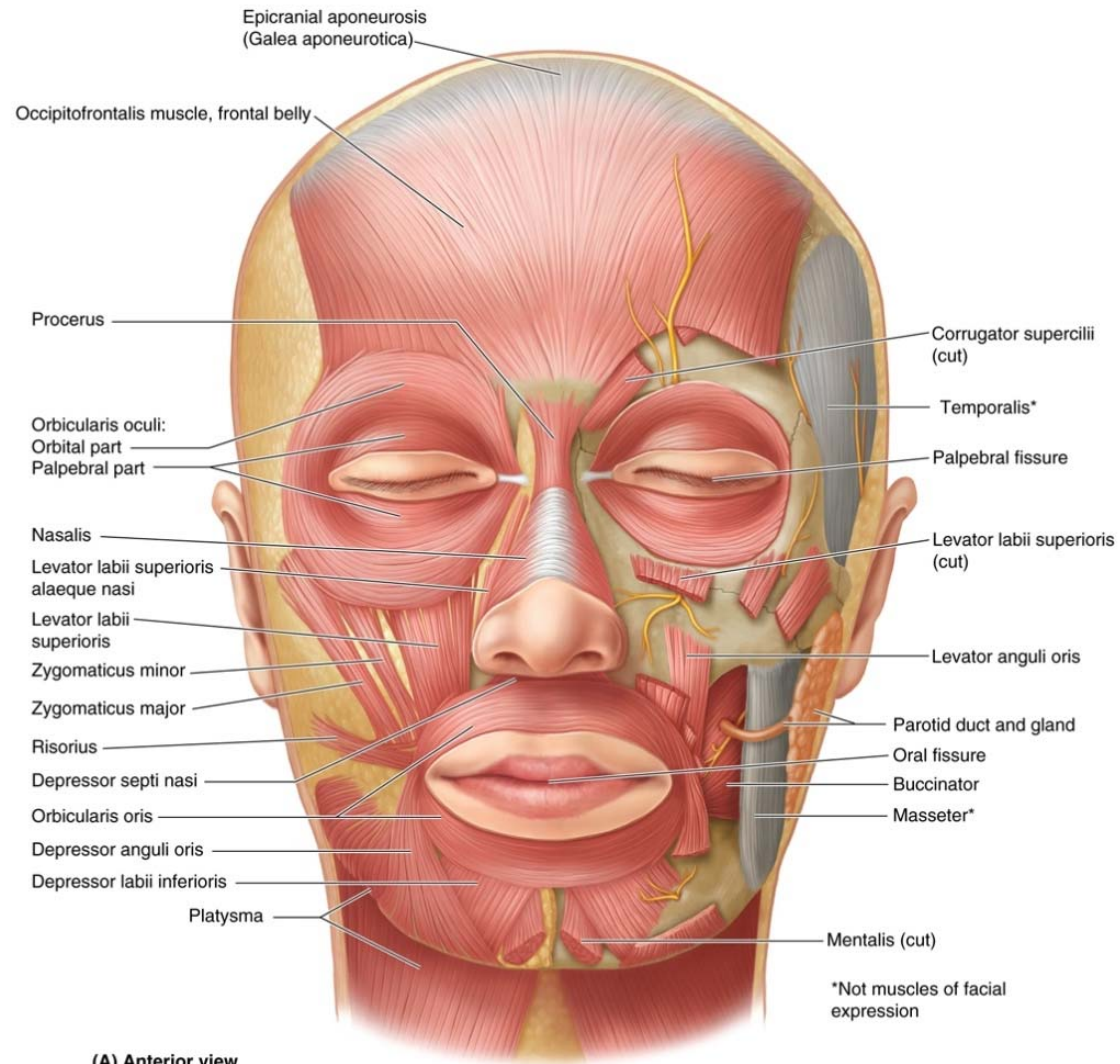


# Muscles of Facial Expression

- Arise from fascia or skull bones & insert onto skin
- Encircle eyes, nose & mouth
- Express emotions
- Facial Nerve (VII)
- Bell's palsy = facial paralysis



# Facial Muscles

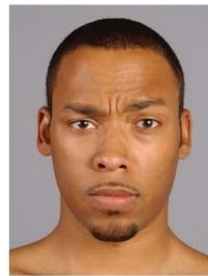


(A) Anterior view

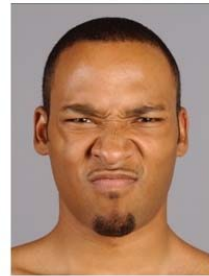
# Facial Muscles Action



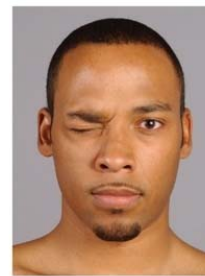
Occipitofrontalis



Corrugator supercilii



Procerus + transverse  
part of nasalis



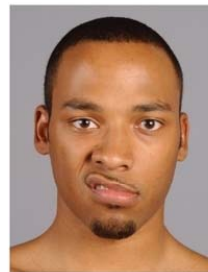
Orbicularis oculi



Lev. labii sup. alaeque nasi +  
alar part of nasalis



Buccinator + orbicularis oris



Zygomaticus major + minor



Risorius



Risorius + depressor  
labii inferioris



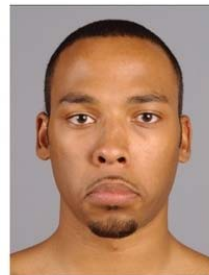
Levator labii superioris +  
depressor labii



Dilators of mouth:  
Risorius plus levator labii superioris  
+ depressor labii inferioris



Orbicularis oris



Depressor anguli oris

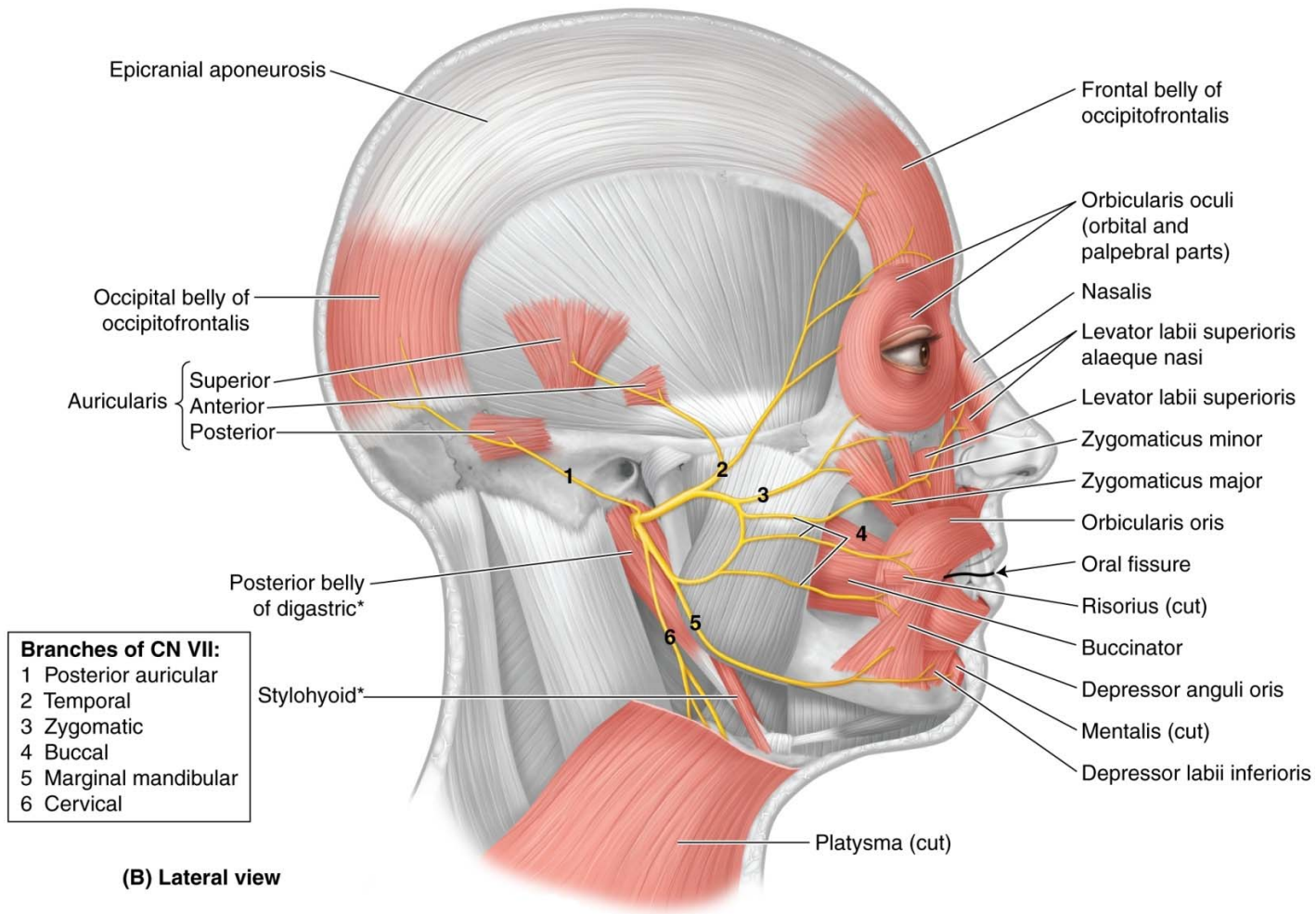


Mentalis



Platysma

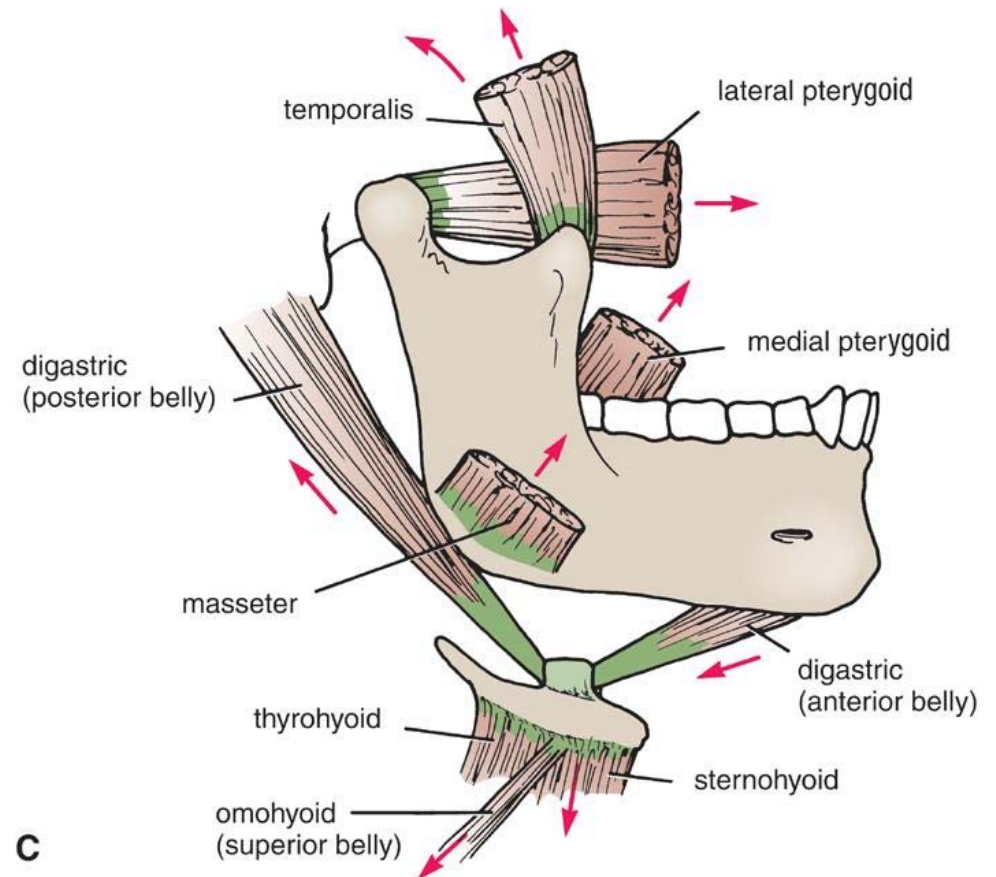
# Facial Muscles Innervation



| Muscle                                                                                                                                                                                                                                                            | Origin                                                                                                                                                                               | Insertion                                                                                                                                                               | Nerve Supply                                                                                 | Action                                                                                                                                                                                                                                                                 |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Muscle of Scalp</b><br>Occipitofrontalis<br>Occipital belly<br>Frontal belly                                                                                                                                                                                   | Highest nuchal line of occipital bone<br>Skin and superficial fascia of eyebrows                                                                                                     | Epicranial aponeurosis                                                                                                                                                  | Facial nerve                                                                                 | Moves scalp on skull and raises eyebrows                                                                                                                                                                                                                               |
| <b>Muscles of Facial Expression</b><br>Orbicularis oculi<br>Palpebral part<br>Orbital part<br>Corrugator supercilii<br>Compressor nasi<br>Dilator naris<br>Procerus<br>Orbicularis oris                                                                           | Medial palpebral ligament<br>Medial palpebral ligament and adjoining bone<br>Superciliary arch<br>Frontal process of maxilla<br>Maxilla<br>Nasal bone<br>Maxilla, mandible, and skin | Lateral palpebral raphe<br>Loops return to origin<br>Skin of eyebrow<br>Aponeurosis of bridge of nose<br>Ala of nose<br>Skin between eyebrows<br>Encircles oral orifice | Facial nerve<br>Facial nerve<br>Facial nerve<br>Facial nerve<br>Facial nerve<br>Facial nerve | Closes eyelids and dilates lacrimal sac<br>Throws skin around orbit into folds to protect eyeball<br>Vertical wrinkles of forehead, as in frowning<br>Compresses mobile nasal cartilages<br>Widens nasal aperture<br>Wrinkles skin of nose<br>Compresses lips together |
| <b>Dilator Muscles of Lips</b><br>Levator labii superioris alaeque nasi<br>Levator labii superioris<br>Zygomaticus minor<br>Zygomaticus major<br>Levator anguli oris<br>Risorius<br>Depressor labii inferioris<br>Depressor anguli oris<br>Mentalis<br>Buccinator | Arise from bones and fascia around oral aperture and insert into substance of lips<br>Outer surface of alveolar margins of maxilla and mandible and pterygo-mandibular ligament      |                                                                                                                                                                         | Facial nerve<br>Facial nerve                                                                 | Separate lips<br>Compresses cheeks and lips against teeth                                                                                                                                                                                                              |

# Muscles of Mastication

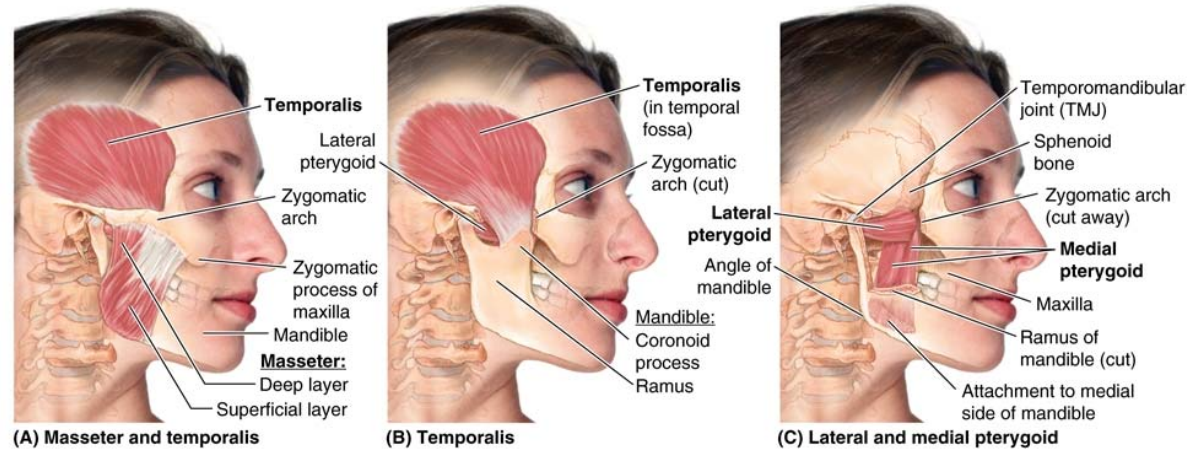
- **Masseter, temporalis & pterygoids**
- Arise from skull & insert on mandible
- Cranial nerve V (trigeminal nerve) – mandibular division
- Protracts, elevates or retracts mandible



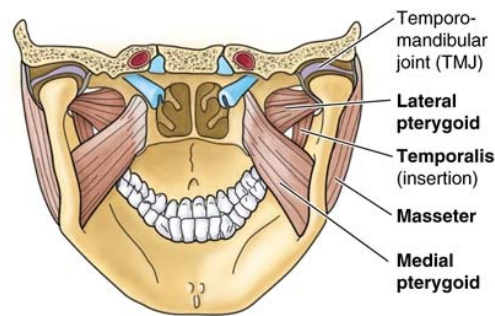
C

Copyright © 2007 Lippincott Williams & Wilkins.

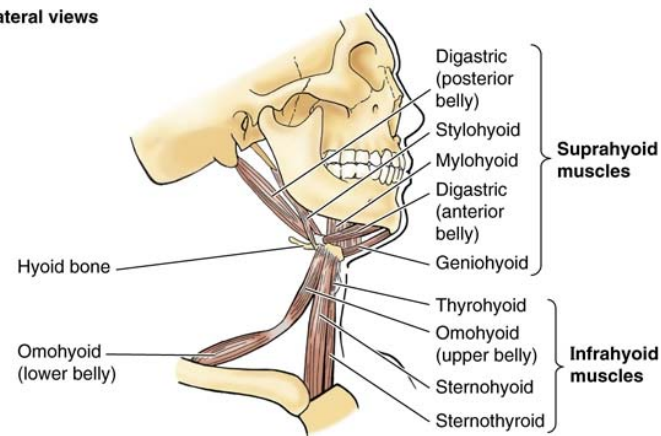
# Muscles of Mastication



Lateral views

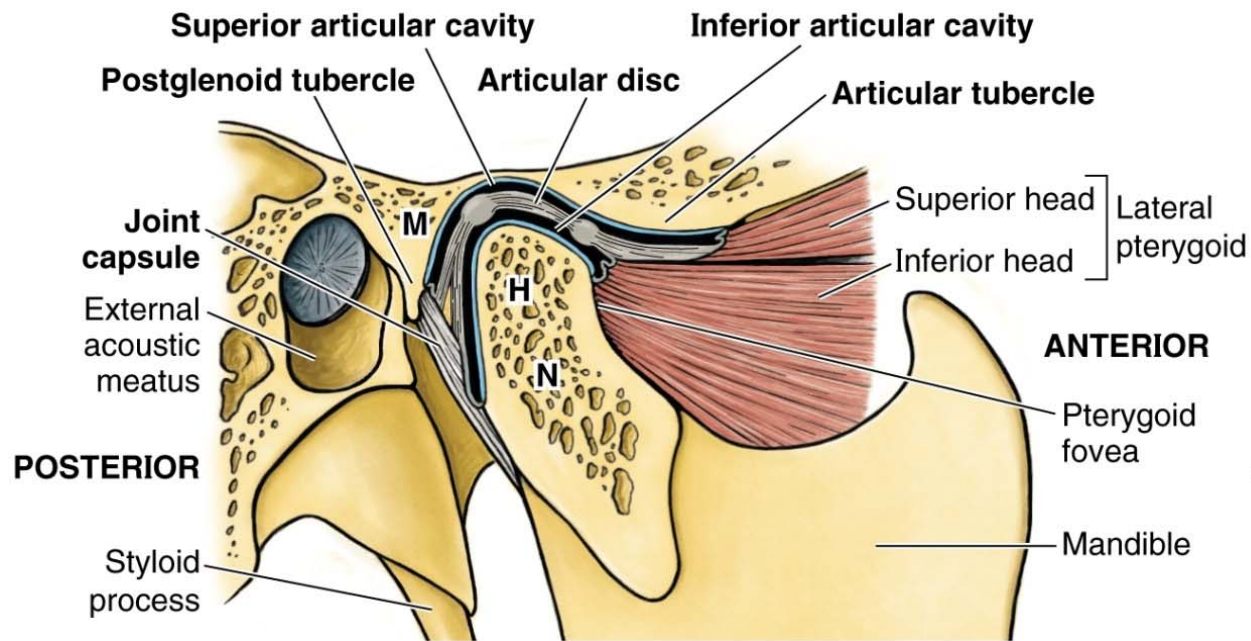


(D) Posterior view of viscerocranium



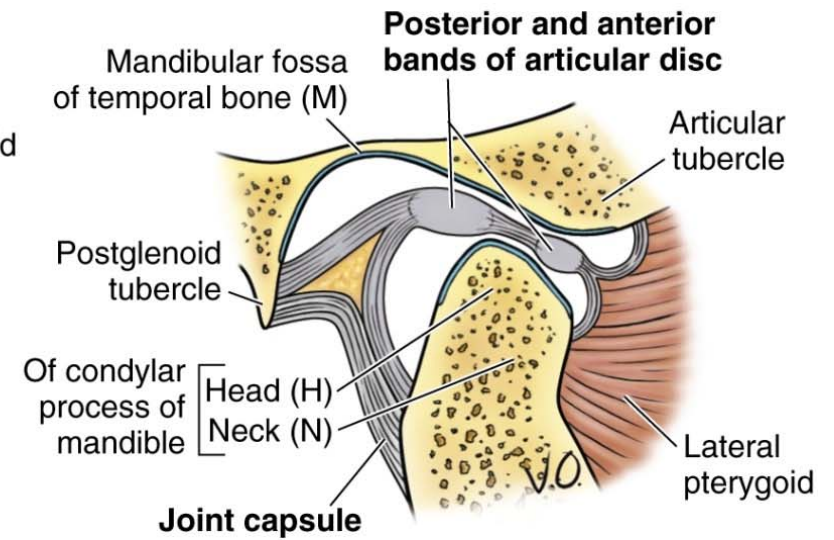
(E) Anterolateral view with head rotated slightly to left

# Lateral Pterygoid



**(A) Closed mouth, sagittal section**

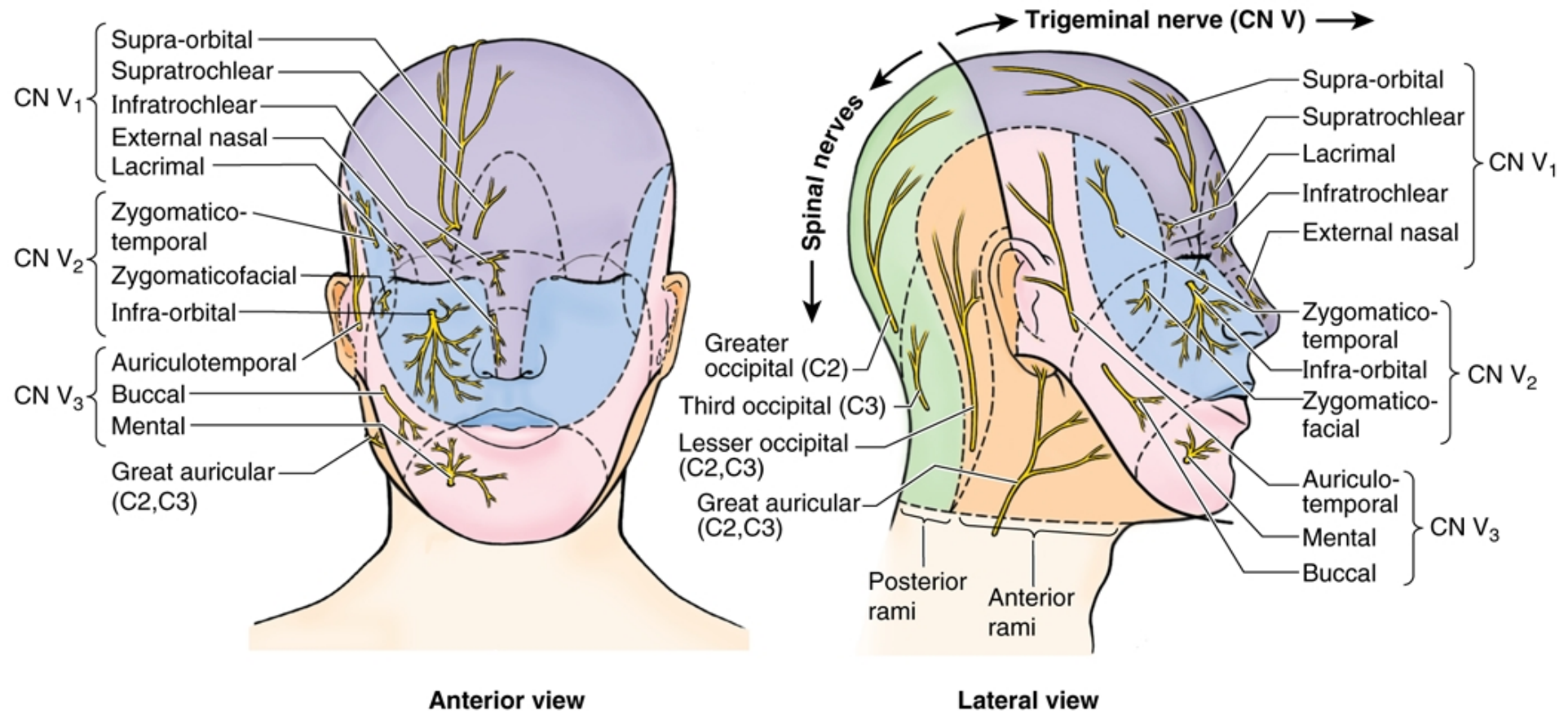
Copyright © 2010 Wolters Kluwer Health | Lippincott Williams & Wilkins



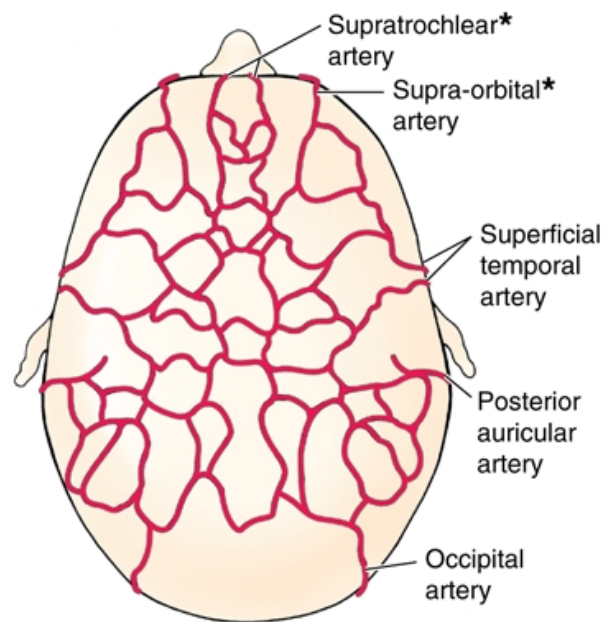
**(B) Open mouth, sagittal section**

| Muscle                           | Origin                                                     | Insertion                                 | Nerve Supply                                     | Action                                |
|----------------------------------|------------------------------------------------------------|-------------------------------------------|--------------------------------------------------|---------------------------------------|
| <b>Muscles of Mastication</b>    |                                                            |                                           |                                                  |                                       |
| Masseter                         | Zygomatic arch                                             | Lateral surface<br>ramus of<br>mandible   | Mandibular<br>division of<br>trigeminal<br>nerve | Elevates mandible<br>to occlude teeth |
| Temporalis                       | Floor of temporal<br>fossa                                 | Coronoid process<br>of mandible           | Mandibular<br>division of                        | Anterior and<br>superior fibers       |
| Lateral pterygoid<br>(two heads) | Greater wing of<br>sphenoid and lateral<br>pterygoid plate | Neck of mandible<br>and articular disc    | Mandibular<br>division of<br>trigeminal<br>nerve | Pulls neck of<br>mandible<br>forward  |
| Medial pterygoid<br>(two heads)  | Tuberosity of maxilla<br>and lateral<br>pterygoid plate    | Medial surface of<br>angle of<br>mandible | Mandibular<br>division of<br>trigeminal<br>nerve | Elevates mandible                     |

# Cutaneous Nerves of Face and Scalp

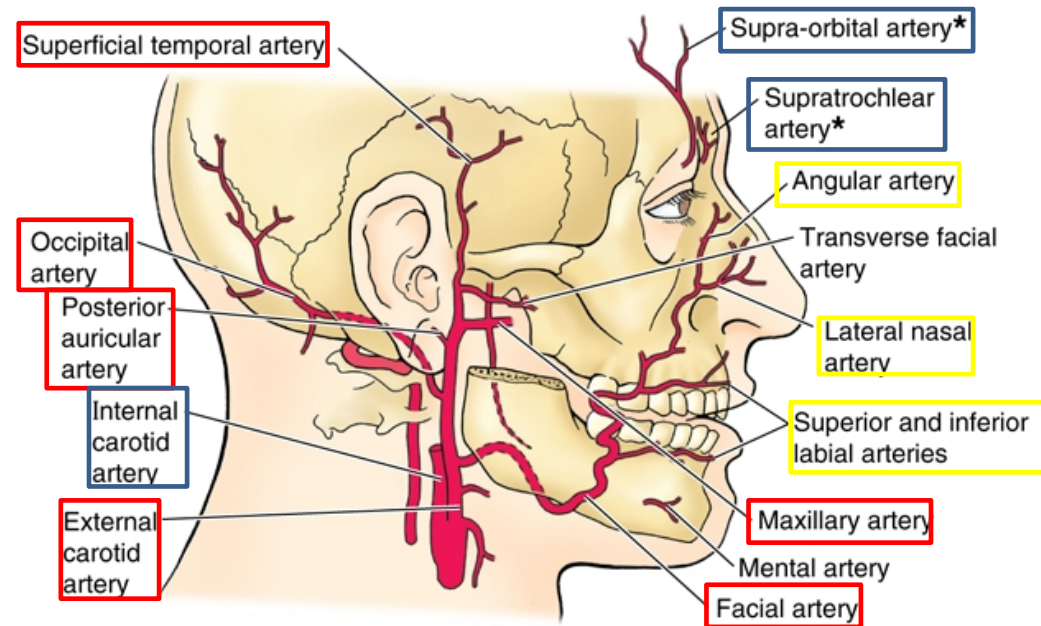


# Arterial Supply for Face and Scalp



**(A) Superior view**

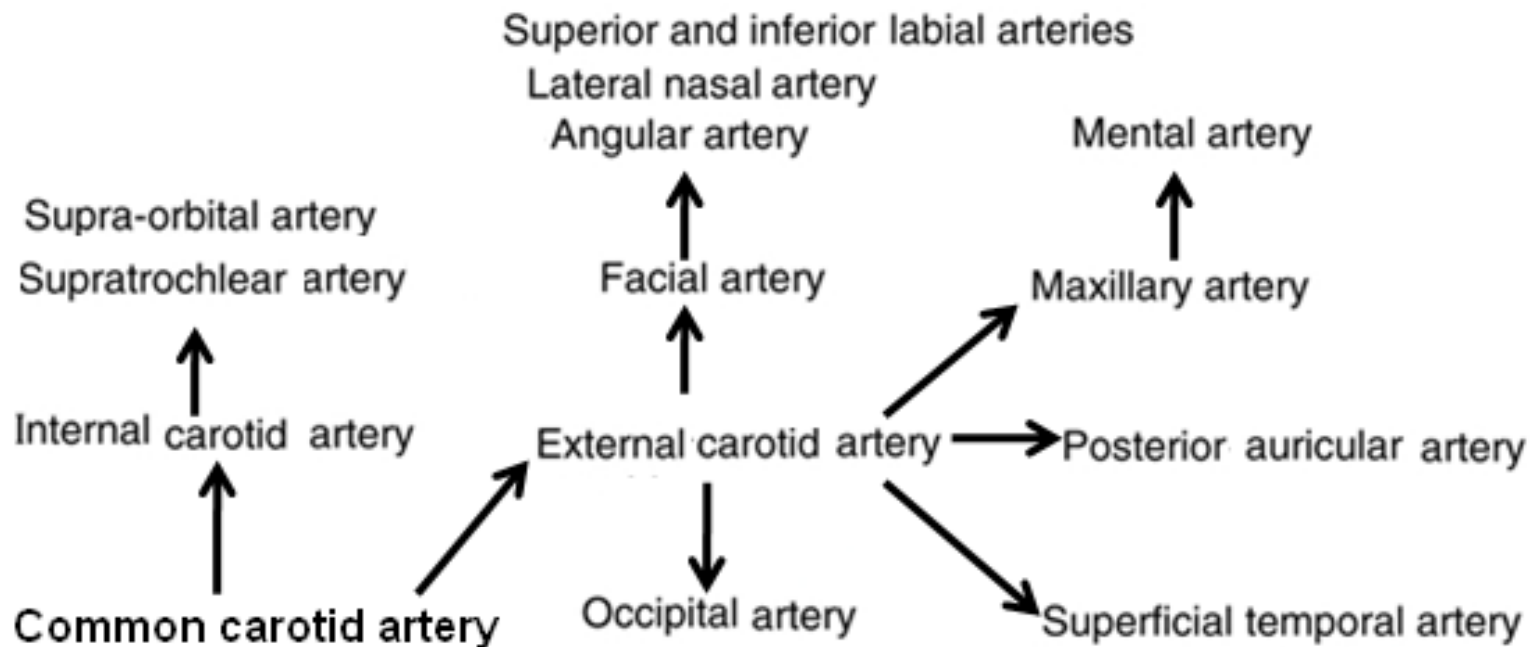
Copyright © 2010 Wolters Kluwer Health | Lippincott Williams & Wilkins



\*Source = internal carotid artery; all other labeled arteries are from external carotid

**(B) Lateral view**

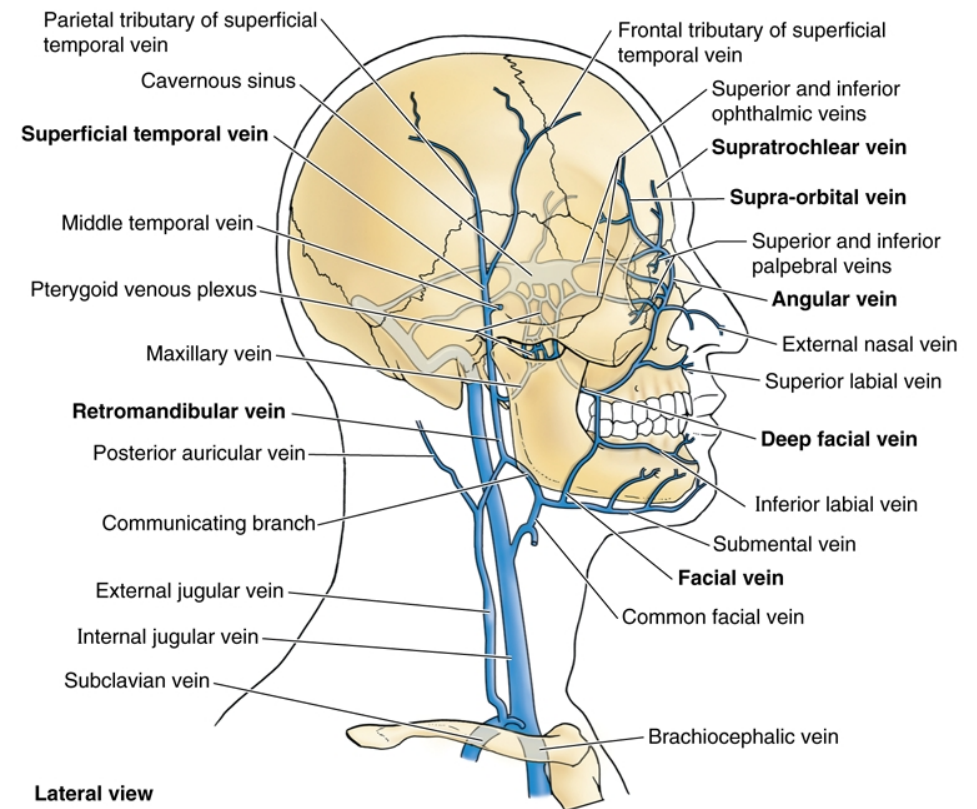
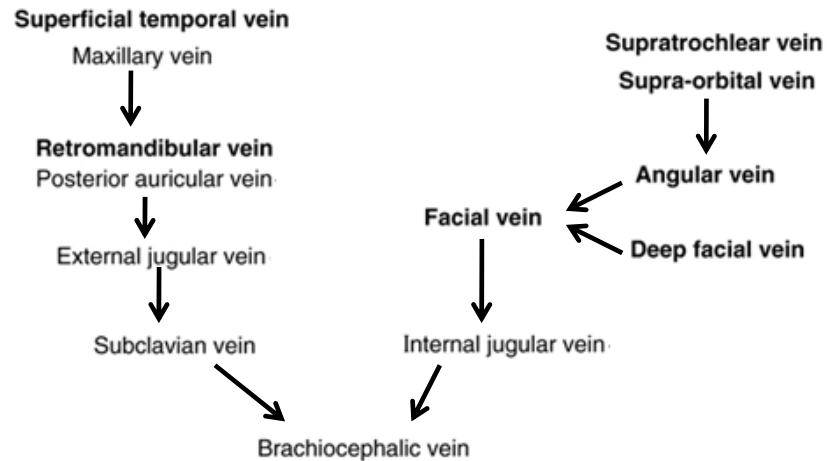
# Arterial Supply for Face and Scalp



**TABLE 7.5. SUPERFICIAL ARTERIES OF FACE AND SCALP**

| Artery                      | Origin                                             | Course                                                                                                             | Distribution                                                     |
|-----------------------------|----------------------------------------------------|--------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------|
| Facial                      | External carotid artery                            | Ascends deep to submandibular gland; winds around inferior border of mandible and enters face                      | Muscles of facial expression and face                            |
| Inferior labial             | Facial artery near angle of mouth                  | Runs medially in lower lip                                                                                         | Lower lip                                                        |
| Superior labial             |                                                    | Runs medially in upper lip                                                                                         | Upper lip and ala (side) and septum of nose                      |
| Lateral nasal               | Facial artery as it ascends along-side nose        | Passes to ala of nose                                                                                              | Skin on ala and dorsum of nose                                   |
| Angular                     | Terminal branch of facial artery                   | Passes to medial angle (canthus) of eye                                                                            | Superior part of cheek and inferior eyelid                       |
| Occipital                   | External carotid artery                            | Passes medial to posterior belly of digastric and mastoid process; accompanies occipital nerve in occipital region | Scalp of back of head, as far as vertex                          |
| Posterior auricular         | External carotid artery                            | Passes posteriorly, deep to parotid gland, along styloid process between mastoid process and ear                   | Scalp posterior to auricle and auricle                           |
| Superficial temporal        | Smaller terminal branch of external carotid artery | Ascends anterior to ear to region and ends in scalp                                                                | Facial muscles and skin of temporal frontal and temporal regions |
| Transverse facial           | Superficial temporal artery within parotid gland   | Crosses face superficial to masseter and inferior to zygomatic arch                                                | Parotid gland and duct, muscles and skin of face                 |
| Mental                      | Terminal branch of inferior alveolar artery        | Emerges from mental foramen and passes to chin                                                                     | Facial muscles and skin of chin                                  |
| Supra-orbital <sup>a</sup>  | Terminal branch of ophthalmic artery               | Passes superiorly from supra-orbital foramen                                                                       | Muscles and skin of forehead and scalp and superior conjunctiva  |
| Supratrochlear <sup>a</sup> |                                                    | Passes superiorly from supratrochlear notch                                                                        |                                                                  |

# Venous Supply for Face and Scalp



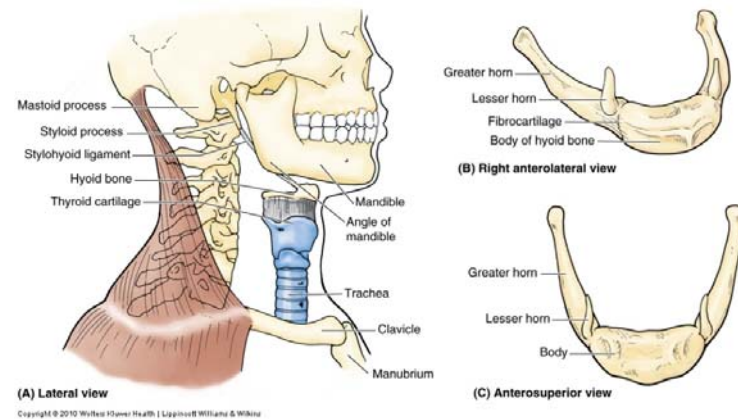
**TABLE 7.6. VEINS OF FACE AND SCALP**

| Vein                 | Origin                                                                                                                                                                             | Course                                                                                                                                                                                                                                                                          | Termination                                                                     | Area Drained                                                                                                                  |
|----------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------|
| Supratrochlear       | Begins from venous plexus on forehead and scalp, through which it communicates with frontal branch of superficial temporal vein, its contralateral partner, and supra-orbital vein | Descends near midline of forehead to root of nose, where it joins supra-orbital vein                                                                                                                                                                                            | Angular vein at root of nose                                                    | Anterior part of scalp and forehead                                                                                           |
| Supra-orbital        | Begins in forehead by anastomosing with frontal tributary of superficial temporal vein                                                                                             | Passes medially superior to orbit; joins supratrochlear vein; a branch passes through supra-orbital notch and joins with superior ophthalmic vein                                                                                                                               |                                                                                 |                                                                                                                               |
| Angular              | Begins at root of nose by union of supratrochlear and supra-orbital veins                                                                                                          | Descends obliquely along root and side of nose to inferior orbital margin                                                                                                                                                                                                       | Becomes facial vein at inferior margin of orbit                                 | Anterior part of scalp and forehead; superior and inferior eyelids and conjunctiva; may receive drainage from cavernous sinus |
| Facial               | Continuation of angular vein past inferior margin of orbit                                                                                                                         | Descends along lateral border of nose, receiving external nasal and inferior palpebral veins; then passes obliquely across face to cross inferior border of mandible; receives communication from retromandibular vein (after which, it is sometimes called common facial vein) | Internal jugular vein opposite or inferior to level of hyoid bone               | Anterior scalp and forehead; eyelids; external nose; anterior cheek; lips; chin; and submandibular gland                      |
| Deep facial          | Pterygoid venous plexus                                                                                                                                                            | Runs anteriorly on maxilla superior to buccinator and deep to masseter, emerging medial to anterior border of masseter onto face                                                                                                                                                | Enters posterior aspect of facial vein                                          | Infratemporal fossa (most areas supplied by maxillary artery)                                                                 |
| Superficial temporal | Begins from widespread plexus of veins on side of scalp and along zygomatic arch                                                                                                   | Frontal and parietal tributaries unite anterior to the auricle; crosses temporal root of zygomatic arch to pass from temporal region and enter substance of the parotid gland                                                                                                   | Joins maxillary vein posterior to neck of mandible to form retromandibular vein | Side of scalp; superficial aspect of temporal muscle; and external ear                                                        |
| Retromandibular      | Formed anterior to ear by union of superficial temporal and maxillary veins                                                                                                        | Runs posterior and deep to ramus of mandible through substance of parotid gland; communicates at inferior end with facial vein                                                                                                                                                  | Unites with posterior auricular vein to form external jugular vein              | Parotid gland and masseter muscle                                                                                             |

Neck

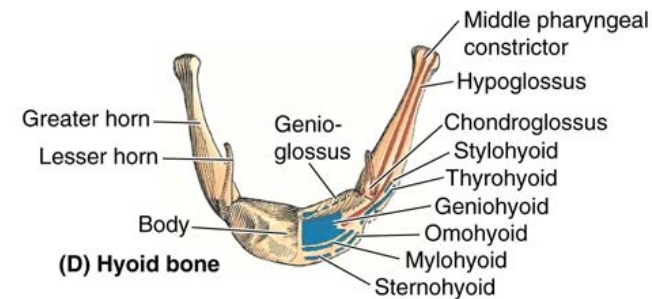
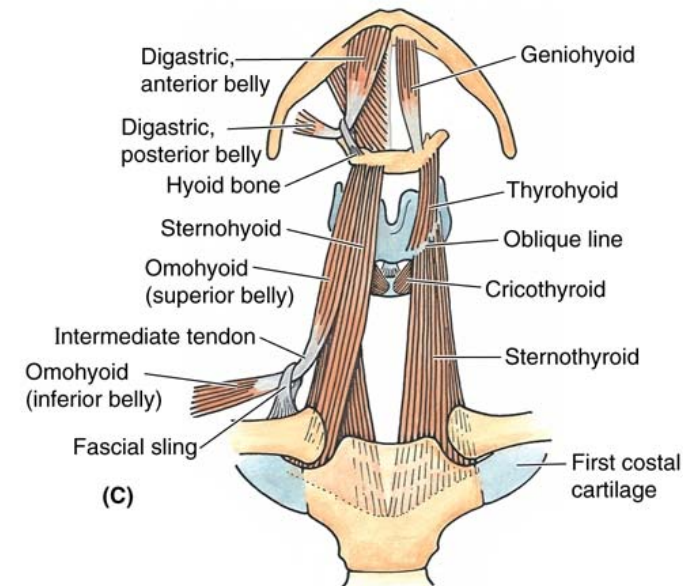
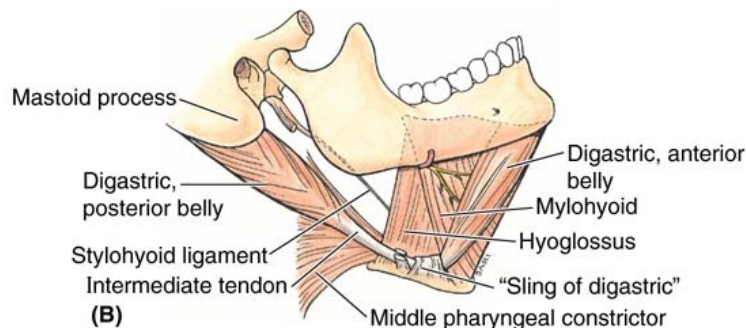
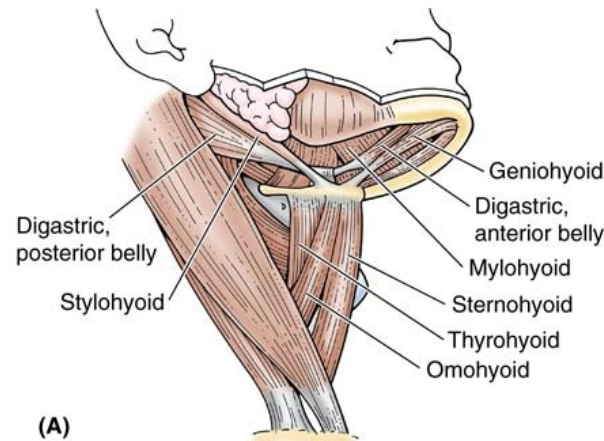
# Hyoid Bone

- Position – C3
  - Between mandible & thyroid cartilage
- Shape – U
- Stylohyoid ligament
- Parts
  - Body
  - Lesser horn
  - Greater horn



# Neck Muscles

- Superficial mm. of the side of the neck
  - Platysma - VII
  - SCM - XI
- Suprahyoid mm.
  - Stylohyoid - VII
  - Digastric
    - Posterior belly - VII
    - Anterior belly - V
  - Mylohyoid - V
  - Geniohyoid – C1
- Infrahyoid mm.
  - Omohyoid - AC
  - Sternohyoid - AC
  - Sternothyroid - AC
  - Thyrohyoid – C1

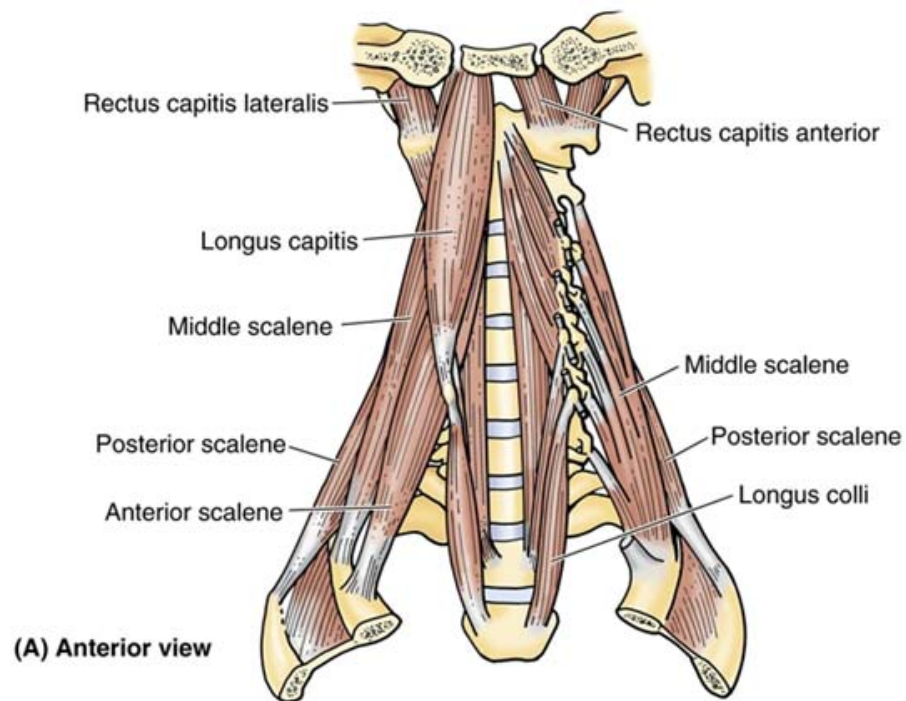


**Table 13-3 Muscles of the Neck**

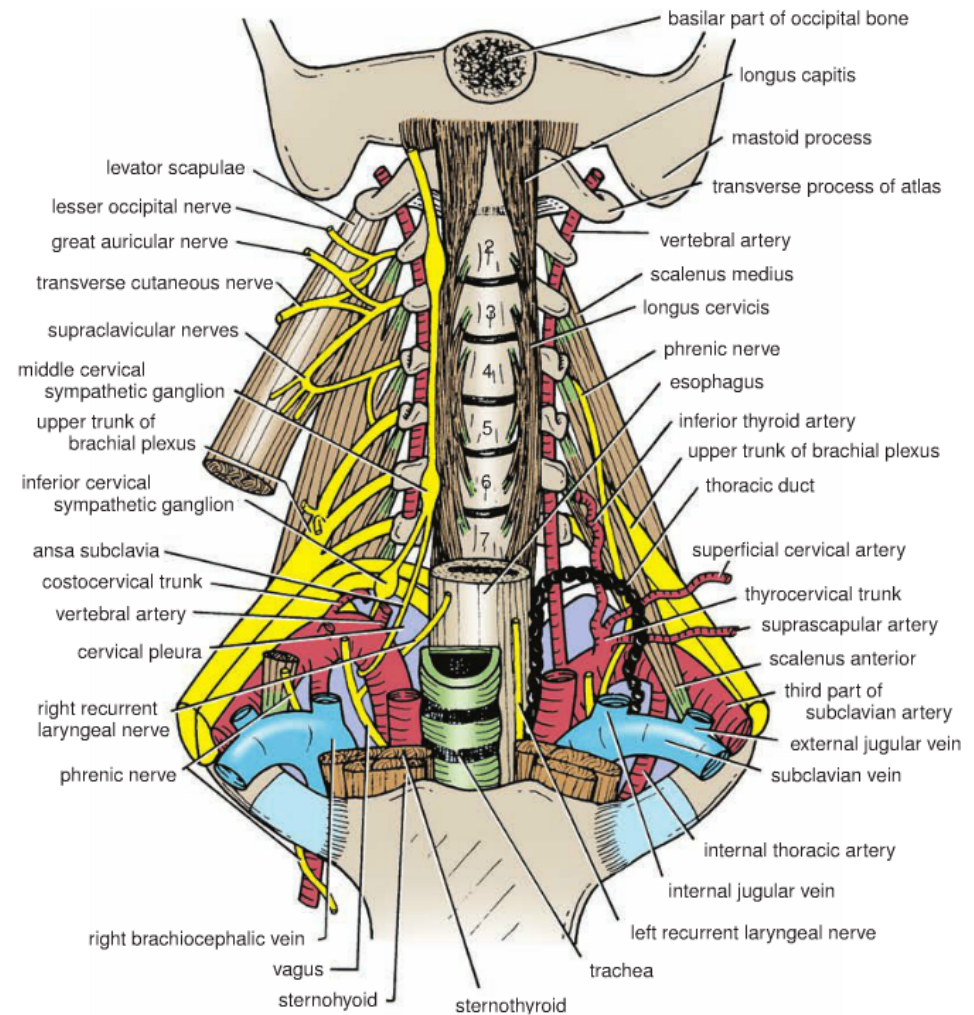
| Muscle                       | Origin                                                | Insertion                                                              | Nerve Supply                                | Action                                                                                          |
|------------------------------|-------------------------------------------------------|------------------------------------------------------------------------|---------------------------------------------|-------------------------------------------------------------------------------------------------|
| Platysma                     | Deep fascia over pectoralis major and deltoid         | Body of mandible and angle of mouth                                    | Facial nerve, cervical branch               | Depresses mandible and angle of mouth                                                           |
| Sternocleido-mastoid         | Manubrium sterni and medial third of clavicle         | Mastoid process of temporal bone and occipital bone                    | Spinal part of accessory nerve and C2 and 3 | Two muscles acting together extend head and flex neck; one muscle rotates head to opposite side |
| Digastric<br>Posterior belly | Mastoid process of temporal bone                      | Intermediate tendon is held to hyoid by fascial sling                  | Facial nerve                                | Depresses mandible or elevates hyoid bone                                                       |
| Anterior belly               | Body of mandible                                      |                                                                        | Nerve to mylohyoid                          |                                                                                                 |
| Stylohyoid<br>Mylohyoid      | Styloid process<br>Mylohyoid line of body of mandible | Body of hyoid bone<br>Body of hyoid bone and fibrous raphe             | Facial nerve<br>Inferior alveolar nerve     | Elevates hyoid bone<br>Elevates floor of mouth and hyoid bone or depresses mandible             |
| Geniohyoid                   | Inferior mental spine of mandible                     | Body of hyoid bone                                                     | First cervical nerve                        | Elevates hyoid bone or depresses mandible                                                       |
| Sternohyoid                  | Manubrium sterni and clavicle                         | Body of hyoid bone                                                     | Ansa cervicalis; C1, 2, and 3               | Depresses hyoid bone                                                                            |
| Sternothyroid                | Manubrium sterni                                      | Oblique line on lamina of thyroid cartilage                            | Ansa cervicalis; C1, 2, and 3               | Depresses larynx                                                                                |
| Thyrohyoid                   | Oblique line on lamina of thyroid cartilage           | Lower border of body of hyoid bone                                     | First cervical nerve                        | Depresses hyoid bone or elevates larynx                                                         |
| Omohyoid<br>Inferior belly   | Upper margin of scapula and supra-scapular ligament   | Intermediate tendon is held to clavicle and first rib by fascial sling | Ansa cervicalis; C1, 2, and 3               | Depresses hyoid bone                                                                            |
| Superior belly               | Lower border of body of hyoid bone                    |                                                                        |                                             |                                                                                                 |

- Anterior and lateral vertebral mm.

- Scalenus anterior
  - Relations
- Scalenus medius
- Scalenus posterior



# Neck Muscles

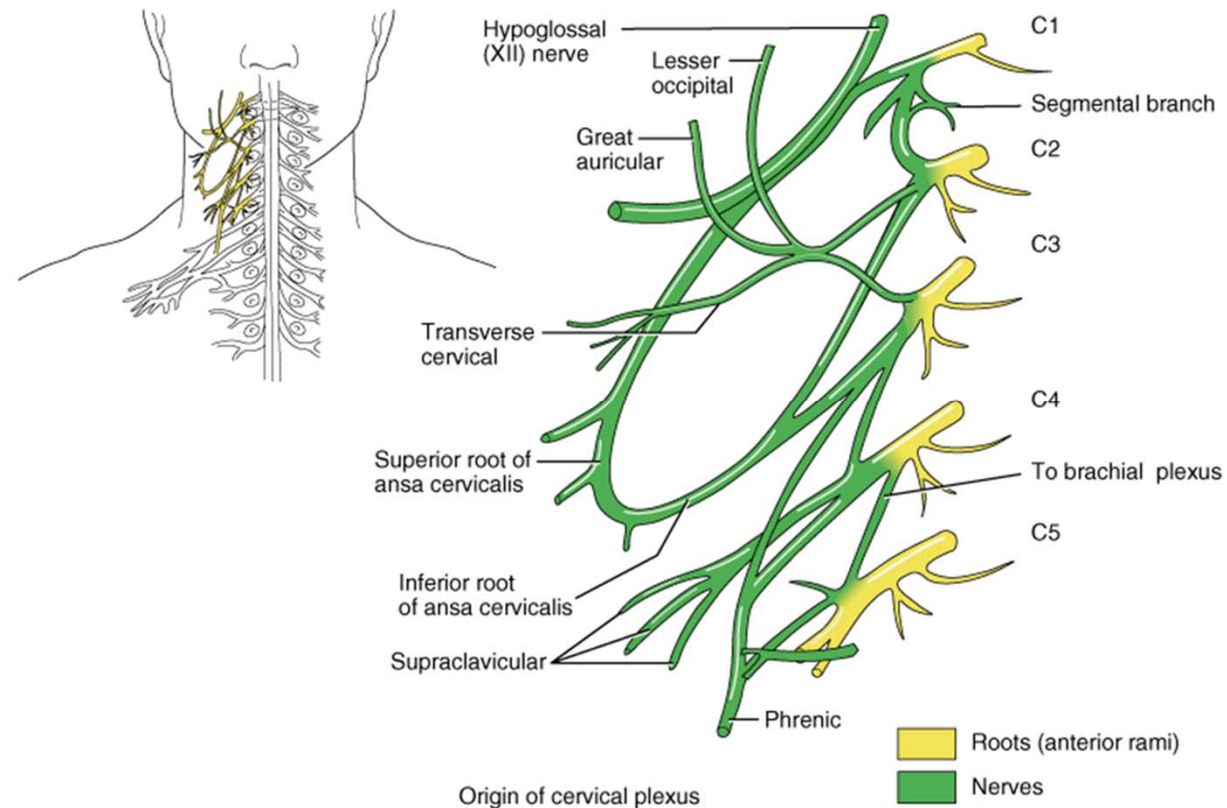


**Table 13-3**    **Muscles of the Neck**

| Muscle             | Origin                                                                     | Insertion  | Nerve Supply                     | Action                                                                              |
|--------------------|----------------------------------------------------------------------------|------------|----------------------------------|-------------------------------------------------------------------------------------|
| Scalenus anterior  | Transverse processes of third, fourth, fifth, and sixth cervical vertebrae | First rib  | C4, 5, and 6                     | Elevates first rib; laterally flexes and rotates cervical part of vertebral column  |
| Scalenus medius    | Transverse processes of upper six cervical vertebrae                       | First rib  | Anterior rami of cervical nerves | Elevates first rib; laterally flexes and rotates cervical part of vertebral column  |
| Scalenus posterior | Transverse processes of lower cervical vertebrae                           | Second rib | Anterior rami of cervical nerves | Elevates second rib; laterally flexes and rotates cervical part of vertebral column |

# Cervical Plexus

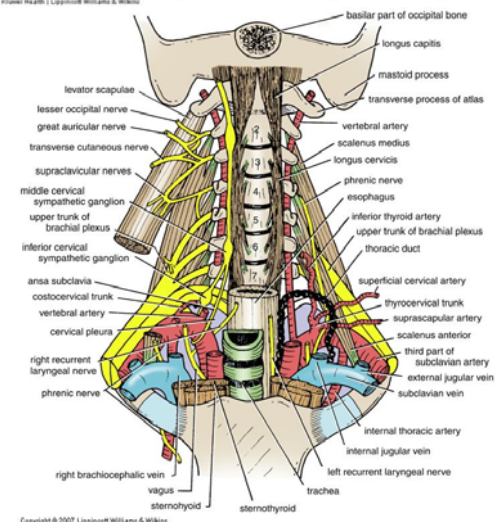
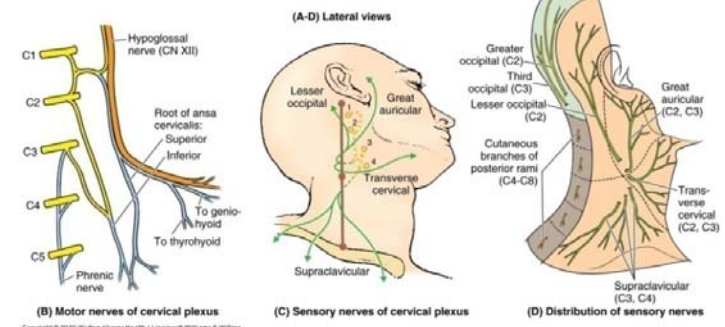
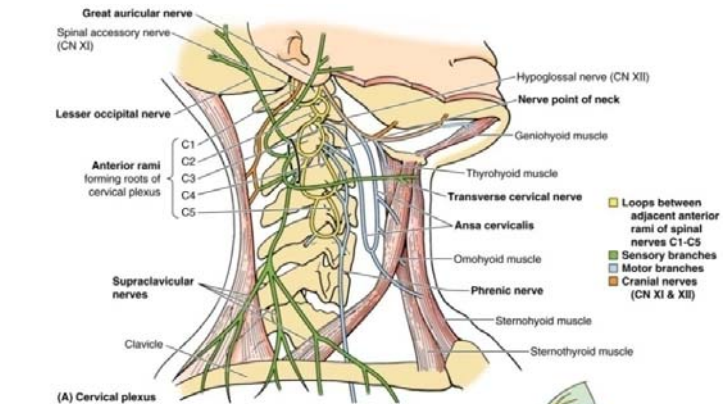
- Ventral rami of spinal nerves (C1 to C5)
- Supplies parts of head, neck & shoulders



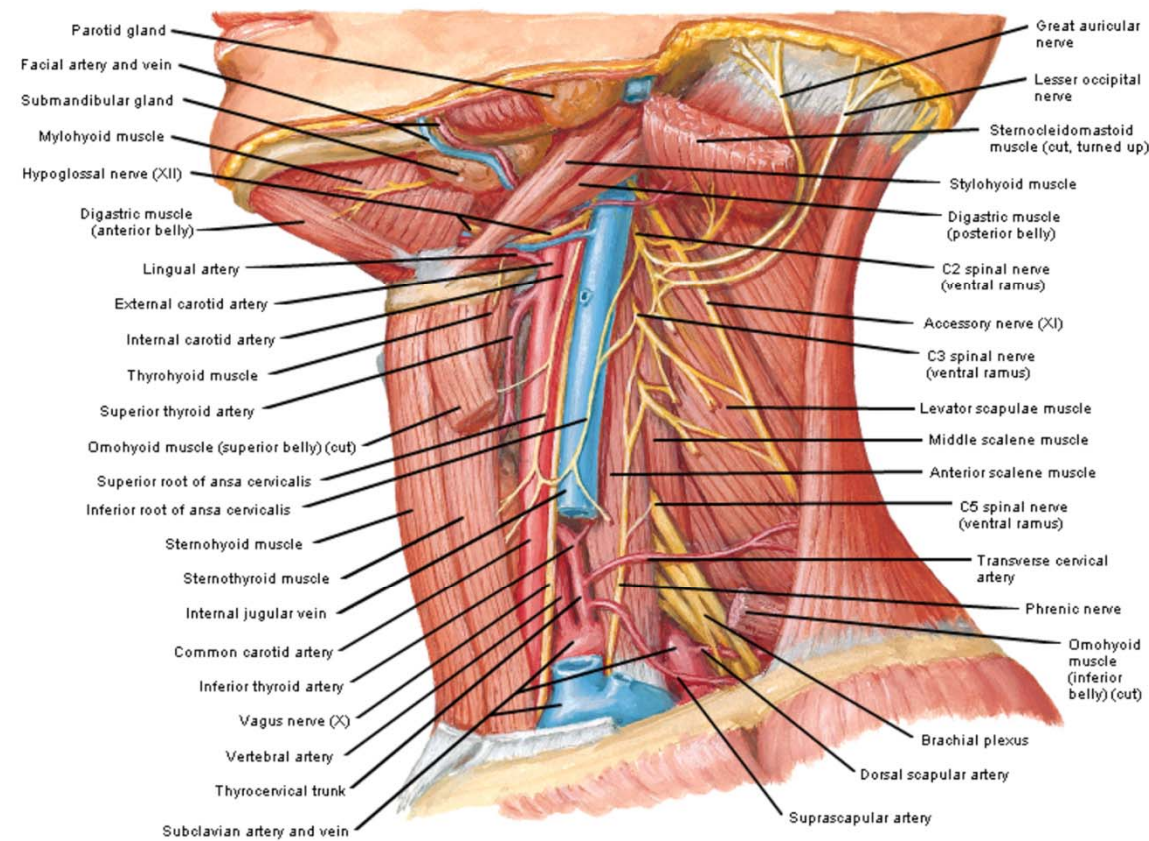
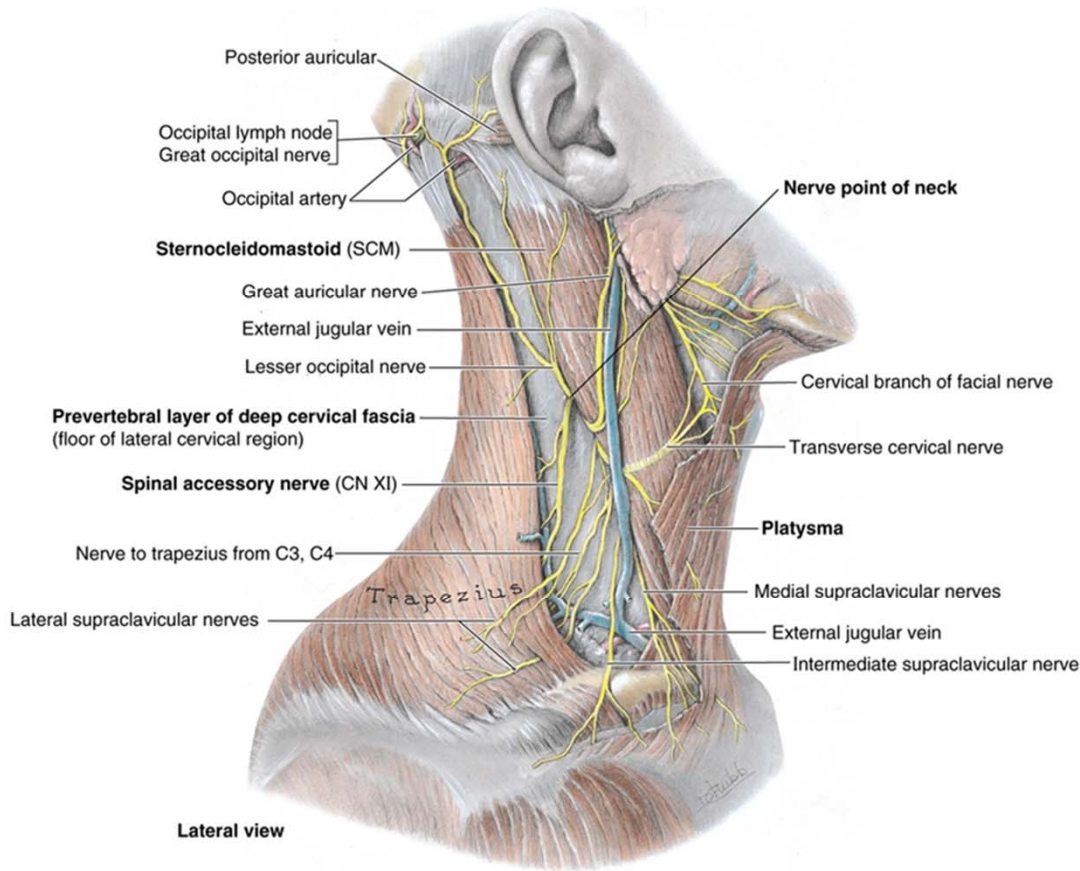
# Cervical Plexus

- Relations

- Anterior to levator scapulae m. and middle scalene m.
- Posterior to the sternocleidomastoid m.
- Subcutaneous branches emerge behind the lateral border of the sternocleidomastoid m.

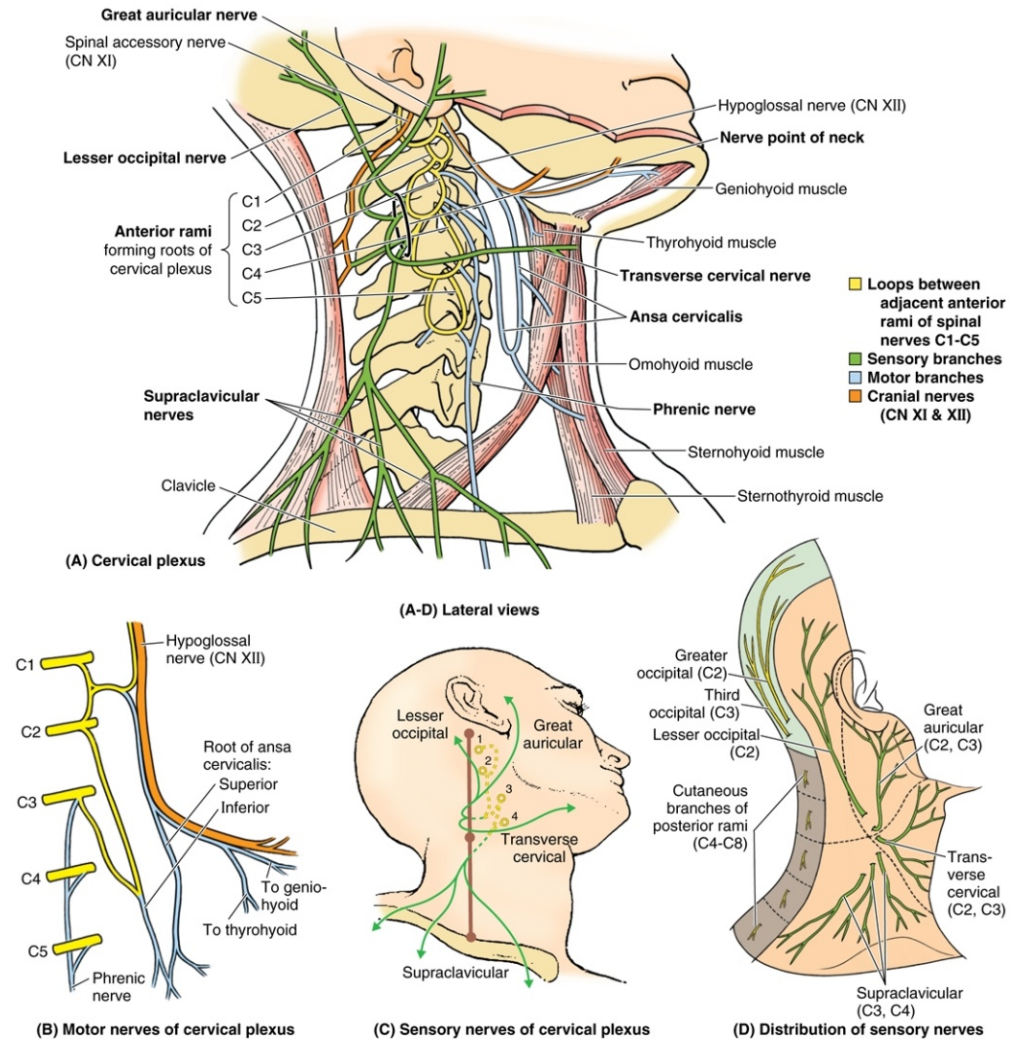


# Cervical Plexus: Relations



# Cervical Plexus: Branches

- Cutaneous branches
  - Lesser occipital n. (C2)
  - Greater auricular n. (C2-C3)
  - Transverse cervical n. (C2-C3)
  - Supraclavicular nn. (C3-C4)
- Muscular branches
  - Ansa cervicalis (Infrahyoid mm.)
    - Descending branch from hypoglossal n. (C1)
    - Descending cervical n. (C2-C3)
  - Phrenic n. (C3-C5)
    - Diaphragm



**Table 17-1****Summary of the Branches of the Cervical Plexus and Their Distribution**

| Branches                        | Distribution                                                                                   |
|---------------------------------|------------------------------------------------------------------------------------------------|
| Cutaneous                       |                                                                                                |
| Lesser occipital                | Skin of scalp behind ear                                                                       |
| Greater auricular               | Skin of parotid salivary gland, auricle, and angle of jaw                                      |
| Transverse cutaneous            | Skin over side and front of neck                                                               |
| Supraclavicular                 | Skin over upper part of chest and shoulder                                                     |
| Muscular                        |                                                                                                |
| Segmental                       | Prevertebral muscles, levator scapulae                                                         |
| Ansa cervicalis (C1, 2, 3)      | Omohyoid, sternohyoid, sternothyroid                                                           |
| C1 fibers via hypoglossal nerve | Thyrohyoid, geniohyoid                                                                         |
| Phrenic nerve (C3, 4, 5)        | Diaphragm (most important muscle of respiration)                                               |
| Sensory                         |                                                                                                |
| Phrenic nerve (C3, 4, 5)        | Pericardium, mediastinal parietal pleura, and pleura and peritoneum covering central diaphragm |