# Anterior Triangle of Neck
# 頸部 前三角區域

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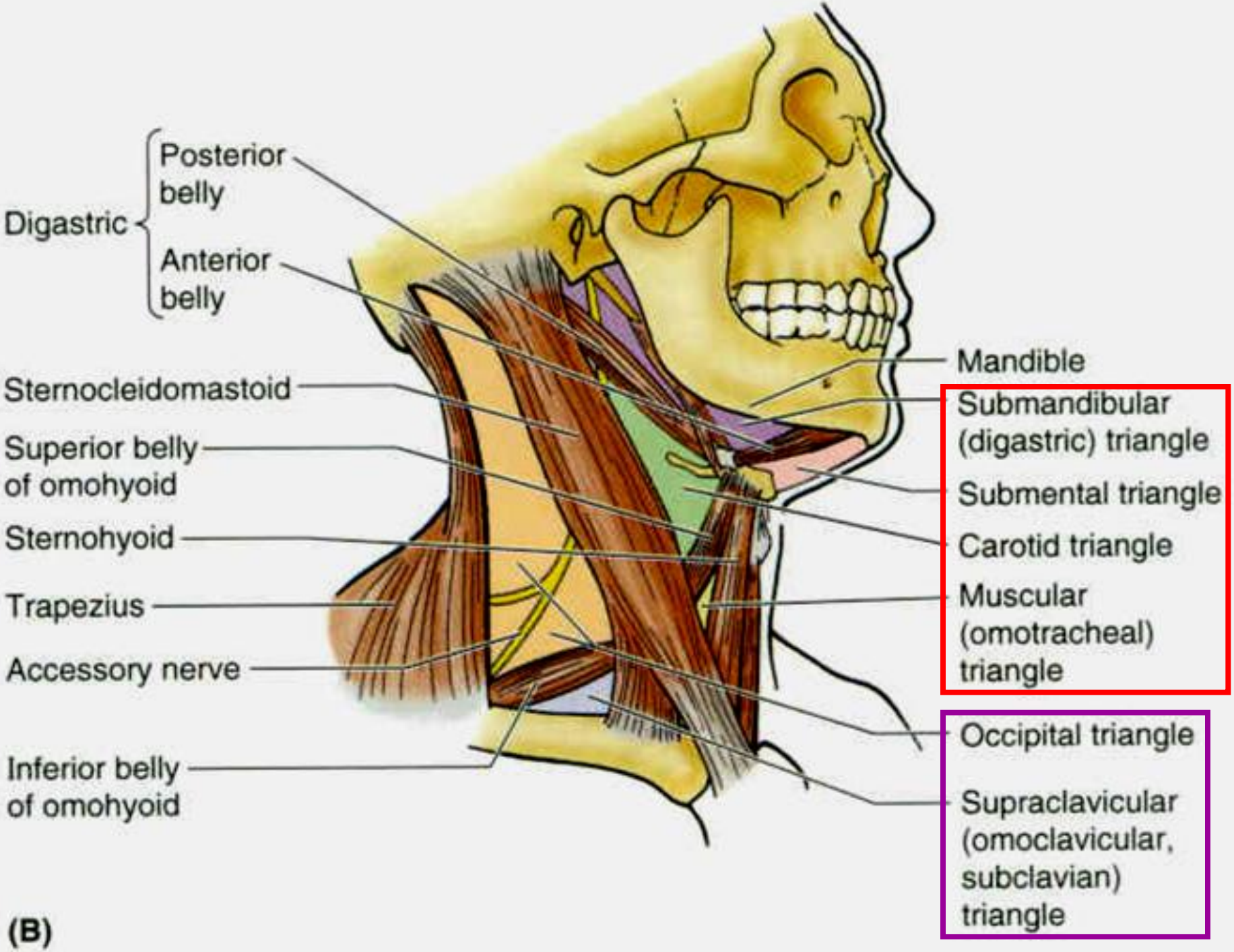
# Outline:

- Boundary and division of anterior triangle.
- Contents of anterior triangle.


Digastric
Posterior belly
Anterior belly
Sternocleidomastoid
Superior belly of omohyoid
Sternohyoid
Trapezius
Accessory nerve
Inferior belly of omohyoid
Mandible
Submandibular (digastric) triangle
Submental triangle
Carotid triangle
Muscular (omotracheal) triangle
Occipital triangle
Supraclavicular (omoclavicular, subclavian) triangle
(B)

**Anterior triangle** :

*boundary* – SCM, median line on neck & inf. border of mandible

**submandibular triangle** (digastric triangle)

*boundary* – mandible, ant. & post. bellies of digastric muscle

*contents* – **submandibular gland**, **duct** and **lymph nodes**, **hypoglossal n.**, parts of **facial artery** & **submental artery**

**submental triangle**

*boundary* – hyoid bone, right & left ant. bellies of digastric m.

*contents* – submental **lymph nodes**

# carotid triangle

*boundary* – sup. belly of omohyoid, ant. border of SCM & post. belly of digastric

*contents* – **common carotid artery**

→ internal & external carotid arteries

**carotid sinus (*baroreceptor*)** &

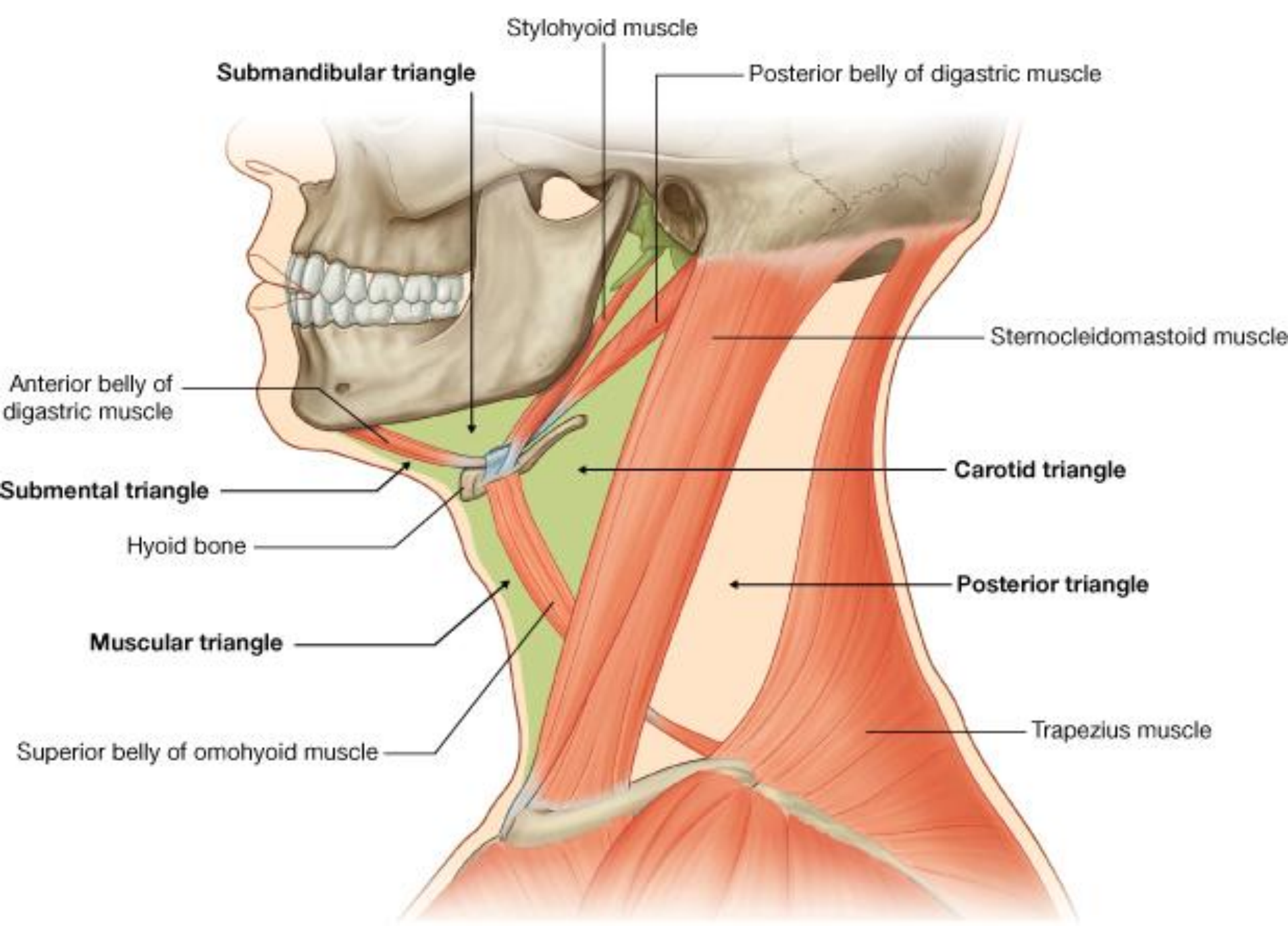
**carotid body (*chemoreceptor*)** and **ansa cervicalis**

**carotid sheath** – common carotid artery (medially), IJV (laterally) & vagus nerve (posteriorly)

- **muscular triangle**

*boundary* – sup. belly of omohyoid, ant. border of SCM & median plane of neck

*contents* – **infrahyoid muscles** and **viscera** of the neck



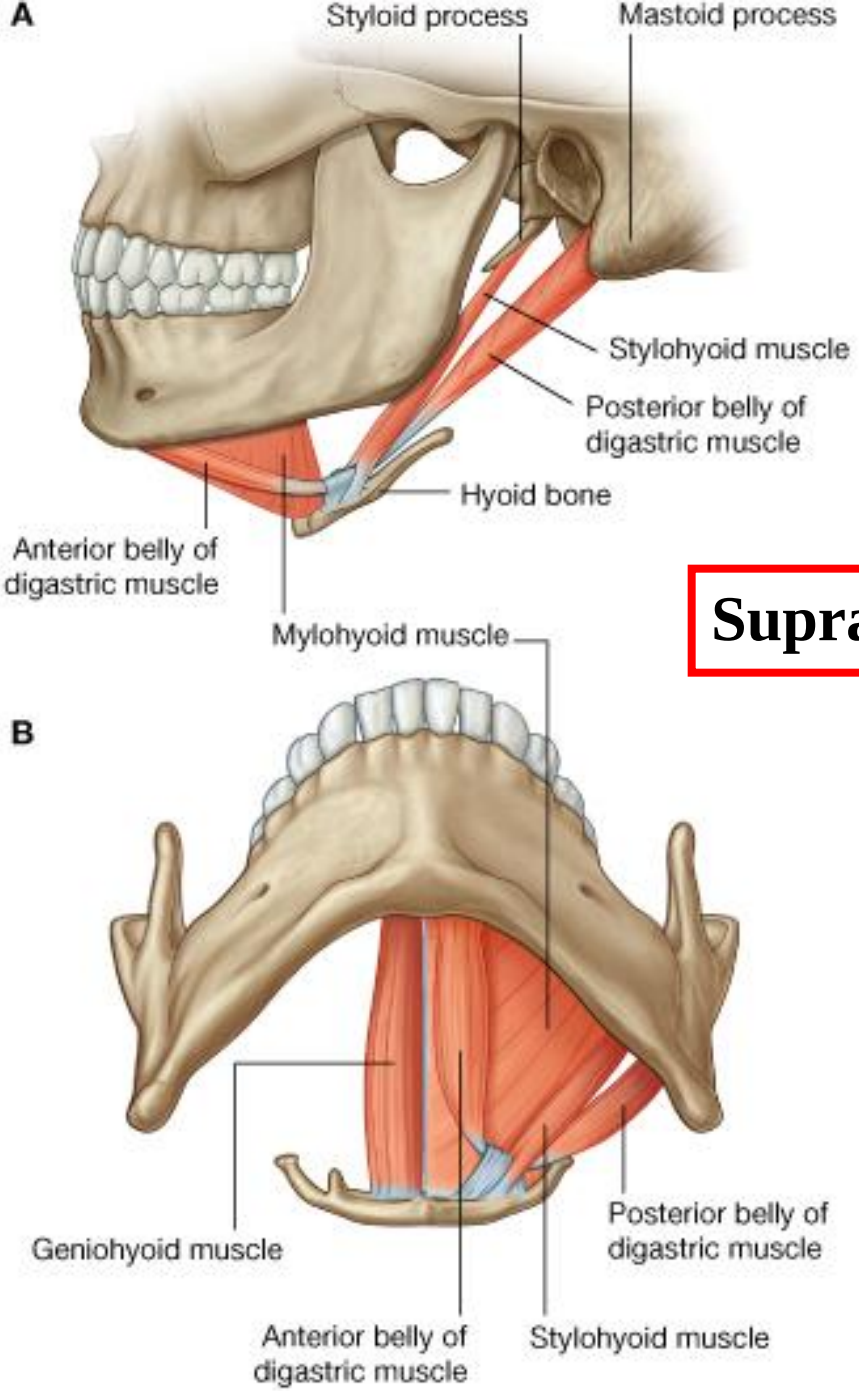
# Muscles in the Anterior Triangle

**Supra-hyoid muscles**:

- **Stylohyoid**: CN VII
- **Digastric muscle**: (ant. belly – CN V3 & post. belly – CN VII)
- **Mylohyoid**: CN V3 (motor root)
- **Geniohyoid**: ant. ramus of C1 along with CN XII

**Infra-hyoid muscles**:

- **Sternohyoid**: ansa cervicalis
- **Omohyoid** (ant. belly & post. belly): ansa cervicalis
- **Sternothyroid**: ansa cervicalis
- **Thyrohyoid**: ant. ramus of C1 along with CN XII




**Suprahyoid muscles**

# Infrahyoid muscles

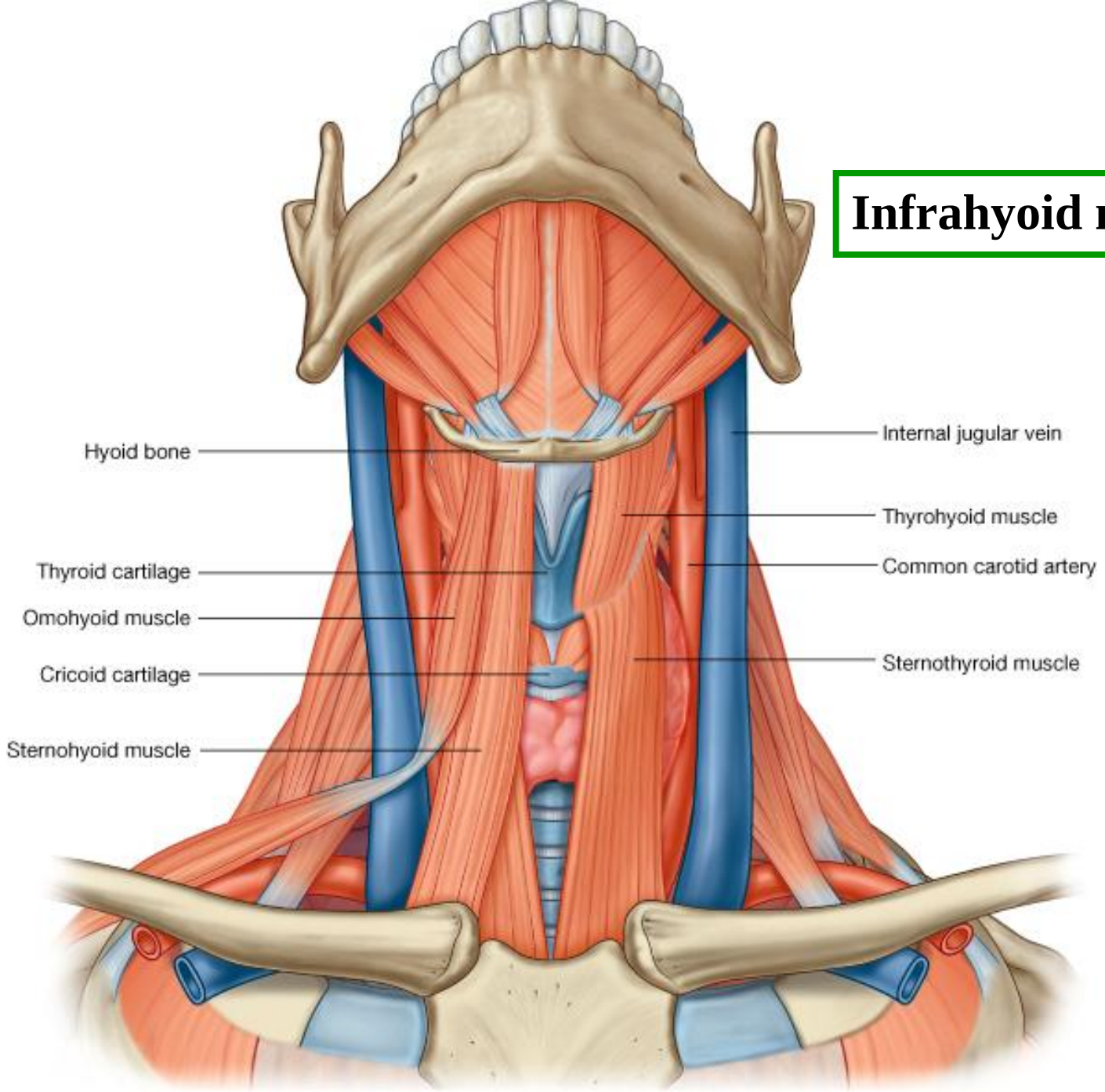
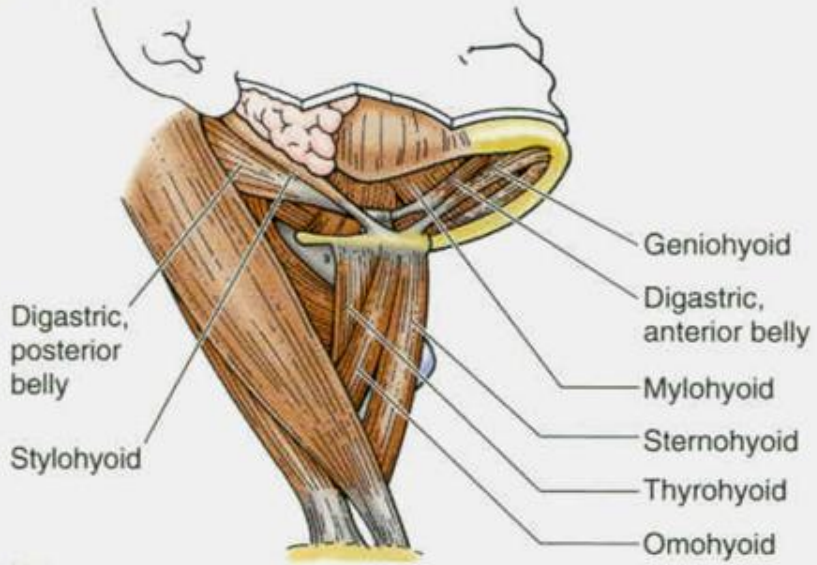
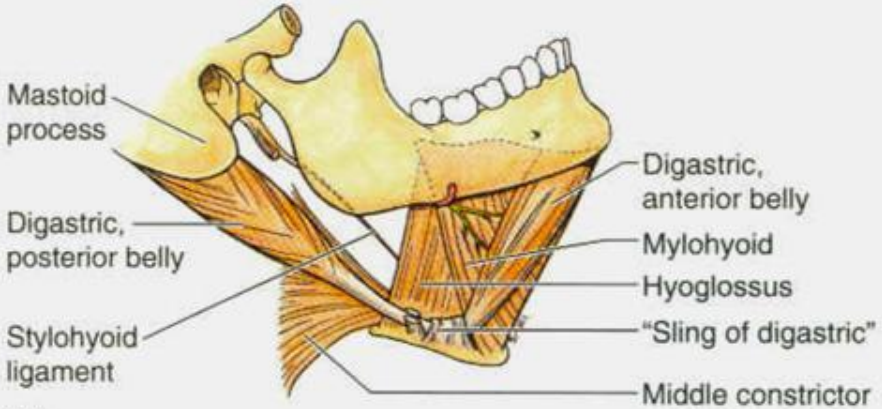


**Table 8.3. Suprahyoid and Infrahyoid Muscles**




(A)

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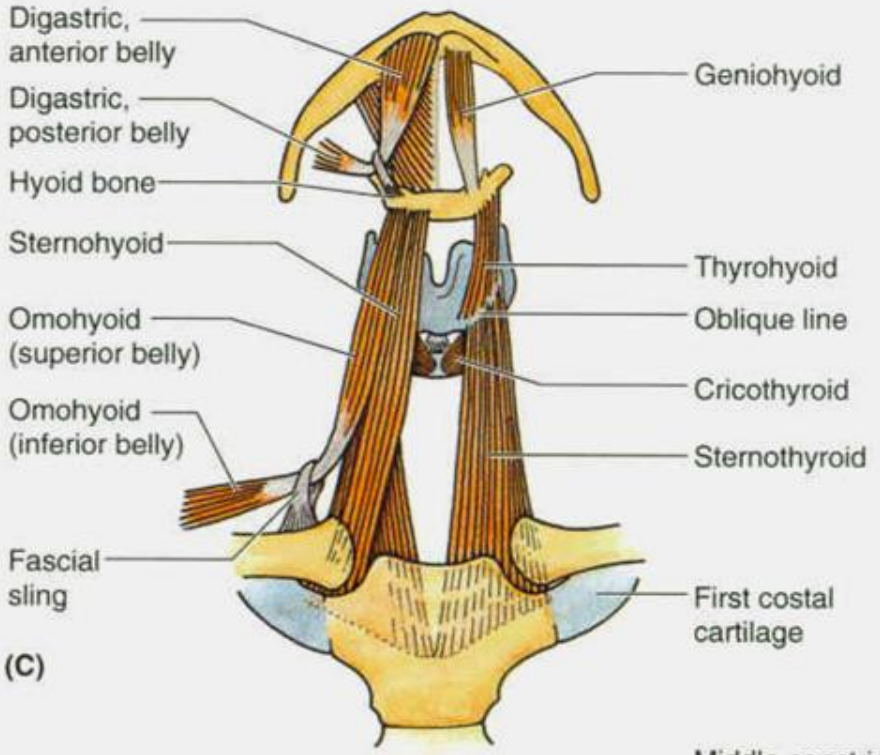
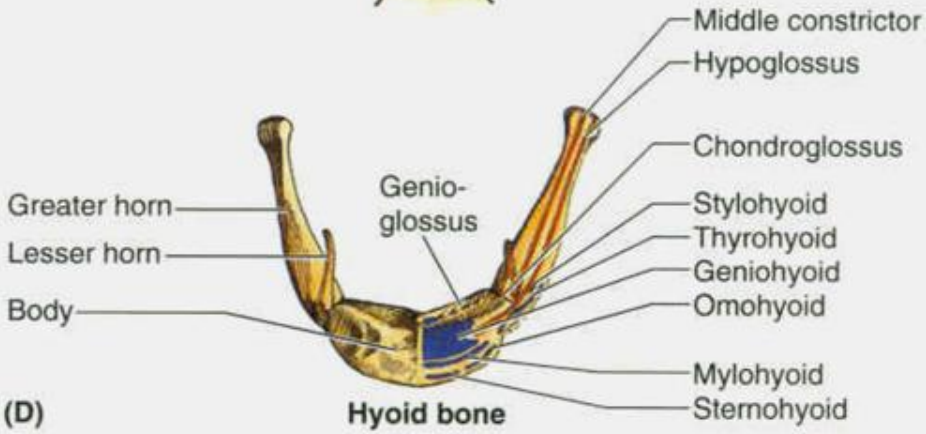



(C)




(D) **Hyoid bone**

| Muscle | Origin | Insertion | Innervation | Main Action |
|---|---|---|---|---|
| **Suprahyoid** | | | | |
| Mylohyoid | Mylohyoid line of mandible | Raphe and body of hyoid bone | Mylohyoid nerve, a branch of inferior alveolar nerve of CN $V_3$ | Elevates hyoid bone, floor of mouth, and tongue during swallowing and speaking |
| Geniohyoid | Inferior mental spine of mandible | Body of hyoid bone | C1 via the hypoglossal nerve | Pulls hyoid bone anterosuperiorly, shortens floor of mouth, and widens pharynx |
| Stylohyoid | Styloid process of temporal bone | | Cervical branch of facial nerve | Elevates and retracts hyoid bone, thereby elongating floor of mouth |
| Digastric | Anterior belly: digastric fossa of mandible<br>Posterior belly: mastoid notch of temporal bone | Intermediate tendon to body and greater horn of hyoid bone | Anterior belly: mylohyoid nerve, a branch of inferior alveolar nerve<br>Posterior belly: facial nerve | Depresses mandible; raises hyoid bone and steadies it during swallowing and speaking |

| Muscle | Origin | Insertion | Innervation | Main Action |
|---|---|---|---|---|
| **Infrahyoid** | | | | |
| Sternohyoid | Manubrium of sternum and medial end of clavicle | Body of hyoid bone | C1–C3 by a branch of ansa cervicalis | Depresses hyoid bone after it has been elevated during swallowing |
| Omohyoid | Superior border of scapula near suprascapular notch | Inferior border of hyoid bone | | Depresses, retracts, and steadies hyoid bone |
| Sternothyroid | Posterior surface of manubrium of sternum | Oblique line of thyroid cartilage | C2 and C3 by a branch of ansa cervicalis | Depresses hyoid bone and larynx |
| Thyrohyoid | Oblique line of thyroid cartilage | Inferior border of body and greater horn of hyoid bone | C1 via hypoglossal nerve | Depresses hyoid bone and elevates larynx |

# Vessels in the Anterior Triangle

*Arteries*:

common carotid artery

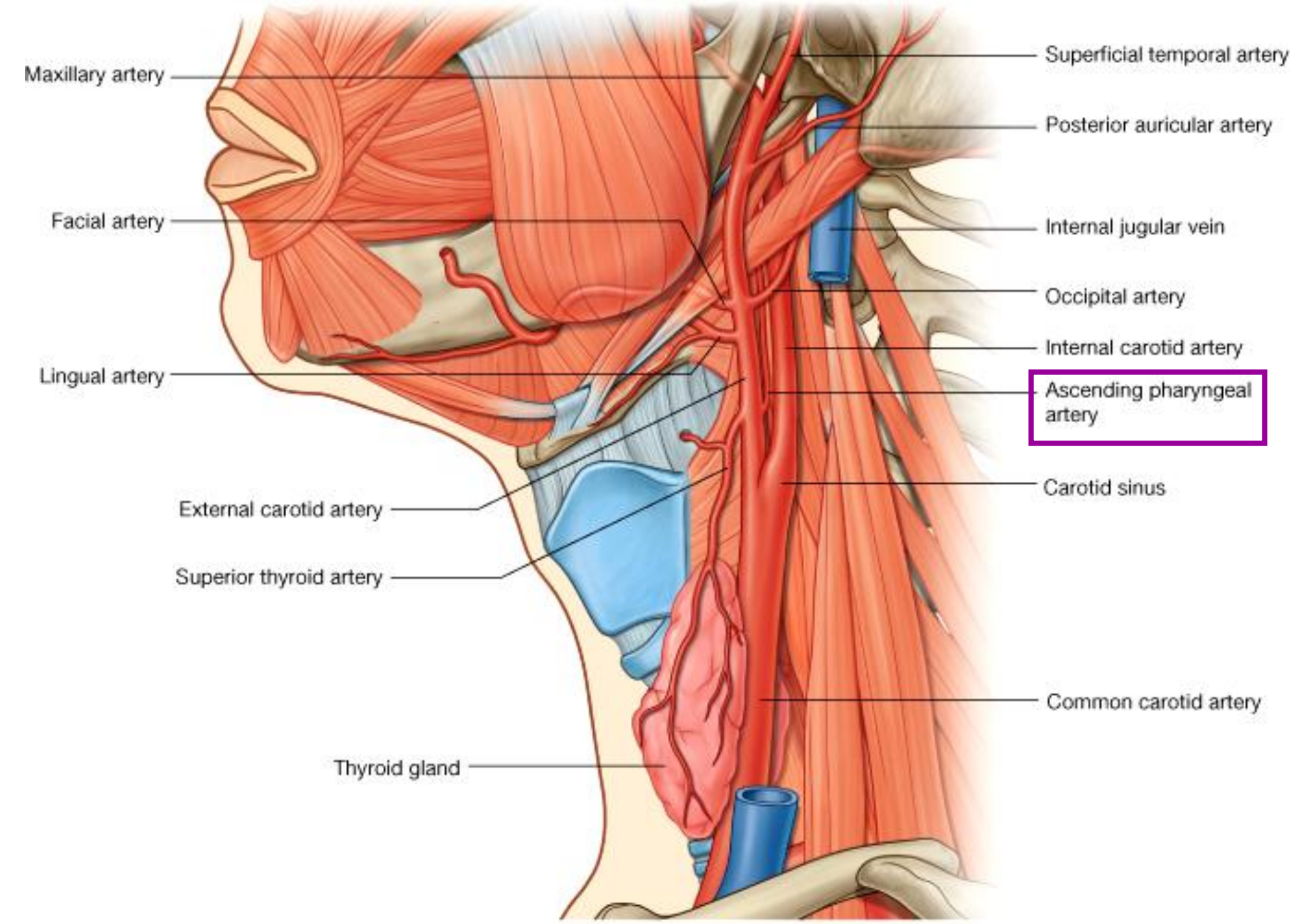
→ **internal carotid artery** (no branch in the neck)

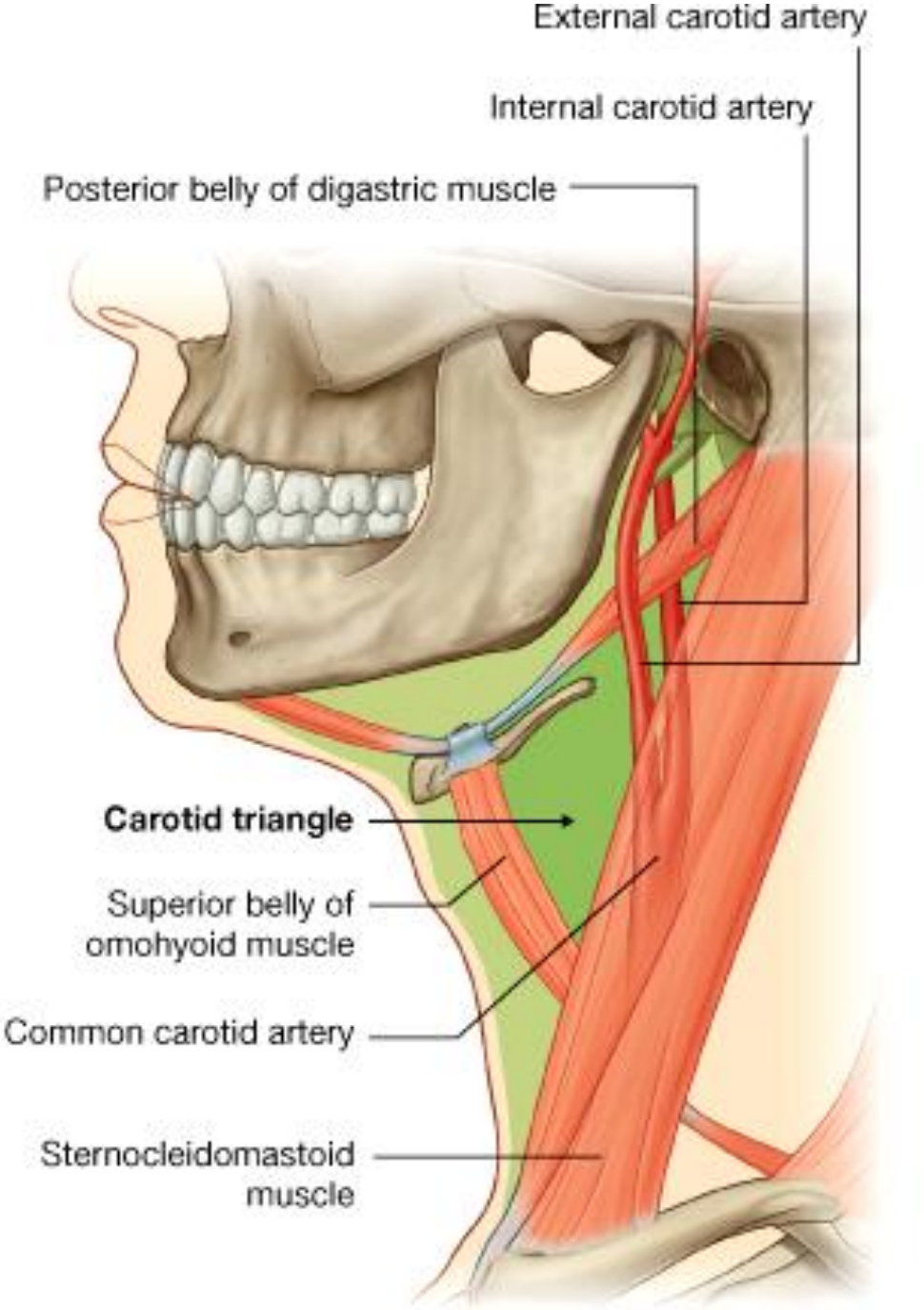
branches of **external carotid artery**:

**ascending pharyngeal artery,**
**superior thyroid artery,**
**lingual artery,**
**facial artery,**
**occipital artery, posterior auricular artery**

*Veins*:

**superior & inferior bulb of IJV**
**occipital vein, facial vein, lingual vein,**
**pharyngeal vein**
**superior & middle thyroid veins**





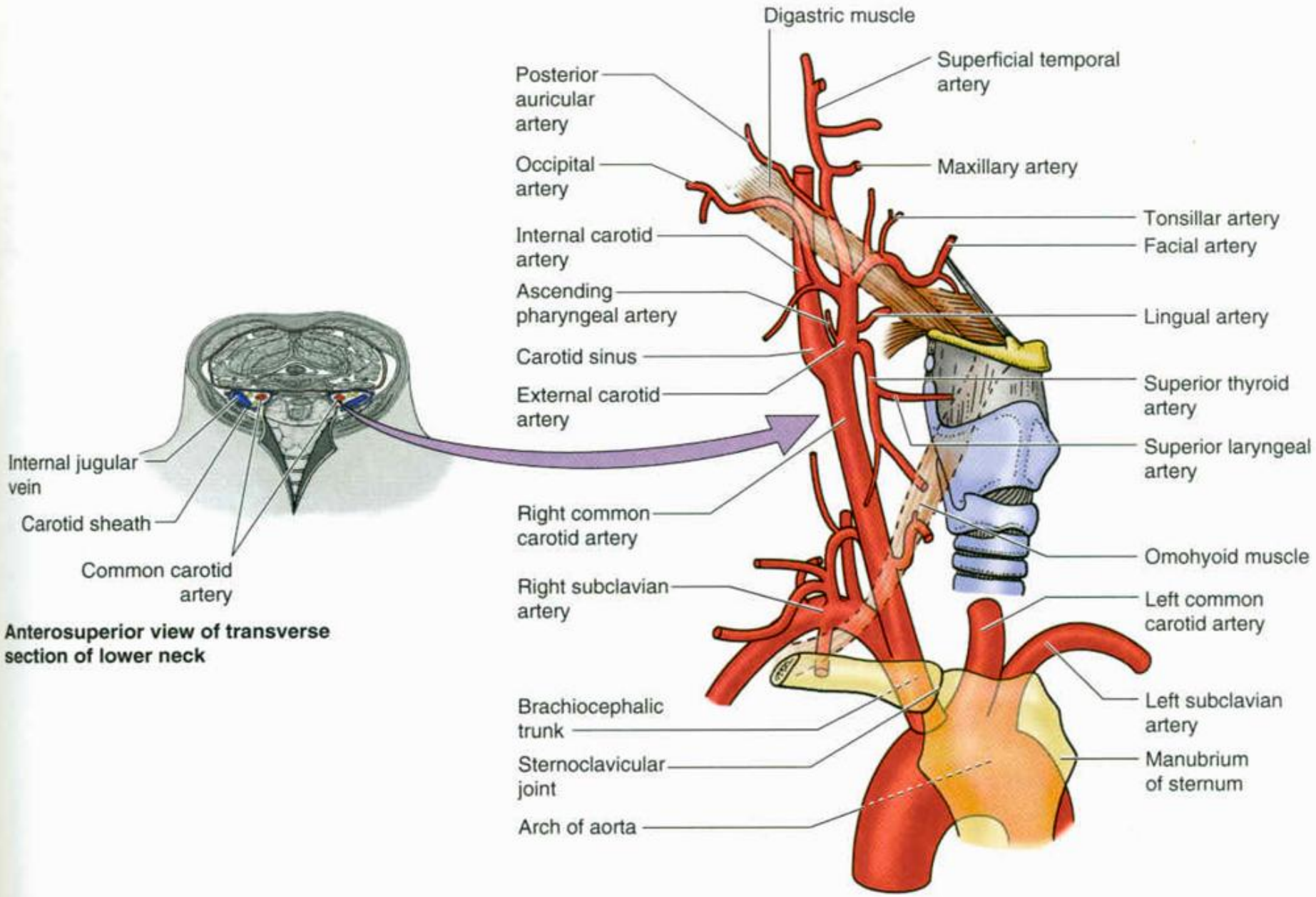



**Figure 8.15. Subclavian and carotid arteries and their branches.** In the inset, observe the carotid sheath, the dense fibrous investment of the common carotid artery, internal jugular vein (IJV), and vagus nerve (CN X). The carotid sheath is deep to the sternocleidomastoid (SCM).

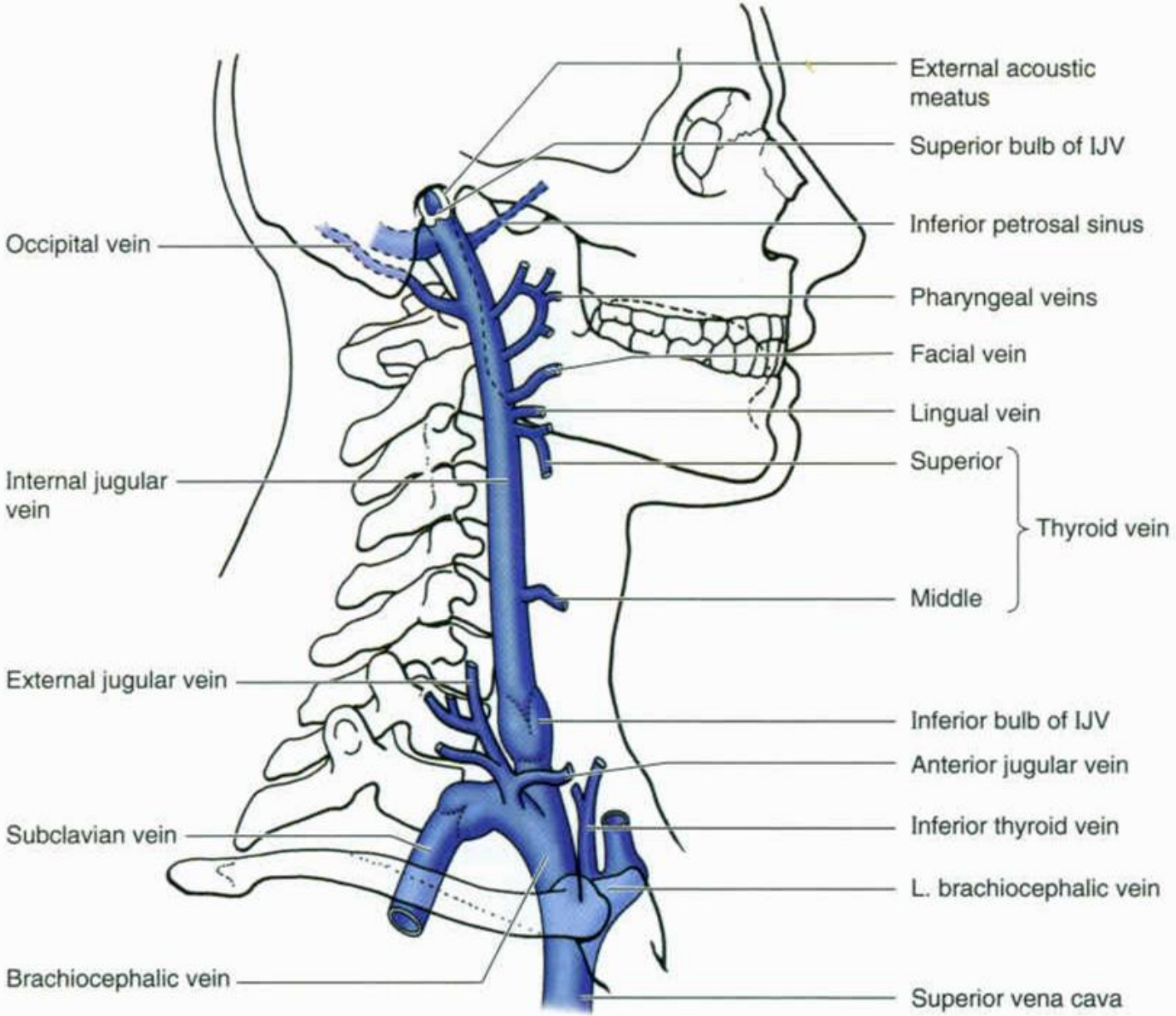



**Figure 8.16. Internal jugular vein (IJV).** This is the main venous structure of the neck. It originates as a continuation of the sigmoid (dural venous) sinus, is contained in the carotid sheath as it descends in the neck, and unites at the T1 vertebral level superior to the sternoclavicular (SC) joint with the subclavian vein to form the brachiocephalic vein. Notice the large valve near its termination that prevents reflux of blood into the vein.

# Nerves in the Anterior Triangle

**Transverse cervical nerves (C2 & C3)**

**Facial nerve:**

stylohyoid & post. belly of digastric m.

**Glossopharyngeal nerve:**

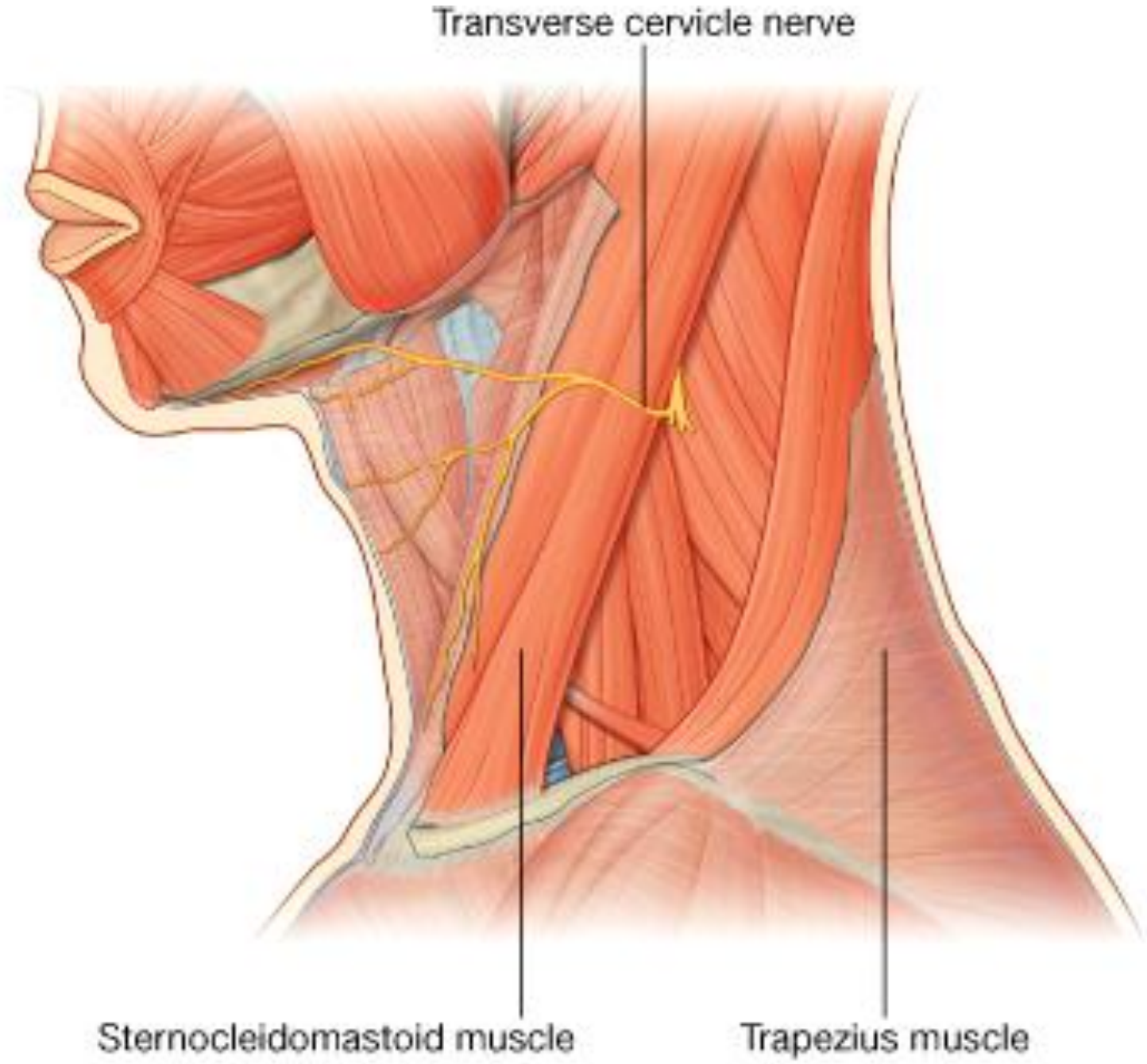
pharyngeal branch & **carotid sinus** branch

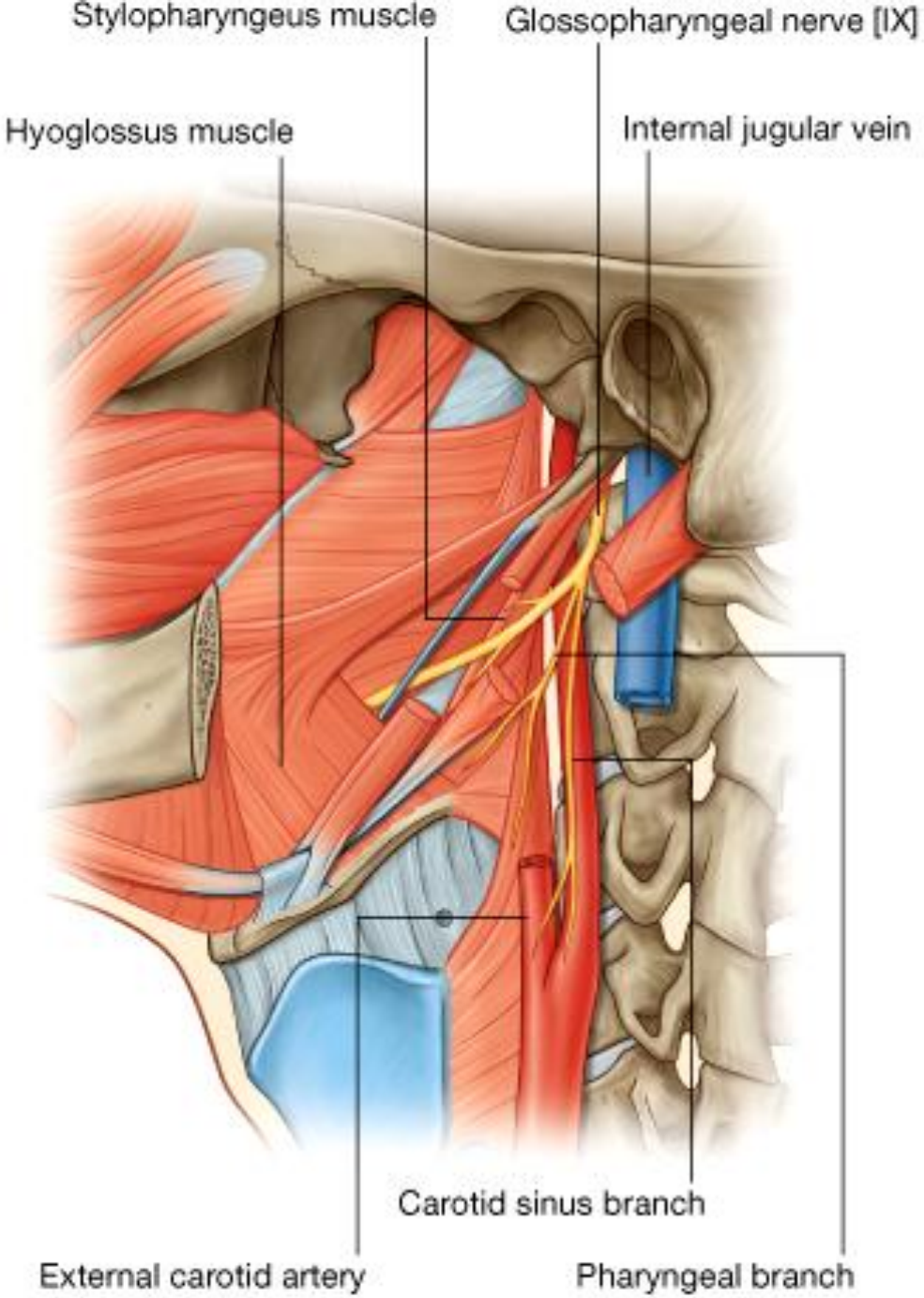
**Vagus nerve:**

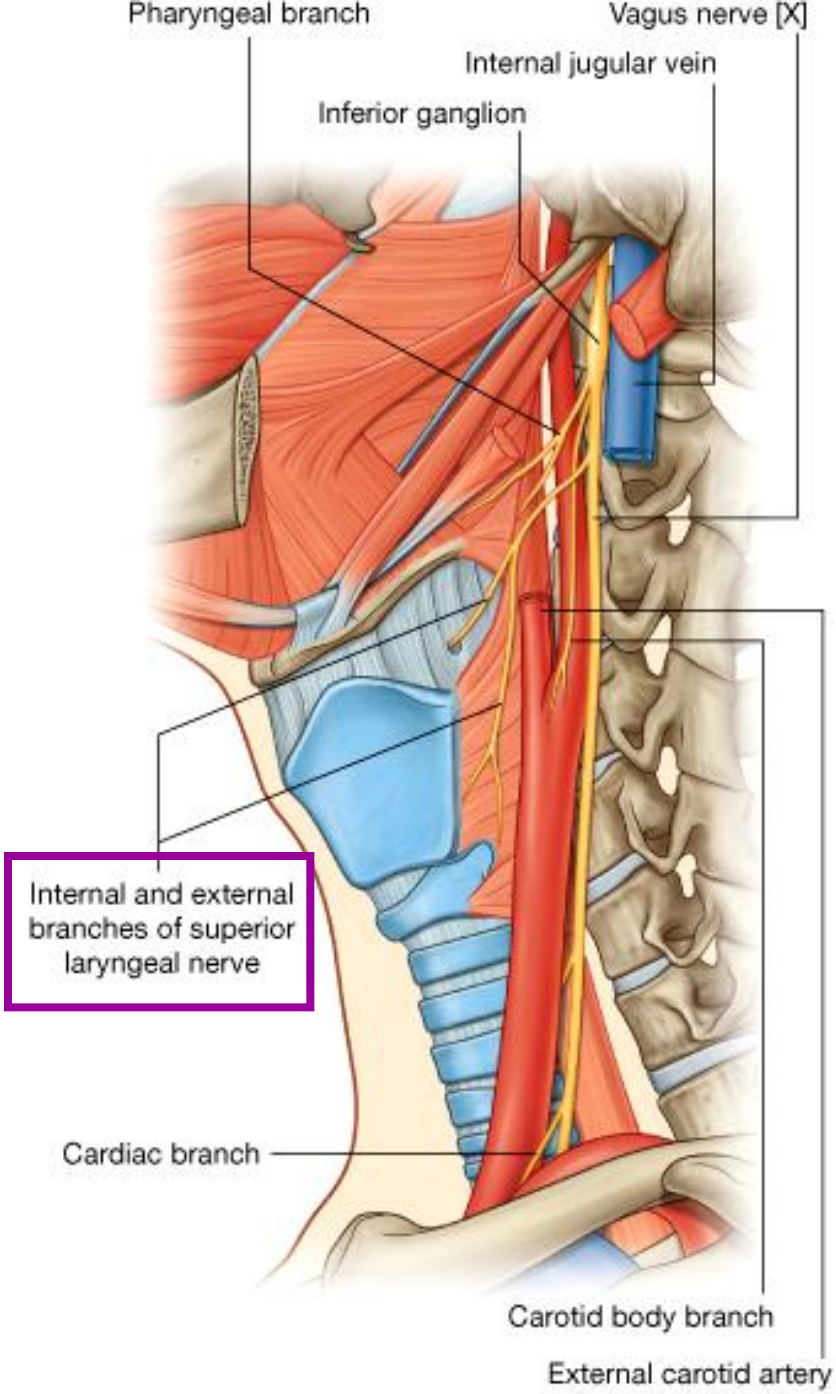
pharyngeal, **laryngeal** & **carotid body** branch & cardiac branches

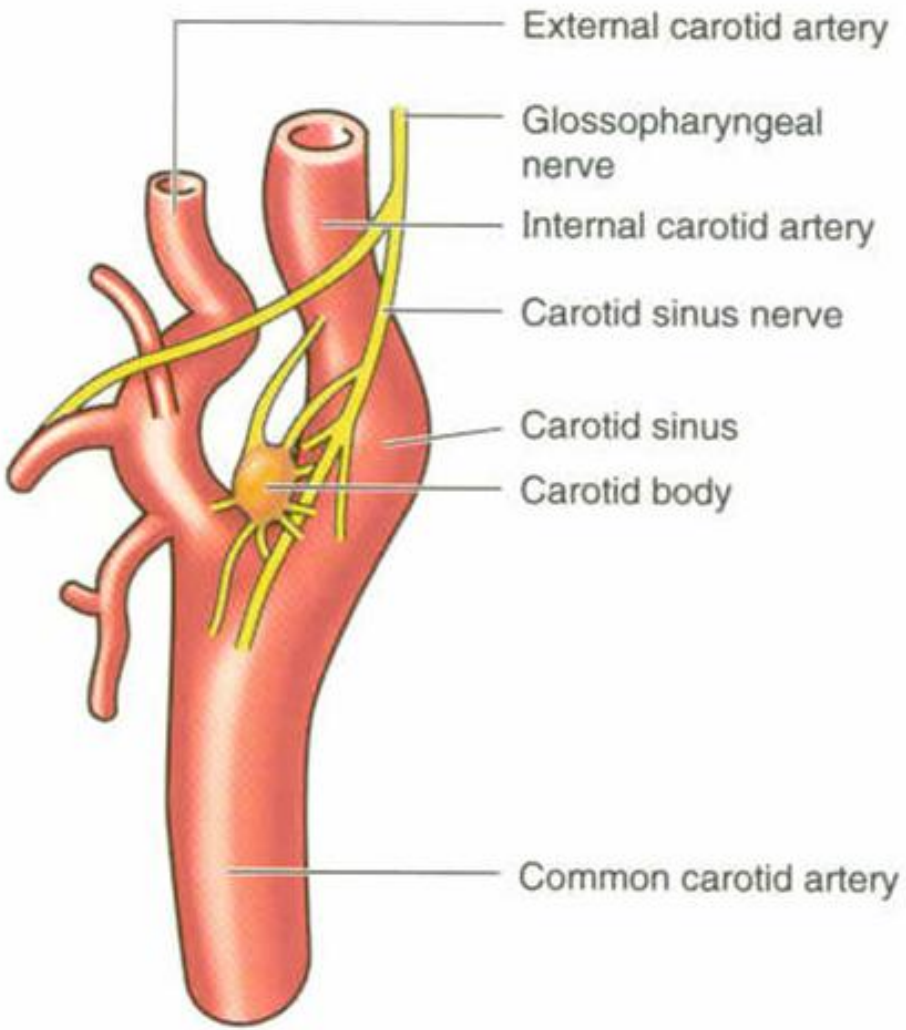
**Hypoglossal nerve:**

ant. ramus of C1 along with CN XII



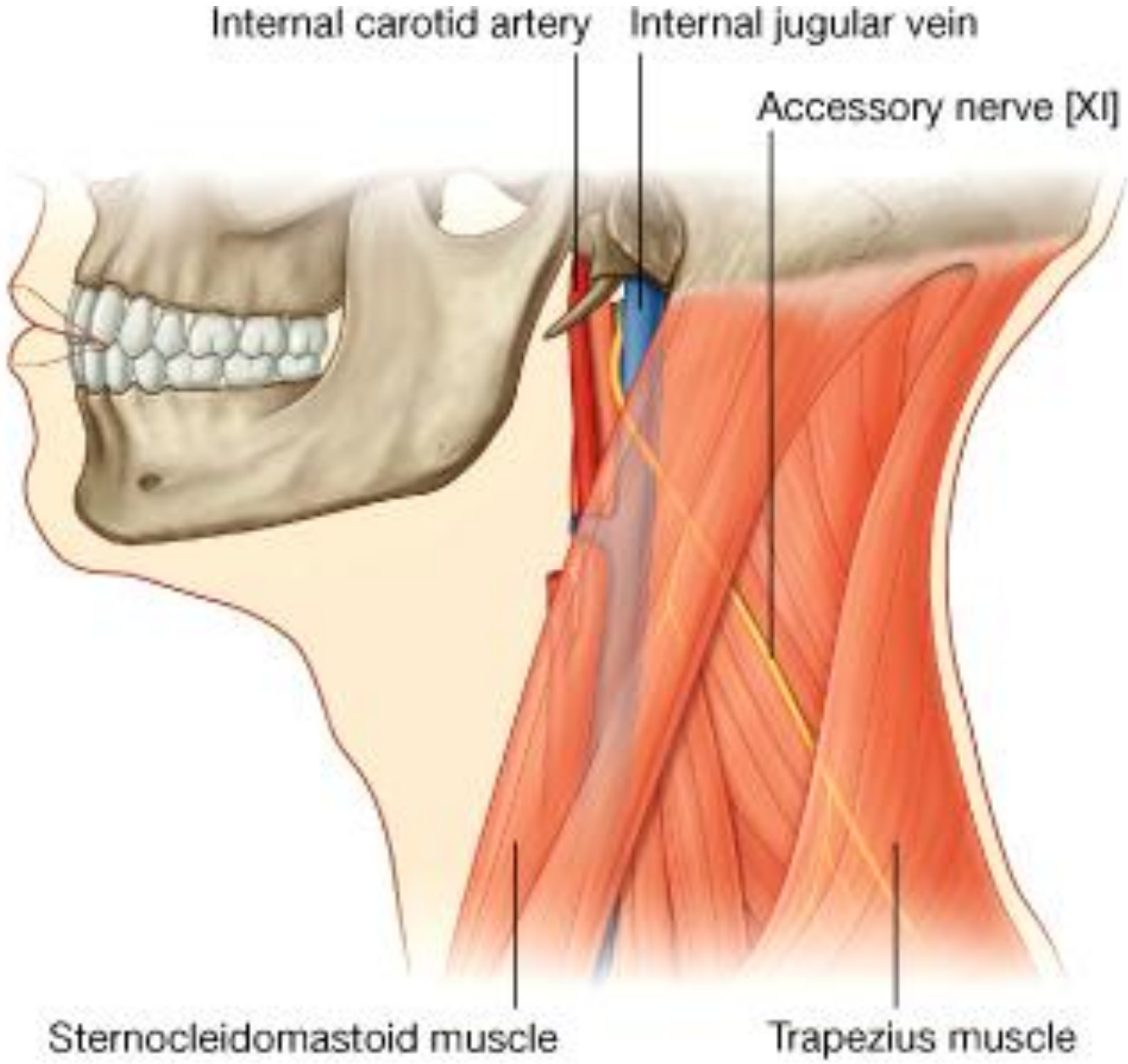


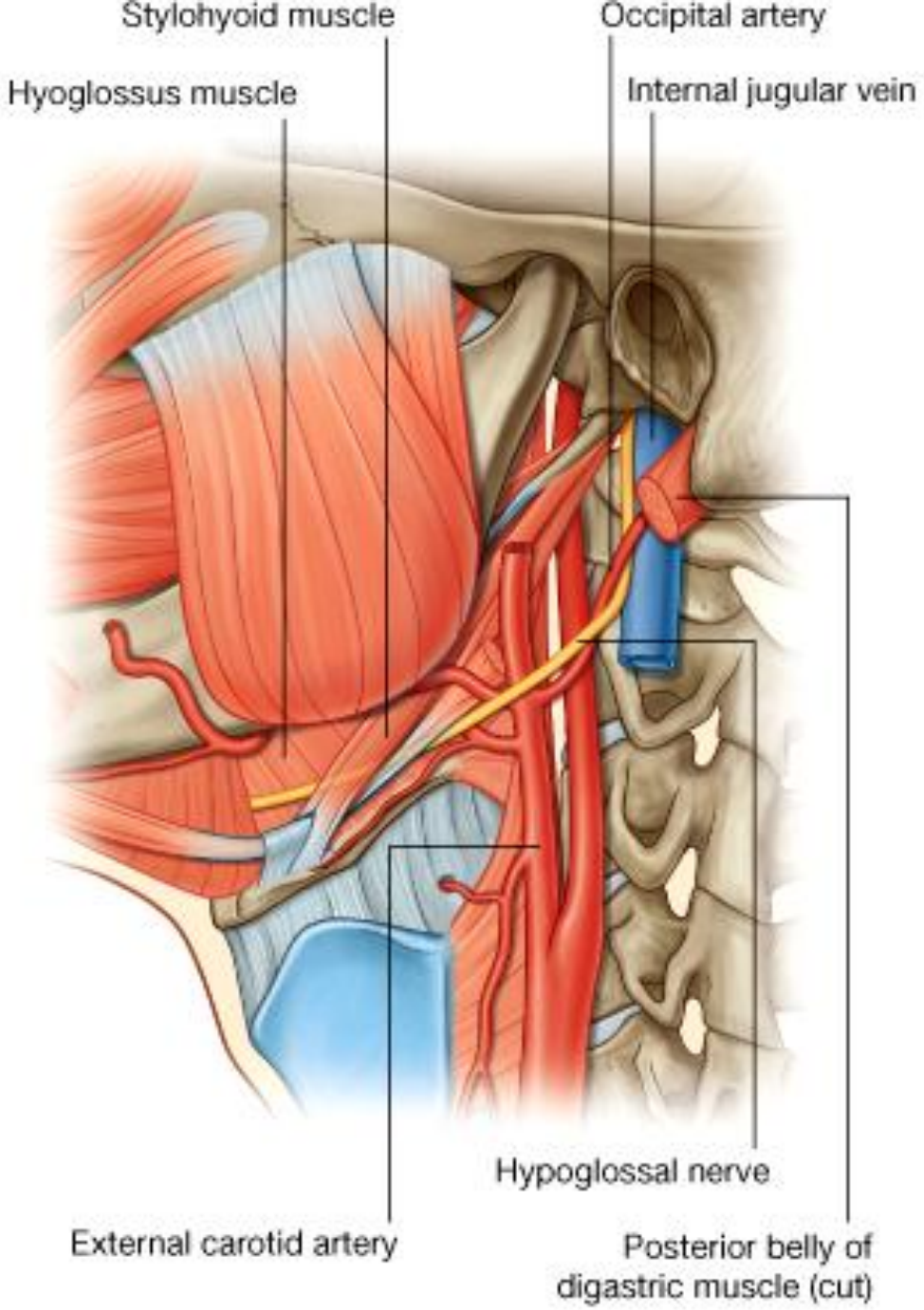


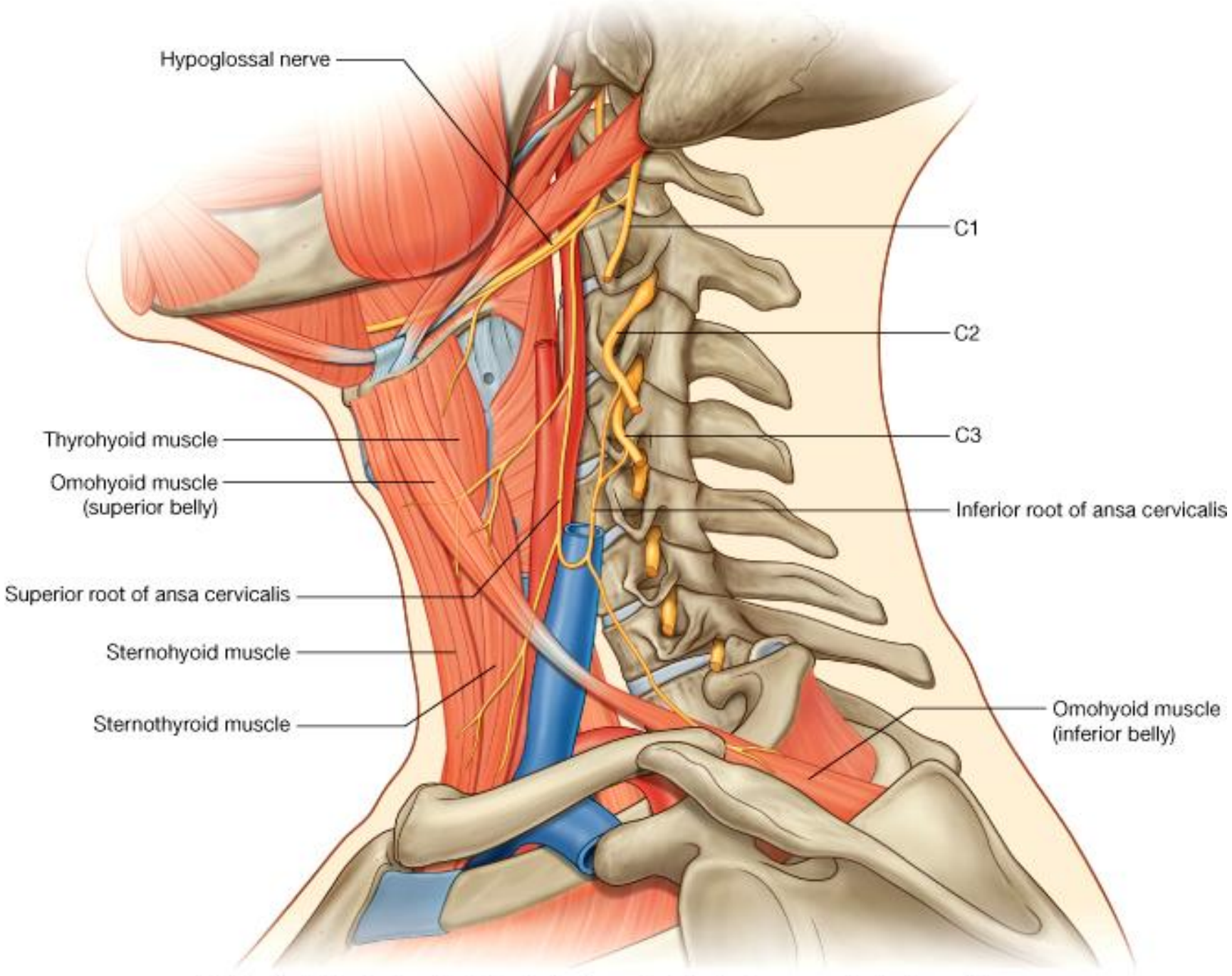



**Medial view of right carotid artery**

**Figure 8.14. Carotid body.** Observe that this small epithelioid body lies within the bifurcation of the common carotid artery. Also observe the carotid sinus and the associated network of sensory fibers of the glossopharyngeal nerve (CN IX).







# Dissection of the Neck

## Anterior triangle of Neck

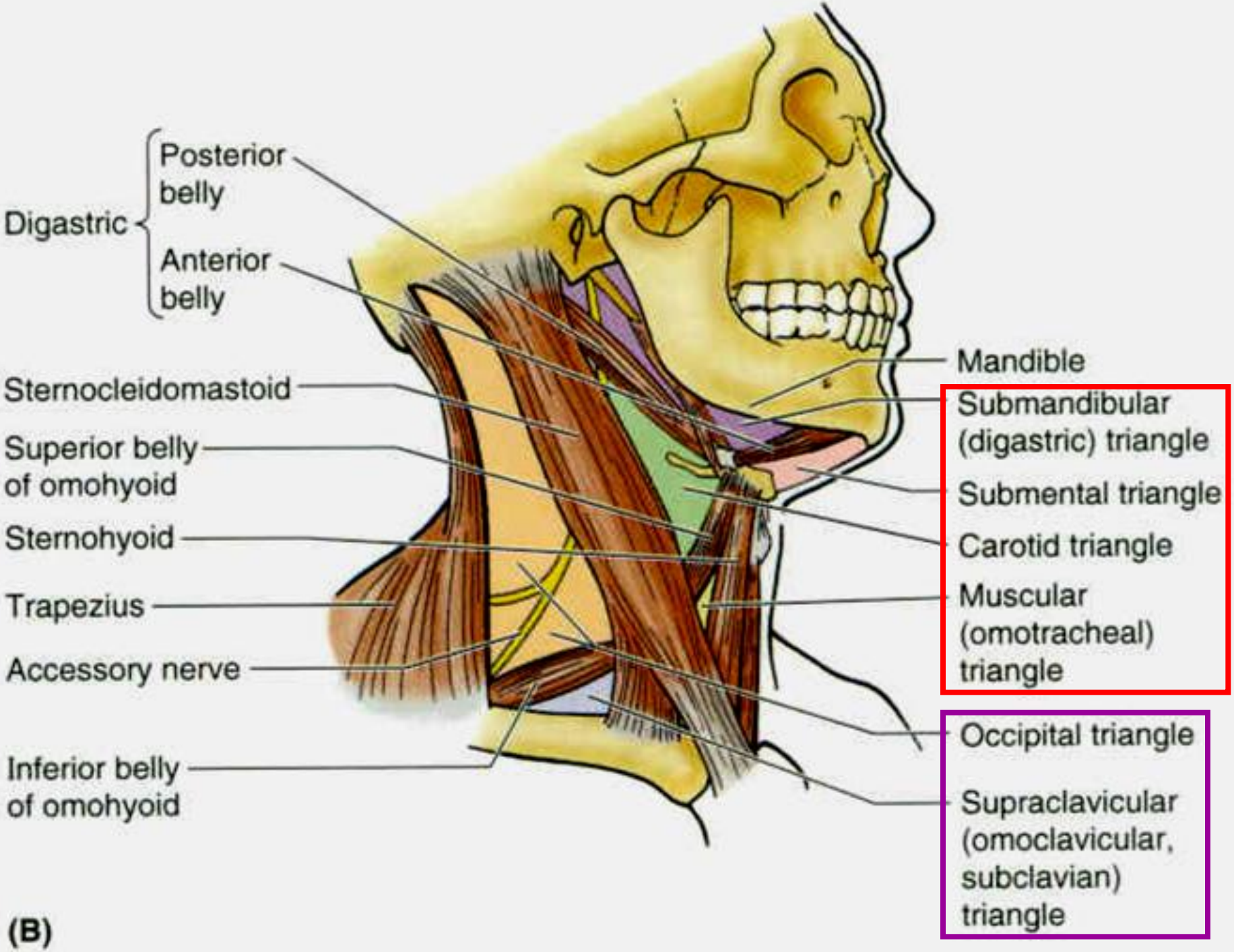
# Anterior triangle of neck

Bony and cartilaginous landmarks

- hyoid bone, thyroid cartilage, cricoid cartilage, trachea (1st, 2nd, 3rd rings)

1. Skin incision in the midline
   from ***tip of chin*** to ***supra-sternal notch***
2. Identify **platysma**, **cutaneous n.s** and
   transverse cervical nerves

   **Superficial veins**
   (**exteranl jugular vein, facial vein, retromandibular vein, internal jugular vein, anterior jugular vein**)


Digastric
Posterior belly
Anterior belly
Sternocleidomastoid
Superior belly of omohyoid
Sternohyoid
Trapezius
Accessory nerve
Inferior belly of omohyoid
Mandible
Submandibular (digastric) triangle
Submental triangle
Carotid triangle
Muscular (omotracheal) triangle
Occipital triangle
Supraclavicular (omoclavicular, subclavian) triangle
(B)

# Muscular triangle

1. Identify **infrahyoid muscles**
   (superior belly of omohyoid,
   sternohyoid, sternothyroid, thyrohyoid)
   are supply by nerves branches from
   **ansa cervicalis**.

2. Identify larygeal prominence;
   cricoid cartilage; **cricothyroid membrane**;
   1st tracheal ring; isthmus of thyroid gland

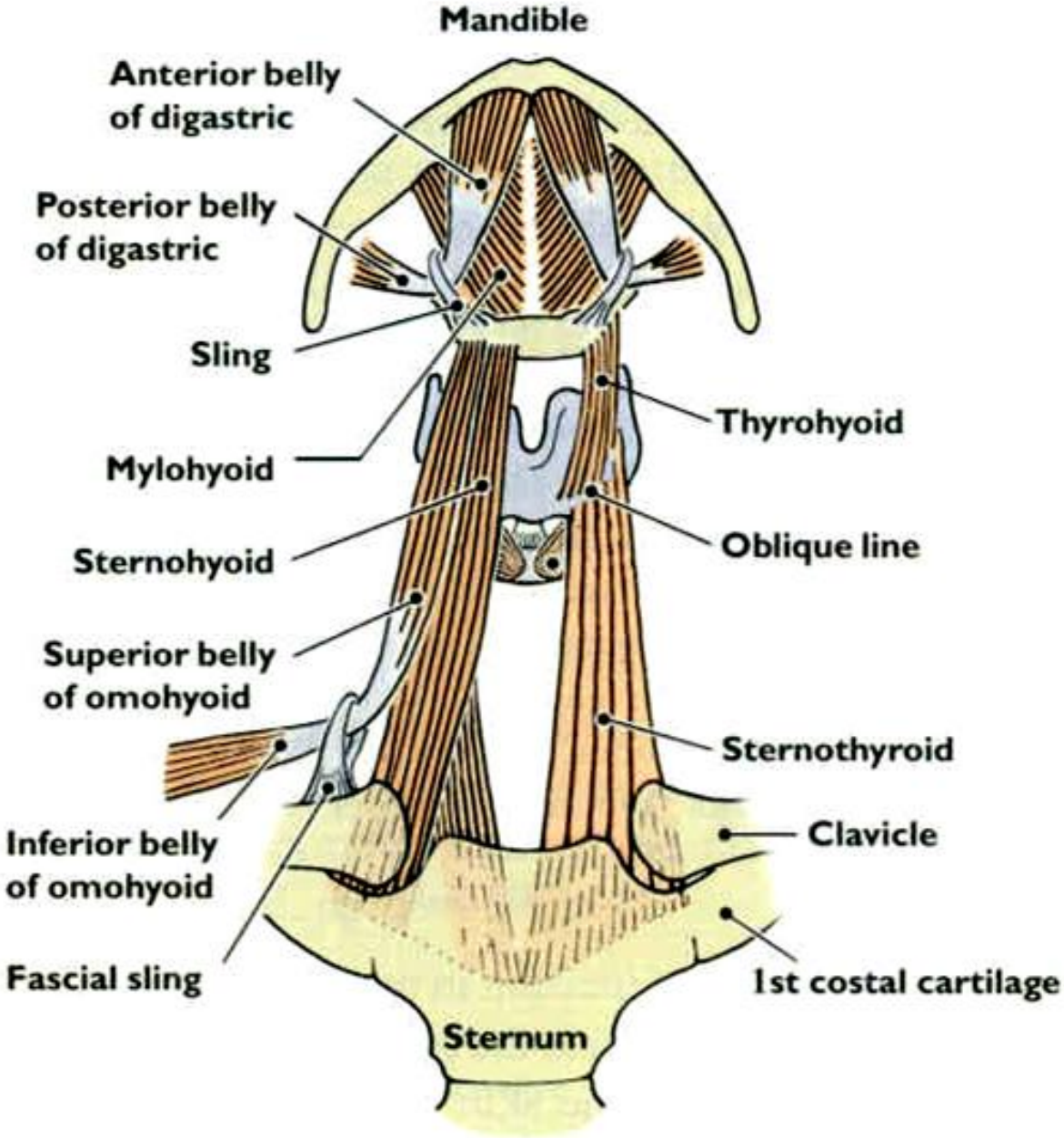



**Figure 7.52.** Muscles bounding the anterior median line of the neck. A diagram of the infrahyoid muscles.

# Carotid triangle

## Nerves in carotid triangle

### *Accessory nerve (CN XI)*

1. find accessory nerves – enter SCM;
2. clean SCM; notice the arteries to the SCM,
   cut arteries do not damage the nerve.
3. ***Cut SCM*** – 5cm superior to the sternum,
   then reflect SCM superiorly.
4. Trace accessory nerve, it may cross
   internal jugular vein anteriorly or posteriorly.
   ***Cut the facial vein*** where it empties into IJV

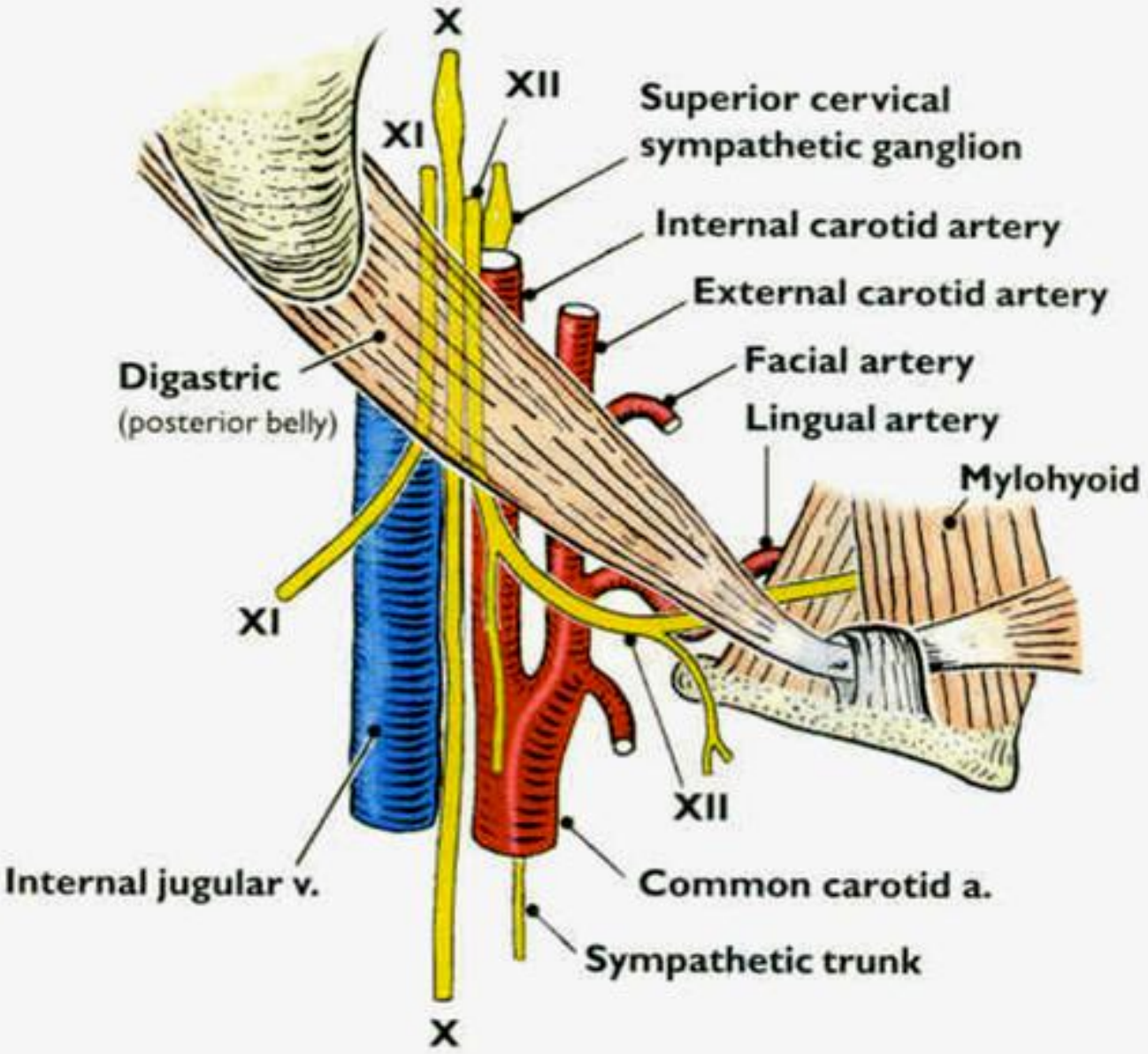



**Figure 7.55.** The posterior belly of the digastric muscle and structures deep to it.

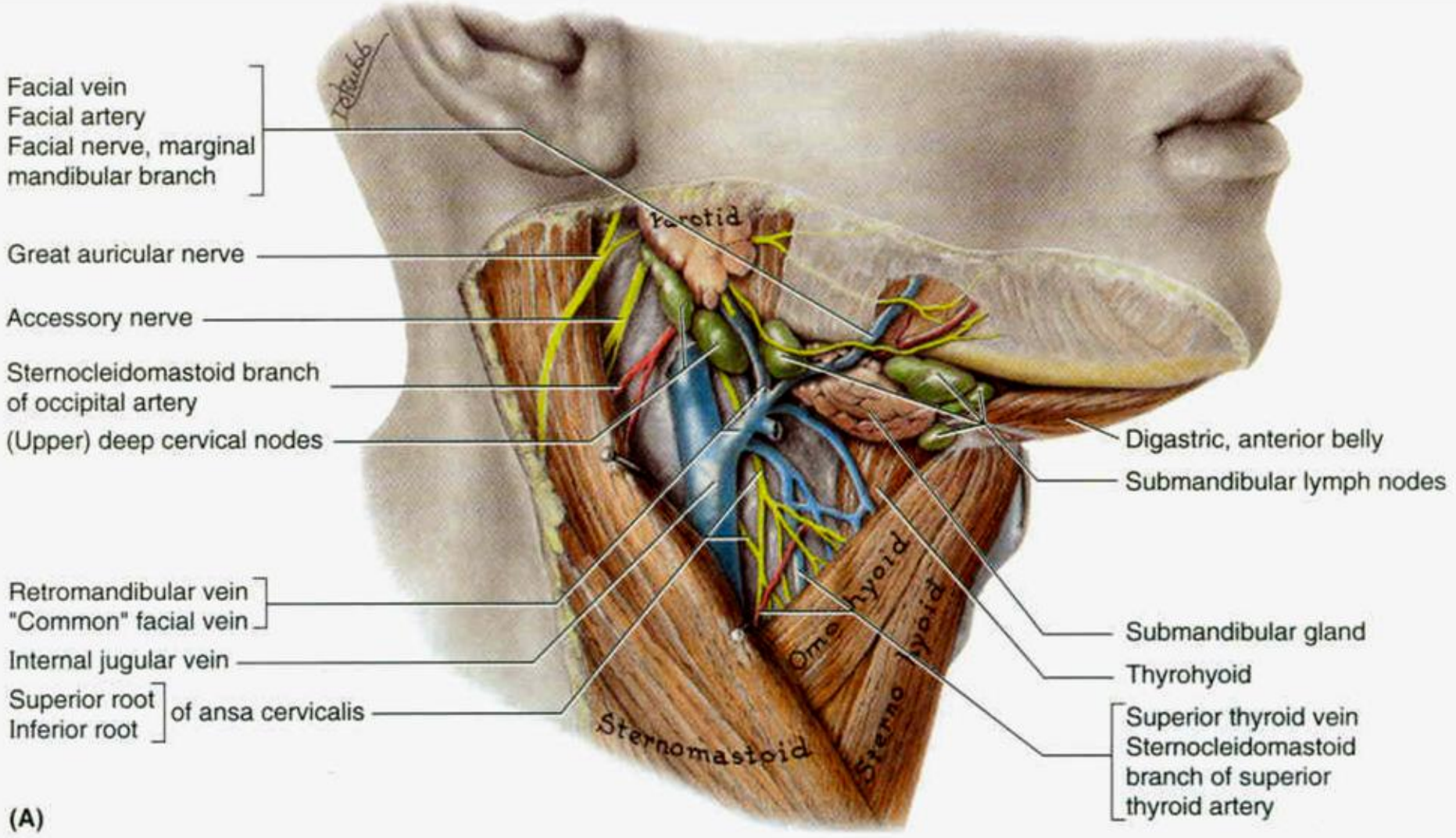


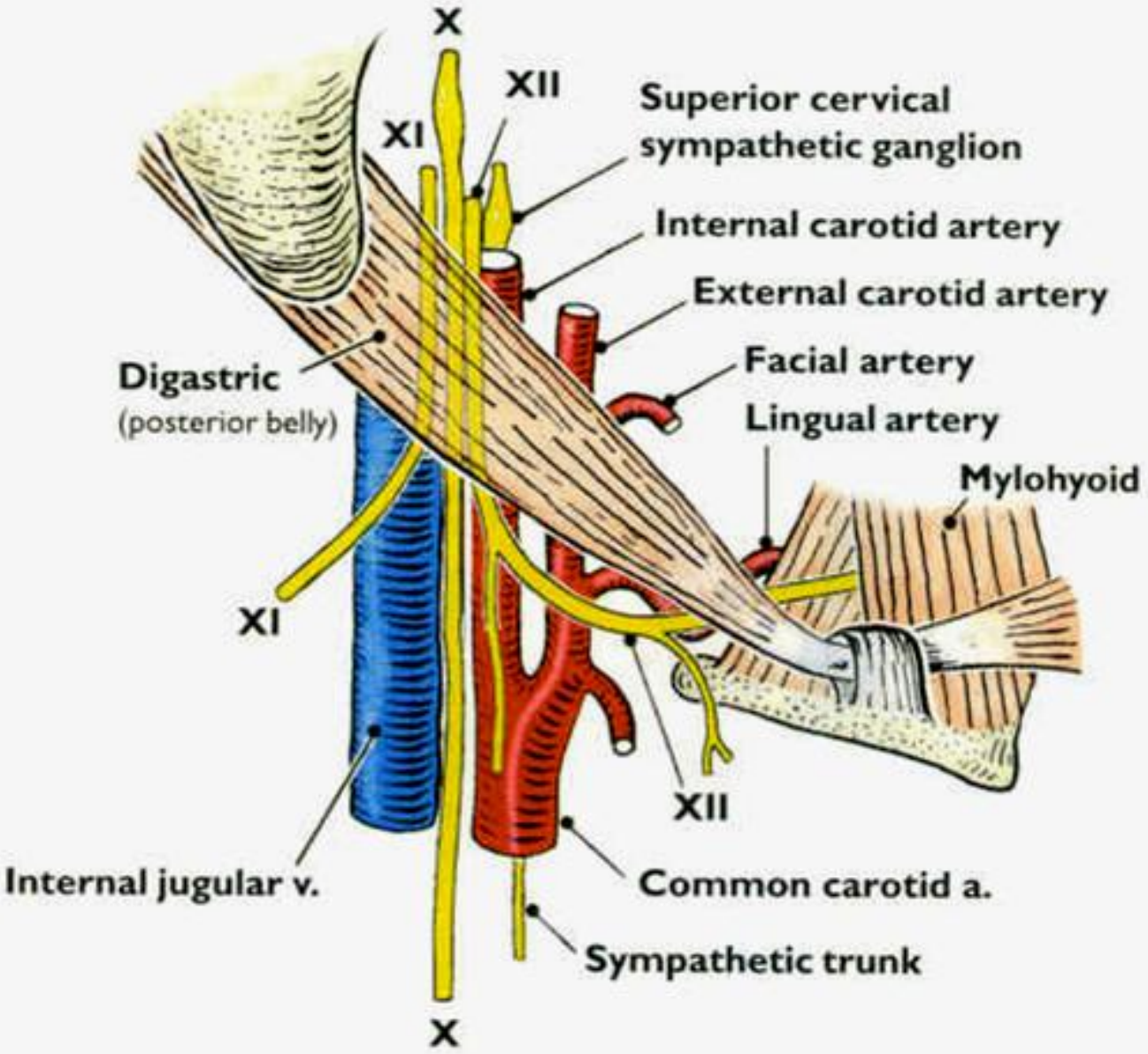

**Figure 8.11. Dissections of the anterior triangle of the neck and the suprahyoid region.** Lateral views. **A.** Superficial dissection of the neck. Observe the submandibular gland and lymph nodes. **B**. Suprahyoid region. The right half of the mandible (lower jaw) and the superior part of the mylohyoid muscle have been removed. Observe that the cut surface of the mylohyoid muscle becomes progressively thinner as it is traced anteriorly. Also observe the lingual nerve between the medial pterygoid muscle and the ramus of the mandible.

# *Hypoglossal nerve (CN XII)*

1. find **hypoglossal nerve** –
   superior to the tip of greater horn of hyoid bone.
   crossed with muscular branch of occipital artery

2. **nerve to thyrohyoid muscle**

3. Trace **sup. & inf. roots** of **ansa cervicalis**

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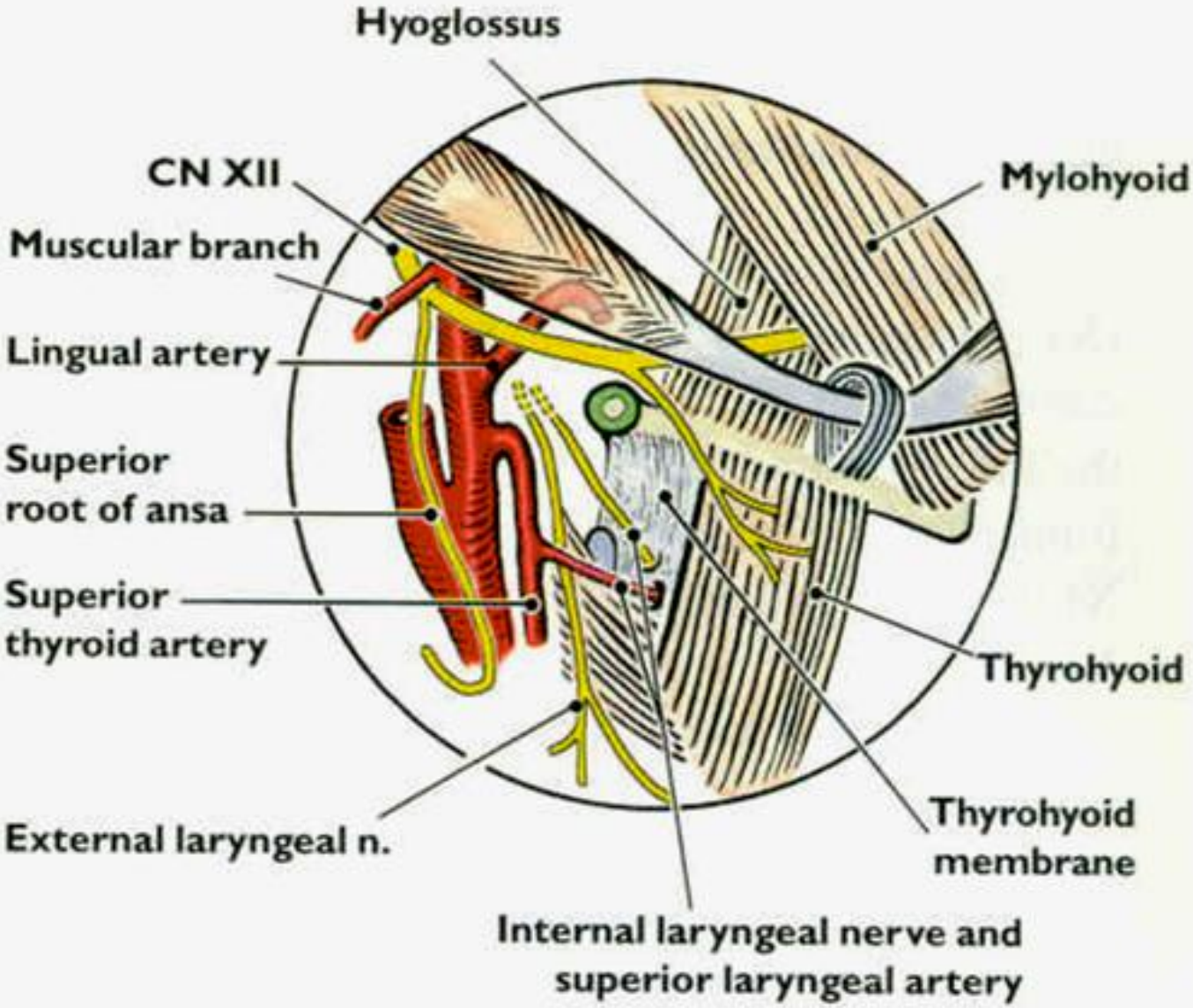



**Figure 7.54.** The tip of the greater horn of the hyoid bone (green bull's-eye) is the reference point for many structures: nerves, arteries, and muscles.

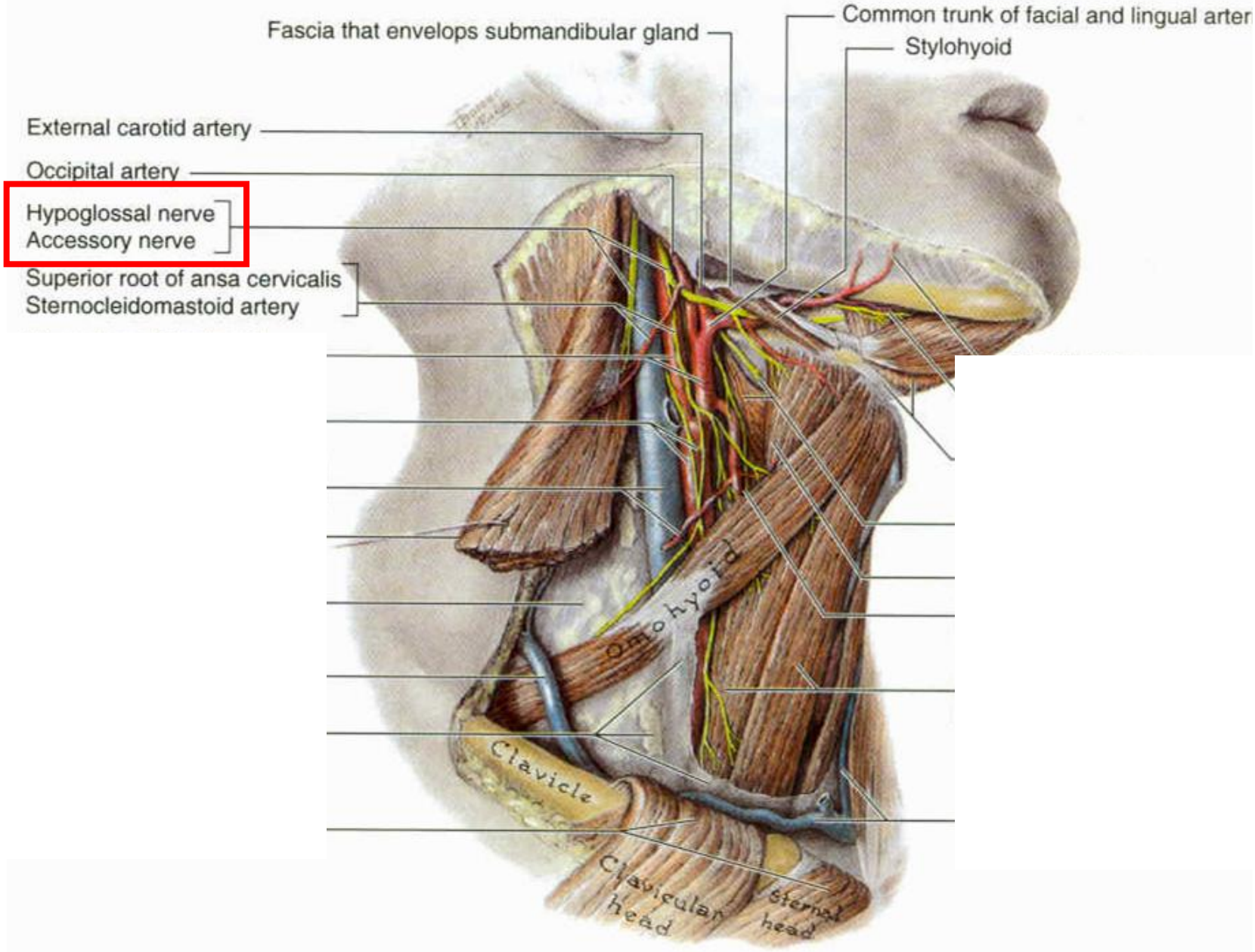



**Figure 8.12. Deep dissection of the anterior triangle of the neck.** Right side. Observe that the facial and lingual arteries in this person arise by a common trunk that passes deep to the stylohyoid and digastric muscles to enter the submandibular triangle.

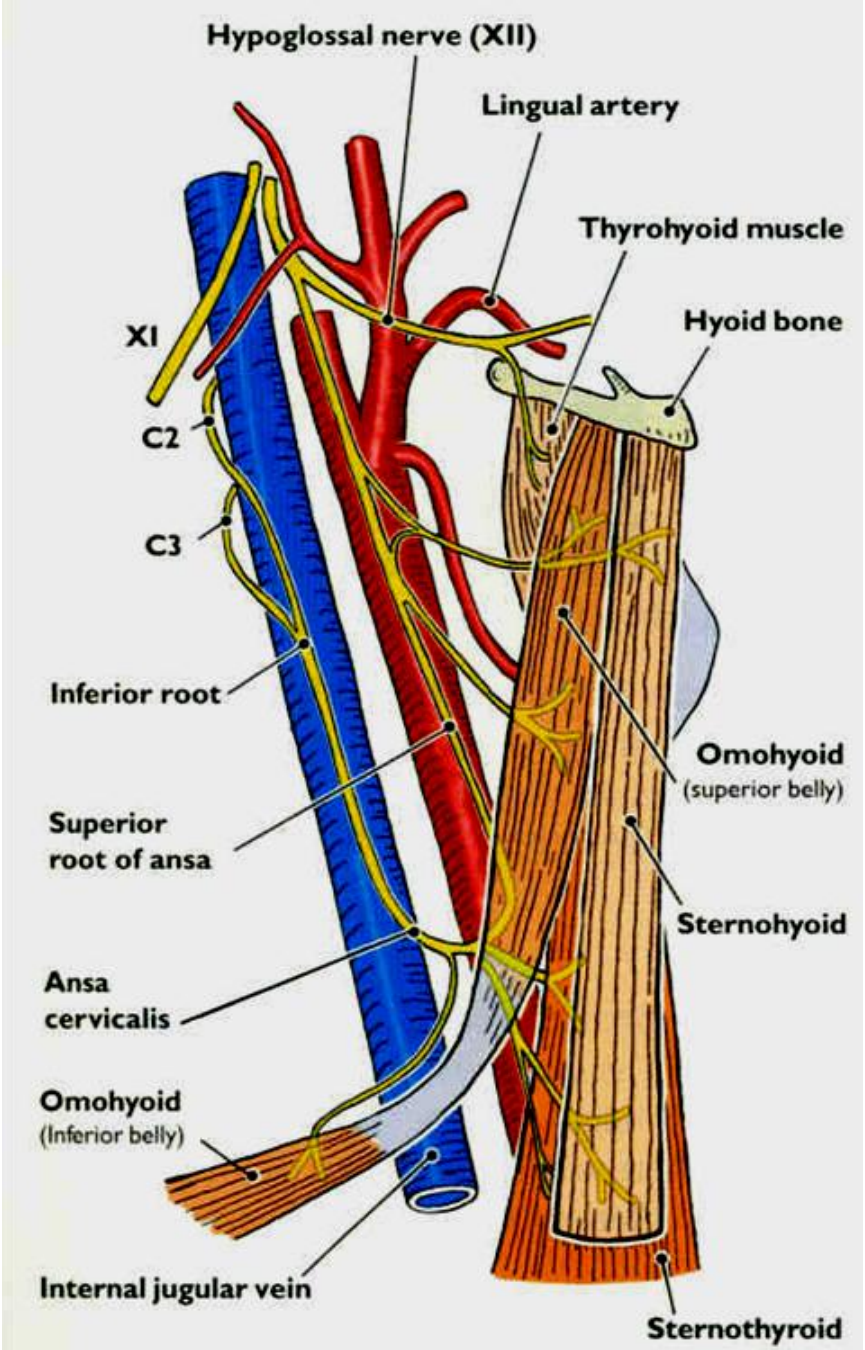



**Figure 7.56.** The ansa cervicalis.

# *Vagus nerve (CN X)*

1. Find and trace the **vagus nerve** and its branches;
   **superior laryngeal nerve**
   – **internal** & **external laryngeal nerves.**
2. Relax the neck by bending it anteriorly
3. Sever **omohyoid** and **sternohyoid** – close to hyoid bone;
   reflect them inferiorly
4. Sever **thyrohyoid muscle** – close to hyoid bone;
   reflect it inferiorly
5. Expose **thyrohyoid membrane**;
   **internal laryngeal nerve** pierces the membrane
6. Find and trace the **external laryngeal nerve**
7. Sever **sternothyroid muscle**
   from the ***oblique line of thyroid cartilage***
8. Trace **external laryngeal nerve** to
   the **cricothyroid muscle**

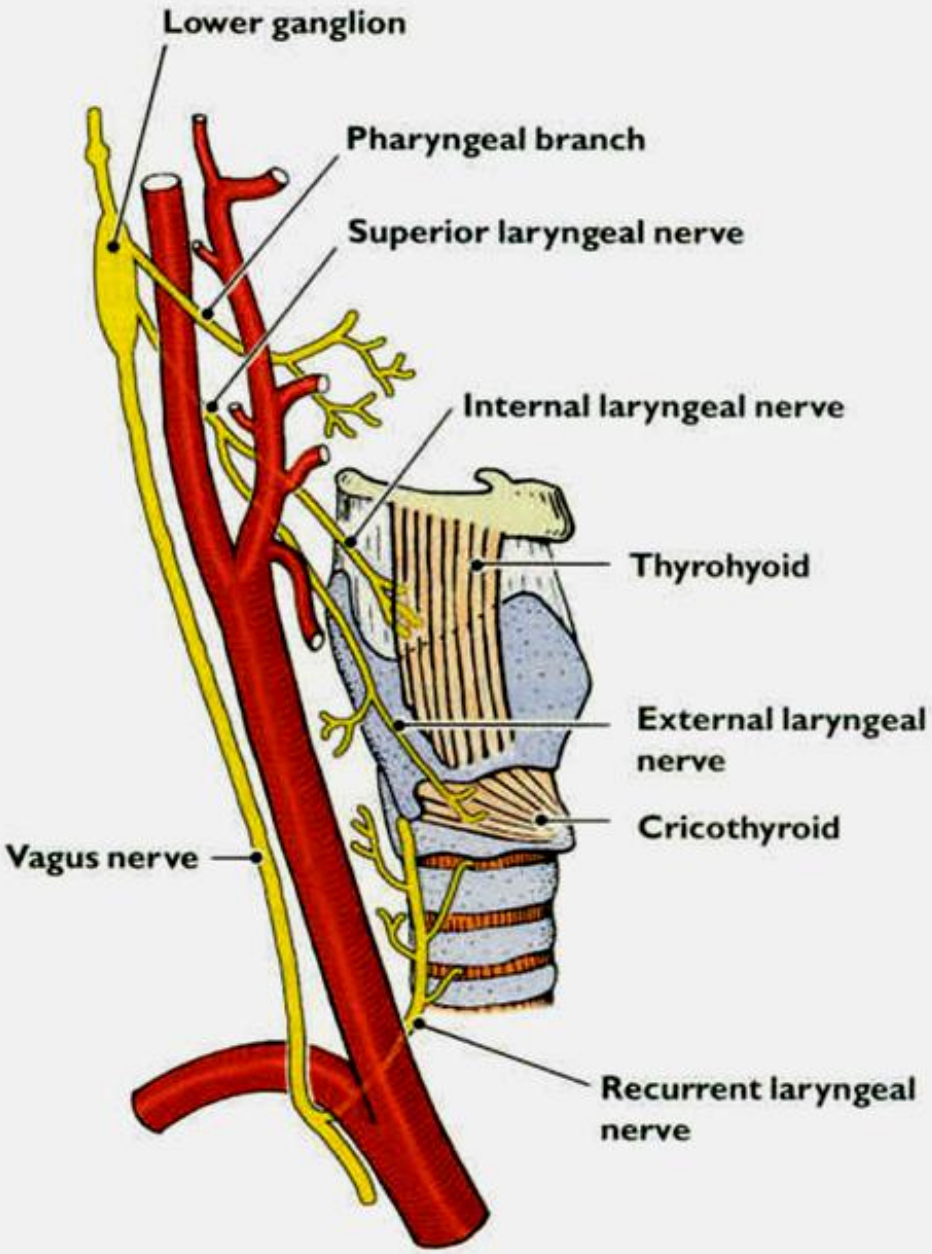



**Figure 7.57.** Laryngeal branches of the right vagus nerve (cranial nerve X)

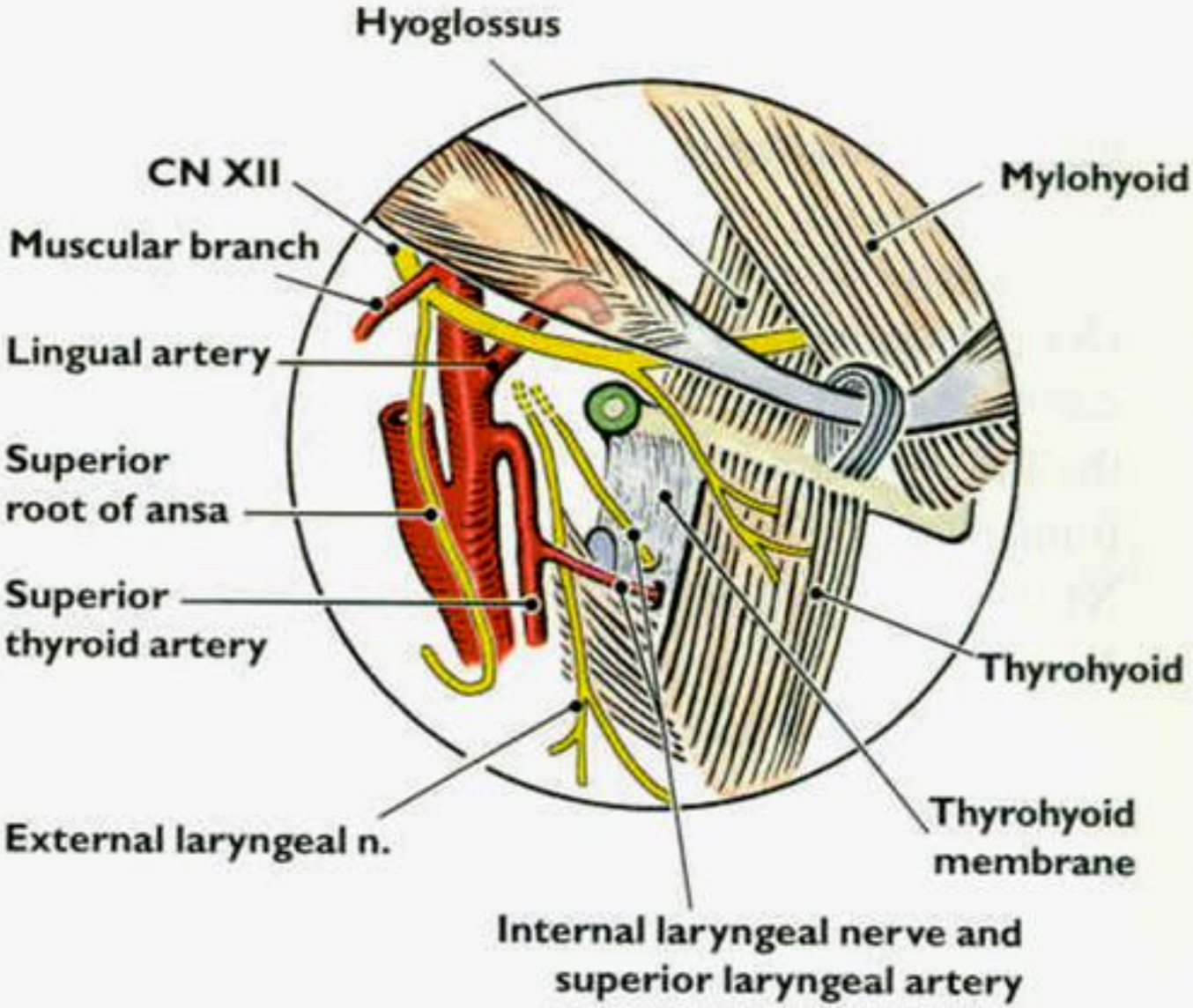



**Figure 7.54.** The tip of the greater horn of the hyoid bone (green bull's-eye) is the reference point for many structures: nerves, arteries, and muscles.

# Arteries in carotid triangle

1. remove **carotid sheath**;
   idnetify common carotid artery,
   int. & ext. carotid artery and its branches.

2. **superior thyroid artery** – **sup. laryngeal artery**
   together with **internal laryngeal nerve**

3. **lingual; facial; occipital;**
   **& ascending pharyngeal artery**

**Carotid sinus** and **carotid body** (do not identify)

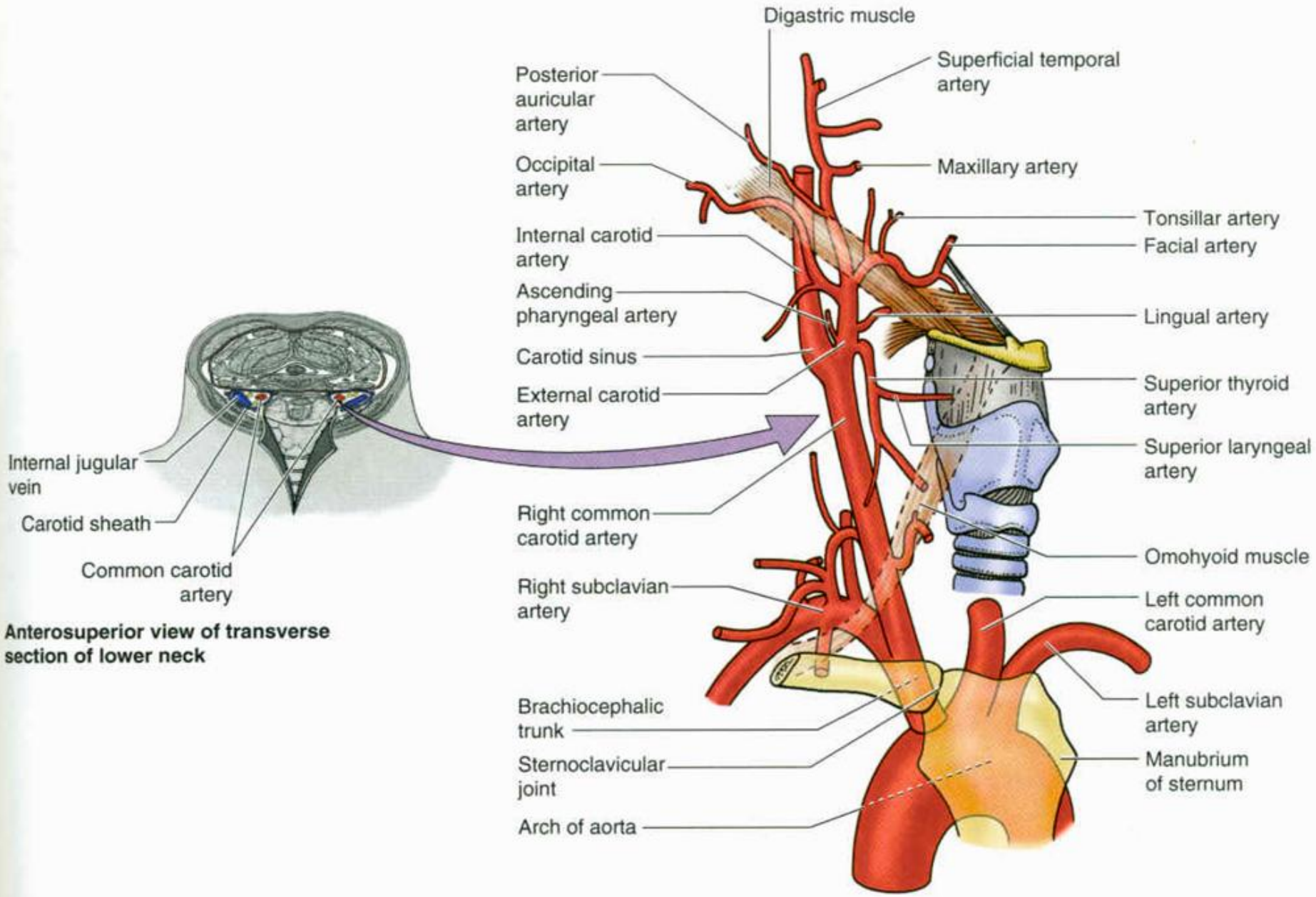


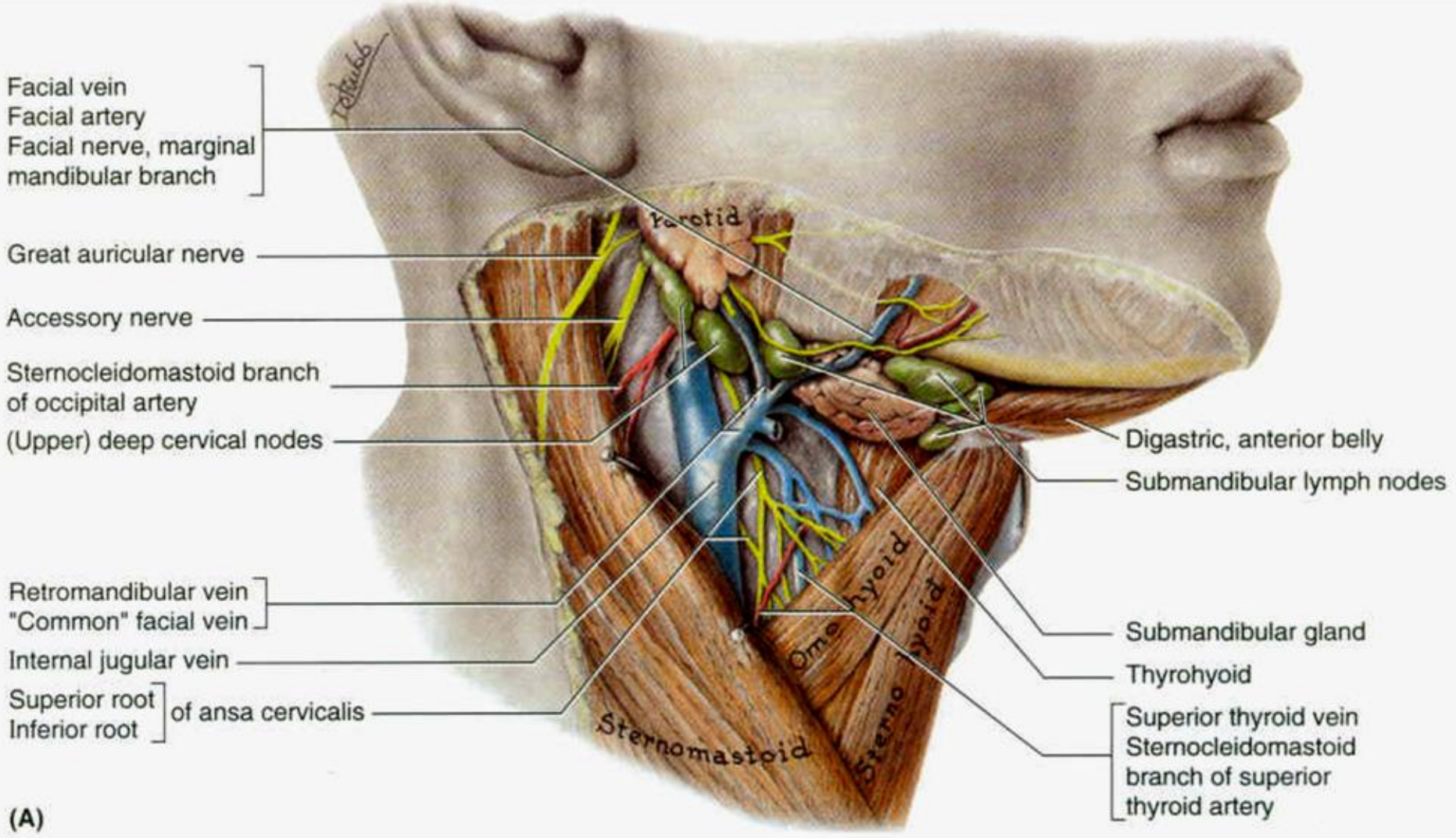

**Figure 8.15. Subclavian and carotid arteries and their branches.** In the inset, observe the carotid sheath, the dense fibrous investment of the common carotid artery, internal jugular vein (IJV), and vagus nerve (CN X). The carotid sheath is deep to the sternocleidomastoid (SCM).

## Submandibular triangle

1. sever and remove the ***superficial part*** of **submandibular gland** at post. border of mylohyoid muscle.
   Separate facial artery and vein from the gland.
2. defined ant. and post. bellies of digastric muscle & **intermediate tendon** (which pierces stylohyoid muscle) and fibrous sling.
3. trace **hypoglossal nerve** under cover of **mylohyoid muscle**.
4. pull ***ant. belly of digastric*** medially to expose **mylohyoid nerve** (a branch of V3)
5. ***Post. belly of digastric*** and ***stylohyoid*** muscles are supplied by a branch of VII

## Submental triangle

expose and clean the **mylohyoid muscles**

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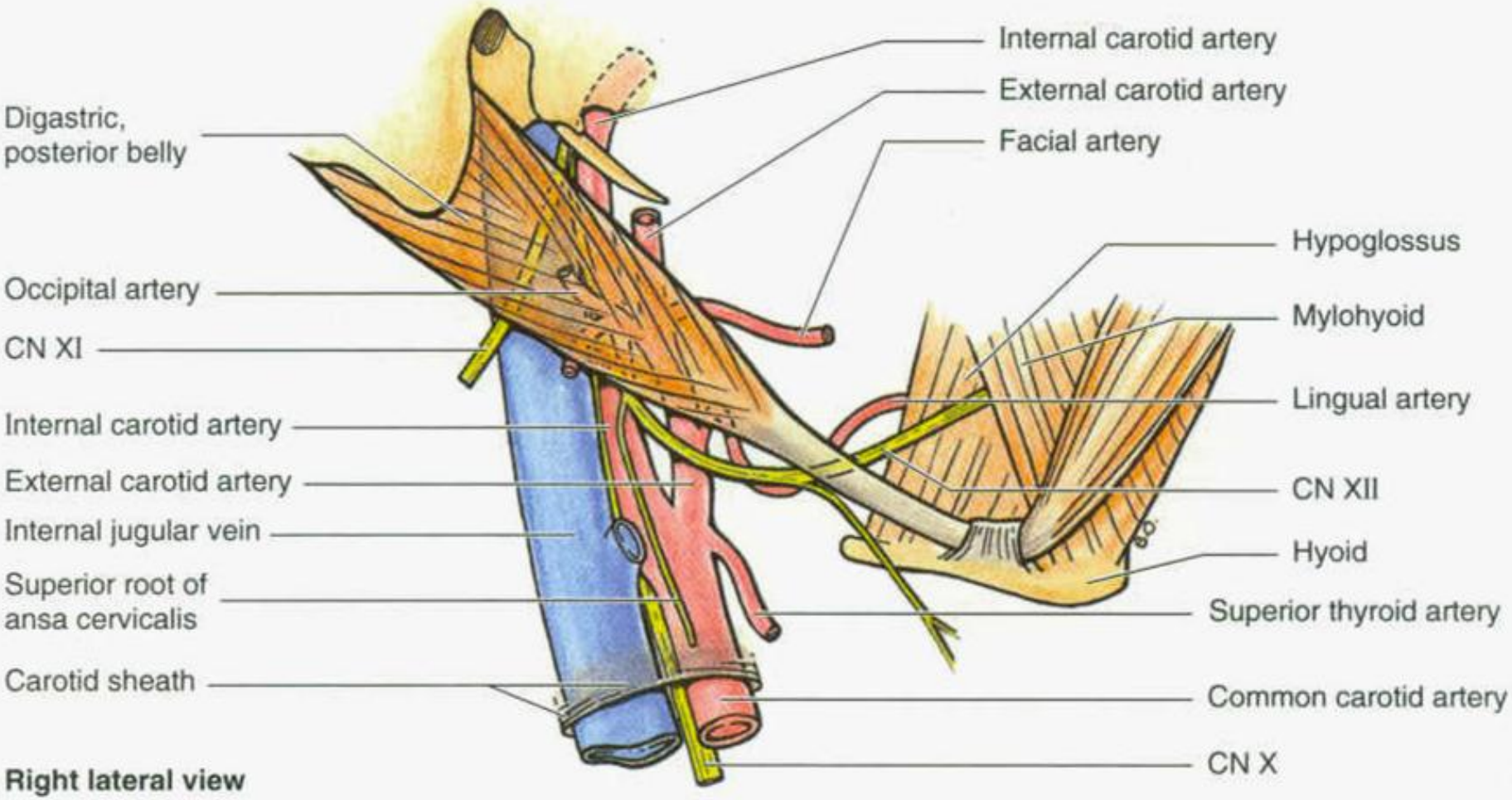


**Figure 8.17. Diagram of structures related to the posterior belly of the digastric muscle.** Observe the superficial and key position of the posterior belly of the digastric muscle that runs from the mastoid process to the hyoid bone. Note that all vessels and nerves cross deep to this belly except for the cervical branches of the facial nerve (CN VII), facial branches of the great auricular nerve, and the external jugular vein (EJV) and its connections (none of which are shown here).