

NECK

By

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Introduction

- The neck is a tube providing continuity from the head to the trunk.

Anteriorly:

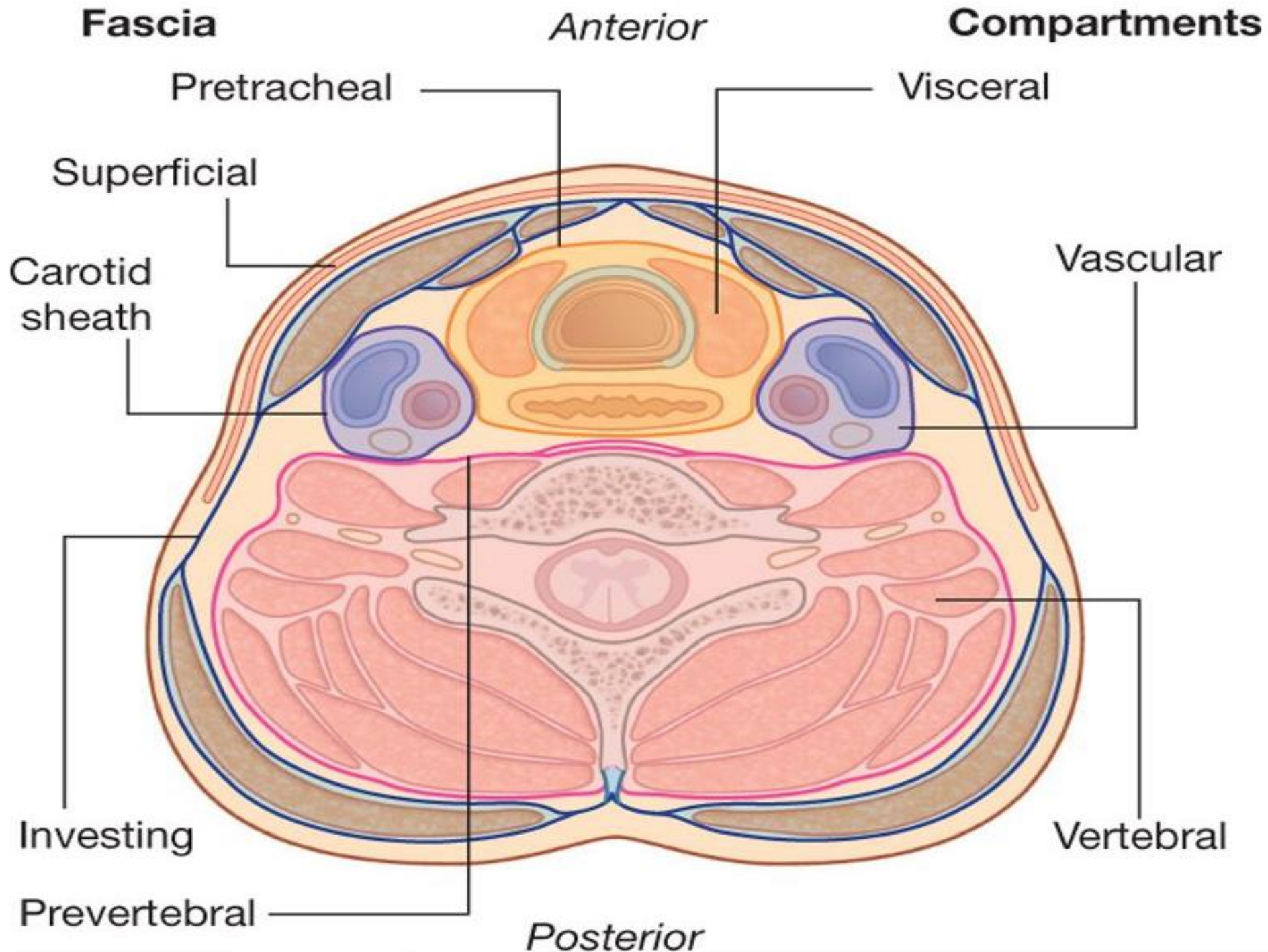
- from the lower border of the mandible to the upper surface of the manubrium of sternum.

Posteriorly:

- from the superior nuchal line on the occipital bone of the skull to the intervertebral disc between the CVII and T1 vertebrae.

Longitudinal organization of Neck

- the **visceral compartment** is anterior and contains parts of the digestive and respiratory systems, and several endocrine glands;
- the **vertebral compartment** is posterior and contains the cervical vertebrae, spinal cord, cervical nerves, and muscles associated with the vertebral column;
- the **two vascular compartments**, one on each side, are lateral and contain the major blood vessels and the vagus nerve [X].
- All these compartments are contained within unique layers of **cervical fascia**.

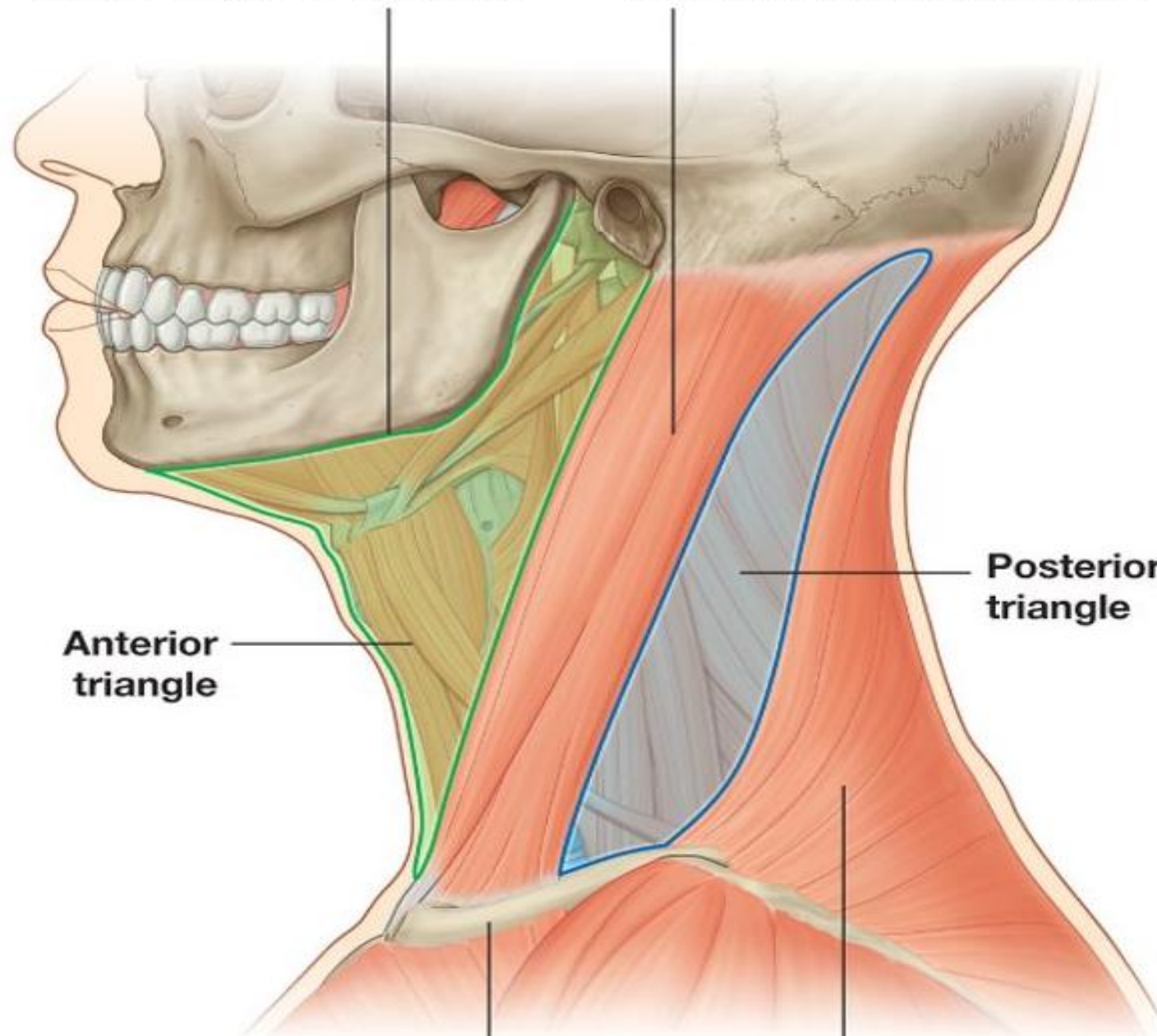


Triangles of Neck

- For descriptive purposes the neck is divided into anterior and posterior triangles.
- the boundaries of the **anterior triangle** are the anterior border of the sternocleidomastoid muscle, the inferior border of the mandible, and the midline of the neck;
- the boundaries of the **posterior triangle** are the posterior border of the sternocleidomastoid muscle, the anterior border of the trapezius muscle, and the middle one-third of the clavicle

Inferior border of mandible

Sternocleidomastoid muscle



Anterior triangle

Posterior triangle

Clavicle

Trapezius muscle

Fascia of Neck

The fascia of the neck has a number of unique features.

Superficial fascia:

The fascia in the neck contains a thin sheet of muscle (the **platysma**), which begins in the superficial fascia of the thorax, runs upward to attach to the mandible and blend with the muscles on the face, It is innervated by the cervical branch of the facial nerve [VII].

Deep Cervical fascia

- the deep cervical fascia is organized into several distinct layers.
 1. an **investing layer**, which surrounds all structures in the neck;
 2. the **prevertebral layer**, which surrounds the vertebral column and the deep muscles associated with the back;
 3. the **pretracheal layer**, which encloses the viscera of the neck; and
 4. the **carotid sheaths**, which receive a contribution from the other three fascial layers and surround the two major neurovascular bundles on either side of the neck

Investing layer of Deep cervical fascia

- The investing layer completely surrounds the neck.

Posteriorly:

- Attaching posteriorly to the ligamentum nuchae and the spinous process of the CVII vertebra, this fascial layer splits as it passes forward to enclose the trapezius muscle, reunites into a single layer as it forms the roof of the posterior triangle, splits again to surround the sternocleidomastoid muscle, and reunites again to join its twin from the other side

Anteriorly

- the investing fascia surrounds the infrahyoid muscles.

- **superiorly** to the external occipital protuberance and the superior nuchal line.
- **laterally** to the mastoid process and zygomatic arch.
- **inferiorly** to the spine of the scapula, the acromion, the clavicle, and the manubrium of sternum.
- The external and anterior jugular veins, and the lesser occipital, great auricular, transverse cervical, and supraclavicular nerves, all branches of the cervical plexus, pierce the investing fascia

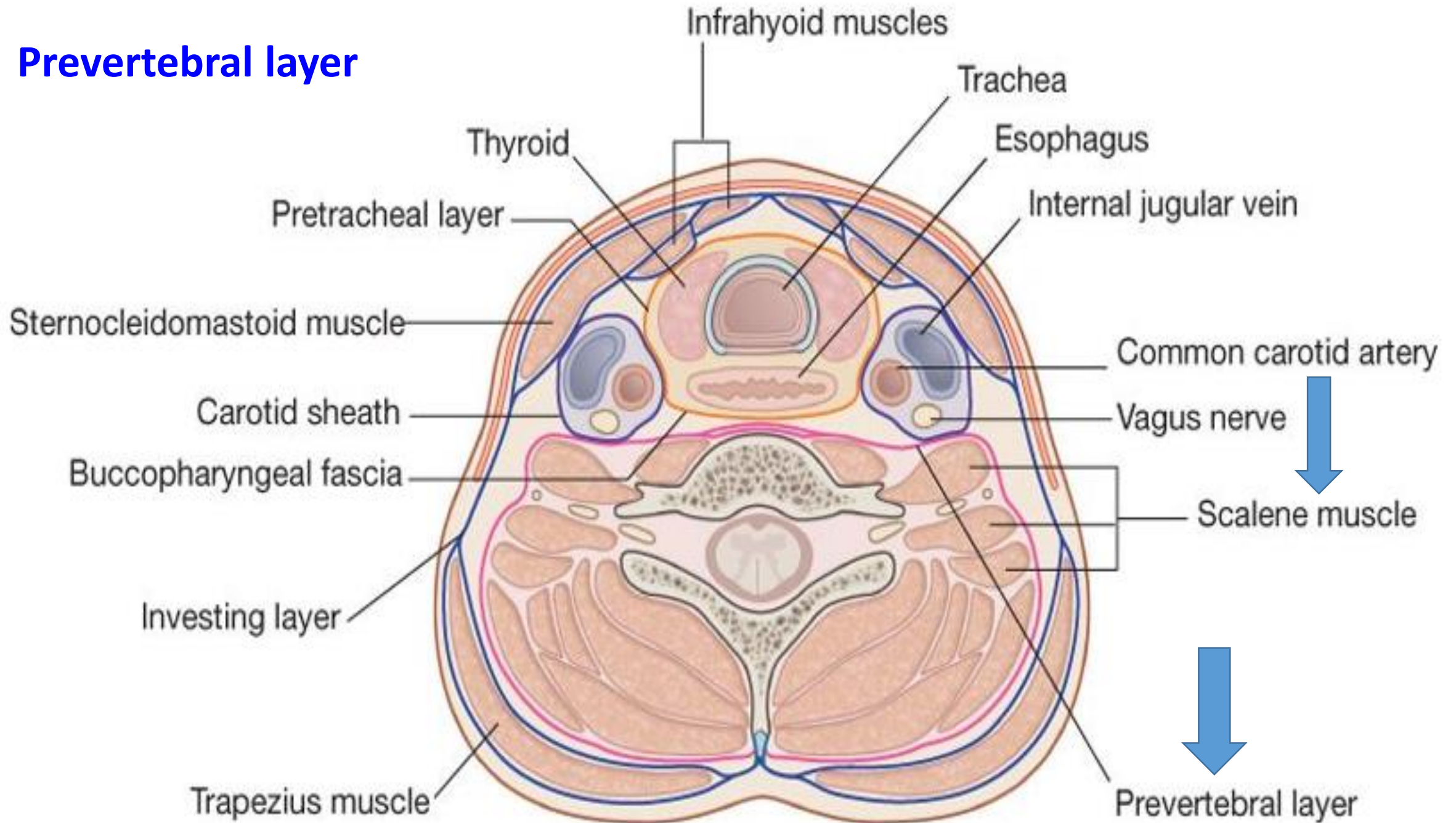
Prevertebral layer of Deep cervical fascia

- The prevertebral layer is a cylindrical layer of fascia that surrounds the vertebral column and the muscles associated with it.

Muscles in this group include

- the prevertebral muscles.
- the anterior, middle, and posterior scalene muscles.
- the deep muscles of the back.

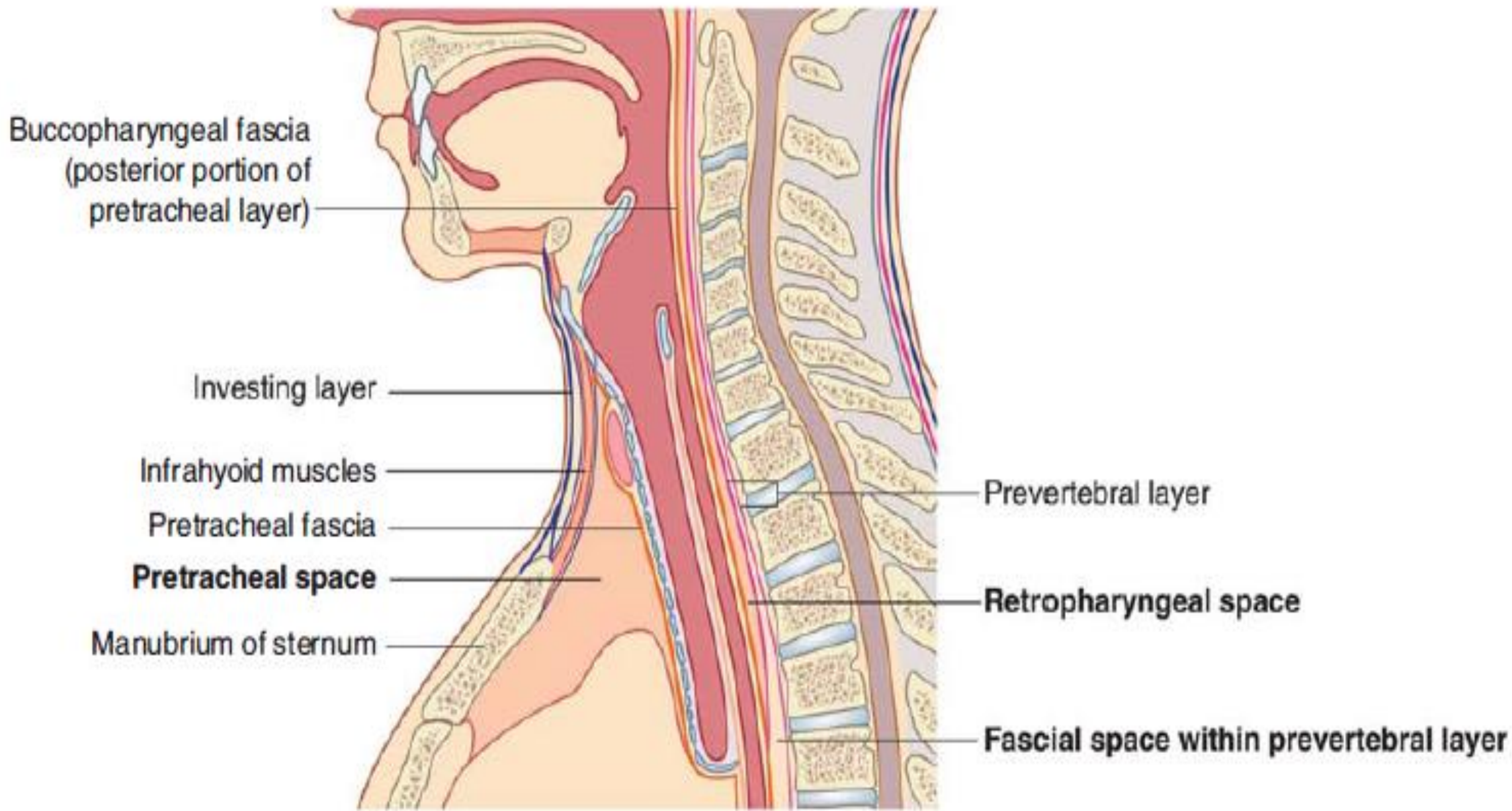
Prevertebral layer



Attachments of Prevertebral fascia

- The prevertebral fascia is attached posteriorly along the length of the ligamentum nuchae, and superiorly forms a continuous circular line attaching to the base of the skull.
- This circle begins: **anteriorly** as the fascia attaches to the basilar part of the occipital bone, the area of the jugular foramen, and the carotid canal;
- continues **laterally**, attaching to the mastoid process; and
- continues **posteriorly** along the superior nuchal line ending at the external occipital protuberance, where it associates with its partner from the opposite side.

- **Anteriorly**, the prevertebral fascia is attached to the anterior surfaces of the transverse processes and bodies of vertebrae C1 to CVII.
- The prevertebral fascia passing between the attachment points on the transverse processes is unique. In this location, it splits into two layers, creating a longitudinal fascial space containing loose connective tissue that extends from the base of the skull through the thorax.



Axillary sheath.

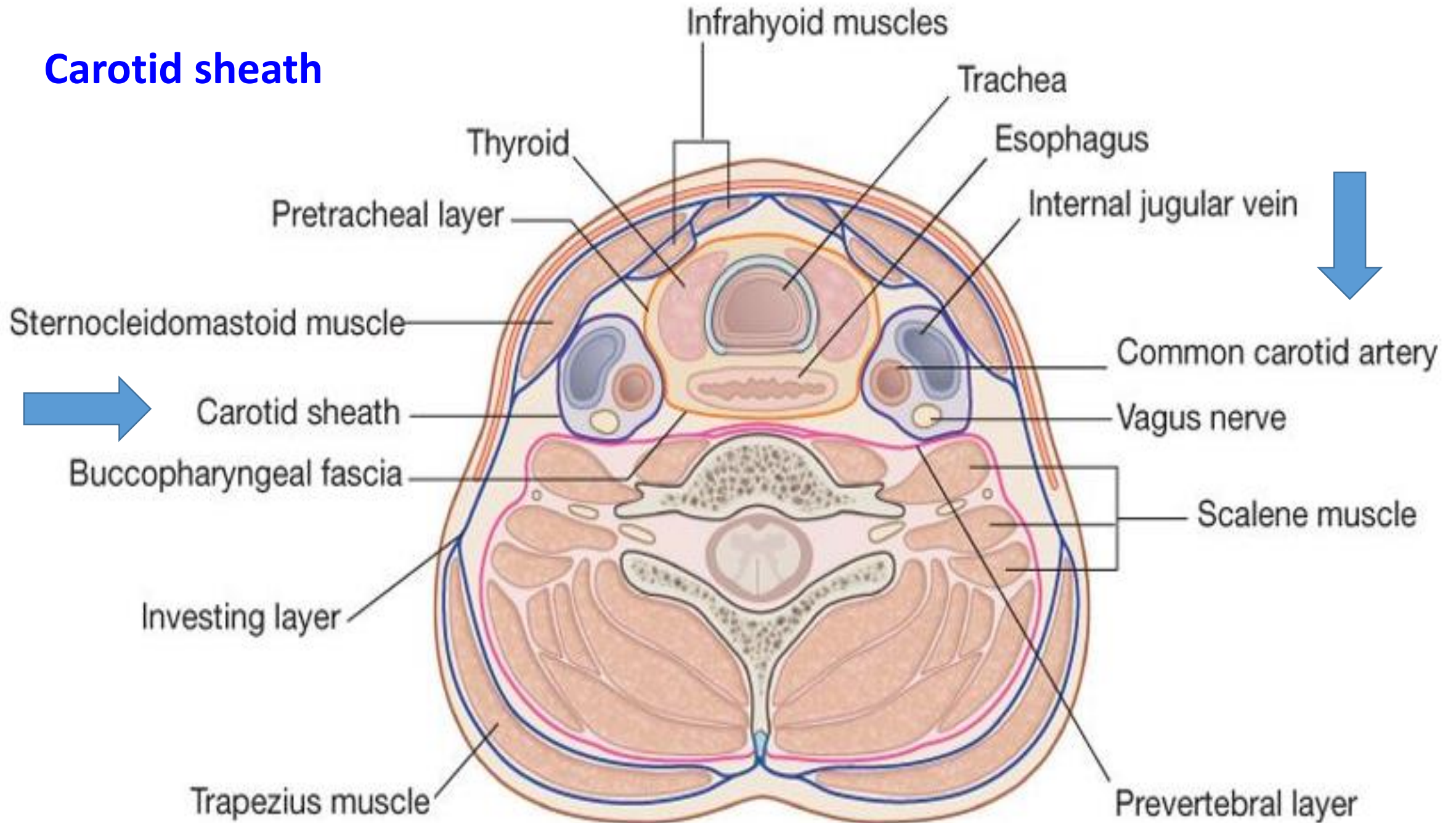
- The prevertebral fascia in an anterolateral position extends from the anterior and middle scalene muscles to surround the brachial plexus and subclavian artery as these structures pass into the axilla. This fascial extension is the **axillary sheath**

Pretracheal layer

- The **pretracheal layer** consists of a collection of fascias that surround the trachea, esophagus, and thyroid gland (Fig. 8.153).
- **Anteriorly**, it consists of a pretracheal fascia that crosses the neck, just posterior to the infrahyoid muscles, and covers the trachea and the thyroid gland.
- The pretracheal fascia begins **superiorly** at the hyoid bone.
- ends **inferiorly in** the upper thoracic cavity.
- **Laterally**, this fascia continues and covers the thyroid gland and the esophagus.

- Posteriorly, the pretracheal layer is referred to as the buccopharyngeal fascia and separates the pharynx and the esophagus from the prevertebral layer
- The buccopharyngeal fascia begins superiorly at the base of the skull and ends inferiorly in the thoracic cavity

Carotid sheath



Carotid sheath

- Each **carotid sheath** is a column of fascia that surrounds the common carotid artery, the internal carotid artery, the internal jugular vein, and the vagus nerve as these structures pass through the neck.
- It receives contributions from the investing, prevertebral, and pretracheal layers

Fascial spaces

- Between the fascial layers in the neck are spaces that may provide a conduit for the spread of infections from the neck to the mediastinum.
- Three spaces could be involved in this process
- **pretracheal space**
- **retropharyngeal space**
- **third space**

Pretracheal space

- the first is the **pretracheal space** between the investing layer of cervical fascia (covering the posterior surface of the infrahyoid muscles) and the pretracheal fascia (covering the anterior surface of the trachea and the thyroid gland), which passes between the neck and the anterior part of the superior mediastinum

retropharyngeal space

- the second is the **retropharyngeal space** between the buccopharyngeal fascia (on the posterior surface of the pharynx and esophagus) and the prevertebral fascia (on the anterior surface of the transverse processes and bodies of the cervical vertebrae), which extends from the base of the skull to the upper part of the posterior mediastinum

Third space

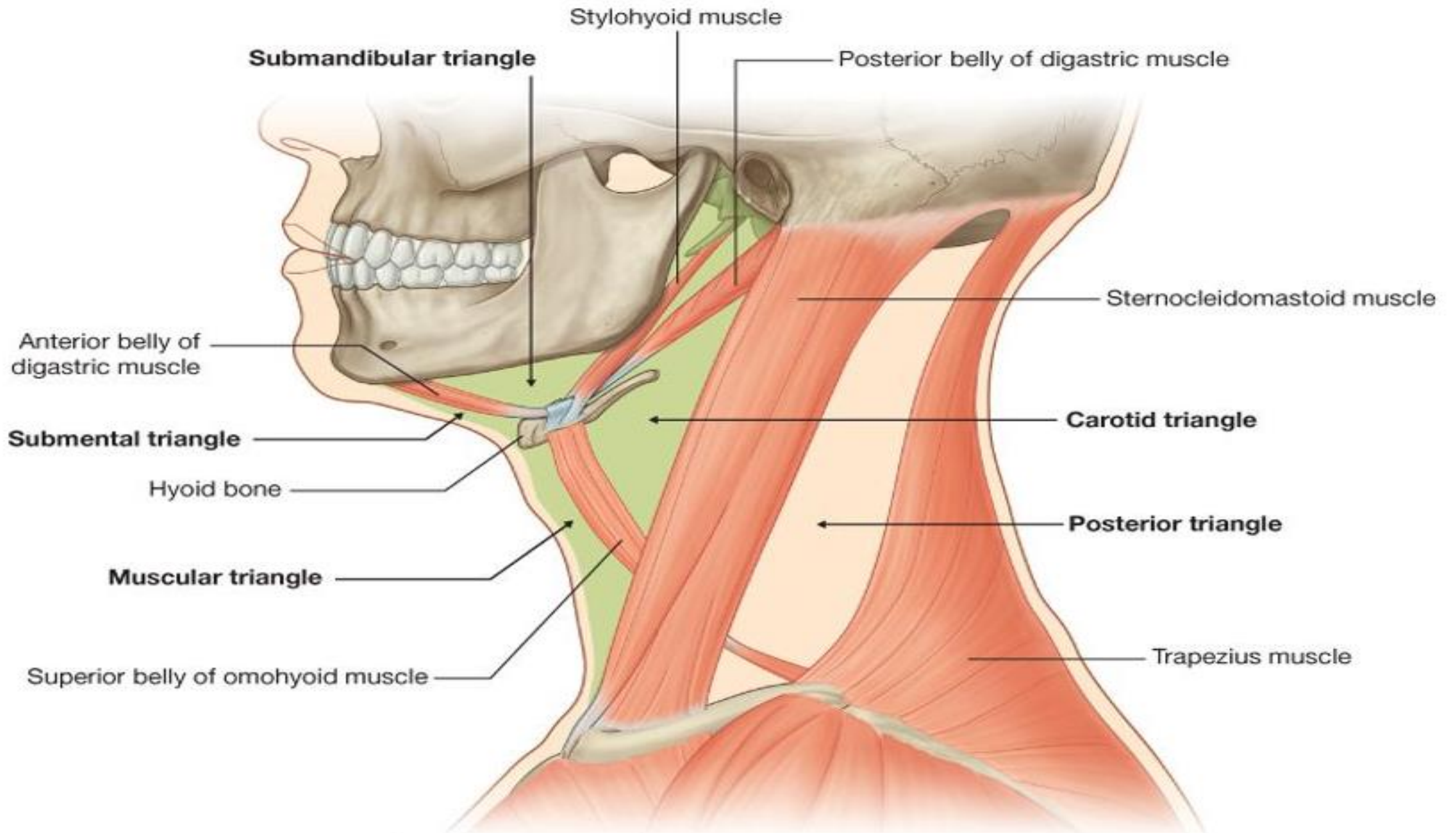
- the **third space** is within the prevertebral layer covering the anterior surface of the transverse processes and bodies of the cervical vertebrae. This layer splits into two laminae to create a fascial space that begins at the base of the skull and extends through the posterior mediastinum to the diaphragm.

Superficial venous drainage

- The external jugular and anterior jugular veins are the primary venous channels for superficial venous drainage of the neck.

Anterior triangle of the neck

- The anterior triangle of the neck is outlined by the anterior border of the sternocleidomastoid muscle laterally, the inferior border of the mandible superiorly, and the midline of the neck medially. It is further subdivided into several smaller triangles as follows.
- the **submandibular triangle** is outlined by the inferior border of the mandible superiorly and the anterior and posterior bellies of the digastric muscle inferiorly
- the **submental triangle** is outlined by the hyoid bone inferiorly, the anterior belly of the digastric muscle laterally, and the midline.



- the **muscular triangle** is outlined by the hyoid bone superiorly, the superior belly of the omohyoid muscle, and the anterior border of the sternocleidomastoid muscle laterally, and the midline;
- the **carotid triangle** is outlined by the superior belly of the omohyoid muscle anteroinferiorly, the stylohyoid muscle and posterior belly of the digastric superiorly, and the anterior border of the sternocleidomastoid muscle posteriorly

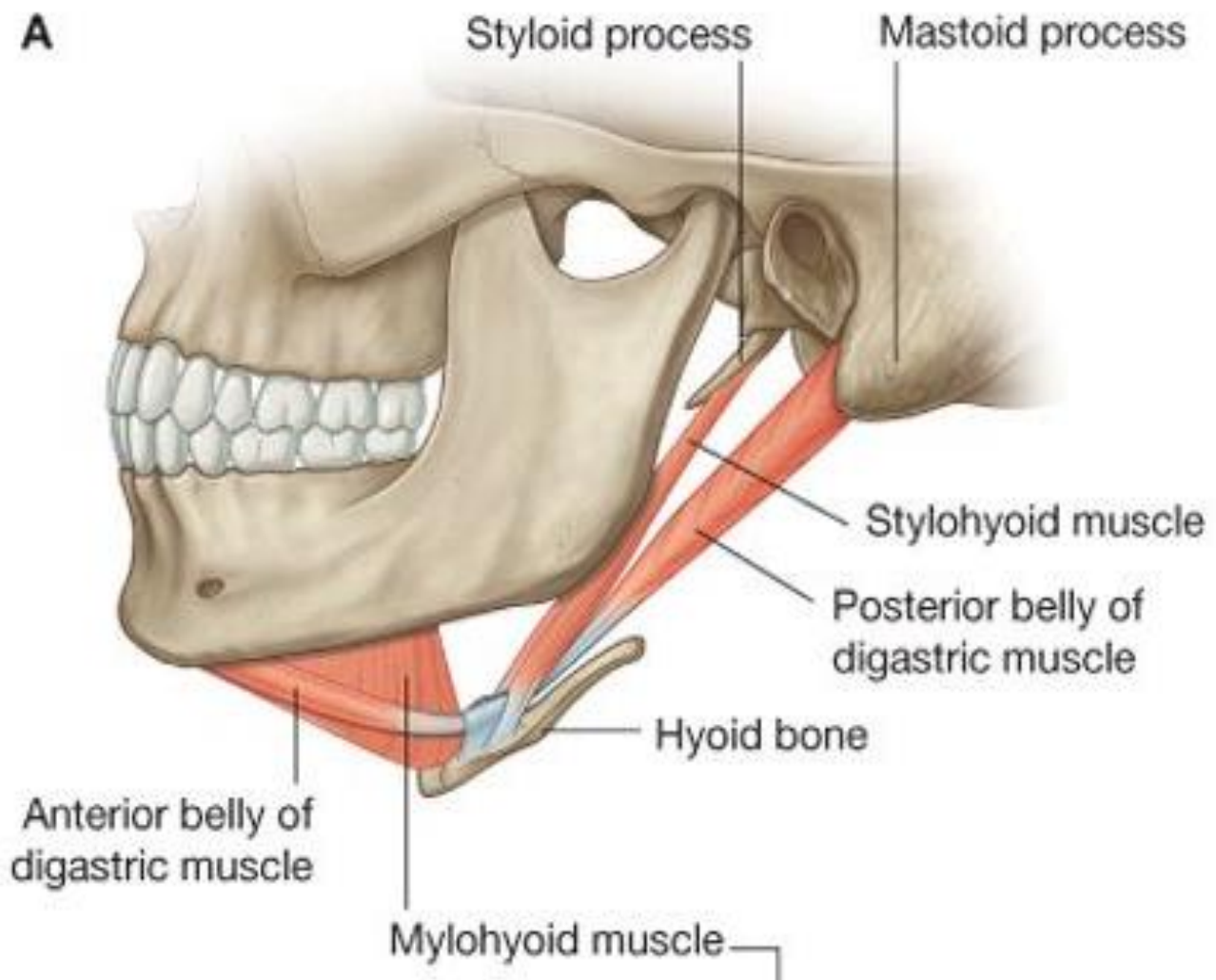
Table 6-11 Subdivisions of the anterior triangle of the neck & regional approach

Subdivision	Boundaries	Contents
Submental triangle (unpaired)	Mandibular symphysis; anterior belly of digastric muscle; body of hyoid bone	Submental lymph nodes; tributaries forming the anterior jugular vein
Submandibular triangle (paired)	Lower border of mandible; anterior belly of digastric muscle; posterior belly of digastric muscle	Submandibular gland; submandibular lymph nodes; hypoglossal nerve [XII]; mylohyoid nerve; facial artery and vein
Carotid triangle (paired)	Posterior belly of digastric muscle; superior belly of omohyoid muscle; anterior border of sternocleidomastoid muscle	Tributaries to common facial vein; cervical branch of facial nerve [VII]; common carotid artery; external and internal carotid arteries; superior thyroid; ascending pharyngeal; lingual, facial, and occipital arteries; internal jugular vein; vagus [X], accessory [XI], and hypoglossal [XII] nerves; superior and inferior roots of ansa cervicalis; transverse cervical nerve
Muscular triangle (paired)	Midline of neck; superior belly of omohyoid muscle; anterior border of sternocleidomastoid muscle	Sternohyoid, omohyoid, sternohyoid, and thyrohyoid muscles; thyroid and parathyroid glands; pharynx

Muscles

- The muscles in the anterior triangle of the neck can be grouped according to their location relative to the hyoid bone
- muscles superior to the hyoid are classified as **suprahyoid muscles** and include the stylohyoid, digastric, mylohyoid, and geniohyoid;
- muscles inferior to the hyoid are **infrahyoid muscles** and include the omohyoid, sternohyoid, thyrohyoid, and sternothyroid

Muscle	Origin	Insertion	Innervation	Function
Stylohyoid	Base of styloid process	Lateral area of body of hyoid bone	Facial nerve [VII]	Pulls hyoid bone upward in a posterosuperior direction
Digastric -Anterior belly	Digastric fossa on lower inside of mandible	Attachment of tendon between two bellies to body of hyoid bone	Mylohyoid nerve from inferior alveolar branch of mandibular nerve [V ₃]	Opens mouth by lowering mandible; raises hyoid bone
-Posterior belly	Mastoid notch on medial side of mastoid process of temporal bone		Facial nerve [VII]	Pulls hyoid bone upward and back
Mylohyoid	Mylohyoid line on mandible	Body of hyoid bone and fibers from muscle on opposite side	Mylohyoid nerve from inferior alveolar branch of mandibular nerve [V ₃]	Support and elevation of floor of mouth; elevation of hyoid
Geniohyoid	Inferior mental spine on inner surface of mandible	Anterior surface of body of hyoid bone	Branch from anterior ramus of C1 (carried along the hypoglossal nerve [XII])	Fixed mandible elevates and pulls hyoid bone forward; fixed hyoid bone pulls mandible downward and inward
Sternohyoid	Posterior aspect of sternoclavicular joint and adjacent manubrium of sternum	Body of hyoid bone medial to attachment of omohyoid muscle	Anterior rami of C1 to C3 through the ansa cervicalis	Depresses hyoid bone after swallowing
Omohyoid	Superior border of scapula medial to suprascapular notch	Lower border of body of hyoid bone just lateral to attachment of sternohyoid	Anterior rami of C1 to C3 through the ansa cervicalis	Depresses and fixes hyoid bone
Thyrohyoid	Oblique line on lamina of thyroid cartilage	Greater horn and adjacent aspect of body of hyoid bone	Fibers from anterior ramus of C1 carried along hypoglossal nerve [XII]	Depresses hyoid bone, but when hyoid bone is fixed raises larynx
Sternothyroid	Posterior surface of manubrium of sternum	Oblique line on lamina of thyroid cartilage	Anterior rami of C1 to C3 through the ansa cervicalis	Draws larynx (thyroid cartilage) downward



Digastric muscle

B

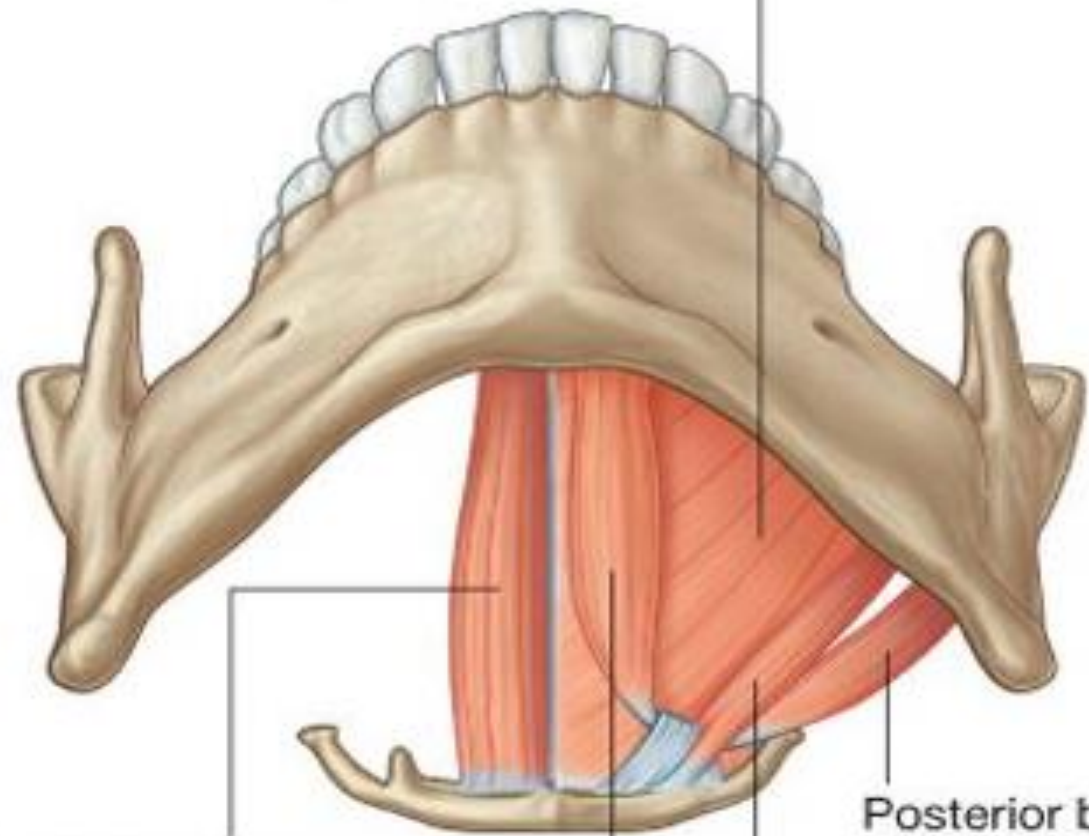
Mylohyoid muscle

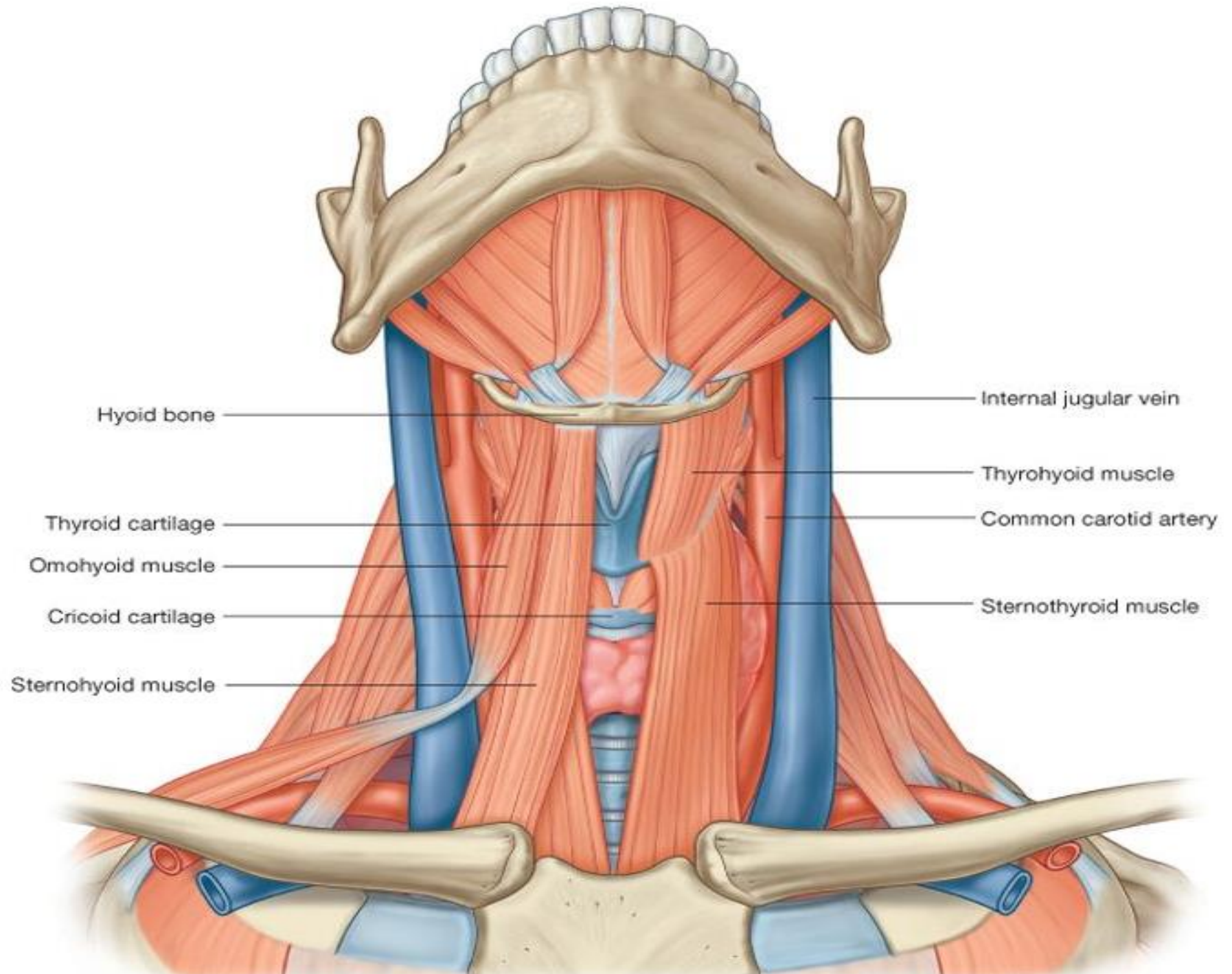
Geniohyoid muscle

Anterior belly of digastric muscle

Stylohyoid muscle

Posterior belly of digastric muscle





Hyoid bone

Thyroid cartilage

Omohyoid muscle

Cricoid cartilage

Sternohyoid muscle

Internal jugular vein

Thyrohyoid muscle

Common carotid artery

Sternothyroid muscle