



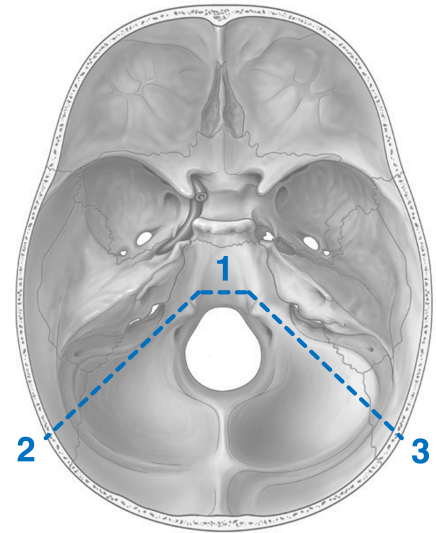
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Lab 7: Pharynx and Larynx

Prior to the lab, our technicians, faculty, and student volunteers completed the three skull cuts shown in the image below (1, 2, & 3), which will allow you to separate the anterior and posterior parts of the head and access the retropharyngeal space. If your skull has *not* been cut, please flag down a member of the teaching team and we will help you perform these cuts with one of the hand-held bone saws!

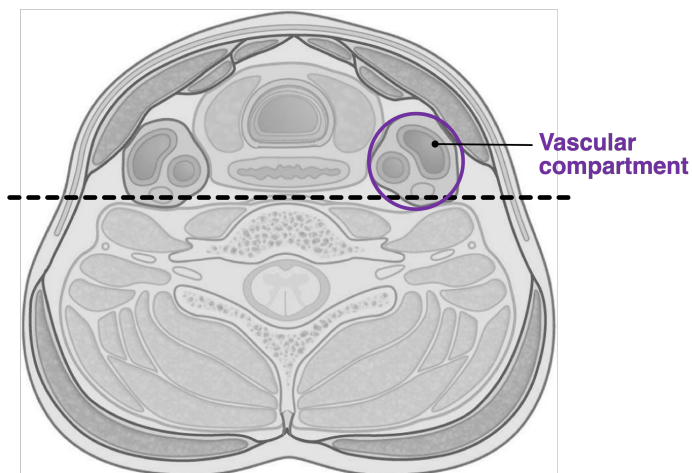
STEP 1: Reflect the head and neck to access the retropharyngeal space (~30–40 minutes)

- With all of the skull cuts completed, begin by making incisions through the skin and subcutaneous tissues of the scalp and neck in line with cuts **2** and **3**. You should be able to connect these incisions with the lateral edges (near the mastoid processes) of the incision along the mandible that you made in Lab 5!
- Using a probe and/or your fingers, bluntly dissect **posterior** to the structures in the **vascular compartment** of the neck (i.e., common carotid artery, internal jugular vein, and vagus nerve) bilaterally to enter the retropharyngeal space
- Once your fingers meet from both sides, gently move them superiorly and inferiorly to break through the connective tissues in this plane



Adapted by Dr. Stiver from Drake RL et al. Gray's Anatomy for Students. 4th ed. Elsevier; 2020.

Dissection Tip: After establishing the location of the retropharyngeal space, place a probe horizontally through the space to mark its location → see the dashed line in the image below!

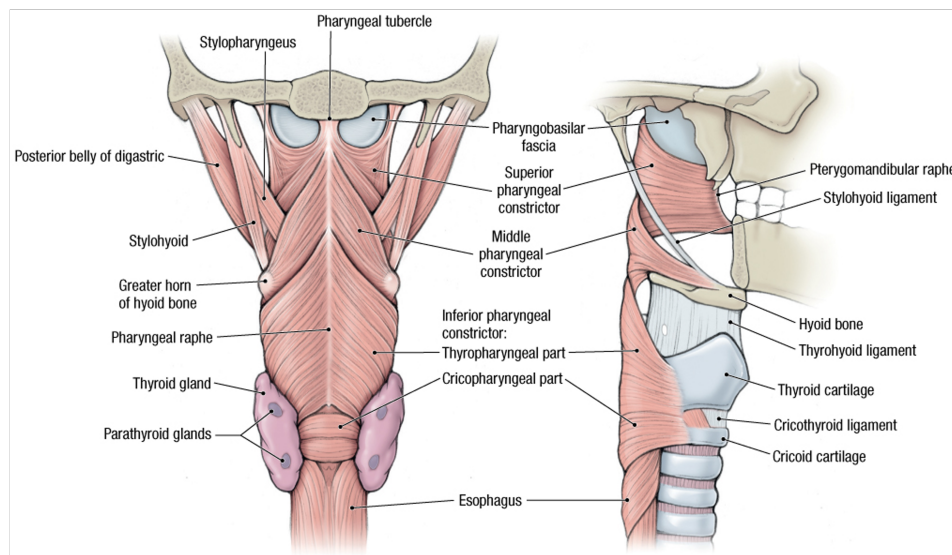


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- Holding the posterior part of the skull (occipital bone) steady, carefully pull the rest of the skull anteriorly and inferiorly away from the vertebral column. You may need a chisel and mallet to break any pieces of bone that are still intact
- Look for the probe that you left in the retropharyngeal space to ensure you are in the correct plane and continue separating the two halves. **Anteriorly**, you should see the posterior aspect of the pharynx covered in fascia, sympathetic chain / trunk, & contents of **vascular compartment**. **Posteriorly**, you should see the prevertebral muscles and vertebral bodies

STEP 2: Dissect the posterior aspect of the pharynx (~60 minutes)

- Begin by palpating the greater horns of the hyoid bone and the posterior aspect of the thyroid cartilage — these will be important landmarks for the posterior pharyngeal dissection
- Identify the pharyngobasilar fascia (superior to the superior pharyngeal constrictor muscle) and buccopharyngeal fascia covering the pharyngeal constrictors
- Carefully remove the buccopharyngeal fascia from the posterior surface of the pharyngeal constrictor muscles and locate the following structures and discuss their innervation via the pharyngeal plexus:
 - Superior pharyngeal constrictor
 - Middle pharyngeal constrictor
 - Inferior pharyngeal constrictor (thyropharyngeal & cricopharyngeal parts)

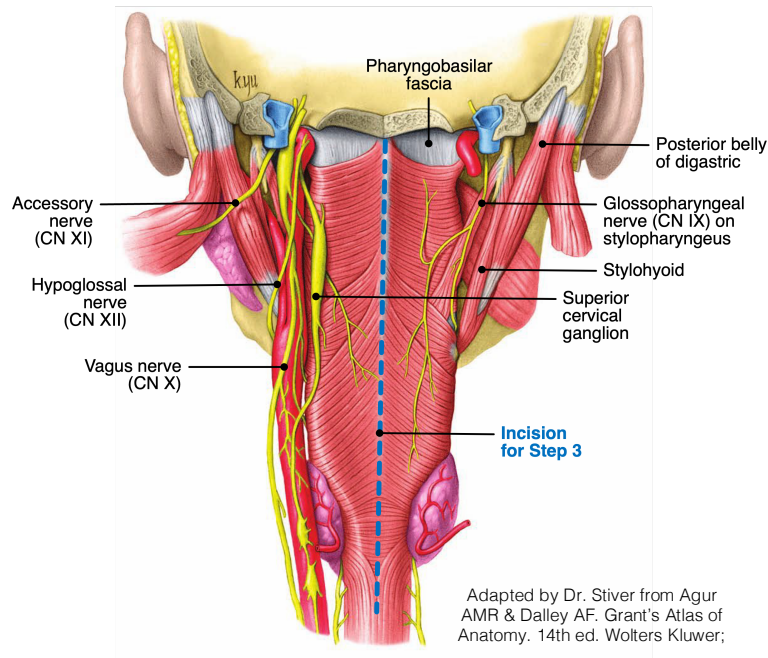


Detton AJ. Grant's Dissector, 17th ed. Wolters Kluwer; 2021.

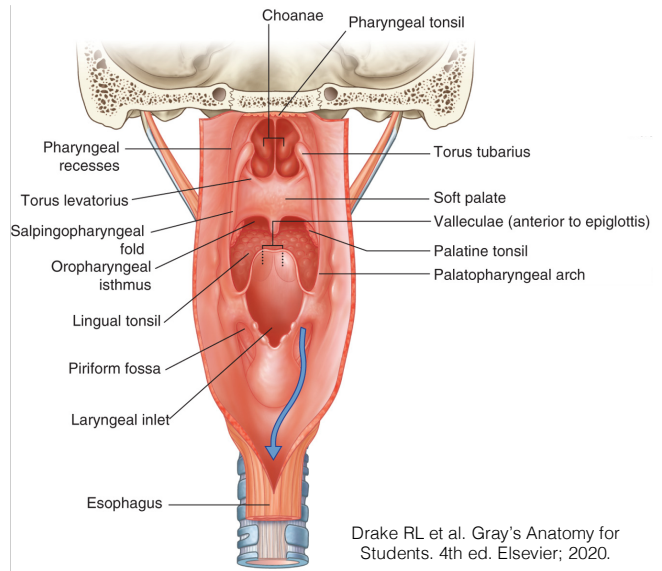
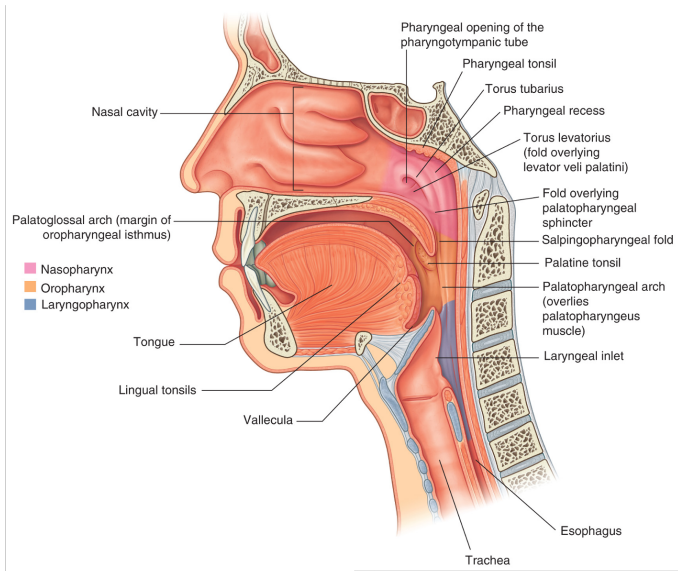
Identification Tip: Use the greater horns of the hyoid bone as a landmark to locate the middle pharyngeal constrictors and the thyroid & cricoid cartilages as a landmark to locate the thyropharyngeal and cricopharyngeal parts of the inferior pharyngeal constrictor, respectively

- Observe the pharyngeal raphe to which all the pharyngeal constrictors attach medially
- Approximately one finger width above the greater horns of the hyoid bone, look for the stylopharyngeus muscles passing between the superior and middle pharyngeal constrictors and follow it superiorly to the styloid process of the temporal bone. It will be challenging to visualize the styloid process, but you can palpate its sharp inferior end with your finger
- Use blunt dissection to identify the glossopharyngeal nerve (CN IX) running parallel to the stylopharyngeus muscle along its posterior surface
- Lateral to the pharyngeal constrictors, identify the contents of the carotid sheath from a posterior view: carotid arteries (common, internal, external), internal jugular vein, and vagus nerve (CN X)

- Look for the (spinal) accessory nerve (CN XI) passing between the internal jugular vein and internal carotid artery en route to the deep surface of the sternocleidomastoid muscle
- Recall that you found the hypoglossal nerve (CN XII) during Lab 5. Locate it again in the submandibular triangle and follow it posteriorly and superiorly to find it passing **medial** to the internal jugular vein and **lateral** to the internal carotid artery
- Identify the superior cervical ganglion — the largest and most superior ganglion of the sympathetic chain / trunk located posterior to the superior pharyngeal constrictor muscle. Follow it inferiorly to observe its continuity with the sympathetic chain / trunk



- STEP 3: Examine the internal pharynx and the larynx (~30–40 minutes)**
 - Use scissors to cut through the posterior wall of pharynx along the pharyngeal raphe (**dashed line in image above**) from the occipital bone to the esophagus
 - Reflect the pharyngeal constrictor muscles laterally and examine the internal pharynx. Observe the nasopharynx, oropharynx, and laryngopharynx, and discuss their respective sensory innervations
 - Locate the various openings and spaces related to the 3 regions of the pharynx
 - Nasal choanae
 - Oropharyngeal isthmus
 - Epiglottic valleculae
 - Laryngeal inlet
 - Pharyngotympanic (auditory) tubes
 - Pharyngeal recesses
 - Identify the soft palate, uvula, & root of the tongue at the posterior aspect of the oral cavity
 - Identify the locations of the palatopharyngeus muscles (deep to the palatopharyngeal folds / arches), salpingopharyngeus muscles (deep to the salpingopharyngeal folds), and levator veli palatini muscles. Where would you find the tensor veli palatini muscles? Review the actions and innervations of these muscles.
 - Moving inferiorly to the larynx, locate the epiglottis and quadrangular membrane



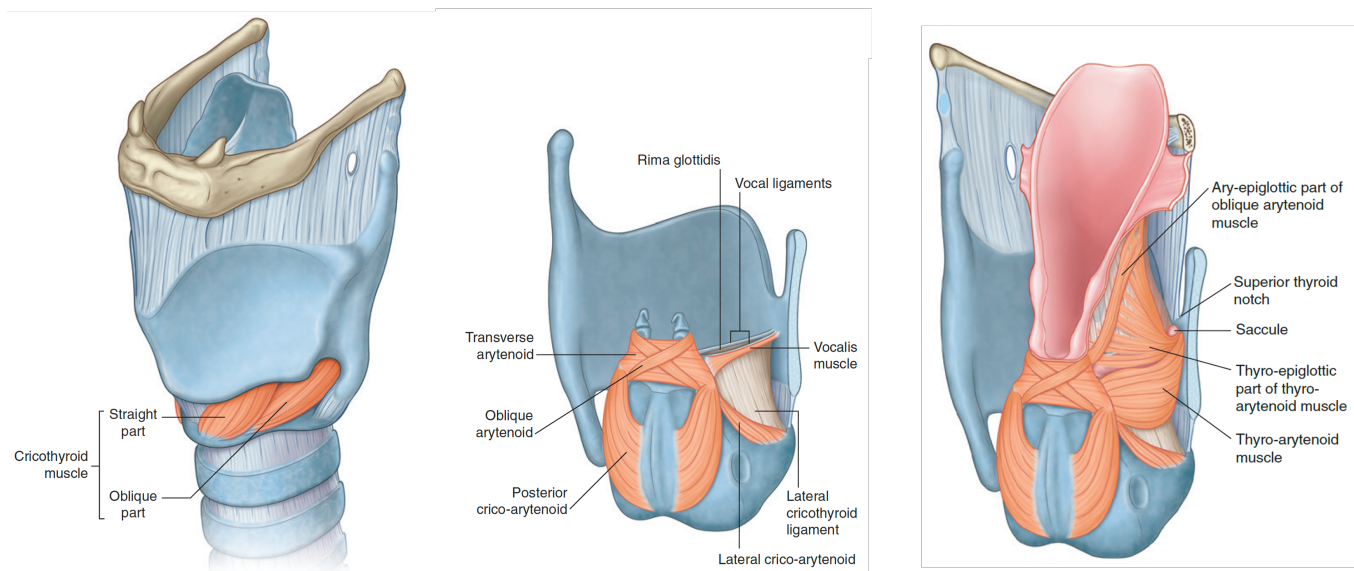
Drake RL et al. Gray's Anatomy for Students. 4th ed. Elsevier; 2020.

Palpate the arytenoid cartilages just inferior to the laryngeal inlet → you will be able to see the more detailed features of these cartilages on the models

Note: Large models of the larynx are available to help you identify some of the smaller structures and muscles that are not visible in your dissections – not everything is clearly visible and/or accessible from a posterior view!

It may be possible to peek inside the laryngeal inlet and visualize the vestibular folds (a.k.a., false vocal folds) and vocal folds (a.k.a., true vocal folds). The rima glottidis is the triangular opening between the vocal folds. If you cannot see these structures, there are several prosected specimens that are available for you to look at as well!

- Identify the following muscles of the larynx, along with their actions and innervations:
- Posterior cricoarytenoid muscles
 - Lateral cricoarytenoid muscles
 - Oblique and transverse arytenoid muscles
 - Thyroarytenoid muscles
 - Cricothyroid muscles



Drake RL et al. Gray's Anatomy for Students. 4th ed. Elsevier; 2020.

EXAM PREP ACTIVITY: Collaborative Mock Bellringer (optional; any remaining time)

Take advantage your FINAL FMD LAB EVER by participating in this collaborative mock bellringer exam activity!

- Each dissection group will be given a note card and two exam pins (**1 red A**; **1 blue B**)
- Working with your group, write two questions on the front of the notecard and the corresponding answers on the back
 - If you're feeling ambitious, I recommend creating a first-order question for **pin A** (e.g., identify the structure) and a second-order question for **pin B** (e.g., something related to the pinned structure... innervation, action, attachment, etc.)
- Once all the tables are ready to go, everyone will rotate around the room in a clockwise direction and have an opportunity to answer the other groups' questions. It is entirely up to you whether you want to answer the questions individually or work with a group!

Note: *You are more than welcome to pin ANY structures covered in Block J that are visible on your donor. We will not be taking out the nasal cavity & paranasal cavity specimens for this activity, but you will have access to these specimens during the independent review sessions next week! 😊*

Checklist of Structures:

(Note: all lab content is testable — this checklist is only intended to serve as a guide)

Retropharyngeal Space & Posterior Pharynx

- Buccopharyngeal fascia
- Pharyngobasilar fascia
- Pharyngeal constrictor muscles
 - Superior, middle, inferior [thyropharyngeal & cricopharyngeal parts]
- Pharyngeal raphe
- Stylopharyngeus muscles (attaching to styloid processes)
- Sympathetic chain / trunk & superior cervical ganglion
- Carotid arteries (common, internal, external)
- Internal jugular vein
- Glossopharyngeal nerve (CN IX)
- Vagus nerve (CN X)
- (Spinal) accessory nerve (CN XI)
- Hypoglossal nerve (CN XII)

Internal Pharynx

- Nasopharynx, oropharynx, & laryngopharynx
- Openings and spaces related to the pharynx:
 - Nasal choanae
 - Oropharyngeal isthmus
 - Epiglottic valleculae
 - Laryngeal inlet
 - Pharyngotympanic (auditory) tubes
 - Pharyngeal recesses
- Soft palate
- Uvula
- Root of the tongue
- Palatopharyngeal folds (& underlying palatopharyngeus muscles)
- Salpingopharyngeal folds (& underlying salpingopharyngeus muscles)
- Levator veli palatini muscles
- Tensor veli palatini muscles

Larynx

- Epiglottis
- Quadrangular membrane
- Thyroid, cricoid, & arytenoid cartilages
- Vestibular folds (false vocal folds)
- Vocal folds (true vocal folds)
- Rima glottis
- Posterior cricoarytenoid muscles
- Lateral cricoarytenoid muscles
- Oblique and transverse arytenoid muscles
- Thyroarytenoid muscles
- Cricothyroid muscles