Unit 27: Prevertebral Region and Pharynx

Dissection Instructions:

Step 1: (Figure 27-1) Insert your fingers posterior to the sternocleidomastoid muscle, vagus nerve, internal jugular vein, carotid arteries and pharynx, and anterior to the prevertebral muscles and vertebral column. If the sympathetic trunk has gray communicating rami to the cervical nerves on one side, leave the trunk on the vertebral column, but on the other side, take the sympathetic trunk with the carotid arteries. Separation of structures must be done from each side so the retropharyngeal space is open (Plates 35, 60, 63; 8.1, 8.35, 8.36) Now push your fingers superiorly and extend the separation to the base of the skull. Palpate the pharyngeal tubercle of the occipital bone and the anterior tubercle of the atlas.

Figure 27-1

Step 2: (Figure 27-2) Using a chisel and mallet, cut thru the clivus from the cranial cavity to come out below between the tubercles palpated above. Sometimes the chisel can be pushed thru the bone without the use of the mallet. The chisel must be felt in the retropharyngeal cleft before extending the cut laterally and posteriorly. The cut should pass between the jugular foramen and the foramen magnum. The cut should pass just posterior to the mastoid process. The lateral parts of the cut can be made using the electric saw. Move the anterior and posterior portions of the skull to verify that the bone is completely cut. Carefully cut the muscles and ligaments attaching the vertebral column to that part of the skull anterior to the cut. When this is completed, the visceral structures can be pulled anteriorly. On the anterior surface of the vertebral column, identify the longus capitis and longus coli muscles. More inferiorly, review the scalene muscles. The rectus capitis anterior and rectus capitis lateralis muscles are probably cut and difficult to identify (Plates 30; 8.17B, Table 8.6 and figures-p.774, 775).
Step 2

The neurovascular structures lying on the lateral wall of the pharynx should now be studied (Plates 69-71, 73; 8.23A&B). In cleaning the vessels, do not destroy the nerves that are related to them. The internal jugular vein begins at the jugular foramen and descends thru the neck, receiving tributaries along the way. At the base of the skull, it is medial to the styloid process and posterior to the internal carotid artery. At the base of the neck, it lies anterior and lateral to the common carotid artery. The internal jugular vein is the most lateral structure in the carotid sheath.

Follow the internal carotid artery as it begins at or above the upper border of the thyroid cartilage and continues through the neck. (Plates 69; 8.10, Table 8.5 and figure – p. 764). It has no branches in the neck. The external carotid artery begins at the same level, but anterior to the internal carotid artery. Find the six branches of the external carotid artery in the neck before it ends between the styloid process and neck of the mandible by dividing into the maxillary and superficial temporal arteries. The branches are: anteriorly; the superior thyroid, lingual and facial arteries; medially the ascending pharyngeal artery; and posteriorly the occipital and posterior auricular arteries. Locate the hypoglossal nerve (Plates 69, 71; 8.9B, 8.10) and observe that it passes lateral to both carotid arteries where it is joined by nerve fibers from C1 and 2, and then passes behind, under and lateral to the occipital artery on its way to the tongue.
Review the descendens hypoglossi and nerve to the thyrohyoid muscle before it passes between the hyoglossus and mylohyoid muscles just above the hyoid bone (Plates 32, 71, 123; 8.10, 8.11, 8.19B, C and D).

Clean the nerves as they go through the jugular foramen and look for their sensory ganglia. Open the jugular foramen but leave the nerves attached to some dura. Follow the vagus nerve superiorly and locate its branches in the neck (Plates 74-76, 80; 8.23). The pharyngeal branches pass between the two carotid arteries and help form the pharyngeal plexus on the wall of the pharynx. The superior laryngeal nerve passes medial to both carotid arteries and divides into internal and external branches (Plates 74, 76, 80; 8.23). Below the jugular foramen, the enlargement of the vagus nerve is the inferior vagal/nodose ganglion (sensory).

Find and follow the accessory nerve as it exits with the vagus nerve, then passes the jugular vein (usually anteriorly) to reach the deep surface of the sternocleidomastoid muscle (Plates 71; 8.23A&B). It crosses the posterior triangle of the neck to supply the trapezius muscle.

Find and follow the glossopharyngeal nerve as it exits the jugular foramen and travels thru a separate compartment of dura, then passes lateral to the internal carotid artery and medial to the external carotid artery on its way to the tongue (Plates 69, 71; 8.23A&B). Between the two carotid arteries, it gives off the nerve to the carotid sinus and the pharyngeal nerves which join those from the vagus to form the pharyngeal plexus. The glossopharyngeal nerve lies on the superficial surface of the stylopharyngeus muscle, supplies it, then enters the posterior third of the tongue by passing deep to the hyoglossus muscle (Plates 69, 71; Table 8.9 and figure-pp. 788).

Review the superior cervical ganglion and observe that its gray rami continues into the head as the internal carotid nerve, which enters the carotid canal and forms a plexus around the internal carotid artery to be distributed with it. (Plates 130, 131; 8.23A&B, Figure-pp. 774, 775).

Clean the pharyngeal constrictor muscles without destroying the nerves and vessels which supply them (Plates 67, 68, 71, 73; 8.23A&B, 8.24A&B, 8.27C, Table 8.9 and figure-p. 788). Covering the muscles is buccopharyngeal fascia, which continues anteriorly on the surface of the buccinator muscle in the cheek. Remove remnants of rectus capitis muscles and connective tissue so that the wall of the pharynx can be cleaned all the way to the base of the skull. The superior border of the superior pharyngeal constrictor does not follow the base of the skull from posterior to anterior. Above the superior pharyngeal constrictor, levator veli palatini and auditory tube pass through the wall. Observe that the remaining space above the superior constrictor is filled in by the pharyngobasilar membrane (Plates 67, 73; 8.23A&B), an upward continuation of the submucosa. As the superior pharyngeal constrictor muscle is cleaned, observe that it is overlapped by the middle pharyngeal constrictor muscle posteriorly and laterally. Dissect the stylopharyngeus muscle and glossopharyngeal nerve as they enter the wall of the pharynx between the superior and middle pharyngeal constrictor muscles. As the middle pharyngeal constrictor muscle is cleaned, observe that it is overlapped by the inferior pharyngeal constrictor. Clean the gap, the between the middle and inferior pharyngeal constrictor muscles, the thyrohyoid membrane. It is pierced by the internal laryngeal nerve and vessels.
Make a mid-line incision through the posterior wall of the pharynx from the base of the skull to the beginning of the esophagus. Make a second incision horizontally about 1 cm below the base of the skull. Now open the pharynx and study its interior (Plates 66; 8.24A&B).

The nasal, oral and laryngeal cavities can be seen opening into the pharynx (Plates 66, 67; 8.24A&B.) Observe that the pharynx is divided into three parts, the nasopharynx, oropharynx and laryngopharynx. The oropharynx extends from the lower border of the soft palate to the upper margin of the epiglottis. Opening into the lateral aspect of the nasopharynx is the auditory tube. Its prominence is called the torus tubarius. A vertical fold of tissue extends inferiorly from the torus, the salpingopharyngeal fold. The posterior wall of the nasopharynx contains the pharyngeal tonsils or adenoids. The soft palate continues laterally and inferiorly as the palatopharyngeal folds. In the mid-line, the uvula hangs down from the soft palate (Plates 63, 64, 66, 67; 8.24A&B, 8.26, 8.27A&B). The dorsal surface of the tongue can be seen in the oral cavity.

Pull the epiglottis posteriorly and locate the median glossoepiglottic fold and on either side the vallecula (Plate 58, 64; 7.49B, 8.28F). Extending laterally from the epiglottis is the lateral glossoepiglottic fold which is sometimes called the pharyngoepiglottic fold. Continuing from the lateral aspect of the epiglottis to the posterior aspect of the larynx are the aryepiglottic folds. The epiglottis and the aryepiglottic folds bound the opening of the larynx leading into the vestibule of the larynx. On each side of the larynx within the laryngopharynx are the piriform recesses or fossae (Plates 66, 67; 8.24A)
Be sure to identify all of the following in this unit:

- longus capitis muscle
- longus coli muscle
- scalene muscles
- internal jugular vein
- carotid artery
- carotid sheath
- internal carotid artery
- external carotid artery
- superior thyroid artery
- lingual artery
- facial artery
- ascending pharyngeal artery
- occipital artery
- posterior auricular artery
- hypoglossal nerve
- descendens hypoglossi nerve
to thyrohyoid muscle
- vagus nerve
  - superior laryngeal nerve
    - internal laryngeal nerve
    - external laryngeal nerve
  - inferior vagal ganglion (nodose)
- accessory nerve
glossopharyngeal nerve
- stylopharyngeus muscle
- sympathetic trunk
- superior cervical ganglion
- grey communicating rami
- superior pharyngeal constrictor muscle
- middle pharyngeal constrictor muscle
- inferior pharyngeal constrictor muscle
- buccopharyngeal fascia
- pharyngobasilar membrane
- levator veli palatini muscle
- auditory tube
- thyrohyoid membrane
- nasopharynx
- oropharynx
- laryngopharynx
- torus tubarius
- salpingopharyngeal fold
- pharyngeal tonsils
- soft palate
- palatopharyngeal fold
- uvula
- median glossoepiglottic fold
- lateral glossoepiglottic fold
- pharyngoepiglottic fold
- aryepiglottic fold
- piriform recess