Unit 23: Deep Face, Infratemporal Fossa

Dissection Instructions:

Clean and study the temporal fascia which covers the contents of temporal fossa as it attaches to the superior temporal line and zygomatic arch. (Plates 26, 54; 7.12, 7.16B, 7.41A). Note the attachment to the zygomatic arch is by two layers, one attaching to the outer surface of the arch, and the other to the inner surface. The space between the two layers is filled with fat and a few small vessels. Carefully reflect the temporal fascia upwards, leaving it attached superiorly for demonstration.

Clean and study the temporalis muscle (Plates 54; 7.8, 7.41). Note that the most posterior fibers run almost horizontally and thus can retract the mandible. It inserts onto the coronoid process of the mandible. Some of its deepest fibers are anterior and can insert as low as the last molar tooth.

If the parotid gland has not been completely removed on both sides, it must be done now (Plates 25; 7.39). Try to preserve the major branches of the facial nerve for review.

Take your probe and explore the attachments of the zygomatic arch. Carefully cut the attachments of the arch anterior and posterior to the origin of the masseter muscle. Avoid cutting into the orbit, maxillary sinus or temporomandibular joint. Find the nerve supply to the masseter muscle from the mandibular division of the trigeminal nerve as it comes from the infratemporal fossa through the notch between the coronoid process and condylar process of the mandible. When the zygomatic arch has been cut, carefully begin to roll the arch downward and dissect on the deep surface of the masseter muscle to locate its nerve and blood supply. When the neurovascular bundle has been found, cut a square of masseter muscle containing the bundle and separate the square from the rest of the muscle. Reflect the arch and muscle downward. The upper portion of the mandible will now be exposed. Explore the insertion of the temporalis muscle on the coronoid process (Plates 54, 7.41B). Cut the coronoid process, including as much of the temporalis muscle insertion as needed. Do this without cutting structures deep to the mandible. Reflect the temporalis muscle upwards, exposing the infratemporal fossa (Plate 7.42). Note the fibers of the temporalis muscle extend inferiorly on the ramus of the mandible.

Insert a blade of the forceps deep to the neck of the mandible and slide it downward until it reaches the lingula of the mandible. This will mark the level of entrance of the inferior alveolar nerve into the mandible. With the autopsy saw cut through the neck of the mandible immediately below the temporomandibular joint and insertion of the lateral pterygoid muscle. Next cut through the ramus of the mandible immediately above the mandibular foramen without cutting the inferior alveolar nerve and vessels and the lingual nerve. Clean the vessels and nerves on the surface of the medial pterygoid muscles (Plates 40, 46, 71; 7.42-7.44). The pterygoid plexus of veins that is in the fossa at this point can be removed (Plate 70). Determine
if the maxillary artery passes superficial or deep to the lateral pterygoid muscle. The arrangement of its branches may differ from person to person. The branches of the maxillary artery tend to follow the branches of the mandibular division of the trigeminal nerve (Plates 40, 46, 69, 71; 7.42-7.44). Lift up the temporalis muscle and look for the anterior and posterior deep temporal nerves and vessels entering the deep surface of the temporalis muscle. These nerves appear above the lateral pterygoid muscle. Also appearing above the lateral pterygoid muscle is the nerve to the masseter muscle, which is joined by the vessels of the same name. Appearing between the two heads of the lateral pterygoid muscle is the buccal nerve, a sensory nerve supplying both inner and outer surfaces of the cheek (Plate 46: 7.42). The inferior alveolar and lingual branches of the mandibular division appear below the lateral pterygoid muscle and lie superficial to the medial pterygoid muscle. The inferior alveolar nerve lies posterior and gives off the nerve to the mylohyoid muscle before it enters the mandibular foramen along with the vessels of the same name. The lingual nerve lies anterior to the inferior alveolar nerve on the medial pterygoid muscle in the fossa and then descends to the tongue.

Dissect the lateral pterygoid muscle (Plates 55; 7.42) and note that the two heads arising from infratemporal surface of the greater wing of the sphenoid bone (superior head) and from the lateral surface of the lateral pterygoid plate (inferior head). Follow the muscle belly to the capsule of the temporomandibular joint, the fibrocartilaginous disk within the joint (if possible) and the neck of the mandible (Plates 55; 7.42, 7.46, Table 7.9 and figures-p. 672).

Clean the medial pterygoid muscle. Note that the larger head arises from the medial surface of the lateral pterygoid plate and the smaller head arises from the tubercle of the maxilla near the last molar tooth (Plates 55; 7.42). Observe that its insertion on the medial surface of the angle of the mandible is opposite the masseter muscle which inserts on the mandible’s lateral surface.

If the maxillary artery (Plates 40, 69; 7.42A&B, 7.43) passes superficial to the lateral pterygoid muscle, clean it and its branches. The artery is divided into three parts by its relationship to the lateral pterygoid muscle. Its first portion, the mandibular part, extends from its origin until it reaches the lateral pterygoid muscle. Its second part is the pterygoid portion and continues until it reaches the pterygomaxillary fissure. The third part is the pterygopalatine part, which will be studied later. Clean and identify the maxillary artery branches: deep auricular; anterior tympanic; middle meningeal artery, which travels deep to the lateral pterygoid muscle to enter the foramen spinosum of the sphenoid bone; accessory meningeal artery; masseteric artery; anterior and posterior deep temporal branches; muscular branches (to the medial and lateral pterygoid muscles) and the buccal branch which accompanies the buccal branch of the mandibular nerve.

If the maxillary artery runs deep to the lateral pterygoid muscle, then study the temporomandibular joint first (Plates 16, 55; 7.45 7.46, Table 7.10 and figures-p.673).

Dissect and find the sphenomandibular and stylomandibular ligaments (Plates 16; 7.45A&B). Disarticulate the temporomandibular joint, retaining the insertion of the lateral pterygoid muscle to the capsule and neck of the mandible. Reflect the head of the mandible and lateral pterygoid muscle anteriorly exposing the deepest portion of the infratemporal fossa.
Clean the lingual and inferior alveolar nerves as they lie superficial to the medial pterygoid muscle and locate the chorda tympani nerve as it joins the lingual nerve posteriorly and superiorly (Plates 46, 71; 7.42, 7.44).

Locate again the middle meningeal artery and trace it from the maxillary artery to the foramen spinosum (Plate 40, 69; 7.42, 7.43). The artery passes between two roots of the auriculotemporal nerve as the nerve leaves the mandibular division. Trace the auriculotemporal nerve posteriorly and superiorly to the parotid gland and the temporal region. Look for the nerves to the lateral pterygoid and medial pterygoid muscles. The latter nerve may arise from the deep surface of the mandibular division and pass through the otic ganglion. The otic ganglion is located just below the foramen ovale and medial/deep to the mandibular division of the trigeminal nerve. It may be difficult to find.

Review all the branches of the mandibular division of the trigeminal nerve and note their relationships to the lateral and medial pterygoid muscles and their anatomic relationships with the parasympathetic nerves and ganglia (Plates 46, 122, 131; 7.44, Table 9.8 and figures-pp. 828).
Be sure to identify all of the following in this unit:

- temporal fascia
- temporalis muscle
- nerve supply to masseter muscle
- masseter muscle
- coronoid process of mandible
- condylar process of mandible
- zygomatic arch
- mandibular foramen
- inferior alveolar nerve
- pterygoid plexus of veins
- maxillary artery
- lateral pterygoid muscle
- anterior deep temporal nerve & vessels
- posterior deep temporal nerve & vessels
- buccal nerve
- medial pterygoid muscle
- pterygomaxillary fissure
- deep auricular artery
- anterior tympanic artery
- middle meningeal artery
- masseteric artery
- temporomandibular joint
- lingula of mandible
- sphenomandibular ligament
- stylomandibular ligament
- lingual nerve
- chorda tympani nerve
- otic ganglion