

Removal of Parotid, Submandibular, and Sublingual Glands

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KEYWORDS

- Parotidectomy • Submandibular gland • Sublingual gland
- Facial nerve

PAROTID GLAND

Surgical Anatomy

The parotid gland is the largest of the paired major salivary glands. The anatomy and localization of the facial nerve is the most critical step in surgery of the parotid gland. The facial nerve is a mixed nerve carrying motor, sensory, and parasympathetic fibers; it has 5 intracranial segments and 1 extracranial segment. The motor fibers originate from the facial nucleus of the pons. The nerve enters the temporal bone through the internal acoustic meatus after being joined by the nervus intermedius. The nerve takes a labyrinthine course traveling anteriorly toward the geniculate ganglion. It travels posteriorly along the medial wall of the tympanic cavity toward the second genu at the oval window. Just before exiting the skull, the nerve divides to give rise to the posterior auricular nerve and motor branches to the posterior belly of the digastric and stylohyoid muscles. The last segment of the nerve exits the skull through the stylomastoid foramen and provides motor innervations for the muscles of facial expression.¹ The facial nerve divides the parotid gland into a larger superficial lobe and a smaller deep lobe. It then turns anterolaterally into the parotid gland and splits into 2 major branches. This division is an important surgical and anatomic landmark that is termed pes anserinus (Latin for goose's foot). It further branches into temporal, zygomatic, buccal, marginal mandibular, and cervical branches (Fig. 1). Davis and colleagues² studied 350

cervicofacial halves and described 6 different branching patterns without a common pattern. However, in all of the cadavers, the upper temporal and zygomatic branches were noted to be branches of the upper division of the facial nerves, whereas the marginal mandibular and the cervical branches were of the lower division. The buccal branch demonstrated the most anatomic variability and cross-innervation, with the highest number of cross-innervations occurring between the zygomatic and buccal branches.³ All muscles of facial expression receive motor innervations from the facial nerve on their deep surface except for the mentalis, buccinator, and levator anguli oris.

The parotid duct, also known as the Stensen duct, runs 13 mm inferior and parallel to the zygomatic arch. The parotid duct is 4 to 6 cm in length and 5 mm in diameter. It exits the gland from its anteromedial surface and travels superficial to the masseter muscle. The duct turns medially at the anterior border of the muscle through the buccinator muscle to empty into the oral cavity. The orifice into the oral cavity, the parotid papilla, is typically buccal to the upper second molar. Accessory parotid glands are found overlying the masseter muscle in nearly 20% of patients. This finding is clinically significant, as a tumor may arise in the accessory gland and present as a mass anterior to the main parotid gland.⁴

The secretory parasympathetic innervation originates from the inferior salivatory nucleus, and the efferent fibers travel through the glossopharyngeal nerve. The superior cervical ganglion supplies

The authors have nothing to disclose.

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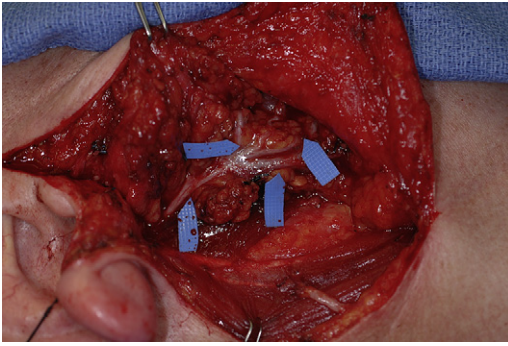


Fig. 1. Facial nerve branches during a superficial parotidectomy procedure (*blue arrows*).

the sympathetic innervation. A terminal branch of the external carotid artery, namely the transverse facial artery, provides the gland's arterial blood supply. The venous return is through the retromandibular vein, which drains into both the external and internal jugular veins. The lymphatic drainage of the parotid glands is rich and complex. Intraparotid lymph nodes receive drainage from the ears, soft palate, and posterior nasopharynx. Periparotid lymph nodes, superficial to the gland's capsule, serve as lymphatic basins for the scalp, the auricle, and the temporal region. Both of these systems drain into the superficial and deep cervical lymphatic chains.⁴

MANAGEMENT OF A PAROTID SWELLING

A parotid swelling or mass warrants a thorough history and physical examination to help elucidate the cause. Diagnostic tools include fine-needle aspiration, ultrasonography, computed tomography (CT), magnetic resonance imaging (MRI) (**Fig. 2**), and sialography (**Fig. 3**). Parotid swellings can be categorized into inflammatory, obstructive, autoimmune, or pathologic origin.

Inflammatory or infectious disorders, including viral or bacterial sialadenitis, are typically associated with fever, tenderness, and a rapid clinical course. Chronic or recurrent infectious sialadenitis is characterized by multiple bouts of acute exacerbations with clinically quiescent phases. Management of acute bacterial sialadenitis involves adequate hydration, antibiotics, and medical supportive treatment. Chronic refractory sialadenitis may be managed with a superficial parotidectomy (SP).

Obstructive sialadenitis is typically associated with postprandial pain and swelling. It is most commonly caused by sialoliths (66%).⁵ Sialoliths, however, are more common in submandibular glands (80%–90%); the parotid gland is involved



Fig. 2. Axial view of a magnetic resonance image at the midparotid level. The arrow points to a deep-lobe lesion of the right parotid gland.

in only 5% to 10% of cases. Sublingual sialoliths are uncommon (0%–5%).⁶ Initial conservative treatment includes adequate hydration, sialogogues, and anti-inflammatory medications. If conservative measures fail, surgical options are considered, including intraoral sialolithectomy if the stone is located distally in the duct, sialadenectomy and, introduced more recently, sialoendoscopy.⁷ Transparotid stone retrieval is a surgical option but requires dissection of the nerve and isolation of the duct, which may be complicated in the setting of recalcitrant obstruction and infection.



Fig. 3. Sialogram of the left parotid duct, demonstrating a sausage-like appearance caused by multiple strictures resulting from chronic sialadenitis.

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