

SUBMANDIBULAR SALIVARY GLAND EXCISION

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OTOLARYNGOLOGY ONLINE

Submandibular salivary gland excision

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Indication:

1. Sialolithiasis
2. Chronic sialadenitis
3. Benign tumors involving submandibular salivary gland
4. Malignant tumors involving submandibular salivary gland

Surgical anatomy:

The submandibular gland has two components:

1. Oral - Above the mylohyoid muscle
2. Cervical - Below the mylohyoid muscle. Connected to the oral component by a tail that passes around the posterior border of mylohyoid muscle. The mylohyoid muscle which forms the diaphragm of the mouth separates the oral component from the cervical component.

Major portion of the submandibular gland is situated mainly in the submandibular triangle (Level 1b) of the neck. The oral component extends some distance along the submandibular duct immediately deep to the mucosa of the floor of the mouth. The duct opens close to the midline in the anterior floor of the mouth.

The cervical portion of the gland is immediately deep to the platysma, and is encapsulated by the investing layer of deep cervical fascia.

Digastric muscle:

This muscle forms the anteroinferior and posteroinferior boundaries of the submandibular triangle. It is an important landmark as there are no important structures lateral to the muscle. The facial artery emerges from immediately medial to the posterior belly and the XII nerve runs immediately deep to the digastric tendon.

Mylohyoid muscle:

This is a flat muscle attached to the mylohyoid line on the inner aspect of the mandible, the body of the hyoid bone, and by a midline raphe to the opposite muscle. It is a key structure when excising the submandibular gland, as it forms the floor of the mouth, and separates the cervical form of the oral part of the submandibular gland. One important aspect for the surgeon to remember is that there are no important neurovascular structures superficial to the mylohyoid muscle. The lingual nerve and the XII nerve are deep to the muscle.

Marginal mandibular nerve:

This branch of the facial nerve which supplies the depressor anguli oris runs within the investing layers of deep cervical fascia overlying the gland and may loop up to 3 cms below the ramus of the mandible. It is composed of 4 parallel running branches. It crosses over the facial artery and vein before ascending to innervate the depressor anguli oris (the muscle of lower lip). In order to protect this nerve, one should incise skin and platysma at least 3 cms below the mandible and incise the fascial covering of the submandibular gland just above the hyoid bone and do a subcapsular resection of the gland.

Lingual nerve:

This is a large flat nerve and it runs in the lateral floor of the mouth above the submandibular gland. It sends secretomotor fibers to the submandibular ganglion which innervate the gland. It comes into view during submandibular gland excision when the gland is retracted inferiorly and the mylohyoid is retracted anteriorly.

Hypoglossal nerve:

This nerve enters the submandibular triangle posteroinferiorly and medial to the hyoid bone, crosses the submandibular triangle in an anterosuperior direction and exits into the mouth behind the mylohyoid muscle. It traverses the medial wall of the submandibular triangle, where it is applied to the hyoglossus muscle. This nerve is covered by the thin layer of fascia, which is distinct from the submandibular capsule and is accompanied by thin walled ranine veins that are easily torn at surgery.

Nerve to mylohyoid:

This is a branch of the third division of the trigeminal nerve and it innervates the mylohyoid and anterior belly of digastric. It is generally not looked for or preserved at surgery. But when diathermy is used to mobilize the gland off the mylohyoid muscle, contractions of the mylohyoid and anterior belly of digastric is usually noted due to stimulation of this nerve.

Facial artery:

This is identified during excision of submandibular salivary gland. It enters the submandibular triangle posteroinferiorly from behind the posterior belly of digastric and hyoid. It courses across the posteromedial surface of the submandibular gland, and reappears at the superior aspect of the gland where it joins the facial vein to cross the mandible. A few anterior branches enter the submandibular gland and have to be divided if the surgeon elects to preserve the artery.

Mylohyoid artery and vein are encountered by the surgeon when the submandibular gland is elevated from the lateral surface of the mylohyoid.

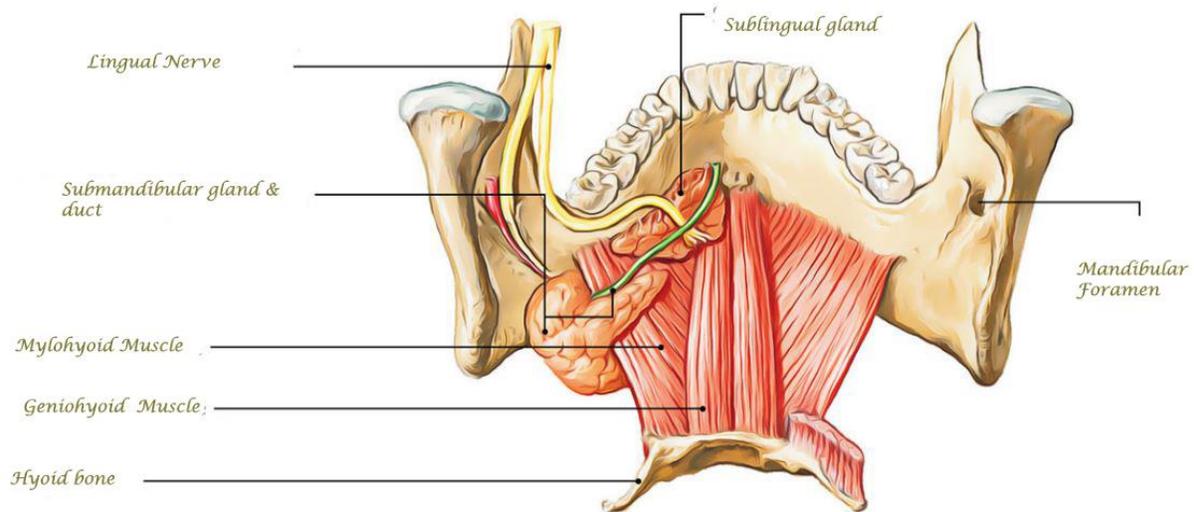


Illustration showing the anatomy of submandibular salivary gland

Investigations:

Ultrasound salivary gland is an important diagnostic tool in submandibular lesions. It is very useful especially in submandibular gland superficial lesions.

CT & MRI should be used to investigation tumor spread, local invasion, and perineural invasion in cases of malignancy of submandibular gland.

Other pre op investigations include those mandated for anesthesia fitness.

Anesthesia:

General anesthesia with orotracheal intubation with tube secured to contralateral corner of mouth.

Position:

Patient is supine with head end of the table elevated to reduce bleeding with face turned to the opposite side.

Incision:

The skin incision is made at the hyoid level or 3 cm below the inferior border of mandible. Flap is elevated in the subplatysmal plane up to the level of inferior border of mandible.



Image showing the incision for submandibular salivary gland excision



Figure showing flap being raised

Protection of marginal mandibular nerve:

If dissection is proceeded in the subplatysmal plane then there is less chance of this nerve being damaged. Identification of facial vein is the key to identify this nerve. The facial vein is identified at the notch of the mandible and at the superior border of the submandibular gland. The marginal mandibular nerve can then be exposed above the facial vein through dissection of the superficial cervico-fascial layers. If needed the facial vein can be divided and slung superiorly to protect the marginal mandibular nerve (Hayes Martin Maneuver).



Figure showing the facial vein

Identification of lingual nerve and hypoglossal nerve:

The submandibular gland is freed from the anterior belly of digastric and the lateral surface of mylohyoid muscle. The mylohyoid vessels are divided.

The free edge of the mylohyoid muscle is identified and retracted superiorly and laterally to expose the lingual nerve, hypoglossal nerve and Wharton's duct.

After ligation of the facial artery and vein superiorly, the submandibular gland is retracted inferiorly to identify the submandibular ganglion that is then divided to free the lingual nerve, it should be ensured that the nerve should not be included in the tie.

Identification and division of the facial artery:

The Wharton's duct is divided after identification of hypoglossal nerve. If the surgery is performed for sialolithiasis, the surgeon should follow and divide the duct anteriorly close to the floor of the mouth in order not to leave behind the calculus.

The submandibular gland is then reflected inferiorly and the facial artery is identified, ligated and divided as it exits from behind the posterior belly of digastric muscle.

The submandibular gland is then removed by securing its pedicle with a set of clamps. The pedicle can be tied with silk.

Suction drain is placed in the submandibular gland bed and the wound is closed in layers.

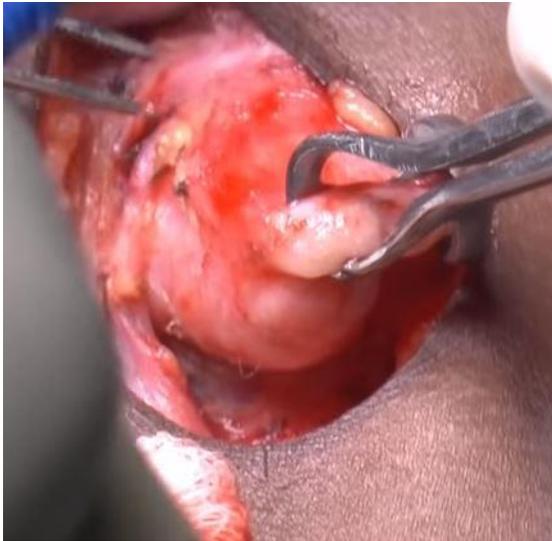


Image showing lower pole of submandibular gland freed



Image showing facial vein



Image showing the lingual nerve loop pointed

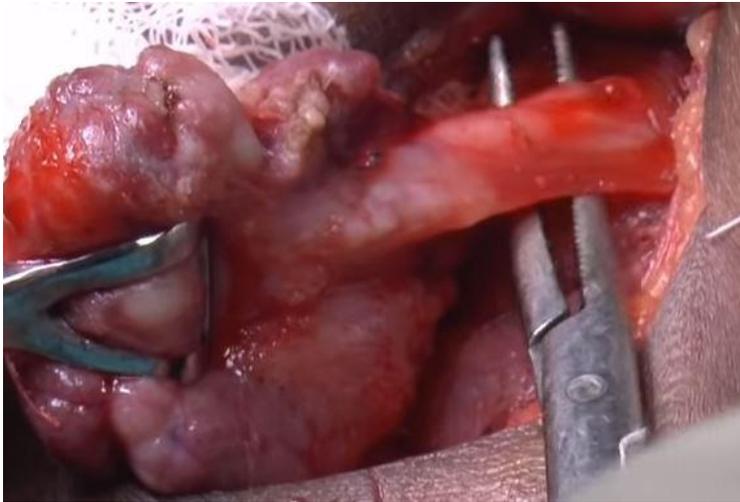


Image showing Wharton's duct

Complications:

1. Injury to marginal mandibular nerve
2. Injury to lingual nerve
3. Bleeding