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Indications

- Tumors of the parotid gland
- Chronic sialadenitis or calculi of the parotid ducts
- Radical lymph node dissection of parotid region for melanoma

Pitfalls and Danger Points

- Damage to facial nerve and its branches
- Failure to excise a parotid tumor with a sufficient margin of normal parotid tissue

Operative Strategy

Extent of Resection

Although the parotid gland is not anatomically a truly bilobed structure, the surgeon may visualize it as having a superficial lobe and a deep lobe, with the branches of the facial nerve passing between these two structures. Consequently, it is feasible to excise the superficial lobe with the preservation of the branches of the facial nerve. This dissection is indicated for most patients who have benign tumors of the parotid gland. A few benign tumors arise in the deep lobe of the gland. In these cases, perform a superficial parotid lobectomy to identify each of the facial nerve branches. Then, with the preservation of the facial nerve, remove the deep lobe.

Occasional small benign tumors require dissection of the facial nerve only in the region of the tumor. The tumor may then be resected with a good margin of parotid tissue by

doing a partial superficial lobectomy. One alternative technique is termed extracapsular dissection (see further reading at the end of the chapter). This chapter describes the classical performance of superficial and total parotidectomy.

Malignant tumors of the parotid gland, unless unusually small, should be removed by total parotidectomy with excision of that portion of the facial nerve lying within the tumor. Microsurgical techniques allow the nerve to be reconstructed with a graft, which is often taken from the auriculotemporal nerve.

Locating and Preserving the Facial Nerve

There are two methods for identifying and dissecting the facial nerve. Some surgeons prefer to locate the major trunk of the facial nerve by first identifying a peripheral branch, such as the marginal mandibular branch. They then trace this nerve backward toward its junction with the cervical facial branch and finally to the main facial trunk. We prefer the more common technique of first identifying the main trunk of the facial nerve posterior to the parotid gland. Before it enters the parotid gland, the main facial nerve is a large structure, often measuring 2 mm in diameter. Once this main trunk is identified, the key to the dissection technique is to use either fine, blunt-tipped Jones scissors or a mosquito hemostat. The closed hemostat tip is inserted in the plane immediately anterior to the nerve. After the surgeon gently opens the hemostat, the assistant cuts the loose fibrous tissue that attaches the nerve to the overlying parotid gland. Never divide any parotid tissue before identifying the facial nerve and its branches.

If the proper plane of dissection is maintained, bleeding is rarely a problem. Most bleeding arises from small veins, and it generally stops with application of gauze pressure. An important part of the dissection technique is for the surgeon to apply pressure on the tissue posterior to the nerve with gauze while the assistant applies tension to the superficial

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lobe of the parotid gland using Allis clamps or small retractors. An occasional small vein must be clamped with a small mosquito hemostat and tied with a fine absorbable ligature. Electrocautery may be used for hemostasis in areas of the dissection away from the facial nerve and its branches.

The surgeon should have sufficient familiarity with the appearance of the facial nerve to make a positive visual identification. Occasionally, some fibers of questionable nature attach to the facial nerve branches. They may be tested by gently pinching or stimulating the fiber and then looking at the cheek for muscle twitching. This test, of course, requires that the entire cheek and the corner of the eye be exposed when the surgical field is draped.

The key to successful nerve preservation is early identification of the main facial trunk. The facial nerve emerges from the skull through the stylomastoid foramen, which is situated just anterior to the mastoid process and just below the external auditory canal. Behars emphasized that if the surgeon places the tip of the index finger over the mastoid process with the fingertip aimed toward the nose, the middle of this finger is pointing to the facial trunk, which emerges about 0.5 cm anterior to the center of the fingertip and perhaps 1 cm deep to the external surface of the mastoid process. An idea of the depth at which the nerve emerges can be gained by identifying the posterior digastric muscle and tracing it toward its insertion deep to the mastoid process. The nerve crosses at a level equivalent to the surface of the digastric muscle. In other words, dissect along the anterior surface of the sternomastoid muscle and the mastoid process posterior to the parotid gland. There are no vital structures in this plane crossing superficial to the main trunk of the facial nerve.

There is a tiny arterial branch (posterior auricular artery) crossing just superficial to the facial trunk. If the exposure is not adequate for accurate clamping and ligating, simple pressure stops bleeding from this vessel if it has been transected. Consequently, focus intense attention on an area about 1 cm in diameter just anterior to the mastoid process and about 1 cm deep to its surface. This is where the facial trunk is found unless a tumor in the deep portion of the parotid gland has displaced the nerve to a more superficial plane. The cephalad margin of this 1 cm area of intense attention may be considered to be the fissure between the external auditory canal and the superior portion of the mastoid process.

One should be cautious while elevating the skin flap along the inferior border of the parotid to avoid nerve damage. Avoid elevating the caudal portion of the flap beyond the anterior edge of the parotid gland before the facial nerve dissection because the marginal mandibular branch of the facial nerve emerges from the parotid gland together with the posterior facial vein with which the nerve may be in contact. This is the smallest branch of the facial nerve and the easiest to injure because it is quite superficial at this point. Damage

to this nerve causes weakness in the area of the lateral portion of the lower lip.

Documentation Basics

- Findings
 - Extent of resection
-

Operative Technique

Incision and Exposure

Although many incisions have been devised for this operation, we prefer the one illustrated in Fig. 133.1. It starts in a skin crease just anterior to the tragus and continues in the form of a Y, as shown. Continue the posterior limb of the incision over the mastoid process in a caudal direction roughly parallel to the underlying sternomastoid muscle down to a point about 1 cm below the angle of the mandible. Do not make the angle of the Y too acute. Carry the incision through the platysma muscle. Obtain hemostasis with accurate electrocautery. Apply small rake retractors to the anterior skin flap and strongly elevate the

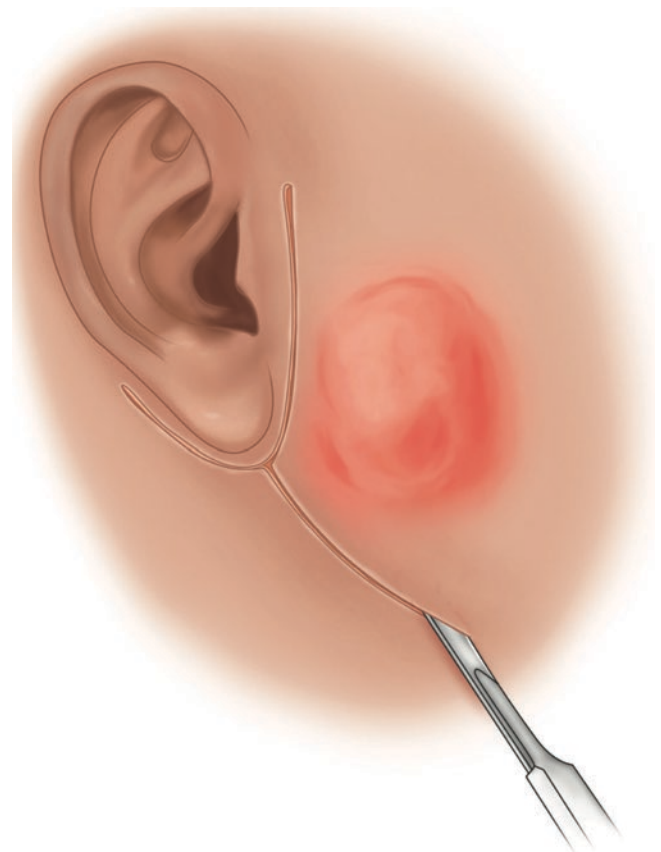


Fig. 133.1

tissue in the plane just deep to the platysma. As soon as the surface of the parotid gland is exposed, continue the dissection with small Metzenbaum scissors. Some of the fibrous tissue attaching the parotid gland to the overlying tissue resembles tiny nerve fibers. There are no facial nerve fibers superficial to the parotid gland. Therefore, each of these fibers may be rapidly divided. If a total superficial lobectomy is planned, continue the dissection in a cephalad direction to the level of the zygomatic process and anteriorly to the anterior margin of the parotid gland. Do not continue the dissection beyond the anterior and inferior margins of the gland, as the small facial nerve branches may inadvertently be injured if this is done before identifying the facial nerve.

Elevate the skin flaps and the lobe of the ear in a cephalad posterior direction to expose the underlying sternomastoid muscle, mastoid process, and cartilage of the external auditory canal. Elevate the posterior flap to expose 1–2 cm of underlying sternomastoid muscle. Obtain complete hemostasis. Some surgeons prefer to place a few sutures to attach the skin flaps temporarily to the underlying cheek, maintaining exposure of the gland.

Exposing the Posterior Margin of the Parotid Gland

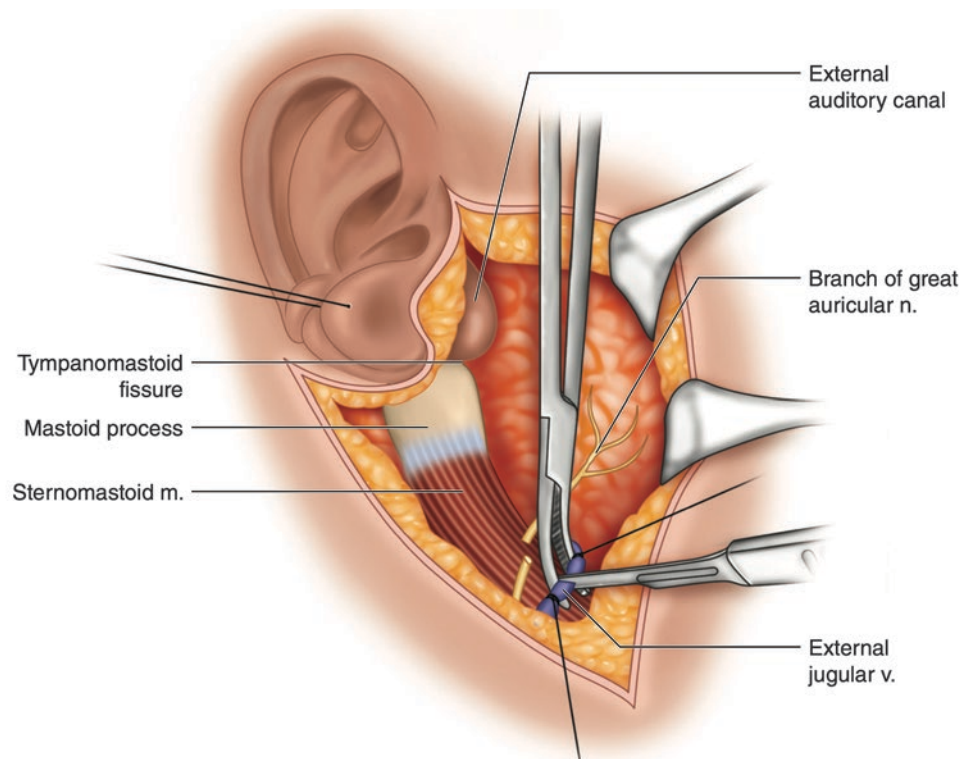
Identify the great auricular nerve overlying the surface of the sternomastoid muscle about 3–4 cm caudal to the mastoid

process. Divide the branch of the great auricular nerve that enters the parotid gland. Adjacent to this nerve is found the external jugular vein, which is generally also divided and ligated posterior to the parotid gland (Fig. 133.2). Expose the anterior border of the sternomastoid muscle and continue this dissection in a cephalad direction toward the mastoid process. When dissecting the tissues away from the anterior surface of the mastoid process, there may be some bleeding from branches of the superficial temporal vessels. It can be controlled by accurate clamping or electrocautery.

Locating the Facial Nerve

Running from the tympanomastoid fissure to the parotid gland is a fairly dense layer of temporoparotid fascia. Elevate this layer of fascia with a small hemostat or right-angle clamp and divide it (Fig. 133.3). Continue the dissection deep along the anterior surface of the mastoid process. Remember that the main trunk of the facial nerve is located in a 1-cm area anterior to the tympanomastoid fissure and the upper half of the mastoid process at 0.5–1.0 cm depth. Try to identify the small arterial branch of the posterior auricular artery in this area. Divide and ligate it. If it has been inadvertently divided and accurate clamping cannot be achieved, simply apply pressure for a few minutes to stop the bleeding. Continue the blunt dissection using a hemostat until the posterior portion of the parotid gland can be retracted away from

Fig. 133.2



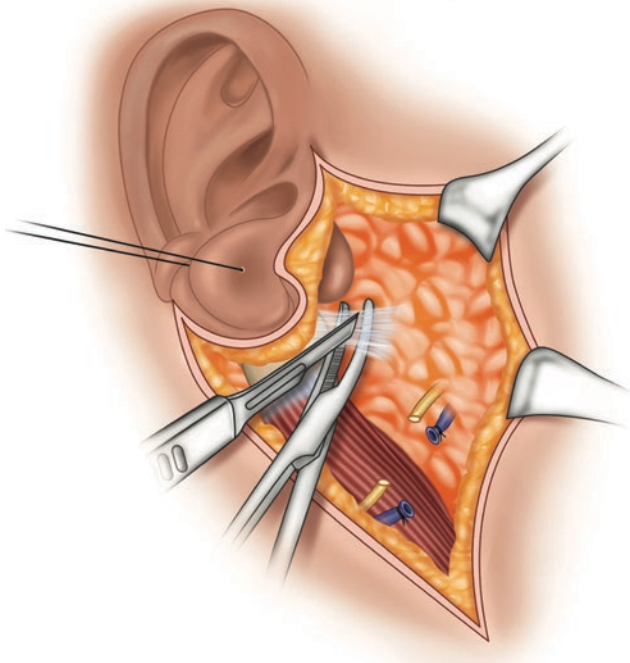


Fig. 133.3

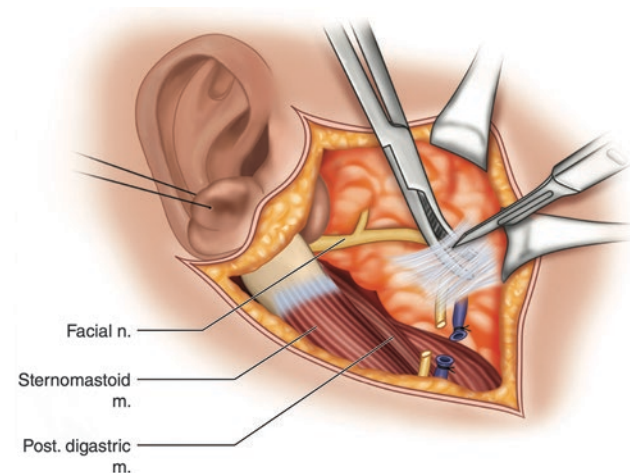


Fig. 133.4

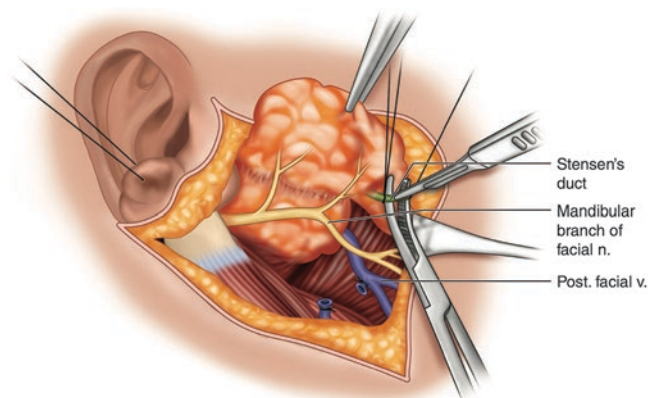


Fig. 133.5

the mastoid process. Continuing to separate and divide the fibrous tissue in this area uncovers the main trunk of the facial nerve. Although the nerve usually runs in a transverse direction from the mastoid process toward the gland, it sometimes can run obliquely from the upper left portion of the operative field toward the right lower portion as it enters the parotid gland. Some idea of how deep the dissection must be carried to expose the facial nerve can be obtained by observing the depth of the surface of the posterior digastric muscle as it reaches its origin behind the mastoid process. The nerve is at or just superficial to this vessel (Fig. 133.4).

Dissecting Facial Nerve Branches

Apply traction to the superficial lobe of the parotid using several Allis clamps or retractors. Insert a small hemostat in the plane *just superficial* to the facial nerve. Ask the assistant to divide the fibrous tissue being elevated by the hemostat (Fig. 133.4). Continue the dissection in this plane until each of the branches of the facial nerve has been separated from the overlying parotid tissue. Pay special attention to the cervical division and its marginal mandibular branch, as it permits elevation of the lowermost portion of the parotid gland. As the dissection reaches the anterior margin of the parotid gland, identify Stensen's duct. Ligate with 3-0 PG and divide the duct (Fig. 133.5). After all of the nerve branches have been identified and the duct has been divided, remove the superficial lobe of the gland.

Hemostasis during the nerve dissection can generally be achieved by gauze pressure. At this point in the dissection, carefully identify each bleeding point and clamp it with a mosquito hemostat. Ligate with 4-0 or 5-0 PG. Do not use electrocautery in areas close to the nerve.

Removing Deep Lobe of Parotid Gland (When Indicated)

To remove the deep lobe of the parotid gland, first excise the superficial lobe of the parotid as described above; then carefully free the lower division of the facial nerve from the underlying tissue. By retracting one or more of these divisions, one can begin to mobilize the deep lobe.

Identify the posterior facial vein. Separate the marginal mandibular nerve branch from the vein; then divide and ligate the posterior facial vein with 4-0 PG as in Fig. 133.6. Now divide the superficial temporal artery and vein as in Fig. 133.7. Elevate the lower border of the gland and divide and ligate the external carotid artery; then divide and ligate the internal maxillary and the transverse facial arteries at the anterior border of the gland. The deep lobe may now be

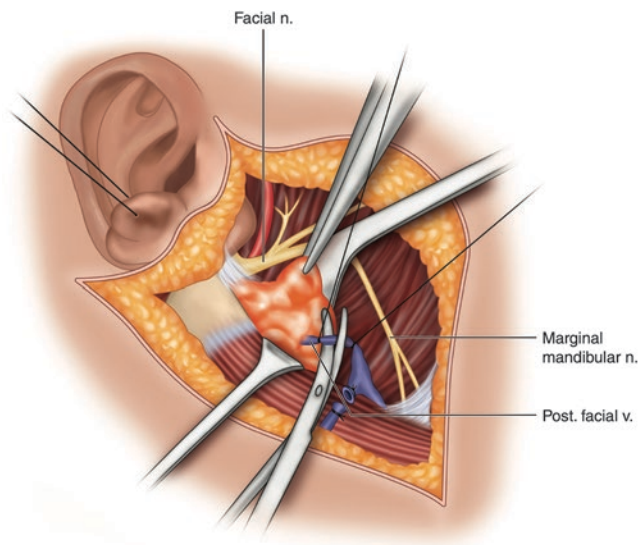


Fig. 133.6

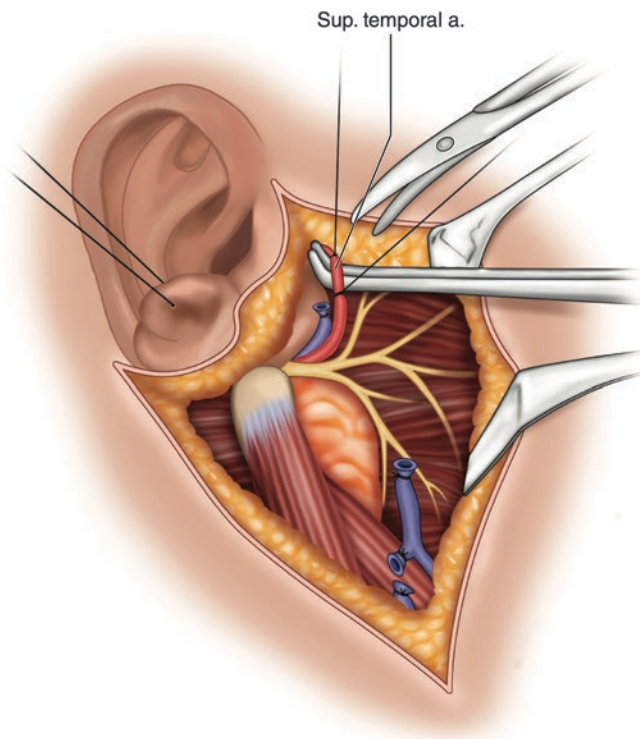


Fig. 133.7

removed. The appearance of the operative field after removing the deep lobe is seen in Fig. 133.8.

Drainage and Closure

Place a small Silastic closed suction drain through a puncture wound posterior to the incision. Close the incision using

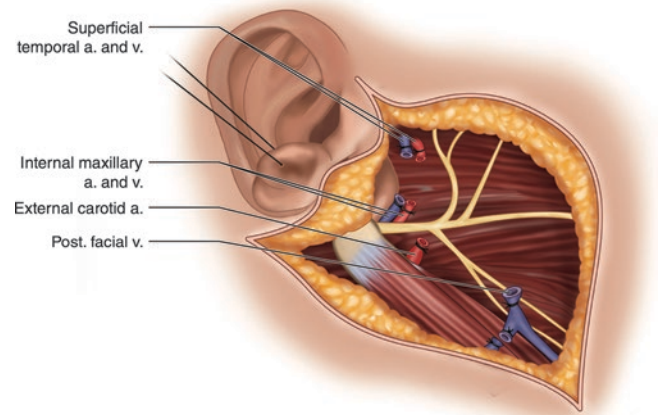


Fig. 133.8

interrupted 5-0 PG sutures to the platysma and subcutaneous fat. Close the skin with interrupted 5-0 nylon sutures.

Postoperative Care

Leave the closed suction drain in place until the drainage has essentially ceased (3–4 days).

Complications

- *Facial weakness due to nerve damage.*
- *Hematoma.*
- *Infection.*
- *Gustatory sweating.* Otherwise known as Frey syndrome, it manifests as almost painful sweating in the skin of the operative area while eating. It occurs to some extent in as many as 25% of patients. This is believed to be due to the regrowth of parasympathetic motor nerve fibers of the auriculotemporal nerve into cutaneous nerve fibers of the skin flap.
- Such crossed innervation of the sweat glands produces uncomfortable gustatory sweating. Loré stated that it may be prevented by removing a section of the auriculotemporal nerve during surgery of the parotid gland.
- *Salivary fistula.* This may appear when a significant portion of the parotid gland has been left intact. It generally corrects itself with expectant treatment.

Further Reading

Christensen NR, Jacobsen SD. Parotidectomy: preserving the posterior branch of the great auricular nerve. *J Laryngol Otol.* 1997;111:556.

- De Ru JA, van Benthem PP, Hordijk GJ. Morbidity of parotid gland surgery: results one year postoperative. *Eur Arch Otorhinolaryngol.* 2006;263:582.
- Dulguerov P, Quinodoz D, Cosendai G, et al. Prevention of Frey syndrome during parotidectomy. *Arch Otolaryngol Head Neck Surg.* 1999;125:833.
- Kadletz L, Grasl S, Grasl MC, Perisanidis C, Erovic BM. Extracapsular dissection versus superficial parotidectomy in benign parotid gland tumors: the Vienna Medical School experience. *Head Neck.* 2017;39:356–60.
- Kato MG, Erkul E, Nguyen SA, Day TA, Hornig JD, Lentsch EJ, Gillespie MB. Extracapsular dissection vs superficial parotidectomy of benign parotid lesions: surgical outcomes and cost-effectiveness analysis. *JAMA Otolaryngol Head Neck Surg.* 2017;143:1092–7.
- Larian B. Parotidectomy for benign parotid tumors. *Otolaryngol Clin North Am.* 2016;49(2):395–413.
- Loree TR, Tomljanovich PI, Cheney RT, et al. Intraparotid sentinel lymph node biopsy for head and neck melanoma. *Laryngoscope.* 2006;116:1461.
- Rice DH. Malignant salivary gland neoplasms. *Otolaryngol Clin N Am.* 1999;32:875.
- Terrell JE, Kileny PR, Yian C, et al. Clinical outcome of continuous facial nerve monitoring during primary parotidectomy. *Arch Otolaryngol Head Neck Surg.* 1997;123:1081.
- Viera MB, Maia AF, Riberio JC. Randomized prospective study of the validity of the great auricular nerve preservation in parotidectomy. *Arch Otolaryngol Head Neck Surg.* 2002;128:1191–5.
- Wertz AP, Durham AB, Malloy KM, Johnson TM, Bradford CR, McLean SA. Total versus superficial parotidectomy for stage III melanoma. *Head Neck.* 2017;39:1665–70.