Preservation of the superficial lobe for deep-lobe parotid tumors: A better aesthetic outcome

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Abstract
Deep-lobe parotid tumors are relatively uncommon. Most of these tumors present as external masses. They can also present in the oral cavity or oropharynx. Magnetic resonance imaging and ultrasound-guided fine-needle aspiration for biopsy and cytology have made it possible to establish a definitive diagnosis and identify the exact location of the tumor in almost all cases before surgery. Traditionally, deep-lobe tumors have been managed by a formal superficial parotidectomy and identification and preservation of the facial nerve, followed by removal of the deep lobe that contains the tumor. Superficial parotidectomy is associated in most cases with periauricular depression secondary to a loss of volume, leading to variable aesthetic deformities. A complete parotidectomy is more likely to be associated with a larger aesthetic deficit secondary to a greater loss of tissue volume. The incidence of gustatory sweating is high after superficial parotidectomy, particularly in the early postoperative period. We hypothesize that if the superficial lobe is preserved, there is less likelihood of gustatory sweating because of the interposition of tissue between the skin and the cut ends of the secretomotor fibers. Approximately 80% of parotid tissue volume is made up of the superficial lobe, and therefore preservation of the superficial lobe should be associated with less postparotidectomy depression. Therefore, we decided to preserve the superficial lobe of the gland for deep-lobe tumors. Nine patients underwent deep-lobe parotidectomy with preservation of the superficial lobe over a 6-year period. Patients were studied prospectively with regard to technical difficulty, complications, and cosmetic outcome. Follow-up ranged from 12 months to 6 years. We did not experience any undue technical difficulty, and there were no cases of facial weakness. One patient developed gustatory sweating, which almost completely resolved over a 2-year period. There were no cases of postparotidectomy depression, and both patients and surgeons were satisfied with the cosmetic appearance. We present our technique and experience.

Introduction
Salivary gland tumors are relatively uncommon. Most arise in the parotid, and most are pleomorphic adenomas.1 Fewer than 20% arise in the deep lobe.2 Although there is no anatomic division of the parotid gland into superficial and deep lobes, that portion of the gland lying within the prestylloid compartment of the parapharyngeal space deep to the facial nerve is termed the deep lobe.3 At present, there is no reliable way of visualizing the intraglandular portion of the facial nerve itself.4,5 Hence, a number of anatomic landmarks are used to determine if the tumor lies in the deep or superficial lobe on computed tomography (CT) or magnetic resonance imaging (MRI). The most common way is to determine the relationship of the mass to the retromandibular vein, which lies just deep to the prestylloid compartment of the parapharyngeal space deep to the facial nerve and termed the deep lobe.3 At present, there is no reliable way of visualizing the intraglandular portion of the facial nerve itself.4,5 Hence, a number of anatomic landmarks are used to determine if the tumor lies in the deep or superficial lobe on computed tomography (CT) or magnetic resonance imaging (MRI). The most common way is to determine the relationship of the mass to the retromandibular vein, which lies just deep to the facial nerve. However, the retromandibular vein is not always identified on CT or MRI, so two other methods can be employed: identification of the facial nerve line (a line joining the lateral surface of the posterior belly of the digastric muscle and the lateral surface of the ascending ramus of the mandible) and identification of Stensen’s duct. A tumor is said to be in the deep lobe if it is deep to these two landmarks.4,7 Several authors have reported that MRI is superior to CT for identifying intraparotid masses.4,8,9 CT, however, is recommended if there is any suspicion of skull base destruction in malignant cases. Generally, deep-lobe tumors present with a visible or palpable mass in the parotid region, although a small proportion present in the oropharynx and displace the tonsil medially. We routinely carry out preoperative fine-needle aspiration for biopsy and cytology (FNABC), as well as MRI; in difficult cases, we add ultrasound-guided FNABC.
This allows us to determine the exact nature, location, size, and histologic differentiation of the tumor. This information is used in the planning of surgery and to obtain a detailed informed consent. Traditionally, deep-lobe parotid tumors are removed via a total or subtotal parotidectomy, with the surgeon carrying out a superficial parotidectomy with preservation of the facial nerve followed by removal of the deep lobe that contains the tumor. The senior author (A.H.) has never employed a transoral approach, but this approach has been reported in the literature.10

Figure 1. To reduce the visible portion of the scar, the operation begins with a standard rhytidectomy incision with a retrotragal component.

Figure 2. The superficial lobe is dissected off the tumor.
There are various problems with total parotidectomy, particularly variable postsurgical defects secondary to the loss of volume. This is particularly apparent in older patients because of the larger volume of the gland and ptosis secondary to the aging process. Attempts to reconstruct the postparotidectomy defect are often less than satisfactory. With total parotidectomy, there is an additional risk to the facial nerve, as well as the complication of gustatory sweating. We present our technique of preservation of the superficial lobe for benign deep-lobe parotid tumors.
which has been developed by the senior author to improve aesthetic and functional outcomes—that is, less likelihood of gustatory sweating.

Surgical technique
An ideal technique should provide adequate exposure of the facial nerve, preserve sensation to the ear, minimize complications, and result in a good aesthetic outcome. The initial steps of our technique are standard and well established.\textsuperscript{3,12} Other steps have been incorporated into the technique to improve the aesthetic outcome. Our preferred approach is the standard rhytidectomy incision\textsuperscript{13} with a retrotragal component to reduce the visible portion of the scar and achieve a better aesthetic outcome (figure 1). A thick sub-SMAS (superficial musculoaponeurotic system) flap external to the parotid fascia is elevated as far anteriorly as required. In more recent cases, however, we have left the skin attached to the superficial lobe. After identification of the main trunk of the facial nerve in the standard manner,\textsuperscript{3} the superficial lobe is dissected off the branches as much as required for adequate exposure of the deep lobe that contains the tumor (figure 2). The superficial lobe containing Stensen’s duct is left attached anteriorly. The tumor is then dissected from underneath the facial nerve and removed either below the marginal mandibular branch or between the two divisions (figure 3).

The superficial lobe is replaced in its anatomic location and sutured to the pretragal soft tissue and sternocleidomastoid muscle with 5-0 Vicryl sutures, thereby obliterating the dead space left by the removal of the deep lobe with the tumor (figure 4). A medium suction drain is brought out behind the hairline to eliminate a visible puncture scar. In those cases where the superficial lobe was left attached to the skin, a suction drain was not required. The incision is closed in two layers, with 5-0 Vicryl to the subcutaneous tissue and 8-0 Vicryl to the skin (figure 5). Suture removal is not required. Figure 6 shows the postoperative result in one patient at 3 months. Figure 7 shows the pre- and postoperative MRIs of another patient who had a pleomorphic salivary adenoma of the deep lobe of the left parotid. Both cases demonstrate a lack of volume deficit or asymmetry and an excellent aesthetic outcome.

Discussion
Total or near-total parotidectomy is a well-established technique for treatment of deep-lobe tumors.\textsuperscript{3} This invariably leads to a degree of postsurgical volume deficit that results in asymmetry secondary to depression in the periauricular region. It has been suggested that a less aggressive surgical approach for deep-lobe tumors compromises the prognosis for tumor recurrence because the tumor capsule is significantly thicker in deep-lobe tumors.\textsuperscript{14} We felt that sacrifice of the superficial lobe simply for exposure was unnecessary, and this prompted us to develop a technique that would provide adequate exposure without sacrificing the uninvolved component of the parotid gland. Hence, we developed our technique of preservation of the superficial lobe for treatment of deep-lobe tumors, which to our knowledge has not been reported in the literature before. We studied our patients in a prospective manner with regard to technical difficulty, complications, and aesthetic
A: Preoperative MRI demonstrates a pleomorphic salivary adenoma of the deep lobe of the left parotid in one of our patients. B: Follow-up MRI shows no volume defect postoperatively.

outcomes. The symmetry and the aesthetic outcome were assessed with standard clinical photographs (figure 6). One patient underwent a postoperative MRI to assess the volume preservation radiologically (figure 7).

We employed this technique in 9 cases over a 6-year period. All patients underwent deep-lobe parotidectomy with preservation of the superficial lobe. There were 8 cases of pleomorphic salivary adenoma and 1 case of Warthin’s tumor. All tumors were completely excised without any significant technical difficulty. It was our observation that despite preservation of the superficial lobe, there was more than adequate exposure of the deep lobe to execute surgery in a comfortable and safe manner. The senior author has previously employed total or near-total parotidectomy for the treatment of deep-lobe tumors during the previous 10 years, and he felt that the new technique was equally easy and safe and yet allowed for preservation of volume. Our follow-up period ranged from 12 months to 6 years. There were no cases of facial paresis or palsy. There was 1 case of gustatory sweating, which required no intervention and almost completely resolved within 2 years.

There was no postsurgical volume defect in any of our patients. In addition, there were no cases of recurrence during the follow-up period.

In conclusion, deep-lobe parotidectomy is technically straightforward, it results in no postsurgical soft-tissue defect or asymmetry, and it provides an excellent aesthetic outcome, thereby precluding the need for corrective treatment. It may possibly reduce the incidence of gustatory sweating if the superficial lobe is left attached to the overlying skin. We feel that in an increasingly body-image–conscious society, this technique offers a new way of treating deep-lobe tumors with an excellent aesthetic outcome.

References