

## Chapter 29 – Suprahyoid Pharyngotomy

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The surgical approach to the base of the tongue and the posterior wall of the oropharynx and hypopharynx is controversial. Carefully selected benign and malignant tumors arising in these anatomic sites may be surgically resected and reconstructed through a suprahyoid pharyngotomy approach with excellent opportunity for tumor clearance, very little morbidity, and very good cure rates. Fundamental to success, however, is accurate assessment of the tumor in preoperative planning and meticulous attention to detail. Treatment results for tumors of the base of the tongue are measured in terms of speech and swallowing function; need for a gastrostomy or tracheostomy tube; local, regional, and distant control; and the patient's quality of life.[1]

Resection of isolated tumors of the base of the tongue may be associated with significant morbidity, primarily impaired speech and deglutition, which may at times also result in chronic aspiration. These sequelae are due to decreased tissue volume and fibrosis after muscle resection. Mandibulectomy procedures are associated with additional morbidity beyond that of isolated tongue base resection, including visible scarring of the lip, facial depression, loss of support of oral cavity structures, salivary incontinence, malocclusion, temporomandibular joint pain, nonunion, impairment of the oral phase of swallowing, and the requirement for major reconstruction of the defect.[2–5] Oncologically sound mandible-sparing procedures (mandibulotomy) may be an alternative in selected cases to provide adequate surgical exposure while avoiding the previously mentioned complications.[2,6–10]

Blassingame,[8] in an excellent historical review of suprahyoid pharyngotomy, stated that Vidal de Cassis, an anatomist, was the first to describe incising the anterior pharyngeal wall to gain access to the base of the tongue in 1826. Malgaigne in 1834 proposed a suprahyoid incision to approach the epiglottis and base of the tongue after having carried out autopsy studies.[8] Jeremitsch (1895) was the first surgeon to use this approach.[11] His decision was based on observation of a patient who had attempted suicide by slashing his neck. During the attempt, a laceration was produced that approximated a suprahyoid pharyngotomy. Jeremitsch noted that bleeding was minimal, no nerves were severed, the airway was good, and the patient healed favorably. Hofmann reported good success with this approach in the early 1900s.[12] Unfortunately, Grünwald, an influential writer at the time, did not share this success,[13] and the technique was temporarily abandoned. Blassingame speculated that the lack of success was due to Grünwald's failure to suspend the larynx. Even after Blassingame's article in 1952, surgeons were reluctant to perform either the suprahyoid or the lateral pharyngotomy introduced by Orton.[10] It was believed to be oncologically unsound because of poor exposure and violation of the preepiglottic space.[4,14,15] It should also be recalled that these attempts took place before the advent of perioperative prophylaxis.

Barbosa, of Brazil, in 1974 included the classic description of the technique of suprahyoid pharyngotomy in his textbook.[16] Moore and Calcaterra[2] reported successful management of T3 cancer of the base of the tongue with a version of the subhyoid approach proposed by Rethi.[17]

The suprahyoid approach for T1/T2 squamous cell carcinoma of the base of the tongue has been used in our department for many years and has provided an excellent cure rate, normal speech, good cosmesis, and swallowing without clinical evidence of aspiration.[18] In a series of 13 patients with T1/T2 squamous cell carcinoma of the base of the tongue, suprahyoid pharyngotomy was used in every case. Patients with lymph node metastasis underwent radical neck dissection, and many patients received adjuvant radiation therapy. Patients in whom extracapsular spread was demonstrated received adjuvant chemotherapy. All of the patients were decannulated before discharge no later than 3 weeks after surgery. All patients were able to eat a regular diet 2 months after discharge. Long-term follow-up revealed stable weight after an initial weight loss. No patient required a completion laryngectomy for chronic aspiration. Speech was found to be easily understood in all of the patients in this series. All these patients have a minimum of 2-year follow-up with no evidence of local recurrence of tumor. A paper by Zeitels and coworkers[19] showed strikingly similar results when this technique was used primarily for limited lesions of the tongue base.

This approach is also used in the management of benign and malignant salivary gland tumors of the base of the tongue, as well as early squamous cell carcinomas of the posterior pharyngeal wall, with similar good results. It should be noted that we now manage the majority of early squamous cell carcinomas of the base of the tongue with nonsurgical organ preservation protocols and have achieved excellent outcomes. Excision via suprahyoid pharyngotomy is reserved for benign tumors or those that are not radiosensitive or fail nonoperative therapy.

### PATIENT SELECTION

Suprahyoid pharyngotomy is an excellent approach when combined with neck dissection for the treatment of T1/T2 lesions of the base of the tongue. It may also be applied without neck dissection in patients with benign or low-grade malignant salivary gland tumors. Tumors of the tongue excised by suprahyoid pharyngotomy should ideally be limited to the tongue base, posterior to the circumvallate papillae. Involvement of the lateral pharyngeal wall or tonsil may require extension of the approach, such as lateral pharyngotomy, for adequate exposure. Tumor resection anterior to the circumvallate papillae is a relative contraindication to this approach because the defect would be difficult to close primarily, the anterior margin of resection may be compromised, and postoperative difficulties with speech and swallowing will be proportionately more severe.

This procedure should not be used for tumors of the vallecula that involve the lingual surface of the epiglottis. Moore and Calcaterra<sup>[2]</sup> reported oncologic success in T3 squamous cell cancer of the tongue base with this approach together, in some cases, with supraglottic laryngectomy. We have tended not to use this technique because of the considerable problems that patients have with delayed deglutition and chronic aspiration.

Excision of cancer of the posterior wall of the oropharynx or hypopharynx may be accomplished with this technique. Primary closure of the mucosa of the posterior pharyngeal wall to the prevertebral fascia or the use of a split-thickness skin or dermal graft will complete the reconstruction.

## **PREOPERATIVE PLANNING**

Correct preoperative staging is essential to determine whether suprahyoid pharyngotomy is the best surgical approach for early squamous cell carcinoma, adenocarcinoma, or benign tumors of the base of the tongue or posterior pharyngeal wall. Magnetic resonance imaging (MRI) has proved to be the most sensitive modality for evaluating tumors involving the base of the tongue because of the excellent soft tissue definition that it provides. Gross invasion of the preepiglottic space and the depth of infiltration into the base of the tongue may be determined by obtaining sagittal MRI scans of the tongue base–larynx complex. The high signal intensity of preepiglottic fat can usually be distinguished from the dense fibers of the hyoepiglottic ligament, tongue base musculature, lingual lymphoid tissue, and cancer.<sup>[19]</sup> Resectability of tumors of the posterior pharyngeal wall is determined by size and fixation. A barium pharyngoesophagogram can often assist in assessing mobility of these tumors. However, physical examination, especially palpation, remains the most important aspect of the evaluation. In most instances, endoscopy under general anesthesia will be required at a separate procedure performed at the time of biopsy.

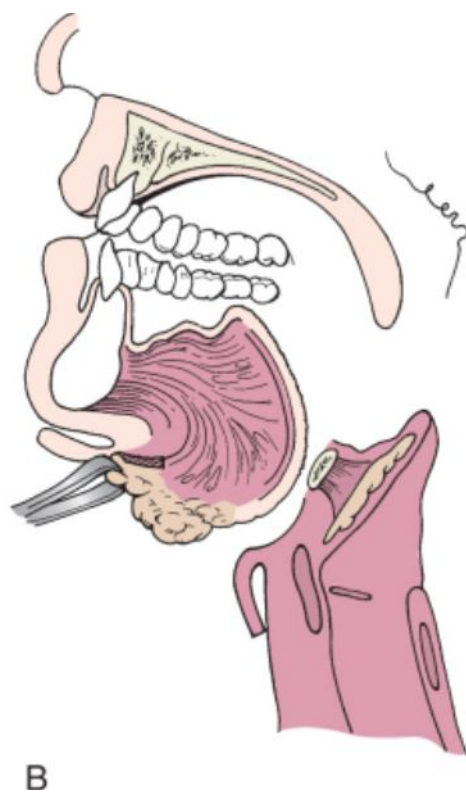
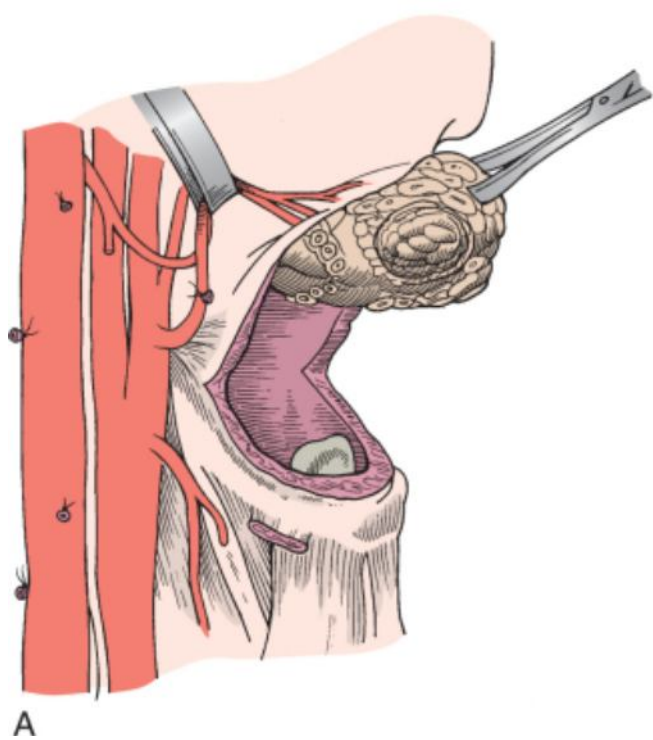
In the event that the tumor is larger than anticipated and requires more exposure, alternative procedures are described in Chapter 28.

The structure of the oropharynx and hypopharynx plays a key role in swallowing. Temporary aspiration is a predictable postoperative occurrence. Accordingly, the patient's functional status, especially as it pertains to cardiopulmonary performance, must be considered in patient selection. Patients with severe pulmonary disease may require either laryngotracheal separation or laryngectomy to protect them from life-threatening postoperative aspiration. Many of these patients benefit from placement of a percutaneous endoscopic gastrostomy (PEG) or G tube at the time of surgery. As in all patients with head and neck cancer, dental evaluation with extraction or restoration of diseased teeth is required, usually at a separate procedure.

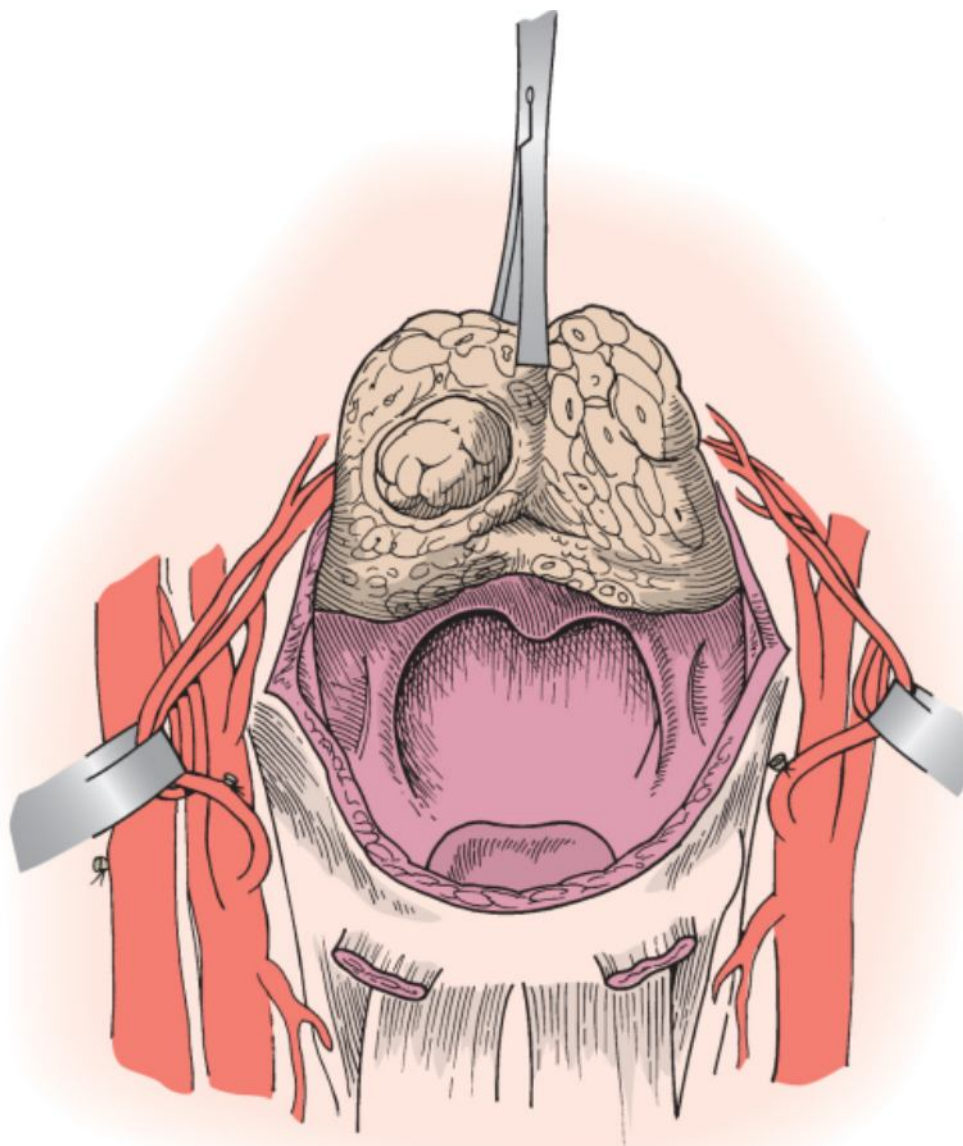
## **SURGICAL TECHNIQUE**

Suprahyoid pharyngotomy is always carried out under general anesthesia, and a tracheotomy is performed. When appropriate, the procedure is performed in conjunction with either unilateral or bilateral neck dissection. Intravenous perioperative antibiotics are administered. All patients must undergo preoperative endoscopy with palpation as noted in the previous section. This is usually performed as a separate procedure at the time of biopsy.

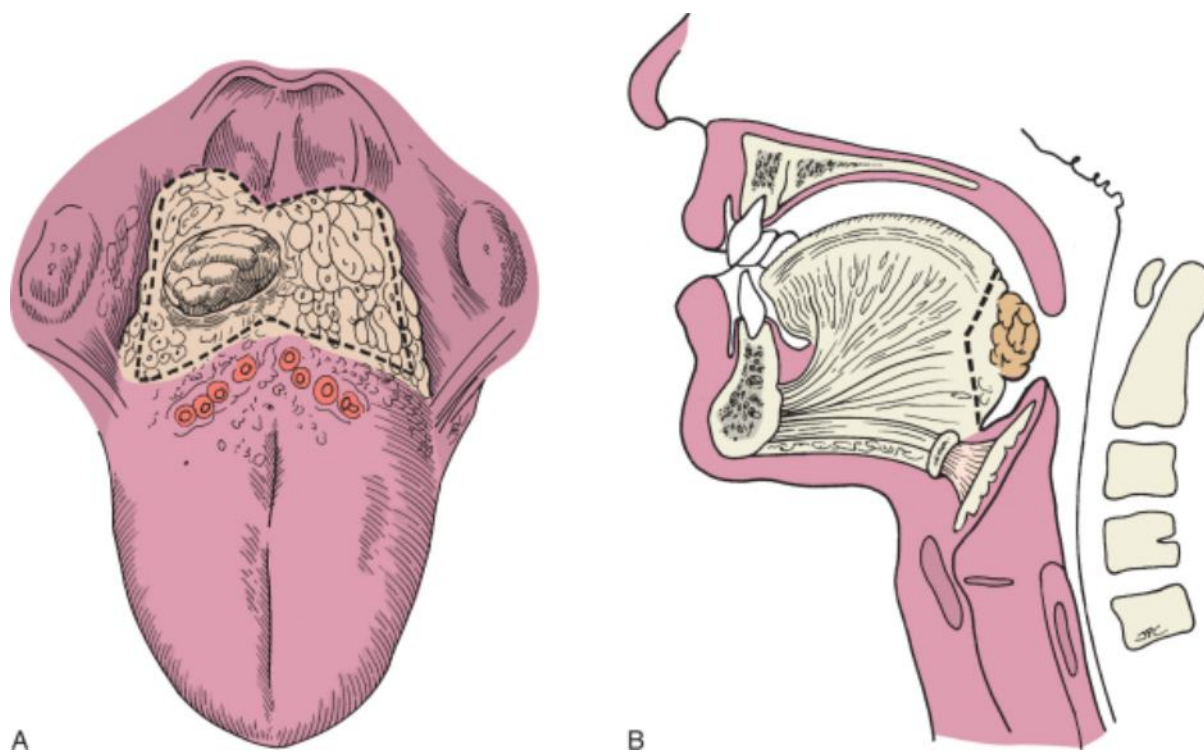
A superiorly based apron flap is outlined, and the flap is elevated. The suprahyoid muscles are sharply separated from the hyoid bone. Care must be taken laterally around the greater cornu of the hyoid bone to avoid injury to the hypoglossal nerve and lingual artery. Detailed illustrations of this step can be found in Chapter 49. The dissection is facilitated by grasping the hyoid bone with a tenaculum and pulling it into the wound. Superior retraction of the separated suprahyoid tongue musculature will define the hyoepiglottic ligament, which extends from its broad hyoid origin to its narrow insertion into the epiglottis. The mucosa of the vallecula is loosely attached to the epiglottic cartilage and is elevated completely off the lingual surface of the epiglottis as far as the tip. This provides an additional inferior margin of resection in the vallecula. An incision through the mucosa just superior to the tip of the epiglottis provides entry into the pharynx. A broad right-angled retractor is inserted above the tongue base, and traction is exerted on the hyoid bone while the pharyngotomy is completed. The hypoglossal nerves and lingual arteries are identified and retracted laterally (Fig. 29-1). A tenaculum is placed on the tongue base, and the tongue base is drawn into the wound (Fig. 29-2). After final assessment, the lesion is excised from the tongue base (Fig. 29-3). If disease extends to the tonsillar fossa, the incision can be extended to resect this area.



**Figure 29-1** **A**, The tongue is grasped with a tenaculum after the suprahyoid musculature has been separated from the hyoid bone. **B**, Approach depicted from the lateral view.

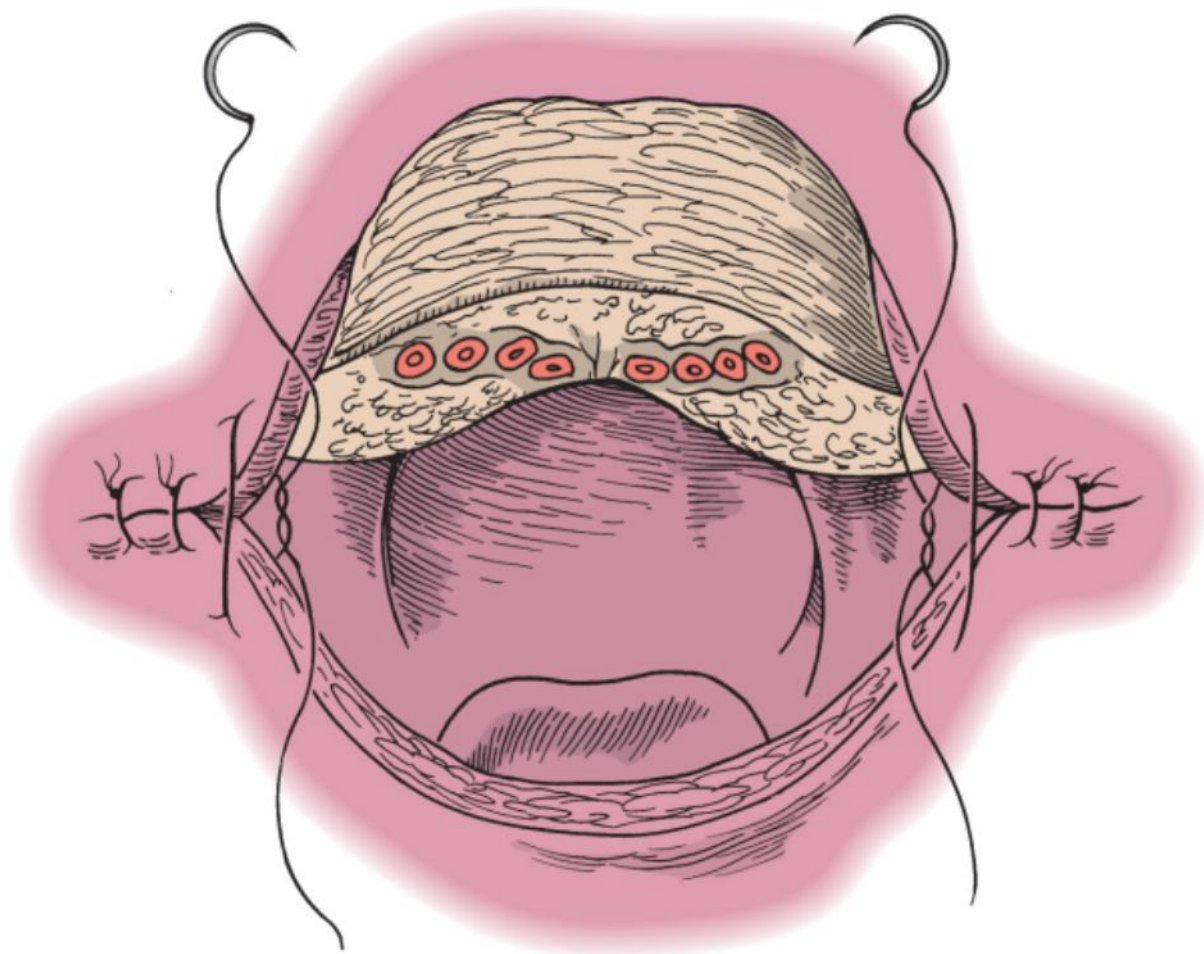


**Figure 29-2** Excellent exposure of tumors limited to the tongue base is achieved with this approach. The hypoglossal nerves and lingual arteries are retracted.



**Figure 29-3** A, Schematic drawing demonstrating the tissue to be excised. B, Lateral schematic of the area to be removed.

After the tumor has been removed and adequacy of the resection has been verified by frozen section evaluation, a multilayer primary closure of muscle and mucosa is carried out (Fig. 29-4). There has been no need in our series of cases to use a skin graft or any type of flap.



**Figure 29-4** The defect can be reapproximated primarily.

A nasogastric tube is inserted and the cervical wound is closed over Hemovac drains. Special attention must be paid to closing the subcutaneous tissues to the strap muscles around the tracheostoma to prevent contamination of the cervical wound when the patient coughs. Safety features for the tracheostomy include the placement of traction sutures (see Chapter 68) and sewing the neck plate of the tracheostomy tube to the surrounding skin. Tracheostomy tape is not used in cases in which a large apron flap is used to avoid interfering with circulation in the flap.

The technique is modified in patients in whom the pharyngotomy is used to approach a lesion of the posterior pharyngeal wall. After the pharyngotomy is made, the tumor is identified and excised from the posterior pharyngeal wall. Frozen section control is carried out, and hemostasis is obtained. There are several possibilities for reconstruction of the defect. The temptation to simply close the defect primarily must be avoided because primary closure will narrow the pharynx and inevitably result in dysphagia with aspiration. Rather, closure must maintain the preoperative pharyngeal circumference, which can be achieved by simply sewing the mucosa either to the posterior muscular wall, if this structure remains after resection, or more commonly, to the prevertebral fascia. Alternative methods include the use of a skin or dermal graft. The graft is immobilized with a bolus of medicated gauze, which must be removed endoscopically any time after the fifth postoperative day. If this technique is used, care is necessary to avoid disrupting the pharyngotomy closure when the bolus is removed. A nasogastric feeding tube is inserted.

## **POSTOPERATIVE MANAGEMENT**

Our patients receive routine postoperative care for tracheostomy and care of the cervical wound as described in Chapters 68 and 78. Patients are fed by nasogastric tube for approximately 7 to 10 days. Decannulation is achieved before removal of the nasogastric tube and initiation of oral feeding. Initial feedings take place under the guidance of our speech pathologist, who evaluates the patient's readiness and instructs the patient in swallowing strategies. During this initial retraining of the swallowing act, the speech pathologist sits with the patient at mealtimes and helps the patient attain the technique necessary for swallowing. There are no special aspects of management for the pharyngotomy wound.

In our series,<sup>[18]</sup> a small pharyngocutaneous fistula developed in three of the patients, all of which healed within 10 days. Pneumonia developed in one patient immediately postoperatively, but it resolved quickly with antibiotics. All patients were decannulated and ingesting an oral diet before discharge.

### **PEARLS**

- Direct laryngoscopy and imaging studies, particularly MRI, are fundamental for accurate staging, but palpation is the most accurate means of evaluating the base of tongue.
- This approach should be limited to early (T1/T2) cancer of the base of tongue or cancer of the posterior pharyngeal wall to maximize tumor clearance and limit difficulty with deglutition.
- Excellent exposure for early tumors of the base of the tongue, as well as the posterior pharyngeal wall, is provided by this approach.
- Limited resection of tissue plus preservation of both hypoglossal nerves leads to early return of functional deglutition without aspiration.
- The apron flap that is used for this procedure lends itself to the performance of bilateral neck dissection when appropriate.

### **PITFALLS**

- Lack of accurate preoperative assessment will lead to an inappropriate plan of management.
- Evaluation under anesthesia as well as imaging is required for assessment.
- Underestimating the size and location of the tumor (e.g., extension to the vallecula, tonsil, supraglottic larynx) will lead to positive margins or an inability to remove the tumor entirely.
- The patient with a large tumor of the posterior pharyngeal wall will not be a candidate for this procedure.
- Recurrence of tumor in the neck may take place if elective neck dissection is not included in the initial procedure.
- Lack of frozen section control may lead to positive margins and an inability to cure the patient.

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