

Chapter 63 – Prestyloid Parapharyngeal Space

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The prestyloid parapharyngeal space (PSPS) is a triangular space that extends from the hyoid bone inferiorly to the skull base superiorly. The medial limit of the space is the lateral pharyngeal wall, whereas laterally it is limited by the fascia of the pterygoid muscles superiorly and the soft tissues of the neck inferior to the angle of the mandible. The anterior aspect of the parapharyngeal space ends at the pterygoid mandibular raphe anteriorly and is posteriorly limited by the carotid sheath and the contents of the poststyloid parapharyngeal space. The PSPS is separated from the poststyloid parapharyngeal space by the fascia of the tensor veli palatini muscle, which extends from the styloid process posterolaterally to the pterygoid plates anteromedially (Fig. 63-1).[1]

Normally, the PSPS contains adipose tissue, lymphatics, and small unnamed vessels. Tumor involvement of the PSPS most commonly reflects expansion of benign salivary gland neoplasms into the PSPS from either the deep lobe of the parotid gland or minor salivary gland rests.[1-4] Accordingly, the most common neoplasm encountered is pleomorphic adenoma. Malignant salivary gland neoplasms may develop, but they are unusual. We have also observed lipoma in the PSPS (Fig. 63-2). Metastatic neoplasms to the lymphatics of the PSPS may occasionally be encountered (Fig. 63-3).[5,6] Other neoplasms developing, for instance, in the mandible, the maxilla, or the various soft tissues surrounding the PSPS, may extend into the PSPS; however, according to more strict definition, they should not be considered parapharyngeal space neoplasms but rather neoplasms arising from adjacent structures (Fig. 63-4).

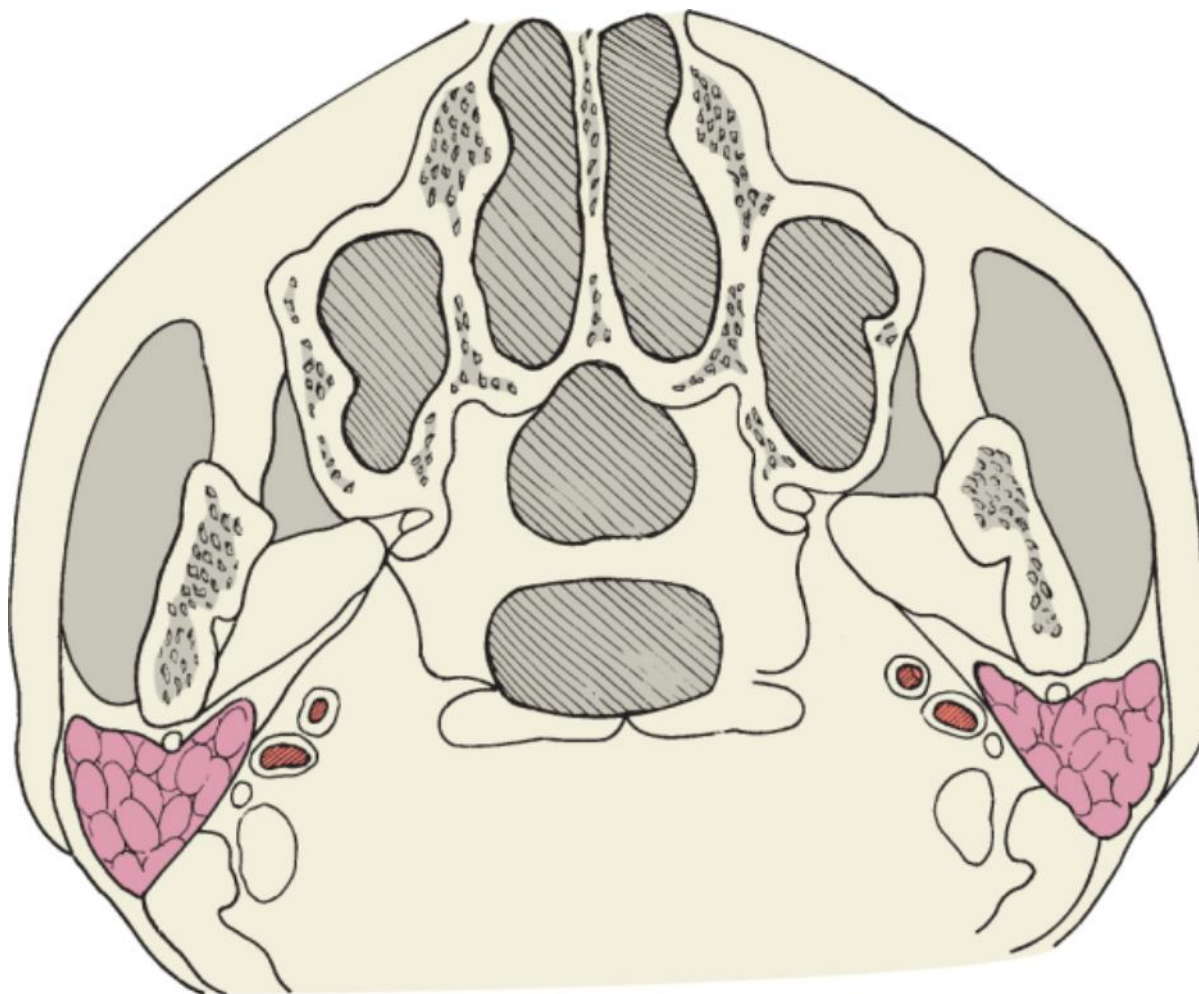


Figure 63-1 The parapharyngeal space in the axial plane.

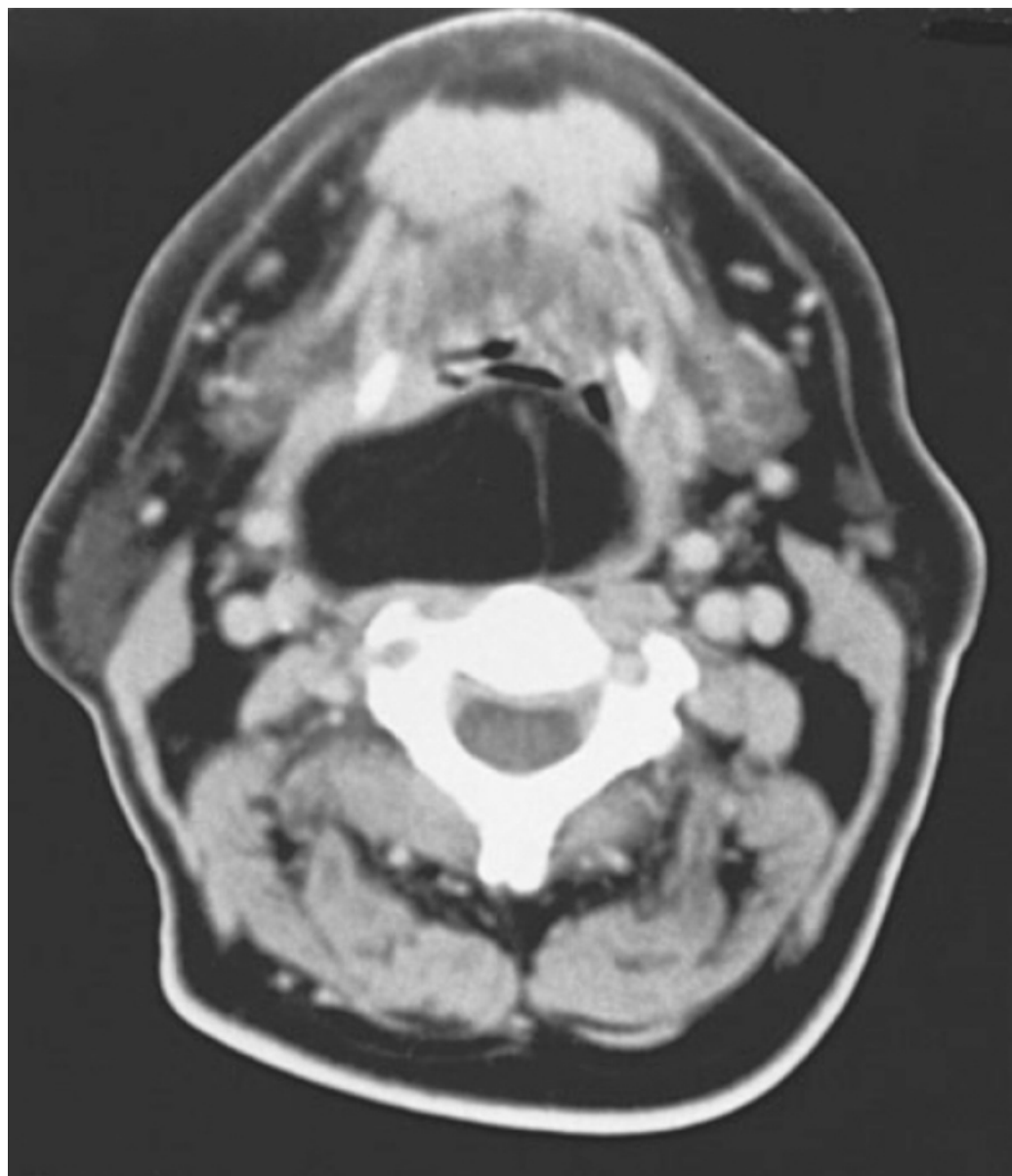


Figure 63-2 Axial computed tomography scan demonstrating massive lipoma in the parapharyngeal space with extension across the midline through the retropharyngeal space. This patient was remarkably asymptomatic. The diagnosis is apparent because of the fat density of the lesion.

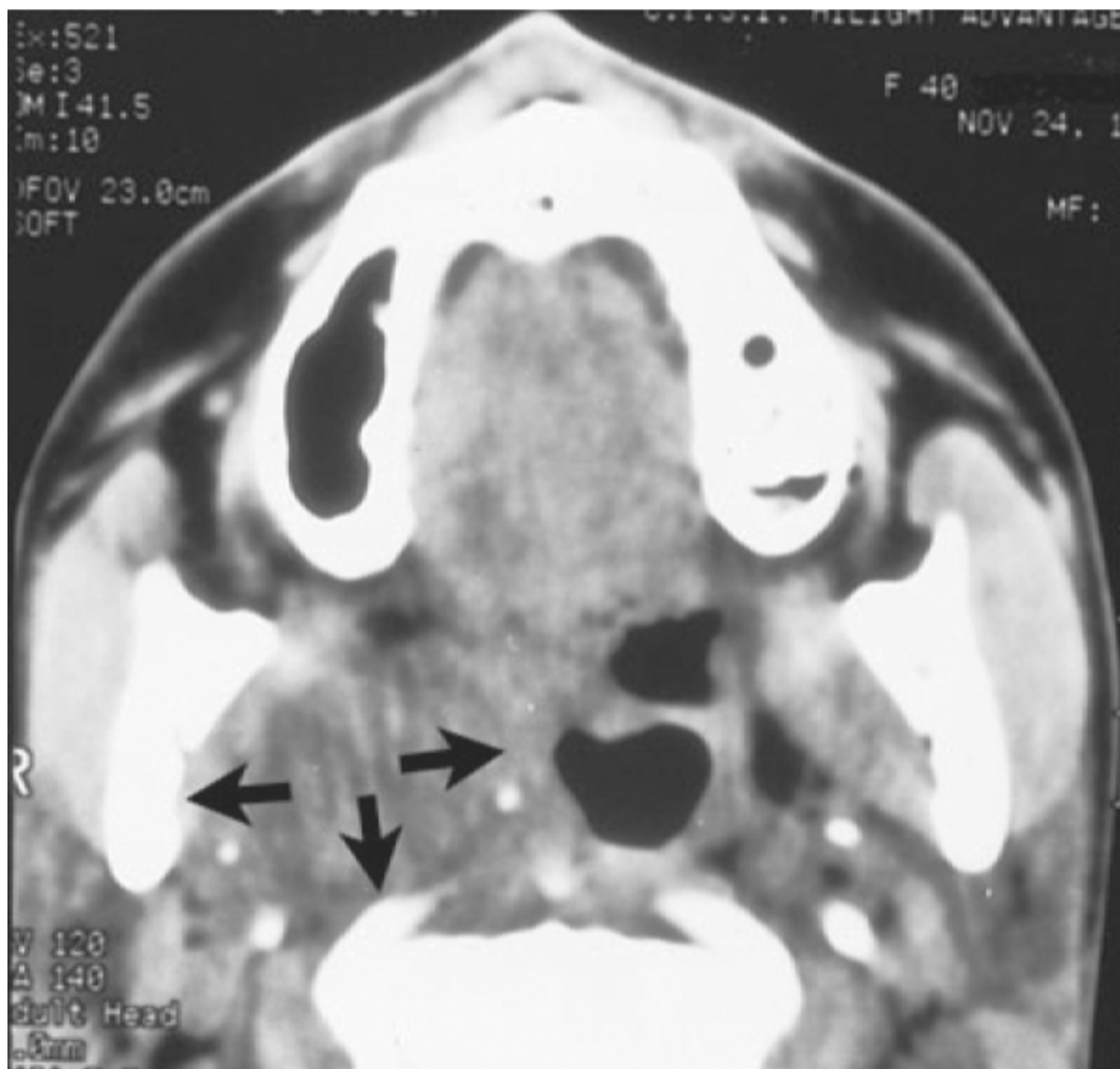


Figure 63-3 Axial computed tomography scan demonstrating a lesion in the parapharyngeal space (*arrows*). The displacement of parapharyngeal fat was not characteristic of either a prestyloid or a poststyloid lesion. The patient had previously been treated for papillary carcinoma of the thyroid. It was subsequently removed and proved to be metastatic thyroid cancer.

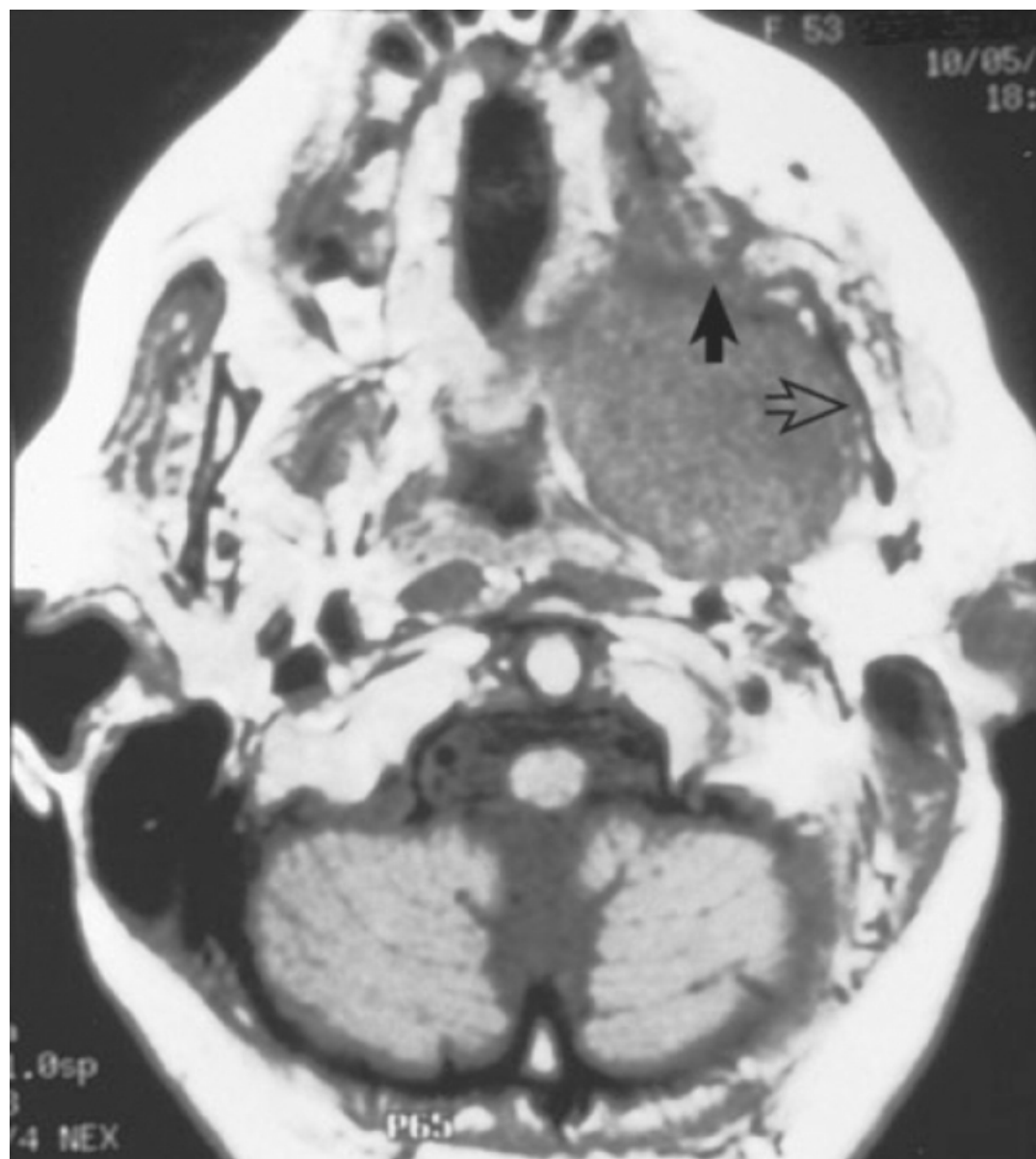


Figure 63-4 Axial magnetic resonance image demonstrating a large mass that involved the parapharyngeal space. Anterior extension into the mandible (*open arrow*) and maxilla (*solid arrow*) with involvement of the pterygoid muscle suggests that this lesion is malignant, originated in structures adjacent to the parapharyngeal space, and extended posteriorly. This tumor proved to be a chondro-sarcoma.

PATIENT SELECTION

The most commonly encountered initial symptom of a neoplasm involving the PSPS is an asymptomatic mass located either immediately posterior or immediately inferior to the angle of the mandible in the neck or submucosally in the soft palate or lateral pharyngeal wall. Medial expansion of these tumors may interfere with the fit of a dental prosthesis and, on occasion, may become symptomatic as a result of partial obstruction of the aerodigestive tract because of size (Fig. 63-5). We have been impressed by the rather remarkable size that may be attained by a benign pleomorphic adenoma in the parapharyngeal space with relatively innocuous symptoms. The presence of pain or neuropathy should lead the clinician to suspect an alternative diagnosis such as a primary or metastatic malignant tumor.



Figure 63-5 An oral view of a parapharyngeal mass displacing the soft palate anteromedially.

PREOPERATIVE EVALUATION

Imaging with either computed tomography (CT) or magnetic resonance imaging (MRI) is a critical aspect of patient evaluation. In fact, it was only with the advent of CT that there was a clear understanding of the parapharyngeal space and the biology of tumors arising in this area. The site of origin of large tumors is sometimes difficult to assess. Displacement of parapharyngeal fat posteromedially is a strong indication that the lesion arose in the PSPS (Figs. 63-6 and 63-7). Conversely, displacement of parapharyngeal fat anteriorly and laterally strongly suggests the presence of a neoplasm arising in the poststyloid space. Tumors arising in the deep lobe of the parotid gland may pass through the stylomandibular tunnel to reach the parapharyngeal space (Fig. 63-8). These tumors have a characteristic dumbbell shape (Fig. 63-9). The imaging characteristics of a normal parotid gland allow the surgeon to make this assessment without need for concurrent sialography. When tumors pass posterior or inferior to the stylomandibular ligament, a more rounded configuration is attained.

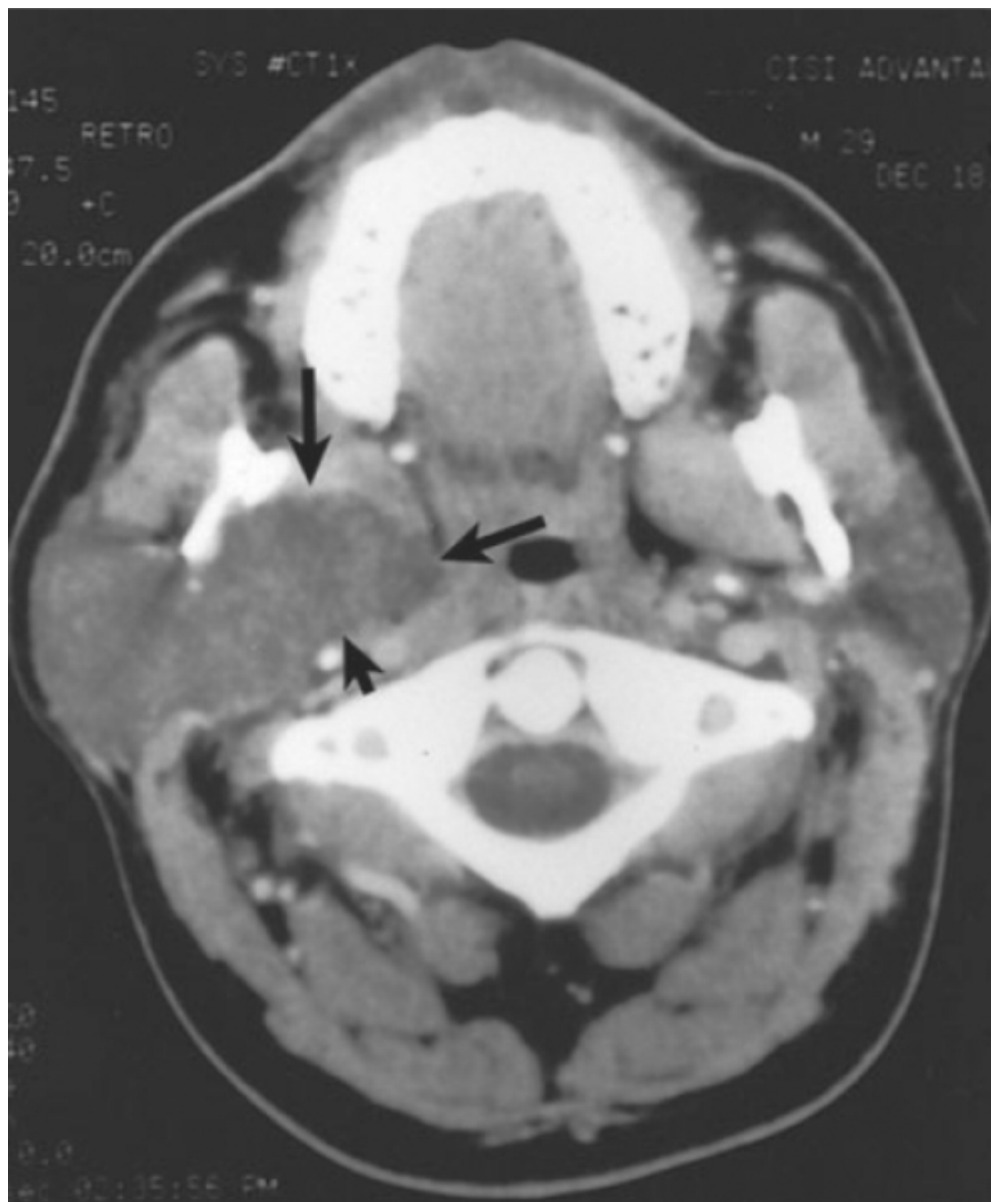


Figure 63-6 Computed tomography scan of a pleomorphic adenoma. This mass (*arrows*) originated in the parotid and extended into the prestyloid parapharyngeal space.

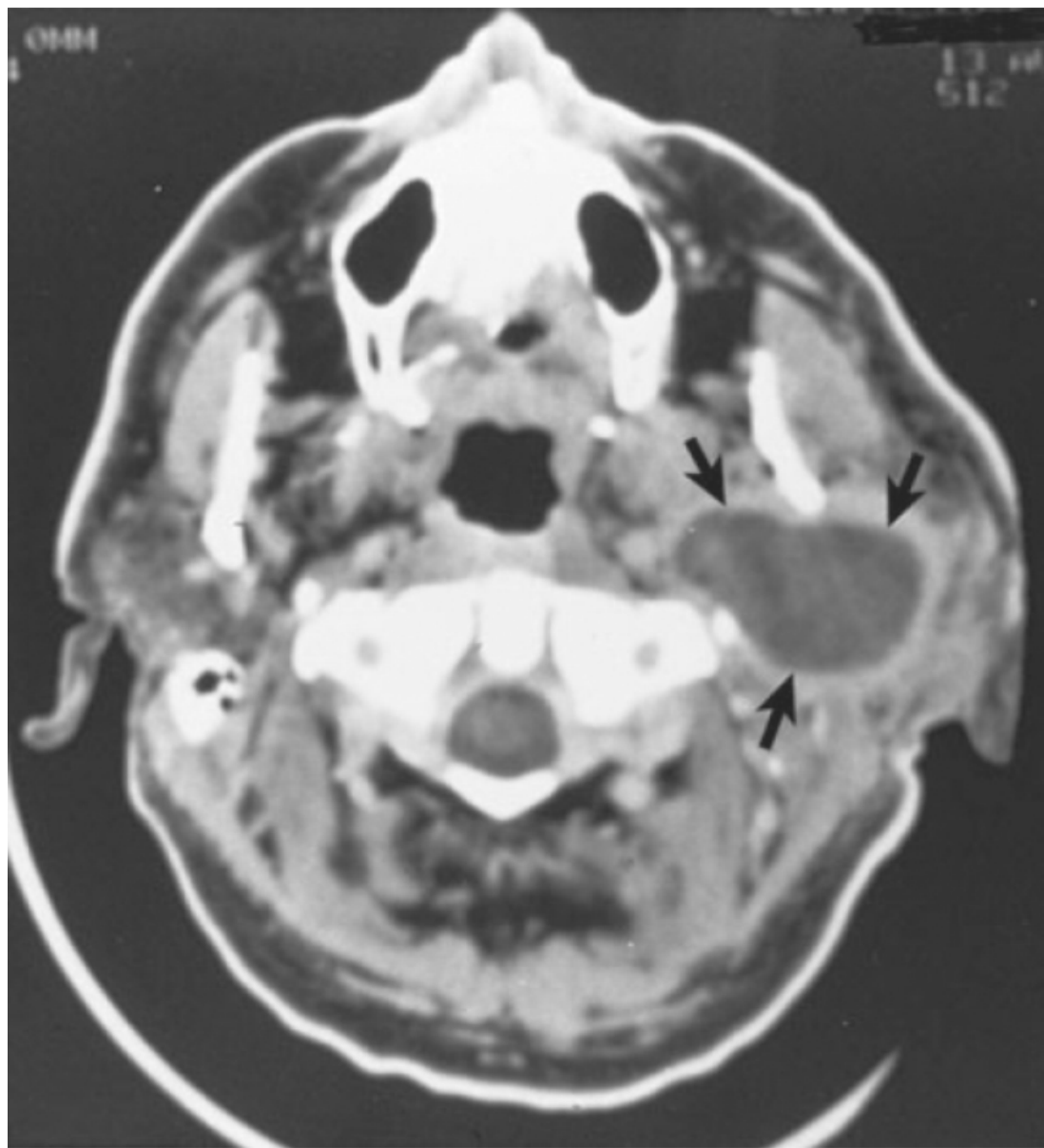


Figure 63-7 Axial computed tomography scan clearly demonstrating a dumbbell tumor (*arrows*) originating in the parotid and extending medially. It was a pleomorphic adenoma.

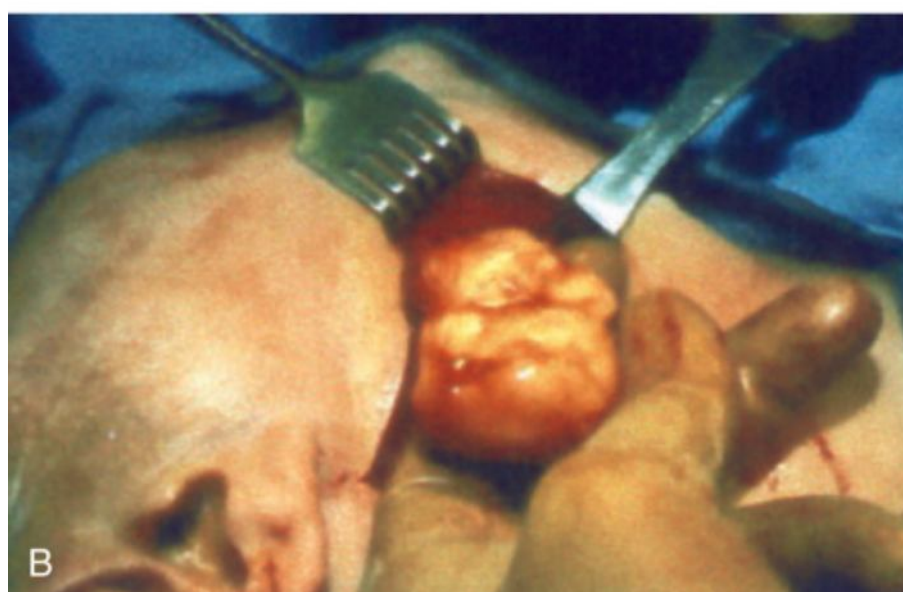
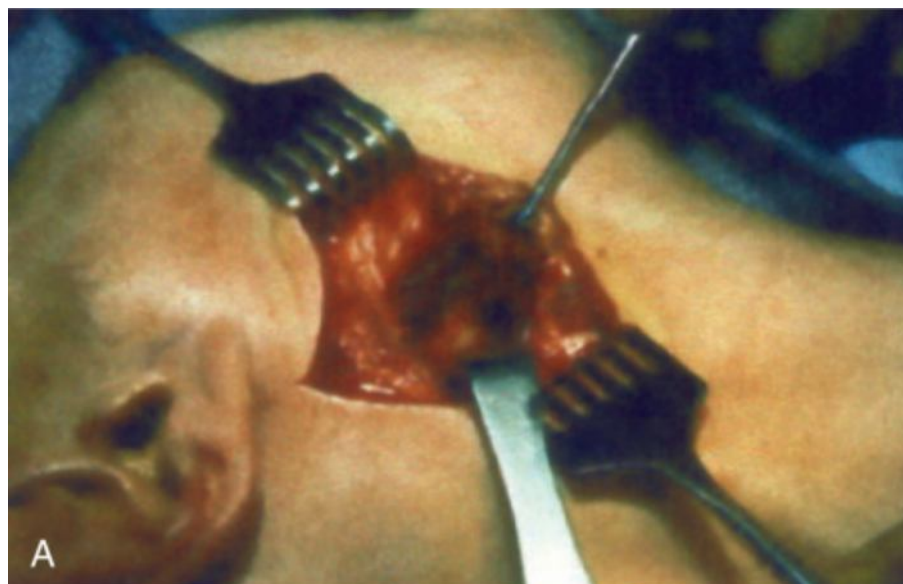


Figure 63-8 **A**, Relationship between the styloid process, the ascending ramus, the mandible, and the stylomandibular ligament. Some tumors develop in the deep lobe of the parotid gland and may extend through the stylomandibular tunnel into the parapharyngeal space. **B**, Deep lobe parotid tumor passing through the stylomandibular ligament into the parapharyngeal space.

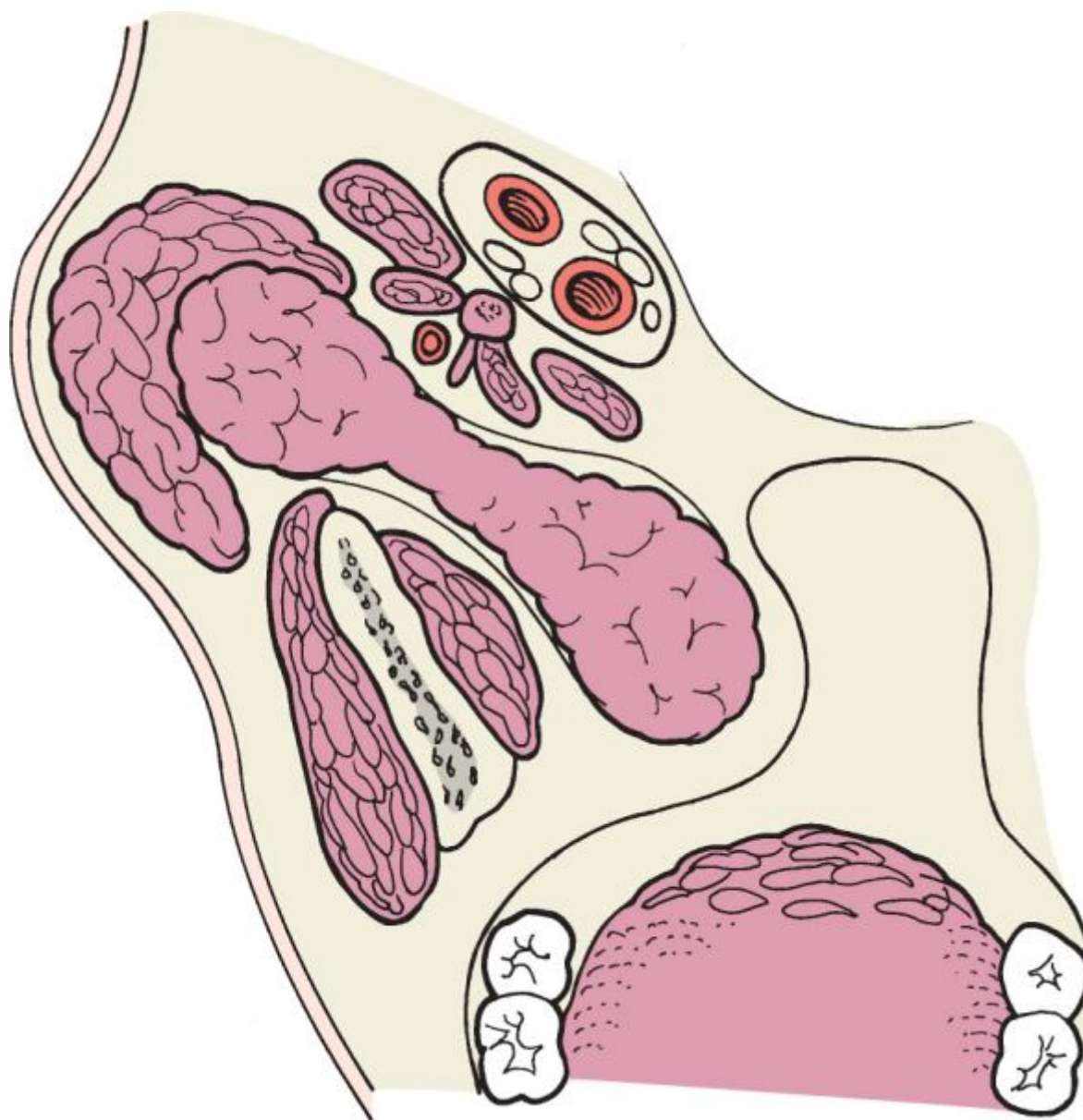


Figure 63-9 The confines of the stylomandibular tunnel tend to create an isthmus in deep lobe parotid tumors that gives them a characteristic dumbbell configuration.

Tumors arising from minor salivary glands or minor salivary gland rests in the parapharyngeal space are commonly diagnosed by displacement of the soft palate and lateral pharyngeal wall toward the midline. Bimanual examination facilitates clinical determination of the size and site. Imaging demonstrates the characteristic displacement of parapharyngeal fat; however, the presence of fat between the deep lobe of the parotid gland and the neoplasm confirms that the neoplasm arose independently of the parotid gland (Fig. 63-10).

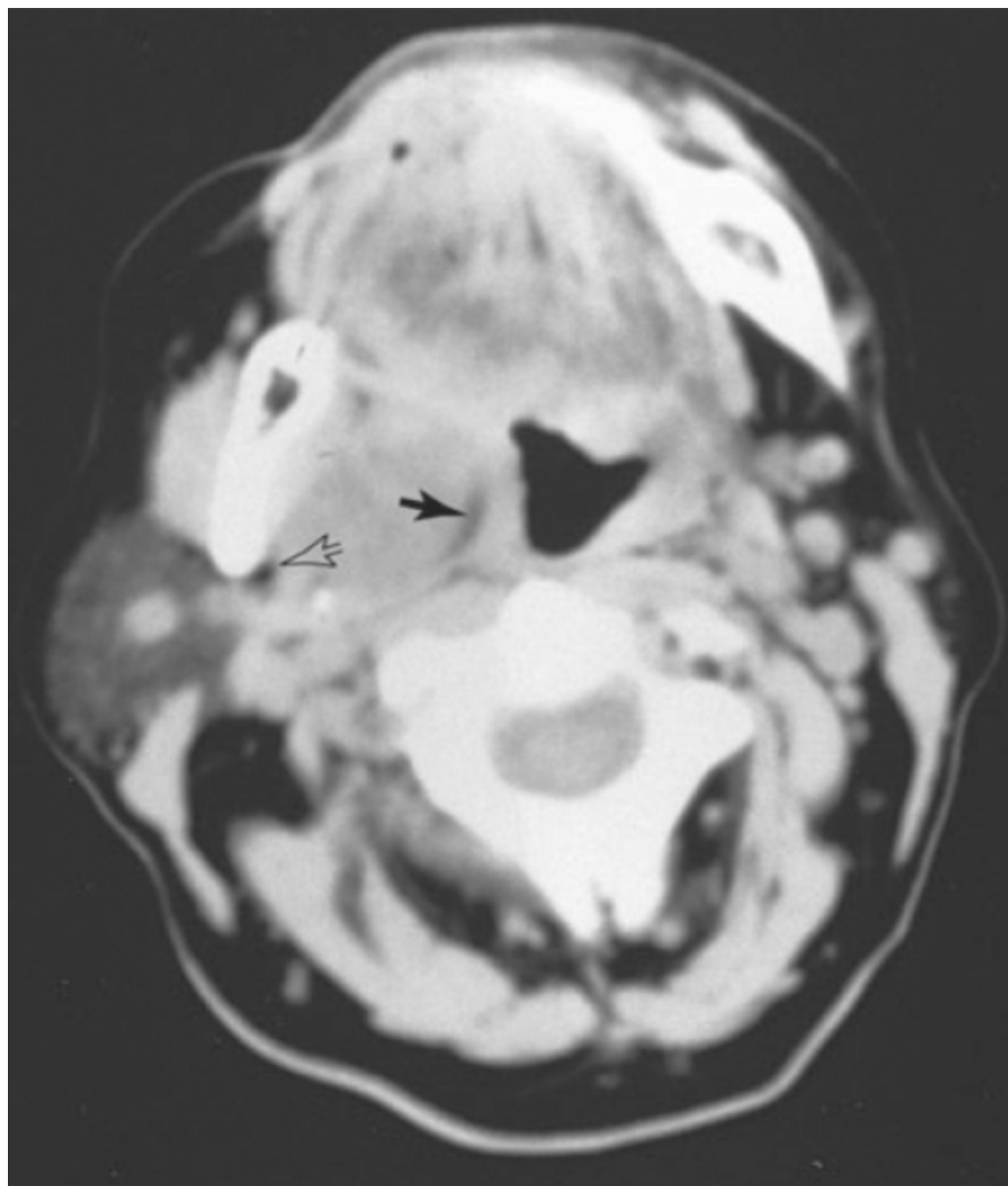


Figure 63-10 This pleomorphic adenoma displaced fat medially (*closed arrow*). Separation from the parotid gland (*open arrow*) is also noted.

Preoperative fine-needle aspiration biopsy of parapharyngeal space tumors is frequently undertaken. This technique requires the close cooperation of a skilled cytopathologist. Interpretation of the cytology should be closely correlated with the clinical findings. Transoral incisional biopsy of parapharyngeal space masses is to be discouraged. The possibility of inadvertent biopsy of a highly vascular tumor originating in the poststyloid parapharyngeal space can be minimized through initial use of contrast-enhanced imaging techniques; nonetheless, transmucosal biopsy invariably soils the mucosa with tumor, creates inflammation and adhesions, and compromises subsequent total tumor removal. We do not recommend preoperative incisional transoral biopsy of parapharyngeal space masses. This technique might be advocated only for tumors that are clearly atypical and therefore demand preoperative histologic establishment of the diagnosis.

SURGICAL APPROACHES

The PSPS is ideally approached with the transcervical-submandibular technique. A skin incision is developed approximately 2 to 3 cm inferior to the lower border of the mandible in a horizontal skin crease (Fig. 63-11). The incision is carried through subcutaneous tissue and the platysma, after which the mandibular branch of the facial nerve should be identified, elevated, and preserved. Identification of the anterior border of the sternomastoid muscle facilitates identification of the posterior belly of the digastric muscle, which is retracted inferiorly as the submandibular gland is reflected anteriorly (Fig. 63-12). This provides direct access to the PSPS and allows identification of the facial artery as it enters the submandibular space. The artery is divided and ligated so that the gland can be more fully retracted anteriorly. This provides access to the apex of the PSPS. Retractors are then used to facilitate blunt dissection of the mass from the adjacent soft tissue so that it can be delivered through the

wound and removed (Fig. 63-13). Delivery of very large tumors is facilitated by dividing the digastric tendon and then repairing it with suture. Pleomorphic adenoma does not invade surrounding soft tissue, and a cuff of normal tissue need not be excised. Efforts should, however, be made to preserve the capsule of the neoplasm intact. Should the capsule be violated, every effort should be made to remove all tumor and the wound should be copiously irrigated before closure.^[7,8] When tumor removal is complete and hemostasis is obtained, a suction drain is placed in the depths of the wound and brought out through a separate incision just adjacent to the incision. The wound is closed in layers and a dressing applied.

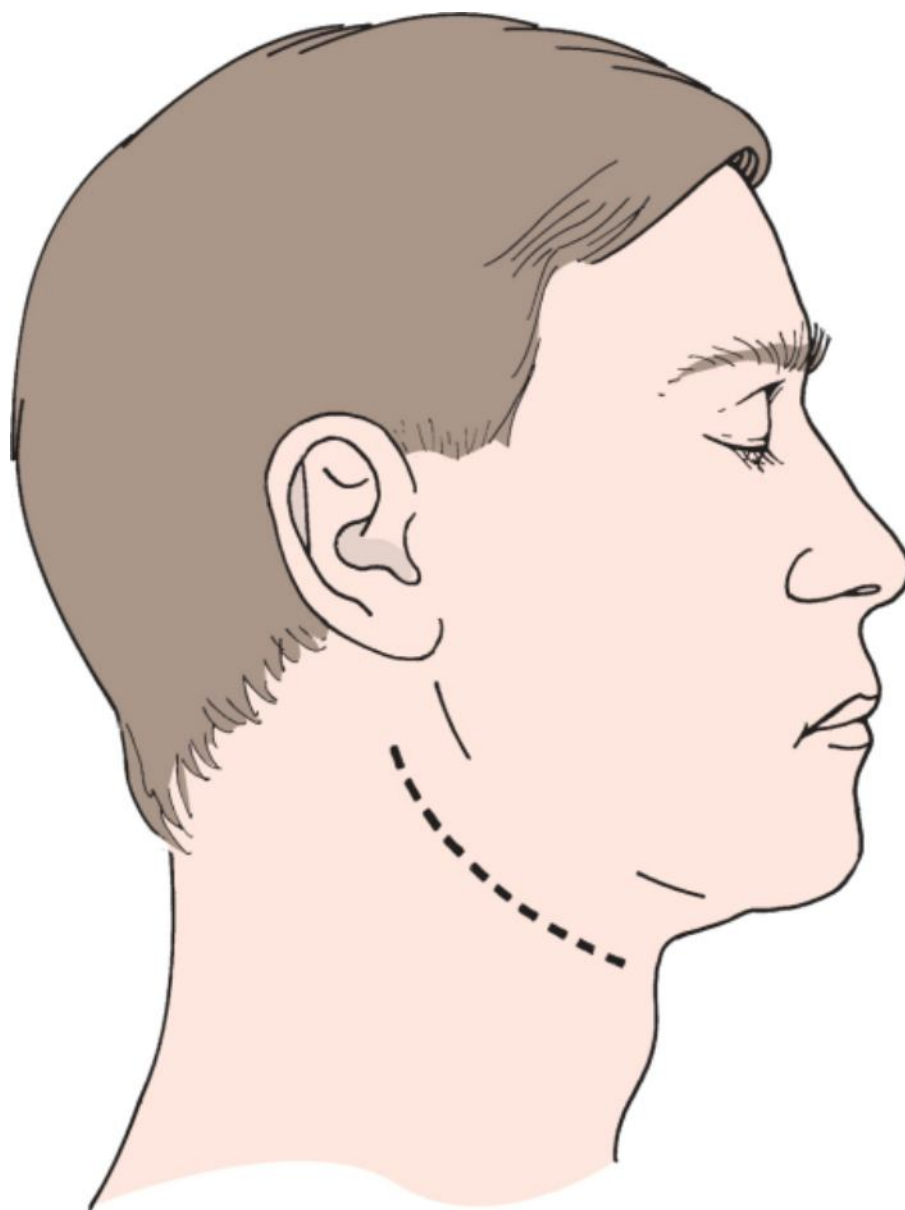


Figure 63-11 A horizontal incision in a submandibular skin crease affords adequate exposure to the parapharyngeal space.

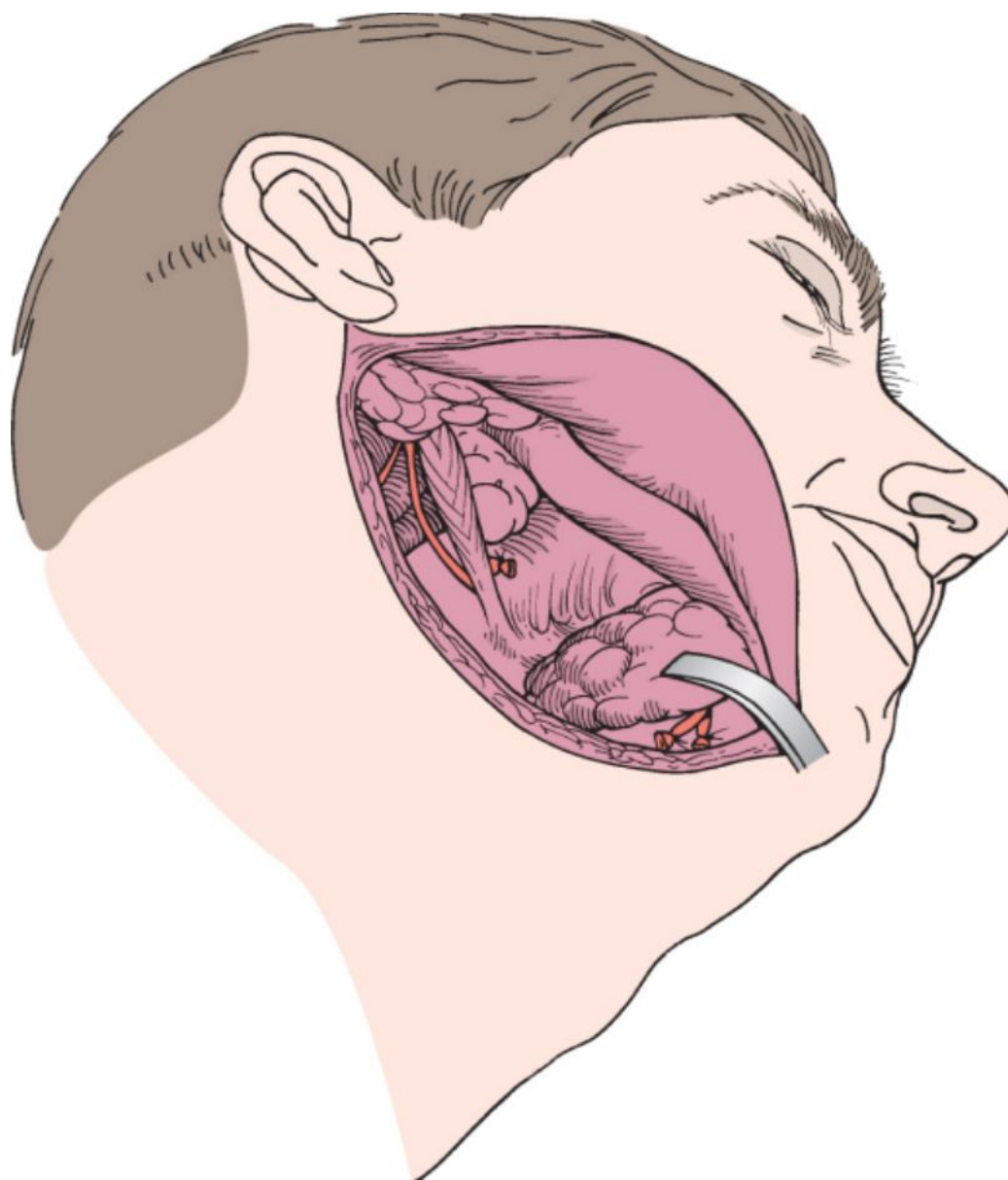


Figure 63-12 After ligation of the external branch of the facial artery, the submandibular gland is retracted anteriorly and the parapharyngeal space tumor is visible just anterior to the posterior belly of the digastric muscle.

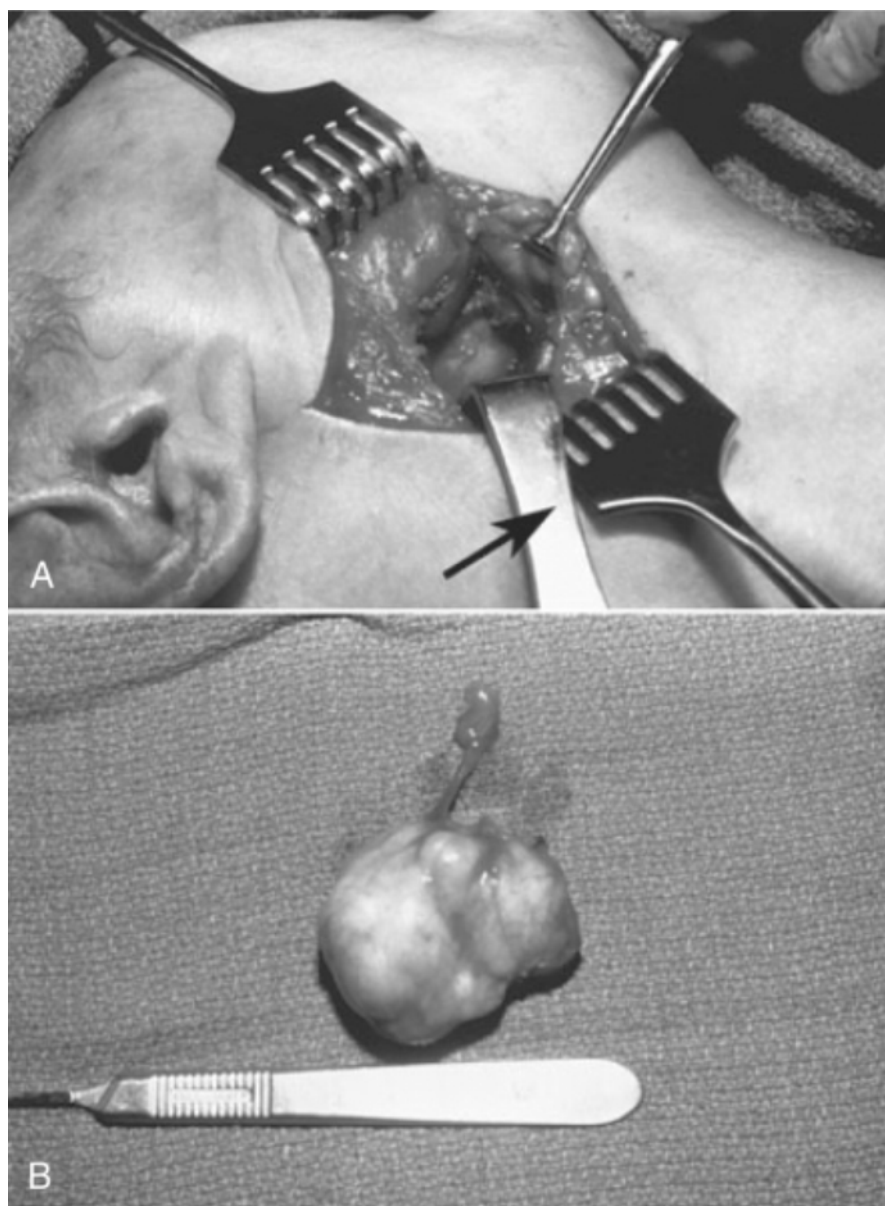


Figure 63-13 A, A submandibular incision has been used to expose the parapharyngeal space. An army-navy retractor (*arrow*) is retracting the submandibular gland. B, A benign pleomorphic adenoma was removed from the prestyloid parapharyngeal space. This lesion was not connected to the parotid gland.

Successful removal of a tumor arising from the deep lobe of the parotid gland is dependent on proper identification and dissection of the facial nerve. An incision is made anterior to the tragus around the earlobe into the postauricular area, and a horizontal submandibular skin incision is created to afford adequate exposure (Fig. 63-14). The skin flap is elevated and the facial nerve is identified. The superficial lobe of the parotid gland is mobilized off the facial nerve. This step is necessary to fully expose the facial nerve. The facial nerve is then carefully elevated with nerve hooks as the facial nerve is dissected free of the deep lobe of the parotid. With this maneuver the remaining medial aspect of the tumor can be dissected free and delivered into the wound. Occasionally, the stylomandibular ligament must be divided to allow sufficient access to the medial aspect of the tumor (Fig. 63-15). In patients with a benign parotid tumor, the superficial lobe of the parotid gland can be returned to its anatomic position and preserved. This maintains the normal contour of the face and reduces the incidence of Frey's syndrome.

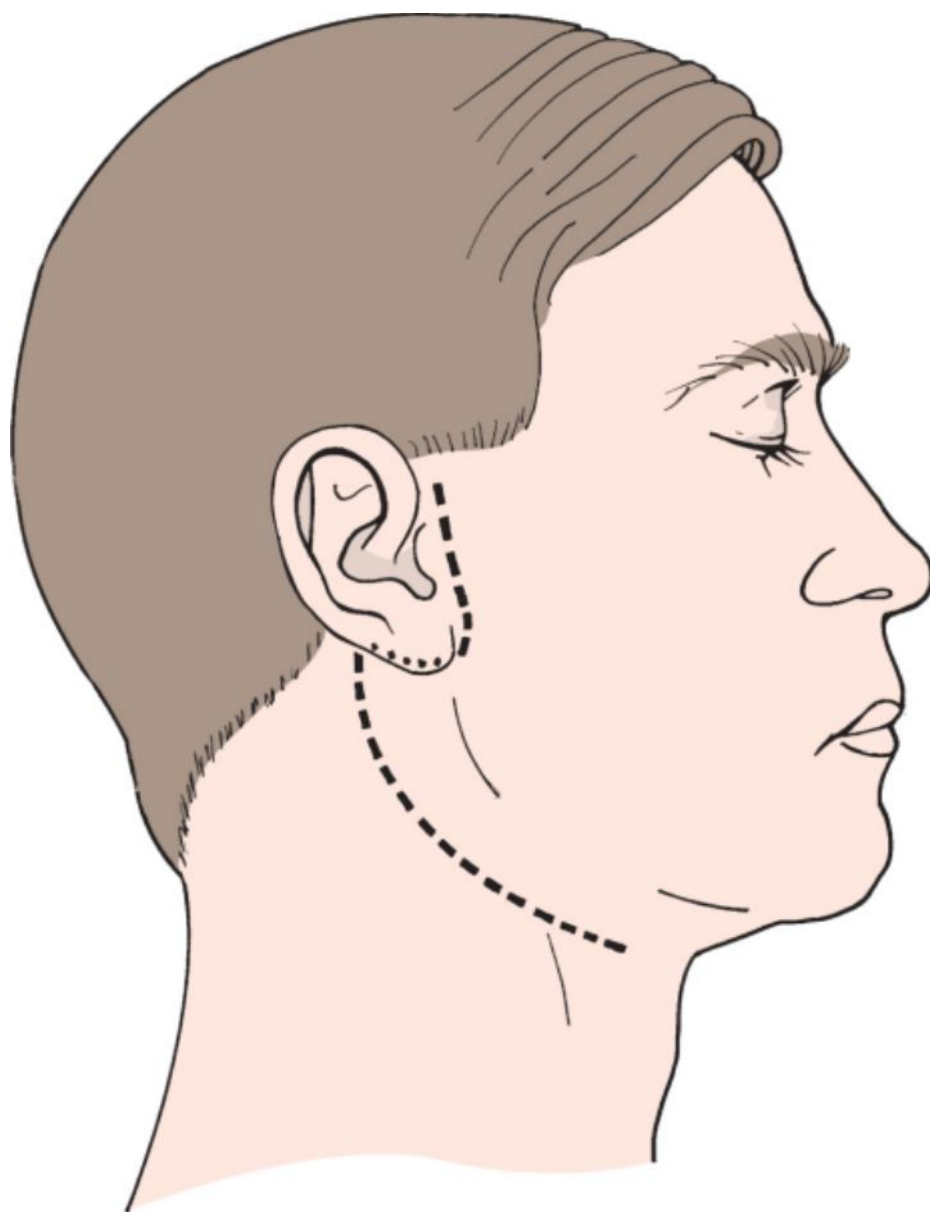


Figure 63-14 A horizontal submandibular incision is carried around the earlobe and up to the preauricular skin to afford exposure for superficial parotidectomy and simultaneous removal of a deep lobe parotid tumor.

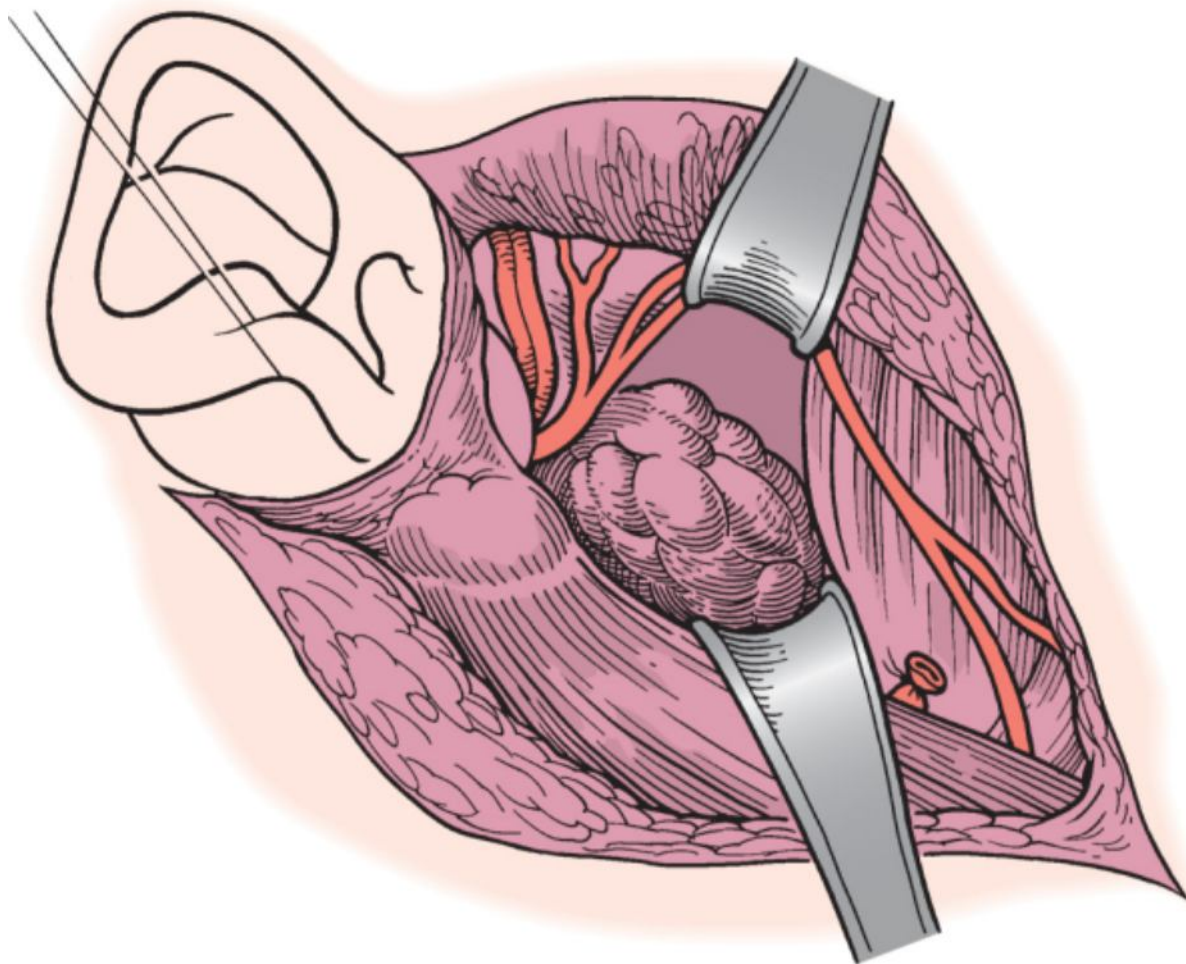


Figure 63-15 Subsequent to superficial parotidectomy, the facial nerve can be elevated and protected while the deep lobe tumor is removed. Note that the exposure is obtained just anterior to the posterior belly of the digastric muscle.

The literature is replete with descriptions of techniques by which exposure of the parapharyngeal space may be improved. The common technique is exposure through a mandibulotomy,^[9–14] which can be carried out either directly through the body of the mandible or anteriorly with retraction of the mandible laterally. The use of subcutaneous mandibulotomy may reduce the occurrence of facial scars.^[15] Alternatively, the temporomandibular joint can be disarticulated and the mandible displaced anteriorly. Our experience with many very large neoplasms of the parapharyngeal space suggests that a mandibulotomy is rarely necessary, especially with benign pleomorphic adenoma involving the deep lobe of the parotid gland or of minor salivary gland origin. Dumbbell tumors invariably require that the stylomandibular ligament be divided. Malignant tumors with involvement of the mandible, posterior aspect of the maxilla, or skull base represent special cases in which the procedure should be developed to afford three-dimensional excision (see Fig. 63-8). Further discussion of these issues is beyond the scope of this chapter and is presented in Chapter 101.

Infratemporal Fossa

PSPS neoplasms may achieve rather remarkable size before coming to the attention of either the patient or the physician. The amount of dissection required to free the facial nerve from the deep lobe of the parotid gland frequently results in temporary postoperative facial nerve paresis. Accordingly, patients requiring total parotidectomy should be counseled preoperatively that some degree of temporary facial paresis or paralysis is to be expected. We have encountered a benign pleomorphic adenoma that required mandibulotomy to achieve adequate exposure for removal. This technique does permit direct visualization of the carotid sheath and skull base and is an important addition to the surgical management of tumors of the poststyloid parapharyngeal space and tumors that are malignant or require resection of adjacent structures.

POSTOPERATIVE MANAGEMENT

Discharge from the hospital may take place several hours after the drains have been removed. Routine administration of perioperative antibiotics is not indicated unless the pharyngeal mucosa has been violated. A compressive cervical dressing frequently serves to coapt the superficial tissues and helps reduce dead space.

Removal of tumors from the PSPS creates a “dead space.” Patients may resume a soft diet as soon as they are comfortable enough to swallow. Drains are placed on wall suction, and drainage is monitored daily. Drains are discontinued when total drainage is less than 15 mL per 24 hours.

COMPLICATIONS

Hematoma is the most commonly encountered complication of PSPS surgery and can be avoided by meticulous hemostasis before closure. Ties placed on the facial artery are especially important and should be secure. The sudden development of a hematoma may compromise the oropharyngeal airway and may be considered an indication for tracheotomy.

The parapharyngeal space is closely related to many crucial anatomic structures. Nevertheless, trauma to the great vessels or cranial nerves is unusual and should not be anticipated. Critical to this assumption is accurate preoperative establishment of the site of origin of the tumor. Neuromas involving the vagus or cervical sympathetic chain originate in the poststyloid parapharyngeal space. These lesions must be distinguished preoperatively with modern imaging techniques. When neuromas are identified, the patient should be counseled that a postoperative nerve defect is to be expected.

Transoral excision of PSPS neoplasms has been advocated,^[16] but this technique is suited only to patients with neoplasms arising in salivary gland rests. The deep lobe of the parotid gland cannot be removed safely when undertaken transorally. Transoral excision does not afford the surgeon an opportunity to identify closely related neurovascular structures such as the facial nerve. Additionally, it compromises the wound through contamination with oral secretions. We continue to recommend that tumors involving the parapharyngeal space be removed through a transcervical approach.

First bite syndrome is the occurrence of facial pain at the initiation of a meal after parotid surgery. It is attributed to loss of sympathetic nerve function to the parotid and has been described after surgery on the PSPS.^[17] Medical management is of little help. Surgical cure requires a tympanotomy and excision of Jacobson's nerve in the middle ear.

PEARLS

- CT or MRI can reliably distinguish prestyloid parapharyngeal pathology from other entities.
- Salivary gland neoplasia accounts for the most commonly encountered pathology.
- The potential for metastasis to the prestyloid space should not be discounted.
- Excision of a deep lobe parotid tumor requires that the facial nerve be identified and mobilized.
- The lateral lobe of the parotid need not be excised in the case of a benign tumor of the deep lobe and may be returned to its anatomic position to preserve the contour of the face.
- Mandibulotomy is rarely necessary, even with removal of very large tumors in the PSPS.

PITFALLS

- Transoral biopsy of a parapharyngeal space tumor will contaminate the mucosa and make eventual resection more difficult.
- Failure to identify the marginal branch of the facial nerve may lead to permanent dysfunction of the lower lip.
- Failure to provide adequate postoperative drainage may necessitate performance of a tracheotomy.
- Attempted transoral excision of even benign pleomorphic adenoma is an error if the tumor is attached to the parotid or near the facial nerve.