



# Transcervical approach for removal of benign parapharyngeal space tumors



Patrick Sheahan, MB, MD, FRCSI (ORL-HNS)

*From the Department of Otolaryngology—Head & Neck Surgery, South Infirmity Victoria University Hospital, Cork, Ireland*

## KEYWORDS

Parapharyngeal space;  
 Pleomorphic adenoma;  
 Transcervical;  
 Salivary neoplasm

Tumors of the parapharyngeal space are rare. Owing to the deep location and minimal symptoms in early stages, they typically present at an advanced stage. Traditional transmandibular techniques of excision are associated with a high degree of morbidity, and low acceptance by patients for what is in most cases a benign condition. However, most of these tumors can be removed very elegantly via a transcervical approach, with minimal morbidity. This article presents our technique for transcervical removal of parapharyngeal tumors. Using this technique, the risk of complications is low, and oncologic outcomes are excellent.

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## Introduction

Tumors of the parapharyngeal space (PPS) are rare. Because of the deep location, these tumors usually have minimal symptoms during early stages and can grow to considerable size before diagnosis. Although most tumors are benign, surgery is recommended in most cases as the only way to definitively exclude malignancy, as well as to avert the risk of delayed malignant transformation, and prevent future symptoms from continued growth of the tumor with encroachment into the pharynx and airway.

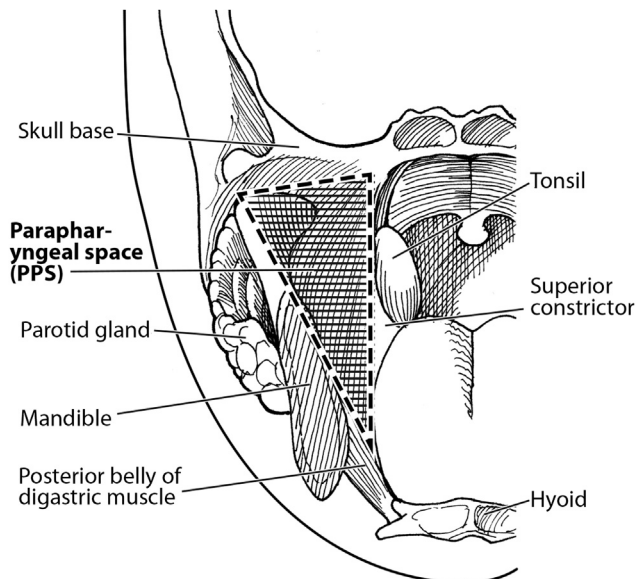
Traditional transmandibular techniques for removal of PPS tumors may be associated with significant morbidity and are often not very acceptable to patients with minimal symptoms. However, most PPS tumors can be removed very elegantly using a transcervical approach.

## Relevant anatomy and pathology

The PPS is shaped like an inverted pyramid, with its base above at the skull base, and limited inferiorly by the posterior belly of digastric (PBD) muscle. The medial boundary is the buccopharyngeal fascia covering the superior constrictor muscle, which separates the PPS from the pharynx, and the fascia covering the tensor veli palati and levator veli palati muscles. Anteriorly the PPS is limited by the posterior surface of the maxilla. Between the anterior and medial boundaries, it extends to the pterygomandibular raphe, between the superior constrictor and buccinator muscles. Anterolaterally, the PPS is limited by the medial pterygoid muscle and covering fascia, and the ramus of the mandible. Laterally it is continuous with the parotid space behind the mandible (Figure 1). Posteriorly, the PPS is limited by the prevertebral fascia. Conventionally, the PPS is divided into prestyloid and retrostyloid compartments, with the styloid process and attached muscles forming the posterior boundary of the prestyloid compartment. Recently, many authors have described the retrostyloid compartment, containing the carotid sheath and sympathetic trunk, as a separate space, known as the carotid space.<sup>1</sup> By this

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**Address reprint requests and correspondence:** Patrick Sheahan, MB, MD, FRCSI (ORL-HNS), Department of Otolaryngology—Head & Neck Surgery, South Infirmity Victoria University Hospital, Cork, Ireland.  
 E-mail address: Sheahan.patrick@sivuh.ie



**Figure 1** Coronal section of PPS showing location between parotid gland (laterally), pharynx, or tonsil (medially); digastric muscle (inferiorly); and skull base (superiorly).

definition, the PPS proper consists of the prestyloid compartment and contains fatty tissue, minor salivary glands, lymph nodes, and veins, as well as the internal maxillary artery (IMA), the ascending pharyngeal artery, and part of the mandibular division of the trigeminal nerve.

The PBD muscle forms the inferior boundary of the PPS, running from the hyoid bone to the inner surface of the mastoid process. It is always lateral and inferior to the facial nerve. The junction of the superior border of the PBD and the mastoid process is a most useful landmark for the point of exit of the facial nerve from the skull base at the stylomastoid foramen. The stylohyoid muscle runs along the upper border of the PBD to the tip of the styloid process. The surgeon should be aware that the origin of this muscle is medial to the facial nerve.

When dissecting in the PPS, it is useful to remember that the styloid process and attached muscles separate and protect the contents of the carotid space, including the internal carotid artery (ICA) and the internal jugular vein (IJV), from the prestyloid PPS.

The external carotid artery (ECA) runs through the deep lobe of parotid gland and divides into the IMA and the superficial temporal artery, within the substance of same. The IMA runs through the PPS deep into the ramus of the mandible and may require ligation during surgery in the PPS. The ECA frequently obstructs access to the PPS and may also require ligation for surgical access.

The most common pathologies in the PPS occur in the prestyloid compartment and are usually salivary gland tumors. In practice, it is often impossible to differentiate with certainty between tumors arising in minor salivary glands within the PPS from the parotid gland and tumors arising from the deep lobe of the parotid gland. Most are benign pleomorphic adenomas,<sup>2</sup> with malignant salivary tumors forming a minority. Other causes of tumors in the

PPS include metastatic nodes, lymphangioma, and atypical branchial cysts.

Owing to the deep location of the PPS, tumors in this location can grow to a considerable size before diagnosis, and many are found incidentally. The fixed lateral wall renders neck swelling as a late symptom. Occasionally, on oral examination, patients may present with incidental finding of a bulge of the lateral wall of the oropharynx (Figure 2). Because tumors of the PPS tend to be diagnosed at a later stage and bigger than tumors of the superficial parotid, the surgeon should be aware of the possible increased risk of carcinoma ex pleomorphic adenoma.

## Workup and surgical planning

Good cross-sectional imaging is essential in cases of PPS tumors. Magnetic resonance imaging and computed tomography (Figure 3) scanning are complementary, and most patients benefit from undergoing both of these modalities.

The first priority is to ascertain whether the tumor is arising in the prestyloid or retrostyloid compartment. This can be determined by noting the relationship with the styloid process. The relationship of the tumor to the ICA and IJV can help determine whether tumors of the retrostyloid space are arising from the vagus nerve or sympathetic trunk.<sup>3</sup> The medial pterygoid muscle should also be identified and is always anterolateral to PPS tumors. Tumors displacing the medial pterygoid posteriorly are arising in the masticator space (infratemporal fossa).

The surgeon should play close attention to the boundaries of the tumor. Most tumors appear radiologically to be well encapsulated and because of this are amenable to transcervical resection. Tumors with infiltrative margins or with destruction of adjacent bone are much more likely to be malignant and will not be suitable for transcervical approach.

In practice, it can be difficult to distinguish between tumors arising from the deep lobe of the parotid and growing into the PPS, and those arising primarily within the



**Figure 2** Bulging of right lateral oropharyngeal wall due to PPS tumour. (Color version of figure is available online.)

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