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Short Communication

# Transoral finger-retraction for surgical resection of benign tumors involving masseter muscle and buccal space

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## KEYWORDS

Accessory parotid pleomorphic adenoma;  
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Finger retraction;  
Intramasseteric schwannoma;  
Mid-posterior cheek

**Abstract** The regular treatment of tumors involving masseter muscle and buccal space like accessory parotid pleomorphic adenoma is performed with external approaches including parotidectomy and facelift incision, which require a large flap elevation and leave an external scar. The current study aimed to revisit the clinical features of the benign tumors involving masseter muscle and buccal space in the mid-posterior cheek region and presented a case series of the patients ( $n = 10$ ) who underwent surgical resection by transoral finger-retraction. The accessory parotid pleomorphic adenoma ( $n = 4$ ) and hemangioma ( $n = 3$ ) were a little bit more in this region. We focused on the surgical procedure of very rare masseteric schwannoma, due to the deep localization of the masseteric mass in the intraoral space. Transoral finger-retraction as a supplemental surgical technique was used to allow for the tumor involving the masseteric and buccal spaces to be delivered into the oral cavity for complete resection. The use of a facial nerve monitoring during the surgical dissection was also recommended. Collectively, this report demonstrated the ability to adequately and safely resect

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tumors involving masseter muscle and buccal space using a transoral approach facilitated by finger retraction, with better cosmetic results and without visible scar formation.

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## Introduction

Various masses involving masseter muscle and buccal space can arise from different tissues in the mid-posterior cheek region; for examples, masseteric schwannoma, accessory parotid tumor, vascular malformation, lipoma can originate from neurogenic tumor, salivary structure, vasculature, and adnexa.<sup>1–4</sup> Surgical excision is optimal management of the mass in this region, and a majority of the masses are benign tumors.<sup>1</sup> Given this region facial nerve–mass relationship is complicated, a standard parotidectomy incision with added extensions superiorly into the hair-bearing portion of the scalp and inferiorly into an upper cervical crease is widely used as advocated.<sup>1,5</sup> Take accessory parotid gland tumor for example. The regular treatment of accessory parotid gland tumor is radical excision, carried out with external approaches including parotidectomy and facelift incision.<sup>1</sup> Although external approaches allow a good control over the anterior facial nerve's branches and Stensen's duct, they require a large flap elevation and leave an external scar.

Recently, incision through intra-oral approach for masseteric and buccal space lesions were reported in a few cases.<sup>6–10</sup> The current study aimed to revisit the clinical features of the benign tumors involving masseter muscle and buccal space in the mid-posterior cheek region and presented a case series of the patients ( $n = 10$ ) who underwent surgical resection by transoral finger-retraction. We discussed the optimal approach to the benign tumors in mid-posterior cheek region based on the results obtained in these patients and review of the literature.

## Materials and methods

The available cases of the tumors involving masseter muscle and buccal space who attended the Department of Oral and Maxillofacial Surgery, Shanghai Ninth People's Hospital, Shanghai, China were collected and retrospectively reviewed by the authors. These cases who had a mass in the mid-posterior cheek were diagnosed as a benign tumor based on clinical examination and ultrasonographic or radiographic examination at the authors' clinic. The following data were collected by the same professional: age, gender, clinical characteristics, ultrasonographic and radiological features, treatment, and outcomes. In this retrospective analysis, the case who underwent surgery by transoral excision approach was included and the one who did through external approach including parotidectomy or facelift incision was excluded. This study was approved by the Institutional Review Board of Shanghai Ninth People's Hospital (SH9H-2021-T106-2).

## Results

### Clinical features and diagnosis

In this report, 10 cases of benign tumor involving masseter muscle and buccal space in the mid-posterior cheek region were included and retrospectively analyzed. Baseline characteristics of these cases are presented in Table 1. The accessory parotid pleomorphic adenoma ( $n = 4$ ) and hemangioma ( $n = 3$ ) were a little bit more in this region. We reported 3 cases of uncommon tumors, including 1 case of schwannoma derived from the masseter muscle, 1 case of hamartoma and 1 case of lipoma derived from buccal space of over months or years duration. They often presented with a chief complaint of a painless mass with or without the facial swelling, which may progress in size over few months. They denied prior history of any craniomaxillofacial trauma, surgical procedures, or facial cosmetic procedures within this region. Facial movements were normal, and any other symptoms were not found in oral cavity including Wharton's papillae. On physical examination, a soft or moderate texture, mobile, nontender, and ovoid mass was palpated in the mid-posterior cheek of about 1–4 cm in its diameter. Importantly, the mass could be palpated intraorally by bimanual examination. Ultrasonography often showed an oval-shaped, well-demarcated, and non-pulsatile mass involving masseter muscle and buccal space. Preoperative contrast-enhanced computed tomography (CT) or magnetic resonance imaging (MRI) usually showed an oval-shaped and well-circumscribed tumor in this region (Fig. 1A and B), without infiltration of the surrounding structures. Moreover, fine-needle aspiration cytology can be of diagnostic value for the exclusion of the malignancy.

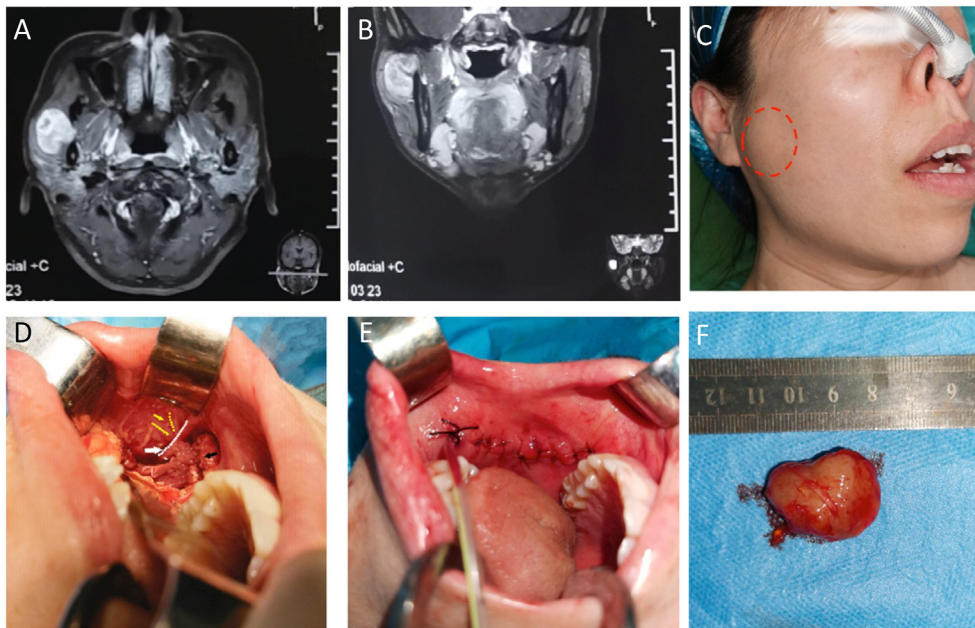
### Surgery strategy and outcome

Given the benign diagnosis of the tumor and patient's cosmetic expectation, the decision was made to offer transoral surgical resection under general anesthesia via nasotracheal intubation (Fig. 1C). We herein took the surgical procedure of very rare masseteric schwannoma (case 1) as an example, since surgical resection of accessory parotid gland tumors has been reported in some cases.<sup>8,9</sup> To begin with, facial nerve monitoring leads were placed in the distal muscles for continuous monitoring of the marginal mandibular, zygomatic, and buccal nerves. To provide a good view of the oral cavity, a Crowe-Davis mouth gag was placed and the orifice of Stensen's duct was identified. A vertical incision of the oral mucosa was then made posteriorly to the orifice of Stensen's duct. The oral mucosal flap

**Table 1** Baseline characteristics of the present cases of tumor involving masseter muscle and buccal space.

Case	Age (y)	Gender	Tumor location	Assistant examination	Tumor size (cm)	Diagnosis
1	45	Female	Masseter muscle	USG, MRI, FNAC	2.9*2.7*2.6	Schwannoma
2	35	Female	Buccal space	USG, CT	2.1*2.0*1.8	Hamartoma
3	41	Male	Buccal space	USG, MRI	1.9*1.8*1.5	Lipoma
4	21	Female	Accessory parotid gland	USG, CT	2.5*2.4*1.8	Pleomorphic adenoma
5	73	Female	Accessory parotid gland	USG, CT	2.3*1.5*1.3	Pleomorphic adenoma
6	42	Male	Accessory parotid gland	USG, CT	2.2*2.0*1.7	Pleomorphic adenoma
7	53	Female	Accessory parotid gland	USG	1.4*1.2*1.1	Pleomorphic adenoma
8	43	Female	Masseter muscle	USG, MRI	2.1*1.2*1.0	Hemangioma
9	26	Female	Masseter muscle	USG, MRI	1.8*1.6*1.5	Hemangioma
10	29	Male	Buccal space	USG, MRI	1.5*1.4*1.1	Hemangioma

USG, ultrasonography; MRI, magnetic resonance imaging; CT, computed tomography; FNAC, fine-needle aspiration cytology.



**Figure 1** Description of a 45-year-old female patient with intramasseteric schwannoma. (A) Axial and (B) coronal contrast-enhanced magnetic resonance imaging showing a subcutaneous oval-shaped and well-circumscribed mass within the masseter muscle with heterogeneous enhancement. (C) Patient's tumor location (red ovoid dotted line) under general anesthesia via nasotracheal intubation. (D) Surgical bed after resection with Stensen's duct (white dotted line) and facial nerve branches (yellow dotted line). (E) Wound closure with buccal fat pad grafted into space. (F) Surgical specimen with intact capsule. (For interpretation of the references to color in this figure legend, the reader is referred to the Web version of this article.)

was elevated, and buccal fat pad below oral mucosa was bluntly dissected. The anterior parts of masseter muscle were exposed, and muscle above the mass was bluntly dissected to the minimum extent required. Once the tumor capsule was identified, transoral retraction displaced the tumor from masseteric space into buccal space using the extraoral fingers of the other hand. Careful, blunt dissection continued posteriorly underneath the masseteric fascia and demarcation of the mass was complete. The branch of the facial nerve and Stensen's duct in close contact with the mass were identified (Fig. 1D), and it was preserved using blunt dissection. Once the mass was freed anteriorly, the posterior aspect of the lesion was bluntly dissected using intraoral fingers. Expectably, the mass was removed in an en bloc fashion (Fig. 1F). Finally, buccal fat pad was

grafted into the buccal space and the wound was closed (Fig. 1E). The histologic diagnosis was consistent with masseteric schwannoma. The postoperative course was uneventful without complications, and facial nerve function was normal and symmetric. Six months postoperatively, the patient underwent a follow-up visit that found no complications or signs of neurologic dysfunction and local relapse.

## Discussion

Generally, it is difficult to diagnose the nature of the mass based on clinical and radiologic information in the mid-posterior cheek region. Complete surgical excision is

considered the standard management. In this report, we retrospectively review 10 cases of benign tumor involving masseter muscle and buccal space in the mid-posterior cheek region. The present report provides support for transoral finger-retraction surgical resection of benign tumors involving masseter muscle and buccal space, with identification of the facial nerve and Stensen's duct at the time of surgical incision and favorable cosmetic results and without an external skin scar and facial paralysis or tumor recurrence. Accessory parotid pleomorphic adenoma, hemangioma, and lipoma in this lipoma have been described in isolated case reports.<sup>1–3</sup> In this report, we focus on the surgical procedure of very rare masseteric schwannoma. Due to the deep localization of the masseteric mass in the intraoral space, it is considerably difficult to excise it from the masseter muscle compared to accessory parotid gland and buccal space. The transoral approach to the mass involving masseter muscle and buccal space may be initially rejected because the working space and the exposure are limited in the oral cavity, and the facial nerve branch is located almost behind the mass. Resection of such benign tumors can be achieved with less neurologic dysfunction with a nerve monitoring system.

Transoral finger-retraction represents a supplemental surgical technique that allows for mass involving the masseteric and buccal spaces to be delivered into the oral cavity for complete resection. Encapsulated benign tumors such as schwannoma and pleomorphic adenoma allow for such technique. Potential contraindications to apply the technique may be cases of large-sized tumors, tumors suspected of being malignant, and tumors localized to the posterior accessory parotid gland. It is essential that proper preoperative evaluation includes a careful physical examination, ultrasonographic and radiologic (contrast-enhanced MRI or CT scan) examination, and/or fine-needle aspiration cytology. Importantly, encapsulated benign tumors are often of the well-demarcated and relatively mobile features. In addition, relative loose and less fat and muscle tissues are beneficial to pushing the tumor and delivering the location into oral cavity. In well-selected benign mid-posterior cheek cases, the transoral finger-retraction surgical resection approach allows the excision of tumors involving masseter muscle and buccal space with better cosmetic results, if compared to the transcutaneous external approach, without visible scar formation and facial asymmetry.

In conclusion, this report demonstrates the ability to adequately and safely resect tumors involving masseter muscle and buccal space using a transoral approach facilitated by finger retraction. Key points to consider when

operating on these tumors include: 1) the diagnosis of benign tumor is made by cautious preoperative evaluation; 2) transoral finger-retraction allows for tumors involving the masseteric and buccal spaces to be delivered into the oral cavity. 3) To reducing the risk of any nerve injuries, the use of a facial nerve monitoring during the surgical dissection is recommend.

## Declaration of competing interest

The authors have no conflicts of interest relevant to this article.

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