Case Report

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Intraoral surgical management of dermoid cysts of the floor of the mouth: report of three cases

Ana Carolina Plado Barreto de Almeida [1], Bruno Teixeira Gonçalves Rodrigues [1], Paulo José D'Albuquerque Medeiros [1], Henrique Martins da Silveira [1], Thaís Pimentel de Sá Bahia [1], Ramiro Beato Souza [1], Fábio Ramoa Pires [2], Danilo Passeado Branco Ribeiro [1]

[1] Oral & Maxillofacial Surgery, Pedro Ernesto University Hospital, Rio de Janeiro State University, Rio de Janeiro, Brazil.
[2] Oral Pathology, Department of Diagnosis and Therapeutics, Dental School, Rio de Janeiro State University, Rio de Janeiro, Brazil.

* Corresponding Author: Ana Carolina Plado Barreto de Almeida – Pedro Ernesto University Hospital – Rio de Janeiro State University - Boulevard 28 de Setembro, 77 - Vila Isabel, Rio de Janeiro - RJ, Brazil. Zip Code: 20551-030. Email: anacarolinaplado@gmail.com

Authors: https://orcid.org/

Ana Carolina Plado Barreto de Almeida[1] (ORCiD: 0000-0003-0901-636X)
Bruno Teixeira Gonçalves Rodrigues[1] (ORCiD: 0000-0001-7678-2588)
Paulo José d'Albuquerque Medeiros[1] (ORCiD: 000-0001-7629-0698)
Henrique Martins da Silveira[1] (ORCiD: 000-0001-0882-9909)
Thaís Pimentel de Sá Bahia[1] (ORCiD: 0000-0001-7060-0560)
Ramiro Beato Souza[1] (ORCiD: 0000-0003-3935-3295)
Fabio Ramoa Pires[2] (ORCiD: 0000-0003-0317-8878)
Danilo Passeado Branco Ribeiro[1] (ORCiD: 0000-0001-7629-0698)

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ABSTRACT

Introduction: Dermoid cysts (DC) are uncommon developmental lesions that rarely occur in the oral cavity. The floor of the mouth is the most frequent intraoral location, where these lesions may present diagnostic and therapeutic challenges because of their variable clinical and radiographic features. **Case Series:** This study reports three cases of DC involving the floor of the mouth. The patients were aged 16, 23, and 30 years and presented with painless swellings of varying duration. Clinical examination and imaging studies, including ultrasonography, computed tomography, and magnetic resonance imaging, were used for diagnostic assessment. In one case, the lesion was initially interpreted as a plunging ranula, highlighting the challenges associated with the differential diagnosis of cystic lesions in this region. Aspiration contributed to the preoperative diagnosis by revealing characteristic cystic contents. All lesions were treated by complete surgical excision through an intraoral approach under general anesthesia. Histopathological examination confirmed the diagnosis of DC in all cases. No postoperative complications or recurrences were observed during follow-up. **Conclusion:** DC should be considered in the differential diagnosis of cystic lesions of the floor of the mouth. Comprehensive diagnostic assessment and complete surgical excision provide favorable outcomes with a low risk of recurrence.

Keywords: Dermoid cyst; Mouth floor; Oral surgical procedures; Differential diagnosis.

Clinical Significance

Dermoid cysts should be considered in the differential diagnosis of cystic lesions of the floor of the mouth. Comprehensive preoperative assessment, including clinical examination and imaging studies, is essential for accurate diagnosis and surgical planning. These cases demonstrate that even large lesions may be successfully managed through an intraoral approach, avoiding external scars and achieving favorable outcomes.

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INTRODUCTION

Dermoid cysts (DCs) are uncommon benign developmental lesions that may arise from ectodermal tissue entrapped during embryonic fusion. Although they may occur throughout the body, involvement of the oral cavity is rare, and the floor of the mouth is the most frequent intraoral site[1]. Clinically, these lesions usually present as slow-growing, painless swellings and are often diagnosed during the second and third decades of life[1-4]. Larger lesions may elevate the tongue and interfere with speech, swallowing, or airway patency, making accurate diagnosis and appropriate surgical planning particularly important[4,5].

Imaging plays an important role in evaluating floor-of-mouth cystic lesions because it helps define lesion extent, internal characteristics, and, particularly, the relationship to the mylohyoid muscle and adjacent spaces[4,6-7]. These anatomical relationships influence the choice between intraoral and extraoral surgical access. The differential diagnosis includes ranula or plunging ranula, epidermoid cyst, thyroglossal duct cyst, lymphatic malformation, and other cystic lesions of the floor of the mouth[,1-3]. Definitive classification relies on histopathological examination after excision[1].

Complete surgical excision is the treatment of choice, and the relationship of the lesion to the mylohyoid muscle is traditionally considered a major determinant of surgical access[4,6]. An intraoral approach is generally preferred for lesions located above the mylohyoid muscle, whereas an extraoral approach may be considered for lesions located below the muscle or extending into the submental or submandibular spaces[4,6-9]. However, lesion size and extension beyond the sublingual space do not necessarily preclude intraoral excision, and the optimal approach should be individualized according to the anatomical characteristics and surgical accessibility of the lesion[9].

Although DCs and their surgical management are well described, the selection of an intraoral approach for large or anatomically extensive lesions remains a clinically relevant challenge. Herein, we report three floor-of-mouth DCs treated through an intraoral approach and describe their clinical, imaging, surgical, and histopathological features.

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CASE REPORT

Case 1

A 30-year-old male patient with no significant medical history presented with a painless swelling involving the submandibular and submental regions (Figure 1A). According to the patient, the lesion had progressively enlarged over approximately three years. He denied dysphagia, dyspnea, masticatory difficulties, or other functional impairment, but reported considerable aesthetic concern. Intraoral examination revealed a soft, well-circumscribed mass occupying the floor of the mouth (Figure 1B), without tenderness or signs of infection. The patient presented at the first consultation with previously obtained computed tomography (CT) and magnetic resonance imaging (MRI). These examinations demonstrated a large, well-defined cystic lesion predominantly involving the sublingual space, with superior displacement of the tongue and extension into the ipsilateral submandibular space (Figure 1C,D). Complementary ultrasonography (US) with Doppler was performed during the first evaluation at our clinic because the modality was readily available for real-time assessment. US demonstrated a predominantly echogenic lesion measuring approximately 8.4 × 4.0 × 4.8 cm, without detectable internal vascularization. Taken together, the clinical and imaging findings initially favored a plunging ranula, particularly because of the cystic appearance and extension toward the submandibular space. Aspiration was therefore performed to further assess the nature of the lesion contents and whether the lesion was cystic or solid. Aspiration yielded dark-yellow fluid with a gross keratinaceous appearance; the aspirated material was not submitted for cytological examination. The findings prompted reconsideration of the initial differential diagnosis, with a DC subsequently included as a diagnostic possibility.

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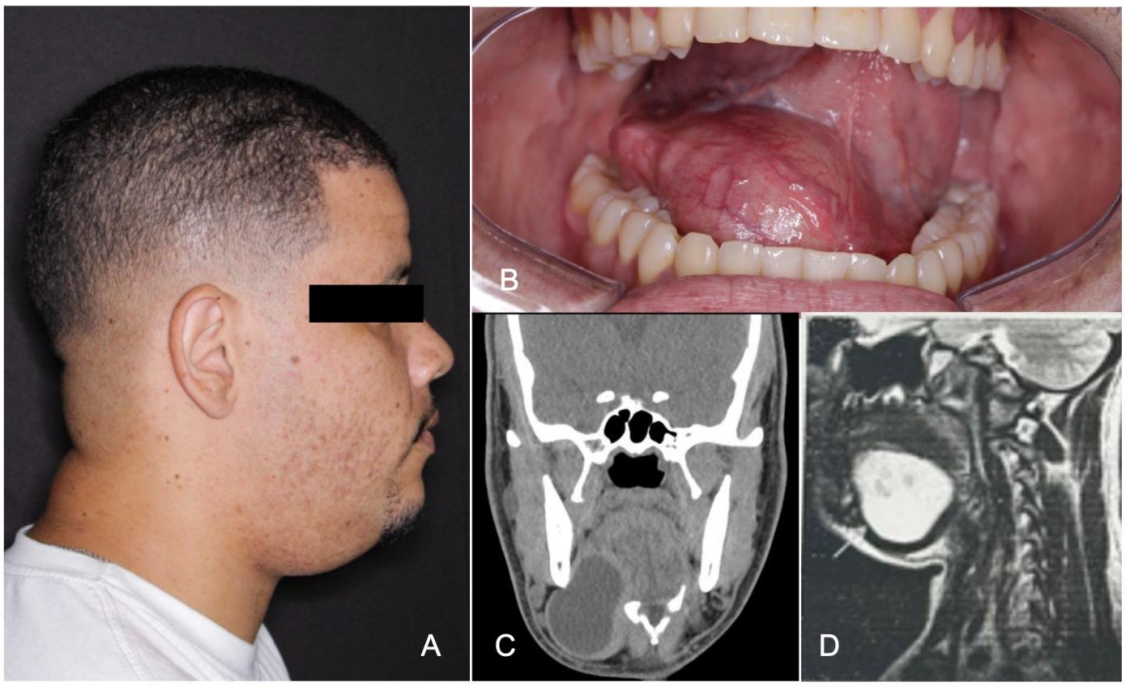


Figure 1. Clinical presentation and computed tomography findings of Case 1. (A) Extraoral exam demonstrating a prominent swelling of the submandibular and submental regions. (B) Intraoral examination showing a large lesion occupying the floor of the mouth and causing superior displacement of the tongue. (C) Coronal CT section demonstrating a well-circumscribed, low-density cystic lesion involving the floor of the mouth and extending into the right submandibular space. (D) Sagittal MRI section confirming the extent of the lesion and its relationship to adjacent anatomical structures.

Considering the prominent and surgically accessible intraoral component, the predominantly supramylohyoid location and the preoperative assessment of lesion extent, complete excision through an intraoral approach was selected despite the lesion size and submandibular extension. Under general anesthesia, a linear incision was made in the floor-of-mouth mucosa overlying the swelling and extended along the lesion. Careful blunt dissection was performed inferiorly, with attention to preserving relevant neurovascular and salivary duct structures; small vessels were ligated when necessary. A well-defined cleavage plane was identified around the lesion, allowing progressive mobilization of its inferior component and extension toward the submandibular space. The cyst was removed completely together with its capsule, without capsular rupture or spillage of its contents. No

significant intraoperative bleeding occurred, and no drain was required. The wound was closed in layers to minimize dead space and reduce the risk of hematoma formation. Histological examination of the surgical specimen confirmed the diagnosis of DC. The postoperative course was uneventful, and no evidence of recurrence was observed during the 6-month follow-up period.

Case 2

A 23-year-old male patient presented with a painless swelling in the floor of the mouth that had progressively increased in size over a five-month period. Extraoral examination revealed bilateral submandibular enlargement (Figure 2A), while intraoral examination demonstrated a well-defined mass occupying the floor of the mouth and elevating the tongue (Figure 2B-C). MRI revealed a well-circumscribed cystic lesion located superior to the mylohyoid muscle, between the genioglossus muscles and the oral mucosa, suggesting a DC or epidermoid cyst (Figure 2D). Based on its supramylohyoid location and accessible intraoral component, complete excision under general anesthesia through an intraoral approach was performed. The excised specimen measured approximately 6.0 cm in its greatest dimension (Figure 2E). Histopathological examination of the specimen confirmed the diagnosis of DC. The postoperative course was uneventful, and no recurrence was observed during the one-year follow-up period.

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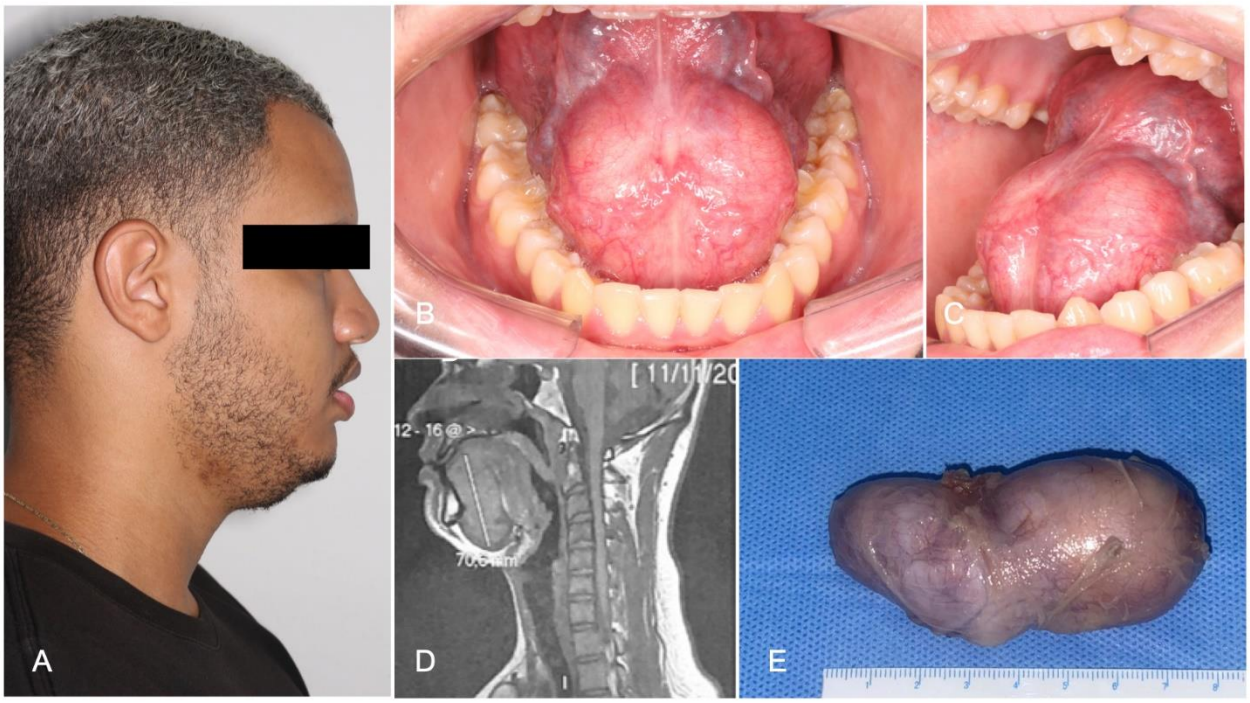


Figure 2. Clinical, radiographic, and histopathological findings of Case 2. (A) Extraoral exam showing mild submandibular volume swelling. (B,C) Intraoral view demonstrating a large, well-circumscribed swelling occupying the floor of the mouth and causing superior displacement of the tongue. (D) Sagittal magnetic resonance image revealing a well-defined cystic lesion located superior to the mylohyoid muscle. (E) Gross specimen after surgical excision through intraoral approach.

Case 3

A 16-year-old female patient presented with a painless swelling in the sublingual region. No extraoral swelling, cervical enlargement, or facial asymmetry was observed (Figure 3A). Intraoral examination revealed a well-defined, midline swelling occupying the floor of the mouth and causing elevation of the tongue (Figure 3B). Based on the clinical presentation and anatomical location, a developmental cyst, particularly a DC or epidermoid cyst, was considered among the main diagnostic possibilities, while ranula and lymphatic malformation were included in the differential diagnosis. Preoperative MRI was performed to assess the extent of the lesion and its relationship to adjacent anatomical structures and contributed to surgical planning. Based on the clinical and preoperative imaging assessment,

an intraoral approach was selected. Under general anesthesia, the lesion was completely excised through an intraoral approach (Figure 3C,D). The cyst was removed intact, and the gross specimen measured approximately 7.0 cm in greatest dimension. Histopathological examination of the surgical specimen confirmed the diagnosis of DC. The postoperative course was uneventful, with no evidence of recurrence during the one-year follow-up period.

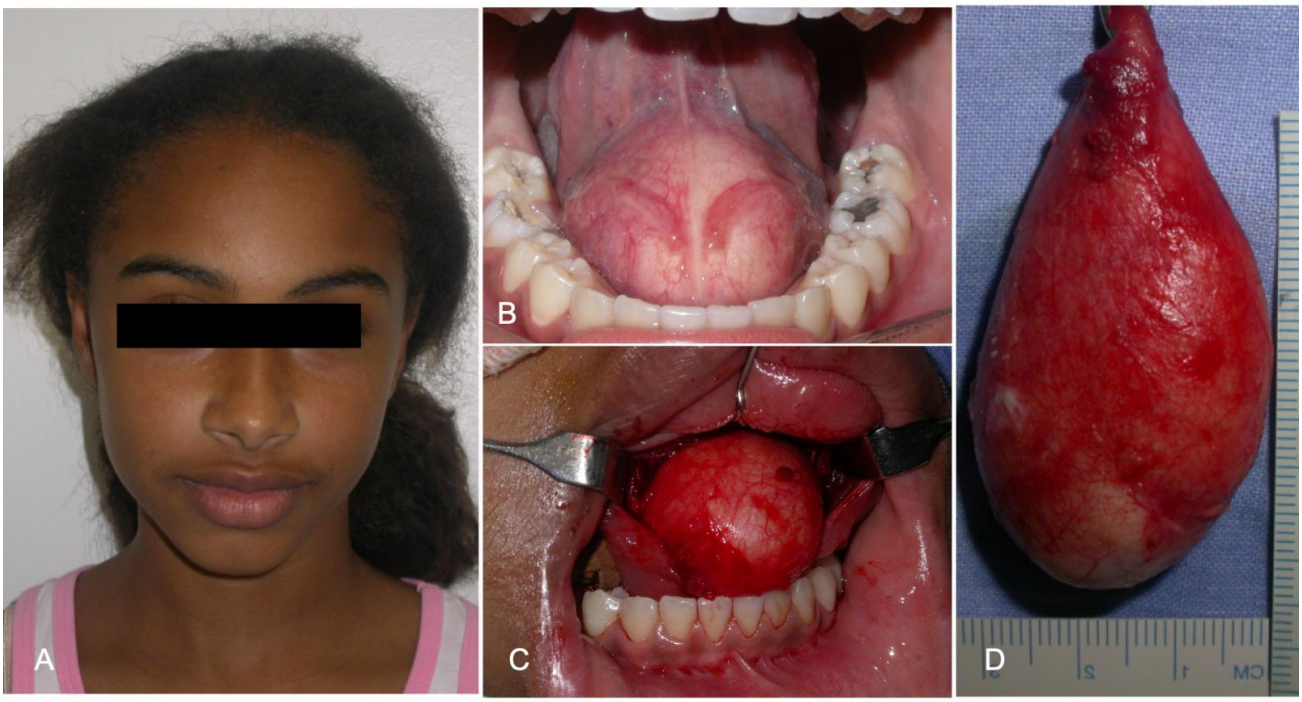


Figure 3. Clinical and surgical findings of Case 3. (A) Frontal extraoral photograph showing the absence of facial asymmetry or cervical swelling. (B) Intraoral view demonstrating a well-circumscribed midline swelling occupying the floor of the mouth and causing elevation of the tongue. (C) Intraoperative view during intraoral approach. (D) Gross specimen after surgical excision, showing an intact cystic lesion with a smooth external surface.

The three surgical specimens were submitted to conventional histogical processing and analysis of the hematoxylin and eosin stained 5 µm sections under light microscopy revealed the presence of a large cystic cavity lined by an orthokeratinized stratified squamous epithelium of variable thickness (Figures 4A). The cavity lumen was filled by sheets of

desquamated keratin (Figure 4B). The fibrous capsule showed the presence of cutaneous adnexal structures, mostly sebaceous glands and sweat glands (Figures 4C, 4D, and 4E), confirming the diagnosis of DC in all cases.

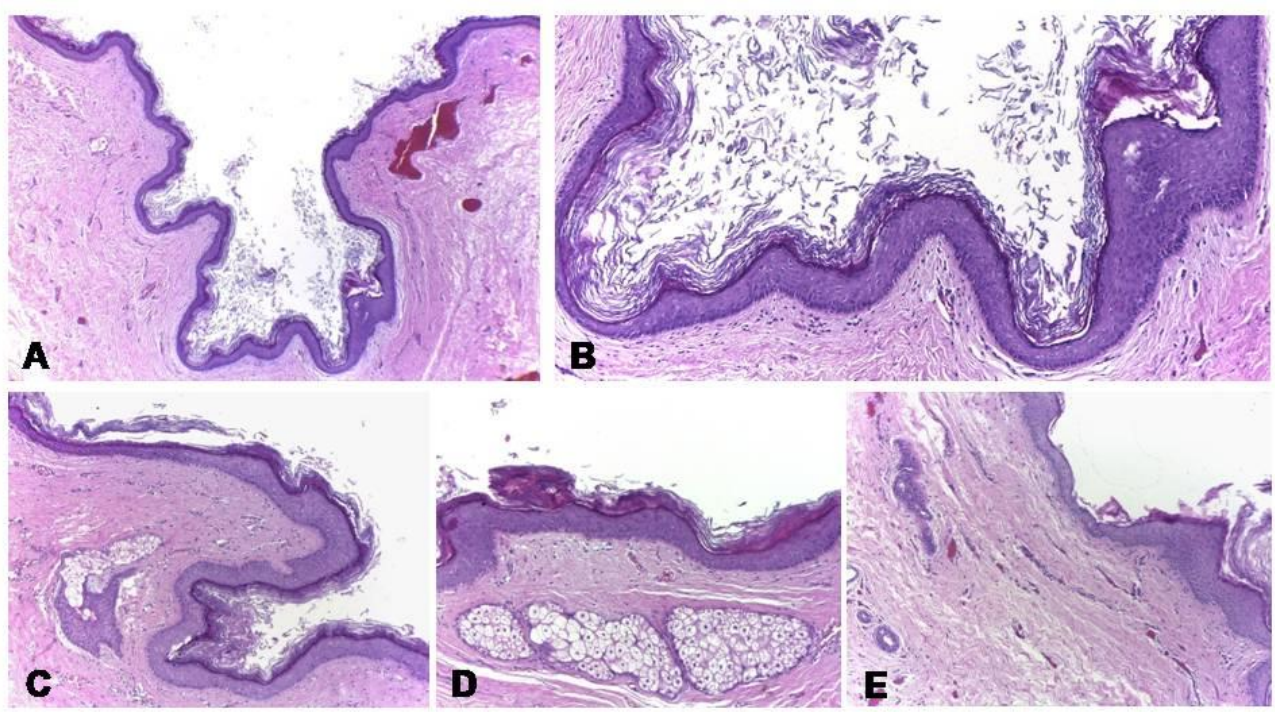


Figure 4. Histological features of DCs. Cystic cavity lined by an orthokeratinized stratified squamous epithelium (A, Case 1, HE 40x), and showing the lumen filled by sheets of desquamated keratin (B, Case 1, HE 100x). The fibrous capsule showed the presence of sebaceous glands (C, Case 2, HE 100x; D, Case 2, HE 200x) and sweat glands (E, Case 3, HE 100x).

DISCUSSION

DCs of the floor of the mouth are uncommon and usually present as slowly enlarging, painless masses[1-4]. The present series is clinically relevant because all three lesions were removed through an intraoral approach despite differences in size and anatomical presentation. Case 1 was the most distinctive: the lesion measured 8.4 cm in greatest dimension, was predominantly supramylohyoid, extended into the ipsilateral submandibular

space, produced both intraoral and cervical swelling, and initially mimicked a plunging ranula. This combination created both a diagnostic challenge and a surgical-access question that is central to the present report.

The differential diagnosis of a cystic floor-of-mouth lesion depends on clinical location, imaging appearance, and histopathological findings[1,2]. Ranulas arise in relation to the sublingual gland and may extend through or around the mylohyoid muscle into the submandibular space, a pattern that can overlap with an extensive DC. Epidermoid cysts and DCs may be clinically and radiographically similar[1]; their definitive distinction is histopathological, with DC showing cutaneous adnexal structures in the cyst wall, whereas epidermoid cysts lack such appendages[5-10]. Teratoid lesions should be also considered but they contain tissues derived from more than one germ layer[1,3]. Other more uncommon differential diagnosis in this anatomical location include thyroglossal duct cyst and lymphatic malformation. In Case 1, the lateral/submandibular extension and cystic appearance favored a plunging ranula initially, whereas subsequent integration of the clinical assessment, imaging findings, aspiration findings, and operative features supported reconsideration of the differential diagnosis.

The relationship with the mylohyoid muscle remains a major determinant of clinical presentation and surgical access[7,8-10]. Lesions located above the muscle usually produce a sublingual swelling, whereas lesions with a substantial component below it may present as submental or submandibular enlargement. Nevertheless, large lesions can cross or extend around anatomical boundaries. Case 1 was predominantly supramylohyoid but extended into the ipsilateral submandibular space. Importantly, extension into an adjacent space did not, by itself, preclude an intraoral approach. The accessible floor-of-mouth component, predominantly superior location, preoperative definition of lesion extent, and intraoperative identification of a well-defined cleavage plane permitted controlled mobilization of the inferior extension without a cervical incision.

Complete surgical excision is the treatment of choice for DCs of the floor of the mouth[1-3,7,8,12-15].Traditionally, an extraoral approach has often been selected for lesions with a substantial component below the mylohyoid muscle or for very large lesions, whereas the intraoral route is commonly used for supramylohyoid lesions. However, previous reports demonstrate that selected large lesions can be removed transorally. *Ohta et al.*[9] described successful intraoral removal of a 55 × 65 mm cyst with extension toward/through the

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mylohyoid region, and *Aydın et al.*[10] reported a giant sublingual DC removed intraorally. *Longo et al.*[11], in a series of 16 floor-of-mouth DCs, also emphasized the importance of lesion location and surgical anatomy in choosing access. These reports, together with the present cases, suggest that size alone should not be treated as an absolute indication for an external approach. Rather, the relative position of the lesion, accessibility from the oral cavity, extension pattern, ability to protect critical structures, and anticipated cleavage plane should be considered together.

In Case 1, a linear floor-of-mouth incision followed by careful blunt dissection provided adequate exposure. Attention was directed toward avoiding injury to neurovascular structures and salivary ducts, and the distinct cleavage plane allowed the lesion and its submandibular extension to be mobilized and removed with the capsule intact. Layered closure minimized dead space, and the absence of significant bleeding made drainage unnecessary. The intraoral route also avoided a cervical scar. These technical features help explain why an intraoral approach was feasible despite the lesion's 8.4-cm greatest dimension and submandibular extension. Nevertheless, the present report comprises only three cases and should not be interpreted as evidence that all extensive lesions are suitable for transoral excision. The approach should be individualized according to anatomy, imaging findings, surgical accessibility, airway considerations, and surgeon experience. Finally, no recurrence was identified during the available follow-up periods of six months for Case 1 and one year for Cases 2 and 3. These observations document the outcomes of the present cases but are not sufficient to estimate recurrence risk.

CONCLUSION

DCs should be included in the differential diagnosis of cystic lesions of the floor of the mouth, particularly when clinical and imaging findings overlap with ranula or other developmental lesions. Imaging is valuable for defining lesion extent and its relationship to the mylohyoid muscle and adjacent spaces, thereby supporting surgical planning. In selected patients, an intraoral approach may be feasible even for a large lesion with extension into an adjacent space when there is favorable oral accessibility, appropriate anatomical assessment, and a safe dissection plane. In the present series, complete intraoral excision

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was achieved without postoperative complications, and no recurrence was observed during the available follow-up periods.

Conflict of Interest

The authors declare that they have no conflicts of interest related to this study.

Informed Consent

Written informed consent was obtained from all patients (or their legal guardians) for publication of the clinical information and accompanying images.

Data Availability Statement

The data supporting the findings of this study are available from the corresponding author upon reasonable request.

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Author Contributions

Conceptualization: ACP and BTGR
Data collection: ACP and BTGR
Clinical management of patients: ACP, BTGR, HMS, DPBR
Investigation: ACP and BTGR
Writing – original draft: ACP and BTGR
Writing – review and editing: PJM, HMS, DPBR
Supervision: PJM, RBS, HMS, DPBR, TPSB, FRP

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All authors have read and approved the final version of the manuscript.

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