



INTERCEPTIVE MANAGEMENT OF A HABIT-RELATED LOWER LIP MUCOCELE: A PEDIATRIC CASE REPORT

Pedodontics

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ABSTRACT

Introduction: Mucocele is a common benign, mucin-filled pseudocyst of the minor salivary glands, most frequently occurring on the lower lip secondary to chronic parafunctional habits such as lip biting or sucking. Surgical excision alone addresses the lesion but does not eliminate the causative habit, predisposing to recurrence. **Case Presentation:** A 10-year-old female presented with a fluctuant swelling on the inner aspect of the right lower lip associated with a long-standing habit of biting the lower lip on the same side. Given the active parafunctional habit, a lip bumper habit-breaking appliance was fabricated with bands on the lower right and left first permanent molars (36, 46) and delivered as the first line of interceptive management. Over the following months the lesion reduced in size, and the habit was fully discontinued by three months of appliance wear. The residual lesion was then excised using a diode laser (Woodpecker) in mucocele-excision mode. Histopathological examination confirmed the diagnosis of mucocele, showing pooled mucin surrounded by granulation tissue. Healing was uneventful with no evidence of recurrence at follow-up. **Conclusion:** Combining habit interception with a lip bumper prior to definitive laser excision is an effective, low-morbidity strategy for managing habit-related mucocele in children and may reduce the risk of recurrence by addressing the underlying etiology rather than the lesion alone.

KEYWORDS

Mucocele, Lip Bumper, Lip Biting, Diode Laser, Habit Interception

INTRODUCTION

Mucocele is the most common benign lesion of the minor salivary glands, presenting as a soft, fluctuant, often bluish swelling most frequently located on the lower lip (Chi et al., 2011). It is broadly classified into two histopathological types: the extravasation type, resulting from rupture of a minor salivary gland duct or acinus with spillage of mucin into surrounding connective tissue and consequent granulation-tissue response (accounting for the majority of cases, without an epithelial lining), and the retention type, resulting from obstruction of the duct with an epithelium-lined cavity (Mukundan & Ramesh, 2024; Ayhan et al., 2020). The lower lip is affected in the majority of cases because it is most exposed to mechanical trauma from occlusal contact and parafunctional habits (Chi et al., 2011).

In children, the extravasation-type mucocele is overwhelmingly linked to chronic mechanical trauma from habitual lip biting or lip sucking, often perpetuated by anxiety, malocclusion, or an unfavorable interarch relationship that allows repeated entrapment of the lower lip between the dental arches (Kawale et al., 2024; Kolcakoglu & Yucel, 2021). Management options range from minimally invasive techniques (intralesional corticosteroids, micro-marsupialization) to definitive surgical approaches — conventional scalpel excision, electrocautery, and laser ablation — each with differing profiles of postoperative bleeding, discomfort, scarring, and recurrence (Mukundan & Ramesh, 2024).

A frequently underemphasized aspect of management is that surgical excision alone removes the lesion but does not address the causative habit, and recurrence is well documented when the parafunctional behavior persists (Kawale et al., 2024). A lip bumper, a well-established myofunctional habit-breaking appliance, physically keeps the lower lip away from the dentition, interrupts the abnormal muscular pattern (hyperactive mentalis contraction), and has been successfully used to eliminate lower lip-sucking/biting habits in children (Kawale et al., 2024). Combining this interceptive approach with subsequent definitive laser excision of the mucocele — rather than proceeding directly to surgery — offers the theoretical advantage of addressing etiology first, potentially reducing lesion size preoperatively and lowering the risk of recurrence.

We report a case of a habit-related mucocele of the right lower lip in a 10-year-old female, managed first with a lip bumper appliance to eliminate the causative lip-biting habit, followed by diode laser excision of the residual lesion.

Case Presentation

A 10-year-old female patient reported to the Department of Pediatric and Preventive Dentistry accompanied by her parents, with a chief

complaint of a swelling on the inner aspect of the right lower lip. On further history, the parents disclosed that the child had a long-standing habit of biting the lower lip specifically on the right side.

Intraoral Examination: A well-circumscribed, fluctuant swelling with normal-to-slightly bluish overlying mucosa was noted on the labial mucosa of the right lower lip, corresponding to the site of habitual lip biting on the right side. The swelling was sessile, non-tender on palpation, and not adherent to the underlying tissue, with no associated difficulty in speech or mastication.



Figure 1: Pre-operative Clinical Photograph with Lip Biting Habit

Differential diagnosis: Based on the site, clinical appearance, and history of habitual trauma, a differential diagnosis of mucocele, fibroma (irritation/traumatic fibroma), lipoma, oral hemangioma, lymphangioma, soft-tissue abscess, and benign minor salivary gland tumor was considered.

Provisional diagnosis: A provisional diagnosis of mucocele secondary to a habitual lip-biting habit was made, based on the fluctuant consistency, bluish hue, sessile nature, and clear association with the parafunctional habit on the same side.

Management

Phase 1: Habit Interception with a Lip Bumper Appliance

Given that the lesion was directly attributable to an active, ongoing lip-biting habit, and considering that surgical excision performed while the causative trauma persists carries a recognized risk of recurrence, the treatment plan prioritized elimination of the habit before definitive excision of the lesion.

Diagnostic impressions of the maxillary and mandibular arches were made with alginate, and a lip bumper appliance was fabricated:

- Banding was done on the lower right and left first permanent molars (46, 36) followed by impression making and transfer of the bands to the cast model.

- A 19-gauge stainless steel wire was contoured to run buccal to the lower incisors, kept approximately 4–5 mm away from the incisor labial surfaces to allow free lip clearance.
- A cold-cure acrylic shield was fabricated over the anterior wire component to provide a smooth, tolerable interface against the lower lip and to reinforce the appliance.
- The wire and band assembly were soldered, verified for fit, and cemented intraorally with Type I glass ionomer luting cement.



Figure 2: Lip Bumper Appliance and Facial Profile Post Cementation

The patient and parents were counseled on the purpose of the appliance and encouraged to make a conscious effort to discontinue the habit. Follow-up visits were scheduled at 1, 2, and 3 months. By the 2-month follow-up, complete cessation of the lip-biting habit, and the mentalis/lip musculature showed improved tone with parents also reporting the cessation of Lip biting habit. The residual mucocoele, though reduced, had not fully resolved and was planned for definitive excision.

Phase 2: Diode Laser Excision of the Residual Lesion

With the causative habit eliminated, excision of the residual lesion was performed to achieve definitive resolution and enable histopathological confirmation.

After obtaining informed consent from the parents, the procedure was carried out under local anesthesia (2% lignocaine with 1:100,000 adrenaline). The lesion was excised using a Woodpecker diode laser set to the manufacturer's mucocoele-excision preset mode with 450 nm, 2.00 W Power at continuous mode. Excision was carried out circumferentially around the periphery of the lesion down to its base, with care taken to remove the associated minor salivary gland tissue to minimize recurrence risk. Hemostasis was achieved intraoperatively via the coagulative effect of the laser.



Figure 3: Immediate Post-operative Photograph with 10 Days Follow up

The excised specimen was preserved in 10% formalin and submitted to the Department of Oral Pathology for histopathological examination.

Histopathological Examination: Hematoxylin and eosin-stained sections revealed a para-keratinized stratified squamous epithelium overlying a fibrocellular connective tissue stroma. The stroma exhibited cyst-like spaces containing eosinophilic mucinous material, surrounded by granulation tissue composed of lymphocytes, plasma cells, and collagen fibers interspersed with spindle-shaped fibroblasts, along with abundant infiltration by chronic inflammatory cells predominantly comprising lymphocytes. A few minor salivary glands were also appreciated. Blood vessels of varying shapes and sizes engorged with red blood cells, together with focal areas of hemorrhage, were noted. The deeper connective tissue stroma showed intact skeletal muscle bundles. The findings were consistent with the clinical diagnosis of mucocoele.

Follow-up

The patient was reviewed postoperatively at 3 months. Healing was uneventful with no scarring and no discomfort. There was no clinical evidence of recurrence noted at the last follow-up visit. The lip bumper was removed followed by oral prophylaxis.

DISCUSSION

Mucocoele in children is most commonly the consequence of chronic, repetitive mechanical trauma to minor salivary gland ducts from parafunctional habits such as lip biting or sucking (Chi et al., 2011; Kolcakoglu & Yucel, 2021). While definitive management of an established mucocoele ultimately requires excision of the lesion along with the associated minor salivary gland tissue, an important but often overlooked component of comprehensive treatment planning is addressing the causative habit, without which even a technically successful excision carries a risk of recurrence at the same or an adjacent site (Kawale et al., 2024).

In the present case, the decision to introduce a lip bumper appliance before proceeding to excision was based on the rationale that:

1. Removing the mechanical trigger (habitual biting) allows the inflammatory/extravasation process driving lesion size to subside, potentially reducing the extent of surgery required;
2. Breaking the habit prior to surgery reduces the likelihood of the lip re-traumatizing the surgical site during the critical early healing period, thereby lowering recurrence risk; and
3. It shifts the treatment paradigm from purely reactive (lesion removal) to a combined etiological and definitive approach.

This mirrors an emerging practice pattern reported in the literature, where a lip bumper has similarly been used as an adjunct to non-surgical (intralesional corticosteroid) treatment of a recurrent, habit-related mucocoele, with the explicit aim of preventing further recurrence by eliminating the causative trauma before or alongside lesion-directed therapy (Kawale et al., 2024). The present case extends this concept to a laser-excision pathway, using the interceptive phase to allow lesion regression and habit cessation, followed by definitive removal of the residual lesion.

Regarding the excisional modality, diode lasers are strongly absorbed by hemoglobin, producing efficient coagulation and carbonization of soft tissue. This translates clinically into a bloodless operative field, minimal intraoperative and postoperative discomfort, no requirement for suturing in many cases, reduced scarring, and faster healing compared with conventional scalpel excision or electrocautery (Mukundan & Ramesh, 2024; Gogoi et al., 2022). In a comparative pediatric case series, diode laser excision of lip mucocoele was associated with the least postoperative pain (mild, resolving within a day) and no scarring at follow-up, compared with moderate pain and mild scarring following scalpel excision, and intermediate outcomes with electrocautery (Mukundan & Ramesh, 2024). These advantages are particularly relevant in a 10-year-old child, in whom minimizing intraoperative anxiety and postoperative discomfort has direct implications for behavior management and future dental cooperation.

CONCLUSION

A combined interceptive and surgical approach — using a lip bumper appliance to eliminate a causative lip-biting habit prior to diode laser excision of the resultant mucocoele — achieved lesion regression, habit cessation, and uneventful healing without recurrence in this 10-year-old patient. This case supports addressing the underlying parafunctional habit as an integral part of mucocoele management in children, rather than relying on lesion excision alone, and highlights the diode laser as a well-tolerated definitive treatment modality in this age group.

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