



## A Diode Laser Used for Treatment of Mucocele Present on Lower Lip in Pediatric Patients: A Case Series

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### Abstract

Mucocele is a cavity filled with mucus. It is the most frequent minor salivary gland lesion that affecting mankind. It is mostly seen in minor salivary glands of the oral cavity. Mucin accumulation in mucocele results in restricted oral cavity swelling. Mucoceles typically go off on its own and emerge as a translucent, blue, soft cystic swelling. Vascular congestion, cyanosis of the tissue above, and accumulation of fluid below are the causes of the blue color. Although mucoceles rarely cause pain, they can occasionally be unpleasant when they hinder speaking, chewing, or swallowing. Surgical excision, cryosurgery, laser vaporization, micro-marsupialization, marsupialization, and laser excision are some of the accessible modalities for treatment. Therefore, the aim of the current case series was to assess the effectiveness of dental lasers in treating oral mucoceles in pediatric patients.

**Keywords:** Mucocele; Laser; Pediatric; Cyst

### Introduction

The clinical features of oral mucoceles, which are benign soft tissue masses, include one or more painless, soft, smooth, spherical, translucent, fluctuating nodules that are typically asymptomatic [1]. Mucoceles (muco - mucus and coele - cavity), by definition, are cavities filled with mucus [2]. It is the most frequent minor salivary gland lesion that affects humanity. It is mostly seen in minor salivary glands of the oral cavity except the gingiva. Mucin accumulation in mucocele results in restricted oral cavity swelling [3].

There are two histology categories in the reported cases: extravasation and retention. The extravasation type, a pseudocyst without defined walls, is commonly observed on

the lower labial mucosa, buccal mucosa, and retromolar area; it is not lined by epithelial lining. It is caused by mechanical trauma to the gland's excretory duct, resulting in rupture and extravasation of mucin into the connective tissue stroma [4]. A lot of patients refer to that viscous fluid intermittently oozes from the lesion.

Retention type is less common than extravasation; it typically affects older people and is commonly observed on the maxillary sinus, hard palate, floor of the mouth, and upper lip [5]. Mucus may be retained in the duct and/or acini in the mucous retention type due to sialolith-induced duct congestion [6]. Repeated use of tartar-control toothpastes, hydrogen peroxide mouthwashes, anti-plaque solutions, or deodorant mouthwashes may induce irritation and result in

ductal restriction [7].

Extravasation and retention mucocèles have similar clinical characteristics. Mucocèles typically go off on its own and emerge as a translucent, blue, soft cystic swelling. Vascular congestion, cyanosis of the tissue above, and accumulation of fluid below are the causes of the blue color. Nonetheless, the lesion's size, proximity to the surface, and the softness of the tissue surrounding it may all influence the hue..

In America, there are an estimated 2.5 lesions for every 1000 people, 0.11% in Sweden, 0.08% in Brazil [8], and 0.4% in India [9]. They rank as the seventeenth most typical oral cavity lesion. Because the diagnosis is made clinically, the anamnesis must be completely performed, to identify prior trauma. While retention mucocèles can occur at any other site, extravasation mucocèles tend to form in the lower lip.

Although mucocèles rarely cause pain, they can occasionally be unpleasant when they hinder speaking, chewing, or swallowing. Surgical excision, cryosurgery, laser vaporization, micro-marsupialization, marsupialization, and laser excision are some of the accessible modalities for treatment [10].

Using a laser for oral and dental procedures on a paediatric patient has many benefits, including less anxiety for the child and more parental acceptance [11]. When a medical professional utilizes a laser for a pulpal or surgical procedure, children cooperate better and the treatment results are superior [12]. It is used for caries prevention, early detection, cavity restoration, care of damaged teeth, and small oral surgical procedures in pediatric patients. It appears to have quickly become the gold standard in pediatric dentistry practice [13].

Therefore, the aim of the current case series was to assess the effectiveness of dental lasers in treating oral mucocèles in pediatric patients.

## Case Reports

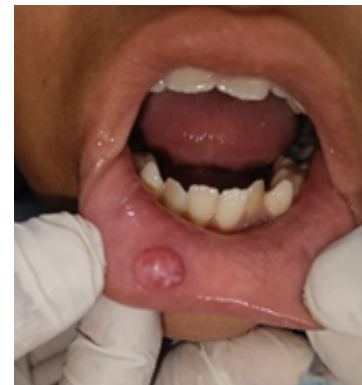
### Case 1

The primary complaint of a 9-year-old child was stated as painless swelling on the inner surface of the lower lip that had been present for four weeks (Figure 1). The swelling started out low and then increased gradually to reach its current size. There was no significant medical background.

A round, solitary, fluctuating swelling was observed during an intraoral examination on the inner part of the lower lip, between the right central and lateral incisor regions. The swelling measured 6 mm below the lower lip's vermilion border and extended roughly 5 mm inferiorly toward the

lingual vestibule. The swelling's color resembled that of the nearby mucosa. There were no other oral problems detected. The patient's history of lip-biting was positive. Chewing or speaking was not hard.

The lesion's appearance and history of lip-biting activity led to the diagnosis of a mucocèle. It was treated with a Diode Laser 980nm 3rd Generation polyamide tips (Novolase Duo, India).therapy under local anesthetic. After the lesion was removed from the base (Figure 2), it was sent for pathological examination. The diagnosis of mucocèle was confirmed by the histopathological report. There was no history of lesion recurrence during the one-month follow-up (Figure 3).



**Figure 1:** Pre-operative photograph of mucocèle.



**Figure 2:** Post-operative photograph of mucocèle.



**Figure 3:** One- month follow up.

### Case 2

A 13-year-old child reported that his bottom lip had been swollen for three months (Figure 4). The child had a habit of biting their lips. On the inside surface of the lower lip, between the left central and lateral incisor regions, there was a gentle, oval, sessile, and painless swelling. The swelling measured 7 mm below the lower lip's vermilion border and extended roughly 6 mm inferiorly toward the lingual vestibule. Mucocele was diagnosed based on the clinical presentation and history. The lesion was surgically excised using a diode laser (Figure 5) treatment under local anesthesia. The diagnosis proved accurate through histological investigation of the specimen. The child visited up for the two-month follow-up with an uneventful healing (Figure 6).



**Figure 4:** Pre-operative photograph of mucocele.



**Figure 5:** Post operative photograph after excision with laser.



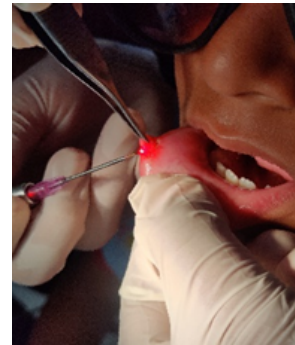
**Figure 6:** One month follow up.

### Case 3

An 8-year-old child reported with two months of swelling on his bottom lip (Figure 7). The prominence had been present for two months when he first noticed it, and its size had previously changed on frequently. An intraoral examination on the right side revealed a soft, asymptomatic nodule. The swelling measured 7 mm below the lower lip's vermilion border and extended roughly 5 mm inferiorly toward the lingual vestibule. No history of systemic disease was present. The clinical findings led to the uncertain diagnosis of mucocele. Under local anesthetic, the lesion was surgically removed (Figure 8) using a diode laser (Figure 9). Mucocele swelling was confirmed by the histopathological results. After two weeks of follow-up evaluation, the lesion disappeared (Figure 10).



**Figure 7:** Preoperative photograph of mucocele.



**Figure 8:** Intra-operative photograph of excision of laser using diode laser.



**Figure 9:** Post operative photograph after excision with laser.



**Figure 10:** One month follow up after excision.

#### Case 4

A girl, seven years old, complained of swelling on her bottom lip (Figure 11). When she first noticed the bulge, it had been present for over a month, and its size had fluctuated previously. An intraoral examination revealed a mild, asymptomatic expansion on the left side of the labial mucosa. The swelling measured 7 mm below the lower lip's vermillion border and extended roughly 5 mm inferiorly toward the lingual vestibule. There was no record of systemic disease. The initial diagnosis of mucocele was made based on the clinical data. The lesion was surgically removed using a diode laser while under local anesthesia (Figure 12). The histopathology results confirmed the presence of mucocele. Following a seven-day period of observation, the lesion did not recur (Figure 13).



**Figure 11:** Pre-operative photograph of mucocele.



**Figure 12:** Post-operative photograph after removal of mucocele.



**Figure 13:** Post operative photograph after one-month follow up.

#### Discussion

A swelling triggered by the accumulation of saliva from a severed or obstructed small salivary gland duct is known to as a "mucocele" [7]. It is a self-limiting salivary gland cyst that contains mucus and typically starts to expand in size fairly rapidly in the oral cavity [8]. The lesion might have split, causing a build-up of mucin or the reabsorption of saliva deposits. This could cause the lesion to return after its size has reduced [5].

Most oral mucocele are covered in granulation tissue or have no epithelial lining at all. There may be many oral mucoceles, which often rupture and leave behind uncomfortable erosions that usually go away entirely in a few days. The duration of a lesion may differ, extending anywhere from a few days to three years. The clinical presentation may be influenced by the depth of the lesion. Lesions can be found directly under the mucous membrane (superficial mucocele) or in the upper submucosa (classical mucocele). Six Oral mucoceles are fluid-filled blisters or vesicles in the surface mucosa, or they can be found deep into the connective tissue as fluctuant nodules [14].

Oral mucoceles are believed to affect patients of all ages, with the second decade having the highest occurrence. The majority of those diagnosed with mucoceles are young people. Patients with oral mucocele treated by Menta, et al. [15], Yamasoba, et al. [16] and Oliveira, et al. [17] were younger than 20 years old in more than 65% of cases. Similarly, our hypothetical situations generate the same results. However, if the lesion is asymptomatic, individuals could delay seeking therapy; therefore this could not always be the case.

Oral mucoceles appear in an assortment of sites on the oral mucosal surfaces that surround accessory small salivary glands. However, in certain locations, they happen more frequently. The lower lip is typically affected by mucoceles. Nonetheless, there have been sporadic cases of mucoceles affecting the palate, upper lip, retromolar region, buccal mucosa, lingual frenum, and dorsal tongue. The occurrence

of lesions at the lower lip and other oral locations was consistent with our findings. Unexpectedly, our findings conflicted with those of Menta, et al. [15] and More, et al. [14] who also found the existence of mucoceles on the tongue.

The Oral Mucocele of the case series simulated these findings and matched with the studies of Jani, et al. [18] and Paulo, et al. [19]. The color of mucoceles ranged from deep blue to the common color of the oral mucosa. The deep blue color is caused by tissue cyanosis, vascular congestion associated with the stretched encasing tissue, and the translucency of the pooled fluid beneath.

Surgical excision of the glandular tissue and surrounding mucosa below to the muscle layer is the conventional course of treatment. A simple mucocele incision would allow the material to drain out, but as soon as the wound healed, the lesion would appear again [20]. If superficial extravasation mucoceles resolve on their own, treatment is not required.

One of the most common lesions in the mouth is the mucocele. Its management historically entailed the use of a variety of treatment techniques, including surgical excision, electrocautery, cryosurgery, marsupialization and laser therapy. Because it prevents recurrence and is inexpensive, conventional surgical excision, both with and without marsupialization, continues to be the gold standard treatment approach. Despite these benefits, there could be side effects like lip disfigurement, damage to adjacent salivary ducts, numbness, and scarring [21-23].

According to study done by Garcia, et al. [24], the initial cryosurgical approach or intralesional corticosteroid injection in the treatment of mucocele can be used but relapse occurs in this treatment method. One of the other treatment protocols of Mucocele is use of CO2 laser; it is rapid, simple and indicated for the patients who cannot tolerate long procedures. In the study done by Delbem, et al. [25] used micromarsupialization which is simple, rapid and has less chances of recurrence.

The 1990s witnessed an upsurge in the use of lasers in dentistry. In dentistry, they serve as adjunct or independently treatment tools. Overcoming the drawbacks of traditional treatments is the primary objective of employing lasers instead of them [26]. Studies indicated that as compared to scalpel excision, laser therapy had less postoperative bleeding, pain, problems, damage to the surrounding structures, a quicker healing period, and relapse [27]. Additionally, research has shown that lasers in dentistry were particularly well-tolerated and acceptable by children, which can enhance treatment results and facilitate surgery and recovery. Studies by Yagüe, et al. [28] and Wu, et al. [29] investigated cases of laser treatment and conventional

surgical excision, and they concluded that, in comparison to surgical excision, laser therapy produced a more comfortable postoperative outcome for the patient and so in the present case series laser therapy was used.

Moreover, the bulk of the studies documented satisfactory wound healing with little to no scarring, no pain or discomfort following surgery, no additional complications, and no recurrence of the lesions that had been treated. Furthermore, reduced procedure times, improved visibility of the surgical site, and haemostasis were achieved [30,31].

The compared studies' findings show that using lasers to remove oral mucocele is a safe and successful therapeutic option. Young patients accept it well because it is painless and has few to no implications after treatment. Consequently, it should be considered a preference over surgical excision, particularly in cases involving younger people.

Additionally, Diode laser of various wavelengths (650 nm) and observed minimal pain or discomfort, no or reduced bleeding and uneventful healing with a follow-up of 3 weeks to 1 month. In our cases also, healing was seen in 1 week to 1 month follow-up.

Clinical trials should be included in future research to compare various groups' results with those of conventional surgical techniques. However, more patients should be included in the research to provide sufficient variety; more significantly, clinical correlation and long-term follow-up periods following surgery ought to be discussed in order to predict the actual outcome of laser radiation in the treatment of pediatric mucoceles.

## Conclusion

It may be concluded, within the limitations of this review, those dental lasers of various types, wavelengths, and laser-related parameters shown efficacy in the treatment of mucoceles. The great majority of cases indicated better outcomes for the patient and clinician, including both intra- and post-operative benefits. The overall quality of the literature was compromised by the non-uniformity of laser-associated factors. Better quality research is needed to provide reliable and standardized laser schedules for the successful treatment of oral mucoceles in pediatric patients.

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