Laser Diode: A Solution for Recurring Oral Mucocele in Children

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ABSTRACT

Oral mucocele is an asymptomatic, non-neoplastic lesion of the salivary glands caused due to mechanical trauma to the excretory ducts. With an incidence of 2.5 lesions per 1,000, it is most common among pediatric patients. Clinically, they appear as well-circumscribed, round, single or multiple, and soft and fluctuant swellings. Although various surgical and nonsurgical treatment modalities are present in the literature, diode lasers provide a simple, rapid, effective, bloodless, and well-accepted procedure for treating mucocele in pediatric patients.

Keywords: Laser diode, Mucocele, Oral lesion.

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INTRODUCTION

The term “mucocele” is derived from the Latin terms *mucus* and *coele*, which means mucus in the cavity. It is defined as the collection of mucus in the subepithelial tissue, secreted from the salivary glands and their ducts in the oral cavity.¹ They are also found in the lacrimal sac and in the paranasal sinuses. Mucoceles are classified into extravasation mucoceles and retention mucoceles.² Although they occur at any age, typically they occur in the second and third decades of life. Mechanical trauma to the gland’s excretory duct is the primary cause. Clinically, they are distinguished by single or numerous, soft and fluctuant nodules varying in hue from normal pink to deep blue.³ Mucocele rarely resolve on their own and have a great tendency of recurrence thus requiring proper management, especially in children with behavioral problems that can be challenging at times.

CASE REPORT

A 5-year-old male patient reported to the department with the chief complaint of recurring asymptomatic swelling in the labial mucosa of lower lips for the past one month (Fig. 1). No significant medical history or any known allergy was noted. On personal history, patient reported oral habit of lip biting frequently since 6 months. On clinical examination of the lesion, a whitish red, translucent swelling of size 5 × 5 mm was noted on the inner aspect of the lower lip on the labial mucosa for the past one month, which had increased in size gradually over time and changed in color from reddish to whitish. The patient also reported having mild discomfort while eating and speaking.

MANAGEMENT OF LESION

The initial clinical diagnosis of the lesion was established on the basis of lesion history and clinical features. The lesion was removed under local anesthesia using a diode laser (Fig. 2) with a wavelength of 976 nm in continuous mode at a power setting of 2 W. First, a topical lignocaine anesthetic gel was applied over the lesion, followed by infiltration in the periphery of the lesion using 2% lignocaine with 1:100,000 epinephrine. The fiber tip of the diode laser was initiated by moving the fiber tip across a black articulating

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paper until it became a useful hot thermal contact device. Laser-specific safety eye wear was used by the patient, operator, and the assistant during the procedure. The lesion periphery, including

Fig. 1: Lower lip showing mucocele

Fig. 2: Laser diode application on mucoccele

Fig. 3: Immediate postoperative view after excision

an extra 1 mm of tissue, was marked using an eosin pencil. After initiation of the diode laser, mucoccele was excised by retracting or pulling it away from the surface and simultaneously separating the lesion and its associated minor salivary gland tissue from the adjacent surface using tissue-holding forceps. A water-moistened gauze pad was used to control the temperature of the tissues with simultaneous application of a water jet on the spot using a syringe, and alternatively air cooling was also employed on the treatment site. No bleeding was observed during or after the procedure. [Figure 3](#) shows the immediate postoperative view of the lesion. Vitamin E gel was applied on the lesion site immediately after excision to promote healing. The wound was left open without any sutures for healing by secondary intention. An anti-inflammatory analgesic was prescribed for 3 days along with application of vitamin E gel over the lesion site three times a day for 1 week. Patient was advised strictly to stop the lip-biting habit and not to consume any spicy or hot food for a few days and to rinse with normal saline three times a day for the following week.

The excised lesion was stored in 10% formalin and sent for biopsy for laboratory diagnosis ([Fig. 4](#)). The laboratory results confirmed the initial diagnosis of extravasation mucoccele. The patient was instructed for follow-up visits on the third day to evaluate postoperative healing followed by a week and every month ([Fig. 5](#)). In the follow-up visits, the patient reported no discomfort or pain, and healing was satisfactory with no scarring.

HISTOLOGICAL REPORT

The macroscopic findings of the excised tissue revealed soft tissue, brown in color, soft in consistency and measuring $0.4 \times 0.5 \times 0.2$ cm in size. On microscopic examination, deeper connective tissue revealed mucin pooled and surrounded by muciphages and other inflammatory cell infiltrates ([Fig. 6](#)). The remaining connective tissue comprised collagen fibers and minor salivary gland. Surface epithelium was nonkeratinized stratified squamous.

DISCUSSION

The laser diode, which was introduced in 1962, is manufactured from semiconductor crystals with a short wavelength (800–980 nm, and most recently, 1064 nm). It works by transmitting photothermal energy to the cells it contacts, which causes an increase in temperature, vaporization, protein denaturation, and carbonization.

Fig. 4: Excised specimen (size $0.4 \times 0.5 \times 0.2$ cm) collected for histological examination

Due to the high affinity of the diode laser to certain protein molecules like hemoglobin and melanin, there is an elevation in the temperature thus promoting coagulation and hemostasis.^{4–6} In 2010, Pedron et al. reported that the laser diode is rapid, simple, and fast with minimal postoperative discomfort and scarring on one-month follow-ups.⁷

Mucoccele is a self-limiting lesion of salivary glands with rapid onset and fluctuating size, commonly occurring in the oral cavity. The clinical features of mucoccele are pathognomonic, and the following points like location, history of trauma, variations in size, rapid appearance, bluish color, and the consistency are crucial for its clinical diagnosis.⁸ The histopathologic findings of this lesion vary from acute inflammation with accumulation of mucus to the arrangement of lesions with lesser amounts of mucus and connective tissue fibrosis. The surface epithelium of the lesion may show hyperplastic parakeratinized stratified squamous tissue. The presence of spilled mucin surrounded by granulation tissue, small cystic spaces containing mucin, and sebaceous cells in the connective tissue are the histological features.³ Differential diagnosis of oral mucoccele include lipoma, benign or malignant salivary gland neoplasms, oral hemangioma, venous varix, oral lymphangioma, irritational fibroma, gingival cyst of adults, oral lymphoepithelial cyst, soft tissue abscess,

Figs 5A to C: Postoperative view of the healing lesion on (A) Day 3; (B) Day 10, and (C) After 45 days, respectively (top to bottom)

Fig. 6: Histological view showing central eosinophilic pooled area surrounded by foamy muciphages

pyogenic granuloma, cysticercosis, etc. Diagnosis is mainly based on clinical features like rapid occurrence, fluctuant swelling with soft consistency, bluish-to-pink color, specific location, recurrence, and associated history of trauma or oral habit. Occasionally, it may require routine radiographs, ultrasonography or advanced diagnostic methods—computed tomography and magnetic resonance imaging for better visualizing the form, position, and diameter, as well as for determination of the lesion origin.

CONCLUSION

Laser diode removal of oral mucocele is an alternative non-surgical procedure which can be performed in short span of time and

achieve hemostasis that provides better results with minimum discomfort. Due to its variety of beneficial effects including bloodless operational field, good visualization, minimal swelling and scarring, it has good acceptance in pediatric patients.

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