

Innovative applications of electrocautery in oral soft tissue lesion treatment: Focus on mucoceles

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Abstract

Introduction: Oral mucoceles are common benign lesions in children, frequently caused by trauma to minor salivary glands, with the lower lip being the most affected site. Chronic lip biting is a common etiological factor. While conventional excision is widely practiced, electrocautery presents a minimally invasive alternative with superior hemostasis and healing properties, making it suitable for pediatric patients.

Case History: A 10-year-old male presented with a painless, clear, soft swelling on the left side of the lower lip, present for approximately one month. The lesion measured 5 mm in diameter. The patient reported a habitual lip biting behavior. Based on clinical findings, an extravasation-type mucocele was diagnosed and the lesion diagnosis was confirmed by histopathology anatomy (HPA). The lesion was excised under local anesthesia using electrocautery, along with adjacent minor salivary glands to prevent recurrence. The procedure was bloodless, quick, and required no sutures. Postoperative recovery was uneventful, with observed within one weeks follow up.

Discussion: Electrocautery offers precise tissue removal, excellent intraoperative control, and minimal postoperative morbidity. Compared to scalpel or laser excision, it is cost-effective and better tolerated by pediatric patients. Addressing etiological habits, such as lip biting, is essential to prevent recurrence.

Conclusion: Electrocautery is an effective, minimally invasive method for managing soft tissue lesion, specifically a mucocele in a pediatric patient. Its ability as an innovative treatment that results in minor bleeding and promotes accelerating recovery.

Keywords: Mucocele; Electrocautery; Pediatric Patient; Oral Lesion; Quality of Life

1. Introduction

Oral soft tissue lesions are a diverse group of conditions that affect the non-hard tissues of the oral cavity, including the mucosa, gingiva, tongue, lips, and salivary glands. These lesions may range from benign reactive growths to infectious, inflammatory, or neoplastic conditions, and are commonly encountered in dental and pediatric clinical practice. One of the most frequently observed benign lesions of salivary gland origin is the mucocele, a mucous-filled cyst that typically results from the rupture or obstruction of minor salivary gland ducts. Mucoceles often present as painless, dome-shaped, translucent or bluish swellings, commonly located on the lower lip, floor of the mouth, or ventral surface of the tongue [1]. In pediatric populations, mucoceles are relatively common due to increased susceptibility to oral trauma and habits such as lip or tongue biting. Studies have reported that mucoceles account for up to 5–10% of all oral soft

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tissue lesions in children, the lower labial mucosa is the most commonly affected site due to its anatomical vulnerability to trauma, especially in young patients with developing orofacial habits [2,3].

The histopathological types of mucoceles are categorized into two main types: extravasation-type and retention-type. The extravasation mucocele is more common in pediatric patients and results from mechanical trauma that leads to rupture of the excretory duct of a minor salivary gland, causing mucus to pool in the surrounding connective tissue. In contrast, retention mucoceles are caused by ductal obstruction without rupture, leading to dilatation of the gland and mucus accumulation. Most mucoceles in children are of the extravasation type and are directly linked to behaviors such as lip biting, bruxism, or accidental trauma [4,5].

Chronic lip biting stands out as a key etiological factor in the development of mucoceles in children. This parafunctional habit often goes unnoticed by caregivers and is commonly triggered by stress, anxiety, or boredom. Persistent lip trauma leads to repeated damage to the ductal structures of the minor salivary glands, initiating the extravasation of mucin and subsequent lesion formation. If left unaddressed, the lesion may persist, recur, or enlarge, potentially interfering with speech, mastication, and overall quality of life [6].

Standard treatment of mucoceles involves complete excision of the lesion along with the surrounding minor salivary glands to prevent recurrence. Timely diagnosis and appropriate intervention are essential in the management of mucoceles. In pediatric cases, minimally invasive techniques such as electrocautery have gained popularity due to their efficiency, bloodless field, reduced postoperative discomfort, and shorter healing time [7,8].

This case report aims to describe the application of electrocautery in managing a soft tissue lesion, specifically a mucocele in a pediatric patient. It highlights the use of electrocautery as an innovative treatment that results in minor bleeding and promotes accelerating recovery.

2. Case history

An 8-years old-male patient came to the Pediatric Dentistry General Hospital Hajj Surabaya with the chief complaint of swelling present in the lower lip for the last 4 weeks. The swelling was small initially but then its size increased gradually. The lesion occasionally subsided but tended to recur, sometimes interfering with speech and chewing. The child also reported having lip biting habit. On examination of the lesion, it was painless, soft, fluctuant, and palpable with a diameter of 5 mm (Figure 1). His past medical, dental, and drug history were not significant. There was no contributory family history.



Figure 1 Intraoral examination of mucocele on the lower lip preoperative

Removal of the lesion was performed under local anesthesia by using electrocautery. A written informed consent was obtained from the patient's parents. In this case, excision was done under local anesthesia using lidocaine 2% combined with adrenaline 1:80.000, administered through the local infiltration on the lower lip (Figure 2a). Before infiltration, a topical anesthetic gel for 2 minutes was applied. The electrocautery was set to mode cut + coagulant 1, with speed 5 and tip number T2 to remove the mucocele. The lip was then everted with digital pressure to increase the lesion's prominence. The perfect way to oblige the lesion for minimally invasive treatment was by circular motion surrounding the lesion (Figure 2b). Minor salivary glands around the lesion were also explored to prevent a recurrence. The

procedure was bloodless, quick, and required no sutures (Figure 2c). Postoperative management included prescribing an analgesic, providing instructions to avoid lip biting and to maintain good oral hygiene. The excised tissue was preserved in 10% formalin and sent for histopathological examination, which confirmed the diagnosis of a mucocele and ruled out the minor salivary gland tumors. The patient was recalled 1 week after excision and had no any complaints from the mucocele healing process (Figure 2d).



Figure 2 a. Local anaesthesia on the lower lip; b. Excision of the lesion using electrocautery; c. Intraoral postoperative view; d. Follow up intra oral examination after 1 week postoperative

3. Discussion

Mucoceles are common oral lesions in children, often arising from trauma-induced rupture of minor salivary gland ducts. The lower lip is particularly susceptible due to its anatomical location and frequent exposure to repetitive trauma, especially from parafunctional habits like lip biting. The lesion typically presents as a soft, fluctuant swelling, occasionally bluish in appearance, and may interfere with daily functions such as speech or mastication if left untreated. Extravasation-type mucoceles dominate pediatric cases due to the higher incidence of trauma in this age group, distinguishing them from retention mucoceles which are less common and result from ductal obstruction without rupture [9,10].

The primary goal of mucocele management is complete removal of the lesion while minimizing recurrence and discomfort. Traditional excisional surgery often requires suturing and carries risks of bleeding, postoperative pain, and scarring, which can be distressing for children. Electrocautery offers a minimally invasive alternative that provides several advantages, including effective hemostasis, reduced surgical time, and a relatively bloodless field. Notably, it enables precise lesion removal with minimal collateral tissue damage, an important consideration in pediatric care where cooperation and comfort are essential [11,12].

In this case, the use of electrocautery allowed for successful excision of a lower lip mucocele in a pediatric patient without the need for sutures. The technique was performed under local anesthesia, and healing was uneventful with no signs of recurrence or complications during follow-up. The absence of suturing reduced postoperative discomfort and eliminated the need for suture removal, improving patient compliance. Moreover, electrocautery promotes coagulation of capillaries, contributing to faster wound healing and less postoperative edema are key benefits for young patients [13].

Recent studies have supported the efficacy and safety of electrocautery in the management of oral soft tissue lesions in children. Comparative analyses have shown that electrocautery results in similar recurrence rates to scalpel excision, with superior patient comfort and shorter recovery times [14,15].

4. Conclusion

Electrocautery is an effective, minimally invasive method for managing soft tissue lesion, specifically a mucocele in a pediatric patient. Its ability as an innovative treatment that results in minor bleeding, accelerating recovery and particularly suitable for pediatric patients with a history of lip biting and anxiety about invasive procedures. Additionally, addressing the underlying lip biting habit through behavioral counseling or habit-breaking appliances is crucial to ensure long-term treatment success and preventing future lesions.

Compliance with ethical standards

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Disclosure of conflict of interest

The authors declare that there is no conflict of interest regarding the publication of this document.

Statement of informed consent

Informed consent was obtained from patient included in the study.

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