

Treatment of Lower Lip Mucocele with Er,Cr:YSGG Laser – A Case Report

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Summary: Mucoceles are benign, mucus-containing cystic lesions of the minor salivary glands. They are not true cysts since most of them lack an epithelial lining. These lesions occur most commonly in the lower lip. They are caused by trauma, orthodontic devices, or biting habits. This report presents a case of a 22-year-old male with a 3-mm mucocele on the lower lip. This lesion was removed using an Er,Cr:YSGG laser. The healing was uneventful and no suture or analgesic was required. The histopathological report confirmed the presurgical diagnosis. No relapse was observed up to one year after surgery.

Keywords: mucocele, Er,Cr:YSGG laser, mucus extravasation cyst.

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Mucoceles (from the Latin terms mucus, or mucus, and coele, or cavity) are defined as mucus-filled cavities that can appear in the oral cavity, appendix, gallbladder, paranasal sinuses or lacrimal sac.^{1,2} They are characterized by the accumulation of liquid or mucoid material, giving rise to a rounded, well-circumscribed, transparent and bluish-colored lesion of variable size. The consistency is typically soft and fluctuant in response to palpation. Mucoceles are painless and tend to relapse.^{3,4} By definition, they are not true cysts. The incidence is high, in the order of 2.5 lesions per 1000 individuals. Indeed, mucoceles are the most common minor salivary gland disorder, and represent the second most frequent benign soft tissue tumor of the oral cavity, following irritative fibromas.^{1,5,6}

There are two types of mucoceles: extravasation mucoceles and retention mucoceles. Extravasation mucoceles mostly appear in children where there is mucous in periglandular in connective tissue, presumably due to trauma in gland duct. Retention mucoceles are less common. They are caused by obstruction leading to saliva retention. Clinically, two types of mucoceles are not differentiated. They can however be distinguished histologically.^{7,8}

The tentative diagnosis of a mucocele is made from the clinical history, clinical presentation and palpation,⁹ and the definitive diagnosis is made by histopathology. A differential diagnosis has to consider recurring oral herpes, mucous pemphigoid, bullous lichen planus,⁴ lymphangioma, hemangioma, haemotoma, soft fibroma

and abscesses.¹⁰ Histopathologically, retention mucoceles are true cysts, as the duct has an epithelial lining. Extravasation mucoceles are considered pseudocysts, as they have no epithelial lining and are covered by a pseudocapsule of fibrous connective tissue.^{7,9,11}

Mucoceleles are usually asymptomatic, though in some patients they can cause discomfort by interfering with speech, chewing, or swallowing.¹ However, in most cases these lesions rupture spontaneously or traumatically a few hours after being formed, with the release of a characteristic viscous, mucoid fluid.⁴ This may give the mistaken impression of healing, since the lesion decreases in size or disappears. However, once the small perforation allowing release of the mucocele contents has healed, the secretions accumulate again, and the lesion relapses.^{1,5,12} On the other hand, in the case of repeated trauma, the lesion may become nodular and firmer in response to palpation, with rupture in this situation being more difficult.^{13,14}

As regards treatment, resection is carried out when the lesions are multiple, recurrent or cause patient discomfort.^{5,14,15} Conventional treatment of the mucocele is excision with the associated overlying mucosa and the glandular tissue down to the muscle layer. After excision, there may be occasional recurrence because surgery may damage the surrounding minor salivary glands, but this possibility is less likely if the adjacent glandular acini are removed. If the mucocele is merely incised, the contents will drain, but the lesion will reform as soon as the incision heals.¹⁶

Cryosurgery is an alternative nonsurgical method and a gas expansion cryosurgical system or cotton swab with liquid nitrogen can produce effective results.¹⁶

Another treatment option available is excision using lasers. Various soft tissue lasers have been used, eg, diode lasers and CO₂ lasers. A new addition to this generation of lasers is Er,Cr:YSGG laser. This laser emits energy at a wavelength of 2780 nm and delivers photons into an air-water spray matrix producing microexplosive forces on water droplets.¹⁷ It is a hydrokinetic system laser with a frequency of 20 Hz, pulse energy between 0 and 300 mJ, a focal distance of approximately 1.5 mm from the tissue, and has FDA approval for several soft tissue procedures. The water droplets of the water spray are energized by laser energy 1.5 mm from the end of the tip; thus, the most focused distance while working with this laser is 1.5 mm from the tissue so that less thermal damage occurs.

CASE REPORT

A 22-year-old male presented to the Department of Periodontics and Oral Implantology, Maulana Azad Institute of Dental Sciences, New Delhi, with a chief complaint of a recurrent painless swelling on the lower lip for the past 2 years. There was no significant medical history. History of the patient revealed that the swelling ruptured and then recurred spontaneously every 15 to 20 days.

The clinical examination revealed a round, sessile nodule in the lower lip's midline, which was 3 mm in diameter, fluctuant, of an elastic consistency and the same color as adjacent mucosa. No other oral anomalies were detected (Fig 1). This clinical examination led to a tentative diagnosis of a mucocele. The procedure was explained to the patient and a written informed consent was taken.

Local infiltrative perilesional anesthesia was applied (12 mg of 2% lidocaine with epinephrine 1:100,000). The anesthetic was not infiltrated directly into the lesion to avoid compromising the biopsy. The lip was then everted with digital pressure to increase the lesion's prominence. Patient and staff used special eye glasses for protection. The Er,Cr:YSGG laser application (short pulse 'H' mode) was done with a 600- μ m sapphire tip, 1.5 W power, 13% air and 9% water in noncontact mode (Fig 2). A circular incision was made around the lesion to obtain a proper biopsy sample. Irradiation of the mucocele was avoided and the laser circumscribed it to obtain the lesion in one piece (Fig 3). Once the lesion had been removed, the operation field was wiped with sterile gauze soaked in 1% normal saline solution (Fig 4). A laser bandage was applied with 0.5 W power with air and water switched off (Fig 5). The patient was advised to avoid smoking, alcohol and spicy foods. No analgesic was prescribed. No scar could be palpated or observed 4 weeks after the intervention. The patient was followed-up for a period of 1 year and no recurrence was observed (Fig 6).

Histological, light-microscopic examination with H&E staining revealed an area of mucus extravasation surrounded by dense fibrous connective tissue with infiltration of chronic inflammatory cells. Mucous salivary acini were seen in the vicinity (Fig 7). Mucus showing muciphages and chronic inflammatory cell infiltrate were observed. The surrounding connective tissue wall showed fibrovascular stroma with chronic inflammatory infiltrate (Fig 8) and confirmed the diagnosis of a mucous extravasation cyst.

Not for Publication



Fig 1 Pre-operative view.



Fig 2 Mucocele treatment with Er,Cr:YSGG laser.



Fig 3 Excised mucocele.



Fig 4 Lower lip after excision.

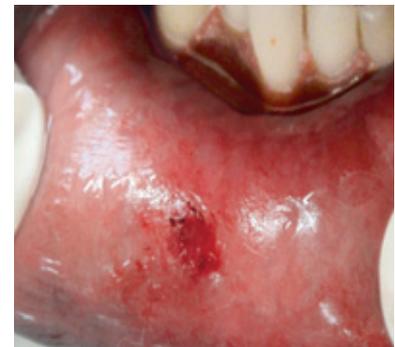


Fig 5 Laser bandage with Er,Cr:YSGG laser.



Fig 6 Fifteen days postoperatively.

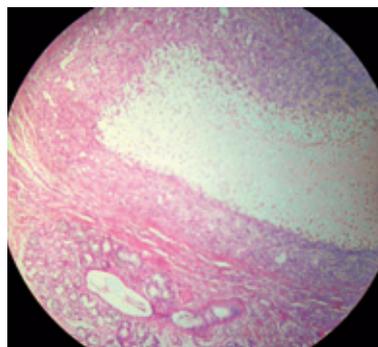


Fig 7 Histological sample stained with H&E, 100X magnification.

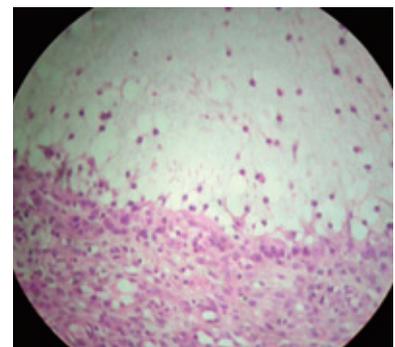


Fig 8 Histological sample stained with H&E, 400X magnification.

DISCUSSION

The incidence of mucoceles in the general population is 0.4% to 0.8%,⁶ with scant differences between males and females. An interesting and controversial aspect of mucoceles is their origin. Bhaskar et al¹⁹ suggested obstruction of the salivary gland ducts as the cause of mucoceles, though this hypothesis has lost support in favor of a traumatic origin of the lesions.²⁰ The literature contains a number of studies that confirm the traumatic etiology of these lesions.^{12,21}

As regards mucocele location in the oral cavity, most investigators consider the lower lip to be the most frequently affected location (40% to 80% of all cases), followed by the cheek mucosa and floor of the mouth. The literature describes different treatment options, including medication (Gamma-linolenic [GLA] acid), cryosurgery,²² intralesional corticosteroid injection,¹⁵ micromarsupialization,²³ marsupialization of the mucocele,^{1,24} conventional surgical removal of the lesion,^{1,12,21} and laser ablation.^{11,25-27} GLA is a precursor of prostaglandin E, and its use has been associated with limited success in the treatment of mucoceles.²⁸ GLA works by reducing inflammation through competitive inhibition of prostaglandins and leukotrienes. This is a possible mechanism for the anti-inflammatory, antiatherogenic, antithrombotic, and antiproliferative effects of GLA.^{28,29}

Micromarsupialization is a treatment technique that involves placing a 4.0 silk suture through the widest diameter of the lesion without including the underlying tissue. It is indicated for lesions less than 1 cm in size. The suture is then tied off and is left in place for 7 days. As a result, reepithelization of the duct occurs, creating a new epithelial-lined duct. This allows the saliva to be released from the duct.²³ However it is restricted to lesions with clinical characteristics that strongly suggest a diagnosis of mucocele, since histopathological examination is not possible.^{1,23,30}

Cryosurgery is a method of lesion destruction by rapid freezing. The lesion is frozen, and the resulting necrotic tissue is allowed to slough off spontaneously.³¹ Reported postoperative symptoms, however, include marked edema and irritation, as well as a prolonged healing time.^{30,32}

Vaporization with argon and Nd:YAG lasers has been described for the treatment of mucoceles.^{14,32} The diode laser (wavelength 800 to 810 nm), similar to argon and Nd:YAG lasers, has also been used for treating mucoceles. However, these lasers are intensely absorbed by hemoglobin, elevating the temperature and promoting coagulation and carbonization of soft

tissues such as oral mucosa. Hence, caution must be exercised while using these lasers to avoid excessive thermal damage to the soft tissues and consequent unfavorable postoperative symptoms.³⁰ CO₂ laser is less penetrating than the above-mentioned lasers but still has the potential to produce fibrous scars or destruction of the adjacent tissues.³³ The Er,Cr:YSGG laser is a very precise ablation instrument that offers certain advantages. It is strongly absorbed by water and causes minimal damage to the adjacent tissues, especially the underlying muscle layers. Due to minimal trauma to the adjacent tissues, postoperative healing was favorable, with very little scar formation. Postoperative bleeding in the case reported was minimal. No sutures were placed after the excision, as the denatured proteins serve as a natural wound dressing. In this case, there was little contraction and scarring.

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