

**Cryotherapy for Treatment of Mucocele: Case Report with Literature Review****Rajesh Sabnis, Deepak Thakur<sup>1</sup>, Manish Pandit<sup>1</sup>, Kamta Sahu<sup>2</sup>, Heena Khan<sup>2</sup>, Priyanka Chopra<sup>3</sup>**

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**ABSTRACT:**

Mucocele is one of the common lesions of oral mucosa resulting from an alteration of minor salivary glands, also known as mucous retention phenomenon. This report is a case of mucocele in right buccal vestibule. The lesion being small in size and located close to mental nerve area, cryotherapy was opted to be the choice of treatment. This article also presents literature review on the use of cryotherapy for the treatment of mucocele

**Keywords:** Cryotherapy, Cyst, Mucocele, Oro-facial.

**INTRODUCTION**

Mucocele is defined as a mucus filled cyst that can appear in the oral cavity, appendix, gall bladder, paranasal sinuses or lacrimal sac.<sup>1,2</sup> Mucocele term has been derived from a Latin word, mucus and cocele means cavity.<sup>3</sup> It is the seventeenth commonest salivary gland lesion found in the oral cavity.<sup>4</sup> This mucous retention cyst is lined by ductal epithelium and results from the accumulation of mucus in an obstructed and dilated excretory duct. Mucocele is formed by epithelial proliferation of a partially obstructed salivary duct, unable to adequately drain saliva produced, and in turn leading to duct dilatation and swelling henceforth.<sup>5-7</sup> Frequency of occurrence is highest on the lower lip<sup>8</sup> this in turn is related to a high incidence of mechanical trauma to the salivary duct, from biting, although the lesion can occur anywhere from the floor of the mouth, cheek, upper lip, tongue, retromolar fossa, and to the junction of the hard and soft palate. Clinically the lesion presents as an asymptomatic, fluctuant, bluish-gray swelling, which is usually less than 1 cm in diameter.<sup>9</sup> The lesion can withstand in the oral cavity from a few days to several years, and patients

may relate a history of recurrent swelling with periodic rupture and release of fluid. The most commonly affected ones are the children and young adults. Surgical excision still remains the most frequently recommended treatment for these lesions, but the trauma from surgical procedure may itself result in its recurrence.<sup>10,11</sup> Various treatment options like CO<sub>2</sub> laser ablation, cryosurgery, intra-lesion corticosteroid injection, micro marsupialization, marsupialization and electrocautery etc reported in literature.<sup>12-15</sup> So hereby there is an attempt to describe the use of a cheaper and relatively non-invasive approach-cryosurgery to treat mucoceles.

**HISTORY**

A 34-year-old male patient presented to the department of Oral and Maxillofacial surgery with the complaining of swelling on his right lower buccal vestibule since 2 weeks. History of present illness revealed swelling on his right buccal vestibule in premolar region following trauma 3 weeks ago while mastication. The patient's medical and family history revealed no significant findings. Clinical examination revealed a soft, fluctuant, palpable and non-

tender swelling with no rise in temperature, the swelling was oval shaped of approximately 0.5 x 1 cm in size (Figure 1).



Figure 1: Preoperative View of Mucocele

As the lesion was small in size and located in close proximity to mental nerve distribution area, cryotherapy for treatment under local anesthesia was the method of treatment opted. A cryoprobe (nitrous oxide) of spherical shape of tip diameter 1 cm was used. The lesion was exposed directly to three consecutive freeze-thaw cycles of 60 sec each. From the center of the lesion, cryoprobe was moved to the borders until the lesion appeared white and frozen, resembling an ice ball (Figure 2).



Figure 2: Application of Cryoprobe to Lesion

After 3 freeze-thaw cycle, lesion appeared erythematous with mild swelling (Figure 3). Patient was prescribed postoperative analgesic (Tab.Ketolorac 10 mg) for pain. Patient was scheduled for a 1- week, 4-weeks and 3-months postoperative evaluation. 1 week follow up showed that the mucocele had reduced in size. Lesion disappeared completely with no evidence of scarring, bleeding, or infection at 4 weeks evaluation.

At the 3-months follow-up visit, no recurrence was noted. (Figure 4)



Figure 3: After 3 freeze-thaw cycle



Figure 4: Followup After 3 Months

## DISCUSSION

Cryosurgery is the method of deliberate destruction of tissues by controlled cooling. James Arnott (1851) was the pioneer in reporting the therapeutic use of low temperature in malignant disease by means of salt /ice mixture applied to breast neoplasm. Gage has established the treatment of oral cancers with liquid nitrogen.<sup>16</sup> Currently, liquid nitrogen is one of the most popular cryogen agent used in different specialties of medical and dental sciences. If sufficient liquid nitrogen is applied by spray or probe, temperatures of -25°C to -50°C (-13°F to -58°F) can be achieved within 30 seconds. In general, temperatures of -20°C to -30°C (-4°F to -22°F) are required for the removal of benign lesions.

The basic principle of cryotherapy relies on rapid cooling, slow thawing and repetition of the freezing process to maximize tissue destruction. These two recognized methods

can be done either by a closed system with use of probes and nitrous oxide, or by an open system with the use of a liquid nitrogen spray or a cotton tip. In the present case, the closed system was employed. The probes are guided by the principles of Joule-Thompson expansion, which enables a substance to witness a drop in temperature when moved from a high pressure area to a lower pressure area. For example, when nitrous oxide is released from the high pressure inside the cryoprobe to the lower pressure cryo tip, the temperature drop allows freezing of the tissues. Presently, the optimal temperature of cell death is unclear, but, it has been clearly determined that most of the tissues freeze at  $-2.2^{\circ}\text{C}$  and the temperature must fall below  $-20^{\circ}\text{C}$  for cell death to occur. As the temperature drops during the freeze cycle, it is believed that extracellular water undergoes crystallization and the membrane lipids harden at low temperatures which in turn decreases the cell resistance to shrinkage. As soon the extracellular stores of water get diminished, the concentration of electrolyte increases. In order to counteract this concentration gradient, there is an out flux of intracellular water of the cell, and this water gets involved in the crystallisation process, the intracellular ice so formed gets trapped within the cellular membrane. As a result, the intracellular electrolytes reach the toxic levels, causing lethal damage to the cell. During a slow thaw cycle, the cells which are at the periphery of the cryo-lesion take up excess electrolytes. To equalise this gradient, water enters the cell and can lead to swelling and lysis.<sup>17,18</sup>

Immediately following treatment, cryolesions are indistinguishable from the original tissue. Inflammation gradually develops during first 24 hours after treatment, which further contributes to destruction of the lesion through immunologically mediated mechanisms. Following cryosurgery, blister formation and edema occur between 24 hours and 72 hours followed by crusting between 3 to 14 days in all patients.<sup>19</sup>

Marcusshamer et al.,<sup>20</sup> described the use of cryosurgery to treat mucoceles in 6 year old children, the treatment of which consisted of direct application of liquid nitrogen with a cotton swab without local anesthesia or any sedative agent. The authors mentioned that after 1 week, all patients returned for evaluation; in all 6 cases, the mucocele reduced in size, although a secondary application was performed, using the same method and the patients returned to the clinic 1 week later for a postoperative evaluation. All the lesions had disappeared completely. At the 6-month follow-up visit, no recurrence was observed in any patient. According to Farah and Savaget (2006) current protocols suggest that for most benign mucosal lesions, a 1- to 2-minute freeze-thaw cycle using a cryoprobe is sufficient. According to the literature, cryosurgery has advantages over conventional treatment of the mucoceles (surgical excision) which is extremely useful in patients in those patients where surgery is contraindicated as in medically compromised patients or elderly individuals. Among pediatric and anxious patients, the technique is easily performed, effective, and painless, requires no expensive supplies or injectible anesthesia, does not require patients to return for suture removal, it is better tolerated by fearful children.<sup>21-23</sup> It is also well received by patients due to the absence of bleeding and minimal to no scarring.<sup>24</sup> In addition, cryosurgery is a cheap and a safe treatment suitable for a day care practice. The chief disadvantage of this particular technique is the lack of a specimen to be examined microscopically for confirming the diagnosis. Other few of the disadvantages include unpredictable degree of swelling and lack of precision with depth and area of freezing. This technique is highly dependent on the skill and experience of the operator. A cryoprobe attached to the liquid nitrogen spray gun, however, can provide added versatility, depending on the site and types of the lesion.<sup>25</sup> Cryoprobe applied directly to the lesions is used in our case report. There are few contraindications with cryosurgery which are

related to concomitant illness, in which hyper reactions to cold may possibly occur or else delayed healing may be anticipated.<sup>26</sup>

## CONCLUSION

Cryotherapy is well-accepted by the patients as it is relatively a painless procedure and causes less discomfort, minimal to no scarring and the absence of bleeding. It is an efficient, easy, relatively safe and self-limiting method for almost all types of oral lesions.

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