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The CO_2 laser for excisional biopsy of oral mucocele: A case report

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Abstract

Mucocele is a prevalent oral mucosa lesion, which is generated due to a modification of minor salivary glands because of a mucous accumulation. Mucoceles can be found at any site of the oral mucosa where minor salivary glands exist. Treatment frequently includes surgical elimination. Nevertheless, cryosurgery, steroid injections, CO_2 laser, and micro-marsupialization are also reported. This study aimed at evaluating the outcome of a mucocele treatment with carbon dioxide laser. The patient was an 11-year-old girl with a Mucocele at the ventral surface of the tongue. the mucocele was removed under infiltrating local anesthesia, CO_2 laser was utilized, and the power was adjusted to 1 W. The patient was re-examined after 7, 14, and 30 days.

Key words: Mucocele, CO_2 laser, Biopsy

Introduction

Mucocele is prevalent oral mucosa lesion, which is generated from a modification of minor salivary glands because of a mucous accumulation. Mucocele includes mucin accumulation resulting in limited swelling (Bagán et al., 1990). 2 types of mucoceles can appear including extravasation and retention. Extravasation mucocele is generated due to a damaged salivary glands duct and the resulting leakage into the soft tissues around this gland. Retention mucocele occurs because of a reduction in or lack of glandular secretion generated by obstruction of the salivary gland ducts (Bonet et al., 2005). These lesions are defined as ranulas (because the inflammation resembles the cheeks of a frog) when they are situated on the floor of mouth (Baurmash, 2003).

Mucus is generated only by the minor salivary glands. Mucoceles can occur by extravasation or a retention mechanism. Extravasation mucoceles result from spillage of fluid from nearby tissue ducts or acini. This type of mucocele is generally present on the minor salivary glands. Physical trauma can lead to spillage of salivary secretion into nearby submucosal tissue. Inflammation becomes apparent because of stagnant mucus resulting from extravasation (Yamasoba et al., 1990). The occurrence of mucoceles is commonly high, including 2.5 lesions/1000 patients, usually in the 2nd decade of life (Guimarães et al., 2006; Bentley et al., 2003; Yagüe García et al., 2009). Based on numerous investigations, there is no variation between genders (Bagán et al., 1990; Yamasoba et al., 1990; Guimarães et al., 2006; Huang et al., 2007; de Camargo Moraes et al., 2009). The lower lip is the main site of the appearance of mucocele (Harrison, 1975) because it is the most likely site place for trauma, particularly at the premolar level (de Camargo Moraes et al., 2009). Mucoceles can be seen at any site of the oral cavity where salivary glands exist. Approximately 60-80% of the lesions exist on the lower lip (Harrison, 1975), while other common sites are the floor of the mouth, ventral surface of the tongue, cheek, and retromolar pad area (Guimarães et al., 2006). Mucoceles are identified mostly by clinical examination and having a former history of trauma. The examination comprises of the appearance as bluish to transparent, lesion onset, lesion location, size of the lesion, and any associated findings as traumatic occlusion or history of trauma (Bahadure et al., 2012).

There are varous treatment modalities such as cryosurgery (Twetman and Isaksson, 1990; Marcushamer et al., 1997; Yeh, 2000), intra-lesion injection of corticosteroids (Wilcox, 1978; Luiz et al., 2008), micro-marsupialization (Delbem et al., 2000), marsupialization to inhibit injury to neighboring anatomical structures (Baurmash, 1992), conventional surgical elimination of the lesion (Baurmash, 2003), and laser ablation (Cecconi et al., 2010). Conventional treatment is generally surgical extirpation of the nearby mucosa and glandular tissue down to the muscle layer. Conventional surgical excision entails complete resection of the mucocele through cautious dissection and ensuring that both the affected and neighboring glands are eliminated along with pathologic tissue before primary closure of the wound (Bodner and Tal, 1991). If superficial extravasation mucoceles resolve spontaneously, there is no need to treatment.

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The laser has many benefits over a scalpel in soft tissue dental surgery. Contrasting the scalpel, the laser has the capability to vaporize, coagulate, or cut. The laser causes immediate sterilization of the surgical wound, affords, for the most part, a bloodless surgery, and permits for a non-contact form of surgery and consequently no mechanical trauma to the tissue (Pick and Pecaro, 1987). At present, the CO_2 laser efficiency is better than all techniques because it provides rapid and simple mucocele ablation with no need to suture (Huang et al., 2007). The complete process takes 3-5 min and no postoperative bleeding and healing issues. The CO_2 laser also provides minimal damage to neighboring tissue (Niccoli-Filho and Morosolli, 2004), highly decontaminated, bloodless surgical field, less swelling, and postoperative pain with no need for analgesics (Yagüe García et al., 2009). Still using this technology to replace common surgical techniques have been questioned by many surgeons. Due to expensive laser generators and lack of familiarity with this technology, this technology has not been fully developed in our country (Mahmood Hashemi, 2005).

Case report

The patient was an 11-year-old girl with a lesion at the ventral surface of the tongue. She complained of collision with anterior teeth and speech impairment. In the clinical examination, a single pedicle exophytic lesion with a size of 4 mm and soft consistency on the ventral surface of the tongue were observed. In history, the patient presented that the lesion was first made 2-3 months ago when the chin and tongue were hit. She stated that the onset of the lesion was with a blue bruise change in the color and periods of discharge due to pressure and then recurrence (Fig. 1).

Fig. 1: Pedicle exophytic lesion.

The mucocele was removed under infiltrating perilesional local anesthesia (2% lidocaine with 1:100,000 epinephrine). The CO_2 laser was applied and the power was adjusted to 1W, defocalizing for controlling bleeding and/or for vaporizing residual pathologic tissue and focalizing for mucosa sectioning. A wooden spatula was used protect the teeth and nearby tissues. The resulting surgical wounds regardless of their depth, were allowed to heal by second intention (Fig. 2).

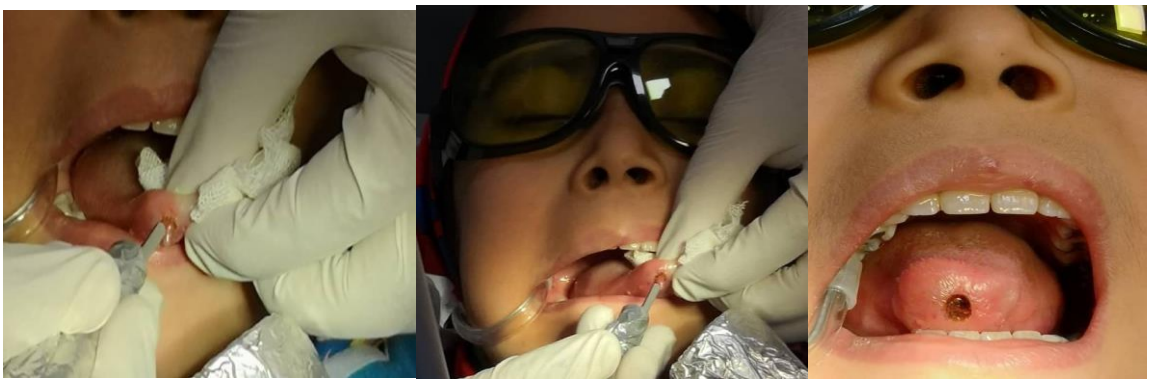

Fig.2: Removal of exophytic lesion with CO_2 laser

After surgery, the lesion was sent to the laboratory for histopathologic examination. The result showed that eosinophilic amorphous materials (Mucin like) were surrounded by granulation tissue and foamy mucinophag cells. Blood vessel and bleeding regions between collagen fibers were observed. The lesion was coated with paracrathinized squamous epithelium. diagnosis of mucocele was confirmed. The patient was followed after 1 week, 2 weeks (Fig. 3), and one month (Fig. 4).

Fig.3: follow up after a week

Fig.4: follow up after one month

Discussion:

The literature describes different treatment options, including cryosurgery (Twetman and Isaksson, 1990), intralesional corticosteroid injection (Wilcox, 1978), micro-marsupialization (Delbem et al., 2000), marsupialization of the mucocele (Baurmash, 2003; Cataldo and Mosadomi, 1970), conventional surgical removal of the lesion (Baurmash, 2003; Harrison, 1975; Cataldo and Mosadomi, 1970), and laser ablation (Huang et al., 2007; Frame, 1985; Pogrel et al., 1990; Tost et al., 1990). Some authors suggest a primary cryosurgical approach (Twetman and Isaksson, 1990) or the intralesional injection of corticosteroids (Wilcox, 1978). Nevertheless, the number of relapses related to these techniques is very high, and in most cases, therefore, need reintervention in the form of conventional surgery to guarantee the complete resolution of lesions.

It is suggested that in pediatric patients, micro-marsupialization is the best treatment alternative for mucoceles because this procedure is simple and rapid, with good results. This is the least traumatic of all the options and involves traversing the lesion along its maximum diameter with a suture thread that is left in place for at least 7 days (Delbem et al., 2000). Using the scalpel, Baurmash (2003) suggested complete resection of the mucocele through cautious dissection and ensuring that both the affected and neighboring glands are removed, along with the pathological tissue, before primary closure of the wound. This reduces the risk of relapse surgery utilizing a surgical blade, which causes a lot of bleeding and reduces visibility. It also needs suturing after surgery. Postoperative pain and the need for tissue transplantation are also problems related to this method (Mahmood Hashemi, 2005).

Of the two forms of lasers currently existing for dental applications, both the Nd:YAG and CO_2 lasers can be utilized for ablation of lesions, frenectomies, coagulation of graft donor sites, excisional and incisional biopsies, operculum removal, gingivectomies, soft tissue tuberosity reductions, gingivoplasties, and certain crown lengthening techniques. The benefits of lasers comprise a comparatively bloodless surgical and post-surgical course, minimal scarring and swelling, cutting, vaporization, and coagulation, reduction in surgical time, no or minimal suturing, and, in most cases, no or much less pain after surgery. CO_2 laser is faster than Nd:YAG for most techniques, with less tissue penetration depth and a well-documented history (Pick and Pecaro, 1987). Finally, the CO_2 laser frequently has been utilized in oral soft tissue surgery. However, it has been little used to date for treating oral mucoceles (Frame, 1985).

Water strongly absorbes this laser, and consequently its effect is rarely penetrating, and the action is mainly confined to the surface of the soft tissues. Moreover, the device is very potent and can offer power settings between 1-100W (Tost et al., 1995). According to Espa-ña et al. (Tost et al., 1995), the recommended power setting for treating oral soft tissues is 5-10W in most cases, since higher settings produce fibrous scars or destruction of the adjacent tissues. For this reason, we used the Lasersat 20W at the power of 5-7W.

The CO_2 laser was seen to offer a range of advantages with respect to the scalpel (Tost et al., 1995). Firstly, the CO_2 laser allowed rapid and simple mucocele ablation. In coincidence with the observations of Huang et al. (2007), we found the total treatment time with the laser to be 3-5 minutes. This was less than with the scalpel that requires a meticulous technique as well as suturing of the lesion at the end of the surgery. For this reason, re-section using the CO_2 laser also would be indicated in pediatric and geriatric patients, who are less able to tolerate long procedures.

Another advantage of the CO_2 laser is the minimization of complications and relapses. However, few studies have been published on this subject. A review of the literature yielded only 2 investigations that involved a small number of mucoceles treated with the CO_2 laser (Kopp and St-Hilaire, 2004; Frame, 1985), and a publication by Huang et al. (2007), in which 82 lower lip mucoceles were treated with this type of laser. These latter authors recorded no postoperative bleeding or healing problems. One case of lower lip paresthesia was observed that lasted two weeks. Furthermore, only two relapses were documented among the 82 lower lip mucoceles treated with the CO_2 laser. Our own findings agree with those of Huang et al. (2007) in which postoperative relapses and complications following ablation of the lower lip mucoceles with the CO_2 laser were minimal. In addition, we recorded no lip paresthesias or bleeding, and only one recurrence was documented.

According to Basu et al. (1988), healing of the wounds caused by the CO_2 laser includes the appearance of a fibroserous membrane after 72 hours that substitutes the superficial necrotic layer of the irradiated tissue. The epithelial covering of the wound begins from the periphery after two weeks and is thinner and parakeratotic in contrast with the epithelium that appears after scalpel resection. Probably, for this reason, the esthetic outcome of all the CO_2 laser interventions was excellent, with no fibrosis or scarring, while the scalpel left small residual esthetic defects after the usual healing period, in 5 of the 25 lower lip mucoceles treated with this surgical instrument.

Other advantages of the CO_2 laser versus the cold scalpel are minimal damage to the neighboring tissues, a bloodless and highly decontaminated surgical bed, lessened swelling and pain during the postoperative period, and the appearance of fewer myofibroblasts resulting in relatively less wound contraction (Kopp and St-Hilaire, 2004; Frame, 1985; Tost et al., 1995). Our observation of only minimal postoperative pain and swelling coincides with the findings of other authors (Huang et al., 2007; Pogrel et al., 1990; Silva et al., 2004). No medication was needed in any of the patients subjected to CO_2 laser treatment, compared with the need for analgesia in over half of all scalpel-treated patients.

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