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Mucocele of the minor salivary glands in an infant: treatment with diode laser

ABSTRACT

Background Mucoceles are benign lesions that develop as a result of retention or extravasation of mucous material from minor salivary glands. Very uncommon in newborns and infants, they rarely may interfere with breastfeeding and compromise the respiratory function.

Case report We report a case of mucocele in a three-month-old infant in the right labial commissure excised by diode laser of different wavelengths (635–980 nm), with an average power of 1.8 W, in continuous wave mode, using 300 to 320 µm optical fibers. The healing occurred in 10 days. There were no adverse effects and the patient was carefully followed-up until complete healing.

Conclusion The diode laser is not only a valuable tool for mucocele eradication but it also reduces relapses, thanks to the characteristics of the laser light.

Keywords Buccal mucosa; Diode laser; Mucocele; Salivary gland.

Introduction

Mucoceles are common minor salivary gland lesions, clinically characterised by single or multiple, spherical, fluctuant, well-circumscribed nodules which are generally asymptomatic [Anastassov et al., 2000;

Gatti et al., 2001]. They may originate by a trauma of the excretory duct of the salivary glands thus causing duct transection or rupture of the excretory duct or of the acinus, with consequent extravasation of mucin to the connective tissue stroma (mucus extravasation type). In addition, mucus might be retained in the duct and/or acinus as a result of duct obstruction (mucus retention type). In this latter case, the cavity is lined with epithelium [Gatti et al., 2001]. Extravasation-type mucoceles are the most frequent, whereas retention-type mucoceles are very rare [Gatti et al., 2001; Yagüe-García et al., 2009; Granholm et al., 2009]. Congenital mucoceles may be caused by congenital atresia of the salivary duct or by a trauma of the baby's oral tissues during pregnancy or at birth (intrauterine finger sucking, passage through the delivery channel, use of forceps during delivery, newborn manipulation by attending nurses and doctors) [Gatti et al., 2001; Yagüe-García et al., 2009; Granholm et al., 2009].

The lower lip is the region most affected by mucoceles [Gatti et al., 2001; Knapp, 1971; Anastassov et al., 2000; Bhaskar et al., 1956; Cataldo and Mosadomi, 2002; Jinbu et al., 2003; Wilcox and History, 1978; Silva et al., 200; Arendorf and Van Wyk, 1981]. However, cases of mucoceles involving the upper lip, palate, retromolar region, buccal mucosa, lingual frenum and dorsal tongue have been reported [Baurmash, 2002; Harrison, 1975; Cataldo and Mosadomi, 2002; Jinbu et al., 2003 b; Wilcox and History, 1978; Silva et al., 2004; Arendorf and Van Wyk, 1981; Eversole and Sabes, 1971], mucoceles located in the floor of the mouth have been also reported [Anastassov et al., 2000; Gatti et al., 2001; Baurmash, 2002; Knapp, 1971; Harrison, 1975; Anastassov et al., 2000; Cataldo and Mosadomi, 2002; Wilcox and History, 1978; Silva et al., 2004; Arendorf and Van Wyk, 1981; Twetman and Isaksson, 1990; Delbem, 2000] and are designated with the term ranula. The name comes from the Latin word for frog, *rana*, because of its resemblance with the animal. Ranulas are generally related to the duct systems of the sublingual salivary glands and, less frequently, to the submandibular gland and minor salivary gland ducts of the floor of the mouth. Depending on size and location, patients may present external swelling and consequent discomfort, interference with speech, mastication and swallowing [Cataldo and Mosadomi, 2002].

Different treatment techniques have been used for mucoceles of the oral cavity, including needle aspiration [Silva et al., 2004], cryosurgery, sclerotherapy, intralesional corticosteroid injection [Wilcox and History, 1978], micro-marsupialisation [Delbem, 2000], marsupialisation [Anastassov et al., 2000; Cataldo and Mosadomi, 2002], conventional surgical removal of the lesion [Anastassov et al., 2000; Harrison, 1975; Cataldo and Mosadomi, 2002] and laser ablation [Kopp and St-Hilaire, 2004; Frame, 1985; Pogrel et al., 1990; Huang et al., 2007]. There have also been few reported cases of spontaneous resolution of these lesions [Granholm et al., 2009; Jinbu



FIG. 1 The first visit.



FIG. 2 Clinical image showing the lesion in the right labial commissure.

et al., 2003 a; Silva et al., 2004]. We report a case treated with diode laser to remove the lesion.

Case report

A 3-month-old male infant was referred to the Department of Maternal and Child Dentistry of the Italian Stomatological Institute (ISI), for a nodular lesion on the labial commissure (Fig. 1). The mother stated that the lesion first appeared 10 days before the visit and that progressively increased in size. She also reported hospitalisation at 20-days of age for a bronchiolitis caused by human respiratory syncytial virus (RSV). The lesion on the child's commissure interfered with feeding. Clinical examination revealed a translucent, fluid-filled swelling that was soft in consistency and measured 1.5 cm in size (Fig. 1, 2). After a period of wait-and-see, the lesion persisted and slightly increased in size. Surgical excision was decided upon.

Patient's parents signed an informed written consent for publication of the manuscript and figures.

Surgical procedure

Treatment was performed with a diode laser (wavelength 635–980 nm, from 1.6 to 1.8W average power in continuous mode, optical fiber of 320 μm) (Fig. 3, 4). Before and during laser therapy, the surface was cooled with physiological solution to protect the superficial tissues from damage. Treatment was performed without topical, local, or general anaesthesia, nor oral analgesic. Frequent contact cooling was employed to avoid ulceration. Irradiation was delivered by means of a flexible quartz fiber that was kept in contact with the lesion, at an energy output of 1.6–8.8W with an average power of 1.7W, in continuous wave mode for 5–10s with a mean fluence of 11–22 J/cm^2 (Fig. 5). At first step, three applications were made, of 20s each, keeping the laser tip at a distance of 1 cm to obtain an analgesic effect in the surgical area. The total fluence to achieve the analgesic effect was delivered during 20s, for three times (total 1 min) with 2.0W in continuous wave (CW) mode in the non-contact mode, keeping the laser tip at a distance of 1 cm from the tissue. The specimens obtained were fixed in 10% formalin solution for histological study to



FIG. 3 The position of the neoformation interfered with feeding.



FIG. 4 Treatment with diode laser.



FIG. 5 The final phase of surgery with diode laser.



FIG. 6 Postsurgical image.



FIG. 7 Two weeks after surgery.

establish the definitive diagnosis.

Histology

Sections of the surgical sample were cut into 3- μ m-thick sections and stained with hematoxylin and eosin. Microscopic examination revealed a soft tissue lesion covered by stratified squamous epithelium. There was a space within the connective tissue lined by granulation tissue and filled with neutrophils, macrophages, and mucin. A minor salivary gland with some degree of atrophy of the acini and a slightly dilated duct was found adjacent to the mucocele. The histologic diagnosis was mucocele (extravasation type) (Fig. 6).

Postsurgical procedure

The resulting surgical wounds healed by second intention, regardless of their depth (Fig. 7). No antibiotics or anti-inflammatory analgesics were prescribed. Chlorhexidine was applied as a gel (0.2%) to the surgical zone twice per day in order to maintain good postoperative oral hygiene. The follow-up after 14 days showed a perfect healing of the wound, with restitution ad integrum. In only 2 weeks, the patient had gained all the weight lost (Fig. 8).

Discussion

Mucoceles are asymptomatic lesions that are frequently diagnosed only at routine clinical controls. Very rarely they create difficulties in differential diagnosis. The lesions similar to mucoceles are: epignathus, gingival cyst, palatal cyst, thyroglossal cyst, congenital epulis, vascular hamartoma, lymphangioma and oropharyngeal teratoma [Anastassov et al., 2000; Granholm et al., 2009]. Mucoceles of the buccal mucosa may easily be traumatised, becoming a source of irritation and discomfort for the patient, therefore requiring prompt removal [Yagüe-García et al., 2009]. The decision to perform the surgical procedure in an infant depends on the extent of the patient's respiration and feeding difficulties as well as on the child's development [Granholm et al., 2009]. An early surgical intervention provides a prompt and satisfactory resolution of the problem and also a routine follow-up is fundamental for managing this lesion. The main therapeutic indication is surgical resection, and because of their superficiality and their clear demarcation versus healthy tissues, they are almost always easily removable. In this case, we used the diode laser and the surgical procedure was postponed until the tumefaction of the cheek increased in size. The operation had no surgical difficulty, but its complexity was increased by the young age of the patient, the need to perform a non-traumatic intervention and the urgency of the surgery, since the infant was not sufficiently fed and therefore he was not gaining weight. However, we decided

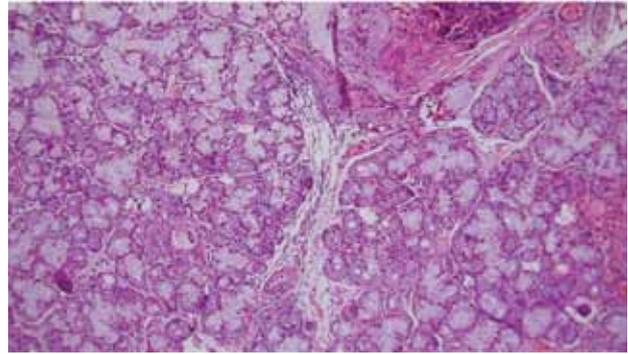


FIG. 8 Photomicrograph of a granulation tissue lined a space filled with mucin, macrophages, and neutrophils (Hematoxylin-Eosin, original magnification 100 x).

to operate with laser diodes, since this technique ensures some advantages over the traditional method, including a rapid and simple excision of mucocele. In according with the observations of Huang et al. [2007], we found that the total treatment time with the laser was 5 minutes. This is less than with the surgery, which requires a meticulous technique and also sutures at the end of the operation. Other advantages of the diode laser is minimisation of complications and relapse, quick and painless surgical operation without the use of local anaesthesia, control of bleeding during incision, and the postoperative recovery is often asymptomatic [Baurmash, 2002].

Our results coincide with those of Huang et al. [2007] where postoperative complications and relapses were minimal following ablation of the lower lip mucoceles with the CO₂ laser. Moreover, we recorded no bleeding or paresthesias, and no recurrence was documented. There has been no evidence of recurrence during the 6-month follow-up.

Conclusion

Early diagnosis is crucial, since it will allow to plan an effective management strategy for a possible establishment of a respiratory distress. To our knowledge, this is the first case treated with diode laser reported in the literature. The use of lasers in paediatric dentistry should be encouraged, once the dentist has received specific and comprehensive training on the use of this technology.

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