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LASER-ASSISTED TREATMENT OF ORAL MUCOCELE: AN EFFECTIVE AND MINIMALLY INVASIVE APPROACH

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Abstract

Mucus build-up in the major and minor salivary glands causes mucoceles, which are nonneoplastic cystic lesions. Children are the most common age group for these lesions. Although local surgical excision is typically an option for treating these lesions, in this instance, a diode laser with a wavelength of 940 nm was used for excision in order to prevent intraoperative surgical problems including haemorrhage and oedema and to promote better healing.

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Introduction

Mucoceles, also referred to as "mucus filled cavities," are typically found in the paranasal sinuses, lacrimal sac, and oral cavity.[1] The two most common major mechanical obstructive disorders of the salivary glands are mucus extravasation and mucus retention.[2] The primary cause of mucus extravasation cyst formation is mechanical trauma that ruptures the salivary gland's ductal system, allowing mucin to seep into nearby soft tissues.[3,4] Mucus retention cysts are mostly caused by obstruction of the walls of the salivary ducts, which dilates the ducts without allowing mucus to spill.[5,6]

Case Report

A male 16-year-old had been experiencing swelling in the lower left labial mucosal area for several months. He reported sporadic swelling that frequently bursts and goes away for a few days. Clinical examination revealed a soft lesion of about 2 by 2 cm [Figure 1 (a.b)]. Mucocele was compatible with the history and clinical manifestations. The patient's guardian was informed about a number of treatment options, including surgical incision, cauterization, and laser excision, and consent to the most recent treatment option—laser excision—was gained. The lesion was removed using a soft diode laser with a wavelength of 940 nm and a tip diameter of 400 µm at 1.5 W in continuous mode after a minimum infiltration with 1,000,000 lignocaine. The lesion was completely excised when the incision was made on its topmost location (Figures 2, 3)(a), and (b)). Histopathological analysis of the specimen revealed a strong fibrous capsule lining a cystic cavity. Mucin, foamy macrophages, and persistent inflammatory cells are found in the cystic lumen. There were also visible areas of coagulation necrosis around the planned biopsy material. There was also a nearby mucous salivary gland visible. Mucous extravasation cyst was diagnosed based on all these histological characteristics. Analgesics were prescribed to the patient. After three weeks of follow-up, there was healing.

Figure 1 (a & b): Showing Mucocele in Lower Labial

Figure 2 (a & b): Showing Removal of Mucocele with Diode Laser in the Lower Labial

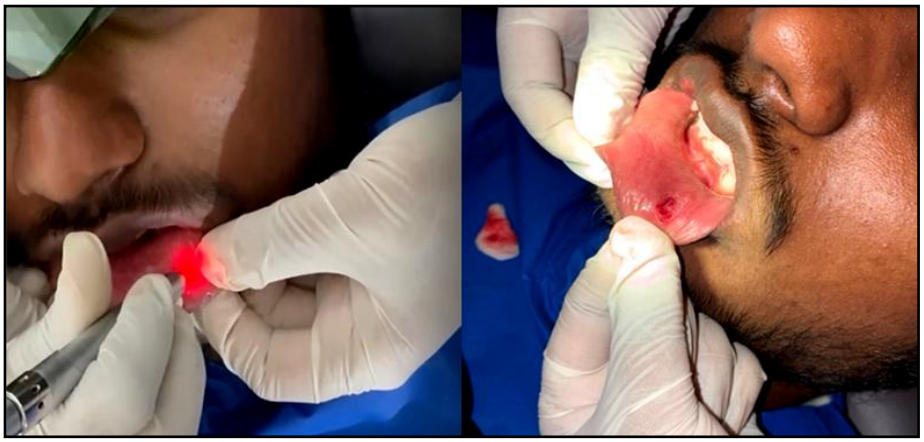

Figure 3 (a & b): Showing Photo Biomodulation and Complete Removal of Mucocele in Lower Labial Mucosa

Discussion

After irritational fibroma, mucocele is the second most frequent lesion in the oral cavity. This lesion is equally distributed by gender in the age range of 10 to 29 years.[7] Mucoceles are mucosal swellings that resemble domes and have a distinctive mucin build-up. These lesions often have a translucent, bluish colour and range in size from 1-2 mm to several centimetres.[3,8] Mucocele most frequently occurs on the lower lip, followed by the floor of the mouth and buccal mucosa.[9] The different clinical symptoms, such as outward swelling, pain, and difficulties with speech, swallowing, and mastication, depend on the size and location of mucoceles.[7] Histopathologic analysis of mucocele frequently shows the development of a well-defined, cyst-like area encircled by granulation tissue, as well as the presence

of mucinophages in the granulation tissue's collapsed wall.[10] Mucocele most commonly occurs on the lower lip, followed by the buccal mucosa and the floor of the mouth.[9] Depending on the size and location of mucoceles, external enlargement, difficulties with mastication, swallowing, and speaking, as well as discomfort, may develop.[7] Histopathologic examination of mucocele frequently indicates the creation of a well-circumscribed, cyst-like area surrounded by granulation tissue and the presence of mucinophages in the collapsed wall of granulation tissue.[10] There are several therapy options for early mucocele care, including knife incision, total surgical excision, marsupialization, micro marsupialization, intralesional corticosteroid injections, cryosurgery, laser ablation, sclerosing agent, and electrocautery.[8] The primary benefits of soft tissue laser applications include low intraoperative bleeding and swelling, as well as postoperative pain, and very little surgical time, scarring, and coagulation, with no need for suturing after excision due to natural wound dressing caused by denatured proteins. Various treatments, such as minor and major soft tissue surgery, bone cutting, and implant exposure with bone removal, can be performed in patients with bleeding disorders utilizing soft tissue lasers.[11,12] Semiconductor diode lasers are available in multiple wavelengths, including 810-830 nm, 940 nm, and 980 nm.[13]. The use of 940 nm resulted in excellent haemostasis due to its affinity for pigments like haemoglobin.[14] The absorption of laser light into the target tissue produces heat through a photothermal process, which further induces intra- and extracellular vaporization of cells, resulting in cellular explosion and tissue ablation. When the laser is applied for an extended period of time, adjacent lateral tissues will absorb heat as well. This will happen in concentric serial circles surrounding the homogeneous target tissue. Laser thermal effects cause reversible or irreversible damage to the areas surrounding the target tissue, resulting in zone of coagulation necrosis. With prolonged laser therapy, healing may be delayed and the wound site may grow larger. On the other hand, sealing small diameter vessels rather than the area of coagulation necrosis provides benefits such as haemostasis during laser surgery. Adjacent coagulation results in reduced bleeding at the surgical site. The appearance of necrotic and coagulated tissue borders in an incisional or excisional biopsy can complicate histological identification.[15] The histological evaluation of laser removed tissue reveals better epithelization and decreased inflammation. An intact basement membrane and connective tissue matrix can also be seen. Matrix proteins trigger reparative synthesis in these tissues. The resistance of matrix proteins to laser application and replacement, as well as the elimination of leftover matrix, is responsible for reduced scarring and contraction.[16]

Conclusion

Our current case study demonstrates the use of a diode laser for the treatment of mucocele, which has a range of benefits including minimal anaesthetic, shorter procedure times, good surgical site visualization, haemostasis, and minimal carbonization in 45 days of periodical follow-up. Laser therapy can alleviate uncertainty and dread in paediatric and geriatric patients.

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