CASE REPORT

REMOVAL OF SALIVARY GLAND MUCOCELE USING 980NM DIODE LASER

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ABSTRACT

Mucoceles are small non-neoplastic cysts that are present in major and minor salivary glands of the oral cavity. They are formed due to the buildup of mucus. Mostly, these Mucoceles are present in young adults. Giving a local surgical excision is the preferable form of treatment. However, in order to avoid intraoperative surgical complications such as bleeding, edema and the need for sutures, a diode laser with the wavelength of 980 nm was used for the Excision of the Mucocele. As a result quick and improved healing was achieved.

Keywords: Laser, Diode, Mucocele, Excision.

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INTRODUCTION

Mucoceles, the"mucus filled cavities," are present in the oral cavity, lacrimal sac, and paranasal sinuses[1]. The two most common are Mucus extravasation and mucus retention cysts[2]. Mucus extravasation cyst is formed primarily due to traumatic injury to the salivary gland's ductal system due to which it gets ruptured, causing drainage of mucin in to the surrounding tissues[3,4]. Whereas, mucus retention cyst is formed when the salivary duct gets obstructed and dilated, however, there is no drainage of mucin[5, 6].

CASE REPORT

A 27-year-old female came to the clinic with a swollen mass localized in the lower left labial mucosal region. Regarding her swelling she reported her condition which she has been experiencing for the past year. She explained that swellings were painless and were of periodic nature after bursting and disappearing every few days. Clinical examination revealed the lesion to be 1×1 cm in size, fluid-filled, painless and soft (Figure 1). On the basis of signs and symptoms the diagnosis was made as a minor salivary gland Mucocele. The patient was explained different treatment modalities including surgical incision, cauterization, and laser excision however, she opted for diode laser excision. Following infiltration of 1:2,00,000 Xylocaine, the excision of cystic lesion was done using diode laser (wavelength 980nm, 200µm diameter tip) at 3.5W impulse mode, with a mean wattage of 1.75W. Initially the uppermost border of the lesion was excised followed by complete excision (Figures shown)

Figure 1: (A) Pre-op; (B) Immediately post op. 635nm laser was used for biostimulation of the lesion

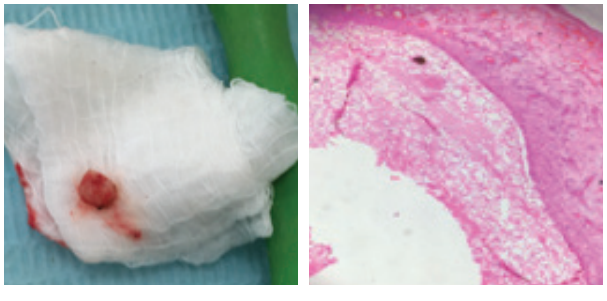
immediately post op. Biostimulation was done for just 20 seconds with a combined energy of 20J/cm2 (Figure 2).

A

B

Figure 2: (A) 635nm laser was used for biostimulation; (B) two days post op.

The specimen was placed in 10 % formalin and sent to the lab for histopathological examination. The results showed a cystic cavity lined by thick fibrous capsule. Mucin was present in the lumen of the cyst along with macrophages, and chronic inflammatory cells. Coagulation necrosis and Mucous salivary gland were seen. Mucous extravasation cyst was diagnosed after histopathological examination (Figure 3).



A B

Figure 3: (A) Gross specimen; (B) Histopathology of Mucocele

DISCUSSION

Mucoceles are common in the oral cavity and also the second most common lesion in the oral cavity. The lesion usually has incidence in the age of 11 to 29 years of age and has equal distribution amongst both gender[5]. Mucoceles are swellings which have a bubble or dome shaped appearance and a collection of mucin which is a distinguishing feature. Mucoceles range in size from 1-2mm to a few centimeters and give a blue or transparent hue[3- 8]. They are commonly found in the lower lip after that in the buccal mucosa and then floor of mouth[9]. Various clinical features are present which depend on the site and size of the swellings. These could be internal or external swellings and could hinder in mastication, speech, swallowing and is sometimes accompanied with general oral discomfort[7].

Oral mucocele histopathology often reveals a well-circumscribed arrangement, with a space which is cyst-like, surrounded by granulation tissue and the wall of granulation tissue has macrophages present in it[10]. To minimize the recurrence of mucocele the adjoining salivary glands and associated tissue should also be in the excised tissue.

Various treatment options are present to treat mucoceles: These include incision given by scalpel, removing the entire lesion by surgical excision, micromarsupialization, marsupialization, corticosteroids injections within the lesion, laser ablation, cryosurgery, electrocautery and sclerosing agent[8].

There are numerous research based advantages of soft tissue diode laser. The major advantages of using soft tissue lasers are short surgical operating time, reduced intraoperative bleeding, less swelling, reduced post operative pain, decreased scarring, and coagulation. Sutures are not needed after excision because denatured proteins act as the natural dressing which is present immediately post operative. Patients with bleeding disorders can also be treated for who require minor or major surgeries[11,12].

The treatment time in total was 10 minutes from infiltration of anesthesia to the excision. There was no intraoperative pain or discomfort felt by the patient.

Diode lasers with semiconductor generators are available in multiple wavelengths which are 610-635, 810–830 nm, 940 nm, and 980 nm[13].

In this case, a 980 nm wavelength laser with an activated tip, which was in direct contact with the tissue was used. This wavelength has shown to have excellent hemostatic capability because of its

high affinity for dark pigments such as hemoglobin which is present in the blood[14].There are many different types of lasers such as Er:YAG, Nd:YAG and CO2 lasers. Diode lasers present a useful alternative to other surgical lasers mentioned above. They have a small size and low cost, which is an advantage. The operator can achieve well-defined margins, as well as hemostasis and coagulation during the excisions[12].

The energy emitted from the laser is then absorbed into the tissue of the target area and uses photothermal effect which causes intra- and extracellular vaporization of the target cells, this results in cellular decomposition and ablation of the tissue. Lateral tissues adjacent to the lesion also absorb heat on laser application but they have localized vasodilation effect[13]. Thermal effects of the laser can result in reversible or irreversible damage to the tissues that surround the target area and will eventually form a zone of coagulation necrosis. Healing maybe delayed and the site of the wound may become larger if time of laser application is increased due to operator error. On the other hand, the small vessels around the lesion are sealed due to the coagulation effect of the laser and this helps in hemostasis. This results in less bleeding at the site of the surgery. The presence of coagulated and necrotic tissue at the border of the incisional or excisional biopsy may result in complexity of histopathological identification[15].
Histological examination of tissues, which was excised using lasers, showed better epithelization and little inflammation. Intact basement membrane and connective tissue matrix can also be observed. Matrix proteins play a role in the initiation of reparative synthesis on these tissues. Resistance to damage to the matrix proteins against laser application and replacement as well as removal of residual matrix is responsible for reduced scarring and contraction[16].
Immediate post operative laser biostimulation was done using a 635nm laser. This improved healing and reduced post operative pain. Biostimulation has shown to increase cellular proliferation and better healing of the tissues. It has also shown to Increase local blood flow and decrease prostaglandin formation in the target tissues[17]. Two day post op figure shows that the wound has almost completely healed with epithelium formation over the wound (Figure 2).

CONCLUSION

This case report highlights that using diode laser for the treatment of mucocele has various beneficial effects which include the amount of anesthesia administered is less, procedural timings is markedly decreased, surgical site visualization is improved due to lack of bleeding, and carbonization of the tissues is minimal. Target tissue showed complete healing in fifteen days of regular follow-up. Lasers make it possible to lessen any apprehension and fear in children and old age patients for surgical procedures. Also the absence of sutures has a psychological impact and a sense of relief in the patients.

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