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Research Article

Diode Laser 980 nm - A Modality of Choice for the Management of Mucocele

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Abstract

The objective: The objective of this study is to compare the results obtained from treatment of mucocele with cold scalpel versus 980 nm diode laser.
Introduction: Mucoceles are common benign lesions of the oral cavity that develop following extra vacation or retention of mucous material from salivary glands in the subepithelialtissue. Treatment may be performed by conventional surgery, cryotherapy and more recently laser surgery.
Material and methods: In this study we report 20 cases with mucoceles of the lower lip treated in the Dental Clinic of the University of Tirana from January 2017 to January 2021, 10 of them are resected with a scalpel and 10 with 980 nm diode laser. We have documented the operative treatment and postoperative follow-up for each patients for the evaluation of early and long term results.
Results: Diode laser surgery was rapid and bloodless. Postoperative period was without complication, after one month from the treatment with laser no scar formation was reported versus the cases treated with scalpel. After 1-3 years of follow-up no recurrence was recorded after laser surgery compared with 3 cases of recurrence among the cases of conventional surgical removal of mucocele.
Conclusion: 980 nm diode laser is a good modality for the treatment of mucocele´s lip. This treatment provides satisfactory results and is also well-accepted by all age groups.

Keywords

980 nm Diode Laser, Woundhealing, Recurrence, Functional Disturbance

Declaration of Conflicting Interest

There are no conflicts of interest

Introduction

Mucoceles are defined as mucus-filled cavities that can appear in the oral cavity, paranasal sinuses or lacrimal sac. They are characterized by the accumulation of liquid or mucoidmaterial, giving rise to a rounded, well circumscribed transparent and bluish–colored lesion of variable size [1, 3, 5, 7]. The consistency is tipically soft and fluctuant in response to palpation. Mucoceles are painless and tend to relapse. Etiologicall, mostmucoceles are considered to be secondary to traumatic or obstructive disorders of the mainly minor salivary glands – the preferential location being the humid mucosa of the lower lip. Mucoceles are usually asymptomatic, though in some patients they can cause discomfort by interfering with speech, chewing or swallowing. They can be different in size, small and large. However in most cases these lesions rupture spontaneously or traumatically a few hours after being formed, with the release of a characteristic viscous, mucoidfluid. This may give the mistaken impression of healing, since the lesion decreases in size or disappears. However once the small perforation allowing release of the mucocele contents has healed, the secretions accumulate again and the lesion relapses [5, 9, 15]. On the other hand in the case of repeated trauma the lesion may become nodular and firmer in response to palpation with rupture in this situation being more difficult. Treatment may be performed by conventional

surgery, cryotherapy and more recently laser surgery. Carbon dioxide laser and high-intensity diode laser both provided satisfactory results [8]. The purpose of this study was to evaluate the effectiveness of 980 nm diode laser in the treatment of mucocele of lower lip and also to compare the results obtained after mucoceleresection with scalpel versus 980 nm diode laser.

Patients and Methods

A total of 10 patients (6 males and 4 females) aged 15 to 40 were treated for mucocele of the lip with 980 nm diode laser. An initial clinical examination consisting of the past medical and dental history and as well as thorough extra and intra oral examination were performed on all patients. Complementary blood test, complete blood count and erythrocyte sedimentation rate made it possible to exclude infectious diseases. The collected data were evaluated and a clinical diagnosis for the type of lesion was established [Figure.1]. All patients were given a written and verbal information on the nature of laser treatment and signed informed consent forms were obtained prior to treatment. Treatments were conducted from January 2007 to January 2011 at the Department of Oral Surgery (Dental Clinic of the University of Tirana, Albania). For all treatment a diode laser was used [Sirona, 980 nm, cw, opticalfibre 300 micrometer, 4 w]. Treatment were conducted with infiltration anesthesia 2% lidocaine, 1cc and excision was performed by surgical technique. The treatment area was cooled by the application of ice 2 to 5 minutes after treatment. Surgical fields were bloodless, no sutures were required and time of surgery was 2-4 minutes. The specimens obtained were fixed in 10% formalin solution for posterior histological study to establish the definitive diagnosis. The resulting surgical wounds were allowed to heal by second intention [see Figure.3]. After treatment analgesic medication was prescribed to be used if necessary, but no antibiotics were prescribed. 10 clinical cases of mucoceles were treated by scalpel. An elliptic incision was made to fully enucleate the lesion along with the overlying mucosa and the affected glands. The operation proved more complicated when the lesion ruptured, since the loss of references made it more difficult to ensure complete elimination of the lesion. The wounds were finally sutured. The follow-up visits were schedulated 10 days, one month, six months, one year and three year after surgery. All lesions were photographically documented at all stages of treatment and healing.

Results

The study comprised 20 patients (12 Males & 8 Females), 6 cases presented between10-20 years of age, 9 cases between 20-30 years of age, 3 cases between 30-40 years of age and 2 cases between 40-50 years of age. In most of the cases there was not evident etiological factor. Mucoceles ranged from 1-3 cm in diameter, no pain was reported by all patients, and only 7 patients referred discomfort associated with nibbling of the lesion. Immediately after the excision all surgical fields were bloodles [see Figure.4]. Histopathological examination confirmed the initially diagnosis. All patients were followed up seven days postoperatively for pain and swelling.

After four weeks the wound healing characteristics of all clinical cases were evaluated. Patients treated with diode laser reported a good, confortable healing without complications [see Figure.4] and functional disturbances versus 10 scar formations and 4 relapses with scalpel. After six months to one year no recurrence was observed in patients treated with laser versus 3 cases treated with scalpel. No lip paresthesias were recorded after the treatment of both groups of patients.

Figure.1 Bardhoshi figure.1.tif

Figure.2 Bardhoshi figure.2.tif

Figure.3 Bardhoshi figure.3.tif

Figure.4 Bardhoshi figure.4.tif

Discussion

In our study 52% of the lesions were found in males. In all our clinical cases mucocele growth was generally found to be slow. Due to the anamnesa taken from the patients some of them reported accidental traumatism and suction habits. Lesions varie in size between 0,2mm and 2cm in diameter without symptoms. Using the scalpel authors [1, 3, 5, 8, 9] proposes removal of both the affected and neighboring glands in order to prevent relapse. Special care is required to avoid damaging other glands or ducts with the suture needle, as this may become a cause of recurrence. The total treatment time with laser was 3-5 minutes, the same as authors report in the literature reports [2, 7, 12]. This was less than the scalpel which required sutures after the fully enucleation of lesion by an elliptic incision whereas wound treated by laser surgery healed by second intention regardless of their depth, however the wound surgical´s size is increased comparing to the lesion´size. Laser surgery is an option of choice for pediatric and geriartric patients who have difficulties tolerating long surgical procedures. Authors [15, 17, 20, 22] recorded no postoperative bleeding and healing complications with laser surgery. This was reflected in our study´s postoperative period as the patients recovered without complications. We recorded no recurrence, no lip paresthesias, no relapses after treatment of mucocele with 980 nm diode laser. On the other hand, we observed complications in the healing process of the patients treated with scalpel. The complications ranged from recurrence, scarring and relapse attributable to damage to the neighboring minor salivary glands cause by scalpel or the needle upon suturing. Other advantage of the laser versus cold surgery include bloodlessness and highly decontaminated surgical bed which allow for less swelling and pain during the postoperative period. Moreover as is reported in literature [4, 16, 17, 18, 19, 20] these advantages also allow for the appearance of fewer myofibrobasts resulting in comparatively lesser wound contraction [12, 13]. Our postoperative results of minimal pain and no or minimal swelling coincides with the observations of other authors [1, 3, 5, 7]. No analgesics or antibiotics were needed in any of the patients treated with laser compared with the need for analgesia in all patients treated with cold scalpel.

Conclusion

Laser surgery is a modality for the treatment of mucocele with beneficial effects and advantages. Intraoperative advantage was the perfect coagulation, the surgeon has a good visualization of the operative field and the operating time was very short which made possible the minimization of fear and anxiety in the patients during the procedure. Its advantages also include a reduction of relapses and scar formation offering the best aesthetic outcome in comparison with the scalpel. Laser surgery is therefore a comfort not only for the patient but also for the surgeon.

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