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Case Report

Preprosthetic Oral Surgery by Dual Wavelength Diode Laser: A Case Report Study

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Abstract

Introduction: Many invasive methods have been used for intra oral surgeries. Considering the high effectiveness of laser surgery with the least complications, it seems that the use of this technology, especially in elderly people with various systemic diseases, seems to be appropriate. So, laser in this case for preprosthetic surgery is used.

Method: Using a dual wavelengths laser device with wavelengths of 810 and 980 nm, with a power of 2 watts, fiber with a diameter of 400 microns, a Continues mode, and an initiated fiber, was the surgical procedure.

Case Report

Medical History: The patient was a 64 years old woman that has had colon adenocarcinoma in the past 5 years and was treated completely. The patient was under controlled with high blood pressure and type 2 diabetes with oral medications.

Dental history: The patient with a history of complete dentures had a severe mandibular bone resorption, the old denture's mismatch caused tissue irritation. Patient's chief complaint was denture instability. Regarding the present situation of the oral tissues, the decision was made to frenectomy, Vestibuloplasty, excisional biopsy of irritationed lesions, and enucleation of the lesion with differential diagnosis of the mucocele, and removing the flabby tissue on the residual ridge.

Conclusion: The Diode lasers can be used in preprosthetic surgeries, especially in patients with systemic problems with minimal complications and relapse.

Keywords: *Adenocarcinoma; Biopsy; Bone Resorption; Case Reports; Complete Dentures; Dentistry; Diode Laser; Labial Frenum; Laser Surgery; Mucocele; Prosthodontics; Surgery; Oral; Vestibuloplasty*

Introduction

Many invasive methods have been used for intraoral surgery for many years, and some of them are now used [1]. Following the advancement of technology, new methods have been introduced to the world with the concept of Minimally Invasive Dentistry [2]. These include Electro Surgery [3], Cryo surgery [4,5], Radio Frequency [6] and Lasers [3].

Considering the high effectiveness of laser surgery with the least complications and the conservatism of this method, as well as the effects of photobiostimulation to improve postoperative wound healing [7], as well as antimicrobial properties [8] of laser cutting, the no necessity for suture and have less bleeding and other complications After surgery [9] than traditional methods, it seems that the use of this technology, especially in elderly people with various systemic diseases [10], seems to be appropriate. Therefore, we use laser surgery in more preprosthetic surgeries [11].

Method

Using a UK Quick Lase dual wavelengths laser device with a maximum power of 12W [12] with wavelengths of 810 and 980 nm, with a power of 2 watts, containing 1 w of each wavelength and fiber with a diameter of 400 micro meters and a Cw mode, and use an initiated tip (7 beats with 0.3 watts on carbon paper), and with a touch-operated, was the surgical procedure (Figure 1).

Figure 1

For moral aspects, Informed consent was got from the patient, and the all procedures were in accordance with the Helsinki Declaration [13].

Case Report

Medical History

The patient was a 64 years old woman that has had colon adenocarcinoma in the past 5 years and was treated thoroughly with surgical procedures, chemotherapy and radiotherapy, and was under Follow-up and control of oncologists over the past two years. The patient was under controlled with high blood pressure and type 2 diabetes with oral medications.

Dental history

The patient with a history of old dentures was ordered to provide a CBCT scan of her mandible and the scan showed a severe mandibular bone resorption (Figure 2), the old denture's mismatch with recessioned mandibular bone caused tissue irritation and causative lesions on the right lingual side of mandibular residual ridge (Figure 3a) as a flabby tissue. The other problem was that on the residual ridge crest, there was a flabby tissue instead of the keratinized mucosa (Figure 3b).

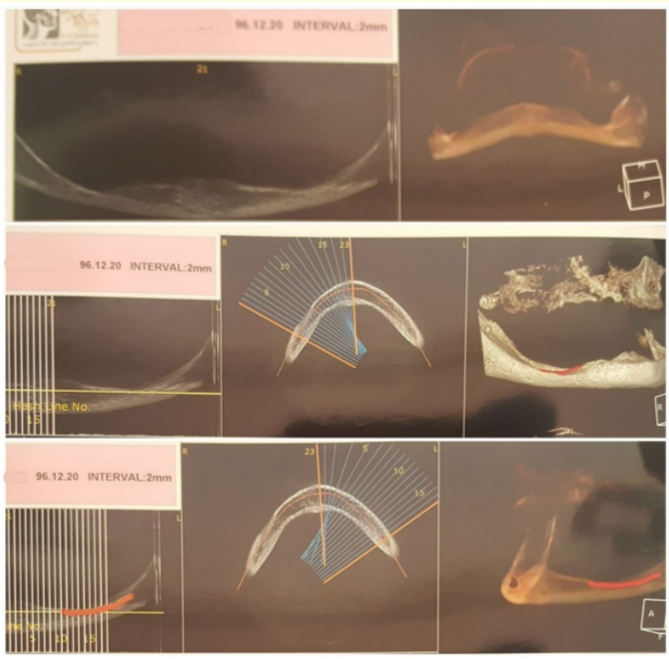

Figure 2

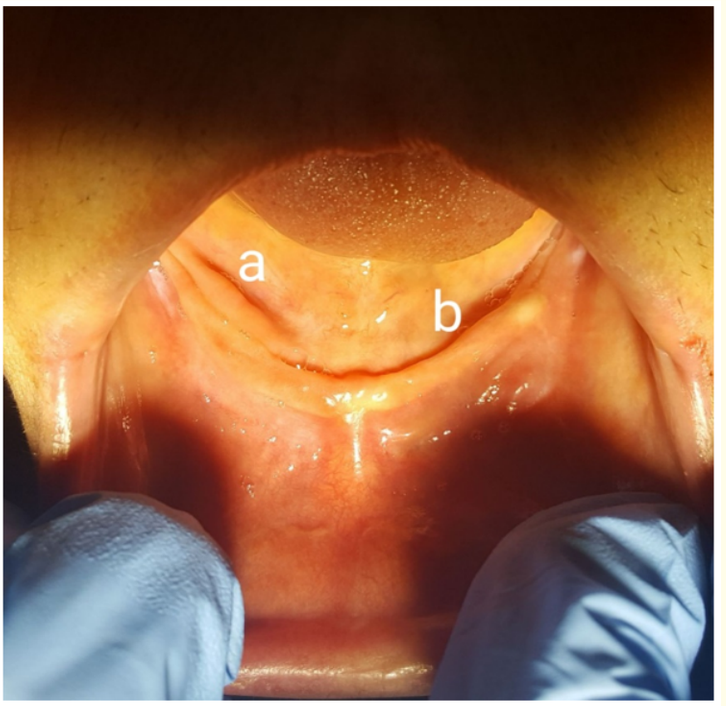

Figure 3

On the other hand, a dome-shaped mucosal swellings that was 0.8 centimeters in diameter with normal color and feel firm to palpation was observed in buccal side of the left mandibular residual ridge (Figure 4a). The patients said that the lesion has been present for several months. She explained a history of a recurrent swelling that periodically was variable in size daily.

The low depth of the vestibule (Figure 4b) and labial frenum pull, which was attached to the residual ridge crest (Figure 4c), made the denture condition worse. Patient's chief complaint was denture instability. Regarding the present situation, the decision was made to frenectomy [14], Vestibuloplasty [15], excisional biopsy of irritationed lesions [16] and enucleation with 1 - 2 mm of safe margins of the lesion with differential diagnosis of the mucocele [17] and to remove the flabby tissue on the residual ridge. The most important point is that the result of these surgeries determined the quality of prosthodontic prognosis [18].

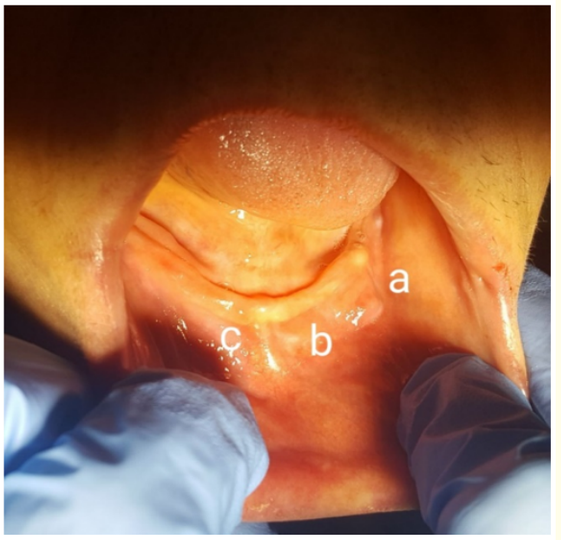

Figure 4

All of the above surgeries were performed using the method described, and, after surgery without any suturing and active bleeding, a Canadian peri acryl glue stitch was used on the wound [19] (Figure 5). The usual post-surgical recommendations were given to the patient.

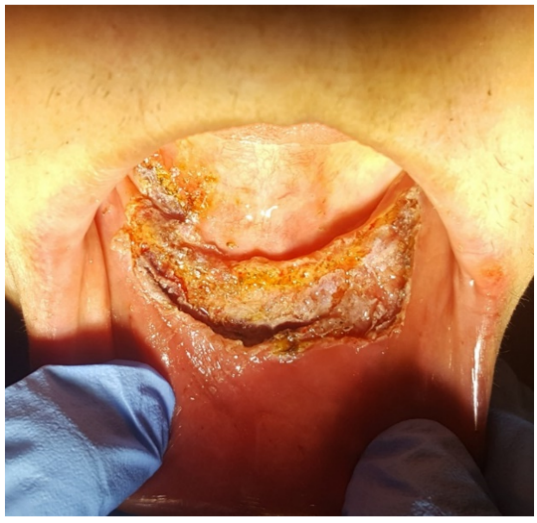

Figure 5

The masses were sent to the pathology for examination (Figure 6) and the diagnosis of mucocele [20] and also chronic irritated tissue was confirmed for flabby tissues. No metaplasia, dysplasia and neoplasia were reported.

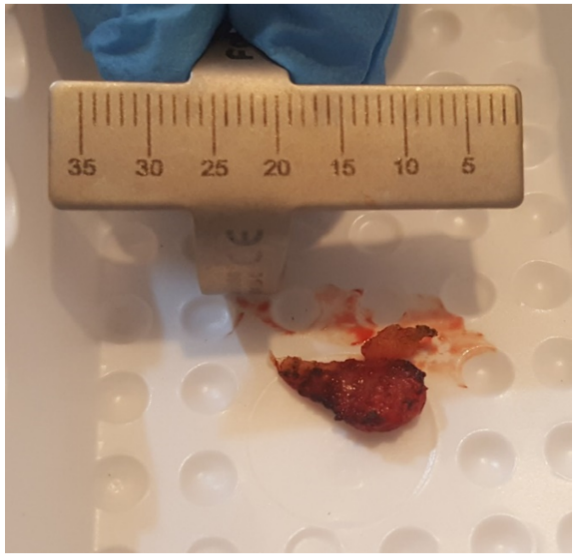

Figure 6

After 2 months of follow up, wound healing was observed, no recurrence for mucocele was detected, and the keratinized tissue was formed on the residual ridge instead of the flabby tissue. Frenectomy was not affected by relapse, and the Vestibuloplasty was associated with a slight relapse (Figure 7).

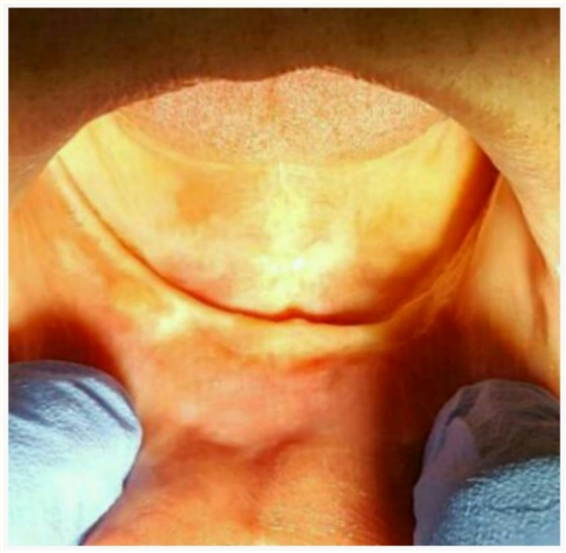

Figure 7

Discussion

Pre prosthetic surgeries In many cases, especially when the patient has had previous dentures, is required to make a new denture to improve the oral tissue support's condition [18].

There are still a lot of protocols for pre prosthetic surgeries to use a blade in traditional ways, which includes disadvantages such as bleeding and high relapses with multiple sutures [1].

Because many patients need these surgeries, are the elderly, and the elderly, have more systemic problems [10], such as type 2 diabetes, hypertension, history of heart and brain stroke and, therefore, required to use anticoagulant drugs, so these surgeries are not suitable for these patients with traditional methods.

With the use of laser without suturing and with minimal bleeding and less need of anesthesia, these problems can be overcomed.

Our goal is to use laser with 2 different wavelengths of 810 and 980 nm simultaneously, taking advantage of the unique features of each one. Depending on the absorption diagram of different laser wavelengths (Figure 8) [12], there is a higher absorption of 980 nm in H_20 [21], which results in a faster, sharper and superficial cutting, as well as a higher absorption of 810 nm in hemoglobin [21], which results in coagulation at the same time as the cutting, which causes the cutting without bleeding or less bleeding. Other dental lasers, such as Er family and CO_2 lasers, can be pointed out, which have more superficial cuts due to absorption diagram [9] and therefore the time to use them in preprosthetic surgeries compared to diode lasers, is much more and the Target of Hgb is not specific for them [9] to gain well coagulation.

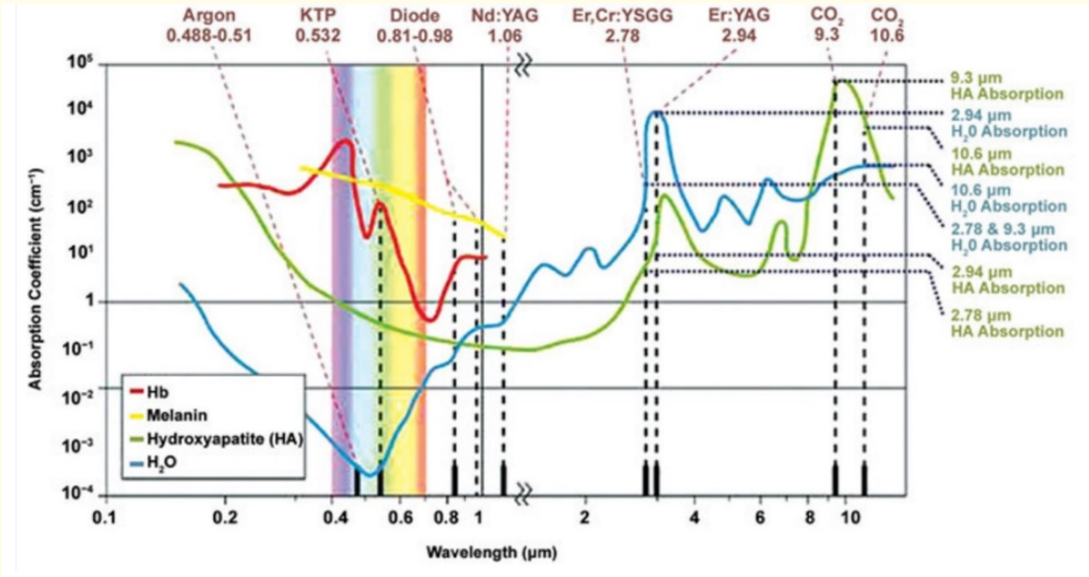

Figure 8

Another important concern to be mentioned is the possibility of a distant metastasis in the adenocarcinoma of the colon [22], so there is a need for further examination of the masses removed from the mouth to rule out the possibility of distant metastasis.

It is noteworthy that with the removal of flabby tissue by diode 810 - 980 nm lasers to the level of the periosteum, the keratinized tissue replaces the flabby tissue, which requires further researches, whether the biostimulation of the diode laser causes this phenomenon or it is due to multifactorial reasons.

Conclusion

The Diode lasers [9] can be used in preprosthetic surgeries, especially in patients with systemic problems [10] with minimal complications and relapse, without need to hospitalization treatment to prepare the oral tissue condition to increase retention, support and stability [18] for the final prosthesis (Figure 9).

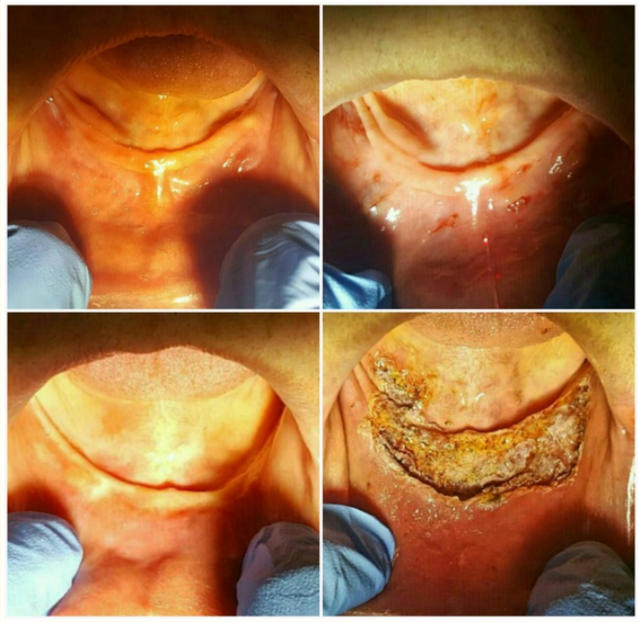

Figure 9

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