Case Report

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Maxillary Labial Frenectomy Using Diode Laser in an Orthodontic Patient: A Case Report

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ABSTRACT

Background: A frenum is a fold of tissue or muscle connecting the lips, cheek or tongue to the jawbone. Their high attachment may cause orthodontic problem (Central diastema), prosthodontic problems (Poor retention of denture), periodontic problems (gingival recession and inflammation) and speech problem (tongue tied in lingual frenum). Such cases require surgical removal called frenectomy. Novel and recent technique for frenectomy is by using lasers which eliminates the need of stitches and scalpel. Such a case with midline diastema with high frenal attachment, and the use of diode laser for the treatment is reported here.

Keywords: Frenum, diode laser, frenectomy, diastema.

INTRODUCTION

Aesthetic concerns have led to an increasing importance in seeking orthodontic treatment, with the purpose of achieving perfect smile. The continuing presence of a diastema between the maxillary central incisors in adults has often been considered as an aesthetic problem. The presence of an aberrant frenum being one of the etiological factors [1,2]

The frena may also jeopardize the gingival health by causing a gingival recession when they are attached too closely to the gingival margin, either because of an interference with the improper placement of a toothbrush or through the opening of the gingival crevice because of a muscle pull.[3] Previously classical or conventional frenectomy (surgically by scalpel and suturing) was the only way to remove the aberrant frenum. Technology has advanced nowadays and lasers have become an in dispensable tool. Diode lasers allow safe, fast, efficient incisions with better field of visibility as there is minimal bleeding and above that patient perceives a pressure less cut that often requires no suturing.

Diode laser is a semi-conductor (Gallium Aluminum Arsenide (GA Al As) used in surgery. It emits coherent monochromatic light of wavelength between (810-900) nanometer i.e. near infrared. This radiation is absorbed by hemoglobin, melanin and collagen chromophores and therefore has a remarkable surgical cutting efficiency in well vascularized tissues.[4,5] This case presentation is about an orthodontic patient presenting with high frenal attachment and use of diode laser for the treatment of the same.

CASE REPORT

A 24 year old female patient reported to the dental clinic with diastema which was her aesthetic concern and wanted treatment for the same. After complete detailed history taking and clinical examination the need for orthodontic treatment

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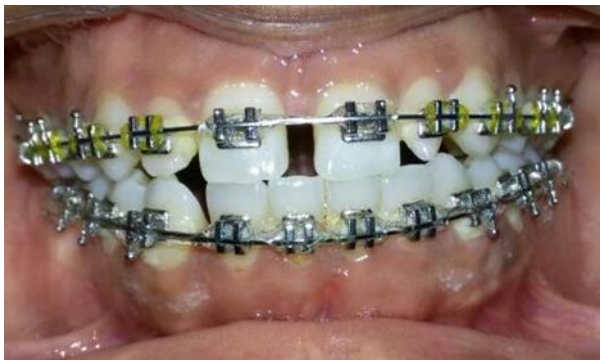

Fig 1: Intraoral photographs.

Fig 2: Thick high frenal attachment.

Fig 3: Laser frenectomy showing rhomboidal design.

was explained to the patient. Along with frenectomy for her high frenal attachment which had caused the diastema. Orthodontic treatment was initiated with .022 slot MBT prescription. After initial level aligning, the space closure was initiated with .017x.025 stainless steel. (Fig 1) Once 70 % space closure was achieved frenectomy procedure was explained to the patient. The clinical examination revealed presence of high frenal attachment extending to palatal interincisal area? (Fig 2) Her medical history was non significant we decided laser frenectomy with diode lasers under

Fig 4: Three days post operative.

Fig 5: One month post operative.

infiltration. Informed consent was taken and with all safety measures frenectomy was performed and infiltration of local anesthesia was given on both sides of the attachment and insertion of the frenum .

Biolase (EPIC) 10 watt with wavelength of 940nm was used in continuous pulsed mode with e4(400micrometer) fiber optic tip and using 1.5 watts. The fiber optic tip was applied vertically and laterally to the frenum initially causing disruption of the mucosa continuity. A rhomboidal shape design of the frenectomy was performed so that deeper fibers were also incised from the origin to the attachment of the frenal fold. (Fig 3) Throughout the procedure, wavelength specific protective eyewear was worn by the operator, patient and assistant and high speed evacuation was employed to reduce the charred odour and to remove the laser plumes. Hemostasis was achieved instantly without suturing. Mild analgesics and antibacterial mouthwashes were prescribed for 3 days and patient was advised to keep good oral hygiene and recalled for follow up. There was no post operative complications reported on the follow-up appointment. Initial epithelialization could be seen. (fig 4). The wound was clean and showed no signs

of infection or inflammation. A month after the patient was recalled mucosal type of frenal attachment was seen (fig 5) and orthodontic treatment for diastema closure was carried out.

DISCUSSION

Photothermal interaction with tissue is the key principle of soft tissue lasers, wherein radiant light is absorbed by the tissue and transformed to heat energy which changes the tissue structure. Laser light from diode laser within was converted to thermal energy on contact with the tissue, causing laser tissue interaction, that when appropriately applied, can produce reaction ranging from incision, vaporization, to coagulation [6,7,8]. The amount of radiant light absorbed by oral tissues depend on a number of factors such as wavelength of laser radiation, output power at the laser tip, optical properties and composition of the target tissue.[4]

The wavelength of 810-980nm of diode lasers has affinity for melanin or dark pigments, and is strongly absorbed by the blood hemoglobin, which contributes to their thermal effect. This was the reason that homeostasis occurs with this wavelength.[9] Keeping this in mind we used diode laser 940nm in continuous pulsed mode operating at 1.5 watts with 400micrometer optical tip in steady motion and in contact mode used it directly over the target tissue. The heated tip of optical fiber was used as a knife to create thermal effects, complete hemostasis was observed as lasers seal the lymphatic and blood vessels, also causing no postoperative edema. The procedure was painless and, eliminated the need for postoperative sutures, thus shortening the operation time. Diode lasers are exclusively used for soft tissue surgeries and there is no risk of etching or injuring of the enamel because the wavelength of diode laser does not interact with the tooth structure. .In addition they are relatively compact and of low cost [10] .Making it an indispensable tool for soft tissue surgeries.

CONCLUSION

The advent of lasers has been a boon to the clinician and it can be stated that use of soft tissue lasers specially diode has shown promise as an alternative to conventional surgical procedure in all dental soft tissue surgical procedures including frenectomy and soft tissue lesions of the oral cavity. Diode laser appears to be a satisfying candidate because it has no harmful effects to the teeth and is cost effective. It has clinical relevance and sound biologic rationale that offers significant benefits to the patient and to the Dentist. Finally clinicians must fully understand the basic science, safety protocol and risk associated with the laser to be used regardless of any type.

CONFLICT OF INTEREST

No potential conflict of interest relevant to this article was reported.

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