Case Report

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MAXILLARY LABIAL FRENECTOMY USING DIODE LASER- REPORT OF TWO CASES

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ABSTRACT

The frenum is a mucous membrane fold that attaches the lip and the cheek to the alveolar mucosa, the gingiva, and the underlying periosteum. The frena may jeopardize the gingival health when they are attached too closely to the gingival margin, either due to interference in the plaque control or due to a muscle pull. In addition to this, the maxillary frenum may present aesthetic problems or compromise the orthodontic result in the midline diastema cases, thus causing a recurrence after the treatment. The management of such an aberrant frenum is accomplished by performing a labial frenectomy, which is a common surgical procedure in the field of periodontics. Dental lasers are currently being employed in many fields of periodontics, providing alternatives to traditional scalpel techniques. The use of diode laser frenectomy without infiltrated anesthesia is currently a novel technique. This article presents two case reports of performing maxillary labial frenectomy in patients using diode laser.

KEYWORDS: Aberrant frenum; diastema; diode laser; frenectomy

INTRODUCTION

Aesthetic concerns have led to an increasing importance in seeking dental 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. Labial thick and high attached maxillary frenum is commonly regarded as contributing etiology for maintaining midline diastema and delayed upper jaw development, so the focus on the frenum has become essential. The superior labial frenum, a triangular-shaped fold connecting the tubercle of the upper lip to the alveolar process, is a combination of epithelium and loose connective tissue.[1] This fold contains vascular structures with thin peripheral nervous ramifications and is covered by stratified layered epithelium. Ideally, the insertion of the frenum should be located at the level of the mucogingival junction, so as not to interfere with the adhesion of the attached gingiva; however, a variety of conditions related to the frenum's insertion can be observed clinically. In fact, the inserting position of the frenum has been correlated with a reduction of adherent gingiva, affecting the mucogingival junction. Placek *et al*.,[2] classified the frenum based on its anatomical situ of insertion: Mucosal, gingival, papillary, or penetrating. Miller has recommended that the frenum should be characterized as pathogenic when it is unusually wide or there is no apparent zone of attached gingiva along the midline or the interdental papilla shifts when the frenum is extended. The abnormal frena are detected visually by applying tension over the frenum to see the movement of the papillary tip or the blanch which is produced due to ischemia in the region. Under such circumstances, revision of the frenum may be introduced. The aberrant frena can be treated by frenectomy or by frenotomy procedures. Frenectomy is the complete removal of the frenum, including its attachment to the underlying bone, while frenotomy is the incision and the relocation of the frenal attachment. Frenectomy can be accomplished either by the routine scalpel technique, electrosurgery or by using lasers. In the "classical frenectomy" by Archer[3] and Kruger[4] the frenum, interdental tissue and palatine papilla are completely excised leading to exposure of underlying alveolar bone and thus leading to scarring. Since the application of lasers in dentistry has widely gained acceptance in

Fig. 1: Pre-Operative View

Fig. 2: Immediate Post-operative

Fig. 3: 1 week after laser surgery

Fig. 4: Pre-Operative View

Fig. 5: Immediate post-operative view

Fig. 6: 1 week after laser surgery

recent years, lasers such as CO_2, Er:YAG, Nd:YAG, Er, diode, diode in conjunction with Er:YAG has been used for frenectomy. Diode lasers are semiconductors using solid state elements as active media, with wavelengths varying between 810nm and 980nm. Because diode laser wavelengths approximate the absorption coefficient of pigmented tissue containing hemoglobin, melanin and collagen chromophores, they are indicated for soft-tissue surgeries. The present article is a compilation of two clinical cases of an aberrant maxillary labial frenum, which were treated using diode laser.

CASE REPORT

Case 1

A 20-year-old patient was referred by his orthodontist during the treatment for assessment of the upper anterior labial frenum. Medical history was non contributory. The clinical examination revealed the presence of a high frenum attachment extending to the palatal inter-incisal region (Fig. 1). After complete evaluation and a detailed history, the treatment of choice was to perform laser frenectomy without infiltrated anaesthesia using specific laser parameters. After explanation of the intra and post operative aspects to the patient, informed consent was obtained to perform frenectomy. The frenectomy was performed with Photon Plus diode laser, manufactured by Zolar Tech Technology with a wavelength of 980nm. The laser was operated at a power of 3.0 watt in continuous wave mode, with a 400µm optical fiber. The labial frenum was sprayed with lidocaine and laser fiber was applied vertically and laterally to the frenum initially causing disruption of the mucosa continuity. This allowed ease of access in performing a deeper cut of the frenum in a horizontal dimension. The design of the frenectomy was rhomboidal so that the fiber-optic could pass efficiently between the central incisors to buccal and palatal area. Throughout the procedure, wavelength specific

goggles were worn by the patient and all staff and high speed evacuation was employed to reduce the slight charred odor and to remove the laser plume. Figure 2 shows an immediate post-operative view. Hemostatis was achieved without suturing. Analgesics were not given since the patient was comfortable with no pain, either intra-operatively or post-operatively. The patient described the procedure as totally painless. The healing of the surgical wound 1 week after surgery can be seen in Figure 3. There was no evidence of post-operative complications according to the report of the patient. New insertion of labial frenum with diastema closure was observed. Also, improved oral hygiene with easy access to the incisal region was claimed by the patient.

Case 2

Similarly a 16-year old patient was referred by his orthodontist for assessment of the upper anterior labial frenum (Fig. 4). Medical and history was non contributory. The upper labial frenum was sprayed with lidocaine and the laser fiber was applied vertically and laterally to the frenum initially causing disruption of the mucosa. Haemostasis was optimum immediately after the procedure (Fig. 5). The patient was comfortable with no pain, either intra-operatively and post-operatively (Fig. 6).

DISCUSSION

In the era of periodontal plastic surgery, more conservative and precise techniques are being adopted to create more functional and esthetic results. The diagnosis of hypertrophic frenum is usually made when, upon pulling the frenum, blanching of the palatal papilla can be observed. Mirko *et al*.,[5] found that certain types of maxillary frenum influence periodontal condition. The periodontal resistance was significantly lower in cases of gingival, papillary and papillary penetrating types of maxillary frenum attachment in persons with pathological changes in papilla in comparisons to persons with same type of attachment but with healthy papilla. A frenectomy usually is indicated for a hypertrophic labial frenum, when the frenum provokes diastema, or when the frenum makes oral hygiene difficult.[6] Various surgical techniques have been proposed by clinicians. The use of lasers for frenectomy has been promoted recently. Laser treatment has been accepted by clinicians and tolerated by patients for its ability to eliminate pain and reduce trauma and intervention time during a procedure. The superiority of laser over conventional scalpel method has been suggested in many studies, including the facility of the technique hemostasis effect, excellent visualization of the operating field, reduced operating time, less need for local anesthesia, sterilization of wound site, elimination of suturing, reduction of post-operative edema, pain and minimum scarring.[7] A 2008 article by Kara compared an Nd:YAG laser to conventional scalpel surgery and reported that patients treated with the laser reported higher levels of satisfaction, less postoperative pain, and fewer functional complications that affected chewing or speaking.[8] Haytac and Ozcelik compared 20 frenectomy procedures performed with a CO_2 laser to 20 performed with conventional scalpel surgery and reported that patients treated with the laser reported less pain after one day and seven days.[9] Awooda *et al*.,[10] performed frenectomy in eight patients using diode laser and showed dry and bloodless field during operation, no post operative swelling, no pain or discomfort, with normal healing process. The authors suggest and stimulate the use of laser for soft tissue surgery because of its time saving, patients comfort and easy manipulation. The present case reports described the advantage of diode laser surgery purposely omitting routine procedure as laser transmits energy to the cells causing warming, welding, coagulation, protein denaturization, drying, vaporization and carbonization. Diode lasers are exclusively used for soft tissue surgeries and there is no risk of etching or injuring the enamel because the wavelength of diode laser does not interact with tooth structure. In addition they are relatively compact and low cost. Considering that patients are more pain sensitive, this case-report discussed that patient had no external stimulus (laser) to react, which means that diode laser may be used under specific parameters safely in all age groups without infiltrated anaesthesia. All these factors justify the use of diode laser in this cases and make diode laser a perfect choice for frenectomy.

CONCLUSION

The introduction of lasers has redefined the management of soft tissue to the benefit of the clinician in determining the outcome and quality

of results for the patient. The ability to quickly complete procedures with very little discomfort in clinic makes laser dentistry an important concept for patients. The responsibility of the clinician is to choose the correct laser wavelength for the procedure and use minimal power to achieve the desired result. Diode laser appears to be satisfying candidate for frenectomy because it has no harmful effects to the teeth and is cost effective. Nevertheless, more investigations are needed to establish the exact efficacy of different lasers used. Finally, clinicians must fully understand the basic science, safety protocol, and risks associated with the laser to use regardless of any type.

CONFLICT OF INTEREST & SOURCE OF FUNDING

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