Frenectomy Using Diode Laser

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Abstracts: The labial frenum may impede oral hygiene and result in diastema between anterior teeth and traction of the attached gingiva. High coronal attachment is generally associated with a hypertrophy of the frenum. Labial frenectomy is a common surgical procedure in the field of oral surgery [1]. Labial frenectomy is a procedure usually done for orthodontic reasons. Surgical removal of the frenum during puberty has been recommended for these patients [2]. This article clinically evaluates the efficacy of a diode laser in removing the frenum in 10 patients using a diode laser at a power setting of 1.5 W or less in a continuous mode. The role of laser surgery in the oral cavity is well established. The use of diode laser in frenectomy has many advantages like no bleeding, no need for suture placement, and placement of orthodontic brackets that can be done on the same day itself. [Nayyar A NJIRM 2015; 6(1):98-101]

Key Words: Abnormal frenum, frenectomy, diode laser

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Introduction: A frenum is an anatomic structure formed by a fold of mucous membrane and connective tissue, sometimes muscle fibers. The superior labial frenum is triangular in shape and attaches the lip to the alveolar mucosa and/or gingiva. It extends over the alveolar process in infants and forms a raphe that reaches the palatal papilla. Through the growth of alveolar process as the teeth erupt, this attachment generally changes to assume the adult configuration.[3] Taylor has observed that a midline diastema is normal in about 98% children between six and seven years of age, but the incidence decreases to only 7% in persons 12-18 yrs old.[4] But in some instances, the infantile arrangement is retained.An abnormal frenum is described as a hypertrophic, fibrotic, ample, fan-shaped or bifid-ending structure; the development of an abnormal frenum is not dependent upon its point of insertion but its high coronal attachment that is associated generally with a hypertrophy of the frenum.

Table 1: Depending Upon the Extension of Attachment of Fibers, Frena Have Been Classified As: [5]

1. Mucosal – when the frenal fibers are attached up to mucogingival junction;
2. Gingival – when fibers are inserted within attached gingiva;
3. Papillary – when fibers are extending into interdental papilla; and
4. Papilla penetrating – when the frenal fibers cross the alveolar process and extend up to palatine papilla.

Table 2: Clinical Indications For Frenum Removal:[1]

1. Anomalous frenum associated with inflamed gingiva, resulting from poor oral hygiene
2. Anomalous frenum associated with gingival recession
3. Maxillary frenum associated with a diastema after complete eruption of the permanent canines
4. Abnormal and/or anomalous maxillary frenum (Class III or IV), resulting in the presence of a diastema during mixed dentition
5. Anomalous mandibular frenum with high insertion, causing the onset of gingival recession

Clinically, papillary and papilla penetrating frena are considered as pathological and have been found to be associated with loss of papilla, recession, diastema, difficulty in brushing, mal-

alignment of teeth, and psychological disturbances to the individual.[6,7]

Abnormal or aberrant frena are detected visually by applying tension over it to see the movement of papillary tip or blanch produced due to ischemia of the region.[8] 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.[9]

In such cases, it is necessary to perform a frenectomy for aesthetic, psychological, and functional reasons. There are numerous surgical techniques for the removal of labial frenum.

The diode laser equipment may be considered a modern technology in the field of dentistry. Diode lasershowed good results as an extra adjunct to the classical methods in the management of inflamed periodontal tissues and endodontics. This case series describes the parameters of performing frenectomyand advantages of diode lasers in soft tissue surgeries.

Case Series: Materials and Methods: jSubject Population: Using diode laser,10 patients underwent labial frenectomy. Parameters were set based on the thickness of frenum and pigmentation of the area. The indication for surgery was the presence of upper and/or lower labial frena that were impeding proper oral hygiene and were associated with the presence of diastema in the anterior teeth. Following an explanation of the clinical treatment plan and options, the patients signed an informed consent document allowing treatment.

Surgical Protocol: After clinical indications for surgery were determined, frenectomies were performed using a diode laser 910 nm laser (unilase, unicorn). A minimal amount of local anesthetic (0.2–0.3 mL of lignocaine 3% with vasoconstrictor 1:200,000) was used in cases where an insertion extended to the palatal level. For those procedures requiring topical anesthesia, acream or spray anesthetic was used.

The laser beam gradually went from a “non-contact” modality to a “contact” modality, (Fig 1) Throughout the procedure, the operator lifted the corresponding lip to stretch the frenum slightly(Fig 2). The first incision was made at the sagittal plane, along the axis of the frenum, continuing with a V-design (Fig 3) that followed the insertion of the frenum and mucogingival junction. Following the incision and vaporization of the collagen fibers, a light incision was made along the mucogingival junction of the periosteum.Constant wetting of the area being cut was done using a sterile gauge piece dipped in normal saline. This was done to prevent rise in temperature of the adjacent tissues and eliminate post-operative burning sensation. The procedure was completed with horizontal vaporizations to dislocate the connective fibers, the entire process took 5-10 minutes (Fig. 4,5).

Figure 1:

Figure 2:

Each patient and his or her parentsreceived post-operative instructions; these included a soft and cold diet for the meal immediately following surgery and avoiding acidic foods (for example, lemons and vinegar) for 36 hours after the surgery.

Anti-inflammatory analgesics (NSAIDs) were not considered necessary.

Figure 3:

Figure 4:

Figure 5:

All patients and their parents were instructed to perform usual daily oral hygiene procedures, although avoiding the treated area was recommended. For seven days following surgery, all patients' parents were instructed for self-application of anantiseptic gel (Rexidene –M gel) at the treated area at the end of the oral hygiene procedure. Follow-up visits were conducted at 3, 7 and 10 days and at these visits, the treated areas were checked for soft tissue appearance, adverse events (including functional complications), and any symptoms reported by the patients or by the parents

Results: At each post-operative visit, the patients reported no post-interventional pain or any other adverse event; no post-operative bleeding was observed (Fig 6). In addition, clinicians did not observe any undesirable clinical findings for all 10 patients. Healing process of the wound, which occurred with second intention-formed granulation tissue, showed less tension on the margins and a lack of scar tissue, since the wound margins were not close to each other, leading to second intention healing. All patients reported that the procedure was well-tolerated and acceptable.

Figure 6:

Discussion: Frenectomy is a common procedure in the field of oral and maxillofacial surgery done for various reasons as cited earlier. The advantage of laser surgery includes higher precision when compared to surgical tools resulting in less pain, bleeding, swelling and scarring post-op. The procedure is not time consuming, easy to perform in an outpatient set-up and no sutures are required, which decreases the risk of post-operative infection [10]. This case series described the advantages of diode laser surgery purposely omitting routine procedure as laser transmits energy to the cells causing warming, welding, coagulation, protein denaturisation, drying, vaporization and carbonization [11]. Although the current trend seems to suggest that surgical intervention is indicated mainly for patients between the ages of 9 and 11, surgical treatment

also may be recommended for younger children (aged 7–8 years) to prevent possible malpositioning of teeth during the final phase of maxilla development. While some may consider this approach to be overtreatment, it should be noted that a single laser intervention performed by experienced clinicians can reduce or minimize numerous related complications that develop at a later age. [12]

Conclusion: In the authors' clinical experience, the diode laser led to a considerable reduction in operating time and visits to dentist. It also eliminated or reduced the amount of local anesthetic used during the procedure and made it possible to avoid the placement of surgical sutures. The patients tolerated the postoperative phase, eliminating the need to prescribe analgesics. Furthermore, tissues responded to this approach with a minimal amount of scar tissue formation.

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