ISSN: 0975-833X

Available online at http://www.journalcra.com

International Journal of Current Research
Vol. 9, Issue, 07, pp.54958-54961, July, 2017

INTERNATIONAL JOURNAL OF CURRENT RESEARCH

CASE STUDY

COMPARISON OF CONVENTIONAL AND LASER FRENECTOMY TECHNIQUES FOR ORTHODONTIC PURPOSE: A CASE REPORT

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ARTICLE INFO

Article History:
Received 26th April, 2017
Received in revised form
11th May, 2017
Accepted 19th June, 2017
Published online 31st July, 2017

Key words:

Frenum,
Frenectomy,
Laser,
Midline Diastema,
Orthodontic treatment.

ABSTRACT

Aesthetic concerns have led to an increasing importance in seeking dental treatment, with the purpose of achieving perfect smile. Maxillary labial frenum is capable of creating a diastema and recession, affecting aesthetics. The management of such abberantfrenum can be accompalished by frenectomy. The aim of this case report is to compare between conventional classical technique of frenectomy and frenectomy by laser. The results concluded that laser frenectomy was better than conventional classical frenectomy as it has advantages like no scarring of tissue, bloodless surgical field,no need for suturing because healing is by second intention and postoperative pain and swelling are less intense or even absent.

Citation: Ameya Thorat, Pooja Darakh, Priyanka Thorat and Abdul Aziz, 2017. "Comparison of conventional and laser frenectomy techniques for orthodontic purpose: a case report", *International Journal of Current Research* 9, (07), 54958-54961.

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. Keen described midline diastema as anterior midline spacing greater than 0.5mm between the proximal surfaces of adjacent teeth (Keene, 1963). A frenum is an anatomic structure formed by a fold of mucous membrane and connective tissue and sometimes muscle fibres that attach the lip and cheeks to the alveolar mucosa and/or gingiva and the underlying periosteum (Henry, 1976). Depending upon the extension of attachment of fibres, The labial frenal attachments have been classified as mucosal, gingival, papillary and papilla penetrating, by Placek *et al*. (1974).

- Mucosal – when the frenalfibres are attached up to the mucogingival junction.
- Gingival – when the fibres are inserted within the attached gingiva.
- Papillary – when the fibres are extending into the interdental papilla.
- Papilla penetrating – when the frenalfibres cross the alveolar process and extend up to the palatine papilla.

Clinically, papillary and papilla penetrating frenum are considered as pathological and have been found to be associated with loss of papilla, recession, diastema and plaque accumulation (Dewel, 1966; Diaz-Pizan *et al*., 2006). 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 (Priyanka *et al*., 2013). The abberantfrena can be treated by frenectomy or frenotomy. The terms frenectomy and frenotomy represent procedures that differ in degree. Frenectomy is the complete removal of the frenum, including its attachment to underlying bone. Frenotomy is the partial removal of the frenum, and is used extensively for periodontal purposes to relocate the frenal attachment so as to create an increased zone of attached gingiva between the gingival margin and the frenum (Newman, 2003).

The various techniques used for frenectomy are:

- Conventional (Classical) frenectomy
- Miller's technique
- V-Y Plasty
- Z Plasty
- Modified Frenectomy technique by Bagga *et al*,2006
- Frenectomy which was done by using electrocautery

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- Frenectomy which was done by using LASERS

In this article we have compared two different techniques for treatment of abberantfrenum. The two techniques used were conventional classical technique and frenectomy by laser. Post –operatively the healing were compared between the two techniques.

CASE REPORT 1

A 21year old patient reported to the private clinic with the complaint of increasing space between upper central incisors since 1year.On examination there was high frenal papillary attachment. A tension test was carried out which was positive suggestive of high frenal attachment. After careful and thorough diagnosis a frenectomy procedure was planned. The patient was explained and informed about the treatment. The patients written consent was taken and frenectomy was carried out using conventional classic technique.

Fig. 1. Pre-operative

Fig. 2. Haemostat used to hold frenum

Fig. 3. Intra-operative

Fig. 4. Immediately after treatment

Fig. 5. Post-operative (1 week)

Post-operative (21 days)

Technique

Local infiltration was given to anesthetize the selected site by using 2% lignocaine with 1:80000 adrenaline. The lip was extended and the frenum was engaged with a haemostat to the depth of the vestibule. Incisions were placed on the upper and the under surface of the haemostat, triangular frenum tissue was removed. Underlying fibrous attachment to the bone was exposed. Horizontal incision was given onto these fibers separating and dissecting from the bone. The edges of the diamond shaped wound were undermined slightly and approximated without creating tension. Interrupted sutures using 4-0 black silk were given. The periodontal pack was placed. Postoperative Instructions were given. The most important postoperative instruction given was not to stretch the lip again and again thus, avoiding vigorous lip movements after the frenectomy procedure. Analgesics and chlorhexidine mouthwash were advised. Sutures were removed after seven days. The follow up was done at 7 days and 21 days.

CASE REPORT 2

A 23 year old patient reported with the complaint of increased spacing between upper central incisors since last 6months. On examination there was high frenal papillary attachment. A tension test was carried out which was positive suggestive of high frenal attachment .After careful and thorough diagnosis a frenectomy procedure was planned. The patient was explained and informed about the treatment. The patient's written consent was taken and frenectomy was carried out using diode laser. Technique: After the area was anaesthetized with local infiltration by using 2% lignocaine with 1:80000 adrenaline, the frenum was held with the haemostat and by using biolase LASER tip, frenum was excised. LASER tip of 9mm was applied in a contact mode with focused beam for excision of the tissue. For its use,the vertical axis of the frenulum was followed until the wound presented a linear shape. At this point the laser was applied transversely until the wound took a rhomboidal shape. The ablated tissue was continuously mopped using wet gauze piece. This takes care of the charred tissue and prevents excessive thermal damage to the underlying soft tissue.

Fig. 6. Pre-operative

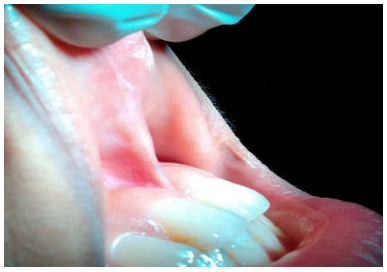

Fig. 7. Pre-operative

Fig. 7. Immediately after treatment(Charring effect)

Fig. 8. Post-operative (1week)

Fig. 9. Post-operative (21 days)

The attachment of frenum to the alveolar ridge was excised to prevent tension on gingiva. Postoperative Instructions were given. The most important postoperative instruction given was not to stretch the lip again and again thus; avoiding vigorous lip movements after the frenectomy procedure. Analgesics and chlorhexidine mouthwash were advised. Patients were instructed to keep a complete oral hygiene throughout the postoperative period. The follow up was done at 7 days and 21 days.

DISCUSSION

A diastema is a space or “gap”, most often seen between two upper front teeth. At some stages of dental development, it is normal to have a diastema but it eventually closes during further development. Often, parents are more conscious about the spaces between the front teeth of their children and seek treatment for cosmetic reasons. However, diastema can also affect the speech (Oesterle, 1999). Treatment of diastema varies and it requires correct diagnosis of its etiology. Correct diagnosis includes medical and dental history, radiographical and clinical examinations (Haug, 1995). Conventional technique is widely followed technique for frenectomyinspite of various modifications in it. The classical technique was introduced by Archer (1961) and Kruger (1964). The healing of conventional technique takes place by primary intention which leads to minimal scar formation. There is initial haemmorhage followed by approximation of cut wound ends due to epithelial cell migration and proliferation. Also there is interplay of various pro-inflammatory cells and mediators .There is no granulation tissue formation. The wound is strengthen with the collagen laid down by fibroblast cells. The classical technique leaves a longitudinal surgical incision and scarring, which may lead to periodontal problems and an anaesthetic appearance (Essential Pathology for Dental Students). The advantage of this technique is it is easy to perform and the disadvantages of this technique are there isscar tissue formation, loss of papilla and high relapse rate. The scar prevents the closure of midline diastema during orthodontic treatment (Coleton, 1977). Hence, the scar formation contraindicates the conventional frenectomy procedure prior to orthodontic treatment.

Recently lasers have been employed for the various dental surgical procedures. Laser treatment can be added as an alternative to conventional technique. Laser is a relatively new and modern technology which has many benefits. There are several types of lasers used in dentistry: Nd: YAG laser, diode laser, Er: YAG, carbon dioxide lasers. Diode lasers have been increasingly utilized for intraoral soft tissue applications like gingivectomy, gingivoplasty, frenectomy, depigmentation and pocket eradication etc. The healing of laser occurs by granulation tissue formation. Post-operatively there is a raw open wound left which is filled with blood clot. The wound is infiltrated by inflammatory cells and mediators similar to healing by primary intention. Post-operatively,there is no scar formation at the treated site which makes it possible for the clinician to carry out frenectomy procedure prior to orthodontic treatment. Lasers also allow the clinician to reduce the amount of bacteria and other pathogens in the surgical field and in the case of soft-tissue procedures, achieve good haemostasis with the reduced need for sutures. The diode laser causes minimal damage to the periosteum and bone under the gingiva being treated. The diode laser exhibits thermal effects using the “hot-tip” effect caused by heat accumulation at the end of the fiber, and produces a relatively thick coagulation layer on the treated surface (Pick, 1993).

The advantages of the surgical laser treatment versus the cold scalpel are as follows: a bloodless surgical field, no need for suturing because healing is by second intention and postoperative pain and swelling are less intense or even absent. The two case report discussed in this article compares the conventional classical technique of frenectomy using scalpel with diode laser.

Also the postoperative clinical findings with healing was discussed. Both the case report showed uneventful healing with better healing and less postoperative discomfort by laser technique.

Conclusion

The present study suggests that diode laser treatment used for frenectomy procedures provide better results than conventional technique. According to our result, diode laser may provide a safe, bloodless, painless surgery compared to conventional technique. Hence it can be concluded that conventional classical technique can be used after orthodontic treatment as it leads to scarring of tissue whereas laser frenectomy can be used before orthodontic treatment as it causes no scarring of tissue at the healed site. Hence, lasers are an impressive alternative for frenectomy procedures.

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