

Comparative evaluation of healing after frenectomy using different techniques – a case series

M Kalaiyazhagi^{1}, N K Savithri², N Gautham Kumar³, C S Krishnan⁴, N Gowrishankar⁵, S Sangeetha⁶*

¹Madha dental college and hospital, Kundrathur, Chennai, India.

²Madha dental college and hospital, Kundrathur, Chennai, India.

³Madha dental college and hospital, Kundrathur, Chennai India.

⁴Madha dental college and hospital, Kundrathur, Chennai, India.

⁵Madha dental college and hospital, Kundrathur, Chennai, India.

⁶Madha dental college and hospital, Kundrathur, Chennai, India.

Abstract

The lip and cheek are attached to the gingiva, periosteum, and alveolar mucosa by a mucous membrane fold called the frenum. When the frenum is attached too closely to the gingival margin, either because of a muscle pull or interference with the control of plaque, the health of the gingiva may be compromised. Frenectomy is the complete excision of the frenum attachment to the underlying bone. The aim of this case series is to evaluate the efficacy of three different frenectomy techniques i.e., conventional technique, paralleling technique, and frenectomy with laterally displaced flap. Pain perception was evaluated using a visual analogue scale (VAS) score obtained from patients at baseline, on 1st day, and after one week. Healing was evaluated with the Landry healing index at 1st and 2nd week postoperatively. It can be concluded that frenectomy with the new paralleling technique and frenectomy with laterally displaced flap cause less postoperative discomfort and prevent unesthetic scar formation compared to other treatment modalities.

Keywords: Frenectomy, paralleling technique, laterally displaced flap, pain, healing

Full length article *Corresponding Author, e-mail: drkalaiyazhagi@gmail.com

1. Introduction

The importance of seeking dental treatment has increased as a result of aesthetic considerations. The continuing presence of midline diastema between maxillary incisors in adults, has been considered as an aesthetic problem. The presence of an aberrant frenum is one of the aetiological factors for the presence of midline diastema. Clinically, abnormal frenal attachment is considered as papillary and papilla penetrating frenum. The frenum is completely removed during a frenectomy, along with its attachment to the underlying bone [1]. Frenectomy can be performed in several ways, namely conventional techniques using a scalpel, electrosurgery, or laser [2]. Conventional frenectomy technique involves the excision of fibers, and fibre detachment from the alveolar bone to the palatine papilla, resulting in delayed healing, loss of interdental papillae, and scarring [3]. Modifications to conventional techniques using scalpels have been developed to deal with various complications. The frenum, interdental tissue, and palatine papilla are completely removed during "classical frenectomy" performed by Archer [4] and Kruger [5], which

exposes the underlying alveolar bone and causes scarring. It resulted in an unesthetic scar, but this technique was advocated to assure the removal of muscle fibres, connecting the orbicularis oris with the palatine papilla.

Coleton et al. [6] and Breault et al. [7] have used free gingival graft combined with frenectomy. This procedure avoids the scar, but a mismatched gingival colour in the midline and the requirement for a second surgical site to achieve donor tissue complicate the technique. In many cases, a frenectomy is done to prevent reopening of a midline diastema following closure by orthodontic therapy.

Miller [8] introduced a surgical method in 1985 that combined a laterally positioned pedicle graft with a frenectomy. Laterally positioned gingiva and primary healing resulted in aesthetically acceptable attached gingiva across the midline. The interdental papilla has not been disturbed since the transseptal fibers were not attempted to be dissected. Better practical and aesthetic outcomes were obtained.

Pain perception was evaluated using a visual analogue scale (VAS) score obtained from patients at baseline, 1st day, and after one week. On a 10 cm horizontal

visual analogue scale (VAS), the patients were asked to rate the degree of speech complication and postoperative discomfort by inserting a vertical mark to indicate the position between the two endpoints. The pain scale was designated with "no pain" at the left end and "worst pain imaginable" at the right end. On postoperative days at baseline, the first day, and one week after surgery, the patients were asked to mark the position between the two endpoints that best described their subjective experience of the degree of pain and discomfort during speech. Healing was evaluated with the Landry healing index at 1st and 2nd week postoperatively. The parameters evaluated include tissue colour, bleeding response to palpation, presence of granulation tissue, characteristics of the inclusion margins, and the presence of suppuration.

2. Case series

The present surgical procedure was undertaken in the Department of Periodontics at Madha Dental College and Hospital, Chennai, Tamil Nadu. The frenectomy procedure was done in the patients for functional, esthetical, periodontal, or orthodontic reasons.

2.1 Case 1 – conventional technique

For the conventional technique, the frenum was held with a pair of haemostats, and the whole band of the tissue and its alveolar attachment were excised with a number 15 BP blade. The surgical site was closed with suture only after dissecting the fibrous attachment to the underlying periosteum. A 20-year-old male patient reported to our Department of Periodontics with a chief complaint of spacing between upper front teeth. On examination, there was a papillary frenal attachment and the frenum was surgically removed by conventional technique (figure 1).

2.2 case 2 – conventional technique

A 19-year-old female patient reported to our Department of Periodontics with a chief complaint of spacing between two teeth. On examination, there was a papillary penetrating frenal attachment and the frenum was surgically removed by conventional technique (figure 2).

2.3 case 3 – frenectomy with laterally displaced flap

A 21-year-old male patient reported to the Department of Periodontics with a chief complaint of spacing between upper front teeth. On examination, there was a papillary penetrating frenal attachment. After local anaesthesia, a primary incision was given to separate the frenum from the base of the interdental papilla. In order to completely separate the frenum from the alveolar mucosa, this incision was extended apically up to the vestibular depth. Any remnant of the frenum in the midline and on the undersurface of the lip was removed. On the mesial side of the lateral incisor, a vertical parallel incision was made up to vestibular depth, 2-3 mm apical to the marginal gingiva. Partially dissecting the gingiva and alveolar mucosa between these two incisions compromised them in order to elevate the flap. Next, to link the coronal ends of the two vertical incisions, a horizontal incision was made in the connected gingiva 1-2 mm apical to the gingival sulcus. The flap was brought up, moved mesially, and stitched to achieve the main closure along the midline (figure 3). No attempt was made to dissect transeptal fibres.

2.4 Case 4 – paralleling technique

A 20-year-old male patient was reported to our Department of Periodontics. On examination, there was a papilla penetrating frenal attachment. Following the administration of local anaesthetic, the frenum was retracted and two parallel incisions were made with a number 11 BP blade on the frenum's side ridge. Deep dissection of the muscle fibers was performed following the initial incision in order to remove every attachment. By giving releasing incisions on both the top and bottom of the frenum, the incised portion was removed. Following frenum excision, the wound was closed with a suture to attain primary closure (figure 4).

3. Results

Results indicated patients treated with Frenectomy with Laterally Displaced Flap and Paralleling Technique had less postoperative pain and discomfort with satisfactory results and healing compared to patients treated with conventional technique. On healing, a wider zone of the attached gingiva was obtained. It was colour matched with adjacent tissue. Healing was obtained by primary intention. There was no evidence of interdental papilla loss. No complication was noted during healing period. Patients' compliance was also very good.

4. Discussion

In this study patients treated by paralleling technique and frenectomy with laterally displaced flap had significantly less postoperative pain and functional complication when compared with the conventional technique. Conventionally, a frenectomy procedure involve holding of frenum with the haemostat, incising above and below the haemostat, creating a large diamond shape wound, often with copious bleeding. Patient often experience postsurgical bleeding and pain mainly because of the open area at the base of the frenectomy site, where primary closure is not possible because large part of mucosa has been removed. To overcome these problems newer techniques are used in this study for frenectomy. The parallel approach is one of the modifications to traditional scalpel techniques that have been developed to deal with various complications. This procedure is advised to remove the fibers that join the papilla to the orbicularis oris muscle in diastema patients with a thin frenulum type. Another advantage of this technique is a lower degree of postoperative pain and reducing patient discomfort caused by functional complications after frenectomy, such as speech disorders [9] Anubh et al [10] performed frenectomy using laterally displaced pedicle graft and achieved aesthetically pleasing result without scar formation in the midline, and there was no loss of the interdental papilla. In this case also, we could achieve the same with good colour match.

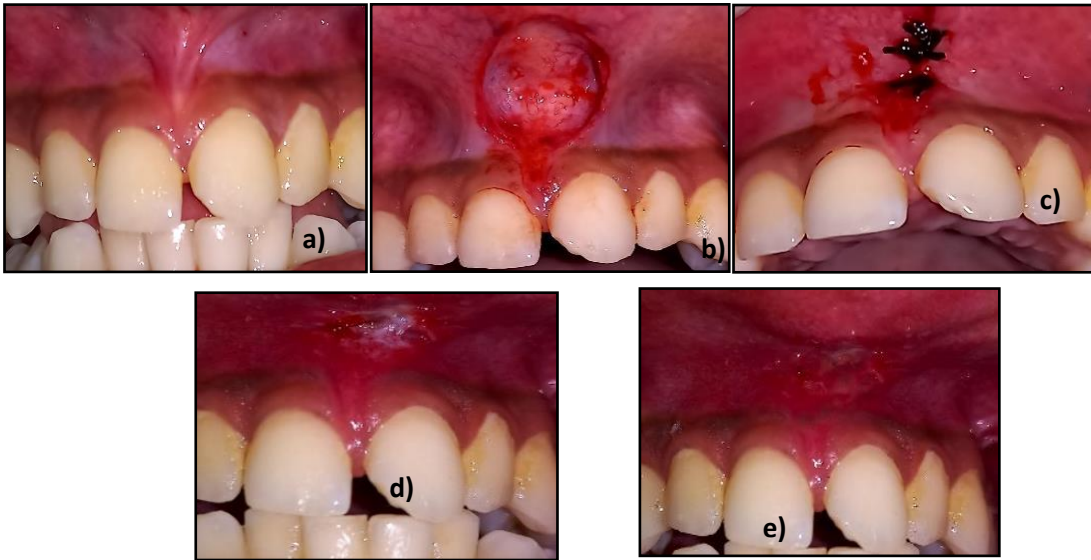


Figure 1: Conventional technique; a) Preoperative view b) Excised frenum site c) Primary closure obtained by suturing d) 1-week postoperative view e) 2-week postoperative view

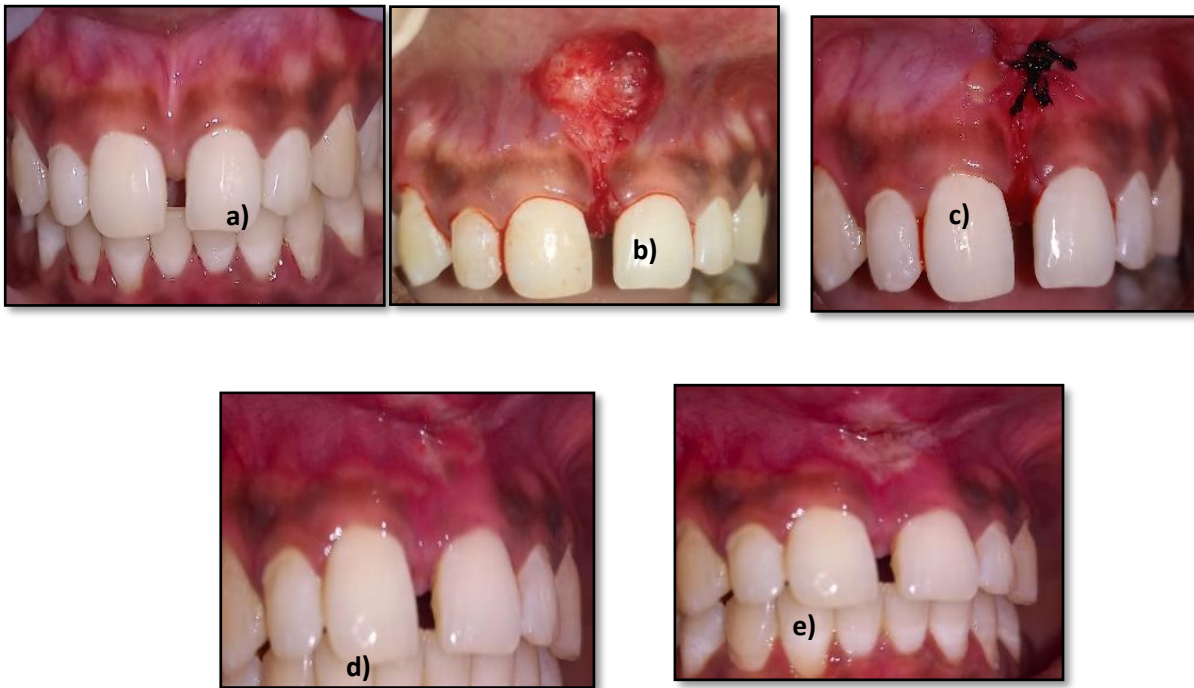


Figure 2: Conventional technique; a) Preoperative view b) Excised frenum site c) Primary closure obtained by suturing d) 1-week postoperative view e) 2-week postoperative view



Figure 3: Frenectomy with laterally displaced flap technique; a) Preoperative view b) Vertical incision mesial to lateral incisor and undermining of pedicle c) Displaced and suturing of the pedicle d) 1-week postoperative view e) 2-week postoperative view

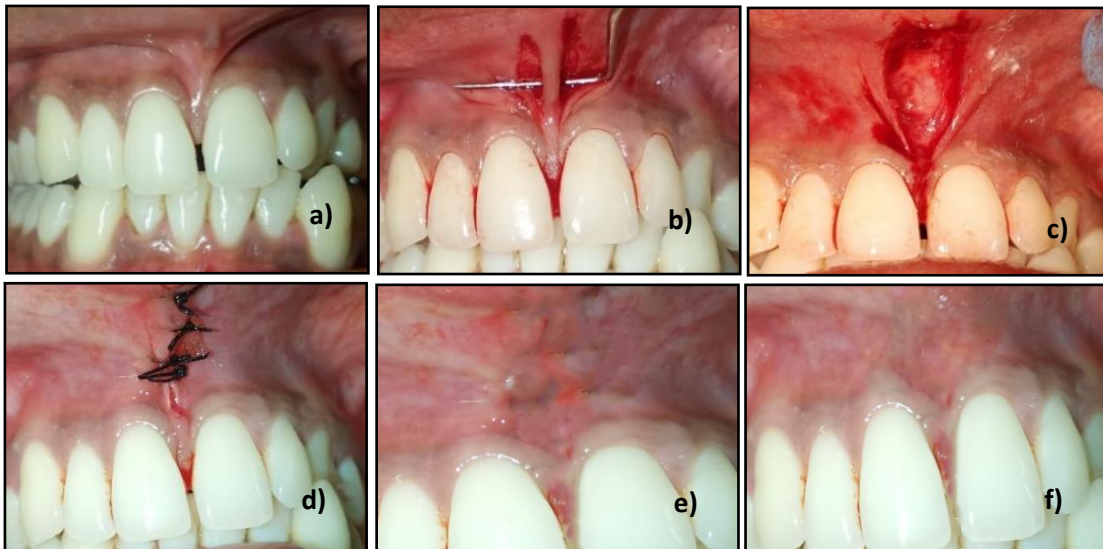


Figure 4: Paralleling technique; a) Preoperative view b) Two paralleling incisions placed on sides of frenum c) Excised frenum site d) Primary closure obtained by suturing e) 1-week postoperative view f) 2-week postoperative view

Chaubey et al. [11] also evaluated that the frenectomy procedure using lateral pedicle graft showing the same result with a scar-free aesthetic zone without loss of the interdental papilla was similar to the present study. Mani et al. [12] and Devishree et al. [13] in their studies using lateral pedicle frenectomy also observed that healing by primary intention did not cause scarring after healing in the midline. Hungund et al. [14] in their study compared the classic frenectomy procedure with unilateral and bilateral displaced flap and concluded that the classic frenectomy failed to provide pleasing aesthetic result, whereas laterally displaced pedicle flap achieved aesthetics with no scar formation and without loss of the interdental papilla. In Miller's technique during healing, there is a continuous band of the gingiva across the midline rather than unesthetic scar, and transseptal fibres are not disrupted surgically. This avoids trauma to the interdental papilla. However, Miller suggested that frenectomy with laterally positioned pedicle flap was to be performed after the closure of diastema [8]. Edward et al. [15] suggested that the frenectomy procedure has to be carried out before the orthodontic closure since the convoluted and compressed fibres hinder the closure of the diastema. Oral hygiene evaluation was done after 1, 7 and 14 days. Both the technique showed improvement in the oral hygiene in upper anterior region at the end of 14 days. After seven days of assessment, there was no improvement in oral hygiene, which may have been caused by sutures, pain or other discomfort.

5. Conclusion

The outcome shows that Frenectomy with Laterally Displaced Flap and Paralleling technique produced satisfactory results. These techniques have certain distinct advantages. It includes healing by primary intention, no unesthetic scar formation and there is no recession of interdental papilla because the transseptal fibers are not severed out. Hence, the frenectomy with laterally displaced flap and paralleling technique can be used as an effective method to eliminate abnormal frenum and also maintain an esthetic outcome.

Acknowledgement

Nil

Conflict of interest

Nil

References

- [1] H. Jhaveri editor. (2006). The aberrant frenum. In: Dr. PD Miller the Father of Periodontal Plastic Surgery. Journal of Periodontology. P 29-34.
- [2] S. Dibart & M. Karima. (2006). Definition and objectives of periodontal plastic surgery. Practical Periodontal Plastic Surgery. 3-4. <https://doi.org/10.1002/9780470344637.ch1>
- [3] K.K. Chaubey, R. Thakur, V. Arora & I. Narula. (2011). Perio-esthetic surgery: Using LPF with frenectomy for prevention of scar. Journal of Indian Society of Periodontology. 15(3):265.
- [4] W.H. Archer editor. (1961). Oral Surgery – A Step by Step Atlas of Operative Techniques. 3rd ed. Philadelphia: W. B. Saunders Co. P 192.
- [5] G.O. Kruger editor. (1964). Oral Surgery. 2nd ed. St. Louis: The C.V. Mosby Co. P 146.
- [6] S.H. Coleton. (1977). Mucogingival surgical procedures employed in re-establishing the integrity of the gingival unit (III). The frenectomy and the free mucosal graft. Quintessence International, Dental Digest. 8:53-61.
- [7] L.G. Breault, E.B. Fowler, E.A. Moore & D.J. Murray. (1999). The free gingival graft combined with the frenectomy: A clinical review. Journal of General Dentistry. 47: 514-8.
- [8] P.D. Jr Miller. (1985). The frenectomy combined with a laterally positioned pedicle graft. Functional and esthetic considerations. Journal of Periodontolog . 56:102-6.
- [9] C. Dhalkari, M. Indurkar & S. Patil. (2017). Paralleling technique for frenectomy - A case report. International Journal of Advanced Research. 5(9):1219-1224.
- [10] N. Anubha, K.K. Chaubey, A. Vipin, K. T. Rajesh, Z. Zeba & S.N. Inderpreet. (2010). Frenectomy combined with a laterally displaced pedicle graft. Indian Journal of Dental Sciences. 2:47-51.
- [11] K.K. Chaubey, V.K. Arora, R. Thakur & I.S. Narula. (2011). Perio-esthetic surgery: Using LPF with frenectomy for prevention of scar. Journal of Indian Society of Periodontology. 15:265-9.
- [12] A. Mani, P. Marawar & L. Furtad. (2012). Frenectomy with laterally displaced flap: A case report. International Dental Journal of Student's Research.1:63-6.
- [13] S.K. Devishree & P.V. Shubhashini. (2012). Frenectomy: A review with the reports of surgical techniques. Journal of Clinical and Diagnostic Research. 6:1587-92.
- [14] S. Hungund, K. Dodani, P. Kambalyal & P. Kambalyal. (2013). Comparative results of frenectomy by three surgical techniques- conventional, unilateral displaced pedicle flap and bilateral displaced pedicle flap. Dentistry. 4:2-6.
- [15] J.G. Edwards. (1977). The diastema, the frenum, the frenectomy: A clinical study. American Journal of Orthodontics and Dentofacial Orthopedics. 71:489-508.