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Research Article

COMPARISON OF POST-OPERATIVE PAIN AND FUNCTIONAL COMPLICATIONS EXPERIENCED AFTER THREE FRENECTOMY TECHNIQUES

Urvashi Singh and Rizwan M Sanadi

Department of Periodontology Dr. G D Pol Foundation's YMT Dental College and Hospital Institutional Area, Sector- 4 Kharghar-410210, Navi Mumbai

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ABSTRACT

Objectives: To assess the degree of post-operative pain and functional complications (speech and chewing) following three frenectomy techniques (conventional, electrocautery and laser).

Methodology: Sixty subjects diagnosed with aberrant frenal attachment were included in the study and randomly divided into three groups, namely Group A (conventional technique, Sample size- 20), Group B (electrocautery, Sample size- 20) and Group C (laser, Sample size- 20). VAS ratings for pain and discomfort (on speaking and chewing), Healing Index (Landry, Turnbull and Hawley, 1988), swelling (present or absent) and number of analgesics used, were assessed at 1 week, 2 weeks and 1 month.

Results: Intragroup changes in the healing index and VAS scores over a period of 1 month was analyzed using Friedman's ANOVA followed by post hoc Wilcoxan Signed Rank test. Intergroup differences were analyzed using Kruskal-Wallis ANOVA. On intergroup comparison, there was no statistically significant difference among the changes in VAS scores for pain ($p = 0.056$), difficulty in chewing ($p = 0.856$) and speaking ($p = 0.259$) between the 3 groups. There was no statistically significant difference in the post-operative swelling between the 3 groups ($p = 0.765$). The number of analgesics consumed after conventional frenectomy were significantly higher as compared to the other 2 groups ($p < 0.001$). Also, there was no statistically significant difference in the change in healing index scores at 2 weeks ($p = 0.355$) and at 1 month ($p = 0.707$) between the 3 groups.

Conclusion: In the present study, post-operative pain and functional complications (speech and chewing) after three frenectomy techniques were comparable. However, laser showed promising results.

INTRODUCTION

Aesthetic concerns have led to an increasing importance in seeking dental treatment, with the purpose of achieving a 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 is one of the aetiological factors for the persistence of a midline diastema; hence the focus on the frenum has become essential.[1]

The frenum or frenulum is defined as a small band or fold of mucosal membrane that attaches the lips and cheeks to the alveolar process and that limits their movements.[2]

The labial frenal attachments have been classified by Placek et al (1974) as Mucosal, Gingival, Papillary and Papilla penetrating.[3,4] The aberrant freni can be treated by frenectomy or by frenotomy procedures. Frenotomy or frenulotomy is the simple excisional release of the frenulum from the apex of its insertion to its base and down to the alveolar process. Frenectomy or frenulectomy is the complete removal of the frenulum, including its attachments to the underlying alveolar process.[2] Frenectomy can be accomplished either by the routine scalpel technique, electrosurgery or by using lasers.

Very few studies have been conducted comparing conventional, electrocautery and laser frenectomy techniques. Thus, there is a lack of information from clinical trials regarding clinical efficacy and patient acceptance of the above three techniques. Hence, the present study was conducted to compare the degree of postoperative pain, discomfort and functional complications (chewing and speech), experienced by

Corresponding author:* **Urvashi Singh
Department of Periodontology Dr. G D Pol Foundation's YMT Dental College and Hospital Institutional Area, Sector- 4 Kharghar-410210, Navi Mumbai

individuals after three frenectomy techniques (conventional, electrocautery and laser).

MATERIALS AND METHODS

Sixty subjects diagnosed with aberrant frenal attachment were selected from the Out Patient Department, Department of Periodontology. The selected subjects requiring frenectomy were randomly divided into three groups as follows: Group A [conventional/scalpel technique, Sample size(n) = 20], Group B [electrocautery, Sample size (n) = 20] and Group C [laser, Sample size(n) = 20].

The subjects in the age group of 20-50 years, of either sex, having aberrant labial frenal attachment, systemically healthy and co-operative were included for the study.

Smokers and tobacco chewers (AHA guidelines), pregnant or lactating women or women taking oral contraceptives (OCs), individuals undergoing orthodontic therapy, individuals with a history of use of medications or nutritional supplements in the past six months were included.

Informed written consent of the subjects participating in the study was obtained.

The clinical parameters assessed were:

- Visual analog scale (VAS) ratings for pain and discomfort (Matthews DC, McCulloch CAG1993)[5] (chewing and speech) at 1 week, at 2 weeks, at 1 month.
- Post-operative swelling – present or absent.
- Number of analgesics taken.
- Healing Index (Landry RG, Turnbull RS, Howley T 1988)[6]

A detailed case history of the subjects was recorded. Phase- I therapy (scaling and root planing) was carried out and oral hygiene instructions were given. Subjects were recalled 3 weeks after phase-I therapy.

The surgical procedure was performed under local anesthesia. (lignocaine hydrochloride 2% with adrenaline 1:80000).

Conventional Frenectomy-After adequate anesthesia was obtained, the frenum was held with a haemostat upto the depth of the vestibule. No 11 blade mounted on a Bard Parker handle was used for placing incisions on upper surface and under surface of the hemostat. The two incisions were joined and the tissue was excised. Any remnant attached fibers were relieved. The wound was sutured with interrupted sutures using 3-0 black braided silk suture. Periodontal pack was placed. Subjects were recalled after 1week for suture and periodontal pack removal. (Figure-1)

Electrocautery -Frenum was excised with light feather stroke motion of the needle electrode tip (Ellmandento-surg; Hertz 50/60; Frequency 3.8 MHz). Periodontal pack was placed. Subjects were recalled after 1week for periodontal pack removal. (Figure-2)

Laser- Soft tissue diode laser with 810 nm wavelength was used. Frenum was excised using laser tip at non-pulsed contact mode at 1Watt power with light feather stroke motion of the tip. Vitamin E was applied at the surgical site. Subjects were instructed to apply vitamin E capsules on the operated site thrice a day, for 3 days. (Figure-3) All Subjects were prescribed analgesic (paracetamol) and were asked to take it, if required. Follow up was done at 1 week, 2 weeks and 1 month post-operatively.

The subjects were asked to separately rate the degree of pain and post-operative functional complications (discomfort during chewing and speech), on a 10-cm horizontal visual analog scale (VAS) on postoperative 1 week, 2 weeks and 1 month.

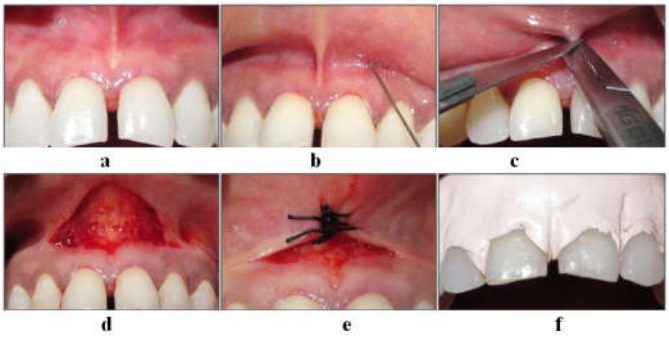


Figure 1 Surgical procedure for conventional frenectomy

a. Pre-operative view
b. Administration of local anaesthesia
c. Incision with scalpel
d. Immediate post-operative view
e. Sutures placed
f. Periodontal dressing placed

Figure 2 Surgical procedure for electrocautery frenectomy

a. Pre-operative view
b. Administration of local anaesthesia
c. Incision with electrocautery tip
d. Immediate post-operative view
e. Periodontal dressing placed

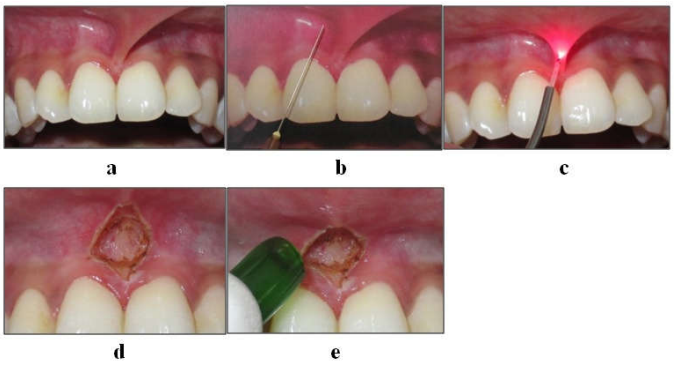


Figure 3 Surgical procedure for laser frenectomy

a. Pre-operative view
b. Administration of local anaesthesia
c. Incision with laser tip
d. Immediate post-operative view
e. Vitamin E applied

a b c

Figure 4 Post-operative follow-up for conventional frenectomy

a. 1 week
b. 2 weeks
c. 1 month

a b c

a. 1 week
b. 2 weeks
c. 1 month

Figure 5 Post-operative follow-up for electrocautery frenectomy

a b c

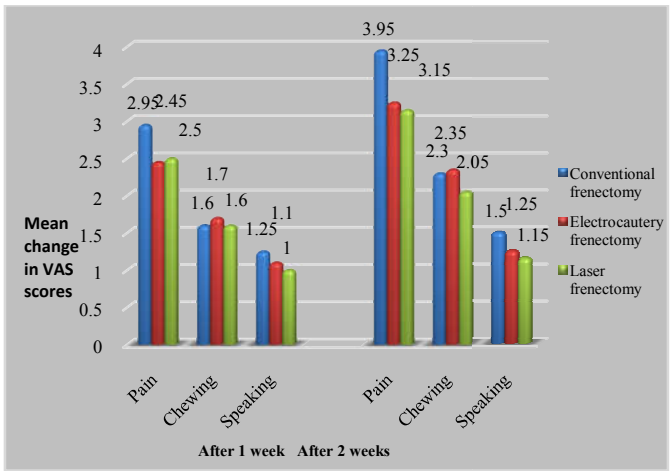
Figure 6 Post-operative follow-up for laser frenectomy

a. 1 week
b. 2 weeks
c. 1 month

RESULTS

Table and Graph No.1 Comparison of change in VAS scores of post-operative pain, chewing and speaking after frenectomy using 3 different techniques after 1 and 2 weeks.

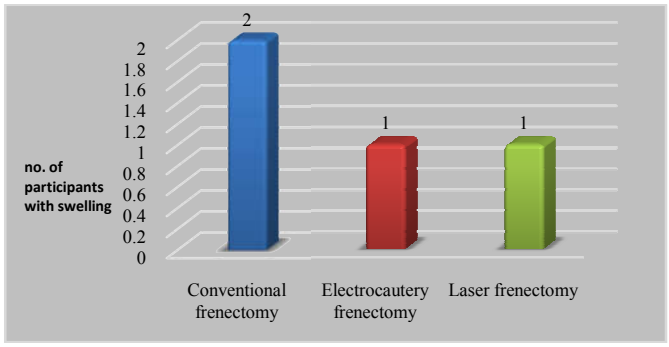
	Conventional frenectomy		Electrocautery frenectomy		Laser frenectomy	
Pain	**1 week**	**2 weeks**	**1 week**	**2 weeks**	**1 week**	**2 weeks**
	2.95 ± 0.69	3.95 ± 0.76	1.60 ± 0.94	2.30 ± 1.13	1.25 ± 0.55	1.50 ± 0.83
Chewing	2.45 ± 0.69	3.25 ± 0.72	1.70 ± 0.73	2.35 ± 0.88	1.10 ± 0.72	1.25 ± 0.79
Speaking	2.50 ± 0.51	3.15 ± 0.81	1.60 ± 0.75	2.05 ± 0.89	1.00 ± 0.92	1.15 ± 1.04
P value (Kruskal Walis ANOVA)	0.056	0.006*	0.856	0.582	0.259	0.344

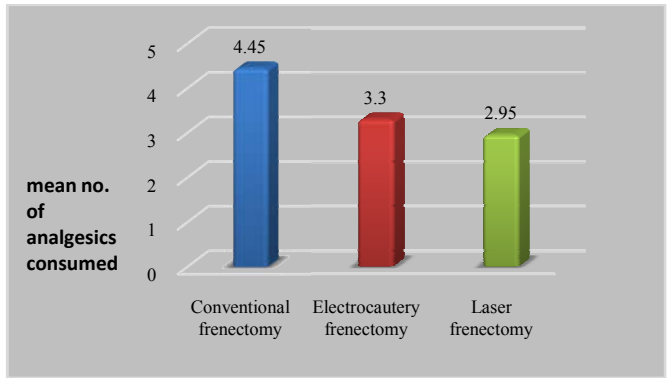


On intergroup comparison, there was no statistically significant difference among the changes in VAS scores for pain (p = 0.056), difficulty in chewing (p = 0.856) and speaking (p = 0.259) at 1 week between the 3 groups. However, at 2 weeks, there was a statistically significant difference in VAS score for pain at 2 weeks (p = 0.006) between the 3 groups. The change in VAS score for pain was higher in the conventional frenectomy group as compared to laser and electrocautery group.

Table No 2 Comparison of post-operative swelling and number of analgesics consumed after frenectomy using 3 different techniques

	Conventional frenectomy	Electrocautery frenectomy	Laser frenectomy	P value
Swelling (yes)	2	1	1	0.765 (Chi Square test)
Swelling (no)	18	19	19	
No. of Analgesics (mean)	4.45	3.30	2.95	<0.001* (One Way ANOVA)





Graphs No.2a and 2b Comparison of post-operative swelling after frenectomy using 3 different techniques.

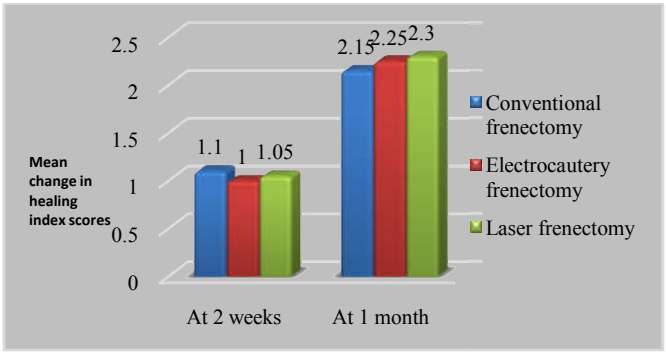
On intergroup comparison, there was no statistically significant difference in the post-operative swelling between the 3 groups (p = 0.765). The number of analgesics consumed after conventional frenectomy were significantly higher as compared to the other 2 groups (p <0.001).

Table and Graph No.3 Healing Index scores after frenectomy using three different techniques

Healing index score (Mean ± SD)	Conventional frenectomy	Electrocautery frenectomy	Laser frenectomy
1 week	2.85 ± 0.59	2.65 ± 0.49	2.55 ± 0.51
2 weeks	3.95 ± 0.51	3.65 ± 0.49	3.60 ± 0.50
1 month	5.00 ± 0.00	4.90 ± 0.31	4.85 ± 0.37
P value (Friedman ANOVATest)	<0.001*	<0.001*	<0.001*

Table No.4 Comparison of change in Healing Index scores after frenectomy using 3 different techniques at 2 weeks and 1 month

	Change in Healing Index (2 week – 1 weeks) Mean ± SD	Change in Healing Index (1 month – 1 week) Mean ± SD
Conventional frenectomy	1.10 ± 0.31	2.15 ± 0.59
Electrocauteryfrenectomy	1.00 ± 0.00	2.25 ± 0.44
Laser frenectomy	1.05 ± 0.22	2.30 ± 0.47
P value (Kruskal Walis ANOVA)	0.355	0.707



On intragroup comparison, there was a statistically significant increase in the healing index scores at 2 weeks and at 1 month in all the 3 groups (p value <0.001), which was statistically higher than the score at 1 week.

On intergroup comparison, there was no statistically significant difference among the change in healing index scores at 2 weeks (p = 0.355) and at 1 month (p = 0.707) between the 3 groups.

On intragroup comparison, there was a statistically significant reduction in the VAS scores for pain, difficulty in chewing and speaking at 1 and 2 weeks (p value <0.001), which was statistically lower than the baseline scores after conventional frenectomy.

On intragroup comparison**,** there was a statistically significant reduction in the VAS scores for pain, difficulty in chewing and speaking at 1 and 2 weeks (p value <0.001), which was statistically lower than the baseline scores after electrocautery frenectomy. However, the VAS score for difficulty in speaking at 1 week and 2 weeks were not statistically different.

On intragroup comparison**,** there was a statistically significant reduction in the VAS scores for pain, difficulty in chewing and speaking at 1 and 2 weeks (p value <0.001), which was statistically lower than the baseline scores after laser frenectomy. However, the VAS score for difficulty in speaking at 1 week and 2 weeks were not statistically different.

DISCUSSION

The facial surface between the maxillary and mandibular central incisors along with canine and premolar areas is the area that is most prone to frenal problems. There is remarkable consensus among scientists concerning the existence of a cause-effect relationship between the presence of hypertrophic or malposed maxillary labial frenum and the maxillary midline diastema. Shashua and Artun (1999) found that there is a correlation between the width of the diastema and the presence of an abnormal frenum.[7]

This study showed good patient compliance after laser frenectomy and the results were in accordance with the studies conducted by Al-Khatib AA and Al-Azzawi AS (2015)[8] which showed that diode laser is an efficient modality for frenectomy procedure. Butchibabu K et al (2014)[9] reported similar results and concluded that diode laser is a dependable alternative as it is an efficient and satisfactory option for procedures like frenectomy.

The results for intergroup comparison were in accordance with the study conducted by Sanadi RM et al (2017)[10] where they reported less post-operative pain, discomfort and functional complications (chewing and speech) experienced by subjects that underwent frenectomy with laser, concluding that laser showed promising results. In a similar study KaurPet al (2014)[11], Gargari M et al (2012)[12], Kara C (2008)[13] and Haytac MC and Ozcelik O (2006)[14] concluded that laser provides better patient perception in terms of post-operative pain and function than that obtained by the scalpel technique, which was similar to the results in the present study.

The results regarding the healing index are in accordance with the study conducted by Medeiros Junior R et al (2015)[15].

Patients often experience post-surgical bleeding and pain after conventional frenectomy. The conventional technique leaves a longitudinal surgical incision and scarring, which may lead to periodontal problems and an unaesthetic appearance, thereby necessitating other modifications. The change in VAS score for pain was higher in the conventional frenectomy group as compared to laser and electrocautery groups. The number of analgesics consumed after conventional frenectomy was also significantly higher as compared to the other 2 groups. Although, the healing was better initially after conventional frenectomy , there was no statistically significant difference in healing at 1 month in the three groups.

The electrosurgery procedure offered the advantage of minimal time consumption and a bloodless field during the surgical procedure, with no requirement of sutures.

Laser technique offered some advantages, such as relatively bloodless surgical field; minimal swelling and scarring; no suturing; little mechanical trauma; decreased post-surgical pain and discomfort in chewing and speech.

Conventional technique is the most economical, followed by electrocautery technique, laser being the most expensive. While an aberrant frenum can be removed by any of the techniques that have been proposed, a functional and an aesthetic outcome can be achieved by a proper technique selection, based on the type of the frenal attachment. To overcome the problems associated with conventional scalpel technique, electrosurgery and laser techniques were tried. Laser showed promising results. However, each technique has its own merits and demerits.[3]

CONCLUSION

The present study was conducted to compare the degree of post-operative pain, discomfort and functional complications (chewing and speech), experienced by individuals after three frenectomy techniques (conventional, electrocautery and laser). The change in healing index, post-operative discomfort on chewing, speaking and swelling between the three groups at 1

week, 2 weeks and 1 month were comparable. Although, laser showed promising results.

However, further long-term studies with larger sample size are required to reach a definitive conclusion.

References

1. Devishree, Gujjari SK, Shubhashini PV. Frenectomy: A review with the reports of surgical techniques. *J Clin Diag Res* 2012; 6(9): 1587-1592.
2. Cohen ES. Atlas of cosmetic and reconstructive periodontal surgery. Olivotto G editor. Mucogingival surgery. BC Decker Inc, Hamilton; 2007. 83p.
3. Gardiner JH. Midline spaces. Dent Pract Dent Res 1967; 17: 287–298.
4. Steigman S, Weissberg Y. Spaced dentition: An epidemiologic study. Angle Orthod 1985; 55: 167–176.
5. Matthews DC and McCulloch CA. Evaluating patient perceptions as short-term outcomes of periodontal treatment: a comparison of surgical and non-surgical therapy. *J Periodontol* 1993; 64(10): 990-997.
6. Landry RG, Turnbull RS, Howley T. Effectiveness of benzydamine HCl in the treatment of periodontal post-surgical patients. Res Clinic Forums 1988; 10:105-118.
7. Stubley R. The influence of transseptal fibers on incisor position and diastema formation. *Am J Orthod* 1976; 70: 645–662.
8. Al-Khatib AA, Al-AzzawiAS. Comparative study of diode laser 940 nm in performing frenectomy in both: Continuous and pulsed modes: An in vivo study. *J Dent Lasers* 2015; 9: 50-68.
9. Butchibabu K, Koppolu P, Mishra A, Pandey R, Swapna LA, Uppada UK. Evaluation of patient perceptions after labial frenectomy procedure: A comparison of diode laser and scalpel techniques. *Eur J Gen Dent* 2014; 3: 129-33.
10. Sanadi RM, Dere SV, Maknojia MB, Suthar NJ, Chelani LR. Comparative evaluation of frenectomy procedures performed with scalpel, laser and electrosurgery- a clinical study. *Int J Sci Res* 2017; 6(9): 292-294.
11. Kaur P, Dev YP, Kaushal S, Bhatia A, Vaid R, Sharma R. Management of the upper labial frenum: a comparison of conventional surgical and lasers on the basis of visual analogue scale on patients perception. *J Periodontal Med ClinPract* 2014; 01:38-46.
12. Aldelaimi TN and Mahmood AS. Laser-Assisted Frenectomy Using 980nm Diode Laser. *J Dent Oral* Disord Ther 2014; 2(4): 1-6.
13. Kara C. Evaluation of patient perceptions of frenectomy: a comparison of Nd:YAG laser and conventional techniques. Photomed Laser Surg. 2008; 26(2): 147-152.
14. Haytac MC and Ozcelik O. Evaluation of patient perceptions after frenectomy operations: a comparison of carbon dioxide laser and scalpel techniques. *J Periodontol* 2006; 77: 1815-1819.
15. Medeiros R, Gueiros LA, Silva IH, Carvalho AA, Leao JC. Comparison of labial frenectomies performed with conventional surgery and Neodymium-doped Yttrium Aluminum Garnet (Nd:YAG) laser. Lasers Med Sci. 2015; 30(2): 851-856.

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