ORIGINAL RESEARCH PAPER
Volume-6 | Issue-9 | September-2017 | ISSN No 2277 - 8179 | IF : 4.176 | IC Value : 78.46
INTERNATIONAL JOURNAL OF SCIENTIFIC RESEARCH

COMPARATIVE EVALUATION OF FRENECTOMY PROCEDURES PERFORMED WITH SCALPEL, LASER AND ELECTROSURGERY- A CLINICAL STUDY

Dental Science

Rizwan M. Sanadi Y.M.T Dental College and Hospital, Kharghar,Navi Mumbai, 410210, Maharashtra, India
Suvidha V. Dere Y.M.T Dental College and Hospital, Kharghar,Navi Mumbai, 410210, Maharashtra, India
Munaf B. Maknojia Y.M.T Dental College and Hospital, Kharghar,Navi Mumbai, 410210, Maharashtra, India
Namrata J. Suthar Y.M.T Dental College and Hospital, Kharghar,Navi Mumbai, 410210, Maharashtra, India
Laksha R. Chelani Y.M.T Dental College and Hospital, Kharghar,Navi Mumbai, 410210, Maharashtra, India

ABSTRACT

Objective: The present study was designed to compare frenectomy procedure performed using scalpel, laser and electrosurgery and to evaluate the degree of postoperative pain, discomfort and functional complications (chewing and speech), experienced by patients on 1st and 7th post-operative days after three frenectomy procedures. Materials And Methods: Fifty four subjects requiring frenectomy were selected and divided randomly into Group A (conventional), Group B (laser) and Group C (electrosurgery). Mean VAS scores of postoperative pain, discomfort and functional complications were recorded on postoperative Day 1 and Day 7. Results: On intragroup comparison, there was reduction in pain, discomfort and functional complications (chewing and speech) from postoperative Day 1 to Day 7. On intergroup comparison, at day 1, Group B subjects experienced less pain, postoperative discomfort, less chewing discomfort. On day 7, Group C subjects showed less chewing discomfort. Conclusion: Laser showed promising results.

KEYWORDS

Frenectomy, laser, electrosurgery, conventional

INTRODUCTION

A frenum is a fold of mucous membrane, usually with enclosed muscle fibers, that attaches the lips and cheeks to the alveolar mucosa and/or gingiva and underlying periosteum.[1] A frenum that encroaches on the margin of the gingiva may interfere with plaque removal, and tension onthis frenum may tend to open the sulcus.[1]This condition may be conducive to plaque accumulation and may inhibit proper toothbrushing. In addition to this, the maxillary frenum may present aesthetic problem due to persistence of a midline diastema or compromise the orthodontic result in the midline diastema cases, thus causing a recurrence after the treatment.[2]

The mandibular frenum is considered as aberrant when it is associated with a decreased vestibular depth and an inadequate width of the attached gingiva. [1,2]

The management of such an aberrant frenum is accomplished by performing a frenectomy procedure. This can be accomplished either by the routine conventional scalpel technique[1,3,4] laser[5-8] or by using electrosurgery[9]. The present article is a compilation of clinical cases of an aberrant frenum, treated by frenectomy procedures (performed with scalpel, laser and electrosurgery), with an added note on comparison on the degree of postoperative pain, discomfort and functional complications (chewing and speech) experienced by patients after the procedure.

Thus the aim of this study was to compare the degree of postoperative pain, discomfort and functional complications (chewing and speech), experienced by patients after three frenectomy procedures (using conventional, laser and electrosurgery techniques).

MATERIALS AND METHODS

The study sample was selected from from the Out Patient Department, Department of Periodontics. Fifty four subjects diagnosed with aberrant frenal attachment were included in the study and randomly assigned to receive treatment either with conventional surgical, laser or with electrosurgery techniques. The subjects were divided into three groups, namely Group A (conventional technique, sample size- 18), Group B (laser, sample size- 18) and Group C (electrosurgery, sample size- 18).32 females and 22 males aged between 18 and 26 years were included in the study

The study protocol was reviewed and approved by the institutional review board. Informed written consent was obtained from all subjects. All subjects were systemically healthy, were not on any medications, and had good oral hygiene at the time of the surgery. Only maxillary anterior frena extending to the interdental papilla of the central incisors were included in this study, and the subjects were matched for age, gender and the size of the frenum to standardize the postoperative wound size. A detailed case history was recorded and frenectomy was performed under local anaesthesia.

Surgical procedure

In Group A, the area [Fig 1] was anaesthetized with local infiltration using 2% lignocaine with 1:80000 adrenaline. The frenum was engaged with a haemostat which was inserted to the depth of the vestibule [Fig-2] and incisions were placed on the upper and undersurface of the haemostat until it was free [Fig-3]. The triangular resected portion of the frenum with the haemostat was removed. A blunt dissection was done on the bone to relieve the fibrous attachment. The edges of the diamond shaped wound were approximated by using 4-0 black silk interrupted sutures [Fig-4]. The area was covered with a periodontal dressing. The dressing and sutures were removed after 1 week.[Figure 5].

In Group B, Gallium Aluminium Arsenide (GaAlAs) diode laser (PHOTON ZOLAR™ laser unit) with a wavelength of 810 nm at 1.2 W power was used for excision of frenum. [Figure 6] The semiconductor diode laser was operated in a contact continuous wave mode using a flexible fiber optic tip with a diameter of 400 µm.[Figure 7]The beam was also used to remove any adhesions to the periosteum. The remnants of the ablated tissue were removed using sterile gauze dampened with saline. No sutures were placed after diode laser treatment. [Figure 8,9]

In Group C, once the area [Figure 10] was anaesthetized with local infiltration and the frenum was excised using needle and loop electrode tip [Figure 11]. Electrosurgery offered the advantage of minimal procedural bleeding and there was no need of sutures [Figure 12]. The healing was by secondary intention, as the wound edges were not approximated with sutures [Figure 13].This technique was performed using electrosurgery unit (ELLMAN™ SURGITRON).

Assessment of clinical parameters

Using a visual analog scale (VAS), ratings for pain, discomfort and functional complications (chewing and speech) were recorded at Day 1 and Day 7 post-operatively.

The subjects were asked to separately to rate the degree of pain, discomfort and functional complications (chewing and speech), on a

10-cm horizontal visual analogue scale (VAS) post-operatively on 1st and on 7th days.

The right endpoints of the postoperative pain, discomfort and functional complications (chewing and speech) were designated as "no pain,""no discomfort" and the left endpoints were marked as "worst pain imaginable," "extreme discomfort."

All these parameters were recorded by a single examiner who was blinded for the surgical technique used.

After completion, data obtained was tabulated and subjected to statistical analysis, which included comparison of postopertive pain, discomfort and the degree of functional complications after the three frenectomy techniques. All subjects were instructed to use the same analgesic containing paracetamol if needed, and a comparison of their need for analgesics after the three techniques, was also recorded.

Statistical analysis

Descriptive statistics were expressed as means and standard deviations for each group. Inter group comparisons for the study variables were analyzed using Kruskal Walis ANOVA. In the above test, p value less than or equal to 0.05 ($p \leq 0.05$) was taken to be statistically significant. All analyses were performed using SPSS software version 10.

RESULTS

Results of the study are summarized in (Table 1).

On intragroup comparison, there was reduction in pain, discomfort and functional complications (chewing and speech) from postoperative Day 1 to Day 7 in all the three groups which was not statistically significant.

On day 1, pain and postoperative discomfort were less in frenectomy procedure done by laser (Group B)although the values were statistically nonsignificant, except chewing discomfort which was statistically significant.

On day 7, there was a statistically significant reduction in chewing discomfort values in subjects who were treated by frenectomy procedure done by electrosurgery technique ($p < 0.05$).

More swelling was seen after frenectomy done by electrosurgery but it was not statistically significant (Table 2). More analgesics were consumed after frenectomy by electrosurgery technique. (Table 3)

DISCUSSION

The aim of this study was to compare the postoperative subjective effects of conventional surgical technique, laser and electrosurgery techniques for frenectomy procedures. However, there are studies comparing the postoperative effects of all the three techniques, which can justify their use for frenectomy surgeries.

Conventionally, a frenectomy procedure involves grasping the frenum with hemostat, incising upper and undersurface along the heamostat, creating a large triangular-shaped wound, often with copious bleeding. Patients often experience post-surgical bleeding and pain, and sutures can further increase this when they come in contact with food. The unpleasant taste of blood and unaesthetic appearance of sutures may result in a loss of the sense of well-being during the postoperative period. In addition, suture removal from gingival and labial tissues after 1 week can be painful because the sutures may be buried in the mucosa.[10-12]The classical technique leaves a longitudinal surgical incision and scarring, which may lead to periodontal problems and an unaesthetic appearance, thereby necessitating other modifications.

On the other hand, laser technique offered some advantages, such as relatively bloodless surgical and post-surgical event; the ability to precisely coagulate, vaporize, or cut tissue; sterilization of the wound site; minimal swelling and scarring; no suturing in most cases; little mechanical trauma; reduction of surgical time; decreased post-surgical pain; and high patient acceptance. These results are similar to the findings reported by **Aldelaimi TN and Manmood AS 2014**, concluded that subjects in which frenectomy is done with laser experienced less pain and discomfort postoperatively.[13] Also, **Butchi Babu K**[14]and **Kaur**[15]concluded that diode laser provides better patient perception in terms of post-operative pain and function than that obtained by the conventional scalpel technique. Thus, it can be a dependable alternative for frenectomy procedures. Thus, there is abundant evidence confirming markedly less bleeding, particularly of highly vascular oral tissues, with laser surgery.

Among all the approaches for frenectomy procedure which were employed in the present cases, the electrosurgery procedure also offered the advantage of minimal time consumption and a bloodless field during the surgical procedure, with no requirement of sutures. Subjects treated with electrocautery (Group C) experienced less postoperative chewing discomfort on Day 7 but reported more number of swellings as compared to Group A and B. Also, Group C subjects consumed maximum number of analgesics as compared to Group A and B. This results are similar to reported by **Christensen**, when diode laser is compared with electrosurery concluded that laser can be new go to solution for many soft tissue problems.[16]

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, these techniques have their own merits and demerits, thus further improvements can still be attempted.

FIGURES

Frenectomy performed with scalpel (Group A)

Figure 1 Preoperative view

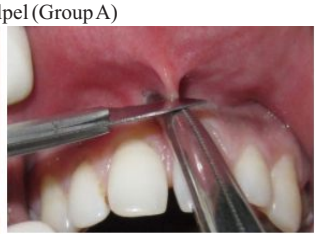

Figure 2 Incision along the upper and under surface of the hemostat

Figure 3 Releasing the muscle fibers

Figure 4 Sutures

Figure 5 Suture removal after one week

Frenectomy performed with laser (Group B)

Figure 6 Preoperative view

Figure 7 Incision using laser

Figure 8 Immediate postoperative view

Figure 9 1 week postoperative view

Frenectomy performed with electrocautery (Group C)

Figure 10 Preoperative view

Figure 11 Frenum excised with a needle electrode

Figure 12 Excision of frenum completed

Figure 13 Post-operative with no requirement for suture placement

Table no.1: Comparison of VAS scores of post-operative patient perceptions after frenectomy using 3 different techniques

	Scalpel frenectomy	Laser frenectomy	Electrosurgery frenectomy	P value
Pain at day 1	3.83 ± 0.75	3.17 ± 0.41	4.33 ± 1.03	0.054
Pain at day 7	1.67 ± 0.52	1.17 ±0.75	1.67 ± 0.52	0.328
Chewing at day 1	3.50 ± 1.05	2.33 ± 0.52	3.33 ± 0.52	0.034*
Chewing at day 7	1.67 ± 0.52	1.00 ± 0.63	0.83 ± 0.41	0.040*
Speaking at day 1	3.00 ± 0.63	2.33 ± 0.52	2.67 ±0.52	0.161
Speaking at day 7	1.33 ± 0.82	0.50 ± 0.55	0.50 ±0.55	0.103

***statistical significance, p < 0.05**

Table no.2: Comparison of post-operative swelling after frenectomy using 3 different techniques.

	Scalpel frenectomy	Laser frenectomy	Electrosurgeryfrenectomy	P value
Swelling (yes)	0	0	2	0.119
Swelling (no)	6	6	4	

Table no.3: Comparison of number of analgesics taken after frenectomy using 3 different techniques.

	Scalpel frenectomy	Laser frenectomy	Electrosurgery frenectomy	P value
No. of Analgesics (mean)	3.33	1.33	4.67	0.063

REFERENCES

1. Jhaveri H. The Aberrant Frenum. Dr.HiralJhaveri (ed), Dr. PD Miller the father of periodontal plastic surgery, 2006;29-34.
2. Huang WJ, Creath CJ. The midline diastema: a review on its etiology and treatment. Pediatric Dentistry 1995;17:171-9.
3. Archer WH. Oral surgery for a dental prosthesis. In: Archer WH (ed). Oral and Maxillofacial surgery. Philadelphia: Saunders, 1975;135- 210.
4. Kruger GO. Oral and maxillofacial surgery. 2nd ed. St. Louis: The C.V. Mosby Co; 1964
5. Gontijo I, Navarro RS, Naypek P, Ciamponi AL, Haddad AE. The application of diode and Er:YAG lasers in labial frenectomies in infants. J Dent Child 2005;72(1):10-5.
6. Olivi G, Chaumanet G, Genovese MD, Beneduce C, Andreana S. The Er,Cr:YSGG laser labial frenectomy: a clinical retrospective evaluation of 156 consecutive cases. Gen Dent. 2010;58:126-33.
7. Shetty K, Trajtenberg C, Patel C, Streckfus C. Maxillary frenectomy which was done by using a carbon dioxide laser in a pediatric patient: a case report. Gen Dent. 2008;56:60-3.
8. Kafas P, Stavrianos C, Jerjes W, Upile T, Vourvachis M, Theodoridis M, et al. Upper-lip laser frenectomy without infiltrated anaesthesia in a paediatric patient: a case report. Cases Journal 2009;2:7138.
9. Cunha RF, Silva JZ, Faria MD. A clinical approach of ankyloglossia in babies: a report of two cases. J ClinPediatr Dent 2008; 32:277-82.
10. Takei HH, Azzi RA. Periodontal plastic and estheticsurgery. In: Newman MG, Takei HH, Carranza FA, eds.Carranza's Clinical Periodontology. London: W.B.Saunders; 2002:870-871.
11. Fiorotti RC, Bertolini MM, Nicola JH, Nicola EM. Early lingual frenectomy assisted by CO2 laser helps prevention and treatment of functional alterations caused by ankyloglossia. Int J Orofacial Myology 2004;30: 64-71.
12. Bullock N Jr. The use of the CO2 laser for lingual frenectomy and excisional biopsy. CompendContinEduc Dent 1995;16:1118-1123.
13. Aldelaimi TN, Mahmood AS. Laser-Assisted Frenectomy Using 980 nm Diode Laser. J Dent Oral DisordTher 2013;2[4]: 1-6.
14. Butchi babu 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.
15. 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 patient's perception. J Periodontal Med ClinPract 2014; 01: 38-46.
16. Christensen GJ. Soft-tissue cutting with laser versus electrosurgery. J Am Dent Assoc 2008; 139.