

Original Research

Comparison of frenectomy with conventional scalpel and Nd:YAG laser technique

¹Jigar Kalaria, ²Vinali Patel, ³Hardik Makadia, ⁴Hardik Lalakiya

¹Assistant Professor, Department of Dentistry, Major S.D. Singh Medical College & Hospital, Baikunthpuri, Bewar Road Fatehgarh Farrukhabad, U.P., India;

²Senior Lecturer, Department of Orthodontics and Dentofacial Orthopaedic, College of Dental Science and Hospital, Bhavnagar, Gujarat, India;

³Senior Lecturer, Department of Prosthodontics and Crown & Bridge, College of Dental Science and Hospital, Bhavnagar, Gujarat, India;

⁴Senior Lecturer, Department of Orthodontics and Dentofacial Orthopaedic, Ahmedabad Dental College and Hospital, Ahmedabad, Gujarat, India

ABSTRACT:

Background: Frenectomy can be done by conventional technique, electrosurgery, or soft tissue lasers. The present study was conducted to compare frenectomy with conventional scalpel and Nd:YAG laser technique. **Materials & Methods:** 84 patients scheduled for frenectomy of both genders were randomly divided into 2 groups of 41 each. Group I patients were treated with scalpel and group II with neodymium-doped yttrium aluminum garnet (Nd:YAG) laser. The severity of bleeding, wound healing and the number of analgesics used during the healing phase was recorded. **Results:** In group I, males were 21 and females were 20 and in group II, males were 18 and females were 23. The mean bleeding score in group I was 2.8 and in group II was 1.1, VAS was 3.2 in group I and 1.7 in group II and analgesics used was 2.4 in group I and 1.2 in group II. The difference was significant ($P < 0.05$). **Conclusion:** Diode lasers provided better patient perception in terms of reduced operative time, pain, and bleeding as compared to the scalpel. Therefore, it can be concluded that Nd:YAG laser is an efficient method for frenectomy.

Key words: Diode lasers, Frenectomy, Scalpel

Received: 18 May, 2019

Accepted: 21 June, 2019

Corresponding author: Jigar Kalaria, Assistant Professor, Department of Dentistry, Major S.D. Singh Medical College & Hospital, Baikunthpuri, Bewar Road Fatehgarh Farrukhabad, U.P., India

This article may be cited as: Kalaria J, Patel V, Makadia H, Lalakiya H. Comparison of frenectomy with conventional scalpel and Nd:YAG laser technique. J Adv Med Dent Sci Res 2019;7(7):250-252.

INTRODUCTION

The frenum that encroaches on the margin of the gingiva may interfere with plaque removal, and tension on this frenum may tend to open the sulcus eventually leading to gingival recession and midline diastema.¹ Depending on the attachment of fibers, frenum has been classified as follows mucosal: Fibers that are attached up to mucogingival junction, Gingival: Fibers inserted within attached gingiva, Papillary: Fibers extended into interdental papilla and Papilla penetrating: When the fibers cross the alveolar process and extend up to the palatine papilla.² Frenectomy involves the complete removal of the frenulum, including its attachments to the underlying alveolar process. Any abnormalities in the size and location of the frenulum can cause functional and

aesthetic problems which requires surgical excision. The most common location for the development of frenum abnormalities are maxillary and mandibular central incisors and canine and premolar areas.³ Frenectomy can be done by conventional technique, electrosurgery, or soft tissue lasers. Patients who undergo conventional frenectomy procedures using a scalpel often experience postsurgical pain and discomfort, which is further aggravated when sutures come in contact with food. One feasible alternative that can be considered is a laser assisted frenectomy.⁴ Lasers, such as the neodymium doped:yttrium aluminum garnet (Nd:YAG), carbon dioxide (CO₂), and erbium-doped (Er):YAG lasers, enable minimally invasive dentistry for soft tissue procedures.⁵ Diode lasers are semiconductor and they are indicated for

soft tissue surgeries as their wavelength approximates the absorption coefficient of pigmented tissues containing hemoglobin, melanin, and collagen chromophores.⁶The present study was conducted to compare frenectomy with conventional scalpel and Nd:YAG laser technique.

MATERIALS & METHODS

The present study comprised of 84 patients scheduled for frenectomy of both genders. All were informed regarding the study and their written consent was obtained.

Data such as name, age, gender etc. was recorded. Patients were randomly divided into 2 groups of 41

each. Group I patients were treated with scalpel and group II with neodymium-doped yttrium aluminum garnet (Nd:YAG) laser.

The severity of bleeding was recorded by scoring the amount of bleeding during the procedure for each patient (1: none, 2: mild, 3: moderate, and 4: severe). Wound healing was assessed after 3 months postoperatively. The healing was scored as 1: complete epithelialization, 2: incomplete epithelialization, 3: ulcer, and 4: tissue defect or necrosis. The number of analgesics used during the healing phase was recorded. Data thus obtained were subjected to statistical analysis. P value < 0.05 was considered significant.

RESULTS

Table I Distribution of patients

Groups	Group I	Group II
Method	Scalpel	Nd:YAG laser
M:F	21:20	18:23

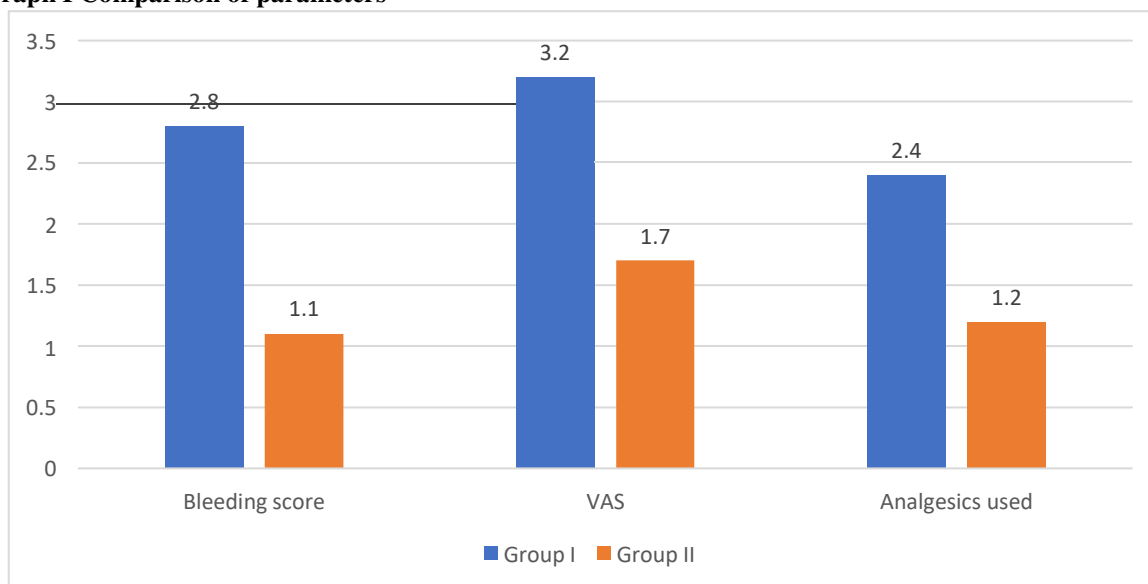
Table I shows that in group I, males were 21 and females were 20 and in group II, males were 18 and females were 23.

Table II Comparison of parameters

Parameters	Group I	Group II	P value
Bleeding score	2.8	1.1	0.02
VAS	3.2	1.7	0.01
Analgesics used	2.4	1.2	0.03

Table II, graph I shows that mean bleeding score in group I was 2.8 and in group II was 1.1, VAS was 3.2 in group I and 1.7 in group II and analgesics used was 2.4 in group I and 1.2 in group II. The difference was significant (P < 0.05).

Graph I Comparison of parameters



DISCUSSION

Frenum is an anatomic structure formed by a fold of mucous membrane and connective tissue fibers that attach the lip and cheeks to the alveolar mucosa and/or gingiva and the underlying periosteum.⁷ 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. In such cases, it is necessary to perform frenectomy for aesthetic and functional reasons.⁸ Frenotomy is the incision and relocation of the frenal attachment, whereas frenectomy is the complete excision of the frenum along with its attachment to the underlying bone.⁹ The

present study was conducted to compare frenectomy with conventional scalpel and Nd:YAG laser technique.

We found that in group I, males were 21 and females were 20 and in group II, males were 18 and females were 23. Patel et al¹⁰ compared the degree of postoperative pain and healing experienced by patients during frenectomy procedure with surgical scalpel and diode laser technique. A total of 20 subjects ranging from 16 to 40 years of age group with papillary or papillary penetrating frenal attachment in the maxillary anterior region were selected. Enrolled subjects were randomly divided into two groups as follows Group A (n = 10): Comprised of 10 subjects selected for conventional scalpel technique. Group B (n = 10): Comprised of 10 subjects selected for diode laser technique. Various parameters such as pain, inflammation, swelling, difficulty of procedure, and wound healing were evaluated at intervals of 1 week, 1 month, and 3rd month. The results indicated patients treated with the diode laser had less postoperative pain ($P < 0.0001$) and required fewer analgesics ($P < 0.001$) as compared to patients treated with the conventional scalpel technique. Wound healing at 7th day and after 1 month for both the groups showed statistically significant difference with better outcome in Group A. However, wound healing at the end of 3 months did not show any significant difference between the groups.

We observed that the mean bleeding score in group I was 2.8 and in group II was 1.1, VAS was 3.2 in group I and 1.7 in group II and analgesics used was 2.4 in group I and 1.2 in group II. Yadav et al¹¹ compared two methods of frenectomy for the pain experienced, intraoperative bleeding, healing outcome, and need for analgesics. Twenty patients with high labial frenum attachment requiring frenectomy were included in this study. Patients were randomly divided into Group A: scalpel group and Group B: neodymium-doped yttrium aluminum garnet (Nd: YAG) laser group. Visual Analog pain score, intraoperative bleeding, number of analgesics used, and healing outcome 3 months postoperatively were recorded. Group B patients experienced less pain ($P = 0.016$), less bleeding ($P = 0.016$), and required fewer number of analgesics ($P = 0.008$). Healing outcome at 3 months showed no significant difference between the two groups ($P = 0.095$).

Butchibabu et al¹² suggested that laser-assisted frenectomies result in greater patient acceptance due to reduced pain perception during the procedure and during the postoperative periods. Fisher et al¹³ reported that the laser wound differed from the conventional wound and showed delayed healing. This was because with the laser there is minimal damage to the adjacent tissue; initially, a coagulum of denatured protein forms on the surface; the inflammatory reaction is less; fewer myofibroblasts are present and there is

little wound contraction; less collagen is formed; and epithelial regeneration is delayed and more irregular. The limitation the study is small sample size.

CONCLUSION

Authors found that diode lasers provided better patient perception in terms of reduced operative time, pain, and bleeding as compared to the scalpel. Therefore, it can be concluded that Nd:YAG laser is an efficient method for frenectomy.

REFERENCES

1. Haytac MC, Ozcelik O. Evaluation of patient perceptions after frenectomy operations: A comparison of carbon dioxide laser and scalpel techniques. *J Periodontol* 2006;77:1815-9.
2. Huang WJ, Creath CJ. The midline diastema: A review of its etiology and treatment. *Pediatr Dent* 1995;17:171-9.
3. Devishree SK, Gujjari SK, Shubhashini PV. Frenectomy: A review with the reports of surgical techniques. *J Clin Diagn Res* 2012;6:1587-92.
4. Pick RM, Colvard MD. Current status of lasers in soft tissue dental surgery. *J Periodontol* 1993;64:589-602.
5. Ishii S, Aoki A, Kawashima Y, Watanabe H, Ishikawa I. Application of an Er:YAG laser to remove gingival melanin hyperpigmentation: Treatment procedure and clinical evaluation. *J Jpn Soc Laser Dent* 2002;13:89-96.
6. 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.
7. Pick RM, Colvard MD. Current status of lasers in soft tissue dental surgery. *J Periodontol* 1993;64:589-602.
8. Goharkhay K, Moritz A, Wilder-Smith P, Schoop U, Kluger W, Jakolitsch S, et al. Effects on oral soft tissue produced by a diode laser in vitro. *Lasers Surg Med* 1999;25:401-6.
9. Funde S, Baburaj MD, Pimpale SK. Comparison between laser, electrocautery and scalpel in the treatment of drug-induced gingival overgrowth: A case report. *IJSS Case Rep Rev* 2015;1:27-30.
10. Patel RM, Varma S, Suragimath G, Abbayya K, Zope SA, Kale V. Comparison of labial frenectomy procedure with conventional surgical technique and diode laser. *J Dent Lasers*. 2015;9:94-9.
11. Yadav RK, Verma UP, Sajjanhar I, Tiwari R. Frenectomy with conventional scalpel and Nd: YAG laser technique: A comparative evaluation. *Journal of Indian Society of Periodontology*. 2019 Jan;23(1):48.
12. 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;3:129-3.
13. Fisher SE, Frame JW, Browne RM, Tranter RM. A comparative histological study of wound healing following CO2 laser and conventional surgical excision of canine buccal mucosa. *Arch Oral Biol*. 1983;28:287-91.