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CASE REPORT

Laser Frenectomy – A Technical Note

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ABSTRACT

Labial frenulum is a band of tissues that connects the lip to the gum inside the oral cavity. In a highly-attached upper labial frenulum, a procedure known as frenectomy is usually performed under local anaesthesia. The indications for removal may include frequently traumatized soft tissues, gum recession, difficulties in maintaining good oral hygiene as well as for orthodontic purposes. There are various techniques in performing frenectomy including conventional scalpel and laser. Nowadays, laser is becoming the first choice for use in frenectomy as it is more time-saving, less painful and shows low-to-none intra- and post-operative complication. In this paper, we report a case of laser frenectomy procedure at the upper labial area, its complication and how we tackled it.

KEYWORDS: Frenum, laser, frenectomy, labial, complication

INTRODUCTION

Genetic diversity has caused the labial frenum to come in different shapes and sizes. Frenum attachment can be classified into 4 types, namely mucosal, gingival, papillary, and papilla penetrating [1]. Problems associated with highly-attached frenum are common encounters in dental practice. This includes frequent mechanical trauma which can be caused by obstruction during daily tooth brushing [2]. Besides, a frenum that is attached too close to the gingival margin will result in muscle pull which in turn will cause midline spacing (diastema), gingival recession, as well as inability to maintain good oral hygiene due to interference with the frenum [3].

Labial frenectomy is a common surgical procedure routinely performed in dentistry. It can be accomplished either by the conventional scalpel, electrosurgery (monopolar and bipolar) or by using laser (eg: Diode laser, Carbon dioxide laser, Neodymium:Yittrium-Aluminium-Garnet (YAG) laser, Erbium: YAG laser) [4, 5]. However, the conventional scalpel technique carries the risk of intra- and post-operative complications compared to laser and electrosurgery as reported in few studies. This includes intra-operative bleeding which will compromise the operating field, the need for suturing, post-operative pain and discomfort, and poor wound healing [6-8].

CASE PRESENTATION

A 19-year-old lady was referred for removal of her highly-attached upper labial frenum. She was diagnosed with dental malocclusion with midline diastema on 11 and 21, five years prior to this presentation. A fixed dental appliance was placed to correct her malocclusion three years back.

Examination of the oral cavity revealed a highly-attached upper labial frenum (Figure 1) which falls under Placek's Class III classification (Papillary types). Orthodontic appliances appeared intact on upper

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and lower arches with traction done using NiTi wire. On further examination, no obvious spacing was seen between 11 and 21. Moreover, no sign of gum recession was seen on the entire dentition as well.

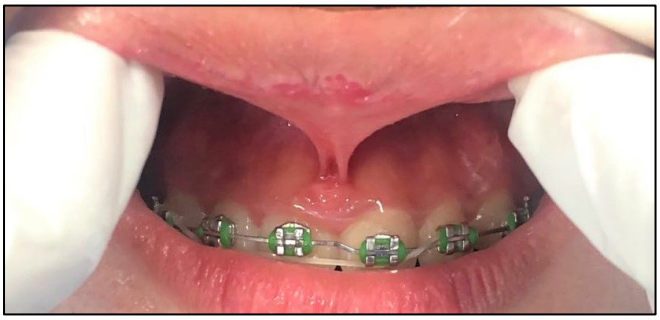

Figure 1 Highly-attached upper labial frenum

Frenectomy was performed under local anaesthesia mepivacaine with 1:100 000 adrenaline. The labial frenum was cut using a diode laser which is set to frenectomy procedure with the power of 6.50 Watts. The depth of cutting extended until the depth of the vestibule. During the procedure, we encountered minimal bleeding from the surgical site, which was cauterized completely (Figure 2). Then, the raw area was cleaned with gauze soaked in chlorhexidine. Hyaluronic acid gel was applied to reduce discomfort.

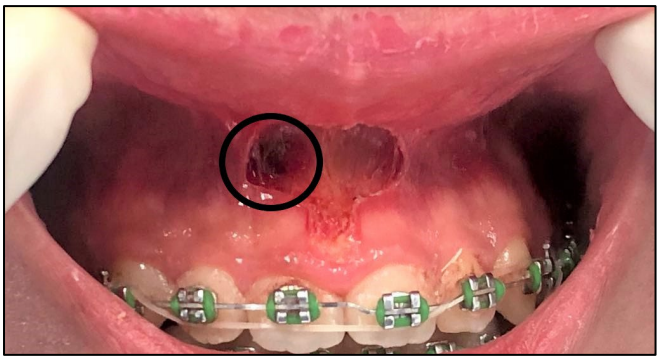

Figure 2 Laser frenectomy performed. Bleeding encountered, noted hematoma area after labial vein cauterization (circled)

Upon discharge she was advised to self-monitor the site and to report to emergency department immediately if bleeding recurred. The patient was reviewed after a week post-operatively. There were no new complaints from the patient and the surgical site showed signs of healing (Figure 3).

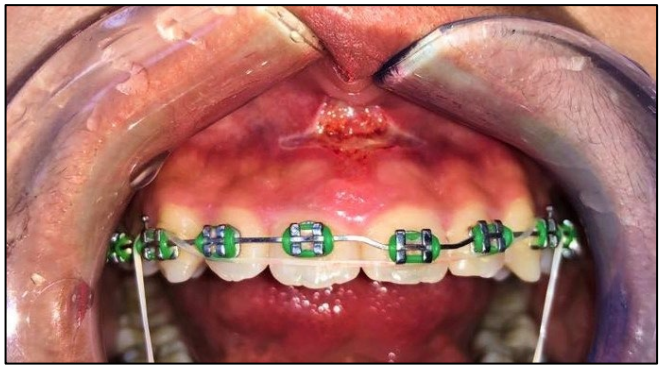

Figure 3 1-week post-op showed surgical area. No active bleeding or discharge noted

DISCUSSION

The decision to use laser instead of scalpel blade was made based on a few reasons, such as to minimize bleeding, pain and most importantly, post-operative discomfort. Diode laser provides better patient perception in terms of operation time, pain and bleeding than that encountered by the scalpel [9].

Electrosurgery (monopolar and bipolar), on the other hand, possesses almost similar advantages to lasers as compared to scalpel, such as reduced intraoperative bleeding, elimination of the necessity for suturing and reduced post-operative pain [6, 10]. However, some studies have reported a few disadvantages of electrosurgery as compared to lasers. These includes the inability to use it in a patient with a pacemaker, increased post-operative swelling, prolonged healing time, and increased risk of tissue burns [11, 12].

Intra-operative bleeding during frenectomy procedure is an important aspect to take into consideration. It was significantly higher in the group where frenectomy was performed using scalpel as compared to laser [13]. Most cases show that when using laser during frenectomy, bloodless surgeries were achieved [7, 14, 15]. However, others also reported some degree of bleeding during the procedure ranging from minimal to oozing [16-18]. Even though every report did not specify the underlying reason for the bleeding, it might be due to improper surgical technique, poor understanding on how the laser works, anatomical variation, patient behaviour and lack of experience. Furthermore, extensive blood loss in major oral surgery including oromaxillofacial procedures can

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lead to hypovolemic shock and can also lead to death [19]. For a procedure that is done under general anaesthesia, the hemostasis may be easier to be controlled, such as in case of requiring any volume replacement to be done. Besides, the patient's airway is already secured.

In the present case, despite choosing laser-assisted technique, bleeding was still present during the procedure. Since it was uncontrolled and profuse at first, it was a bit challenging in managing the bleed. Most importantly, the clinician needed to be able to understand the anatomy and spot the source of the bleeder. We believe that the bleeding was from the superior labial vein since the nature of the bleed, as we observed, was dark red in colour and flowed in a steady manner.

Even though it is not common, bleeding can still occur with an inappropriate technique and understanding of how the laser works. The hot tip of the diode laser has the capability of both cutting and coagulating. These properties depend on the char (eg: organic matter, burnt ink or burnt corkwood) on the diode's glass tip (Figure 4). During the surgery, we constantly wiped the diode tip with wet chlorhexidine-soaked gauze having in mind that removing the char will keep the sterility of the tip at its best. However, insufficient charring reduces the tip temperature and heightens the risk of bleeding due to tissue trauma by sharp edges of the glass tip [20]. In this case, we believe the direct trauma from the sharp laser tip was the main cause of injury to the blood vessels.

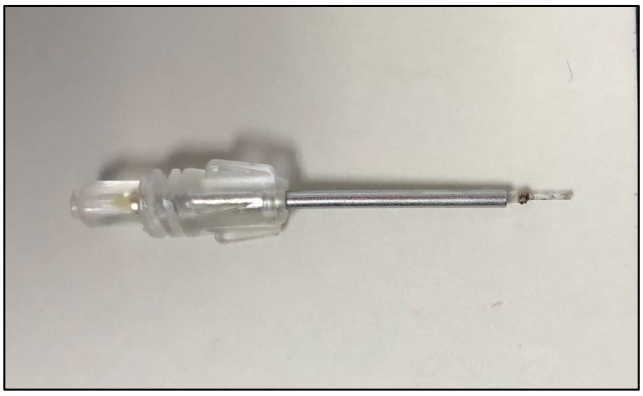

Figure 4 Diode glass tip can be sharp without sufficient charring

Even though sterility is of utmost concern in every surgery, we must also consider avoiding unnecessary injuries. Constant wiping or cleaning the tip will reduce the char and will make the tip sharp. Thus, it is best to minimize wiping and maintain some amount of char at the diode tip during cutting to avoid soft tissue tear.

Management of bleeding play a crucial role in order to reduce any further complication from the surgery. There are few well-documented methods in managing intraoral bleeding. Some conventional methods are mechanical pressure, ligature and application of tourniquet which consume a lot of time. In addition, sealing of bleeding vessels can also be done by thermal method, such as electrocauterization and laser cauterization, which was our preferred choice for this case [19].

Despite application of direct pressure using gauze, bleeding was profuse and persisted. The decision to perform laser cauterization was made and the bleeding finally stopped. The mechanism to explain this is that, at high temperature the wall of blood vessels shrink causing thermal coagulation. Furthermore, coagulation of tissue proteins at the ablated tissue margin resulted in reduced bleeding at the operated site [21].

The patient was seen one-week post-operation. The patient did not have any complaints and complications post-operatively. Moreover, the tissue is healing and the bleeding site is completely healed.

CONCLUSION

Clinicians must be well-versed and prepared for any circumstances during the surgery. Even though, in most laser cases bleeding is not encountered, it still can happen anytime even with laser which is supposed to be blood-less. Most importantly, clinicians must not panic and manage the bleeding accordingly.

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Conflict of Interest

Authors declare none.

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Authors' contribution

Drafting the manuscript: IHM & SLA

Literature review: IHM, SLA & IM

Data collection: IHM & IM

Critical Review: IM

Final Approval: IHM & IM

REFERENCES

1. Dibart S, Karima M. Labial frenectomy alone or in combination with a free gingival autograft (2006). In: Serge Dibart, Mamdouth Karima (eds) *Practical Periodontal Plastic Surgery*. Germany: Blackwell Munksgaard: pp 53.
2. Naini FB, Gill DS. Oral surgery: Labial frenectomy: Indications and practical implications. British Dental Journal. 2018; 225(3): 199-200.
3. Divater V, Bali P, Nawab A, Hiremath N, Jain J, Kalaivanan D. Frenal attachment and its association with oral hygiene status among adolescents in Dakshina Kannada population: A cross-sectional study. Journal of Family Medicine and Primary Care. 2019; 8(11): 3664.
4. Midda M. Lasers in periodontics. Periodontal Clinical Investigation. 1992; 14(1): 14-20.
5. Divya S. Laser-assisted labial frenectomy - A case report. Research Journal of Pharmacy and Technology 2019; 12(8): 3883-5.
6. Shah M, Shah S, Rathwa V, Dave D. Case Report Frenectomy Using Electrocautery: A Case Series. Advances in Human Biology. 2013; 3(2): 26–30.
7. Pié-Sánchez J, España-Tost A-J, Arnabat-Domínguez J, Gay-Escoda C, Resident D, Teknon CM. Comparative study of upper lip frenectomy with the CO2 laser versus the Er, Cr: YSGG laser. Medicina Oral, Patología Oral y Cirugía Bucal. 2012; 17(2): 228–60.
8. Badreldin HM, Eldestawy MT, Elbayomy SY. Comparison Between Diode Laser and Conventional Surgical Technique to Perform Labial Frenum Surgeries in Children: A Randomized Controlled Trial. Al-Azhar Journal of Dental Sciences. 2018; 21(4): 391–4.
9. Patel RM, Varma S, Suragimath G, Abbayya K, Zope SA Kale V. Comparison of labial frenectomy procedure with conventional surgical technique and diode laser. Journal of Dental Lasers 2015; 9(2): 94-9.
10. Babaji P, Singh V, Chawrasia V, Jawale M. Electrosurgery in dentistry: Report of cases. Journal of Pediatric Dentistry. 2014;2(1):20.
11. Gandhi D, Gandhi P. Comparison of Healing Period after Frenectomy Using Scalpel, Electrocautery & Diode Laser. British Journal of Medicine & Medical Research. 2017; 21(12): 1–9.
12. Ramachandra VK. Evaluation of Healing Following Labial Frenectomy: A Comparison of Scalpel, Electrosurgery, and Diode Laser Technique. International Journal and Scientific Research. 2018; 7(10): 215–8.
13. 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; 23(1): 48-52.
14. Júnior RM, Gueiros LA, Silva IH, de Albuquerque Carvalho A, Leão JC. Labial frenectomy with Nd:YAG laser and conventional surgery: A comparative study. Lasers in Medical Sciences. 2015; 30(2): 851–6.
15. Pandey S. Laser Frenectomy of Papilla Penetrating Frenum - A Case Report. Acta Scientific Dental Sciences. 2019; 3(11): 22-4
16. Viet DH, Ngoc VTN, Anh LQ, Son LH, Chu DT, Ha PTT, et al. Reduced need of infiltration anesthesia accompanied with other positive outcomes in Diode Laser application for frenectomy in children. Journal of Lasers in Medical Sciences. 2019; 10(2): 92–6.
17. Al-Khatib A, Al-Azzawi A. Comparative study of diode laser 940 nm in performing frenectomy in both: Continuous and pulsed modes: An in vivo study. Journal of Dental Lasers. 2015; 9(2): 50.

18. Ilaria G, Marco M, Elisabetta M, Giovanni M, Carlo F, Maddalena M, et al. Advantages of new technologies in oral mucosal surgery: an intraoperative comparison among Nd:YAG laser, quantic molecular resonance scalpel, and cold blade. Lasers in Medical Science. 2015; 30(7): 1903–10.
19. Akolkar AR, Kulkarni DG, Gangwani KD, Shetty L, Channe SP, Sarve PH. Bleeding control measures during oral and maxillofacial surgical procedures: A systematic review. Journal of Dental Research and Review 2018; 4(4): 79-89.
20. Levine R, Vitruk P. Hemostasis and coagulation with ablative soft-tissue dental lasers and hot-tip devices. Inside Dentistry 2016; 12(8): 37-42.
21. Levine R, Vitruk P. CO_2 laser efficiency in coagulation and healing. Implant Practice US 2015; 8(3): 34-7.

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