



ORIGINAL RESEARCH PAPER

Periodontics

DIODE LASER ASSISTED FRENECTOMY AND EXOPHYTIC LESION REMOVAL – A CASE REPORT

KEY WORDS:

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ABSTRACT

Lasers are becoming the standard of care for many dental procedures, and are being introduced as a high-tech instrument. They are also becoming more routine in dentistry through the advent of office-based lasers, which are also simple to use within the oral cavity. Many studies have shown the competencies of laser technology for the management of benign oral lesions and aberrant frenum removal as these techniques allow for painless and bloodless oral surgery¹. The management of such an aberrant frenum and oral benign lesions are accomplished by using lasers in recent years, lasers such as CO₂, Neodymium-doped yttrium aluminum garnet, Erbium-doped yttrium aluminium garnet, and diode have been used. In this paper, we present a case of diode laser frenectomy accompanied by exophytic benign lesion removal².

Introduction

Aesthetic concerns have led to an increasing importance in seeking dental treatment, with the purpose of achieving perfect smile. The continuing presence of a diastema between the maxillary central incisors in adults, has often been considered as an aesthetic problem³. The frenum is a mucous membrane fold that attaches the lip and the cheek to the alveolar mucosa, the gingiva, and the underlying periosteum⁴. The maxillary frenum may present aesthetic problems or compromise the orthodontic result in the midline diastema cases, thus causing a recurrence after the treatment⁵. The management of such an aberrant frenum is accomplished by performing a frenectomy. Lasers are currently becoming popular in various fields of dentistry and provide alternative to conventional scalpel procedures.

Also its found that lasers have beneficial and safe clinical applications for oral medicine specialists in both diagnosis and treatment of different forms of oral mucosal lesions. For example orthodontic treatment can inflict such injuries as they are prolonged over a long period of time⁶. Ill-fabricated orthodontic appliances, such as wires and brackets, or the patients' habits such as application of constant pressure over the appliance can traumatize the adjacent oral soft tissues and can develop in to A wide range of benign oral lesions exists as either an isolated oral finding or the manifestation of dermatologic conditions. These lesions can be removed by different surgical procedures such as the conventional scalpel, electrosurgical scalpel, or lasers⁷.

In this study, we report the removal of a benign exophytic lesion and frenectomy from the oral cavity by a laser to emphasize the features of this technique and assess its consequences on living tissues.

Case report

A 17-year-old female patient was referred from the department of orthodontics, coorg institute of dental sciences to the department of periodontics and implantology, coorg institute of dental sciences, virajpet for frenectomy (for the closure of the midline diastema) and exophytic soft tissue

removal.

Clinical examination showed midline diastema with aberrant frenum of pappillary penetrating attachment and it observed that the midline diastema was due the high frenal attachment also there was an exophytic smooth surface nodule with a sessile, red-colored, and popular surface near the tooth region, approximately 0.5 cm × 1 cm in dimension. The lesion bled a little by trauma and the patient is undergoing orthodontic treatment so growth may be because of the constant pressure from the wires and brackets which traumatize the adjacent oral soft tissues and developed in to a exophytic lesion. Her past medical history was clear.

Procedure and laser parameters:

First phase of treatment - frenectomy
Safety measures were taken for the dentist, assistance, and the patient by wearing the protective goggles, The laser was activated before performing the procedure. Surgical tip at 400 μm was used with a power of 1.37 W and was applied in contact mode.

Frenectomy was performed using diode laser of 980nm. The labial frenum was sprayed with topical spray and infiltration anesthesia was given to the frenum. The incision was started with the frenum from the attached gingiva and interdental papilla on the labial surface between the central incisors extending upward from inner side of upper lip to the depth of vestibule ending in a rhomboidal area causing separation of the fibers. Hemostasis was optimal and no sutures were given. Second phase of treatment – Removal of oral benign exophytic lesion.

The lesion was excised completely from its base after local anesthesia injection by a diode laser with an 980 nm continuous wavelength. The fiber tip got in contact with the lesion during surgery. Histopathologic evaluations showed irritational fibroma as the test result and the amount of bleeding was far less than expected.

Post operative instructions - The patient was given verbal instructions to avoid taking hot and spicy food for a few days

and to maintain meticulous oral hygiene. Postoperative analgesics were given to the patient. After 2 weeks of follow-up, significant healing was noted.

Discussion

Lasers that are routinely used in oral operations include CO₂, diode-Er, Nd YAG, as well as low-level lasers for disinfection and accelerating the healing process. Diode lasers have received FDA approval for soft tissue procedures such as incision, ablative excision, and pocket debridement.

The diode laser was introduced in the mid-90s.⁸The diode laser contains a solid active medium and is composed of semiconductor crystals of aluminum or iridium, gallium, and arsenic.⁹ Wavelengths of diode laser range from 810 to 1064nm. They are used in soft tissue surgeries as their wavelength approximates the absorption coefficient of pigmented tissue containing hemoglobin, collagen, melanin, and chromophores. Diode lasers are becoming popular over conventional techniques because they are less invasive, which result in reduced postoperative edema. The sealing of nerve endings result in reduced inflammatory response and the formation of a protein layer over the surgical wound protects the wound from external irritation, causing less post operative pain and avoiding the use of analgesic drugs.¹⁰ Photothermal interaction with tissue is the basic concept of surgical laser. In this process, radiant light is absorbed by the tissue and transformed to heat energy changing tissue structure. Laser light within was converted to thermal energy on contact with the tissue, causing laser tissue interaction, which when appropriately applied can produce reactions ranging from the incision, vaporization, to coagulation.¹¹ For routine clinical dental treatments, pain control is quite important for patient's physical and mental wellbeing as well as for the effectiveness of therapy.

The safety and efficacy of diode lasers have been confirmed in the field of minor oral operations, such as removal of irritative lesions, salivary gland and vascular lesions, as well as hyperplastic gingival tissues.

In this case, we reported 980-nm wavelength diode laser frenectomy and exophytic lesion removal with no complications and excellent patient satisfaction. We used infiltration anesthesia and local anesthesia spray for the procedure. Most of the studies conducted on laser frenectomy have been performed using topical spray with or without infiltration anesthesia. However, in the study conducted by Aldelaimi and Mahmood,¹² the frenectomy was performed under sedative analgesia using midazolam and topical spray.

Conclusion

The rapid developments in laser technology and better understanding of bio-interactions of different laser systems have expanded the use of laser in dentistry. They provide an excellent alternative to conventional scalpel surgery because of patient comfort, bloodless field, and reduced pain and healing time. Owing to the small size, low cost, fiber optic delivery, and ease of use for minor surgery of oral soft tissue, diode laser has become an excellent choice for many surgical procedures.

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Fig A : Showing exophytic lesion palatally between 11 and 21



Fig B : Showing aberrant frenum



Fig C : Post operative view after frenectomy

Fig D : Post operative view after lesion removal