

Lasers in Pediatric Dentistry

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Abstract

LASER is one of the latest technologies available for performing vivid oral procedures with minimal patient discomfort and maximum patient compliance. Its role in treatment of innumerable procedures has shown results par excellence. The present article briefs out two minor oral surgical procedures performed with LASER.

Keywords: Dentistry; LASER

Introduction

The word LASER is an acronym for light amplification by stimulated emission of radiation. Laser technology has been vividly used in dentistry to cater to the diagnostic and therapeutic needs of patients quickly, effectively and efficiently. The first laser was developed by Theodore H. Maiman in 1960 [1]. Lasers in pediatric dentistry proves to be a boon as it allows to perform various procedures in a child with minimal or no use of Local Anaesthetic agent, quicker healing, no bleeding and minimal discomfort. There are lesser post-operative complications seen with LASER in comparison to conventional procedures done under Local Anaesthetic which ultimately leads to more patient cooperation.

Following cases are the two procedures of minor apthous ulcer and ankyloglossia performed with LASER in pediatric patients.

Case 1

A nine year old female patient reported to the department of Pedodontics and Preventive dentistry with the chief complaint of pain in lower left labial mucosa since 2 days. Pain was sharp and intermittent in nature which aggravated on eating food and the patient has taken no medication for the same. The patient had such ulcers for the first time. No extra-oral abnormality was seen. On intra-oral examination 3 greyish-white ulcers were seen on the left labial mucosa measuring about 3 mm in diameter with a necrotic centre and an indurated halo, oval in shape as shown in figure 1a. On palpation the ulcers were tender. The treatment plan that was formulated for the patient was to treat the ulcers with lasers. An 810 nm wavelength diode laser with a power of 0.5 watts

in a defocused non-contact mode was used to treat the patient. The patient and the operator both were made to wear the eyewear. Three continuous sessions of 30 seconds each was given to the patient with a refractory period of 45 seconds as shown in figure 2b. After the treatment, only the decrease in width of the lesion was seen. No decrease in the length of the lesion was observed as shown in figure 2c. The complete remission of the lesion was seen after 3 days as shown in figure 2d.



Figure 1

- (a): showing 3 greyish-white ulcers seen on the left labial mucosa pre-operatively.
- (b): showing intra-operative treatment of ulcer done with LASER.
- (c): showing immediate post-operative treatment of ulcer done with LASER.
- (d): showing 3 days post operative complete remission of the lesion.

Case 2

A 13-year-old male reported to the Department of Pedodontics, with chief complaint of slurred speech. A Complete medical and dental history was recorded for the patient. A thorough extra-oral and intra-oral examination was done. On intraoral examination, it was found that the child had a class II ankyloglossia according to Kotlow's (1999) assessment as shown in figure 2a. A lingual frenectomy procedure was planned using the diode laser. Two mosquito haemostats were used to clamp the lingual frenum. Two incisions were made using defocused non- contact mode of a diode laser. The intervening frenum was excised that resulted in a diamond shaped wound as shown in figure 2b. The patient was given speech therapy sessions. A good healing of the zone was seen after 2 months. The speech was improved and the patient could achieve a tongue protrusion of several millimeters beyond the lower lip.



Figure 2

- (a): showing pre-operative short lingual frenum.
 (b): showing post-operative frenectomy done using LASER.

Discussion

The working of a diode LASER analgesic effect can be explained as follows: there is blockage of action potential generation and conduction of nociceptive signals in primary afferent neuron, increase in amount of natural analgesics such as opioid peptides, decrease in the release of chemical substances such as histamine and blockage of acetyl choline, reduction in synthesis of bradykinin and prostaglandin E₂, improvement in local microcirculation and supply of oxygen to hypoxic cells and mediation of synaptic gate transfer substance. For pediatric patient procedures patient compliance is of utmost importance. The conventional procedures involve use of Local anaesthetics and a blood filled field which is traumatic to the child. Thus introduction of painless and bloodless procedures with use of LASER is gaining popularity. Laser enhances access and visualization due to the lack of interposed instruments and bleeding at the operative field especially in the small mouth of a child. De Souza TO., *et al.* (2010) reported that diode laser can cause reduction in pain and a total regression of the lesion after 4 days [2]. Anand., *et al.* (2013) in a case report concluded that diode laser therapy can decrease the healing time, pain intensity, size, and recurrence of the lesion in patients with minor RAS, and hence can be considered the most appropriate treatment modality for minor RAS, with greatest clinical effectiveness [3].

Dhillon JK., *et al.* (2013) reported two cases of painful aphthous ulcers in a 13 year old child treated with soft tissue diode laser. Immediately after laser therapy the pain reduced significantly and healing occurred in 72 hrs [4]. Payasi S., *et al.* (2017) performed a Laser-assisted lingual frenectomy in a 14 year old child and completed it successfully with no bleeding and no postoperative sutures in a time span of 10 minutes [5]. Kackarska M., *et al.* (2016) performed a labial frenectomy in a 9 year old girl and found excellent results of the same with a quicker wound healing [6].

Conclusion

The diode LASER is an exemplary tool for treating pediatric patients with minor oral surgical procedures. The outcome seen with the above two cases were satisfactory enough as there were no postoperative pain, no sutures required and no postoperative infection seen. The recovery was uneventful with promoted healing.

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