Laser-assisted Operculectomy in an 8-Year-old Child Using Diode Laser: A Case Report

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Abstract

The past years in dentistry has seen the growth of the use of laser advance by leaps and bounds. Though soft-tissue laser was originally presented, but with the development of new-generations of laser technology, lasers are equally effective on hard tissues. Lasers have a plethora of uses in pediatric dentistry including prevention of caries, prompt diagnosis, restoration of cavities, managing cases of trauma to teeth along with various minor oral surgical procedures. Lasers are advantageous for being more rapid, more precise, sterile and providing a bloodless field of surgery and are also better accepted by pediatric patients and their parents. In the same light, treatment of a pediatric patient becomes easier it is less fear-inducing for the child thus increasing co-operative behavior. The soft tissue covering over a partially erupted tooth is known as pericoronal flap or gingival operculum. Surgical removal of the latter is termed as Operculectomy. The following text reports a case of Operculectomy performed using a diode laser in the pediatric operatory.

Keywords: *Laser, Operculectomy, Pediatric dentistry.*

Introduction

LASER is an acronym that expands as 'light amplification by stimulated emission of radiation'. Gordon Gould is credited with its first introduction in 1959 a graduate student at Columbia University.[1] Theodore Maiman at Hughes Research Laboratories created the first working laser in 1960.[2] Application of lasers in dentistry varies widely among both soft and hard tissues. Soft tissue applications may include procedures such as a frenectomy, exposure of unerupted teeth, disinfection of root canals among others. Hard tissue applications involve the detection and removal of caries and removal of old restorations.[3] Pediatric Dentistry involves close interaction with children is thus dissimilar from dentistry in adults. It is thus indispensable for the dentist to be thoroughly acquainted with the skills required in line with the child's age and level of development. The employment of various categories of laser devices facilitates the pediatric dentist to deliver dental care in a minimally invasive way with negligible distress, reduced bleeding, while also being painless both during and post-treatment. Pedodontists aim to fashion a pleasurable experience for the child during their dental visits by inculcating innovative, minimally invasive machinery to instill a positive dental attitude within the child.[4] An operculum may be defined as a flap originating from the gingival tissue usually present distally to a molar or covering the occlusal surface of the molar frequently presenting as a sequela of tooth eruption. In a few cases, an operculum may cause pain due to the masticatory forces from the opposite molar teeth in which case operculum may become ulcerated and inflamed either due to repeated trauma or due to local inflammatory reaction due to accumulation of food debris and plaque between the surface of the tooth and the opperculum.[5]

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Case Report: An 8-year-old female patient reported to the Department of Paediatric and Preventive Dentistry at the Institute of Dental Sciences, Bhubaneswar with a chief complaint of pain on chewing food in her upper right back teeth region since the last 6 months. Patient-reported a history of dull aching pain along with food lodgement in the region of the chief complaint. Clinically the patient showed good general health with the absence of any relevant medical history.

The child displayed a Negative (-) behavior according to the Frankl behavior rating scale given by Frankl et al. in 1962. Intraoral examination revealed the presence of an operculum covering the occlusal surface of the upper right first permanent molar (Figure 1). The operculum was pinkish-brown in colour, firm, resilient and remained tightly adhered to the gingival tissue distal of the upper first molar tooth. No abnormalities were recorded on the radiographic examination of the affected tooth. The results of routine blood investigations were satisfactory.

Keeping into consideration the uncooperative and apprehensive behaviour of the child a treatment planning of surgical excision of the operculum with diode laser was made to reduce both treatment time and patient discomfort.Oral prophylactic procedures were carried outbefore the planned excision. Infiltration anesthesia was given in the region of the upper right first molar tooth to provide anesthesia to the surrounding soft tissue including the operculum tissue. 2% lidocaine with epinephrine [1:2,00,000] was used for the same. Appropriate eyewear was worn by the pediatric dentist, the child and also the dental assistant before the initiation of the surgical procedure (Figure 2). Excision of the operculum was started from the distal margin of attachment using a 940nm diode laser [iLASE^{TM} diode laser from BIOLASE Inc.] in continuous contact mode at 1.8 W of power rating in the presence of a high volume evacuation. The tip of the laser was cleaned regularly during the procedure to remove the adhered scorched tissues. A conscious effort was made to avoid contact between the enamel surface and the laser tip. Satisfactory hemostasis was obtained postoperatively (Figure 3). The surgical site was irrigated with saline and povidone-iodine to remove any unwanted or remaining debris. The total time required for completion of the procedure was below ten minutes and the patient tolerated the procedure well with minimal pain or discomfort. The patient was advised to use a topical anesthetic gel at the site of excision and was counseled on the maintenance of appropriate oral hygiene. A post-operative follow-up after 7 days revealed adequate and uneventful healing (Figure 4).

Figure 1 Pre-operative view of operculum about right upper first molar tooth

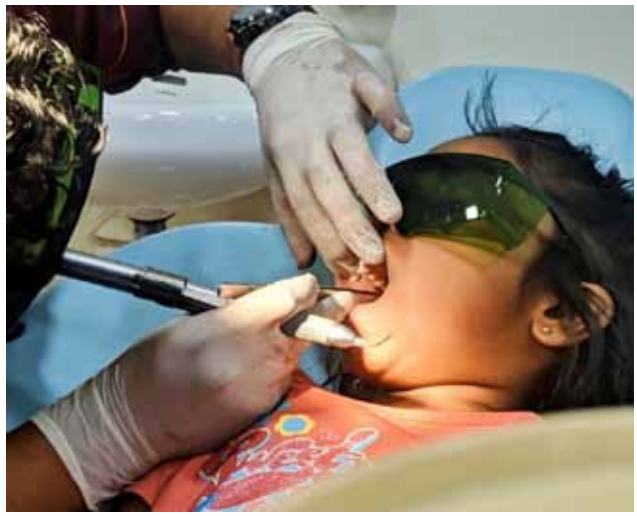

Figure 2 Protective eyewear in place during the procedure

Figure 3: Immediate post-operatively

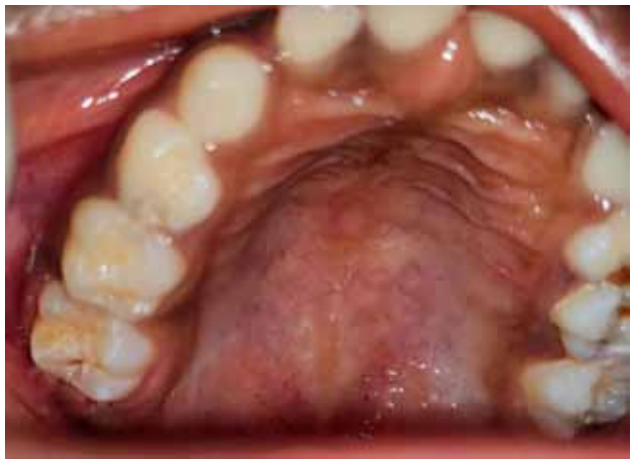

Figure 4: 7 days post-operatively

Discussion

Operculectomy may be referred to as the surgical technique of eliminating the operculum, or the gingival flap that usually covers the occlusal surface of the tooth partially. Operculectomy is aimed to reduce the incidence of pericoronitis, a condition that is marked by pain and inflammation associated with the operculum. Pericoronitis is usually seen among young adults, mainly in the molar teeth that are beginning to erupt.[6] The patient in our case presented with pain and discomfort in the region of upper right first permanent molar due to the presence of an operculum associated with the tooth. Plaque build-up on the underside of the operculum along with the accumulation of food debris caused inflammation and enlargement of the gingiva. The latter was being easily traumatized at the time of mastication, subsequently causing pain and discomfort.

Operculectomy with diode laser was the chosen treatment plan as it presented with numerous advantages over the conventional scalpel surgical procedure.Its profits in soft tissue surgeries include enhanced accuracy, easily achieved hemostasis, less necrosis of tissue from heat in comparison to electrosurgery, the accelerated rate of wound healing, sutureless surgery, decreased post-operative pain, and discomfort with reduced need for analgesics. Most procedures using lasers may be operated with topical local anesthesia alone that results in enhanced patient co-operation along with abridged procedural time that is especially of significance in the pediatric scenario. Additionally, the bactericidal effect of lasers on the surgical site means reduced use of antibiotics postoperatively.[7]

Conclusion

Operculectomy is a minor surgical procedure aimed to eliminate the operculum or the gingival tissue flap present over a fully or partially erupted tooth, usually in molars that if left unchecked may lead to pericoronitis and symptoms associated with the latter. Operculectomy using soft tissue lasers may be considered as a more favorable option in pediatric dentistry in comparison to conventional method where patient co-operation and procedural time must be accounted for.

Ethical Permission: Not required

Conflict of Interests: None

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