Diode laser excision of the soft tissue around submerged permanent canine - A case report

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Abstract

Impacted canines pose a functional as well as an esthetic concern in the patients as they provide a major support for the cheek. Surgical exposure of an impacted tooth is necessary to allow the orthodontist access to the unerupted tooth, in order to bring it into the dental arch and into alignment. This case reports the surgical exposure of the soft tissue covering the maxillary impacted canine with diode laser.

Keywords: Soft tissue exposure, Diode laser, Maxillary canine, Submerged

Introduction

Permanent canines are the foundation of a balanced smile and functional occlusion.(1) Impacted canines pose a functional as well as an esthetic concern in the patients as they provide a major support for the cheek. Also, their absence accentuates the appearance of a flattened upper lip. Most of the impactions are asymptomatic. However, some impacted tooth presents pathological complications in the form of resorption of root of adjacent teeth, cyst formation, loss of arch length, referred pain, etc.(2) Surgical exposure of an impacted tooth is necessary to allow the orthodontist access to the unerupted tooth, in order to bring it into the dental arch and into alignment.(3)

The term LASER is an acronym for 'Light Amplification by the Stimulated Emission of Radiation' which was first applied in dentistry by Miaman, in 1960, and has seen various hard and soft tissue applications. Its use has proved to be an effective tool to increase efficiency, specificity, ease, cost and comfort of the dental treatment. The active medium of the diode laser is a solid state semiconductor made of aluminum, gallium, arsenide, and occasionally indium, which produces laser wavelengths, ranging from approximately 810 nm to 980 nm. All diode wavelengths are absorbed primarily by tissue pigments, melanin and hemoglobin and are poorly absorbed by the hydroxyapatite and water present in the enamel. Some of the procedures that could be performed with diode laser include aesthetic gingival re-contouring, soft tissue crown lengthening, exposure of soft tissue impacted teeth, removal of inflamed and hypertrophic tissue, frenectomies, and photostimulation of the apthous and herpetic lesions.(4)

This paper reports a case of surgical exposure of the soft tissue with diode laser for orthodontic positioning of an impacted maxillary canine.

Case Report

A healthy 19-year-old female presented to the out-patient department of periodontology, Subharti Dental College for comprehensive management of impacted maxillary permanent canine on left side of the arch. Medical history was non-contributory. Upon intraoral and radiographic examination, a delayed eruption of the maxillary left canine was noted which revealed maxillary canine impaction with position favorable for orthodontic extrusion and alignment within the dental arch. On palpation, the tooth showed an erupting position which was facial to the crest of the alveolar process and entirely within the alveolar mucosa (Fig. 1, 2 & 3). The patient was undergoing orthodontic treatment and was referred to the periodontist for the surgical exposure of the impacted canine to extrude it directly down from its current position.

Surgical exposure of the tooth with diode laser was the procedure of choice for soft tissue management. After obtaining an informed consent, local anesthetic infiltration was administered. Diode laser at wavelength 980nm was used at 2.5 W, and the soft tissue over the impacted tooth was exposed (Fig. 4, 5 & 6). Medication included non-steroidal anti-inflammatory drug twice a day for 3 days. The patient was given oral hygiene instructions that included chlorhexidine rinses, gentle tooth-brushing. One week later, patient was recalled and the area was re-evaluated. The impacted tooth was cleaned and scaled to permit bonding and an orthodontic bracket or button was bonded to position. After three weeks, the surgical site had revealed an adequate width of keratinized gingiva (Fig. 7). The patient was followed up by her orthodontist to extrude the maxillary canine into proper occlusion.

Fig. 1: Pre-operative photograph of submerged maxillary canine covered with soft tissue

Fig. 2: Pre-operative photograph of submerged maxillary canine covered with soft tissue (Palatal view)

Fig. 3: Intraoral periapical radiograph showing submerged maxillary canine

Fig. 4: Diode laser tip used for soft tissue excision

Fig. 5: After soft tissue exposure with diode laser

Fig. 6: After soft tissue exposure (palatal view)

Fig. 7: Post-operative photograph showing satisfactory healing

Discussion

The most desirable approach for managing impacted maxillary canines is early diagnosis and interception of potential impaction. And for this, the most common method used to bring impacted canines into occlusion is surgically exposing the teeth and allowing them to erupt naturally during early or late mixed dentition and placing a bonded attachment to and using orthodontic forces to move the tooth.[5] Orthodontists have recommended that other clinicians first create adequate space in the dental arch to accommodate the impacted canine and then surgically expose the tooth to give them access so that they can apply mechanical force to erupt the tooth. Although various methods work, an efficient way to make impacted canines erupt is to use closed-coil springs with eyelets, as long as no obstacles impede the path of the canine.[6] Kokich reported three methods for uncovering a labially impacted maxillary canine: gingivectomy, creating an apically positioned flap, and using closed eruption techniques.[7] The maxillary and

mandibular third molars are the most commonly impacted teeth due to their long development time.[8] The maxillary cuspid is the second most frequently impacted tooth (2%).[9] The cuspids are generally one of the last teeth to erupt into the arch and are adversely affected by[10]: the loss of space, over-retained deciduous teeth and deflection (facially or palatally) of the lateral incisor.

The results of Jacoby's study showed that 85% of palatally impacted canines had sufficient space for eruption, whereas only 17% of labially impacted canines had sufficient space.[11] Therefore, arch length discrepancy is thought to be a primary etiologic factor for labially impacted canines.[12] Use of laser technique in the treatment of this condition has several advantages: allows making a very selective intervention, minimally invasive and respecting the periodontal tissue, and this is positively related to the success of the therapy, particularly by the point of view of the soft tissues. Its less painful, and sometimes anaesthetic injection is not required. Due to the bio-stimulating effect of laser, the healing process is fast and without any discomfort. The greatest advantage is the complete absence of bleeding, which gives the possibility to immediately bond the bracket in dry enamel, so preventing the possibility of detach and reducing the risk of a further re-intervention.[13]

Conclusion

The use of diode laser in the surgical intervention of submerged tooth exposure during orthodontic treatment is full of advantages like patient compliance, reduced pain and discomfort, faster healing process with a good quality of the periodontal tissues, absence of bleeding, and no use of sutures, and disinfection of the operative field without the necessity to prescribe antibiotics. The haemostasis increases the success of the bracket bonding, due to the possibility to maintain the enamel dry, thus reducing the risk of its detachment.

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