

CASE REPORT

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Application of Diode Laser for the Management of Unerupted Tooth in Anxious Paediatric Patients – Two Clinical Case Reports

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Abstract

One of the biggest challenges in paediatric dentistry is dental fear and anxiety, considered to be a reason to avoid dental treatment. The most dependable treatment option for the pediatric population is now laser application and modalities, which is a significant alternative to the current standard surgical techniques because of the recent and widely accepted breakthroughs in these fields. Using a dental laser that is patient-friendly and least invasive in dental practice helps to reduce the patient fear and anxiety. This article explains two clinical cases where diode laser is used in an anxious paediatric patient for managing unerupted tooth.

Keywords: Diode laser; Unerupted tooth; Paediatric patients; Anxious; Management

1 Introduction

Dental paediatric patients may experience anxiety during dental visits as a result of pain phobia and bad past experiences.¹ A stress-free atmosphere is very important in case of paediatric patients in dentistry. The thought of pain and blood itself creates a stressed atmosphere for both child as well as parents.

Lasers are modern tools used in various cases in dentistry. Theodore Maiman

created the first laser in 1960 at Hughes Research Laboratories. Lasers are recommended for a wide range of operations in dental practice due to their ease of use, comfort, and cost-effectiveness compared to traditional modalities. The most common type of laser used in dentistry is the diode laser because of its simple setting, ease of usage, and versatility. Diode lasers are safe and highly recommended for soft oral tissue procedures in areas close to

the dental structures for healing, hemostasis, vaporisation, and curettage since hard dental tissue does not absorb their wavelength well.^{2,3} Diode lasers are very effective in the surgical management of oral tissues because of the high concentration of chromophores.

In paediatric dentistry, lasers are used in soft tissue procedures, endodontic therapies, and the diagnosis and prevention of dental cavities. As dental lasers provide painless, bloodless procedures, it is applied in paediatric dentistry in order to create a friendly treatment atmosphere. In paediatric dentistry, lasers have developed into a cordial and broadly applicable therapeutic method. Hence lasers can be used to reduce the anxiety of children in clinical procedures compared to conventional procedures, thus nullifying the fear towards dental procedures when they approach the dentist in future.

2 Case Description

Case report 1

An 8-year-old boy along with his parents reported to our dental clinic with the chief complaint of missing upper left front tooth (Figure 1). The deciduous left central incisor had exfoliated one year back, and parents were concerned about the unerupted permanent tooth in the respective region. The patient was anxious as it was his first visit to the dental clinic. On radiographic evaluation it was noted that the permanent central incisor of the respective region was present.



Fig 1.

Case report 2

A 7-year boy reported to our dental clinic with chief complaint of missing upper left front tooth (Figure 2). The deciduous left central incisor had exfoliated six months before and the permanent central incisor had not erupted in its place. On radiographic evaluation, the presence of permanent central incisor in the respective region was noted.



Fig 2.

Treatment Plan and Procedure

Considering the age of the patients, the exposure of the central incisor (21) was decided. After discussing with the parents and the child about the exposure of the tooth with the available treatment modalities, we preferred diode laser tooth exposure. This decision was taken in order to reduce the fear and anxiety that was seen in the child. A written informed consent was obtained from the parent's and exposure of unerupted tooth was planned using diode laser (Novolase).

Lignocaine gel was applied in order to reduce the pain during the administration of local anaesthesia. Local anaesthesia of 2% Lidocaine with Epinephrine 1:100,000 was administered. Followed by protective eyewear was worn by the child and dental professional. The diode laser was set at wavelength of 810 nm at a power setting of 2 W in continuous mode (Figure 3). The tissue covering the permanent central incisor (21) was removed using diode laser (Figures 4 and 5). Saline irrigation was done in between the procedure in order to prevent the charring and to cool the soft tissue. The patient remained comfortable and co-operative throughout the procedure. The patient was instructed to avoid hot and spicy food for a day.

3 Discussion

Treating children differs from treating adults; therefore, understanding growth and abilities that are appropriate for their age is crucial. Reducing child's apprehension and improving parent's acceptance to the clinical procedure is very important in paediatric dentistry. Dental lasers help the dental professional to enhance the treatment outcome by reducing the child's fear and making him/her more co-operative towards the treatment procedure. Lasers can be used in caries diagnosis, to prevent cavities, and perform minor oral surgery on paediatric patients. Numerous laser studies have clearly demonstrated that paediatric dental patients seem more cooperative with laser therapy. Laser-



Fig 3.



Fig 4.



Fig 5.

assisted procedures on soft and hard tissue is well-received by pediatric patients and their parents, facilitating easier child behaviour management, lowering psychological trauma during and after dental therapy, fostering a stronger bond between the dentist and the patient, and improving the latter's compliance.²

Different laser wavelengths have different co-efficient of absorption with soft tissue and hard tissue such as blood, water and other pigments. Diode lasers are very well absorbed by pigments and blood when compared to those with longer wavelengths which have greater affinity with water and hydroxyapatite crystals.

In the present case report, the exposure of tooth using diode laser technology provided good healing, with considerably no loss of blood and no discomfort and pain during and after the procedure. Moreover, the procedure took minimal time with good patient co-operation. Thribhuvanan L *et al.* in their case report mentioned a similar case of management of unerupted teeth in a 9-year-old boy, where 980 nm wavelength diode laser in continuous mode at a power setting of 1.8 W was used and follow-up was reported to be satisfactory with the teeth erupting in their exact positions.⁴ In their research, Roberts-Harry *et al.* verified that exposing unerupted teeth with lasers improved patient and dentist acceptability.⁵

Lasers have vast applications in paediatric dentistry like caries detection and diagnosis, laser applied fluoride therapy, disinfection of root canals, excision of fibroma, papilloma, mucocoele, ranula, eruption cyst *etc.*⁶ Pisano M *et al* in their case report mentioned the use of 980-nm diode laser in continuous wave mode for excision of a swelling in the lower lip of an 11-year-old female patient. It was excised with a conservative approach using a diode laser that was non-stressful for the pediatric patient.⁷ Hence laser can be considered as a newer tool for treating oral lesions in pediatric patients as comfortably as possible reducing the children's anxiety and stress.

A diode laser frenectomy performed at an 800 nm wavelength and 2 W of power demonstrated that the laser can be regarded as a secure substitute for kids, lowering the need for local anesthetics, reduced bleeding, and the likelihood of infection, and discomfort.⁸ Apart from surgical applications, lasers have been used in cases of pain and inflammation. In pediatric dentistry, low-level laser therapy is indicated for cases of tooth pain, tooth eruption, TMJ pain, treating aphthous ulcers, and speeding up orthodontic movement. Low-level laser therapy promotes healing by acting on the cell receptors and causing the repair of tissues and reducing inflammation and pain. Because of the improved hemostasis, reduced oedema, and significant reduction in postoperative discomfort, diode lasers are therefore a viable therapeutic option for pediatric patients.

4 Conclusion

Dental care along with minimizing psychological side effects will help to avoid unpleasant and stressful experiences. A diode laser can be used to expose unerupted teeth during an operculectomy without harming the tooth that is erupting. Due of its unique features, the diode laser is an extremely helpful and user-friendly instrument in several pediatric dentistry applications.

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