

Lasers in Paediatric Dentistry

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INTRODUCTION

Many clinicians will be faced with the un-cooperative paediatric patient presenting at their practices with a “fear of the unknown”. Establishing trust with these patients is essential in order to achieve a productive interaction with the child. The hard tissue lasers (Er:YAG and Er,Cr:YSGG) have the advantage of not producing the high pitched sound and vibrations associated with turbines.¹ The “tell-show-do” method can be used to illustrate the water spray with the lowest possible energy setting of the laser in the paediatric patient’s mouth, which may assist in alleviating fear associated with the restorative procedures.

A SYNOPSIS OF LASERS IN PAEDIATRIC DENTISTRY

The hard tissue lasers target the water molecules present in the enamel and dentine producing expansive vaporisation. The effect of the hard tissue laser on the tooth and bone constitutes true ablation ie. surgical removal. The rate of ablation of tooth structure during cavity preparation with the laser is comparable to that of the turbine in clinical practice. The hard tissue laser has the advantage of less thermal and mechanical damage to the surrounding tooth structure, compared with the turbine.^{2,3}

The absorption coefficient of the Er,Cr:YSGG (4000cm⁻¹) is lower than that of the Er:YAG (13000cm⁻¹) for enamel,⁴ however both lasers will allow acceptable clinical parameters for tooth preparation.⁵ The water content of carious dentine is higher (27% -54%) than that of healthy dentine (20%-24%).⁶ Dentine tubules in primary teeth are anatomically larger in diameter than those found in secondary teeth. Therefore carious dentine in primary teeth will have a faster rate of ablation, which must be taken into consideration when the laser energy parameters are selected for the procedure.

Using the concept of minimally invasive restorative procedures, the erbium and 9300-nm CO₂ lasers allow the operator to remove only diseased tissue, thereby

ACRONYMS

Er:YAG:	Erbium-doped Yttrium Aluminum Garnet
Er,Cr:YSGG:	Erbium-Chromium-doped Yttrium Scandium Gallium Garnet
AAPD:	American Academy of Paediatric Dentistry

preserving the healthy, unaffected tooth structure. The effect of the CO₂ for tooth ablation is limited due to the low interaction with the hydroxyapatite. Erbium lasers also avoid the small microfractures in enamel which are produced with the use of conventional dental handpieces.⁷

Diode lasers and the hard tissue lasers can be utilized successfully in various soft tissue procedures including frenectomies, opperculectomies, and exposure of unerupted teeth, gingivoplasties and tissue biopsies.⁸

CONCLUSION

The AAPD recognised the use of lasers in paediatric dentistry as a complementary method for soft- and hard tissue procedures in infants, children and patients with special health care needs. The AAPD stated that it is essential that the clinician receive: “didactic, experiential education and training on the use of lasers before applying this technology on paediatric dental patients”.⁹

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