LUPINE PUBLISHERS

Interventions in Pediatric Dentistry Open Access Journal

DOI: 10.32474/IPDOAJ.2019.02.000148

ISSN: 2637-6636

Review Article

Lasers & Pedodontics

Yadav Karthik[1]*, Saleem Mohammed[2], Shesha Prasad R[3], Kousar Tasleem[4], Kouhar Tanhim[5] and Pai Anuradha[3]

[1]*Department of Oral Medicine and Radiology, India*

[2]*Department of Prosthodontics, KGF College of Dental Sciences, India*

[3]*Department of oral medicine and radiology, The Oxford Dental College, India*

[4]*Department of Conservative & Endodontics, Sri Sai College of Dental Surgery, India*

[5]*Department of Conservative & Endodontics, Kamineni Institute of Dental Sciences, India*

***Corresponding author:** Yadav Karthik, Department of Oral Medicine and Radiology, India

Received: May 07, 2019 **Published:** May 16, 2019

Introduction

The medical terms such as magical and lightening quick are used to represent lasers [1]. Theodore H. Maiman in 1960 coined the term laser, which was initially termed as maser which stands for "microwave amplification by stimulated emission of radiation". However, the term LASER is an acronym for light amplification by stimulated emission of radiation [2,3]. Three types of lasers used for surgical therapy in the oral cavity are neodymium lasers - YAG (Nd: YAG), of argon (Ar) and carbon dioxide (CO2) [3]. Lasers have largely replaced scalpels and other instruments in the field of medicine because of its advantages [4-6]. Different laser wavelengths have different absorption coefficients wherein laser energy can be absorbed or transmitted based on the structure of the target tissue. The presence of water, which is an essential component of all biologic tissues, is important for the use of lasers [2,6]. For hard tissues, Er lasers are used whereas any laser can be used for soft tissue components [2,6,7].

Applications of Lasers in Pediatric Dentistry

For caries removal

Erbium group of lasers are preferred for deep enamel, dentin, and caries removal, whereas the Nd: YAG laser is designated for superficial pigmented caries removal. The other advantages being the non-requirement of anesthesia and the use of conventional drills, which cause micro-fracture of tooth during preparation [1,2]. During cavity preparation, after the removal of enamel, the settings are adjusted to reduce the energy levels as dentin is less mineralized and has higher water content than enamel [2].

Removal of restorations (including amalgam)

Lasers should never be directed towards amalgam and should be pointed towards the surrounding enamel to create a small trough, and hand instruments are used to elevate the restoration out and later the cavity preparation is completed. Also, other restorations like composite and glass ionomer can be removed/replaced [1,2].

Preventive treatment

At the early stages after tooth eruption, enamel grooves are the site of early caries. This can be treated using lasers by cleaning, sterilizing and restoring the same. Also, many studies have reported that etched enamel by erbium has properties like the acid-etched enamel [2].

Treatment of peri coronal problems in erupting teeth

Lasers are used in non-contact mode to remove the peri-coronal tissue covering the newly erupted tooth, which might help in relieving any discomfort, swelling, or infection in the tissue overlying the emerging tooth [2,9].

Gingival re-contouring and orthodontic purposes

Excess gingival growth by the use drugs or by poor oral hygiene, and during other surgical procedures including orthodontics requires removal of tissue in some cases. This can be accomplished by the use of lasers which can be done without the need for a local anesthesia. Use of topical anesthetic can be supplemented for the treatment procedures [8].

Treatment of ankyloglossia

Tongue is stabilized with a hemostat and the frenum is revised, while avoiding any damage to the glands on the floor of the mouth [8].

Treatment of aphthous ulcers and herpetic lesions

Use of low power settings with the laser energy directed at the target tissue in the non-contact mode, for a duration of 15-30 second intervals for three to four times, helps in pain relief. The use of laser in the initial stages in herpes labialis may prevent its further progression and provide a palliative effect for the area and prevent its progression [2,8].

Pulp therapy

The ability of laser to close the dentinal tubules and provide a sedative effect on pulpitis has somewhat encouraged the use of laser in indirect pulp capping [8]. Also, the use of lasers to sterilize the canals and also create a hemostatic environment in adjunct to the conventional procedures has created a stir for the use of lasers.

Other surgical procedures

Other surgical procedures like apicectomies and amputation of impacted teeth underneath the bone also can be performed with the use of lasers. The erbium lasers are ideal for these surgeries and a variety of tips, settings and water sprays can be used. Soft-tissue ablation does not require water spray whereas removal of bone needs to be done with water [2,9].

Advantages of laser therapy

a) Decreasing inflammation and pain.

b) Reduced healing period [3,4,9].

c) Good & faster healing properties.

d) Reduced chances of infection.

e) Reduced bleeding.

f) Instant hemostatic achievement.

g) Good margins.

h) Patients apprehensive for blade.

Contraindication of Laser Therapy

a) Patients with pacemakers, however it can be used with precautions in some case [9].

b) Patients who are sensible to light.

c) In epileptic patients.

d) In patients with antecedent of arrhythmia or chest pain.

e) Avoided on tumorous tissues or benign tumors with malignant potential.

Conclusion

Natural light is and has been considered as the curator [10]. Lasers have gained tremendously over the years; its advantages far outweigh its disadvantages. However, there still exists some limitations as well as some contraindications, which stop its usage with the cost factor being one of it. Nevertheless, it would be the future instrument of choice for most of the procedures included in all the fields with surgery, periodontics, endodontics and orthodontics being one of them.

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DOI: 10.32474/IPDOAJ.2019.02.000148