International Journal of Research and Review
www.ijrrjournal.com E-ISSN: 2349-9788; P-ISSN: 2454-2237

Review Article

Application of Lasers in Treatment of Periodontitis

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ABSTRACT

Lasers are beneficial in debridement of calculus, removal of smear layer from root surface, and disinfection of root. Lasers have bactericidal action. Curettage of pocket epithelium can also be done with lasers. Lasers can be used for soft tissue procedures. However use of lasers is in infancy. Further studies are needed to validate use of lasers either alone or in combination to conventional treatment of periodontitis.

Key words: Lasers; calculus; debridement

INTRODUCTION

The term 'LASER' is an acronym of 'Light Amplification by Stimulated Emission of Radiation'. Advantages of lasers in soft-tissue procedures are hemostasis, photo- biomodulation, less post-treatment tissue edema and swelling. Lasers if not used properly may result into damage to teeth and periodontium. [1] Er:YAG laser and Er, Cr:YSGG laser appear to be a good choice for ablation of oral soft tissues. High power lasers such as Nd:YAG laser [2] and CO_2 laser [3] are effective in coagulation and hemostasis during soft-tissue surgery. Diode laser is an excellent soft tissue surgical laser. [4]

Use of Lasers in Instrumentation of Root Surfaces:

Traditional treatment for periodontitis includes scaling and root planing (SRP). However, SRP is not effective at areas of root flutings, furcations, tight root proximity, poorly contoured restorations due to incomplete subgingival instrumentation. These limitations attract the use of lasers in management of periodontitis. The Er:YAG laser is absorbed by hydroxyl radical component of calcium hydroxyapatite. [5] Er:YAG laser is used in modification of dental hard tissues. [6] Er: YAG laser is equally efficacious in SRP [7,8] as that of mechanical instruments without any modification to root surface. [9] However there is lack of evidence supporting use of Er:YAG laser either as monotherapy or adjunctive to traditional scaling and root planning. [10,11] High power lasers such as Nd:YAG laser [2] and CO2 laser [12] carbonize and damage root surface and are therefore not indicated for use on hard tissues. [13]

Antimicrobial Effect of Lasers:

Nd:YAG laser is effective in destruction of black or brown pigmented bacteria. [14] Er:YAG laser removes endotoxins. [15]

Treatment of Soft Tissue Wall of Periodontal Pocket:

Nd:YAG laser, diode laser and CO_2 laser can be used for de-epithelialization of periodontal pocket.

Detection of Calculus with Lasers:

Diode laser fluorescence spectroscopy is used for detection of dental calculus. Method of subgingival instrumentation of root surface with the Er:YAG laser combined with detection of subgingival calculus with diode laser has been suggested. [16]

Disadvantages of Lasers:

Caution has to be taken during irradiation with lasers and protection has to be provided to areas that are outside the target site. Eyes are to be protected using glasses. Another disadvantage of lasers is that damage can occur to root surface and periodontium.

CONCLUSION

Lasers have advantages over conventional periodontal treatment. However there is insufficient evidence to support its use in periodontal therapy. Further randomized controlled trials are needed for validation of lasers in treatment of periodontitis.

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How to cite this article: Kaur M. Application of Lasers in treatment of periodontitis. International Journal of Research and Review. 2018; 5(8):7-8.

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