

## Microbiological Evaluation of Neodymium and Erbium Lasers on Oral Pathogens

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### SUMMARY

The human oral cavity is a conducive environment to unrestricted formation of natural microbial biofilm. However, in susceptible hosts, infectious pathogens may gain access into the dental tissues and gingival area and cause oral diseases such as caries, gingivitis, periodontitis, which often are concomitant to systemic diseases. *Streptococcus mutans* is one of the main bacteria residing in the oral cavity and a major contributor of tooth decay. *Candida albicans* is the most commonly detected fungal organism in humans, part of the healthy human microbiota, but in immune-compromised hosts it may cause a number of infections, ranging from superficial infections of the mucosa and skin, to life-threatening systemic infections.

Recent studies indicate a high prevalence of *S. mutans* in dental biofilm where the fungal pathogen *C. albicans* resides, suggesting that this association is involved in the enhancement of biofilm virulence, which in turn may affect the overall health of the host. Subgingival bacterial biofilm is one of the main factors in the etiology of periodontal disease. The mechanisms of its development are based on the inflammation of the supportive tissues of the teeth caused by specific periopathogens (*Porphyromonas gingivalis*, *Treponema denticola*, *Tannarella forsythia*). The successful periodontal therapy depends on the elimination of pathogenic microorganisms and their by-products as well as inhibition of recolonization.

Management of infections caused by bacteria and fungi is a viable challenge in various medical fields, including dentistry. The development of laser medicine has provided a number of new therapy modalities capable of damaging pathogenic organisms. The presentation shows the outcomes of an in vitro study using Nd:YAG laser therapy to eliminate *S. mutans* and *C. albicans*, and the results of an in vivo study using a combination of Nd:YAG and Er:YAG lasers to eliminate periodontal pathogens (*Porphyromonas gingivalis*, *Treponema denticola*, *Tannarella forsythia*).

## Minimally Invasive Approach to Prosthetic and Aesthetic Dentistry using the LightWalker Laser System

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### SUMMARY

A minimally invasive approach to therapeutic procedures is one of the goals of prosthetic and aesthetic dentistry. The present tendency is to minimise the impact on soft and hard oral tissues through a variety of procedures performed in the dental office. In the field of prosthetic and dento-facial aesthetics, this trend is increasingly being addressed through the use of techniques and equipment that reduce unwanted effects and lead to more predictable results.

The LightWalker laser system offers the possibility of using two wavelengths (1064 nm and 2940 nm) in prosthetic and aesthetic treatments with minimal side effects. It will be presented along with minimally invasive procedures performed in various clinical situations using the dual-wavelength TwinLight concept. Selected clinical cases will be illustrated in the presentation to exemplify the role of this concept, both in terms of the prosthetics and aesthetics, and specific protocols will be presented in the management of these cases. The use of the LightWalker laser system and laser-assisted therapeutic protocols represents a real benefit in prosthetic and aesthetic dentistry.

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