

# Dental Lasers: Illuminating the Path to Minimally Invasive Dentistry

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## Introduction

Dental practice is a harmonious blend of art and science, where oral health professionals combine their technical expertise with compassion to provide comprehensive care for patients. With a focus on prevention, diagnosis, and treatment of oral diseases, dental practitioners play a vital role in promoting overall health and well-being. In this article, we delve into the multifaceted world of dental practice, exploring the key components that make it an essential pillar of healthcare.

Dental lasers have emerged as a transformative technology in the field of dentistry, revolutionizing the way dental procedures are performed. These high-tech devices use focused beams of light energy to interact with oral tissues, offering precise and minimally invasive treatment options. From soft tissue procedures to cavity detection and teeth whitening, dental lasers have become invaluable tools in enhancing patient comfort, improving treatment outcomes, and advancing the practice of dentistry. In this article, we will explore the many benefits and applications of dental lasers [1,2].

## Understanding the Power of Light

At the core of dental lasers is the power of light. These devices emit concentrated beams of light energy, typically in the form of a specific wavelength, which can be adjusted depending on the intended treatment. Different wavelengths interact with oral tissues in specific ways, making dental lasers versatile tools for various procedures [3].

### Soft Tissue Procedures:

Dental lasers have revolutionized soft tissue surgeries and treatments. With their precise control and minimal invasiveness, lasers offer improved outcomes in procedures such as gum contouring, gum disease treatment, and frenectomy (removal of excessive muscle attachment). Lasers can precisely remove or reshape gum tissue, seal blood vessels during the procedure, and promote faster healing with minimal bleeding and post-operative discomfort.

### Cavity Detection and Dental Fillings:

Laser technology has also transformed the way cavities are detected and treated. Laser fluorescence devices can accurately detect early-stage cavities by measuring the fluorescence response of tooth enamel. This allows for the identification of cavities in their infancy, enabling dentists to intervene with minimally invasive treatments to prevent further decay. Additionally, lasers can be used to prepare teeth for dental fillings, eliminating the need for traditional drills in some cases. The laser energy can remove decayed tooth structure precisely, often without the need for local anesthesia.

### Teeth Whitening:

Dental lasers have become a popular choice for teeth whitening procedures due to their ability to enhance the effectiveness of bleaching agents. The laser energy activates the whitening agents, accelerating the chemical reaction and achieving faster and more dramatic results. Laser-assisted teeth whitening procedures are safe, efficient, and can significantly improve the brightness of a patient's smile.

### Biopsy and Lesion Removal:

The precision and non-invasiveness of dental lasers make them excellent tools for performing biopsies and removing oral lesions. Lasers can be used to precisely remove small tissue samples for biopsy analysis, aiding in the diagnosis of oral diseases. Moreover, lasers can effectively remove benign lesions such as fibromas or papillomas, reducing bleeding and promoting faster healing compared to traditional surgical methods.

### Treatment of Sensitivity and Cold Sores:

Dental lasers have shown promise in addressing tooth sensitivity, a common complaint among many patients. Lasers can be used to seal open dentinal tubules, which are responsible for transmitting sensations to the tooth nerves. By sealing these tubules, lasers reduce tooth sensitivity and provide long-lasting relief for patients. Additionally, lasers can be used to treat cold sores or oral ulcers, reducing pain, promoting healing, and minimizing the risk of infection.

### Advantages of Dental Lasers:

The integration of dental lasers into clinical practice offers several advantages:

1. Precision: Dental lasers allow for precise tissue targeting, minimizing damage to surrounding healthy tissues and preserving more tooth structure.
2. Minimally Invasive: Lasers often require less or no anesthesia, reducing patient discomfort and anxiety associated with dental procedures. Additionally, their non-contact nature reduces the need for incisions or sutures, leading to faster healing and reduced post-operative complications.

Prevention plays a crucial role in periodontics. Dental professionals educate patients on maintaining good oral hygiene practices, including regular brushing, flossing, and routine dental check-ups. Early detection and intervention are key to preventing the progression of gum diseases. During dental exams, dentists assess the health of the gums, measure pocket depths, and perform thorough cleanings to remove plaque and tartar. By promoting preventive measures and addressing issues at their earliest stages, periodontics aims to preserve the health and integrity of the periodontal tissues [2,4].

Gingivitis, the mildest form of periodontal disease, is characterized by inflammation of the gums. It is primarily caused by the build up of plaque and bacteria along the gum line. The good news is that gingivitis is reversible with timely intervention. Dental professionals employ non-surgical treatments such as scaling and root planing to remove plaque, tartar, and bacteria from the gum pockets. They also educate patients on proper oral hygiene practices and provide guidance on maintaining healthy gums. Through these interventions, gingivitis can be controlled, and the gums can return to a healthy state [5].

If left untreated, gingivitis can progress into periodontitis, a more severe form of periodontal disease. Periodontitis involves the destruction of the gum tissues, periodontal ligament, and underlying bone structure. As the disease advances, gum recession, pocket formation, tooth mobility, and even tooth loss may occur. The primary objective of periodontal treatment is to halt the

progression of periodontitis, preserve the remaining gum and bone structure, and restore oral health.

Scaling and root planing, in combination with more advanced treatments, such as local antimicrobial therapy, can help control the infection and reduce inflammation. In cases where deep pockets and bone loss are present, surgical interventions, including flap surgery, bone grafting, and guided tissue regeneration, may be necessary. These procedures aim to restore the supportive structures of the teeth and improve the overall health of the gums.

Research has established a significant association between periodontal health and systemic well-being. Periodontal diseases have been linked to an increased risk of various systemic conditions, including cardiovascular disease, diabetes, respiratory diseases, adverse pregnancy outcomes, and even certain types of cancers. The inflammation associated with gum diseases can contribute to the systemic inflammatory burden, potentially exacerbating existing conditions or increasing the risk of developing new ones [6,7].

Prosthodontics is the specialty of dentistry that deals with the restoration and replacement of missing teeth. Dental practitioners collaborate with prosthodontists to fabricate custom-made dentures, partial dentures, and implant-supported prostheses. These prosthetic solutions improve oral function, speech, and aesthetics, allowing patients to regain confidence in their smiles.

## Conclusion

Dental plaque may be a persistent adversary, but it is not an insurmountable one. By adopting a comprehensive approach that combines personal oral

hygiene practices, regular professional care, education, and technological advancements, we can effectively combat plaque and safeguard our oral health. Let us recognize the importance of addressing dental plaque and work collectively towards achieving optimal oral hygiene for a healthier, brighter smile.

The field of orthodontics has experienced remarkable advancements, driven by technological innovations and evidence-based research. Digital imaging, 3D printing, invisible aligners, TADs, accelerated orthodontics, and cone beam computed tomography (CBCT) have significantly improved the practice of orthodontics. These advancements have transformed treatment planning, appliance fabrication, and patient outcomes, ultimately enhancing both oral health and aesthetics.

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