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IMPLICATION OF LASERS IN THE FIELD OF DENTISTRY: AN OVERVIEW

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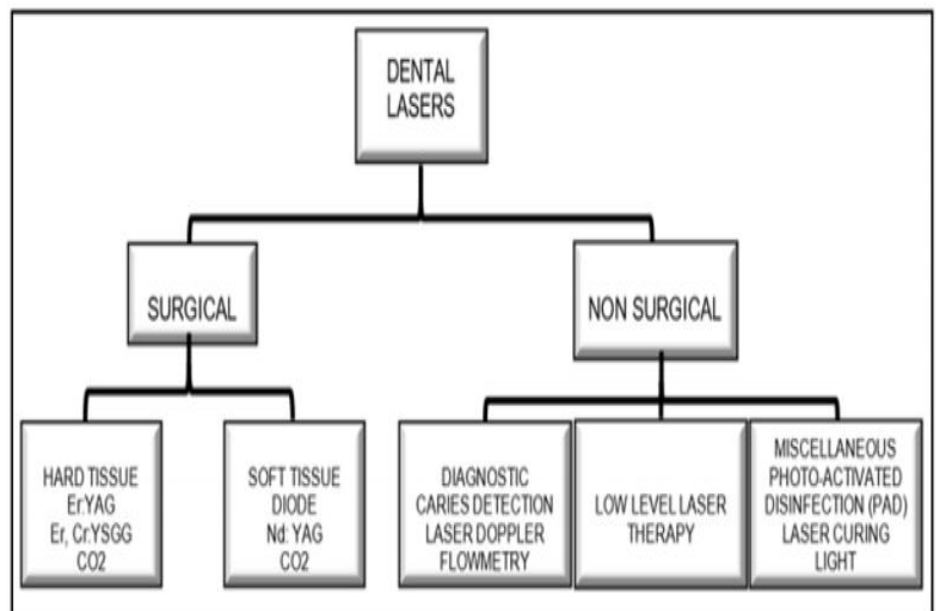
Abstract

Aim: The aim of the study was to access the awareness of implication of lasers in the field of dentistry.

The use of Lasers to manage a number of various dental conditions is known as Laser dentistry. In 1989 it was commercially accepted and used in clinical dental practice for procedures involving tooth tissue. In comparison to drills and other non-laser equipment, laser dentistry may provide a more comfortable treatment alternative for a variety of dental treatments involving hard or soft tissue. Treatments for hypersensitivity, tooth decay, gum disease, and teeth whitening are just a few of the procedures that involve laser dentistry. Lasers can improve the effectiveness, affordability, and comfort of dental procedures. Laser dentistry has received FDA approval as a therapy option for a number of dental problems. There are several ways to categorize lasers used in dentistry practice: According to the lasing medium employed, such as gas laser and solid laser, according to the wavelength range, according to the tissue applicability, such as hard tissue and soft tissue lasers, and of course according to the danger associated with laser application¹

Introduction

Many dental professionals now work more efficiently, more comfortably, and faster due to dental lasers. Delivering energy in the form of light is how all lasers operate. The laser serves as a cutting tool or a vaporizer of tissue when it comes into contact with it during surgical and dental treatments. The laser serves as a heat source and intensifies the effects of tooth-whitening substances when it is employed in teeth-whitening procedures.²



Classification of Lasers

Lasers used in dental practice can be classified into several categories according to:

- (1) The range of wavelength.
- (2) The lasing medium, such as gas laser and solid laser.
- (3) Tissue penetration - soft tissue and hard tissue lasers.
- (4) The risk related to laser application.
- (5) Potential hazards.³

Pros & Cons of Dental Lasers

Pros

In contrast to the common dental drill, lasers:

- May lessen discomfort in some cases, reducing the need for anesthesia
- May calm patients who are anxious about using the dental drill
- May lessen bleeding and swelling during soft tissue treatments
- May allow more healthy tooth to remain after cavity removal

Cons

The disadvantages of lasers are that:

- Lasers cannot be utilised for many common dental treatments, including treating teeth with fillings already in place.

For instance, large cavities that need to be prepped for a crown cannot be filled with lasers, nor can cavities between teeth, around previous fillings, or in between teeth.

Furthermore, it is not possible to utilise lasers to remove damaged crowns or silver fillings or to prepare teeth for bridges.

- Even when a laser is employed, conventional drills may still be required to polish, shape, and modify the filling.
- Using lasers does not make anaesthetic unnecessary.
- Laser treatment is typically more expensive because it is far more expensive than using a dental drill.³

PROCEDURES THAT USE LASER DENTISTRY TREATMENTS

In terms of laser dentistry, some lasers are used to treat teeth, while others are used to treat gums and soft tissue. The wavelength and the kind of tissue that each

laser targets determine how they differ from one another. For instance, the light wavelengths utilized by soft tissue lasers can effectively treat gum and tissue because they are readily absorbed by hemoglobin and water. Hard tissue lasers, on the other hand, have wavelengths that interact with the calcium phosphate salt found in your teeth and bones, making them perfect for some dental operations.

The type of laser your dentist employs depends on the precise dental work you need.

HARD TISSUE PROCEDURES

The wavelengths used by hard tissue lasers are absorbed by water and the calcium phosphate salt found inside of bones and teeth. These lasers are used by dentists to cut this tough tissue. With hard lasers, less anesthesia is required for procedures like fillings.

Typical processes involving hard lasers include:

- Treating teeth sensitivity - sensitivity to hot and cold is caused by the open tub.
- Preparing and shaping teeth prior to composite bonding.
- Repairing worn-out or damaged fillings.

SOFT TISSUE PROCEDURES

Hemoglobin, a blood molecule, and water readily absorb the wavelengths of soft tissue lasers. They can cut into soft tissue and seal any exposed blood vessels, making them perfect for treating gum problems. This shortens the healing process and cuts down on bleeding. Additionally, laser oral surgery effectively eliminates oral bacteria, lowering your risk of infection after surgery. Soft lasers are frequently used for the following procedures:

- Gum disease - Scaling and root planning, which removes plaque and tartar, as well as bone grafting or soft tissue grafting, are some of the traditional treatments for mild to severe gum disease. As the laser can remove inflamed or dead tissue while killing bacteria, it eliminates the need for these procedures during laser gum surgery.
- Reducing unevenness or disproportionate gum lines
- Address restricted tongue movement
- Lengthening crowns
- Removing folds in oral soft tissue often caused by dentures⁴

RISKS INVOLVED WITH THE USE OF LASERS IN DENTISTRY

Despite the fact that using lasers in dentistry is generally regarded as safe, there are still some risks present. Some of the dangers are listed below:

- Eyes at risk: The majority of lasers can harm or damage

eyes. The structures of the eyes burn when a laser beam comes into direct contact with them. Scarring and vision distortion are the results of this.

- Skin burns can occasionally result from laser use because of the high optical power concentration.
- There is a chance that other tooth structures could be harmed by improper laser treatment of teeth and diseased gums, which can harm the dental pulp (the tooth's innermost layer) and the bone that underlies and supports the tooth.
- Laser plume inhalation: When laser light is applied to tissues, a chemical mixture known as laser plume is released. Embedded in the laser plume is dangerous carbon monoxide, organic materials and carbon dioxide. These substances can impair breathing and induce nausea when inhaled.⁵

PRECAUTIONS

The following are some precautions that must be observed when using lasers to lower the possibility of harming other structures:

- The throat of the patient and other non-target sites in the mouth should be protected.
- Patients, operators, and assistants should wear appropriate eye protection.
- Avoid shining metal surfaces when using lasers because the light may reflect back and cause damage; instead, use high-speed suction pipes or evacuation.
- The laser should be functionally sound.
- Accurate foot pedal control is necessary.
- The laser needs to be maintained in accordance with the manufacturer's recommendations.

Conclusion

The use of lasers in dentistry has been demonstrated to be advantageous for treating a variety of dental conditions and as a therapeutic tool in tissue management. Non-oral tissues are generally at risk due to the dynamics of laser energy beams, and the immediate environment must be considered at risk from either direct or scattered exposure.

To protect those who may be involved in dental laser treatment, including staff and patients, safety precautions have been developed.

Clinical Significance:

Additionally, pregnant women with sensitive gums and teeth can benefit from laser dentistry. Even when you brush your teeth, hormonal changes can have an impact on your gums. Many pregnant women avoid visiting the dentist because of tooth discomfort. This is a mistake because laser technology makes these visits painless and maintaining good oral health is essential.

However, laser dentistry procedures are completely safe to receive while pregnant. Dentists never use equipment or procedures that could harm you or your unborn child. They might help the two of you maintain a healthier lifestyle, for sure. Medical professionals believe that children of pregnant women with good oral health are healthier.

Additionally, patients with the condition can receive safe laser dental therapy. Using a laser can be safer than using a dental tool since dental tools are designed to be sharp, and one accidental slip can lead to the gum tissue being scratched or irritated. Patients typically report minor discomfort, and it can achieve the desired results.⁷

CONFLICT OF INTEREST:

The authors share no conflict of interest.

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