Lasers in Pediatric Dentistry

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Commentary:

The field of medical sciences integrated the use of lasers in the middle of the 1970’s for procedures related to soft tissues. In the 1980s, oral and maxillofacial surgeons began the use of laser, [carbon dioxide (CO₂)] in their clinical practice to treat oral lesions¹. In the year 1987, the first laser used for dental procedures was developed and approved by the Food and Drug Administration (FDA) in 1990 was (Nd: YAG) neodymium-yttrium-aluminum-garnet laser and since then, lasers technology has proceeded remarkably¹.

A laser is a device that emits light via the process of optical amplification which is based on the stimulated emission of electromagnetic radiation. Lasers are used to cut, incise or chisel and for ablation of soft tissues². Distinctive wavelengths of different lasers tend to ascertain various clinical applications. Pigments that absorb light, are also known as a chromophore and are present in the dental hard tissues and oral soft tissues which absorb energy emitted by lasers of determined wavelength².

On the application of lasers to the target tissue, it commences with the photothermal reaction and thus leads to the generation of heat which in turn leads to a rise in the temperature in the tissue of interest. As the temperature rises above 60 degrees Celsius, it tends to cause coagulation of proteins within the target tissue. As the temperature increases above 100 degrees Celsius, it vaporizes the water molecules and causes the ablation of the targeted soft tissue. In the case of the dental hard tissues, a temperature above 200 degrees Celsius is required for the procedure to be carried out using determined lasers³.

Safety is another aspect for the clinicians using lasers along with safety for the patient. For example, protective eye wear prevents ocular hazards. Also, the clinician should take precautions to prevent accidental damage to the tissue of non-interest. The area which is being operated should have precise accessibility for others to limit the deleterious effects⁴. It should be ensured that no flammable material is present in the surgical room and the use of explosive anesthetic gases is contraindicated to prevent combustion hazards⁴.

Lasers have aided various branches of dentistry which include periodontology, pediatric and preventive dentistry, oral surgery, operative dentistry, and endodontics, in cosmetic dental treatment which includes teeth whitening and other cosmetic surgeries⁵. In pediatric patients, the lasers being used for various oro-dental treatment procedures are of great benefit as it’s less frightening to the pediatric patient and is well accepted by guardians/parents as well. Lasers used by the pediatric dentist for various procedures be it a pulpal or any surgical procedure instills better cooperative behavior in pediatric patients thereby improving the quality of treatment given and received⁵. Lasers are being used for various oral and dental procedures be it for detection of caries or caries prevention, for restoring a cavity, and for various minor surgical procedures in a pediatric dental patient and thus, lasers may become the most opted dental treatment procedure in the near future in pediatric dentistry⁵.

The minimally invasive approach of Lasers induces higher satisfaction of pediatric patients and their guardians/parents and tends to enhance the quality of treatment delivered by the operator⁶.
References


Keywords: Lasers, Lasers for Diagnosis, Hard Tissue Applications of Lasers, Soft Tissue Applications of Lasers.

How to cite this article: Sharma V, Chib AS, Garg S, Joshi S, Gupta A, Srivastava A. - Lasers in Pediatric Dentistry, PosterJ 2021; 10(1):09.

Source of Support: Nil.

DOI:10.15713/ins.dpj.091

Conflict of interest: None Declared.

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