

Pediatric Dentistry Track

Friday, 10:30 a.m. - 11:30 a.m. and 2:00 p.m. - 3:00 p.m.
Salon 5

Laser Basics for Pediatric Dentistry and Orthodontics: A Full-Day Program

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This one-day program will introduce the general dentist, pediatric dentist, orthodontist, and hygienist to the wonderful world of laser dentistry. A multimedia approach will be used by the presenters to include lecture, video, and forum discussions plus there will be a hands-on session so that attendees can learn by doing. Instructors will be available to guide you through various procedures on pig jaws and extracted teeth. Both erbium and diode lasers will be available for use.

Educational Objectives

1. Summarize the history, physics, and types of lasers along with their specific uses in dentistry.
2. Specify how the diode laser can be used for soft tissue procedures in pediatric dentistry and orthodontics.
3. Explain how the erbium laser can be used for hard-tissue cavity preparations with reduced need for local anesthesia.
4. Practice laser-assisted clinical procedures on tissue specimens in a laboratory setting under controlled supervision.

Friday, 11:30 a.m. - 12:00 p.m. Salon 5

PEDIATRIC STUDENT SCHOLAR

Measuring Heart Rate to Assess Pain Levels in Pediatric Patients During Cavity Preparation with an Er,Cr:YSSG Laser

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Introduction

Operative dentistry using laser ablation allows for caries removal and cavity preparation with minimal noise, no vibration, and lesser need for local anesthesia. Although the precise method in which analgesia is achieved through low-level laser therapy (LLLT) is not completely understood, studies have shown that adequate analgesia for caries removal and tooth preparation is gained. Recent studies have measured pediatric patient pain perception with the use of lasers for operative procedures using only LLLT and laser ablation. Before and after the procedures, patients were asked to rate their experience on facial image scales. The studies concluded that LLLT allows for painless cavity preparation and caries removal with patients indicating pain only on deeper dentinal caries. Studies have also tested patients' preference and pain perception with split-mouth techniques, implementing both laser and high-speed preparations. The results showed a 95% patient preference for the laser preparation. These studies support the idea that LLLT achieves sufficient anesthesia for cavity preparation in most patients, but are limited in their evaluation with subjective scales.

Aim

The aim of this study was to quantitatively measure patients' pain and anxiety during operative procedures using an Er,Cr:YSSG laser. To expand on previous studies, a pulse oximeter was used to gain a baseline heart rate (HR) for each patient and to measure HR increases as an indicator of pain. The patients rated their pain on a facial pain scale to determine whether a correlation exists with the heart rate findings. Readings from a laser-based caries detection aid were recorded to assess the depth for which LLLT is not sufficient enough to produce profound anesthesia.

Study Objective

To quantitatively measure patients' pain and anxiety during operative procedures using an Er,Cr:YSSG laser for LLLT and caries removal during Class 1 cavity preparation.

Methods and Materials

Generally healthy children from the ages of 5-12 years old were included in the study. The children were patients of the Pediatric Dental Clinic of the Children's Hospital Colorado. Patients were chosen based on age and having a carious lesion on a single surface of either a posterior primary or permanent tooth. Teeth found with radiographic periapical radiolucency, history of pain or signs of parulis on exam were excluded from the study. All patients in the study received treatment by the same pediatric dental resident. The pulse oximeter (Nellcor™ OxiMax™ N-600™, Covidien, Mansfield, Mass., USA) was placed on each patient's finger prior to beginning treatment. A base line HR was measured for each patient prior to initiating treatment. Patients were instructed on how to use the facial pain scale (Wong-Baker FACES® Pain Rating Scale, Wong-Baker FACES® Foundation, Oklahoma City, Okla., USA) as a base line. The pulse oximeter remained on each patient's finger throughout treatment to record the patient's HR. The depth of the caries on each tooth chosen for treatment was measured by the caries detection aid (DIAGNOdent® pen 2190, KaVo Dental, Lake Zurich, Ill., USA). The tooth designated for treatment was anesthetized with an Er,Cr:YSSG laser (Waterlase, Biolase Technology, Irvine, Calif., USA) at a power setting of 4.5 Watts, 70% Air, 40% Water. Anesthesia was achieved with the above settings with tip of the laser placed 10 mm from the tooth to be treated and slowly moved for 2 min. The same settings were used for removal of caries, with the tip distance being decreased to 0.5-2.0 mm from the tooth. Protective goggles blocking the laser emission wavelength were used to protect the eyes of all individuals in the treatment room. Cavity preparations were acid-etched with 37% H₃PO₄ and restored with a light-cured composite after application of a bonding agent. Heart rate was measured throughout the entire procedure to measure maximum heart rate at the time of laser anesthesia, during caries removal with laser, and during restoration with composite. Immediately after the restoration of the tooth was completed, patients were asked about their perception of pain and related their experience to the facial pain scale.

Results

Currently being collected and will be presented at the conference.

Conclusions

To come following analysis of data.

This presentation discusses investigational devices that have not yet received U.S. FDA approval or clearance for the specified clinical indications, or describes off-label uses.

Educational Objectives

1. Determine whether laser-induced anesthesia is adequate for cavity preparation and caries removal.
2. Relate relevant research to positive patient experience.
3. Determine whether there is a depth of caries measurement for which LLLT is insufficient to produce profound anesthesia.

Friday, 3:00 p.m. - 5:00 p.m. Salon 3

HANDS-ON WORKSHOP Lasers in Pediatric Dentistry and Orthodontics

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Participants in the **Laser Basics for Pediatric Dentistry and Orthodontics: A Full-Day Program** will participate in an accompanying hands-on program with erbium and diode lasers.

Educational Objective

1. Practice laser technique in a simulated hands-on session.