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NON-INVASIVE, HIGH-RESOLUTION OPTICAL COHERENCE TOMOGRAPHY FOR THE EARLY DETECTION OF DENTAL CARIES

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Background and Objectives: Optical coherence tomography (OCT) is a rapidly developing high resolution in vivo imaging modality that has many potential advantages for early diagnosis. An in vivo, non-invasive modality would be beneficial for diagnosis, preventive treatment, and therapy in patients with high caries risk, large numbers of or poorly accessible restorations, or developmental abnormalities. Early detection and monitoring of dental caries, especially in poorly accessible locations, remains problematic. Using innovative prototype real-time OCT and polarization-sensitive OCT (PS-OCT) technology, to identify the diagnostic capability of OCT/PS-OCT images as compared with clinical and radiographic diagnoses.
Study Design/Materials and Methods: OCT and PS-OCT scans were recorded in 20 freshly extracted teeth with no previous restorations, and in 20 teeth with existing restorations, using 4 standardized scanning locations and standardized angles on each wax-mounted tooth. Radiographs were then made using standardized projection angles, film distance, and processing conditions. Three blinded, pre-standardized investigators evaluated teeth, OCT images, and radiographs individually for the presence and extent of decay on a scale of 0–5. The investigators conducted the evaluations twice, at two separate events using separate radiographic, OCT, and visual data. Caries was validated by using fuchsin/propylene glycol stain on 2 mm sections of the teeth. Sensitivity and specificity of OCT/ODT to the changes detected were evaluated using ROC and kappa characteristics.
Results: The diagnostic capability of OCT (78–88% sensitivity, 71–84% specificity) was best in superficial, inter-proximal areas, margins of restorations, and was least effective in deep caries at locations exceeding 2 mm depth.
Conclusions: OCT is a rapidly developing, promising modality for in vivo real-time imaging with excellent capability for non-invasive early caries detection and monitoring.

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PAIN REDUCTION USING COOLED FORCED AIR AT −20°C DURING LASER AND INJECTION SCLEROTHERAPY

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Background and Objectives: Long pulse 1,064 nm lasers therapies followed by injection sclerotherapy have been our choice to treat leg telangiectasias since 1999. We have achieved increasingly better results but pain continued to be a problem. Pre, parallel, and post-cooling using a Cryo5 unit began 18 months ago in our clinic. Its cooled forced air at −20°C lessens pain and protects the skin. It was also adapted to be used in conjunction with injection sclerotherapy. The objective of this study was to compare pain in both techniques with and without forced cooled air.
Study Design/Materials and Methods: Eight hundred twenty four patients were treated between April 2002 and October 2003. In a standard session, we first use laser and after a 75% dextrose solution is injected at the same sites. Four groups were attained by comparing pain during five shots of each technique with and without cooling: laser (G1), cryo-laser (G2), sclerotherapy (G3), and cryo-sclerotherapy (G4). Patients rated their pain level (0–10) using a visual analog scale (VAS).
Results: Ten percent refused to participate at all because they already prefered the cooling technique. Five percent refused to do the comparison during the injection phase. VAS data in each groups were: G1 = 1.21, G2 = 0.47, G3 = 1.34, G4 = 0.70.
Conclusions: The air cooling device significantly reduced reffered pain in leg vein treatment.

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TREATMENT OF TATTOOS WITH SINGLE AND DOUBLE-PULSE Q-SWITCHED ALEXANDRITE LASER

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Background and Objectives: Q-switched lasers have proven effective for treatment of tattoos. The treatment course often requires multiple treatments to achieve acceptable lightening. In an effort to improve clinical efficacy, a novel Q-switched pulse format was developed with two Q-switched pulses to target tissue. A study was undertaken to evaluate the benefits of this pulse format using the Accolade Q-switched alexandrite laser (Cynosure, Inc., Chelmsford, MA).
Study Design/Materials and Methods: A total of 15 subjects presenting with blue, black, and/or green tattoos were enrolled in the study. Each tattoo was divided into three areas, labeled and photographed. One third was treated using a 60 nanoseconds single pulse format, with a 3-mm handpiece and a fluence of 4–8 J. Another third was treated using 60 nanoseconds double pulse format, with a 3-mm handpiece and a fluence of 8–16 J. The final third was treated at 60 nanoseconds double pulse format, with a 5 mm handpiece and a fluence of 5–7 J, sufficient to cause immediate tissue whitening. Double pulse format consists of two 60 nanoseconds pulses separated by a 70 nanoseconds inter-pulse-interval, and the single pulse format consists of one 60 nanoseconds pulse. Retreatment was done at 6–12 week intervals until acceptable lightening was achieved on both sides.
Results: Both single- and double-pulse treatments resulted in significant lightening of tattoos. Tattoos treated with the double-pulse format achieved acceptable lightening in fewer treatments than the single-pulse treated side.
Conclusions: Enhancement in tattoo removal is likely due to the increased fluence delivered on target in a given treatment with double pulse format.