

**PRODUÇÃO TÉCNICO CIENTÍFICA
DO IPEN
DEVOLVER NO BALCÃO DE
EMPRESTIMO**

The aim of this study was to compare in vitro using SEM, the ability of citric acid, EDTA, citric acid with tetracycline, and Er:YAG laser to remove the smear layer from a root surface after manual scaling. Thirty specimens of root surface before scaling were divided into 6 groups. The Control Group (G1) was not treated; Group 2 (G2) was conditioned with citric acid gel 24 %, pH1, for 2 minutes; Group 3 (G3) was conditioned with EDTA gel 24 %, pH 7, for 2 minutes; Group 4 (G4) was conditioned with citric acid and tetracycline gel 50 %, pH1 for 2 minutes; Group 5 (G5) was irradiated with Er:YAG laser (2.94 μm), 47 mJ/10 Hz, focused, under water spray for 15 seconds and fluence of 0.58J/cm²; Group 6 (G6) was irradiated with Er:YAG laser (2.94 μm), 83 mJ/10 Hz, focused, under water spray for 15 seconds and fluence of 1.03J/cm². The micrographs were analysed by scores and following statistical analysis using Kruskal Wallis ($p < 0.05$) $H = 20,31$. The G1 was significantly different from all groups (28.0). The G2 (13.4), G3 (11.7), and G4 (13.6) showed no difference in relation to G5 (20.3) and G6 (6.0), but the G6 was significantly different to G5. From the results, it can be concluded that all treatments were effective in removing smear layer; G5 and G6 produced an irregular root surface; G6 was the most effective of all.

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Antimicrobial Effects of K.E.Y.-Laser in Root Canals

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Recently it has been shown that bacteria can be killed by Er:YAG laser irradiation. This bactericidal effect can be used in endodontics for canal sterilisation.

The aim of this study was to gain information about the antimicrobial effects of K.E.Y. laser irradiation on bacteria in dental root canals in vitro. 20 extracted human teeth were used, divided into two groups. After enlarging the root canal of the teeth with the conventional method using K-files sizes 10-40, all the teeth were sterilised. Following this the root canals were inoculated with *Enterococcus faecalis* bacteria.

Group I (10 teeth) were then treated with K.E.Y. laser: pulse energy 50mJ, repetition rate 15 Hz, 4 passes. Group II (the remaining 10 teeth) were irrigated with 3 % H₂O₂.

Results showed sterilisation of the root canals of the teeth in group I.

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Pilot Study on Atomic Force Microscopy of CO₂-TEA Laser Irradiated Enamel Surface

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In studies concerning laser applications in oral hard tissues, tooth surface is usually investigated by scanning electron microscopy and associated microanalysis techniques. In this pilot study, the Atomic Force Microscopy (AFM) is evaluated to visualize and quantify structural and morphological changes in enamel surfaces irradiated by laser. The AFM was chosen not only because its high resolution and high contrast imaging capability but mainly due to the fact that quantitative information can be directly obtained from the samples in their natural state (no need of dehydration, coating, staining or even evacuation). Samples were extracted from human and bovine teeth and only the bovine samples were irradiated with pulses of a CO₂-TEA laser. Images of (25 x 25) μm^2 and (10 x 10) μm^2 of scanning area were obtained from random points of the surfaces and prismatic areas (with holes) and interprismatic enamel were easily visualized in unlased samples. The mean diameter and the apparent depth of enamel holes and the RMS roughness (Rq) were directly measured. Lased surface showed typical changes due to fusion and solidification and greater roughness in comparison to unlased surface. Results indicate that AFM is an excellent tool for the proposed task.