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ORIGINAL ARTICLE

The impact of an erbium, chromium: yttrium-scandium-gallium-garnet laser with radial-firing tips on endodontic treatment

U. Schoop & A. Barylyak & K. Goharkhay & F. Beer & J. Wernisch & A. Georgopoulos & W. Sperr & A. Moritz

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Abstract Radial-firing tips should allow a more homogeneous laser irradiation of root canal walls. The aim of the study was to assess the effects of erbium, chromium: yttrium-scandium-gallium-garnet (Er,Cr:YSGG) laser irradiation in conjunction with those newly designed tips. The investigation comprised bacteriology, morphological evaluations and temperature measurements. Root canals were inoculated with two test strains and laser irradiated with power settings of 0.6 W and 0.9 W and a repetition rate of 20 Hz. Subsequently, the samples were subjected to microbiological evaluation. The morphological changes of the canal walls were assessed by scanning electron microscopy. To reveal possible thermal side effects, we carried out temperature measurements. The bacteriological evaluation revealed a decisive disinfectant effect. Scanning electron microscopy showed the homogeneous removal of smear layer from the root canal walls. The temperature rise at the root surface during the irradiation was moderate, yielding 1.3°C for the 0.6 W setting and 1.6°C for the 0.9 W setting. The investigations indicated that the Er,Cr: YSGG laser, in conjunction with radial-firing tips, is a suitable tool for the elimination of bacteria in root canals and for the removal of smear layer.

Keywords Endodontics · Root canal · Laser · Radial-firing tips · Bacteriology · Scanning electron microscopy

U. Schoop (✉) · K. Goharkhay · F. Beer · W. Sperr · A. Moritz
Department of Conservative Dentistry, Dental School,
Medical University of Vienna,
Währingerstr. 25a,
1090 Vienna, Austria
e-mail: curd.schoop@meduniwien.ac.at

A. Barylyak
Department of Therapeutic Dentistry,
Danylo Halytskyy Lviv Medical University,
Lviv, Ukraine

J. Wernisch
Institute for Applied and Technical Physics,
Technical University of Vienna,
Vienna, Austria

A. Georgopoulos
Department of Infectious Diseases and Chemotherapy,
University Clinic for Internal Medicine I,
Vienna, Austria