

The use of the erbium, chromium:yttrium-scandium-gallium-garnet laser in endodontic treatment

The results of an in vitro study

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ABSTRACT

Background. The use of the erbium, chromium:yttrium-scandium-gallium-garnet (Er,Cr:YSGG) laser has become accepted in the field of cavity preparation. The development of miniaturized and flexible fiber tips has allowed this device to be used in endodontics. The authors conducted an in vitro study to assess the effects of Er,Cr:YSGG laser irradiation on root canals.

Methods. The authors inoculated root canals with two bacteria, laser irradiated them at two power settings and subjected them to a quantitative microbiological evaluation. They used scanning electron microscopy (SEM) to assess morphological changes in endodontically processed and laser-irradiated root canal walls. They measured temperature increases on the root surface to determine possible thermal side effects.

Results. The bacteriological evaluation revealed a disinfecting effect in the root dentin samples that was dependent on the output power but not specific for the bacterial species investigated. SEM showed the removal of the smear layer from the root canal walls and the exposure of dentinal tubules. The temperature rise during irradiation was moderate when standardized power settings were used.

Conclusions. The Er,Cr:YSGG laser can be used to eliminate bacteria in root canals. It also effectively removes smear layer and debris from the canal wall.

Clinical Implications. Practitioners can use the Er,Cr:YSGG laser to prepare root canals for endodontic therapy.

Key Words. Endodontics; root canal; laser; bacteriology; scanning electron microscopy.

JADA 2007;138(7):949-55.

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