

A comparison of the efficacy of Er,Cr:YSGG laser and rotary instrumentation in root canal débridement

Daniel A. Radatti, DDS; J. Craig Baumgartner, DDS, PhD; J. Gordon Marshall, DMD

ABSTRACT

Background. The authors evaluated the efficacy of an erbium,chromium: yttrium,scandium,gallium,garnet (Er,Cr: YSGG) laser-powered hydrokinetic system (HKS) versus that of rotary instrumentation for root canal débridement.

Methods. The authors studied four uninstrumented controls and two test groups of 18 matched pairs of teeth. Teeth from each pair underwent different instrumentation but received identical irrigation solutions. The instrumentation protocol involved either rotary instrumentation or the Er,Cr:YSGG laser. The irrigation groups received 0.5 milliliter of distilled water or 5.25 percent sodium hypochlorite (NaOCl) between instruments. The authors measured the amount of debris remaining at 2 and 4 mm from the apex as a percentage of total lumen area.

Results. Lased canals had significantly more debris than did canals that received rotary instrumentation (Wilcoxon signed rank test, $P < .001$). With distilled water irrigation, the debris remaining in lased canals at both the 2- and 4-mm levels was not statistically different from that remaining in uninstrumented controls. Rotary instrumentation yielded significantly less remaining debris than did laser instrumentation (Wilcoxon signed rank test, $P < .001$). With 5.25 percent NaOCl irrigation, there was no difference in remaining debris between the two groups (Wilcoxon signed rank test, $P < .001$). The lased group received significantly more irrigant than did the rotary group (Wilcoxon rank sum test, $P < .001$).

Conclusions. This study indicates that the débridement efficacy of the HKS with distilled water irrigation is unacceptable; with 5.25 percent NaOCl irrigation, it is similar to that of rotary instrumentation.

Clinical Implications. If the HKS is to be used for débridement, then NaOCl irrigation must be used for predictable tissue removal.

Key Words. Er,Cr:YSGG; laser; hydrokinetic system; endodontic treatment; root canal; débridement.

JADA 2006;137(9):1261-6.

When this article was written, Dr. Radatti was an endodontic resident, Oregon Health & Science University, Portland. He now is in the private practice of endodontics in Bend, Ore.

Dr. Baumgartner is a professor and the chairman, Department of Endodontics, School of Dentistry, Oregon Health & Science University, 611 S.W. Campus Drive, Portland, Ore. 97239, e-mail "baumgarc@OHSU.edu". Address reprint requests to Dr. Baumgartner.

Dr. Marshall is an associate professor, Department of Endodontology, Oregon Health and Science University, Portland.

