Effects of Er,Cr:YSGG Laser on Gingival Fibroblast Attachment

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Abstract

Introduction: Successful treatment of periodontitis depends upon removal of bacteria and their products from the root surface. Although debridement with hand or ultrasonic instruments can produce significant clinical improvements, removal of subgingival plaque and calculus is rarely complete. In 1997, the U.S. Food and Drug Administration cleared the Er,Cr:YSGG laser for use on oral hard tissues. There is some clinical evidence to suggest that the use of lasers may provide a more efficacious approach for periodontal debridement. The purpose of this study was to determine whether instrumentation of periodontally diseased root surfaces with the Er,Cr:YSGG laser influenced gingival fibroblast attachment. Materials and Methods: Forty periodontally involved human teeth were extracted and divided into two treatment groups. Twenty teeth were instrumented with conventional hand instruments, and the remaining 20 teeth with an Er,Cr:YSGG laser (Millennium, BioLase Technology, San Clemente, California), 2780 nm, using a 600-µm cylindrical tip at a 30º angle, set at 2.0 W with 80% of maximum air and 70% of maximum water. Sections of the treated root surfaces were then prepared and placed in a suspension of human gingival fibroblasts (20,000 cells/ml). After 24 hours, the cells were stained with Geimsa and mounted on glass slides. Cell numbers on each root surface were then counted using SPOT™ computer software. Results: The hand-instrumented group had a mean cell density of 66.63 cells/mm^2, while the laser-treated group showed a mean cell density of 54.48 cells/mm^2. A Student's t-test revealed that this difference was statistically significant ($p < 0.05$). Conclusions: Although fewer fibroblasts attached to the laser-treated root surfaces, significant numbers of cells attached to both hand-instrumented and Er,Cr:YSGG laser-treated root surfaces, indicating that both conventional mechanical instrumentation and laser treatment were able to restore biocompatibility to diseased root surfaces.

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Biography: Scott Renfrow is a senior dental student at the University of Oklahoma. He has been actively involved in research during dental school, focusing on how laser treatment affects root surface biocompatibility. His future plans include specialty training in periodontics and graduate education in bioengineering.

Disclosure: Mr. Renfrow has no commercial relationships relative to this presentation.

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