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Measurement of temperature changes during cavitation generated by an erbium, chromium: Yttrium, scandium, gallium garnet laser

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ABSTRACT

Aim: The present study evaluated the magnitude of temperature changes in the tooth during cavitation produced by an Er,Cr:YSGG laser. Methods: The root canal of a single extracted maxillary canine was enlarged to a size 30/.02 file. Four thermocouples were attached to the tooth: one to the surface of the root and three inserted into the canal at 3, 9, and 15 mm from the apical foramen, respectively. The tooth was placed in a plastic container at room temperature around 25 °C. The tooth was processed as follows. In the EDTA condition, the tooth was irrigated with 17% EDTA; in the NaOCl condition, the tooth was irrigated with 3% NaOCl; and to analyse the effect of different thicknesses of dentin, the tooth was irrigated with tap water. In all conditions, the irrigants were activated at 2 W for 120 seconds. Results: The mean temperature was 25.2 °C to 27.1 °C and the temperature ranged from 25.0 °C to 29.6 °C. The temperature elevation measured during cavitation generated by the laser didnot exceed 5 °C. Conclusions: The magnitude of the temperature changes in the root canal and at the surface of the tooth did not exceed 5 °C when laser-driven irrigation was used to produce cavitation in the root canal.

KEYWORDS

Cavitation; Heat; Laser-Driven Irrigation; Temperature Changes

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