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In vitro evaluation of the temperature increment at the external root surface after Er,Cr:YSGG laser irradiation of the root canal

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Abstract

Objectives. A study was made to determine the temperature increment at the dental root surface following Er,Cr:YSGG laser irradiation of the root canal.

Design. Human canines and incisors previously instrumented to K file number ISO 30 were used. Irradiation was carried out with glass fiber endodontic tips measuring 200 µm in diameter and especially designed for insertion in the root canal. The teeth were irradiated at 1 and 2 W for 30 seconds, without water spraying or air, and applying a continuous circular movement (approximately 2 mm/sec.) in the apico-coronal direction.

Results. At the 1 W power setting, the mean temperature increment was 3.84°C versus 5.01°C at 2 W. In all cases the difference in mean value obtained after irradiation versus the mean baseline temperature proved statistically significant ($p < 0.05$).

Conclusions. Application of the Er,Cr:YSGG laser gives rise to a statistically significant temperature increment at the external root surface, though this increment is probably clinically irrelevant, since it would appear to damage the tissues (periodontal ligament and alveolar bone) in proximity to the treated tooth.

Key words: *Er, Cr:YSGG, endodontics, temperature, root canal, laser.*