

EFFECTS OF LASER TREATMENT ON INTRACANAL DENTINE AND CEMENTUM AT THE ROOT APEX

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Laser irradiation during root canal treatment is efficient but in order to prevent irreversible thermal damage to dentine, cementum and other periapical structures continuous water cooling is required.

The aim of this study was to ultrastructurally analyze the surface of intracanal dentine and cementum at the root apex after Er:YAG laser irradiation with and without sterile saline solution irrigation.

The study involved 70 intact maxillary and mandibular single-rooted and two-rooted human teeth, divided into two experimental groups and one control group. In all teeth access cavity was created.

For root canal irradiation, Er:YAG laser with the wavelength of 2940 nm, energy output of 140 mJ per pulse, pulse duration of 125-160 ms, pulse repetition rate of 10 Hz and power of 15 W was used. Total irradiation time for each root canal was 10 seconds.

The ultrastructural analysis of intracanal dentine and the cementum of the root apex was done by using scanning electron microscope (JEOL JSM-5300 Tokyo Japan).

Intracanal Er:YAG laser irradiation without water cooling showed melted circumpulpal dentine with large cracks in it, whereas cementum at the root apex was thermally modified in the form of plates and cracks.

Intracanal Er:YAG laser irradiation with continuous water cooling resulted in clean intracanal dentine surface without morphological changes of the cementum.

The canal system irradiation is acceptable and possible only when using constant water cooling; otherwise, irreversible thermal damage to intracanal dentine and cementum at the root apex occur. *Acta Medica Medianae* 2016;55(1):26-32.

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