

ABSTRACT

Evaluation of debris removal efficacy of different root canal irrigants during final irrigation protocol using laser activated irrigation and passive ultrasonic irrigation- an in vitro study

Aim and objective:

The aim of this study was to compare in vitro, the debris removal efficacy of final irrigation protocols that included, saline using conventional syringe irrigation, 2.5% sodium hypochlorite (NaOCl) and 2% chlorhexidine (CHX), using laser activated irrigation (LAI) and passive ultrasonic irrigation (PUI) separately from a simulated canal irregularity placed in the apical third of prepared straight root canals using SEM.

The null hypothesis was that there would be no difference in the debris removal scores regardless of the irrigant and technique performed.

Methodology:

50 lower single rooted first premolar teeth with intact roots were selected. The teeth were decoronated to a length of 15 mm. Access cavity was prepared in all the teeth. Canal instrumentation was done to master apical file size #50 and step back preparation to #80 k file with periodic irrigation. Teeth were then longitudinally sectioned into two halves and a standard depression was made in one of the root halves, 2 mm from the apex. Dentin debris produced by longitudinal splitting of other teeth was collected and placed in

the depression created. The two halves were approximated and placed in putty material following which the different irrigation protocols were performed. Gr I: conventional syringe irrigation with side vented needle and saline; Gr II: NaOCl/ PUI; Gr III: CHX/PUI; Gr IV: NaOCl/LAI; Group V: CHX/LAI. Specimens were then disassembled and analysis was done under scanning electron microscope. The images obtained were processed with GIMP software.

Results:

In this in vitro study, there was a statistically significant difference in the debris removal scores between Group I and all the other groups. Groups II, III, IV and V showed similar results with no statistically significant difference, but when frequency distribution was taken into account, the cleanest canals was produced by group IV.

Conclusion:

All the four test groups showed similar debris removal efficacy which was significantly better than the control group that employed saline with syringe irrigation.

Key words: Passive ultrasonic irrigation, Laser activated irrigation, Final irrigation protocol