



Evaluation of debris extrusion using passive ultrasonic irrigation associated with different endodontic irrigants

Giovanna Dornelas Mantovani*, Lidiane Mendes Louzada, Marlos Barbosa-Ribeiro, Rodrigo Arruda-Vasconcelos, Brenda P F A Gomes

Abstract

The objective of this study was to evaluate the amount of extruded debris after chemo-mechanical preparation (CMP) associated with passive ultrasonic irrigation (PUI) using 6% sodium hypochlorite (NaOCl), 2% chlorhexidine gel + saline solution (2% CHXg + SS), 2% chlorhexidine solution (2% CHXs) and SS alone. Sixty mandibular premolars with single straight root canals were randomly assigned into 4 groups (n = 15) according to the irrigant used: G1 (PUI + NaOCl), G2 (PUI + CHXg + SS), G3 (PUI + CHXs) and G4 (PUI + SS). CMP was performed with Reciproc R25 files (25/.08) and the debris extruded from each tooth were collected in pre-weighed Eppendorf tubes and dried in oven at 68°C for 5 days. The average weight of debris was assessed by using an analytical microbalance. ANOVA and post-hoc Tukey's test were used for statistical analysis ($\alpha = 0.05$). Debris extrusion was observed in all groups, irrespective of the irrigant used. 2% CHXg + SS was associated with lower debris extrusion compared to the other root canal irrigants ($p < 0.05$). No significant differences were observed between 6% NaOCl, 2% CHXs and SS. In conclusion, PUI did not completely prevent extrusion of debris. PUI performed with 2% CHXg + SS significantly minimized debris extrusion compared to 6% NaOCl, CHXs and SS.

Key words:

Debris extrusion, Endodontics, Passive ultrasonic irrigation.

Introduction

The objective of this study was to evaluate the amount of extruded debris after chemo-mechanical preparation (CMP) associated with passive ultrasonic irrigation (PUI) using 6% sodium hypochlorite (NaOCl), 2% chlorhexidine gel + saline solution (2% CHXg + SS), 2% chlorhexidine solution (2% CHXs) and SS alone

Results and Discussion

The extruded debris were collected in an apparatus according to the figure 1.

Table 1 provides an overview of the mean values and standard deviation in each group.

Debris extrusion was observed in all groups, irrespective of the root canal irrigant used during CMP.

The use of 2% CHXg + SS was associated with lower debris extrusion compared to their irrigants ($p < 0.05$).

No significant differences were observed between 6% NaOCl, 2% CHXs and SS irrigation protocols.

Figure 1. A schematic showing the apparatus used to evaluate the collection of apically extruded debris.

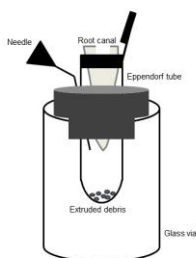


Table 1. Mean and standard deviation (SD) of the amount of apically extruded during chemo-mechanical preparation associated with passive ultrasonic irrigation of each experimental group (in grams).

Root canal irrigants	Mean \pm SD
6% Sodium hypochlorite	0.00422 \pm 0.00154 B
2% Chlorhexidine gel + saline solution	0.00147 \pm 0.00061 A
2% Chlorhexidine solution	0.00405 \pm 0.00174 B
Saline solution	0.00539 \pm 0.001921 B

Different superscript letters represent significant differences ($p < 0.05$).

Conclusions

Passive ultrasonic irrigation did not completely prevent extrusion of debris,

Passive ultrasonic irrigation performed with 2% chlorhexidine gel + saline solution significantly minimized debris extrusion compared to 6% sodium hypochlorite, chlorhexidine solution and saline solution.

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