doi:10.20396/revpibic.v0i0.id

XXVI Congresso de Iniciação Científica Unicamp
17 a 19 de outubro Campinas | Brasil

# Application of XP-Endo Finisher files in the reduction of microbial load in oval-shaped root canals - An ex vivo study

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**Abstract**

The present study evaluated the effectiveness of XP-Endo Finisher (XPF) associated with XP-Endo Shaper (XPS) or Reciproc Blue (RB) files in the reduction of Enterococcus faecalis in oval-shaped root canals. Eighty mandibular incisors with single oval-shaped root canals were contaminated with E. faecalis for 10 days at 37°C with centrifugation on alternate days. The teeth were randomly assigned to eight experimental groups (n=10) as follows: G1 – XP-Endo Shaper, G2 – XP-Endo Shaper + XP-Endo Finisher, G3 – Reciproc Blue, and G4 – Reciproc Blue + XP-Endo Finisher. Chemomechanical preparation was performed with saline solution (NaCl) or 2.5% sodium hypochlorite (NaOCl). Microbial reduction was assessed by colony forming units (CFU/mL) count before (S1) and after (S2) CMP by using sterile paper points. ANOVA, Tukey's test and Bonferroni's post-hoc tests were used at 5% significance level. Bacteria were present in all initial samples (P>.05). All instrumentation techniques reduced bacteria, irrespective of the irrigating solution (P<.05). With the use of NaCl, Reciproc Blue was more effective than XP-Endo Shaper (P=.035). The association of XP-Endo Finisher improved the cleaning efficacy of both systems (P=.239). With the use of NaOCl, XP-Endo Shaper and Reciproc Blue presented similar effectiveness (P=.779). XP-Endo Finisher enhanced the bacterial reduction of both systems tested (P<.05). The use of NaOCl improved the CMP, irrespective of the instrumentation technique used (P<.05). Single-file instrumentation carried out with XP-Endo Shaper and Reciproc Blue files is effective in reducing bacterial levels in oval-shaped root canals. The use of XP-Endo Finisher as a supplementary approach to the irrigation/instrumentation technique has improved the cleaning efficiency of both file systems tested. Mechanical preparation performed with saline solution decreased culturable bacteria from the root canal, but antimicrobial substances such as NaOCl should be used to achieve a significantly better disinfection.

***Key words:*** *Enterococcus faecalis, Sodium hypochlorite, XP-Endo Finisher.*

## Introduction

The present study evaluated the effectiveness of XP-Endo Finisher (XPF) associated with XP-Endo Shaper (XPS) or Reciproc Blue (RB) files in the reduction of *Enterococcus faecalis* in oval-shaped root canals.

## Results and Discussion

After the contamination protocol, bacteria were present in all initial samples (P>.05). All instrumentation techniques reduced bacteria, irrespective of the irrigating solution (P<.05). With the use of NaCl, RB was more effective than XPS (P=.035). The association of XPF improved the cleaning efficacy of both systems (P=.239). With the use of NaOCl, XPS and RB presented similar effectiveness (P=.779). XPF enhanced the bacterial reduction of both systems tested (P<.05). The use of NaOCl improved the CMP, irrespective of the instrumentation technique used (P<0.05).

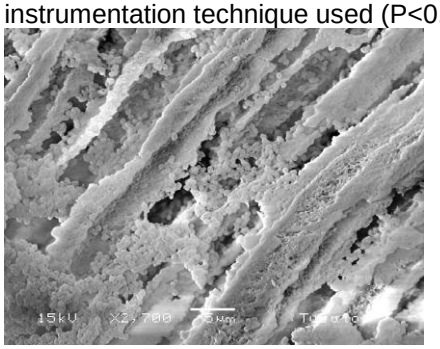

**Figure1.** Scanning Electron Microscopy of *E. faecalis* penetration into dentinal tubules.

**Table 1.** Mean (±SD) of colony forming units (CFU/mL) count before and after chemo-mechanical preparation (CMP) using 0.9% NaCl and 2.5% NaOCl of the different groups (P<0.05).

| | 0.9% NaCl | | 2.5% NaOCl | |
|---|---|---|---|---|
| | Before CMP (UFC/mL) | After CMP (UFC/mL) | Before CMP (UFC/mL) | After CMP (UFC/mL) |
| XP-Endo Shaper | 215800 (±84256)$^{Aa}$ | 681.2 (±118.7)$^{Ab*}$ | 203600 (±77882)$^{Aa}$ | 21.3 (±15.78)$^{Ab*}$ |
| XP-Endo Shaper + XP-Endo Finisher | 150500 (±29737)$^{Aa}$ | 181 (±46.54)$^{Cb*}$ | 175200 (±42949)$^{Aa}$ | 2.6 (±1.075)$^{Bb*}$ |
| Reciproc Blue | 213300 (±80465)$^{Aa}$ | 579.5 (±55.11)$^{Bb*}$ | 190000 (±8069)$^{Aa}$ | 16.6 (±15.42)$^{Ab*}$ |
| Reciproc Blue + XP-Endo Finisher | 211700 (±55140)$^{Aa}$ | 249.5 (±78.83)$^{Cb*}$ | 193500 (±4378)$^{Aa}$ | 2.5 (±1.958)$^{Bb*}$ |

Means followed by distinct letters means statically significant differences; Capital letters in the vertical show comparison of the different groups using the same irrigating solution at the same time. Lowercase letters in horizontal show comparison within the same group before and after CMP. * Comparison of irrigants used in the same technique and after CMP.

## Conclusions

- Single-file instrumentation carried out with XPS and RB files is effective in reducing bacterial levels in oval-shaped root canals.
- The use of XPF as a supplementary approach to the irrigation/instrumentation technique has improved the cleaning efficiency of both file systems tested.
- Mechanical preparation performed with NaCl decreased culturable bacteria from the root canals, but antimicrobial substances such as NaOCl should be used to achieve a significantly better disinfection.

## Acknowledgement

Supported by: FAPESP – 2015/23479-5, CNPq – 308162/2014-5 and CAPES.

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