Biofilm Removal by 6% Sodium Hypochlorite Activated by Different Irrigation Techniques

Author: Zapata et al  Year: 2014  Journal: IEJ

Aim
- To compare the removal of biofilm utilizing four irrigation techniques on a bovine root canal model.

Materials & Methods
- 50 sterile bovine dentine sections (2 x 2 mm) were infected with biofilms.
- A bovine root canal model was created by placing dentine specimens infected with biofilms to previously created cavities in the bovine model (fig 1).
- The bovine root canal was enlarged to size #130 using Gates Gliddens.
- The 50 specimens were randomly divided into 5 groups according to the final irrigation protocol using 6% NaOCl with:
  Group 1: Standard needle irrigation (SNI)
  Group 2: Endoactivator
  Group 3: Passive ultrasonic activation (PUI)
  Group 4: Laser-activated irrigation (LAI)
  Group 5: Distilled water (control)
- SEM pictures were evaluated for each group using a 4-score scale system
  Score 1: Clean dentine or residual microbial (<5%) + No residual biofilm
  Score 2: Residual microbial cells cover 5–33% of the dentine + No residual biofilm
  Score 3: Biofilm and microbial cells can be identified covering 34–66% of the dentine.
  Score 4: Biofilm and microbial cells can be identified covering 67–100% of the dentine.
- Statistical analysis was performed to compare the results between different groups.

Results
- The Control specimens were characterized by the presence of a thick biofilm covering dentine.
- Distilled water irrigation score was classified as 4 in all the SEM pictures evaluated.
- LAI had the lowest scores compared with PUI, Endoactivator and needle irrigation.
- PUI scores were lower than both Endoactivator and SNI scores
- There was no difference between Endoactivator and SNI.
- The worst result was found in control group that do not show any significant effect against biofilm.

Conclusion
- Laser activation of 6% NaOCl significantly improved the cleaning of biofilm-infected dentine followed by PUI.

Authors
Ronaldo Ordinola-Zapata, Clovis Bramante, Raydolfo Aprecio, Robert Handysides & Davide Jaramillo