

ABSTRACT

Background : Irrigation is a key part of successful root canal treatment. Much of the research on endodontic irrigation has focused on the effect of irrigation on the smear layer. Studies have shown that irrigant replacement in positive pressure irrigation systems can not reach apical thereby affecting debridement processes in apical areas. **Purpose :** To Analyze the difference of irrigant replacement in positive and negative pressure irrigation system to root canal cleaning efficacy. **Method :** Twenty seven human single-root mandibular premolar were decoronated and root canals were instrumented using ProTaper Next rotary files up to size X3 with 2,5% NaOCl irrigation between each instrumentation followed by final irrigation with 5 ml sterile aquadest. Prepared teeth were randomly divided three groups irrigation system. After instrumentation and irrigation teeth were sectioned longitudinally bucco-lingually halves then cut in the apical third part and examined under scanning electron microscope (SEM) for smear layer and smear plug evaluation. Irrigant replacement is simulated with computational fluid dynamic (CFD). **Results :** Irrigant replacement in negative pressure irrigation system is better able to reach the apical end compared with irrigant replacement in the positive pressure irrigation system. This causes better smear layer removal in apical third area. **Conclusion :** The root canal cleaning efficacy with a negative pressure irrigation system is cleaner than a positive pressure irrigation system.

Keyword : Root canal irrigation, negative pressure irrigation, positive pressure irrigation, computational fluid dynamic, smear layer