ABSTRACT

INTRODUCTION: In a quest to minimize the smear layer, several irrigants and irrigant activation techniques were accomplished. Thereby it effects the scrupulous sealing of root canal space. Effective smear layer removal has been accomplished using chemical means and methods such as ultrasound, laser and hydrodynamic disinfection for its disruption. But there is no evidence to suggest which material or technique of irrigation is best and reliable.

AIM: The purpose of this study is to evaluate the removal of smear layer after treating the root canal with sodium hypochlorite and EDTA, then activating the final irrigant with three different irrigant activation techniques, i.e., manual agitation, laser, and ultrasonic technique.

METHODOLOGY: A total of 60 maxillary central incisors were divided into 3 groups A, B, and C. 20 specimens in group A were activated by manual agitation technique. 20 specimens in group B were activated by diode laser and 20 specimens in group C were activated by ultrasonics. Treated samples were analysed at 1000x using Scanning electron microscope. SEM photographs were analysed and were scored by two observers using Guttmans scoring criteria. Statistical analysis was done using Kruskal Wallis test and Mann whitney test.

RESULT: None of the groups showed complete removal of the smear layer. Ultrasonic activation of specimens efficiently removes smear layer at apical (3mm), middle (6mm) and coronal (9mm) thirds when compared to laser activated and manual agitated group. Laser evaporates and melts the dentinal tubules. This will effect the sealer penetration. Manual dynamic agitation shows poor efficiency in removal of smear layer when compared to the laser and ultrasonic group.
CONCLUSION: The mode of irrigant activation, has a significant influence on the removal of the smear layer. Ultrasonic activation efficiently removes the smear layer after 2 minutes of activation where as laser activation melts the dentin, which can effect the final hermetic seal. Ultrasonic activation of the final irrigant provides efficient smear layer removal when compared to laser and manual activation.