ABSTRACT

Evaluation of Hydroxyl Ion Diffusion from Calcium Hydroxide Medicament Placed in Intact and Resorbed Teeth During Primary Endodontic Treatment and Retreatment – An Invitro Study

Aim and Objective: The aim of this invitro study was (i) to evaluate the hydroxyl ion diffusion from calcium hydroxide intracanal medicament placed in intact and simulated resorbed teeth during primary endodontic treatment and retreatment and (ii) to assess if the hydroxyl ion diffusion from calcium hydroxide medicament during retreatment was dependent on the type of sealer used during primary endodontic treatment done in extracted mandibular premolars using pH meter.

Methodology: 40 single rooted mandibular premolars were divided into 2 groups of 20 teeth each namely Group 1: Intact teeth and Group 2: Simulated resorbed teeth. All teeth were decoronated at CEJ followed by chemomechanical preparation. Intracanal dressing was done with RC Cal and the access cavity was sealed both during primary endodontic treatment and retreatment. The specimens were then individually suspended in 10ml of deionized water. A digital pH meter was used to measure the pH on 3rd, 7th, 14th, 21st and 28th day. For measuring the pH change after retreatment, the samples in Group 1 and group 2 were further subdivided into 4 groups each based on the sealers used for obturation namely group A (Zinc oxide eugenol sealer), Group B (Sealapex), Group C (MTA fillapex)
and group D (BioRoot RCS). Data obtained were compiled and statistically analyzed.

**Results:** The pH change was most alkaline in both intact and simulated resorbed teeth during primary endodontic treatment and retreatment on the 7th day. The dissociation of hydroxyl ions from the intracanal medicament was more in resorbed teeth than in intact teeth during both primary endodontic treatment and retreatment on 3rd and 7th day, whereas, on the 14th, 21st and 28th day it was higher in intact teeth than resorbed teeth. In both intact and resorbed teeth, significantly higher change in pH was seen during primary endodontic treatment than during retreatment at all time intervals. During retreatment following placement of intracanal medicament in both intact and resorbed teeth, highest pH was observed in Group A (Zinc oxide eugenol) followed by Group B (Sealapex), Group C (MTA fillapex) and Group D (BioRoot RCS) during the entire period of study.

**Conclusion:** The present study showed that the change in pH due to dissociation of hydroxyl ions from the intracanal medicament placed in both intact and resorbed teeth was time dependent. It was also seen that hydroxyl ion diffusion from calcium hydroxide medicament during retreatment was dependent on the type of sealer used during primary endodontic treatment.

**Key Words:** Ca(OH)$_2$, pH, resorbed teeth, mineralization, retreatment.