

## Assessment of efficacy of two different root canal irrigating solutions during root canal therapy: A comparative study

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### Abstract

**Background:** The present study was conducted for evaluating and comparing two different root canal irrigating solutions during root canal therapy. **Materials & methods:** Assessment of 20 freshly extracted mandibular first premolar were obtained and were broadly divided into two study groups with 20 specimens in each group; Group 1- Root canals irrigated using 2.5% NaOCl for 1 min only, and Group 2- Root canals irrigated with 2% CHX gluconate for 1 min followed by 3 ml of 2.5% NaOCl solution. The cleaning ability of irrigating solutions was evaluated using the smear layer score system. All the results were recorded in Microsoft excel sheet and were analyzed by SPSS software. **Results:** Mean smear layer score among specimens of group A and group B was 4.5 and 4.2 respectively. **Non-significant results were obtained while comparing the mean smear layer score. Conclusion:** From the above results, the authors concluded that both the irrigating solutions are equally effective in removing smear layer.

**Key words:** Irrigation solution, Root canal

### INTRODUCTION

Bacteria have long been recognized as the primary etiologic factors in the development of pulp and periapical lesions. Successful root canal therapy depends on thorough chemomechanical debridement of pulpal tissue, dentin debris, and infective microorganisms. Irrigants can augment mechanical debridement by flushing out debris, dissolving tissue, and disinfecting the root canal system. Chemical debridement is especially needed for teeth with complex internal anatomy such as fins or other irregularities that might be missed by instrumentation.<sup>4-6</sup>

Mechanical cleansing, in addition to the removal of necrotic or vital pulp tissue, leads to the formation of a thin layer of debris, known as “smear layer.” This layer is made up of potentially infective organic and inorganic substances that must be removed from the canal walls, dentin tubules, and root canal branches with the aid of root canal irrigants. The presence of isthmi and anastomosis can make the chemical cleansing of the root canal system very difficult since they can be filled with the smear layer. The ideal features of root canal irrigants include the cleansing lubrication of endodontic instruments and root canal system, the dissolution of inorganic and organic substances, the antimicrobial action, the absence of

cytotoxicity, and the inefficacy in the alteration of dental microstructure.<sup>6-8</sup> Hence; the present study was conducted for evaluating and comparing two different root canal irrigating solutions during root canal therapy.

## **MATERIALS & METHODS**

The present study was conducted for evaluating and comparing two different root canal irrigating solutions during root canal therapy. Assessment of 20 freshly extracted mandibular first premolar were obtained and were broadly divided into two study groups with 20 specimens in each group; Group 1- Root canals irrigated using 2.5% NaOCl for 1 min only, and Group 2- Root canals irrigated with 2% CHX gluconate for 1 min followed by 3 ml of 2.5% NaOCl solution. Decoronation of all the specimens was done at the cemento-enamel junction. Teeth were instrumented and at every change of instrument, the canals were irrigated with 2 ml of 2.5% NaOCl solutions during procedure. Canals were dried with paper points after which the roots were split longitudinally and examined. The cleaning ability of irrigating solutions was evaluated using the smear layer score system. All the results were recorded in Microsoft excel sheet and were analyzed by SPSS software. Student t test was used for evaluation of level of significance. P- value of less than 0.05 was taken as significant.

## **RESULTS**

A total of 20 freshly extracted mandibular first premolar were obtained and were broadly divided into two study groups with 20 specimens in each group; Group 1- Root canals irrigated using 2.5% NaOCl for 1 min only, and Group 2- Root canals irrigated with 2% CHX gluconate for 1 min followed by 3 ml of 2.5% NaOCl solution. Mean smear layer score among specimens of group A and group B was 4.1 and 4.3 respectively. Non-significant results were obtained while comparing the mean smear layer score.

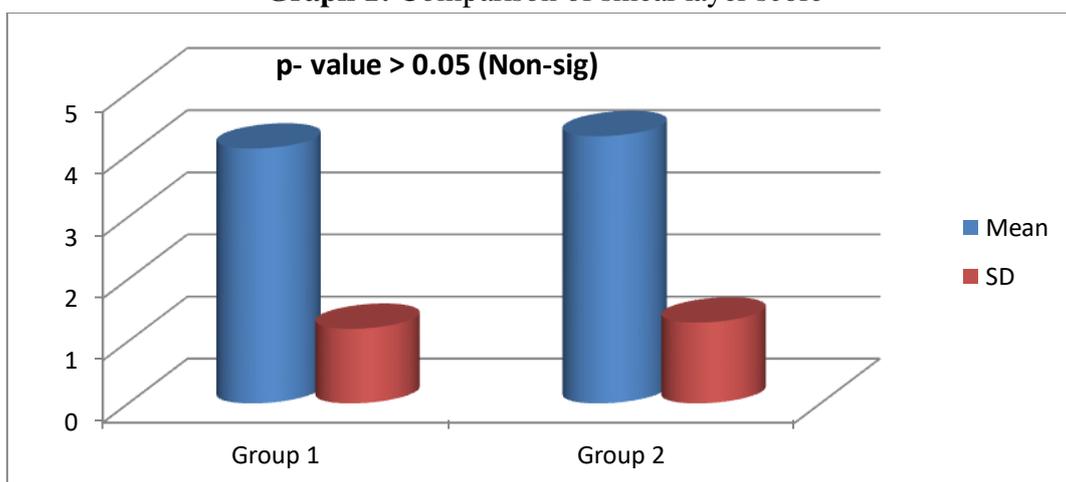
## **DISCUSSION**

Success of root canal treatment depends on good biomechanical preparation. Despite all efforts, it is evident that bacteria can still survive in certain inaccessible areas. Previous authors established that mechanical instrumentation alone is inefficient and supporting actions of disinfectants such as NaOCl are still necessary. Another authors showed that the efficacy of apical irrigation is directly related to the depth of insertion of the needle, which at times presents a challenge to the clinician. Numerous measures have been described to reduce the number of microorganisms in the root canal system, including the use of various instrumentation techniques, irrigation regimens, and intracanal medicaments. The use of chemical agents during instrumentation to completely clean all aspects of the root canal system is central to successful endodontic treatment. Irrigation is complementary to instrumentation in facilitating the removal of pulp tissue and/or microorganisms.<sup>6-9</sup> Hence; the present study was conducted for evaluating and comparing two different root canal irrigating solutions during root canal therapy.

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irrigated using 2.5% NaOCl for 1 min only, and Group 2- Root canals irrigated with 2% CHX gluconate for 1 min followed by 3 ml of 2.5% NaOCl solution. Mean smear layer score among specimens of group A and group B was 4.1 and 4.3 respectively. Kumar P et al compared the efficiency of four commonly used chemicals in their ability to remove smear layer after instrumentation. Seventy-five extracted single canaled teeth of roots ranging 10-12 mm in length were used for the study. Teeth were divided into 4 study groups and 1 control group of 15 teeth each: 3% NaOCl (Group A), 3% NaOCl followed by 17% ethylene diamine-tetra-acetic acid (Group B), 0.2% chlorhexidine (Group C) and 3% NaOCl followed by MTAD (Group D), with distilled water (Group E) which is used as control, revealed that NaOCl showed statistically significant, better cleansing effect than distilled water. Chlorhexidine and NaOCl showed equal kind of efficacy but were statistically significant, with lower efficacy than MTAD. It may be concluded that MTAD appears to be the most effective solution compared to the rest. The study demonstrated that MTAD as a final rinse after the entire instrumentation with 3% NaOCl as irrigant provided the best cleansing in all parts of the root canal system.<sup>11</sup>

**Graph 1:** Comparison of smear layer score



In the present study, non-significant results were obtained while comparing the mean smear layer score. Sahebi S et al compared the antimicrobial effect of Aloe Vera solution with sodium hypochlorite on *E.faecalis* in the root canals of human extracted teeth. Sixty human extracted single rooted teeth were selected for this in vitro study. The teeth recruited in this study had no cracks, internal resorption, external resorption and calcification. *Enterococcus faecalis* was injected in the root canals of all teeth. The teeth were then divided into three groups randomly. Each group consisted of 20 teeth that were all rinsed with one of the following solutions: sodium hypochlorite 2.5%, Aloe vera and normal saline. Subsequent to rinsing, root canals of all teeth were sampled. The samples were cultured and growth of the bacteria was assessed after 48 hours. The difference between the inhibitory effect of Aloe vera and normal saline on *E.faecalis* was not significant according to independent t-test ( $p=0.966$ ). The inhibitory effect of sodium hypochlorite on *E.faecalis* was much greater than that of Aloe vera and normal saline.<sup>12</sup>

## CONCLUSION

From the above results, the authors concluded that both the irrigating solutions are equally effective in removing smear layer.

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