

# Assessment of Sealer Distribution in Root Canal Using Two Different Sealers in Obturated Root Canals

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## ABSTRACT

**Introduction:** The objective of root canal therapy is the extermination of noxious microorganisms from root canal space. Thus, for the accomplishment of successful root canal therapy, cleaning and shaping, and obturation are important parameters.

**Objective:** To assess and compare sealer distribution in root canal using two different sealers in obturated root canals.

**Materials and Method:** This in vitro study was conducted in the Department of Conservative Dentistry and Endodontics of the medical institute from July to August 2020 after obtaining ethical clearance. Twenty freshly extracted single-rooted anterior teeth obtained by convenience sampling method were included. All the specimens were divided into two study groups with 10 specimens in each group. One group consisted of specimen in which AH plus sealer was used while in the other group specimens, Tubliseal EWT sealer was used. Mixing of all the sealers was done following manufacturer's instructions. Obturation was done in all the specimens. After completion of obturation, storing of the specimens was done for seven days. This was followed by horizontal sectioning at 3 mm from the apex. Stereo microscopic examination of the specimens was done and percentage of sealer coated perimeter (PSCP) of canal was done.

**Result:** Mean PSCP of the AH plus sealer group was 96.65 mm while mean PSCP of Tubliseal EWT group was 97.41 mm. While comparing the mean PSCP among the two study groups, non-significant results were obtained.

**Conclusion:** Both AH plus and Tubliseal EWT can be used with equal efficacy in patients undergoing root canal therapy.

**Keywords:** In vitro; root canal therapy; sealer.

## INTRODUCTION

The objective of root canal therapy is the extermination of noxious microorganisms from the root canal space. Thus, cleaning and shaping are the important parameters for the accomplishment of successful root canal therapy. However, the

### Citation

Dixit PB, Dixit S, Roy DK, Ghimire S, Pradhan M, Tyagi KK. Assessment of sealer distribution in root canal using two different sealers in obturated root canals. J Nepal Dent Assoc. 2020 Jul-Dec;20(31):107-10.

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structural complexities of the root canal space and restrictions present in preparation and root canal irrigation procedures decrease the success ratio of root canal therapy.<sup>1-3</sup> Furthermore, complete disinfection in the presence of severe curvatures and narrow canals is difficult to achieve by all known techniques, whether chemical or mechanical.<sup>4</sup>

The complex morphology of the root canal system in teeth makes it difficult to achieve proper cleansing by mechanical instrumentation and irrigation of the canals. So, in order to increase the chance of success of the endodontic treatment, substances with antimicrobial properties are frequently used as root canal filling materials in teeth.<sup>5</sup> A root canal sealer, or cement, is required to adhere to the dentin and to fill the irregularities and minor discrepancies between the core filling material and the canal walls, thus providing a seal.<sup>6</sup>

Hence, the present study was undertaken for assessing and comparing sealer distribution in root canal using two different sealers in obturated root canals.

## MATERIALS AND METHOD

The present study was conducted in the Department of Conservative Dentistry and Endodontics of the Kathmandu Medical College and Teaching Hospital from July to August 2020 after obtaining ethical clearance (Ref. 0207202010). This in vitro experimental study includes assessment and comparison of sealer distribution in root canal using two different sealers in obturated root canals. A total of 20 freshly extracted single-rooted anterior teeth obtained by convenience sampling method were included. Morphologically deformed or carious teeth were excluded from the present study. Decoronation of all the teeth specimens was done at the cemento-enamel junction. Working length was measured radiographically. Biomechanical

preparation was done using a rotary file system “Protaper Universal” (Dentsply) till F1 in all the canals followed by intermittent irrigation process with 2.5% sodium hypochlorite and normal saline solution. After completion of the process, all the specimens were divided into two study groups with 10 specimens in each group. One group consisted of specimen in which AH plus sealer was used while in other group Tubliseal EWT sealer was used. Mixing of the all the sealers was done following manufacturer’s instructions. The sealer was applied in the canal with the help of lentulo spiral in all the specimens. Obturation was done in all the specimens with cold lateral compaction. After completion of obturation, storing of the specimens was done for seven days. This was followed by horizontal sectioning at three millimetres from the apex. Stereo microscopic examination of the specimens was done and percentage of sealer coated perimeter (PSCP) of canal was done. All the results were analysed by IBM Statistical Package for the Social Sciences (SPSS) Statistics for Windows, version 20 (IBM Corp., Armonk, N.Y., USA). Independent t-test was used for assessment of level of significance. P value of less than 0.05 was taken as significant.

## RESULT

In the present study, a total of 20 freshly extracted single-rooted anterior teeth were included. All the specimens were divided into two study groups with 10 specimens in each group. One group consisted of specimen in which AH plus sealer was used while other group consisted of specimens in which Tubliseal EWT sealer was used.

The mean PSCP of the AH plus sealer group was 96.65 mm while mean PSCP of Tubliseal EWT group was 97.41 mm. While comparing the mean PSCP among the two study groups, no significant differences were obtained (Table 1).

**Table 1: Comparison of PSCP among both the study groups.**

Type of sealer	PSCP in millimeters Mean (mm)	t statistics	P value
AH Plus sealer	96.65±6.56	2.36	0.44
Tubliseal EWT sealer	97.41±7.15		
Independent t-test			

## DISCUSSION

Root canal therapy targets to remove the entire infection of the root canal, followed by filling of the root canal space entirely for preventing apical and coronal penetration of noxious and irritating agents. Most root canals are obturated with gutta-percha points after mixing them with endodontic sealer, which helps in establishment of fluid-tight seal. The main purpose of a sealer is to block the spaces between the gutta-percha points and the walls of root canal for forming a coherent mass of obturating material without voids.<sup>7,8</sup>

In the present study, a total of 20 freshly extracted single-rooted anterior teeth were included. All the specimens were divided into two study groups with 10 specimens in each group. One group consisted of specimen in which AH plus sealer was used while other group consisted of specimens in which Tubliseal EWT sealer was used. Setya et al. assessed and compared the distribution of sealer in root canal with various sealers using three different obturation techniques.<sup>9</sup> AH plus, Fuji-1, Tubliseal Extended Working Time (EWT) was placed into the prepared root canals of 90 maxillary central incisors using a lentulo spiral. This was followed by obturation of root canals using three different gutta-percha root filling techniques. Horizontal sectioning was done at three and six millimetres from the apex. Examination of the two specimens was done using a stereo microscope for assessing the sealing capacity for obturation. Assessment of PSCP was done using image analysis software and digital imaging system. In between the three different sealers, significant results were obtained while comparing the PSCP. Tubliseal showed the highest PSCP value in comparison to the other three sealers. They observed significantly higher mean value in lateral condensation technique and vertical condensation technique. However, they reported non-significant difference while comparing in between the three and six millimetres sections. Tubliseal EWT showed highest PSCP value and single-cone technique showed the higher PSCP value then lateral and vertical condensation technique at three and six millimetres sections.<sup>9</sup>

In the present study, mean PSCP of the AH plus sealer group was 96.65 mm while mean PSCP of Tubliseal EWT group was 97.41 mm. While comparing the mean PSCP among the two study groups, non-significant results were obtained. In-vitro impact of four root canal sealers on the fracture resistance of root canal treated teeth was assessed by Phukan et al.<sup>10</sup> They analysed 75 mandibular premolars and divided them broadly into five groups depending upon the type of sealer used, with 15 specimens in each group. In all the study groups, they used the gutta-percha points.: Group I: AH Plus root canal sealer, Group II: MTA Fillapex root canal sealer, Group III: Apexit root canal sealer, Group IV: Conventional zinc oxide-eugenol (ZOE) sealer, Group V: Control (unobtured teeth). Embedding of the tooth specimens was done in acrylic resin blocks followed by assessment of fracture force using a universal testing machine. Group I and Group II showed higher resistance to fracture than other three groups. There was comparable difference in fracture force between Group I and Group II. Moreover, there was no statistically significant difference between Group III and Group IV and between Group IV and Group V. Based on this in vitro study, resin-based sealer was reported to be more effective as compared to other sealers and the control group. However, no significant differences were observed between ZOE and control group.<sup>10</sup>

In another study, the bond strengths of four different endodontic sealers were assessed by Madhuri et al.<sup>11</sup> The authors analysed 40 single-rooted teeth in which tooth apex was completely formed. Decoronation of all the teeth was done followed by determination of the working length. After determination of working length, biomechanical preparation was done and all the 40 specimens were divided into four study groups with 10 specimens in each group as follows: Group 1: Bioceramic sealer (Endosequence), Group 2: Mineral trioxide aggregate (MTA)-based sealer (MTA Fill apex), Group 3: Epoxy resin-based sealer (MM-Seal), and Group 4: Dual cure resin-based sealer (Hybrid Root Seal). As per manufacturer's instructions,

manipulation and application of the sealer in the root was done. This was followed by obturation with 6% gutta-percha. The push-out bond strength of Bioceramic sealer was highest followed by resin-based sealer and lowest bond strength was observed in MTA-based sealer.<sup>11</sup>

The study limitations are: small sample size and comparison between only two sealing agents.

## CONCLUSION

From the above results, both AH plus and Tubliseal EWT can be used with equal efficacy in patients undergoing root canal therapy. However, further studies with larger sample sizes are recommended for better outcome of the treatment.

**Conflict of Interest:** None.



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