ABSTRACT

Aim:
To evaluate three different interfaces between root canal sealers – Apexit Plus, AH Plus, root end filling materials – MTA, Biodentine and dentin using Scanning Electron Microscope (SEM).

Materials and methods:
Eighty extracted human permanent maxillary incisors with mature apices were selected, cleaned, sectioned transversely using diamond disc and standardized to a uniform length of 16 mm. All the root canals were instrumented with K files using step back technique up to size 40 K file. The teeth were randomly divided into forty samples each as Group I (n=40) and Group II (n=40). The canals were obturated with 2% gutta-percha points with size 40 as master cone followed by accessory cones using cold lateral condensation technique with Apexit Plus sealer in Group I and AH Plus sealer in Group II.

Root resection was done perpendicular to long axis of the root at 3mm from apex using diamond disc. Root end cavities were prepared using ultrasonic retrotip with a depth of 3mm. Group I (n=40) with Apexit Plus sealer was subdivided into two subgroups of twenty samples each as Subgroup A: MTA, Subgroup B: Biodentine. Similarly, Group II (n=40) with AH Plus sealer was subdivided into two subgroups of twenty samples each as Subgroup C: MTA and Subgroup D: Biodentine.

Both the root end filling materials were mixed according to manufacturer’s instructions and the retrograde cavities were filled according to the subgroups divided.
All the teeth were wrapped in a wet gauze and placed in an incubator at 37°C for 24 hours for the root end filling materials to set completely. The roots were transversally sectioned with diamond disc to obtain blocks of 6mm length containing the apical third. The blocks were again longitudinally sectioned to expose the interface between the sealer and root end filling material. The samples were viewed under SEM at 600 x magnification and the widest gap values of the interfaces were recorded.

**Results:**

The mean gap values of interface between Apexit Plus and AH Plus with dentin were 33.14µm and 36.35µm respectively which were not statistically significant. The mean gap values of interface between MTA and Biodentine with dentin were 24.20µm and 20.17µm respectively which were not statistically significant. The mean gap values of interface between Apexit Plus with MTA, Apexit Plus with Biodentine, AH Plus with MTA and AH Plus with Biodentine were 16.82µm, 26.29µm, 18.55µm and 23.42µm respectively.

Among the subgroups, Subgroup A (Apexit Plus with MTA) and Subgroup B (Apexit Plus with Biodentine) showed statistically significant difference with Subgroup A presenting smaller gaps, when compared to Subgroup B. Subgroup B (Apexit plus with Biodentine) and Subgroup C (AH Plus with MTA) showed statistically significant difference with Subgroup C presenting smaller gaps. The other subgroups showed no statistical significant difference based on mean gap values.
Conclusion:

Within the limitations of the present study, it can be concluded that

1. AH Plus and Apexit Plus can be used as potent root canal sealers.
2. MTA and Biodentine are considered to have better marginal adaptation with dentin.
3. MTA has better adaptation irrespective of root canal sealers used, either Apexit Plus or AH Plus.

Keywords: Interface, Apexit Plus, AH Plus, MTA, Biodentine, Scanning electron microscopy (SEM).