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An Evaluation of the Solubility of Four Endodontic Sealers in Different Solvents

(An in Vitro Study)

A Thesis

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Abstract

Endodontic re-treatment is a conservative clinical procedure in comparison with more radical procedures. Complete removal of filling material from the root canal is an essential requirement for endodontic retreatment. The purpose of this study was to evaluate and compare the dissolving capabilities of various solvents (Xylene, Eugenate Desobturator, Eucalyptol, EDTA and Distilled water (control)) on different types of sealer (Endofill, Apexit Plus, AH Plus and EndoSequence bioceramic sealer).

Standardized metal rings (8 mm in internal diameter and 2 mm in height) were used for the preparation of the sealer specimens. Eighty samples of each sealer were prepared according to the manufacturers' instructions and then divided into ten groups (of 8 samples) for immersion in solvent. Each sealer specimen was weighed to obtain its initial weight. The specimens were immersed in the tested solvents for 2 and 5 min, followed by rinsing in double distilled water and blotted dry with an absorbent paper, then they were allowed to dry in an oven for 24 hours at $37\pm 1^{\circ}\text{C}$. Thereafter, they were reweighed to determine its final weight. The mean of weight loss determined the solvent capacity to dissolve these sealers.

The data were analyzed and compare by Paired sample t- test and Independent sample t-test. For Endofill sealer, Xylene is more effective after 2 min immersion time, followed by Eugenate Desobturator , EDTA , Eucalyptol in descending order ($P<0.01$); while after 5 min immersion time, Eugenate Desobturator showed the best dissolving capability followed by Xylene, no significant difference between these two solvents ($P>0.05$). Higher values of solubility were obtained at 5 min than that at 2 min immersion time ($P<0.01$); D.W showed the least dissolving capability at both 2 and 5 min immersion times.

For Apexit Plus, Xylene is the most effective solvent after 2 min immersion time, followed by Eucalyptol, Eugenate Desobturator, EDTA in descending order ($P<0.01$); after 5 min immersion time, Xylene is the most effective solvent followed

by Eugenate Desobturator, Eucalyptol, EDTA ($P<0.01$); D.W again showed the least dissolving capability at 2 and 5 min immersion times.

For AH Plus, Xylene exhibited the best dissolving capability followed by Eucalyptol, Eugenate Desobturator, EDTA in descending order ($P<0.01$) at both 2 and 5 min immersion times. AH Plus is insoluble in D.W.

EndoSequence BC showed an increase in the weight in all tested solvents with variations between the subgroups.

It is concluded that Xylene had the greatest capacity for dissolving Endofill, Apexit Plus and AH Plus ($P<0.01$). Eugenate Desobturator, Eucalyptol and EDTA showed a highly significant dissolving capability ($P<0.01$) on these sealers with variations between these subgroups; EndoSequence BC sealer is insoluble in these tested solvents. Regarding the immersion time, higher values of solubility were obtained at 5 min than that at 2 min immersion time.