



In-vitro solubility of different experimental calcium-aluminate cements and MTA

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AIM:

The aim of this study was to compare differences in the solubility of the following materials: MTA, calcium-aluminate with the addition of zirconium-dioxide (CAZrO₂), calcium-aluminate with the addition of strontium-carbonate (CaSrCO₃) and calcium-aluminate with the addition of strontium-fluoride (CASrF₂).

MATERIAL AND METHODS:

Ten samples of each material in the form of a cylinder were immersed in phosphate buffered solution (PBS). Their weight was measured before immersion, and after thirty days of standing in the PBS solution, the samples were removed and was repeated to establish the difference in weight of each sample.

RESULTS:

The lowest solubility was shown with CASrF₂ (* *One-Way ANOVA*)

which even showed increase in the initial mass by as much as (+14.05%) with high statistical significance ($p < 0.001$, *Paired Samples T-Test*). A lower value of increase in mass, was shown by CaSrCO₃ (+2.24%). The highest values of solubility showed CAZrO₂ with loss of initial mass of -3.26% followed by MTA (-1.22%).



Fig. 1. Specially designed Teflon mold for making samples

Table 1. The values of the change in mass are expressed as a percentage

Materials used	%	P-value
MTA	-1,22	0,322
CAZrO ₂	-3,26	0,001
CaSrCO ₃	+2,24	0,083
CASrF ₂	+14,05	<0,001

(*Paired Samples T-Test*)

DISCUSSION AND CONCLUSION:

CASrF₂ imposes as a good material for retrograde obturation of the root canal. Solubility of the material used for retrograde obturation in body fluids can be a major clinical problem given that they are a potential route for the passage of bacteria and their toxins, as well as the consequent reinfection of periapical tissue and treatment failure.

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