## *Expanded Structured Abstract*

# Effect of Mixing Technique on Shrinkage Rate of One Polyether and Two Polyvinyl Siloxane Impression Materials

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**Purpose:** Different mixing techniques may affect the quality of set impression materials. Therefore, dimensional accuracy is the most important factor when constructing a passive and accurate prosthesis.[1] In this study, observation of the shrinkage rate of one polyether and two polyvinyl siloxane impression materials, which are both commercially available for cartridge- and hand-mix techniques, was used for comparative analysis. The hypothesis was that the cartridge-mix technique would produce a more precise impression. The authors also sought to confirm the hypothesis that the studied materials would remain stable after setting.[2,3]

**Materials and Methods:** The low-viscosity polyether material was Permadyne Garant 2:1, type 3 (ESPE). The polyvinyl siloxane materials were: *(1)* medium-viscosity Provil Novo Medium, cartridge- and hand-mix type 2 (Heraeus Kulzer); and *(2)* low-viscosity President, hand- and cartridge-mix type 3 (Coltène).

Measurements were made according to American Dental Association specification No. 19.[4] Ten specimens were made of each impression material; the same examiner measured each specimen 10 times. Shrinkage rates of the same materials mixed using different techniques were compared 30 minutes, 24 hours, and 72 hours after mixing. Dimensional changes at the different measuring times were also compared.

The results were statistically analyzed and compared with the SPSS for Windows program package, version 11.0 (SPSS); a two-sample *t* test was applied to compare the mixing techniques at every measuring time; and a Friedman test was used to analyze the changes in shrinkage rate during the evaluation period ($P > .05$).

**Results:** Figure 1 shows the shrinkage rate data for all materials. Statistical analysis showed no significant difference at any measuring point when the mixing techniques of the polyvinyl siloxane materials were compared. However, analysis showed significant differences for both hand- and cartridge-mixed materials when measurements at 30 minutes, 24 hours, and 72 hours were compared; the shrinkage rate increased significantly as time passed. Statistical analysis of the results of the polyether material showed no significant difference at 30 minutes, but at 24 and 72 hours, the cartridge-mixed material produced a statistically higher shrinkage rate. Analysis also showed significant differences for both hand- and cartridge-mixed materials when measurements at 30 minutes, 24 hours, and 72 hours were compared; shrinkage rate also increased significantly as time passed.

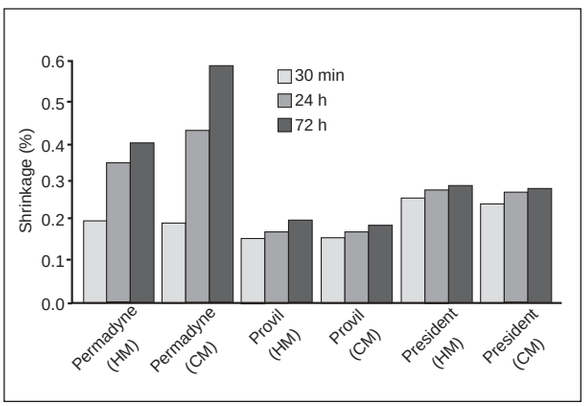


**Fig 1** Shrinkage rate after 30 minutes, 24 hours, and 72 hours; *CM* = cartridge mix; *HM* = hand mix.

**Conclusion:** We could not detect significant differences in dimensional changes when hand- and cartridge-mix techniques were compared at the same measuring time for the tested polyvinyl siloxane materials. The cartridge-mix technique for the polyether material showed significantly higher shrinkage at 24 and 72 hours, while the mean shrinkage rate of all six materials showed a significant time-dependent increase.

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### References

1. Herbst D, Nel JC, Driessen CH, Becker PJ. Evaluation of impression accuracy for osseointegrated implant supported superstructures. J Prosthet Dent 2000;83:555–561.
2. Phillips RW. Elastometric impression materials. In: Phillips' Science of Dental Materials. Philadelphia: Saunders, 1991:135–156.
3. Shen C. Impression materials. In: Anusavice KJ (ed). Phillips' Science of Dental Materials. Philadelphia: Saunders, 2003:205–254.
4. American Dental Association. Revised American Dental Association Specification No. 19 for Non-Aqueous, Elastometric Dental Impression Materials. J Am Dent Assoc 1997;94:733–741.