

## Pala® Denture acrylics and equipment – PalaXpress® and Palajet®

Polymerization shrinkage – MLU Halle-Wittenberg

Factors in polymerization influencing the accuracy of PMMA denture bases.

Even though denture base materials are under continuous improvement, polymerization shrinkage still remains an issue. Polymerization shrinkage of denture base resins results in dorsal and lateral gaps, thus reducing the functional fit of the denture base. Dimensional accuracy of different PMMA denture resin materials depending on polymerization and manufacturing technique was evaluated in an in-vitro study. Best results were found for PalaXpress, processed with the Palajet injection system.

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## Factors in polymerization influencing the accuracy of PMMA denture bases.

### Objective

Aim of this study was to evaluate the influence of polymerization type and manufacturing technique on the dimensional accuracy of PMMA denture base materials.

### Materials and Methods

With each of seven different PMMA denture acrylics (Tab. 1) ten standardized denture bases were fabricated on identical casts. According to manufacturers and product instructions four different manufacturing technologies were tested (Tab. 1). The dorsal gap between master model and denture base served as an indicator for fit and dimensional behavior of the polymerized denture base. Five marking points (palatal centre, bilateral vertical/horizontal border), engraved in the master-model, were chosen for the measurement of the dorsal gap. To observe the dimensional behavior over time, the measurements were carried out immediately after embedding, after one hour, after one day and after one week.

Product	Type of Polymerization	Process	Manufacturer
PalaXpress®	Auto-polymerizing	Pneumatic injection	Kulzer, Hanau, Germany
ProBase® Cold	Auto-polymerizing	Conventional-flask-technique	Ivoclar Vivadent, Ellwangen, Germany
FuturaGen®	Auto-polymerizing	Manual injection	Schütz Dental, Rosbach, Germany
Polyan®	Melting	Injection-moulding	Polyapress, Altkirchen, Germany
FuturAcryl® 2000	Heat-polymerizing	Manual injection	Schütz Dental, Rosbach, Germany
SR Ivocap®	Heat-polymerizing	Pneumatic injection	Ivoclar Vivadent, Ellwangen, Germany
Paladon® 65	Heat-polymerizing	Conventional-flask-technique	Kulzer, Hanau, Germany

Tab. 1: Overview of the tested PPMA denture base resins

### Results

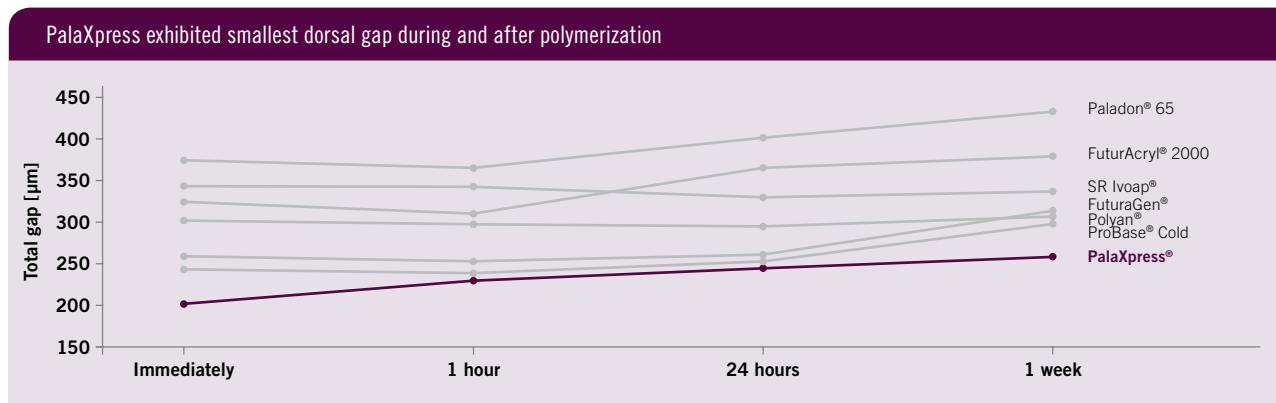


Fig. 1: Total dorsal gaps in µm immediately after embedding and over time

After embedding the tested heat curing denture acrylics showed the highest average dorsal gaps ranging from  $317 \pm 57 \mu\text{m}$  to  $369 \pm 88 \mu\text{m}$ . The cold curing materials exhibited the smallest values ( $196 \pm 46 \mu\text{m}$  to  $256 \pm 83 \mu\text{m}$ ). Best results in this study were found for PalaXpress, processed with the pneumatic injection unit Palajet (Fig. 1).

### Conclusion

The clinical fit of a denture essentially depends on the dimensional behavior of the denture base resin during and after polymerization. Especially the type of polymerization heavily influenced the dimensional accuracy of the denture base resins tested in this study. Cold curing denture acrylics, like PalaXpress, exhibited the smallest dorsal gaps.

### Source

Peters A, Arnold C, Setz JM, Boeckler AF: Factors in polymerization influencing the accuracy of PMMA denture bases. Int Poster J Dent Oral Med 2010, Vol 12 No 1, Poster 476; <http://ipj.quintessenz.de/index.php?doc=html&abstractID=21162>. The study was abbreviated and summarised and all diagrams and titles have been established by Kulzer.

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