

# Utilizing High-Performance-Polymers for the Fabrication of Dental Implant Abutments

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## Introduction

Implant restorations in the aesthetic zone are associated with high expectations from the patient, the dentist and the dental technician. So far the materials of choice have been zirconia-abutments and pressed or layered ceramics either directly on zirconia or as a full-ceramic crown cemented on the abutment. These techniques are very elaborate for the technician and require high-cost equipment.

## Aim

To restore a missing maxillary central incisor with an implant restoration using an advanced polymer material for the fabrication of an abutment-crown of high aesthetic standards.

## Material and Methods

The right maxillary central incisor (#11) of a 27 year-old female patient was lost due to an accident. Subsequent to bone augmentation an implant was placed. After a healing time of 7 months and a provisionalization period of 2 months, an impression was taken for fabrication of the final restoration.

An individual abutment was waxed-up on a titanium base (Fig. 1-2). The abutment was pressed with the white high-performance-polymer BioHPP (Bredent, Senden, D) directly on the titanium base using the For-2-Press vacuum pressing system (Bredent, Senden, D) (Fig. 3-6). In this way the abutment-crown did not need to be cemented onto the titanium base thus eliminating any micro gap or poor fitting. The veneering material was a prefabricated Novo.lign composite veneer (Bredent, Senden, D) luted onto the abutment with Combo.lign luting composite (Bredent, Senden, D) and customised with Crea.lign composite material (Bredent, Senden, D) (Fig. 7-13).

## Results

The restoration demonstrated high aesthetic appearance and a natural emergence profile.

## Conclusions

The high-performance-polymer BioHPP could be a valid alternative to ceramic materials for the fabrication of dental-implant restorations, thus allowing dental technicians to manufacture aesthetic restorations with greater ease and reduced costs compared to all-ceramic alternatives.

The technique of directly pressing BioHPP on the titanium base for fabrication of an abutment-crown leads to a better finish of the restoration along the margin, which is usually 1mm above implant collar. This is beneficial for the soft tissue around the implant.

Further research should investigate mechanical and biological properties of the new material and its long-term survival in clinical use.



Fig. 7: Finishing of individual abutment.



Fig. 8: Trimming of prefabricated composite veneer.



Fig. 9: Luting of prefabricated composite veneer on abutment.



Fig. 10: Customization of Abutment-Crown with composite.



Fig. 11: Completed restoration.



Fig. 12: Completed restoration.



Fig. 13: Abutment-Crown in situ.



Fig. 1: Prefabricated Titanium-Base adjusted on working model.

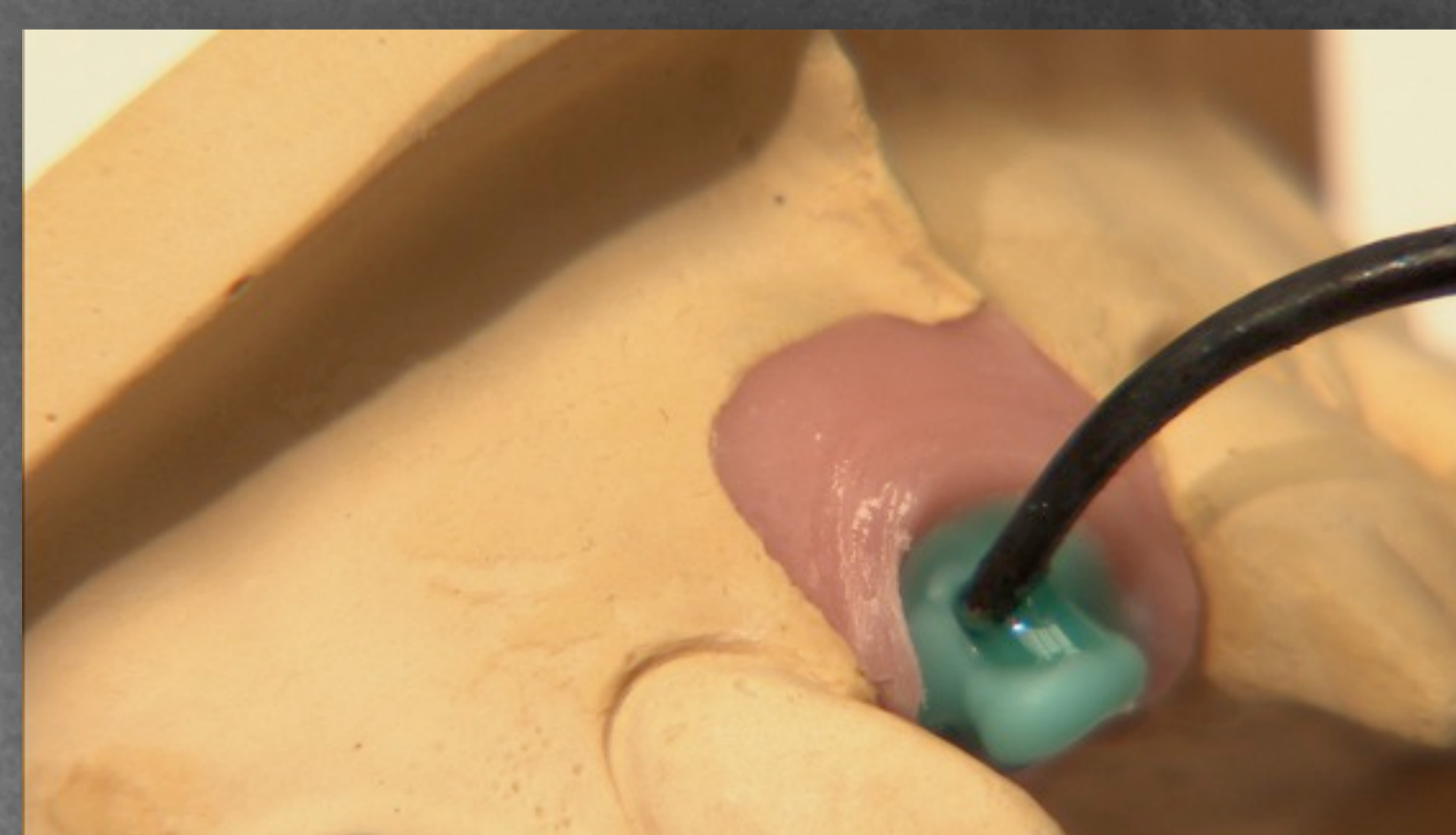


Fig. 2: Individual abutment wax-up.



Fig. 3: Spruing the titanium-base/wax-up abutment.

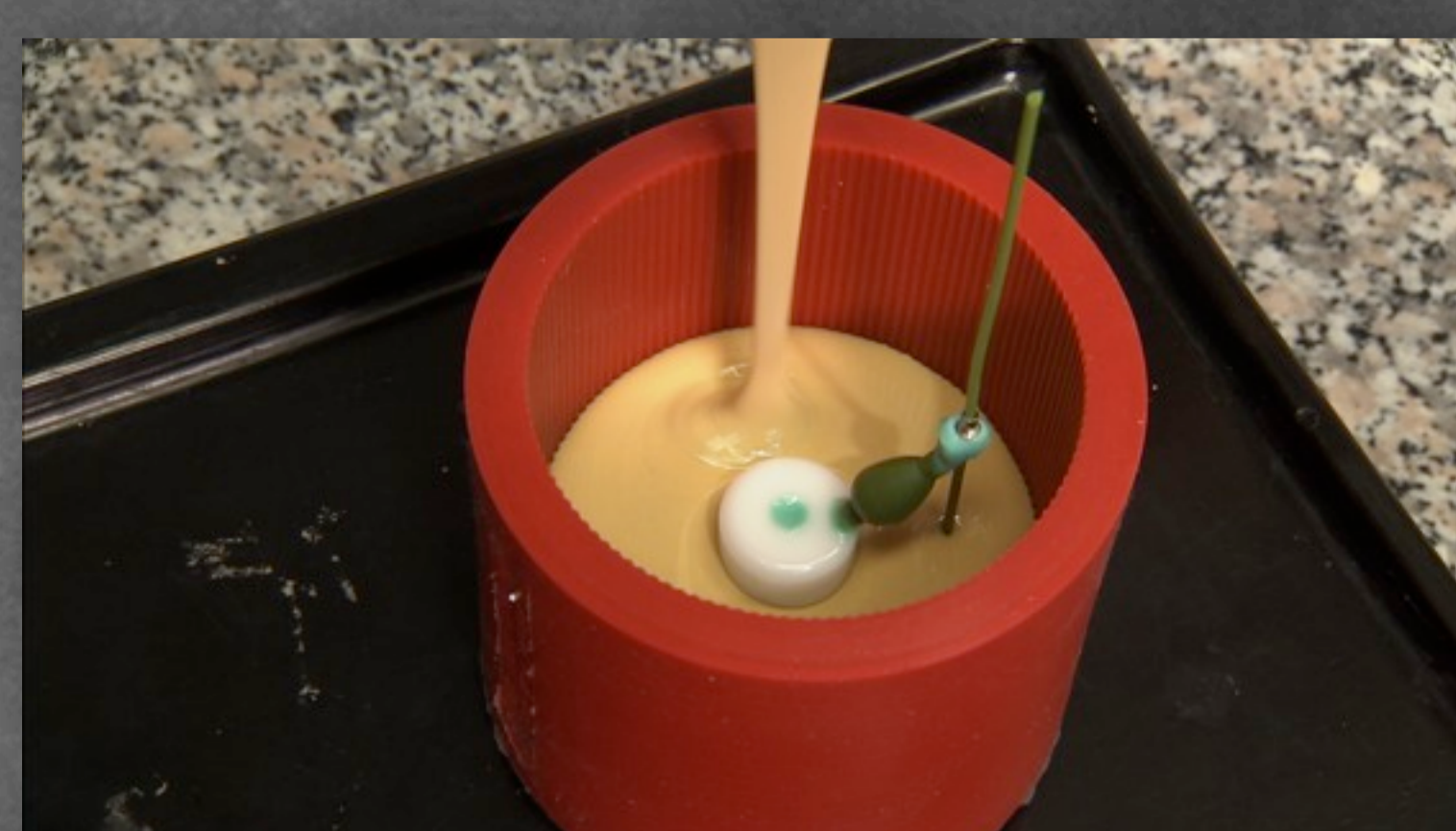


Fig. 4: Investment of the abutment.



Fig. 5: For-2-Press Vacuum Pressing System.

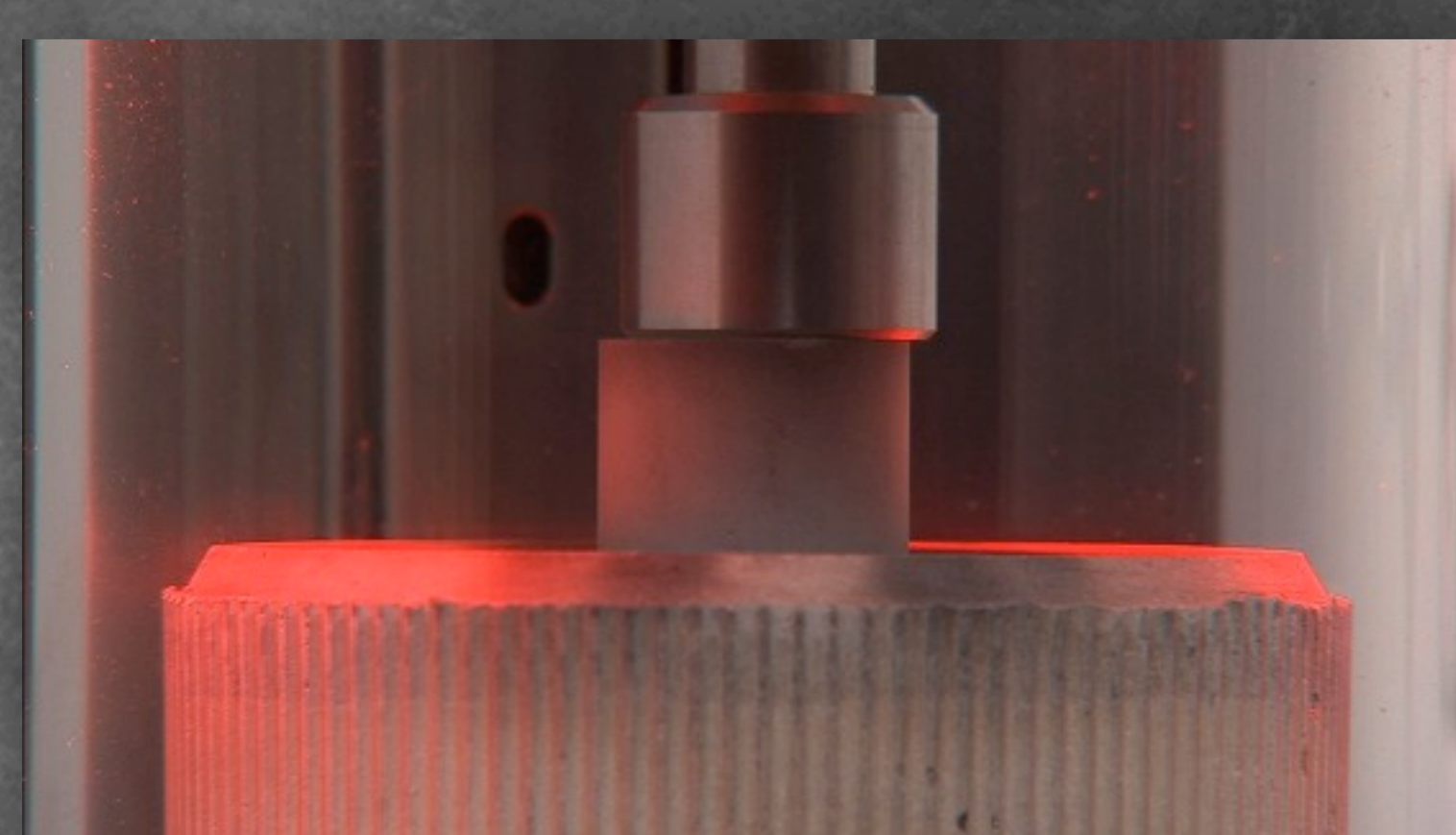


Fig. 6: BioHPP ingot pressed into the investment.

## References

- Kern M, Lehmann F. Influence of surface conditioning on bonding to polyetheretherketon (PEEK). *Dent Mater* 2012;28(12):1280-1283.
- Schmidlin PR, Stawarczyk B, Wieland M et al. Effect of different surface pre- treatments and luting materials on shear bond strength to PEEK. *Dent Mater* 2010; 26: 553-559.
- Neugebauer J, Adler S, Kistler F et al. Der Einsatz von Kunststoffen bei der festsitzenden prothetischen Implantatversorgung. *ZWR Das Deutsche Zahnärzteblatt* 2013; 122: 242-245.
- Sailer I, Mühlemann S, Zwahlen M, Hämmerle CHF, Schneider D. Cemented and screw-retained implant reconstructions: a systematic review of the survival and complication rates. *Clin Oral Implants Res.* 23(Suppl. 6), 2012, 163-201.
- Wilson, TG. The positive relationship between excess cement and periimplant disease: a prospective clinical endoscopic study. *J Periodontol* 2009;80:1388-1392.
- Linkevicius T, Vindasiute E, Puisys A, Peculiene V. The influence of margin location on the amount of undetected cement excess after delivery of cement-retained implant restorations. *Clin Oral Implants Res.* 2011;22(12):1379-84.

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