Stability of zirconia mesio-abutments bonded to titanium bases restored with monolithic crowns

Pitta, J.¹; Hicklin, SP²; Worni, A³; Fehmer, V³; Boldt, F; Gierthmühlen, P³; Mojon, P³; Sailer, I.¹

¹Division of Fixed Prosthodontics and Biomaterials. University of Geneva.
²Department of Prosthodontics. University of Düsseldorf.

Background and Aim

The development of the titanium bonding-bases allows a combination of a metallic connection to the implant with different all-ceramic suprastructures, including monolithic reconstructions. Until today, it remains still not clear how stable these reconstructions are.

The aim of this study was to assess the:

- bending moments of zirconia mesio-abutments on titanium bonding-bases restored with different all-ceramic monolithic crowns after aging.
- failure mode

Methods and Materials

Four different CAD-CAM abutment-crown combinations (n=12 per group) were tested (Fig. 1). The respective abutments were screw-retained onto 48 implants with an internal connection (Conelog, Camlog) and the crowns were cemented onto these abutments.

After aging (dynamic load):

All samples survived the aging and no failures were registered.

Zirconia crowns (T3) exhibited significantly higher mean bending moments than the other groups (p<.05).

No statistically significant differences were found between:

- zirconia mesio-abutments on titanium bonding-base abutments
- customized titanium abutments

In all groups, failures occurred due to fracture of the abutment and screw head in the internal connection of the implants after bending of the abutments and implants.

Conclusions

The use of zirconia mesio-abutments bonded to titanium bonding-bases showed to be a stable combination when compared to the customized titanium abutments. Regarding the crown material, monolithic zirconia revealed to be mechanically superior than the other crown materials.

References


Acknowledgements:
The authors thank to the manufacturers (Camlog, Vicadent, 3M ESPE, VITA Zahnfabrik) for supporting the study with the materials. This presentation was supported in part by Sociedade Portuguesa de Estomatologia e Medicina Dentária with a grant “Bolsa SPEND de Apoio À Divulgação Científica.”

Presented at EACI Congress, Madrid, from October 5th to October 7th, 2017.