I INTERNATIONAL CONFERENCE ON BIODENTAL ENGINEERING

26 and 27 of June 2009
Porto, Portugal

Book of Abstracts
Book of Abstracts of the
I International Conference on
BIODENTAL Engineering
26-27 June, 2009
Porto, Portugal
Metal ceramic fixed partial denture - fracture resistance

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Abstract
Metal ceramic fixed Partial dentures (FPD) are suitable to increase fracture resistance presenting higher clinical longevity. This type of prosthesis is mainly used when a great number of teeth replacements are need. The FPD under analysis is represented in figure 1, defined by a metallic infrastructure (titanium) and by a ceramic coating.

Figure 1- Model for metal ceramic fixed partial denture.

The advantages of hybrid FPD lie in their predictable biomechanical behaviour, versatility and cost. The main disadvantage is related to aesthetic functionality. Different authors [1-3] quantified the life time for hybrid FPD, referring 10 years in service to be a survival of break point. The connector design is of great importance to improve stress pattern into that zone. This region is also restrained by biological and aesthetic reasons. Ceramics present elevated failure rate in FPD due to brittleness. This work presents results for fracture prediction, depending on load level. Figure 2 presents cracks (damage by tension) and stress result in x direction, for limiting load level, based on two point force load, located on top of the supported tooth.

Figure 2- Results for the ultimate limit state (damage of ceramic material).

REFERENCES