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The PROE Software Implied In Numerical Analysis of the Fixed Partial Denture Behaviour

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Abstract

The numerical simulation is a new method that allows evaluating the prognostic of some therapeutically solutions, in our case of the behavior of the prosthetic restorations such as fixed partial prostheses.

Materials and methods

The tool that is used is called MODELA and it can scan through contact, in successive steps, the shape of a solid object. The sum of the points identified as being solids is mathematically preceded and transformed in a virtual three-dimensional representation that is made according to the scanned solid surface. The scanning failure depends on the shape that is scanned and it can be of maximum 0.5 mm, equal to the rise of the needle scan.

Results

The maximum deformations were registered mainly at the fixed partial prostheses that are made of gold, the following were the ones made of ceramics, composite resin, titan, as for the minimum deformations were registered for Co-Cr alloys. A general characteristic was the existence of some maximum tensions at low temperatures (-100C) that reduced afterwards as the temperature increased. It is very important to point out this topic, as it explains the high fragility level of the fixed partial prostheses at low temperatures. This fragility is compensated by metal through its structure, but the ceramics, a material that has a low elasticity, can be broken when making similar trials.

Conclusions

The fixed partial prostheses made out of gold present a reduction of the maximum tensions recorded (at 500C) of 72.01% from the initial recorded value at -1000C, when using the same loading force. The fixed partial prostheses completely made out of ceramics presents a reduction of the initial values of 74.04%. The fixed partial prostheses that is made of composite resin gets to 81.14% of the initial values, while the Co-Cr fixed partial prostheses gets to 51.28%. The one made out of titan records a reduction of the tensions to 64.36% of the initial values. The lowest reductions were recorded in the cases of fixed partial prostheses made out of composite resin (18.86%), followed by ceramics (25.96%), gold (27.99%), titan (45.64%)and Co-Cr (48.72%)