



## Torque loss and misfit of Fixed Partial Denture with cantilever implant-screwed obtained by the conventional method and the CAD / CAM method

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**Background, Motivation and Objective.** The misfit of fixed partial dentures (PPF) on implants can influence the stability of the screwed prosthesis, preventing the loss of torque of the fixation screws. In addition, the method chosen to obtain the infrastructure can influence the misfit and the loss of torque. Thus the aim of this study was to evaluate the torque loss of abutments and screws before and after mechanical cycling and vertical and horizontal misfit of FPDs whose CoCr infrastructures were obtained by the conventional casting method and the CAD/CAM method.

**Methods.** Abutments were screwed (32N.cm) on implants at the position of the second premolar and the molar in polyurethane models. Twenty infrastructures of CoCr were obtained by the conventional method of casting, being sectioned and welded to the laser (G1), the TIG (G2) and ten by the CAD/CAM method (G3), after which they were subjected to ceramic pressing (n=10). The prosthetic parts were screwed (10 N.cm) and the vertical and horizontal misfit at T0 (before cycling) and T1 (after cycling) were evaluated by the Sheffield method: (1) Both molar and pre-molar screwed; (2) Only the molar screwed; (3) Only the pre-molar screwed. For each specimen, a mean value for each face was established for comparative purposes intra and intergroup. The loosening torque of the screws at T0 and at T1 was evaluated. At the end the torque loss of the mini-piers was evaluated.

**Results.** Regarding vertical misfit, with molar torque, G3 presented higher misfit; with pre-molar torque, G1 presented smaller misfit; with molar and premolar torque there were no significant differences. Regarding the horizontal misfit, in all situations, the misfit was smaller for the welded infrastructures (G1 and G2). On the torque loss in the screws, G3 presented the highest loss (T0=27.56[G1]; 23.74[G2]; 38.46[G3]; T1=52.48[G1]; 63.56[G2], 72.28[G3]). Regarding the torque loss of the abutments, there was no significant difference between the groups.

**Discussion and Conclusions.** One of the most common mechanical complications reported for implant-supported prostheses is screw loosening. The lowest values of torque loss were observed for the G1, this situation correlates with the misfit that was lower for this group. The laser weld, as well as TIG, produces concentrated energy in a very short operating time, thus generating less distortion, which may justify the smaller mismatch of this group and less loss of torque, however it presents varying resistance values. Within the limitations of this study, the sectioning and subsequent welding of prosthetic infrastructures result in better adaptation of the prosthesis and consequent lower torque loss.

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**Keywords.** Dental implants; Fixed partial prosthesis; Vertical misfit; Loss of torque