

Fracture force of tooth-tooth- and implant-tooth-supported all-ceramic fixed partial dentures using titanium vs. customised zirconia implant abutments.

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OBJECTIVES: Tooth-coloured customised implant abutments and full ceramic supraconstructions thereon can be made of zirconia by computer-aided manufacturing (CAM). The aim of this study was to examine the potential limits of zirconia three-unit fixed partial dentures made on customised zirconia implant abutments in implant-tooth supported cases. **MATERIAL AND METHODS:** Rigidly mounted implants (XiVE-S diameter 3.8 mm; length 11 mm; Friadent, Germany) were placed in PMMA-moulds pairwise with human molars at a distance of 10 mm in groups #1 and #2. Control group #3 consisted of two molars without implant involvement. Beforehand all molar roots were covered with polyether (Impregum: 3 M Espe, Germany) to simulate periodontal mobility. The abutments in #1 were individually fabricated from CerconBase and luted on experimental titanium bases (both: DeguDent, Germany). In #2, industrially prefabricated titanium abutments (Friadent) were used. All molar teeth were provided with a circumferential chamfer preparation. Three-unit fixed partial dentures were fabricated from CerconBase/CerconKiss in a CAM-process (Material/devices: DeguDent) for all test groups (n=8/group). All fixed partial dentures were cemented with RelyXUnicem (3 M Espe), thermomechanically loaded (TCML=1.2 x 10⁶ x 50 N; 6000 x 5 degrees /55 degrees) and fracture tested in a Universal Test Machine (UTM 1446: Zwick, Germany). **RESULTS:** None of the dentures failed during TCML, and the Cercon abutments showed no damage either to the bonding surface to titanium or to the ceramic itself. Two fixation screws in group #1 broke towards the end of TCML. Fracture test result (Median and 25-/75-Percentiles) were: #1 1190 (1046/2008), #2 991 (832/1402), #3 1331 (1224/1428). **CONCLUSIONS:** All restoration alternatives showed sufficient fracture resistance for posterior regions.

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