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Bacterial Adhesion on the Crown-Abutment Cement Margin

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Objectives The purpose of this study was to investigate the formation of *A. actinomycetemcomitans* and *S. mutans* biofilms on the cement margin of screw-retained monolithic zirconia crowns luted to titanium base abutments.
Methods Screw-retained monolithic zirconia anterior crowns (IPS e.max ZirCAD Prime, Ivoclar Vivadent) were cemented with dual-curing composite-based cement (RelyX Ultimate, 3M Espe) on titanium base abutments (Ti-base, GH 2.0mm, AH 5.5mm, Camlog) and then attached to oral implant replicas (Conelog 4.3, Camlog) according to manufacturer's instructions. Specimens were individually packed and sealed in pouches for 72-hours, and sterilized in an autoclave (1.1 bar, 121°C, 20.5min). Subsequently, specimens (n=3/group) were exposed to two different bacteria, *S. mutans* (NCTC 10449) and *A.actinomycetemcomitans* (ATTC 29523), for 18-hours and 24-hours incubation time respectively. After washing and fixation procedures, specimens were investigated with scanning electron microscopy (SEM); cement margin gap and bacterial biofilm formation were evaluated.
Results SEM evaluation displayed the presence of bacterial biofilm on all surfaces and materials (zirconia, titanium and composite-based cement margin). A distinct cement margin gap, »120 µm in size, was observed at the abutment-crown interface. Lower total bacterial units were observed for A. *actinomycetemcomitans* in comparison to *S.mutans*.
Conclusions Bacterial biofilm was confirmed to develop on the cementation interface, which is located in the critical transmucosal part and can adversely affect the biological stability of peri-implant tissues. The cementation protocol needs to be improved in order to reduce the cement margin gap.