Bacterial Adhesion on the Crown-Abutment Cement Margin

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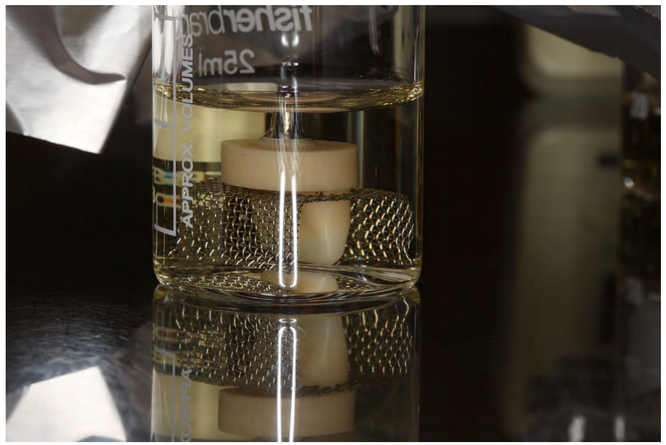
» Background & Aim

S. mutans **is one of the first colonizers on dental implant surfaces and is an important pre-requisite for the attachment of other micro-organisms (e.g.** ***A. Actinomycetemcomitans*****) that are causative factors of peri-implantitis. In addition, variation exists in the fit of the implant crowns, which would also affect the biofilm formation. This study aimed to investigate the formation of** ***S. mutans and A. actinomycetemcomitans*** **biofilms on the cement margin of screw-retained monolithic zirconia crowns fixed on titanium base abutments.**

» Materials & Methods

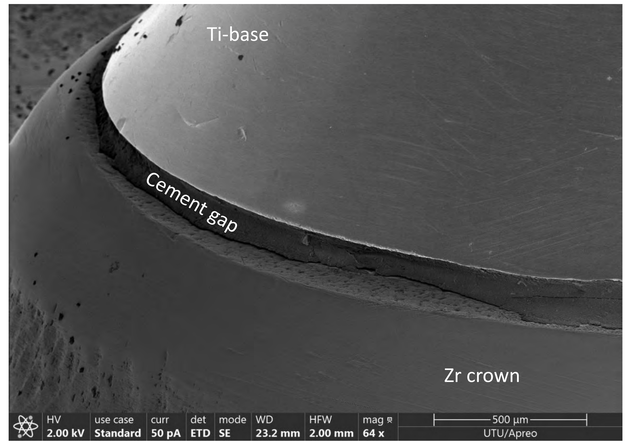
Screw-retained monolithic zirconia anterior crowns (IPS e.max ZirCAD Prime, Ivoclar Vivadent) were cemented with dual-curing composite-based cement (RelyX Ultimate, 3M Espe) on titanium base abutments (Ti-base, GH 2.0mm, AH 5.5mm, Camlog) and then attached to implant replicas (Conelog 4.3, Camlog). Specimens were individually packed and sealed in pouches for 72-hours, and sterilized in an autoclave (1.1 bar, 121°C, 20.5 min). Subsequently, specimens (n=3/group) were exposed to two different bacteria, ***S. mutans*** **and** ***A. actinomycetemcomitans,*** **for 18-hours and 24-hours incubation time respectively. After washing and fixation procedures, specimens were investigated with scanning electron microscopy (SEM) and both, cement margin gap and bacterial biofilm formation were evaluated.**



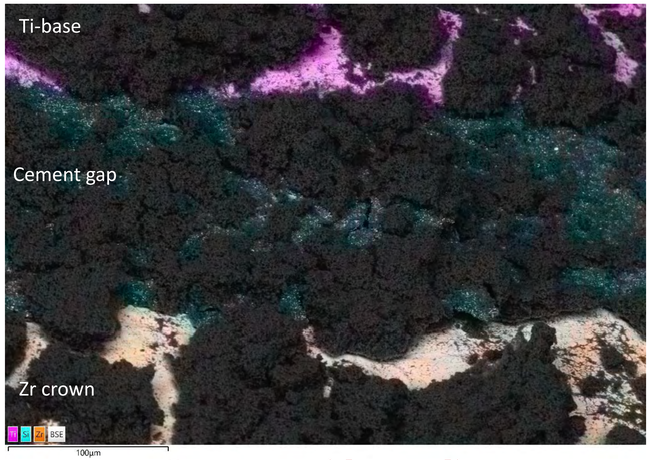
Screw-retained monolithic zirconia crown in S-JB growing medium.

» Results

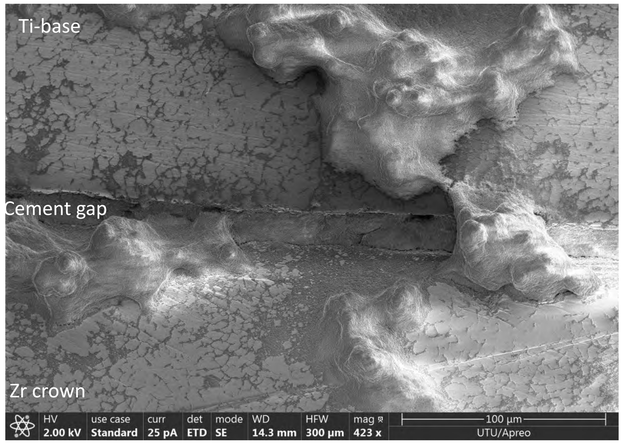
A distinct cement margin gap, 50-250 µm in size, was observed at the abutment-crown interface.



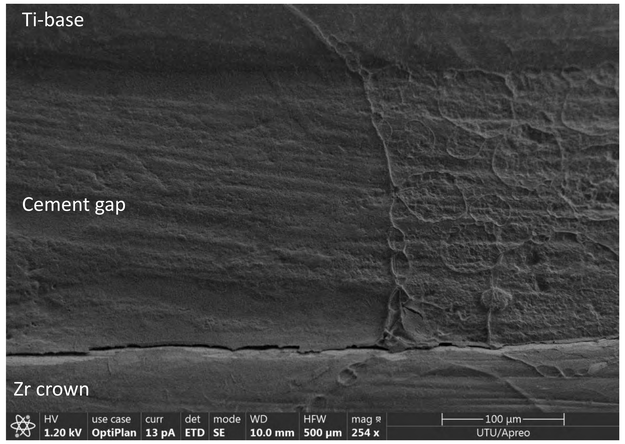
SEM evaluation displayed the presence of bacterial biofilm on all surfaces and materials (zirconia, titanium and composite-based cement margin). Lower total bacterial units were observed for A. *actinomycetemcomitans* in comparison to *S. mutans*. Specimens without saliva had more bacteria than specimens with saliva.



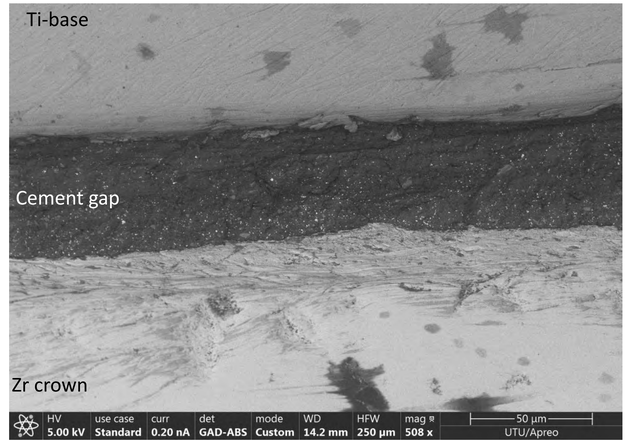
***S. mutans* without saliva.**



***S. mutans* with saliva.**



***A. actinomycetemcomitans* without saliva.**



***A. actinomycetemcomitans* with saliva.**

» Conclusion

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.

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