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Temat : *„Ocena obecności cementu na koronach i łącznikach indywidualnych wykonywanych w technologii CAD/CAM”*

Summary

Introduction: Cementing crowns on standard abutments is burdened with a significant risk of leaving material remnants on the subgingival surface of the abutment. This is because the detection and removal of residual cement is usually impossible due to the limited ability of instrumentation within the pocket around the implant. Additional diagnostic methods, such as X-ray, are also not very effective. The result of leaving the cement in the pocket around the implant is the development of inflammation of soft tissues - *mucositis*, which are particularly likely to develop into *peri-implantitis*, the treatment of which is currently a serious problem in implantology. *Peri-implantitis* is now considered the primary cause of the implants loss in the short and long term observations. The introduction of customized Atlantis ™ abutments made in the CAD/CAM technology reduces the possibility of leaving residues of cement in the pocket, because of individualized position of the shoulder on the abutment just below the free gingiva level. Slightly subgingival position of the shoulder makes the removal of cement excess much easier. However, there is lack of currently available literature data proving that the use of custom made abutments, fully protects against leaving residues of cement and, consequently of inflammation development in the implant surrounding tissues.

The aim of the study was to assess the presence of cement residues on crowns and customized abutments made in CAD/CAM technology.

Material and Methods: The study included 34 patients in who 60 monolithic Prettau (Zirkonzahn, Italy) crowns were mounted on one of two types of customize Atlantis ™ abutments: titanium or titanium nitride coated titanium (Hue Gold ™). Abutments were made in Atlantis ™ milling center in Mölndal, Sweden. After scanning models in Atlantis ™ 3D Editor, abutments were designed on the basis of: the location of the margin of the soft tissues, the position in relation to the adjacent and opposing teeth and, initially, virtually planned prosthetic reconstruction, with the chamfer position localized 1mm subgingivaly. Abutments were screwed into the implants with the force 25Ncm, then crowns were cemented with glass-ionomer cement (GC Fuji I, GC, Belgium). For the study, prosthetic crowns have been specially

modified. On the occlusal surface of the crowns openings were left providing access to the abutments screws, thus making it possible to unscrew the crown-abutment complex. During cementation excess of the cement was removed in a standard way with a dental explorer and dental floss. After the cement was set, abutments with crowns were unscrewed and controlled for the presence of cement residues on the crowns and abutments. After cleaning, abutment-crown units were definitively screwed to the implants with a force 25Ncm. The occlusal openings were filled with composite material.

The presence of the cement on the surfaces of the abutments and suprastructures has been studied as a dichotomous + or -. Also the linear assessment of the cement residues extending coronally and/or apically from the abutment shoulder was assessed. The size of the residues was classified as small or large assumed value of 2mm as the boundary.

Statistical analysis was performed using the chi-square test. Statistical significance was determined at $p < 0.05$.

Results: No cement remnants could be found at the surrounding peri-implant tissues. Clinically undetected cement excess was visible on 73.3 of prosthetic restorations. Only in one case, they extended beyond the threshold of 2mm distance from the shoulder towards the implant/abutment connection. The analysis of the implant positions has demonstrated that cement was present in 70.4% implants located in the maxilla and in 75.8% implants placed in the mandible. Considering the diameter of the implants, it was found that cement residues were present in 76.2% of 3.5mm implants, 68.2% of 4mm implants, 90% of 4.5mm implants and 57.1% of 5mm implants. There was no interdependency between the presence of residual cement and implant region or diameter. A correlation between the presence of cement and surface reconstruction was found. Most often cement residues were found on the distal (17.9%) and mesial (15%) aspect. On the palatal/lingual aspect it was detected in 8.8%, and on buccal in 3.4% of cases.

Conclusions:

1. The use of customized CAD/CAM abutments do not guarantee avoidance of subgingival cement residues after crown cementation.
2. During the procedure of crown cementation on customized abutments it is necessary to pay special attention to the detection of potentially present residues of cement, the removal of which will eliminate one of the factors of *peri-implantitis*.