Rotating titanium made brushes for efficient open flap debridement in peri-implantitis therapy - clinical treatment recommendations

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Objectives

Peri-implant bone loss has recently emerged to be the focus of implant therapy. After bone loss caused by peri-implantitis the implant surface becomes exposed to inflammatory cells, microbes, and organic contaminants. The anti-infective surgical treatment of peri-implantitis in cases with a considerable pocket formation larger than 6 mm is based on the open flap debridement followed by implant surface decontamination. To achieve a sufficient implant debridement concordance and tissue remnants have to be removed. In order to avoid recontamination after mechanical cleaning, additional dissolving of the biofilm and disinfection is necessary.

Previous in vitro tests about the effects of titanium made debridement brushes (Tigran PeriBrush) compared to the treatment with curettes demonstrated an effective surface cleaning of the exposed implants with only minor impact on all tested implant structures. The aim of the study is to give treatment recommendations for the use of rotating titanium debridement brushes regarding the load used in the mechanical debridement.

Methods and Materials

The correct horizontal loadforce for the rotating Tigran PeriBrush onto the surface of implants was measured in vitro. A spring based construction (spring steel wire) with defined distances of impression under load was used. SEM images of the implant surface and the brush before and after treatment with different loadforces (10-60 g / 0.1-0.6 N) were analyzed. In a second stage patients with similar peri-implantitis (pocket depth higher than 6 mm) were treated by open flap debridement followed by implant surface decontamination. The mechanical debridement was performed with rotating titanium brushes using the appropriate horizontal loadforce of 20-30 g / 0.2-0.3 N as measured in the preceding in-vitro tests.

Results

Rotating titanium debridement brushes allow a surface cleaning with only a minor impact on different tested implant structures. The loadforce should be less than 60 g / 0.6 N to avoid bending of the stiff titanium bristles. In the range between 10 g and 30 g / 0.1 N and 0.3 N no bristles were bent or loosened. The time used for a sufficient debridement with a rotating device compared to the vertical movements of a curette was significantly shorter and the debridement, especially in the deeper implants threads, was more efficient due to the rotationally symmetric geometry of the dental implants. X-ray images of the patients treated by curettes or rotating titanium brushes showed no significant difference of bone loss after three month.

Conclusions

The optimal horizontal loadforce onto the angle-piece with rotating titanium debridement brushes for a sufficient debridement and minor effects on the implant surface and the bristles should be 20-30 g / 0.2-0.3 N for 60 sec. The analyzed brush is more effective compared to the vertical movements of curettes in the treatment of peri-implantitis and can shorten the treatment time.

References

3. Duddeck et al. Effects of rotating titanium debridement brushes on the surface structure of dental implants; Poster presentation at EAO meeting October 2011, Athens, Greece.