UNIVERSITÄT HEIDELBERG
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A novel implantoplastic protocol using uncoated burs

Technology Offer

Ref. No.: 8-23

Category

Therapy

Keywords

peri-implantitis, implantoplastic

Development stage

Pre-clinical

Seeking

Licensing

IP status

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(Priority: 16.05.2023)

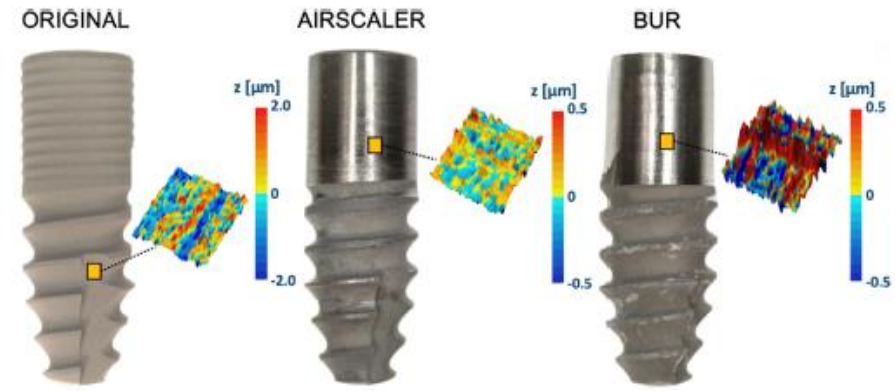

Fig. 1: Macroscopic images of the implants in their original state and after IP treatment using airscaler with non-diamond-coated sonic tip or diamond-coated bur. Corresponding λc-filtered topographc data in the relevant areas is shown.

Background

Peri-implantitis is an inflammatory disease of the soft tissue and bone surrounding a dental implant, usually caused by bacterial plaque. If left untreated, it can lead to bone loss, gum recession, and implant failure. Conventional implantoplasty uses high-speed, coated burs that abrasively remove titanium to reduce contamination. However, this method causes material loss and diameter reduction, which can negatively affect the implant's mechanical properties.

The present technology solves this problem with a non-diamond-coated sonic tip that is attached to an instrument like an air scaler and deforms the implant surface instead of grinding it. This results in minimal material loss. The benefits of this method were confirmed in an in-vitro pilot study.

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Technology

The patented method describes an uncoated tip for an instrument like an airscaler, which smooths the implant surface through plastic deformation without significant material removal. Unlike abrasive burs, the tip is smooth, non-diamond-coated, and optionally equipped with a cooling channel, minimizing titanium particle release and preserving wall thickness.

Sonic tips achieved superior results over abrasive burs in an in-vitro pilot study (Tsampli et al., 2024):

- Roughness (Ra) decreased to 0,33 µm (vs. 0,42 µm with conventional burs, p=0,003), Sa to 0,25 µm (vs. 0,36 µm, p=0,002), with a homogenous surface without grooves (SEM-Analysis).

- Material loss was only 30 µm radius reduction and 6,5 mg weight loss (vs. 178 µm and 39,2 mg with burs, p<0,001), sparing implant stability.

- Additionally, this method showed higher compressive strength (F_max=739 N vs. 665 N with burs, p<0,001) and a better elastic range close to the untreated control value (812 N).

The advantages – lower particle burden, better smoothness (Ra<0,35 µm), and increased fracture strength – make the method ideal for narrow implants with micro threads and for peri-implantitis therapy.

Benefits

- Preservation of mechanical properties for long-term implant stability:
  - Minimal material loss
  - No titanium particle-release through deformation instead of grinding
- Superior surface roughness with homogenous smoothness without grooves
- High fracture strength

Applications

- Therapy of peri-implantitis
- Use with airscaler
- Suitable for narrow implants

Publication

- Tsampli A, Rues S, Kappel H, Rammelsberg P, Kappel S. In vitro pilot study comparing a novel implantoplasty sonic instrumentation protocol with a conventional protocol using burs. Clin Oral Imp Res. 2024; 35: 340-349. doi.org/10.1111/clr.14231.

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