

Resistance of dental implants with different bone defect heights submitted to implantoplasty.

An *in vitro* study.



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Abstract

Background:

Peri-implantitis is a biological complication that affects soft and hard tissues around dental implants and can lead to treatment failure. Implantoplasty is a procedure that mechanically smoothens the suprabony area of the implant in order to decrease surface roughness and prevent bacterial growth. The height of the bone defect and implantoplasty procedures may affect the resistance to fracture of dental implants.

Aim/Hypothesis

To determine if implants submitted to implantoplasty with different bone level heights are more prone to fracture than intact implants in the same conditions; and to assess if the bone level height affects the resistance to fracture of fixtures.

Material and methods

Thirty-two rough surface, grade V, external hexagon 3.5-millimeter platform, 15-millimeter-long dental implants were placed in bone-like resin (elasticity modulus $\geq 3\text{GPa}$, ISO 14801:2016) with 3 or 7.5 millimeters of implant surface exposed. Half of the implants were randomly submitted to implantoplasty. Macroscopic changes were evaluated using ImageJ® software on standardized radiographies. Static resistance to fracture tests were performed according to ISO 14801:2016 established parameters. A scanning electron microscope was employed to analyze the fracture pattern and morphology.

Results

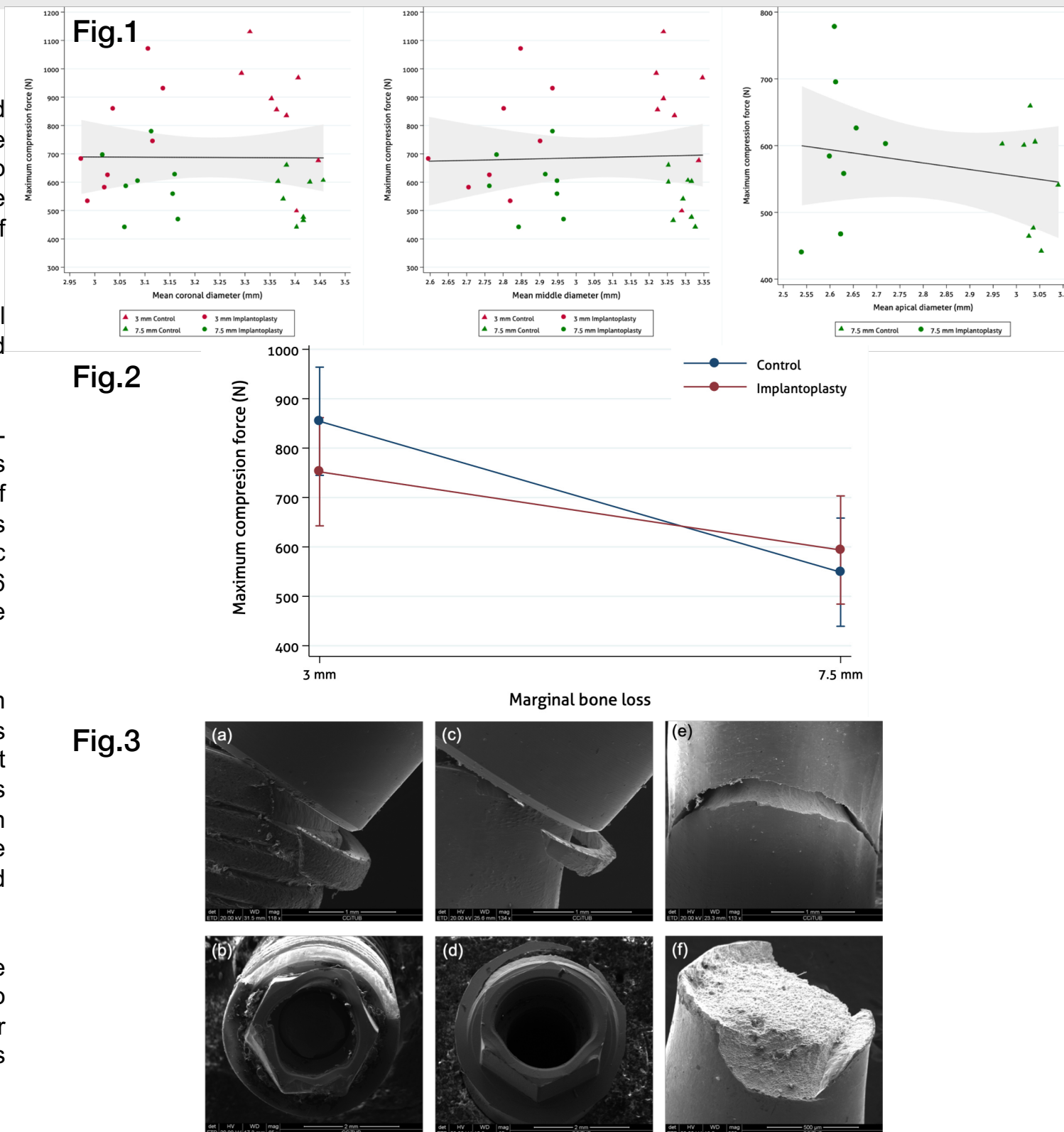
Significant macroscopic changes were observed in all reference points in implantoplasty implants (P-value < 0.01) (Fig.1). No significant differences regarding resistance to fracture were observed between implants with and without implantoplasty with the same simulated bone loss (P-value > 0.01). Intact implants with 7.5mm bone defect heights had a significantly lower fracture resistance when compared to fixtures with 3mm defects (P-value < 0.01) (Fig.2). Platform is the most commonly fractured area (Fig.3a,b,c,d), although body (Fig.3e) and prosthetic screw fractures (Fig.3f) were also observed.

Conclusion and clinical implications

Performing implantoplasty does not seem to increase the risk of fracture regardless of the bone defect height. Bone loss decreases the resistance to fracture specially in the control group implants. The fact that most fractures occur in the platform indicates that this zone is submitted to more mechanical stress especially when bone loss increases.

Keywords: Peri-implantitis; Dental implant; Compressive strength

Results



Background and Aim

Treatment of peri-implantitis (PI): non-surgical VS surgical options. Implantoplasty (IP): surgical treatment option ► detoxify and smoothen the implant surface and prevent biofilm accumulation

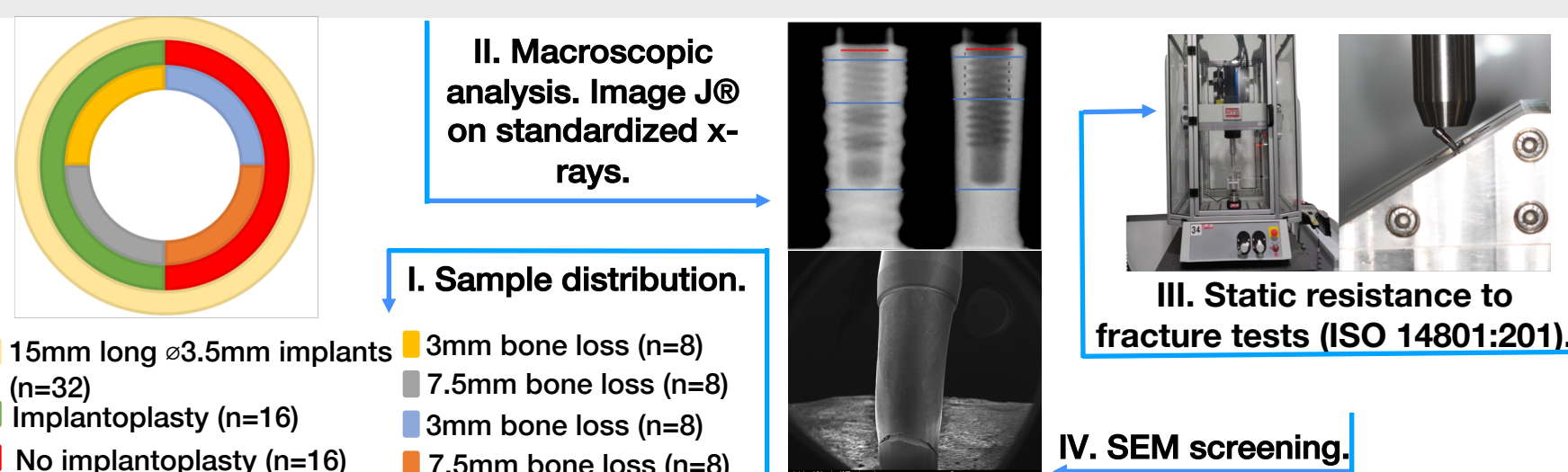
AIM:

- to determine if implants submitted to implantoplasty with different bone level heights are more prone to fracture than intact implants in the same conditions
- to assess if the bone level height affects the resistance to fracture of fixtures.

Conclusion

- Bone loss should be considered a relevant variable when assessing the resistance to fracture of narrow external hexagonal connection implants.
- Although implantoplasty significantly reduces the thickness of the implant walls, it does not seem to increase the risk of fracture of dental implants with the above-mentioned features.

Methods and Materials



References

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