

Surface analysis of Implants submitted to different methods of Implantoplasty

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Abstract

When using the implantoplasty technique to make the implant surface smoother and less susceptible to plaque buildup, many instruments can be used. This study aimed to demonstrate that different types of bur may promote changes in the mechanical properties of dental implants.

Background and Aim

Dental implants are susceptible to plaque buildup due to their rough surface. This may lead to the development and / or progression of peri-implantitis. The use of different rotating instruments is proposed in the literature for the removal of the biofilm from the contaminated portion of the implant.

The aim of this study was to compare fatigue strength and surface morphology of commercially pure grade IV titanium implants submitted to different types of implantoplasty.

Methods and Materials

Dental implants of Grade IV CP Ti, with acid etched surface were submitted to implantoplasty with carbide and diamond burs. The rotating instruments were used on the cervical area and the body of the implants. Afterwards, the implants were analyzed in the SEM and the roughness quantified by interferometry. The parameter to characterize the surface numerically was roughness (Ra). The same implants were submitted to the fatigue test.



1. Diamond and Carbide burs used.



2. Implant before implantoplasty.



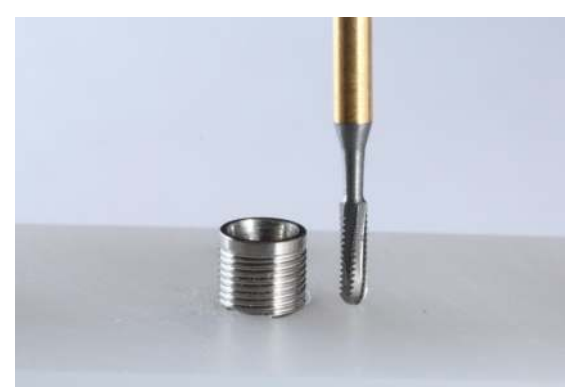
3. Measure of the implants before the implantoplasty.



4. Components used for fatigue tests.



5. Implants in position for fatigue test, control group.



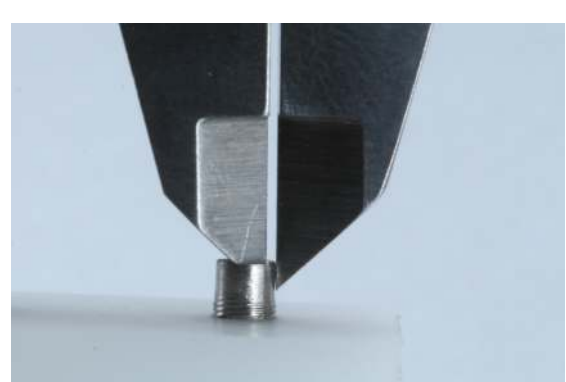
6. Thread removal procedure.



7. Aspect using carbide bur.



8. Aspect using diamond bur.



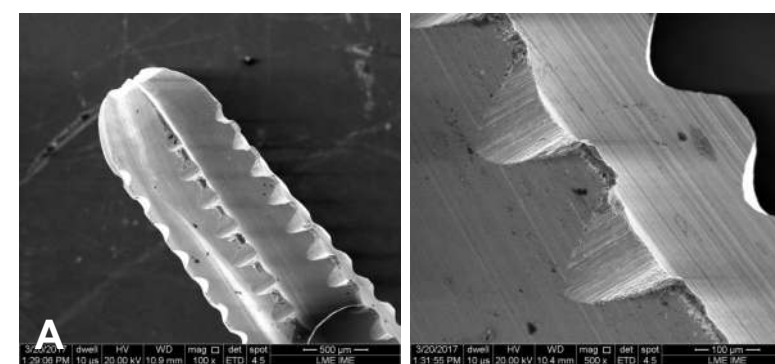
9. Approximately 0,5mm of removal.



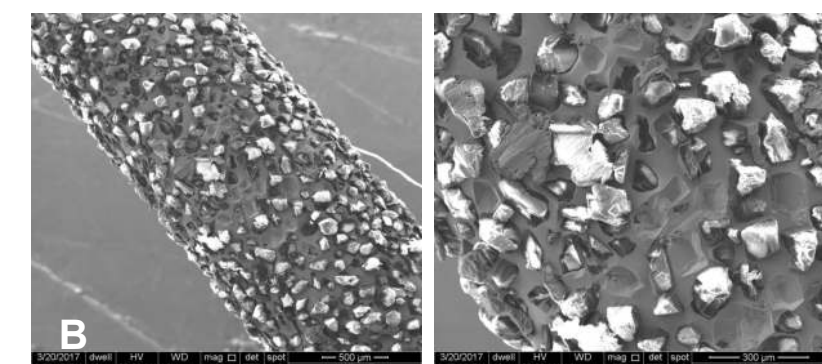
10. Components used in fatigues test; test group

Results

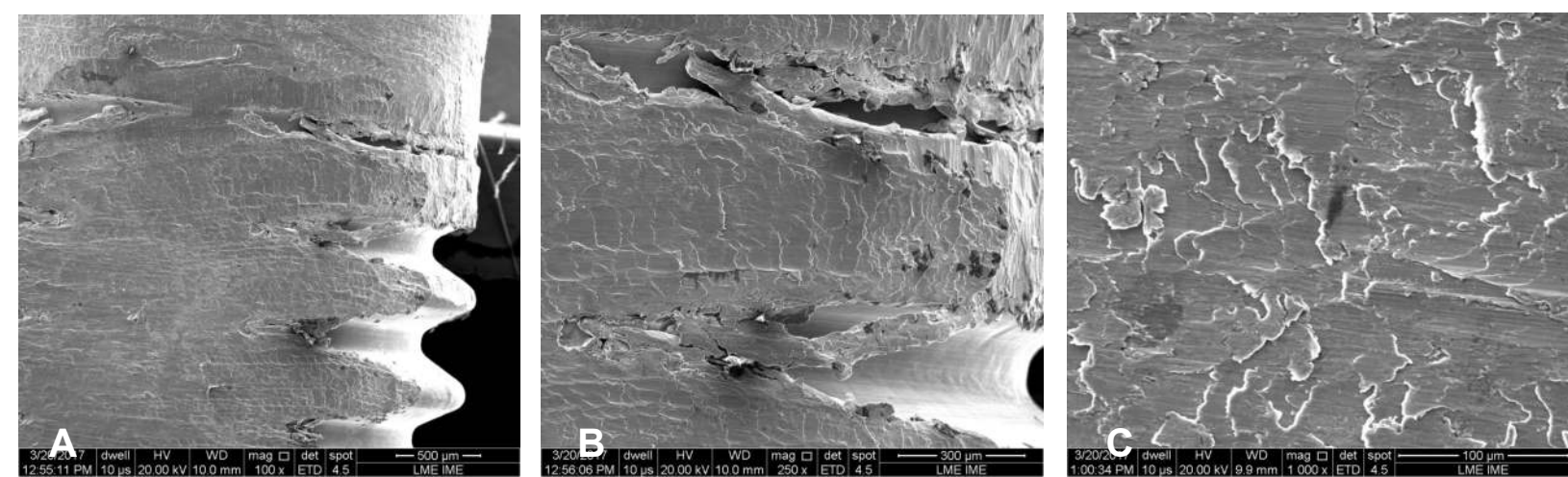
The results have shown that the different instruments used for implantoplasty cause different surface changes. The group that underwent implantoplasty with carbide burs presented a roughness superior (2.97 μm) to the group submitted to wear with diamond drills (1.21 μm). The scanning electron microscopy analysis showed that the group where diamond burs were used presented more uniform morphological characteristics than the group with carbide burs. The results showed that resistance to fatigue with load of 350 on the group submitted to implantoplasty with diamond burs are more resistant (800,000 cycles) than the group with carbide burs (120,000 cycles).



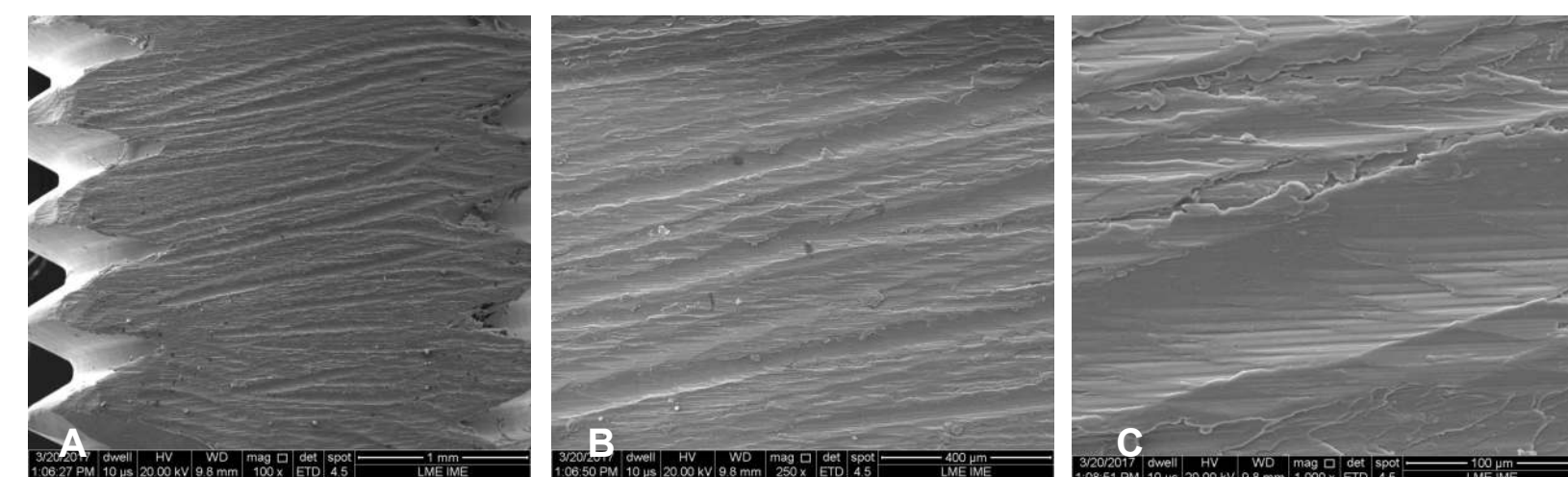
11. SEM analysis of the carbide bur. after the implantoplasty.



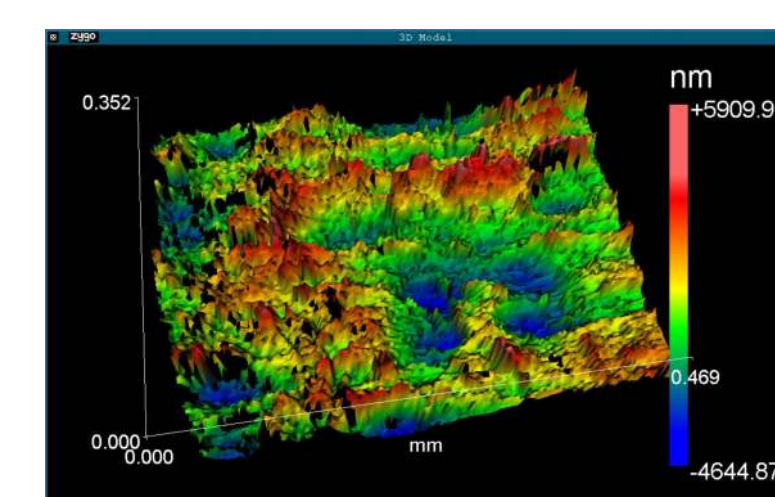
12. SEM analysis of the Diamond bur after the implantoplasty. Note titanium pieces ripped out from implant surface due to its hardness.



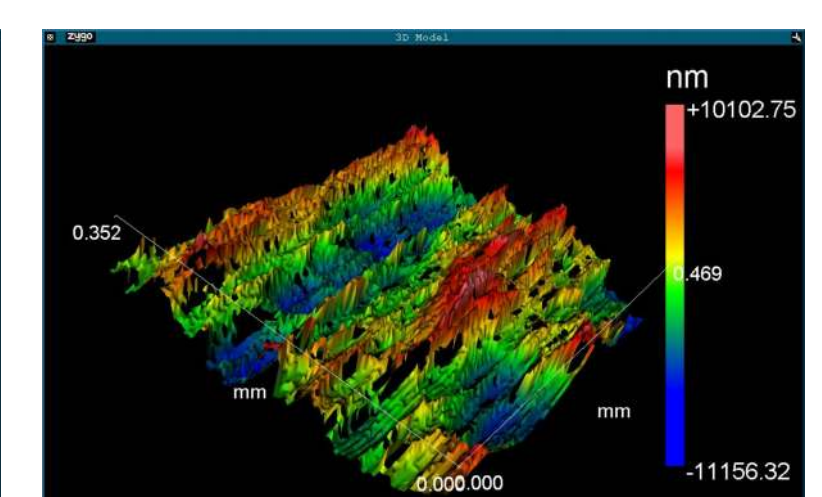
13. SEM analysis of the implant surface after the use of carbide bur. A 100x, B250x, C1000x.



14. SEM analysis of the implant surface after the use of diamond bur. A 100x, B250x, C1000x



15. Surface Roughness of implant surface treated with carbide bur.



16. Surface Roughness of implant surface treated with carbide bur.

Conclusions

The procedure used to remove threads from implants influences surface morphology and roughness.

The use of diamond burs promotes less roughness and greater resistance to fatigue after the Implantoplasty than the use of carbide burs.

References

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