

Two implant surfaces placed in more challenging healing situation.

ARTHUR B. NOVAES JR., VULA PAPALEXIOU, SERGIO L. S. SOUZA, MARCIO F.M. GRISI, DANIELA B. PALIOTO, MARIO TABA JR.

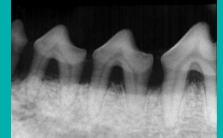
Arthur Belém Novaes Jr.

Address: Av do Café s/n, Ribeirão Preto-SP 14040-904, Brasil
novaesjr@forp.usp.br

Abstract

The purpose of this study is to evaluate the performance of two different implant surfaces when placed into a more challenging healing situation. Periodontal disease was induced during 12 weeks bilaterally from P1 to P4 in 6 dogs. The teeth were extracted and 6 implants were placed immediately in each dog, 3 with Friadent Experimental Surface (FES or CELLplus and 3 covered with titanium plasma spray TPS. During the 12 weeks healing period, 3 fluorescent bone markers were injected in 4 different healing periods to study the bone remodeling around the implants. Following the healing period the dogs were sacrificed, the mandibles removed, dissected and processed for analysis of bone/implant contact (BIC) and bone density and the percentage of newly formed bone surrounding the implants using a confocal laser scanning microscope. The BIC for the FES group was 52.7% and for the TPS group 42.7%. The bone density for the FES group was 66.6% and for the TPS group was 58.7%. The uptake of the bone markers revealed that the bone formation for the FES group was 5.3% at 3 days, 10.3% at 4 weeks, 21.1% at 8 weeks and 7.0% at 12 weeks, while for the TPS group it was: 3.4% at 3 days, 9.6% at 4 weeks, 14.6% at 8 weeks and 7.1% at 12 weeks. In conclusion both implant surfaces performed well when placed into a more challenging healing situation, however the FES surface had a slightly better performance, although statistically non-significant, when compared to TPS surface for all parameters studied.

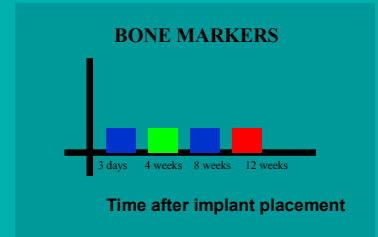
Material and methods



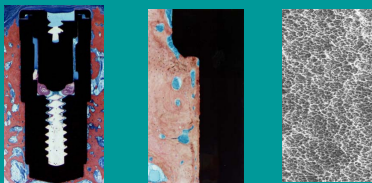
Periodontal disease induction



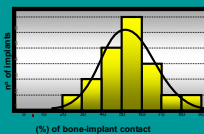
Implant placed immediately after extraction



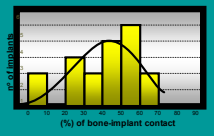
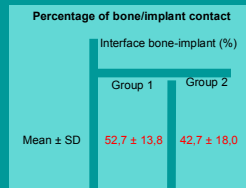
Analysis of bone/implant contact and bone density



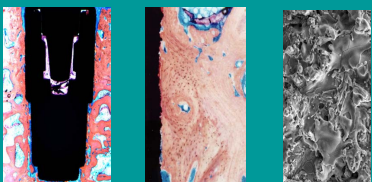
Bone implant contact of the Friadent Experimental Surface. Group 1



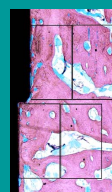
The histogram shows a normal distribution with the majority of the values for the group 1 surfaces (grit blasted/acid etched) concentrated around the mean.



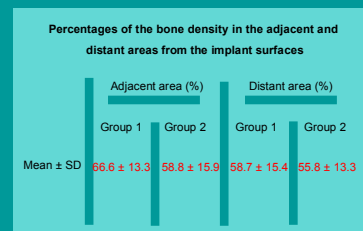
The histogram shows the dispersion of the osseointegration values for the titanium plasma spray surface, group 2.



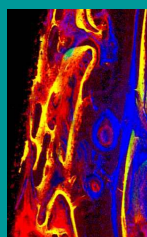
Bone implant contact of the titanium plasma spray surface. Group 2



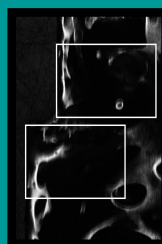
Bone densities were determined by measuring the percentages of bone within the rectangles.



Fluorescence Analysis

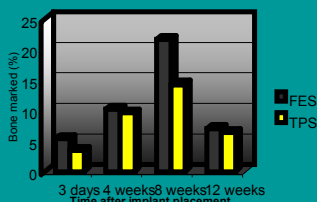


CLSM image of all fluorochromes at 12 weeks.

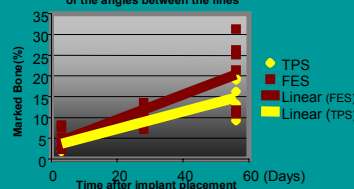


CLSM image of areas used for the measurements

This graph shows the bone formation rate of the FES and TPS group.



This graph shows the bone growth (%) after implant placement. Note the difference of the angles between the lines



Conclusion

In conclusion both implant surfaces performed well when placed into a more challenging healing situation, however the FES or CELLplus surface had a slightly better performance, although statistically non-significant, when compared to TPS surface for all parameters studied. The surface characteristics have an important role, mainly in the initial osteogenesis, demonstrated by the statistically significant difference that was observed between the groups at the 3 days post-implantation period. The association of the fluorescence principles to the confocal microscopy allowed the bone formation to be studied dynamically throughout the study period. The covariance analysis of the fluorochrome marked bone showed that the FES surface had better bone formation between the 3 days and 8 weeks periods confirming the importance of implant surface characteristics.