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Surface Characterization of Titanium Oxide of Dental Implants

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Abstract – To achieve improved osseointegration, there have been many efforts to modify the surface composition and topography of dental implants. The purpose of this study was to investigate the surface chemistry of a titanium oxide layer on commercially micro arc oxidized - MAO (Vulcano Actives[®]) – Fig.1, acid etched (Master Porous[®]) – Fig. 2 and discrete deposition of nanocrystaline particles – Fig. 3, of dental implants, manufactured by Conexão Sistemas de Prótese (Brazil).

Development in contemporary implant dentistry aims to create appropriate materials to replace teeth, recovering the patient's esthetics, and having a positive influence on their phonetics and mastication function [1]. The high success rate of endosteal titanium dental implants for oral reconstruction has been attributed to the formation of a direct bone-implant interface with no intervening soft tissues [1].

Surface modification of titanium implants can increase adhesion, migration and cell proliferation and thus accelerate the osseointegration process [2-3].

Fluorides have also been used in chemical and topographic implant surface changes. Treatments with fluorides have demonstrated a higher capacity for nucleation of Ca P crystals in vitro testing and higher osseointegration resistance in vivo, as tested by removal torque [4].



Figure 1: Microstructure of MAO (Vulcano Actives[®]).

Figure 2: Microstructure of acid etched (Master Porous[®]).

Figure 3: Microstructure of discrete deposition of nanocrystaline particles.

References

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