

Microscopic study of surface microtopographic characteristics of dental implants

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Background: The characteristics of the microtopography of dental implants surface influence their clinical performance. This investigation studied the microtopography of 7 different implants, two well known international implants were used to compared with 5 domestic implants using scanning electron microscopy

Aim/Hypothesis: To determine and compare the micro topographic characteristics of dental implants submitted to different surface treatments, using scanning electron microscopy (SEM).

Material and Methods: Implants were divided into 7 groups of 3 specimens each, according to the surface treatment used: group 1: Osseotite, BIOMET 3i; group 2: SLA surface, Institut Straumann AG; group 3: Oxalife surface, Tree-Oss implant; group 4: B&W implant surface; group 5: Q-implant surface; group 6: ML implant surface; group 7: RBM surface, Rosterdent implant. The surfaces were examined under SEM (Carl Zeiss FE-SEM-SIGMA). Image Proplus software was used to determine the number and mean diameter of pores per area unit (mm). The data obtained were analyzed with the Mann-Whitney test. A confocal laser microscope (LEXT-OLS4100 Olympus) was used to conduct the comparative study of surface roughness (Ra). Data were analyzed using Tukey's HSD test.

Results: The largest average pore diameter calculated in microns was found in group 5 ($3.45 \mu\text{m} \pm 1.91$) while the smallest in group 7 ($1.47 \mu\text{m} \pm 1.29$). Significant differences were observed among each one of the groups studied ($P < 0.05$). The largest number of pores/mm² was found in group 2 (229343) and the smallest number in group 4 (10937). Group 2 showed significant differences regarding the other groups ($P < 0.05$). The greatest roughness (Ra) was observed in group 2 ($0.975 \mu\text{m} \pm 0.115$) and the smallest in group 4 ($0.304 \mu\text{m} \pm 0.063$). Group 2 was significantly different from the other groups ($P < 0.05$).

Conclusions and Clinical Implications: The micro topography observed in the different groups presented dissimilar and specific features, depending on the chemical treatment used for the surfaces.