MORPHOLOGICAL AND CHEMICAL CHARACTERISTICS OF DIFFERENT TITANIUM SURFACES TREATED BY BICARBONATE AND GLYCINE POWDER AIR ABRASIVE SYSTEMS

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Purpose
The aim of this in vitro study was to investigate possible morphological and chemical changes induced by the use of glycine powder or sodium bicarbonate powder air polishing on machined and acid-etched titanium surfaces.

Materials and methods
The glycine powder (granulometry <65 μm) and sodium bicarbonate powder (granulometry <150 μm) were applied on 2 machined healing abutments and on 2 acid-etched healing abutments. The samples were characterized by scanning electron microscopy (SEM) coupled with energy dispersive X-ray spectroscopy (EDXS). The analyses were performed at different steps: 1) as received (right after opening their packaging, Fig. 1,2); 2) after 20 minutes air exposure (Fig.3,4); 3) after aging in artificial saliva (Fig.5,6); 4) after glycine or sodium bicarbonate powder air polishing for 5 seconds (Fig.7,8); 5) after repetition of steps 3 and 4 with longer time of polishing (20 seconds) (Fig.9-14).

Results
SEM observations did not reveal any change in the morphological characteristics of titanium surfaces either using glycine or bicarbonate powder. EDX analysis demonstrated a greater quantity of carbon on abutments treated with sodium bicarbonate powder and a greater amount of silicon on abutments treated with glycine. After immersion in artificial saliva, abutments treated with sodium bicarbonate showed a greater amount of salts on their surface. Greater oxidation and more salts were visible on acid-etched surfaces compared with machined ones.

Conclusions
Air polishing using glycine and sodium bicarbonate powder appeared to be a safe system for professional oral hygiene of titanium dental implants both with machined and acid-etched surfaces, although acid-etched abutments and abutments treated with sodium bicarbonate harbored more salts. More studies are needed to evaluate the clinical significance of the present results.

References