Biomaterials

Volume 24, Issue 2, January 2003, Pages 263-273

Corrosion behaviour of commercially pure titanium shot blasted with different materials and sizes of shot particles for dental implant applications

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https://doi.org/10.1016/S0142-9612(02)00314-9

Abstract

It is well known that the osseointegration of the commercially pure titanium (c.p. Ti) dental implant is improved when the metal is shot blasted in order to increase its surface roughness. This roughness is colonised by bone, which improves implant fixation. However, shot blasting also changes the chemical composition of the implant surface because some shot particles remain adhered on the metal.

The c.p. Ti surfaces shot blasted with different materials and sizes of shot particles were tested in order to determine their topographical features (surface roughness, real surface area and the percentage of surface covered by the adhered shot particles) and

electrochemical behaviour (open circuit potential, electrochemical impedance spectroscopy and cyclic polarisation).

The results demonstrate that the increased surface area of the material because of the increasing surface roughness is not the only cause for differences found in the electrochemical behaviour and corrosion resistance of the blasted c.p. Ti. Among other possible causes, those differences may be attributed to the compressive residual surface stresses induced by shot blasting.

All the materials tested have an adequate corrosion and electrochemical behaviour in terms of its possible use as dental implant material.

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Keywords

Titanium; Dental implant; Shot blasting; Corrosion; Electrochemical impedance spectroscopy

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