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Surface properties of different heat treated titanium alloy dental implants

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Background: Titanium alloy surface properties have an essential role in the interaction of dental implants with bone and alteration of the surface of the implant could improve osseointegration. This study was designed to investigate the effect of different heat treatment temperatures on titanium alloy surface properties for dental implants.

Materials & Methods: The effect of different temperatures of heat treatment (750°C, 850°C, 950°C and 1050°C) were investigated on the surface topography, surface chemistry, titanium oxide layer thickness of the (Ti-6Al-4V) alloy, blood contact angle, and blood drop diameter of titanium alloy samples. 20 disks were prepared from the (Ti-6Al-4V) alloy, the sample was divided into four test groups depending on the effect of different temperatures of heat treatment.

Results: The heat treatment at 1050°C for 30 minutes of titanium alloy significantly enhanced the titanium surface characteristics; surface topography, titanium oxide layer thickness, surface chemistry, blood contact angle and blood drop diameter.

Conclusions: The heat treatment of titanium alloy at 1050°C for 30 minutes enhanced the titanium surface characteristics; surface topography, titanium oxide layer thickness, surface chemistry, blood contact angle and blood drop diameter, which may result in faster and stronger bone formation around dental implant.

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