ONLINE ISSN : 1881-1361
PRINT ISSN : 0287-4547

Dental Materials Journal
Vol. 26 (2007) , No. 6 p.924-929

[PDF (521K)] [References]

Effect of Surface Modification on the Photocatalysis of Ti-Ni Alloy in Orthodontics

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(Received May 20, 2007)
(Accepted July 18, 2007)

Abstract:
Photocatalytic activity from the reaction of titanium oxide with ultraviolet light has recently gained much attention. In particular, there is scientific interest in inducing photocatalytic reactions on Ti-Ni alloy, a material widely used in orthodontic applications. However, it is believed that inducing a photocatalytic reaction with an amorphous oxide film on the alloy is a difficult challenge. In this study, therefore, we sought to induce a photocatalytic reaction on Ti-Ni alloy by subjecting the latter to electrolytic and heat treatments. Then, an antibacterial test was used to examine whether a photocatalytic reaction had indeed been induced. By thickening the titanium oxide film with electrolytic treatment and then applying heat treatment, the surface oxide film of Ti-Ni alloy was thus modified from amorphous structure to rutile crystal. Furthermore, it was revealed that Ti-Ni alloy had an antibacterial effect by virtue of the photocatalytic reaction.

Key words:
Ti-Ni alloy, Surface characterization, Photocatalytic property

doi:10.4012/dmj.26.924

JOI JST.JSTAGE/dmj/26.924