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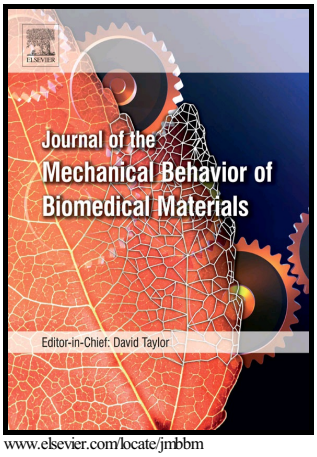

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Bone-implant degradation and mechanical response of bone surrounding Mg-alloy implants

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Abstract

In the present paper, first results of the influence of the degradation of biodegradable materials on the hardness of the bone material are presented in detail. For this purpose, different materials (Mg, Ti and biopolymers) were implanted into the femora of growing rats and bone cross sections were examined for the micro-hardness (MH). The aim of the present paper was to examine the mechanical response of the bone areas surrounding the implant at defined sites and at specified periods after implantation. A special focus was set on Mg alloys. In earlier in-vitro and in-vivo studies, an accumulation of Magnesium in the vicinity of the implant was detected by using different techniques. Therefore, micro-hardness measurements were performed, and the mechanical strength of bone was correlated with the exchange of Magnesium and Calcium in Hydroxyapatite. After the operation and implantation, the micro-hardness values became temporarily lower, but after complete degradation of the implants, the values were identical with those of specimens containing no implants.

Keywords: bone implants; Magnesium alloys; Titanium alloy; In-vivo degradation; Micro-hardness; LA-ICP-MS

1 Introduction