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UDC 616-001.17-089.26

THE STRUCTURE AND CHEMICAL COMPOSITION OF THE FEMUR AFTER DIFFERENT METAL ALLOYS IMPLANTATION

Key words:
metal alloys, osteointegration, scanning electron microscopy, chemical composition.

ABSTRACT. Background. Osteointegration is a key factor for successful implant ingrowth. It depends on quality of bone, lack of initial stability, excessive loading, loosening or fracture of screw, and fracture of implant itself. Other factors that can affect osteointegration are implant composition and features of implant surface. **Objective.** The aim was to study the structure and chemical composition of an injured bone by scanning electron microscopy at different times after the implantation of metal alloys. **Methods.** Experiment was conducted on 90 rabbits, that were divided into 6 groups – 1 control and 5 experimental. We made round defect of femur in rabbits of control group and fill it by different alloys in experimental ones. **Results.** It was estimated that the implantation of TiVT6 and KTC-125 alloys in distal epiphysis leads to the formation of connective tissue around prosthesis and activation of bone remodeling. β- (Ti-Zr) alloy leads to early regression of the connective tissue around the implant and development of minimal changes in the structure and chemical composition of the bone during all periods of observation. Use of hydroxyapatite to coat metallic implants prevents connective capsule formation and stimulates bone growth around prosthesis that ensures its optimum fixation. **Conclusion.** Optimization of osteointegration leads to reduction of calcium loss. Hydroxyapatite coating of β- (Ti-Zr) alloy ensures the absence of stress-shielding displacement effect and development of bone micro-cracks.

Received: 13.08.2015
Accepted: 22.09.2015

Citation:
Zaitseva NV. [The structure and chemical composition of the femur after different metal alloys implantation]. Morphologia. 2015;9(3):22-7. Ukrainian.

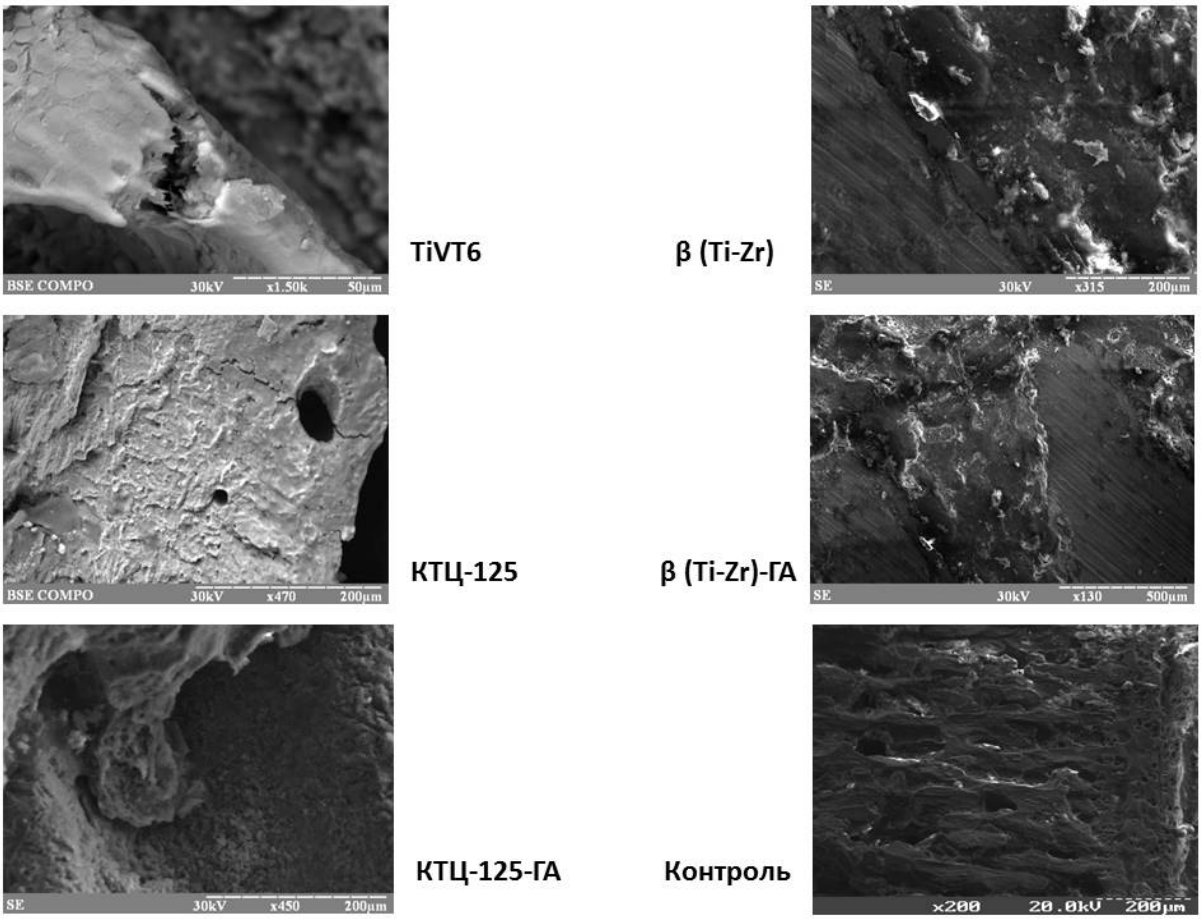

Fig. 1. Scanning electron microscopy of the area of bone around the implant 6 months after implantation of metals of different composition.

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