

Long-Term Histological Evaluation of Bioresorption of Self-Reinforced Polylactide-Polyglycolide 80/20 Screws to Resorb Completely in Rabbit Cranial Bone

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The aim of this study was to assess tissue reactions to bioabsorbable self-reinforced polylactide/polyglycolide (SR-PLGA) 80/20 miniscrews in rabbit cranial bone. One PLGA screw was implanted on one side and one titanium screw on the other side of the sagittal suture (n=21). Three animals were sacrificed after 2, 4, 8, 16, 24, 54 and 72 weeks. In histological examination the numbers of macrophages, giant cells, active osteoblasts and fibrous tissue layers were assessed and degradation of the bioabsorbable screws was evaluated. After two weeks, macrophages were seen near the heads of both screws. After 4 and 8 weeks, the bioabsorbable screws were surrounded by fibrous tissue. Osteoblastic activity and groups of several giant cells were seen. After 24 weeks, a significant change in the morphology of the PLGA screws had occurred. Osteoblastic activity and the amount of giant cells had decreased. After one year, some PLGA biomaterial was still present. PLGA screws had been replaced by adipose tissue, fibrous tissue and "foamy macrophages" which had PLGA particles inside them. After 1½ years, the amount of biomaterial remaining had decreased remarkably. The particles of biomaterial were inside "foamy macrophages". SR-PLGA 80/20 screws are biocompatible and have no clinically manifested complications when used in cranial bone of rabbits. No contraindications as regards their clinical use in craniofacial surgery was found when studied in cranial bone of rabbit.

Keywords

Cranial bone, rabbit, SR-PLGA, tissue reaction, titanium

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