

# STUDY OF COMPLETE RESORPTION OF SELF-REINFORCED POLYLACTIDE-POLYGLYCOLIDE 80/20 SCREWS IN RABBIT CRANIAL BONE

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## Abstract

*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 PLGA screws had been replaced by adipose tissue, fibrous tissue and "foamy macrophages" which had PLGA particles inside them.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 11 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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# RESORBABLE FIXATION OF MANDIBULAR FRACTURES

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## Objective

Bioresorbable osteofixation devices are being increasingly used in orthognathic surgery and in cases of trauma to avoid problems associated with conventional metal osteofixation devices. The aim of this clinical study was to assess the reliability and efficacy of bioresorbable self-reinforced poly-L/DL-lactide (SR-P(L/DL)LA 70/30) plates and screws in the fixation of mandibular fractures in adults.

## Study Design

Ten patients (20 to 49 years old) with isolated anterior mandibular parasymphiseal fractures were treated by means of open reduction and internal fixation using SR-P(L/DL)LA 70/30 bioresorbable plates and screws.

## Results

During the minimum of 6 months of follow-up, no problems were encountered except for 1 case where a plate became exposed intraorally and infected. This required debridement and later excision of the exposed part of the plate. Despite this setback the fractured bone healed well.

## Conclusions

SR-P(L/DL)LA 70/30 plates and screws are reliable for internal fixation of anterior mandibular fractures in adults. Proper soft tissue coverage should be ensured to avoid plate exposure. Should implant exposure occur, it might be necessary to excise the exposed part after fracture healing (6-8 weeks postoperatively).

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