

Effect of absorbable polyglycolide membrane on the bone—an experimental study

Nureddin A Ashammakhi

Department of Orthopaedics and Traumatology, Helsinki University Central Hospital, Helsinki, Finland

Introduction: Self-reinforced polyglycolide (SR-PGA) devices are in clinical use since 1980s. Their use obviates the need for implant removal. SR-PGA membranes were recently developed and have been studied in our department for their probable behavior, effects and use.

Materials and methods: 204 Wistar rats and 46 New Zealand rabbits. SR-PGA membranes, 0.15 mm thick, were applied over femoral cortical and cancellous bone, osteotomies and bone defects. The tensile strength retention of the membrane was studied in vivo by implantation of the membrane in the subcutis and around the bone of rats. For the in vitro, membranes were immersed in saline and kept at room temperature. The animals were followed-up for 1, 3, 6, 8, 12, 24 and 30 weeks. Radiography, histology, planimetry, microradiography, oxytetracycline fluorescence

and strength measurements were performed.

Results: Membranes degraded totally by 30 weeks. They enhanced new bone formation. This was especially beneficial when membranes were applied over non-grafted bone defects. Membranes also induced periosteal thickening as well as fibrous tissue proliferation that had invaded the PGA structure leading to formation of biomembranes. Biomembranes have exhibited a prolonged strength retention, compared to membranes tested in vitro. No adverse effects were seen except fluid accumulation in 4 rabbits and failure of diaphyseal osteotomies to unite.

Conclusion: SR-PGA are considered biocompatible with osseous tissue and are recommended for clinical application for bone defects and cancellous bone fracture augmentation.