TRANSPHYSEAL FIXATION OF DISTAL FEMORAL PHYSEAL FRACTURES WITH SELF-REINFORCED BIOABSORBABLE PINS MADE OF PGA, PLLA AND 80/20 PLGA. AN EXPERIMENTAL COMPARATIVE STUDY ON GROWING RABBITS.

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Introduction. Bioabsorbable implants made of polyglycolide have been used in the fixation of physeal and small-fragment non-physeal fractures in children since 1987. In experimental studies on growing animals performed prior to the clinical series these implants have been found to ensure a progressive stress-transfer to the growing bone during the fracture healing. In addition the implants do not disturb the growth potential and they subsequently biodegrade thus eliminating the later hardware removal operation. However, especially in adult patients some adverse reactions have been reported clinically in connection with the use of polyglycolide implants. In order to minimize the risk of transient tissue reaction in all patients new copolymer implants with a slower and more controlled bioabsorption rate have been developed. This study concerns with the fixation properties and bioabsorption of self-reinforced (SR-) polyglycolide (PGA), poly-L-lactide (PLLA) and 80L/20G (PLGA 80/20) copolymer implant in growing bone (1,2).

Materials and Methods. 60 six-week-old New Zealand White rabbits were used as experimental animals. Experimental physeal fracture of the distal femur was made on the right side and the left femur served as a control. After an accurate reduction the physeal fracture was fixed with two parallel 1.0 mm by 25 mm bioabsorbable implants made of polyglycolide, poly-L-lactide or poly-L-lactide/glycolide 80/20 copolymer. Each series consisted of 20 animals. The follow-up intervals were 3, 6, 12, 28, 52 weeks and 2 years. Both femora including the distal femoral growth plate were analyzed by radiographic, microradiographic, OTC-fluorescence and histological studies.

Results and Discussion. The transphyseal bioabsorbable fixation provided sufficient stability for an uneventful healing of a distal femoral physeal fracture in growing rabbits in all cases. The fixation of a physeal fracture with two bioabsorbable SR-pins did not cause any growth disturbance. The regeneration of growth cartilage was seen after transphyseal fixation of the fracture with PGA implants and occasionally after fixation with PLGA 80/20 copolymer implants. The favourable results of this study encourage us to replace the bioabsorbable polyglycolide pins (SR-PGA) with the SR-PLGA 80/20 pins in pediatric clinical praxis.

REFERENCES

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