Arthrodesis of the first metatarsophalangeal joint in rheumatoid arthritis

Biodegradable rods and Kirschner-wires in 39 cases

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The first metatarsophalangeal joint was arthrodesed in 39 patients with rheumatoid arthritis. Fixation material was either biodegradable self-reinforced poly-L-lactide rods or Kirschner-wires. There were 3 clinical nonunions in the biodegradable group, and none in the K-wire group, and radiographic nonunion in 5 and 2 cases, respectively. The fixator had to be removed in 3 cases in the K-wire group. The biodegradable rods did not seem to be any better than K-wires.

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We have compared biodegradable rods and Kirschner-wires for arthrodesis of the first metatarsophalangeal joint in rheumatoid patients.

Patients and methods

40 consecutive patients with rheumatoid arthritis, admitted for arthrodesis of the first metatarsophalangeal joint, were randomly allocated to fixation, either with K-wires or biodegradable self-reinforced poly-L-lactide rods. Their mean ages were 52 (23–79) years, and 58 (37–70) years. There were 5 men in both of the groups. 3 out of the 40 patients had no medication for their disease, 25 patients had cortisone alone or in combination with other drugs.

All had severe, disabling hallux valgus or a painful and destroyed first metatarsophalangeal joint. In most cases additional operations were performed, usually synovectomy and metatarsal head resections.

The joint was exposed from a dorsomedial incision. The metatarsal and the base of the proximal phalanx were resected in order to get a 15–18-degree hallux valgus position, and 25-degree extension for men and 30-degree extension for women (Raunio 1985, Raunio et al. 1987). There was a temporary fixation with a longitudinal K-wire and 2 clamps. In the K-wire group the arthrodesis was achieved with 2 (exceptionally 3) crosswise placed 1.2-mm or 1.4-mm K-wires. The 2-mm biodegradable rods were tapped into 2 crosswise-drilled channels.

After the operation the patients were allowed to walk weight bearing with a wedge under the heel, but the arthrodesis was protected with a modified splint or plaster on the medial side of the foot until the first re-examination. For another 6 weeks they were allowed to walk normally, but with a metallic rigid insole under the first ray. Usually the K-wires were not removed.

The first re-examination with radiographic control took place usually 6–8 weeks after surgery, and the second after another 4–6 weeks. If the patient was disabled or lived far away and the arthrodesis was obvi-

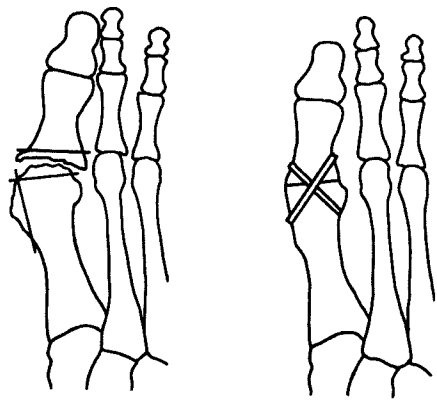

Figure 1. The position of biodegradable rods or Kirschner-wires in a patient with arthrodesis of the first metatarsophalangeal joint.

Table 1. Bone union in the 2 groups

	Control time in weeks	
	6–8	9–12
Rod (n 20)		
Clinical	15	17
Radiographic	7	15
K-wire (n 19)		
Clinical	18	19
Radiographic	12	17

ously fused at the first check-up, the second re-examination was postponed. In these cases the arthrodesis was re-examined during the next 6–8 months, when the patient visited the clinic for another problem.

One patient was excluded from the study, because for an unknown reason she was operated with K-wires, in spite of having been randomized in the rod group.

Results

The mean operation time was 37 minutes in the rod group and 28 minutes in the K-wire group.

There were some peroperative problems in the rod group. In 4 cases the quality of the bone was poor, there were cysts, and the bone was brittle, so that implantation of the rods was difficult. In one of these cases there was no radiographic union of the arthrodesis. 3 other arthrodeses were slightly unstable peroperatively, but they fused normally. In this group there were 3 cases with neither clinical nor radiographic fusion (Table 1). However, they were almost stable, causing no pain or discomfort on walking. In one case the rod felt uncomfortable under the skin for several months, but it was left untouched.

In the K-wire group 3 patients with poor bone quality fused well, although one of these was unstable peroperatively. In 2 other cases there was no radiographic fusion. In 3 cases the K-wires had to be removed.

The position desired was achieved in all the patients. In both groups the extension of the joint was, on average, 28 degrees, and the valgus position was 20 degrees in the rod group and 21 degrees in the K-wire group (Figure 2).

Figure 2. Arthrodesis of a 58-year-old woman with rheumatoid arthritis. Before operation, a few days after the operation, and half a year after the operation.

Discussion

Biodegradable devices for treatment of fractures have been studied in Finland for the last 10 years. The aim of our study was to examine if these kinds of devices are suitable for small joint arthrodeses in rheumatoid patients.

Technically, the implantation of biodegradable rods turned out to be more difficult and time-consuming than drilling of thin self-tapping K-wires. Although biodegradable rods have been successfully used for the treatment of small fractures (Hirvensalo et al. 1990), the accomplishment of the arthrodesis of the first metatarsophalangeal joint was more complicated. In some cases the quality of the bone was poor, the bone being brittle, and in addition there were frequently cysts disturbing the performance of the operation. There were more patients in the biodegradable group who had no bony fusion either clinically or radiographically.

In treatment of fractures the biodegradable devices have been reported to develop fluid accumulation at the site of operation (8 percent of cases) (Böstman et al. 1990). When performing the Chevron osteotomy of the first metatarsal bone, there was less accumulation of this soluble polyglycolide mass (2.5 percent) (Hirvensalo et al. 1991). We did not notice this kind of phenomenon at all.

There were 3 cases in the K-wire group demanding removal of the wires. However, the bony union with the K-wires seemed to be superior compared with biodegradable rods. In this study the more expensive biodegradable rods did not seem to be any better than the K-wires.

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