Acta Orthop Scand 57, 59–61, 1986

Immobilization of operated ankle fractures

Forty-three patients with stable internal fixation of fresh ankle fractures were treated at random with a plaster cast for 6 weeks without weight bearing or were only immobilized for 3 days, after which active movements were encouraged. The two groups were followed for a year. Only at 6 weeks were there significant differences between the groups.

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Early mobilization after rigid internal fracture fixation is the principle which especially the ASIF (Association for the Study of Internal Fixation) has propagated (Müller et al. 1979). However, the goal of a rigid osteosynthesis cannot always be reached, and a period of immobilization is necessary to retain the achieved position of the fracture.

We were prompted to study the effect of a 6-week immobilization period for ankle fractures after operative reduction and osteosynthesis in a randomized series of mobilized and immobilized fractures.

Patients and methods

Fifty-three ankle fractures were operated on according to the principles of Müller et al. (1979). The reduction of the fracture and rigidity of the osteosynthesis were considered satisfactory in all cases, except five, which were excluded together with two compound and three compression fractures. The remaining 43 patients were randomized to two groups.

Immobilization group. The group which was treated with a plaster cast consisted of nine males and 14 females, with median age of 37 (16–66) years. Using Weber's classification (1965), there were 15 fractures of Type B and eight fractures of Type C. The plaster cast was applied on the first postoperative day and no weight bearing was allowed until the plaster cast was removed at 6 weeks. Thereafter, full weight bearing was allowed. The use of crutches was continued if the patient felt insecure. Active exercises were ordered and 12 appointments with a physiotherapist for standardized supervised training according to prescheduled instructions.

Primary mobilization group. The group without immobilization consisted of nine males and 11 females, the median age 35 (16–59) years. The distribution was: Type A-two, type B-eight and type C-ten fractures.

After pain immobilization with a plaster slab for approx. 3 days, active exercises were allowed. At discharge, 12 appointments were made with a physiotherapist. Full weight bearing was allowed after 6 weeks.

The patients were examined at 6, 12, 18 and 52 weeks postoperatively. Ankle strength and range of motion were measured. The operated ankle was compared with the healthy one and the result given as the difference between the two. Standard radiographic studies were done to evaluate osteoporosis and ankle-joint cartilage height.

Student's t-test and the chi-square test were used for statistical analysis.

Results

All fractures healed, and only one patient in the group with primary mobilization developed a temporary superficial wound infection.

Range of motion. As expected, the ranges of motion were poorer in the plaster cast group at 6 weeks (Figure 1). The difference of dorsal flexion from the intact side was on average 15° in the plaster group and 10° in the mobilized group ($P < 0.01$) The differences of plantar flexion were 18° and 9° ($P < 0.001$), those of pronation 8° and 7°, and those of supination 27° and 14° ($P < 0.005$). Otherwise, there were no significant differences at any time of meas-

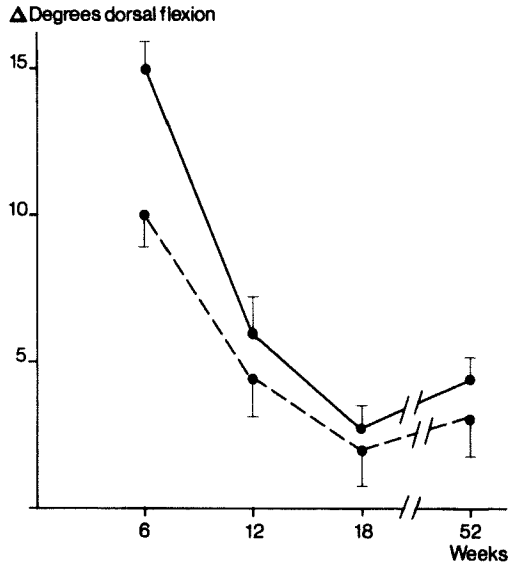

Figure 1. The difference in the range of dorsal flexion between the operated and intact ankles (mean ± standard error). —— plaster cast, – – – without. $p < 0.01$.

urement. The values returned to near zero level during the year.

As regards strength, osteoporosis and ankle joint cartilage height, no significant differences were found between the groups at any time.

Swelling. At 12 weeks, 19 patients in the plaster group and nine patients in the mobilization group had ankle swelling ($P < 0.05$). At 52 weeks, ten patients in the plaster group and seven in the mobilization group still had a slight tendency to oedema.

Pain. The patients in the mobilization group had less painful ankles than the patients with plaster cast immobilization at 6, 12 and 18 weeks. At 52 weeks, the groups were quite similar with seven and eight patients, respectively, having slight pain.

Discussion

Our policy was to operate most ankle fractures, except for minimally displaced fractures of type A (Weber 1965) with a 1 mm lateral displacement of the lateral malleolus.

Postoperative immobilization of ankle fractures has been considered less favourable (Olerud et al. 1978), and some authors do not advocate plaster immobilization at all (Weber 1972); some use it initially (Meyer & Kumler 1980, Lund-Kristensen et al. 1981), and some have used it after an initial period of free movement without weight bearing (Vasli 1957, Burwell & Charnley 1965, Lindsjö 1980). Others have used continuous immobilization in the postoperative period (Yde & Kristensen 1980).

Plaster cast immobilization for 6 weeks did not diminish the strength of the ankle motion in our trial compared with the initially mobilized ankles. The ranges of motion were reduced initially but after the cast removal the ankle movements rapidly improved and were similar to the motion in the initially mobilized ankles at 3 months. After 1 year, the ranges of motion were nearly normalized in both groups. This result compares favourably with other reports of postoperative ankle motion (Lindsjö 1980). The rapid regaining of motion from 6 to 12 weeks may be due to the positive attitude to exercises and resumption of weight bearing at 6 weeks.

Plaster cast treatment did not have any additional effect on the development of post-traumatic osteoporosis. The highest number of patients with osteoporosis was seen at the end of the first 6 weeks. A similar observation was made by Burwell & Charnley (1965).

According to Burwell & Charnley (1965), joint stiffness and swelling should benefit most from active exercises. We found that immediate physiotherapy and active exercises postoperatively cannot eliminate swelling. At 18 weeks, the group with a plaster cast caught up, even if there was a tendency to a slight difference in favour of the primarily mobilized group. Recordings of pain did not show any definite difference between the groups, but the results tended to be more favourable in the group without a plaster cast.

We conclude that plaster immobilization after ankle fracture results in a minor increase in morbidity. If the patient is cooperative and fixation of the fracture stable, an early mobilization (after 1 week of bandaging) is preferable. However, in not very cooperative patients who cannot avoid weight bearing and in cases where a stable osteosynthesis could not be

achieved, one should not hesitate to use a plaster or other cast for a 6-week period.

Acknowledgements

Our thanks are due to Jon Lekven, MD., for assistance in the statistical planning and analysis of the study.

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