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Conservative functional treatment of ankle fractures

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Abstract Thirty-eight patients (mean age 49 years; range 19–91 years; nine of them over 60 years; 28 women, 10 men) suffering from an isolated Weber B fracture with a dislocation of less than 1 mm underwent functional therapy using a pneumatic ankle brace and were included in a prospective study. The clinical outcome was measured according to the Olerud-Molander ankle score. Functional therapy was finished in 34 cases successfully. Twenty-one patients were scored after 17 months on average (range 8–27 months) with the Olerud-Molander ankle score. A very good result was seen in 18 patients, including 12 with 100 points, a complete remission. The remaining 3 patients showed good results (1 had 90, 2 had 85). However, functional treatment failed in 4 cases due to secondary dislocation. These patients underwent surgery without further complications. The control group, 31 operated patients, did not show as good results. Functional therapy of stable Weber-B ankle fractures appears to be superior to surgery. We were able to avoid surgery in 90% of our patients and got better results than with patients undergoing open reduction and internal fixation.

Keywords Ankle fracture · Weber B · Conservative treatment · Functional treatment

Introduction

The ankle fracture is one of the most common fractures in orthopedic traumatology.

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Open reduction and internal fixation form the standard procedure in a displaced or unstable Weber-B fracture (AO-Denis-Weber schema) [2].

Over the past few years, the surgical philosophy regarding the optimal treatment of ankle fractures has undergone many changes. The optimal handling of stable and/or up to 1 (or 2) mm displaced fractures is still under discussion: Whereas open reduction and internal fixation following AO guidelines with subsequent early motion was favored in the German literature [7], Anglo-American authors [6] have recommended conservative treatment over the past 20 years as well [4, 10].

Functional treatment of ligamental injuries and early postoperative motion using an ankle brace are established methods [9]. Sufficient edema resolution after acute ankle fracture has also been reported [8].

The successful use of an air stirrup ankle brace in stable Weber-B fractures of the lateral malleolus was first described by Richter and Muhr [5] in 1998.

The aim of this study was to determinate the indications for conservative functional therapy and to evaluate the outcome of our first patients in a prospective study in comparison with patients undergoing surgery.

Patients and methods

A retrospective and prospective study of patients with an isolated Weber-B fracture (AO-Denis-Weber classification) of the distal fibula was performed. Thirty-eight patients (mean age 49 years; range 19–91 years; nine of them over 60 years; 28 women, 10 men) undergoing conservative functional therapy (starting July 1997) were included in a prospective study.

The control group for the clinical results consisted of patients undergoing surgical therapy. The case notes and X-rays of 23 patients (mean age 44 years; range 22–75 years; five over 60 years; 16 women, 7 men) were reviewed retrospectively. The standard surgical procedure was open reduction and internal fixation following AO guidelines (1/3 tubular plate in all cases) with subsequent early motion using a pneumatic ankle brace for 6 weeks from January 1997 or immobilization in a plaster cast for 4–5 weeks.

The criteria for conservative functional treatment were: isolated Weber-B fracture, dislocation of less than 1 mm, stable fracture, cooperative patient.

Table 1 Olerud-Molander ankle score (total score = 100, excellent: 91–100, good: 61–90, fair: 31–60, poor: <30) [5]

Symptoms	Severity	Points
1. Pain	None	25
	While walking on uneven surface	20
	While walking on even surface	10
	While walking indoors	5
	Constant and severe	0
2. Stiffness	None	10
	Present	0
3. Swelling	None	10
	Evenings only	0
4. Stair climbing	No problems	10
	Impaired	5
	Unable	0
5. Running	Possible	5
	Impossible	0
6. Jumping	Possible	5
	Impossible	0
7. Squatting	No problems	5
	Unable	0
8. Support	No support	10
	Taping, wrapping	5
	Stick, crutches	0
Work, activities of daily living	Same as before injury	20
	Loss of tempo	15
	Changed to a simpler job/part-time	10
	Disabled, strongly impaired work capacity	0

Exact X-rays are important (sagittal and anteroposterior with 15° inside rotation) to exclude additional injuries. Functional treatment was done as follows: AIRCAST ankle brace for 6 weeks, full weight-bearing on crutches when the pain allowed it, physiotherapy starting after 7 days, X-ray follow-ups at least within 7 days and after 3 weeks.

Patients with a follow-up of at least 8 months were called by phone to complete the functional ankle score (Olerud-Molander ankle score) [3] (Table 1).

Results

Surgical treatment group

Twenty-three patients underwent surgical treatment, in all cases open reduction and internal fixation with a 1/3 tubular titanium plate. The mean clinical follow up was 6.2 months (range 0.5–16 months).

Ten patients wore a plaster cast for 5–6 weeks after surgery until January 1997. Later patients (all of the remaining 13) underwent postoperative early motion with an ankle brace.

Postoperative complications were seen in one case, and a superficial wound infection in one case.

Of the 23 patients, 19 showed good clinical results (no pain, no swelling, no loss of motion) within the clinical follow-up of 6–8 weeks. In 4 patients, the results were un-



Fig. 1A, B X-ray of a 19-year-old man suffering a Weber-B ankle fracture (A), control X-ray (day 42) following conservative functional therapy with no further dislocation (B)

satisfactory within this period of time: One patient suffered occasional pain and mild swelling, another only occasional pain. Two patients had impaired motion. However, X-rays showed good results in all cases; there was no loss of reduction and regular implants in all cases.

Fourteen patients were scored with the Olerud-Molander ankle score after at least 8 months (mean follow-up 16.9 months, range 8–36 months). A very good result was seen in 9 patients (95 points in all cases). Five patients showed good results (2 had 90, 3 had 85).

Average time off of work was 10 weeks in this group, almost twice as long as in the group undergoing functional therapy.

Conservative functional treatment group

Functional treatment of a Weber-B fracture was started in 38 patients and finished successfully in 34.



Fig. 2A,B Control X-ray (A) and functional views (B) 18 months after the accident

The mean clinical follow up was 7.5 weeks (range 2–24 weeks). Of these 34, 29 showed good clinical (no pain, no swelling, no loss of motion) and radiological (no dislocation) results within a period of 6–8 weeks. Three patients suffered occasional pain and mild swelling, two only occasional pain. A secondary dislocation of 1 mm on control X-rays was observed in 1 case. However, functional treatment was continued in this case with no further dislocation and a very good clinical result.

Twenty-one patients were scored with the Olerud-Molander ankle score after a mean follow-up of 17 months (range 8–27 months). A very good result was obtained in 18 patients. Among these were 12 with 100 points, a complete remission. The remaining three patients showed good results (1 had 90, 2 had 85). The functional treatment was finished successfully by all patients aged over 60 years (score: 6 very good, 2 good).

Beside the dislocation in 4 cases, there was one complication. A 46-year-old man suffered a deep leg vein thrombosis after 6 weeks, which appeared suddenly following removal of the ankle brace.

However, functional treatment failed in 4 patients due to secondary dislocation, including 1 with incorrect indications (dislocation >2 mm and rupture of the syndesmo-

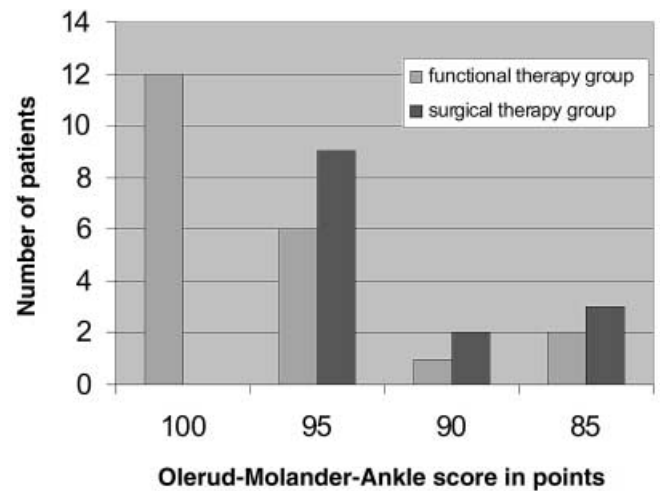


Fig. 3 Olerud-Molander score following conservative functional or surgical therapy

sis). They all underwent surgery within 7 days after edema resolution without further complications.

Average time off of work was 5.4 weeks in this group.

Interestingly, there was 1 patient with an unstable, 1 mm displaced fracture, who refused surgery with plate osteosynthesis. Functional therapy was carried out with a very good result (Fig. 1; Fig. 2; Fig. 3).

Discussion

That the results of surgery are not as good as conservative functional therapy agrees with our own findings and the literature, too. Ponzer et al. [4] reported a mean Olerud-Molander ankle score of 84 following operation for a single Weber-B fracture; 64% of patients scored 90 or more. Only 13 patients (36%) reported a complete recovery. Sixteen patients (44%) had work-related problems, and 22 (61%) had some problems with sport activities. Similar results are reported by Lim and Lim [2] and Van Laarhoven et al. [10]. Van Laarhoven included 579 patients in a retrospective study with a median follow-up of 5 years. He provided a broad indication for conservative, even functional (tape bandaging) treatment, and restricted use of implants during osteosynthesis appears justified considering the results obtained.

Leach and Fordyce [1] reviewed the results of ankle fracture fixation in 76 patients aged over 50 years with special reference to early complications and found complications in 15% (1.8% infection, 5.2% delayed healing and wound necrosis, malunion in 7.9%). These risks were acceptable to the author.

Functional treatment of a stable Weber-B fracture was first reported by Richter and Muhr [5] in 1998 with very good results. In 34 of our patients, we obtained excellent results with complete functional therapy, better than for patients undergoing surgery. The 4 patients with a secondary dislocation did not suffer any disadvantages, except a

slight delay in surgery. The elderly, potentially having a higher risk of local and general postoperative complications, did very well with functional therapy in our group and obviously reaped the most benefits.

However, Richter and Muhr [5] did not report any therapy failure in their group, probably due to a more aggressive primary X-ray regime, including handheld radiological stress views to classify fractures as stable and unstable. Patients with a fragment dislocation of up to 2 mm were categorized as stable and treated conservatively and functionally. [5]

Stress views were not performed in the present study to avoid further stress and painful examinations. Instead, the maximal possible dislocation for possible functional therapy was reduced to 1 mm. However, a secondary dislocation was seen in 4 of our patients (among these 1 with a wrong indication).

A more extended X-ray examination may reduce the frequency of therapy failure (10% in our patients) due to secondary dislocation. We do not recommend stress views generally for every patient but definitely in any case of doubt of a fracture being stable.

The advantages of conservative functional therapy are: comfort for the patient, superior results compared with surgery, shorter time off work, low costs.

It appears to be questionable to call possible secondary dislocation a disadvantage, since that patient would have undergone surgery anyway.

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