Long-term outcome after ruptured lateral ankle ligaments

A prospective study of three different treatments in 79 patients with 11-year follow-up

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In a prospective study of 79 patients with arthrographically verified acute ruptured lateral ankle ligaments we have evaluated the long-term results of 3 different treatments: operation and walking-cast for 5 weeks, walking-cast alone, and elastic bandage. The follow-up period was 11 (9–13) years. Residual disabilities and late complications, such as instability, pain on activity, and the number of ligament reconstructions and talocrural arthroses were equally low in all 3 groups.

We conclude that nonoperative treatment seems adequate.

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Inversion trauma to the ankle is frequent and causes rupture of the lateral ligaments in about 10 percent (Petersen and Lind 1985). Controversy about the best treatment has led to a number of studies, most of which have a follow-up time of 2 years or less. Therefore, we evaluated the long-term results of 3 different treatments.

Patients and methods

During the period 1979 through 1982, 149 patients with arthrographically verified rupture of the anterior talofibular ligament (ATFL) alone or in combination with the calcaneofibular ligament (CFL) were included. None of the patients was younger than 15 years. All the arthrographies were assessed by a specialist in radiography. The diagnostic value of arthrography is above 95 percent (Broström et al. 1965) and the method had been implemented in our department for more than 2 years before the study started (Frøkiær 1981). Inclusion criteria for arthrography were: a) inversion injury within 24 hours, b) hematoma and tenderness in the ATFL and/or CFL and severe pain inhibiting walking, c) no fracture, present or earlier.

In the period May 1979–June 1981, patients were randomly (by envelope drawing) allocated to operation and a below-knee walking plaster cast for 5 weeks (41 patients), or walking-cast alone (43 patients) (Petersen and Lind 1985). In the next period July 1981–August 1982, patients were randomized to a walking-cast (32 patients), or an elastic bandage until absence of pain and then early mobilization (33 patients) (Lind 1984).

At follow-up in 1992, 2 patients had died, 7 had emigrated, and 37 patients had left the South of Denmark. 1 patient was excluded because of rerupture after a repeat trauma and because she had undergone two kinds of treatment. 24 other patients refused to take part in the follow-up. Thus, 78 patients were available for follow-up examination, 18 had been operated on, 44 had worn a walking-cast and 16 an elastic bandage. There were 31 women and 47 men. The mean age was 37 (25–64) years and the observation time was 11 (9–13) years.

All interviews and clinical examinations were performed by the same orthopedic surgeon and all the radiographic examinations, including stress radiographs, were done by the same radiologist.

Ankle motion was measured with a goniometer. Instability was clinically assessed using the anterior drawer test (ADT) at neutral flexion (Kjærsgaard-Andersen et al. 1991) and radiographically by talar tilt (TT) (Johannsen 1978). TT was measured in mm and in degrees. The difference in TT between stable and unstable ankle joints was set at ≥ 3 mm (Johannsen 1978) or ≥ 6° (Freeman 1964). Functional instability was defined as the subjective symptom of repeated giving way, with or without objective instability (Karlsson and Lansinger 1992). The number of secondary inversion traumas requiring treatment was recorded, as also was the patient's use of

Table 1. Initial characteristics and crucial results concerning the injured ankle in the 3 treatment groups. Mean, *SD*

	Elastic bandage n 16	Walking-cast n 44	Operation n 18	P-value
Gender (f/m)	5/11	21/23	5/13	
Age at injury (years)	25	28	27	
Follow-up time (years)	11 *0.9*	11 *1.1*	11 *0.9*	
Ankle dorsiflexion (degrees)	12 *6.6*	12 *5.0*	11 *3.3*	1
Ankle plantar flexion (degrees)	39 *6.6*	40 *6.4*	40 *6.7*	1
Radiographic talar tilt (degrees)	3.0 *3.3*	1.7 *1.8*	2.1 *1.9*	0.9
Radiographic talar tilt (mm)	6.4 *1.5*	5.4 *1.7*	5.9 *1.2*	0.1
Functional instability (number)	1	3	1	
Fraction (binomial confidence limits)	0.06 (0–0.3)	0.07 (0.01–0.19)	0.06 (0–0.27)	
Pain on running (number)	0	4	0	
Fraction (binomial confidence limits)	0 (0–0.20)	0.09 (0.02–0.22)	0 (0–0.18)	
Patient's assessment (number)				
good	13	32	15	
fair	3	9	2	
poor	0	3	1	
Fraction (binomial confidence limits)	0 (0–0.21)	0.07 (0.01–0.19)	0.06 (0–0.27)	

supportive bandage at different activities.

The clinical and radiographic parameters were analyzed statistically, using the Kruskal-Wallis test for homogeneity among the 3 treatment groups. We have used 95 percent confidence intervals. The binomial confidence limits were calculated for each parameter in the 3 treatment groups. As regards patient assessment the good and fair results were grouped and compared to the poor group.

Results

The subjective and objective outcomes did not differ between the 3 groups (Table 1). While there were few complaints of severe pain at rest, walking on even or on uneven ground, there were 4 patients with severe pain on running or during sports activities. 1 of the patients had severe pain at rest and she was the only one who used analgetics intermittently. 5 patients had functional instability. Supportive bandages were used by 15 patients at different activities, 3 at work and 12 during sports. 3 patients had more than a few treated secondary inversion traumas and 10 patients had inversion injuries of the other ankle. No ligament reconstructions were performed. 1 of the patients had pronounced ankle stiffness, 1 had severe edema and 1 patient had a severe reduction in walking distance. The subjective overall result was judged as poor by 4 patients, acceptable by 14 and good by 60 patients. A few from the group treated with an elastic bandage felt that there had been little, if any, supportive effect during the first part of the treatment.

Clinical examination revealed 4 patients with moderate edema at the lateral side of the ankle. 3 patients had marked tenderness over the ATFL. The mean ankle flexion was 40° (25°–52°) and dorsiflexion was 11° (0°–22°). There were 4 patients with severe instability assessed by ADT, whereas 37 patients had moderate instability and 37 had stable ankles.

Stress radiographs showed instability in 12 cases when the limit ≥ 3 mm was used, but only in 1 case using the limit ≥ 6°. Only 5 of the patients with instability ≥ 3 mm had functional instability.

Moderate arthrosis was present in 4 ankle joints, none had severe arthrosis.

Discussion

We found similar outcomes in all 3 treatment groups. Our findings may be questioned, since only about half of the patients underwent follow-up examination, making 2 of our treatment groups relatively small. However, our observations correspond to studies where the follow-up time was only 0.5–1 year, and where equal, or even better, results after functional treatment (tape or elastic bandage and early mobilization) were reported (Freeman 1965, Lind 1984, Møller-Larsen et al. 1988, Sommer and Arza 1989).

Larsen and Henriksen (1993) advocate tape bandage and confirm the findings of Broström (1966): recommendation of strapping as a routine method. If instability persists, suture of the ligaments is possible, even after several years. A tape bandage may be superior to the elastic bandage we have used, since it gives more support and will stay on as applied, despite mobilization. Perhaps this will meet the criticism (complaints of too little supportive effect) we encountered in the group treated with an elastic band-

age. We allowed an early active range of movement training, but did not prescribe or encourage continued peroneal strengthening or proprioceptive and coordination training. Such training may be of importance, since there is doubt about a direct correlation between mechanical instability and the development of chronic functional instability (Karlsson and Lansinger 1992). Our findings seem not to support a direct correlation, as only 5 of 12 patients with instability on stress radiographs had functional instability. Our frequency of functional instability (6 percent) is not markedly different from the 10–20 percent stated by Karlsson and Lansinger (1992).

The numbers of patients with pain on activity and those with talocrural arthrosis were low. Our only selection criterion was age, and we have not recorded the changes in sports activity since these, in general, change over a decade, with or without the presence of injuries.

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