

EARLY MOBILIZING TREATMENT IN LATERAL ANKLE SPRAINS

Course and Risk Factors for Chronic Painful or Function-limiting Ankle

Frank Linde, Inge Hvass, Uwe Jürgensen and Frank Madsen

From the Department of Orthopaedic Surgery, Central Hospital, Esbjerg, Denmark

ABSTRACT. In a prospective study, 150 patients with lesions of lateral ankle ligaments were treated with early mobilization without any fixation of the ankle. After 8 days, 67 % were free from pain on ordinary walking and 81 % had resumed work. After 1 month 90 % were free from pain and 97 % had resumed work. Sport was resumed by 70 % of athletes after 1 month and 90 % after 3 months. At the 1-year follow-up ($n=137$), 18 % were not fully recovered and experienced pain (14 %) or functional instability (7 %) or had not resumed sport at their normal level (7 %). However, only 8 % found the condition inconvenient. Athletes had an increased risk of residual symptoms ($p<0.01$) and residual symptoms occurred in 32 % of top athletes after 1 year.

Key words: Ankle, early mobilization, injuries, rehabilitation, sprain, therapy

Early mobilization is a recognized method of treatment of lateral ankle ligament lesions (1, 2, 4, 5, 8-11). The rehabilitation time is shorter than in treatment with plaster or operation (1, 2, 4, 8, 10, 11) and probably due to a better proprioceptive control, the final result as regards stability is better than in treatment with plaster alone (4). However, early mobilization usually involves residual symptoms in about 1/4 of the patients, though only a few serious. It would be desirable if, even at the first examination, those patients who risked a poor final result could be selected in order to offer them alternative treatment.

The aim of this study was to describe in a prospective series the course of early mobilizing treatment in ankle sprains and to demonstrate any risk factors of a chronic painful or function-limiting ankle.

METHODS

Ankle sprain was defined as a lesion following an inverting injury, with swelling and pain at the lateral ankle joint but with no fractures apart from small avulsions.

Criteria for entrance

1. injury not more than 24 hours old
2. not combined clinical adduction instability and anterior drawer sign
3. no other acute or chronic immobilizing lesion and no residual symptoms from a previous sprain
4. age 15 years and above
5. consent to meeting for the follow-up examination.

Upon entering the study, the patients were examined clinically and a conventional X-ray examination was performed to exclude any fracture. The following risk factors were registered: age, sex, sports activity and level, previous sprain of the same ankle, inflammatory scoring points according to the scoring system by Linde et al. (6) based on degree of pain, functional ability, amount of swelling, range of active motion and degree of pain on passive motion. Further, localization of the swelling, haemarthrosis, which ligaments were affected (determined by careful palpation for tenderness of the anterior tibiofibular ligament, the anterior talofibular ligament, the calcaneofibular ligament, the posterior talofibular ligament, and the calcaneocuboidal ligament), adduction instability and the anterior drawer sign. The patients were instructed to keep the foot elevated during the first 24 hours, then to start doing motion exercise and weight bearing according to ability. Re-examinations were made after 4 and 8 days, 1 and 3 months, and after 1 year. At each of the first 4 re-examinations the patients were evaluated by the scoring system and a new careful physical examination. The 1-year follow-up was made by telephone interviews and questionnaires, and patients who were not completely recovered underwent a clinical examination and were X-rayed under the drawer sign test and the talar tilt test and were offered ankle arthroscopy in order to evaluate the condition of the cartilage. The scoring system for pain and function was modified for the final evaluation in order to detect even small residual symptoms (Table II). The final result was evaluated blindly in relation to the registered risk factors.

The Chi-square test and the Mann-Whitney's rank test with a 5 % significance level were used for statistical calculations.

Of the 150 consecutive patients entering the study, 137 (91 %) were followed until the 1-year re-examination. Of the 13 patients lost to follow-up, one had died and the others did not show up for re-examination, did not answer questionnaires, and could not be contacted by telephone.

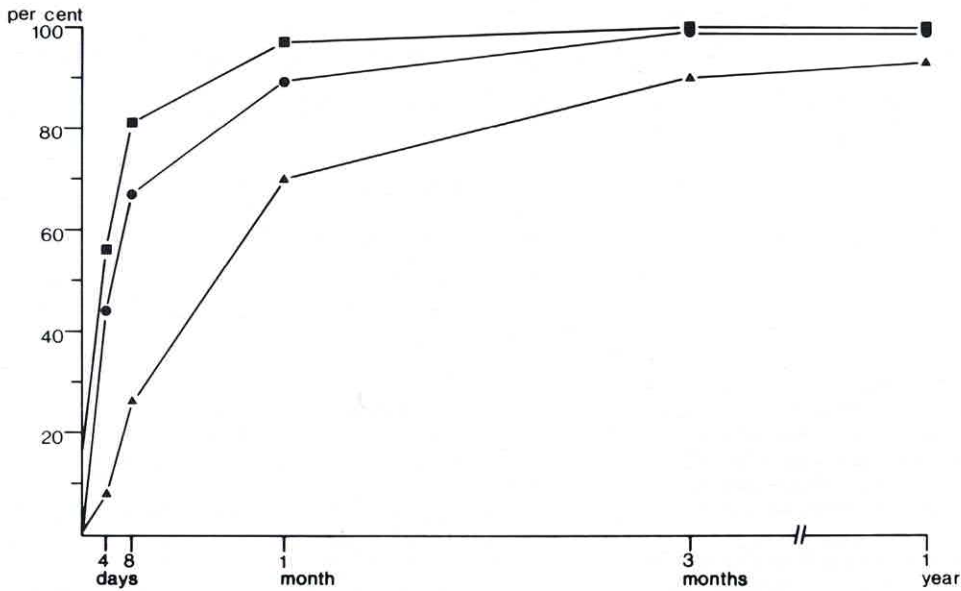


Fig. 1. Course for function and walking pain by early mobilizing treatment. ●, free from pain on ordinary walking; ■, work resumed; ▲, sports resumed.

Of the 137 patients included in the study, 84 were men and 53 women. The median age was 28 years (16–75 years). Among the patients who did not fulfil the criteria for entrance only 3 were excluded due to the criteria of gross instability (both clinical adduction instability and anterior drawer sign). These 3 patients were treated with a plaster cast for 6 weeks. All the other patients who did not fulfil the criteria for entrance were treated with early mobilization—like the patients included in this study.

RESULTS

After 8 days, 2/3 were free from pain on ordinary walking, which increased to 90% after 1 month and 99% after 3 months. Work had been resumed by more than half of the patients after 4 days, by 81% after 8 days, 97% after 1 month, and all were

working within 3 months. Sport was resumed by 70% of athletes after 1 month and 90% after 3 months (Fig. 1).

Twenty-four patients (18%) had residual symptoms after 1 year, but only 11 (8%) found the condition inconvenient. Tables I and II show the type of residual symptoms after 1 year. Fourteen per cent had pain on certain occasions and 11% had symptoms of instability (contracted another sprain of the same ankle or had a feeling of giving way). Five of the 6 patients who contracted a new sprain of the same ankle did so between 3 months and 1 year after entering the study and one patient between 1 and 3 months. Only in 4 cases could a positive talar tilt or an anterior drawer sign be demonstrated during an X-ray examination. Two

Table I. Residual symptoms after 1 year

Type of symptoms	Total n=137	First sprain n=99	Previous sprain n=38
Pain	19 (14%)	9 (9%)	10 (26%)
Function-limiting	10 (7%)	7 (7%)	3 (8%)
Contracting a new sprain	6 (4%)	3 (3%)	3 (8%)
Feeling of giving way	10 (7%)	6 (6%)	4 (10%)
Total	24 (18%)	13 (13%)	11 (29%)
Inconvenient condition	11 (8%)	6 (6%)	5 (13%)

Table II. Scoring system for pain and function

Points	Symptoms	No. of patients after 1 year		
		Total n=137	First sprain n=99	Previous sprain n=38
Pain score				
12	Pain at rest	0	0	0
9	Pain on weight bearing	0	0	0
6	Pain on ordinary walking	1	0	1
3	Pain during sports etc.	6	0	6
2	Pain after sports etc.	6	4	2
1	Pain only on certain motions	6	5	1
0	No pain	118 (86%)	90 (91%)	28 (74%)
Function score				
12	Unable to stand on the foot	0	0	0
8	Unable to work	0	0	0
6	Impeded for work	0	0	0
4	Unfit for sports	2	1	1
2	Sports resumed but not at normal level	8	6	2
0	No functional impairment	127 (93%)	92 (93%)	35 (92%)

per cent had not resumed sport and 5% had resumed sport but not at their normal level. Patients with previous sprains of the same ankle prior to entering the study had residual symptoms more frequently (29%) than patients with the first sprain (13%), but the difference was not statistically significant. However, the pain sequelae were more serious in patients with previous sprains than in patients with first sprain ($p < 0.01$) while there was no difference in function (Table II). Ankle arthroscopy was made in 3 cases concerning osteoarthritis, loose body or sign of a misdiagnosed previous chondral or osteochondral fracture of the dome of

the talus. None of these 3 patients had signs of osteoarthritis or dome fracture sequelae, but a loose body was found and extirpated in one case. Ten patients with subjective instability were offered reconstruction of the ankle ligaments, i.e. a tenodesis using the peroneus brevis tendon (3). Nine of these patients refrained from operation, however, as the condition was not found too inconvenient.

Patients with recurrent ankle sprains who contract another sprain of the same ankle will hardly be offered a primary ligament suture as alternative to early mobilizing treatment but rather a reconstructive

Table III. Risk factors for chronic painful or function-limiting ankle after 1 year for patients with first sprains (n=99)

Risk factor	Total	No residual symptoms n=86	Residual symptoms n=13	p
Sex (male/female)	57/42	46/40	11/2	<0.05
Athlete	57 (58%)	47 (55%)	10 (77%)	NS
Top athlete	22 (22%)	15 (17%)	7 (54%)	<0.01
Haemarthrosis	31 (31%)	26 (30%)	5 (38%)	NS
Clinical adduction instability or anterior drawer sign	19 (19%)	16 (19%)	3 (23%)	NS
Swelling >3 cm	13 (13%)	11 (13%)	2 (15%)	NS
Inability to stand on the foot at the 4th day re-examination	16 (16%)	13 (17%)	3 (25%)	NS

tion. Risk factors were, therefore, evaluated for first sprains only (Table III). Haemarthrosis and clinical instability at the primary examination and inability to stand on the foot at the 4th day follow-up occurred with greater frequency in the group with residual symptoms than in the symptom free group, but the difference was not significant. Athletes accounted for no less than 77% of the group with residual symptoms against 55% of the group without. The figures for top athletes (defined as athletes training ≥ 3 times a week) were 54% and 17% ($p < 0.01$), respectively. Men had an increased risk of residual symptoms compared to women ($p < 0.05$), but this difference may be due to the fact that the percentage of athletes among men (69%) was greater than among women (45%) ($p < 0.025$). Age, localization or amount of the swelling, which ligament(s) affected, the degree of inflammatory symptoms and the course of these symptoms were not found to have any prognostic importance for the final result.

DISCUSSION

Painless normal walking had been reached by 90% and working ability by 97% by early mobilizing treatment after 1 month. If plaster treatment had been chosen for the more serious sprains, many ankles would have been immobilized in a cast at this time. However, no patients contracted another sprain during these first 4 weeks after entering the study. Thus, there is no reason to immobilize the ankle during the early healing phase of the ligaments with the purpose of preventing early recurrent sprains. Then a reason to use plaster treatment could be to gain a higher percentage of good end results, but as far as the authors know, no study has shown better end results in plaster treatment than in early mobilizing treatment. Several studies (1, 4, 5, 8) have, however, shown that early mobilization is as good as or even better than plaster treatment with respect to the final result. According to Freeman (4), this is due to a better proprioceptive sense in the ankle ligaments and capsule treated by early mobilization, but the cutaneous proprioceptive sense may be even more important (7). Since the nerve fibers in the ligaments and capsule have a lower tensile strength than collagenous fibers (4), there may be a serious damage to the proprioceptive nerve fibers in ligaments and capsule by even smaller sprains. The presence of the cutaneous pro-

prioceptive receptors may be the reason why the ankle nevertheless may be controlled.

So far it has been generally accepted that the more extensive the ligament injury was, the greater was the risk of a bad final result. Therefore, much effort has been made to determine the extent of the lesion by careful physical examination with or without anaesthesia and by arthrographies and stress X-ray examinations. In clinical studies, this has often caused differentiation in the treatment according to the extent of the ligament injury. However, the rationale of this has not been investigated until Nilsson (10) arthrographed all patients in his Oslo-study and gave them the same treatment (early mobilization). He found no correlation between the extent of the ligament injury evaluated arthrographically and the end result. The explanation may be that as regards proprioceptive control, an overstrained ligament may be as defect as a ruptured ligament.

In previous studies of early mobilizing treatment in ankle ligament injuries, residual symptoms between 16% and 39% (1, 2, 4, 5, 8-11) were found. Our results do not differ significantly from these.

The only significant prognostic factors for a less perfect final result were sports activity at a high level and male sex, which as far as sex is concerned may be due to a greater share of athletes among men than women. Nilsson (10) found that athletes more frequently contracted total ruptures than non-athletes, but this hardly accounts for the worse prognosis. It is more likely that most ankle ligament injuries leave a more or less pronounced permanent laxity (of mechanical or proprioceptive type), which by normal daily activity usually causes no symptoms.

Residual symptoms as in this study in 32% of top athletes 1 year after the first sprain are not satisfactory. Analogous observations are probably the reason why several authors recommend primary suture of ankle ligament ruptures in top athletes (1, 5, 12, 13). However, so far no controlled trials have been published, which shows that it is better to treat athletes by primary suture than by early mobilization.

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Address for offprints:

Frank Linde
 Trøjborgvej 66, 1. th.
 DK-8200 Århus N
 Denmark