

CLINICAL AND SOCIAL STATUS FOLLOWING INJURY TO THE LATERAL LIGAMENTS OF THE ANKLE

Follow-up of 144 Patients Treated Conservatively

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Out of 174 patients treated conservatively for injuries to the lateral ligaments of the ankle 144 were seen at follow-up after 3.1-6.1 years (mean 4.2 years), and clinical as well as social sequelae were recorded. The diagnostic criterion was a difference in talar tilt of 6 or more degrees between the injured and uninjured foot on inversion stress radiographs.

Occupational and athletic injuries, almost equally represented, made up a total of 64 per cent. Residual symptoms were present in 21 per cent, mainly in the form of functional instability, but only four patients (3 per cent) reported daily complaints. One patient had developed reflex dystrophy, and this was the only patient who had been referred for further orthopaedic treatment. There was a close correlation between pain on movement in the ankle joint and residual symptoms which were, incidentally, unrelated to the degree of primary talar tilt. All the patients seen at follow-up had normal range of movement in the talocrural and subtalar joints. Two patients with residual symptoms had stopped working, while in the others the working ability was unaffected.

The period off work had been twice as long for patients having heavy and fairly heavy work as for those doing light work. All football players with residual symptoms had had to give up playing, but only a few had daily complaints. This indicates that some symptom-free patients have in fact latent symptoms, elicited only by fairly severe strain.

Key words: ankle; ankle injuries; athletic injuries; lateral ligaments of the ankle; sprained ankles

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The diagnosis and treatment of injuries to the lateral ligaments of the ankle pose a problem which is still the subject of discussion (Anderson & LeCocq 1954, Ruth 1961, Freeman 1965, Broström 1965, Olerud 1967, Kolind-Sørensen 1975).

The present study was designed to elucidate the frequency of residual symptoms and their influence upon the working capacity and athletic performance in patients treated

conservatively for such injuries.

A subsequent report will deal with the radiological sequelae and muscular status in the same patients.

PATIENTS AND METHOD

At the Department of Orthopaedic Surgery, Odense University Hospital, radiography of the ankle in two projections, supplemented by inversion

stress radiographs with the foot in 20–30° plantar flexion, has been the routine practice in the event of clinical suspicion of injury to the lateral ligaments of the ankle in patients without fractures and having closed epiphyseal lines. With a view to follow-up, all inversion stress radiographs from the 3-year period January 1970 to December 1972 were reviewed.

The diagnosis of injury to the lateral ligaments of the ankle was made when the difference between talar tilt in the injured and uninjured foot, primary talar tilt = $(I-U)^\circ$ was at least 6 degrees (Freeman 1965). In this case there is rupture of the anterior talo-fibular as well as calcaneo-fibular ligament (Anderson et al 1952). Only patients with unilateral injury were included. The criteria were fulfilled by 179 patients. Five treated surgically were excluded, which leaves 174 conservatively treated patients, 144 of whom were seen at follow-up. Thirty could not be seen because they had gone abroad or refused to attend. There was no difference in primary talar tilt between these 30 patients and those who attended follow-up.

Of the 144 patients examined at follow-up 130 had been treated with a walking cast for 6 weeks and 14 by a supporting bandage until the pain had subsided. All were out-patients. None had had any special physiotherapy. The follow-up period ranged from 3.1 to 6.1 years, mean 4.2 years. The age distribution and sex ratio may be seen from Figure 1. The mean age was 26.9 years (15–75

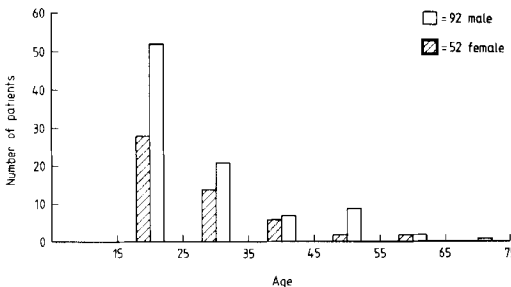


Figure 1. Age distribution and sex ratio of 144 conservatively treated patients.

years). Eighty per cent were 15–35 years. Fifty-two were females and 92 males. Of the injuries 71 were right-sided and 73 left-sided. Table 1 lists the accident situation. The majority were athletic injuries or injuries sustained at work (35.4 and 28.4 per cent, respectively).

Table 1. Situations of the accident

	Number	Per cent
Traffic	7	4.9
Place of work	41	28.4
Home	21	14.6
Sport	51	35.4
Others	24	16.7
Total	144	100.0

At follow-up the patients were questioned about residual symptoms and their influence upon their working ability and sports performance.

“Functional instability” (F.I.) is here taken to mean a feeling of insecurity and a tendency for the foot to “give way”. The clinical examination comprised palpation of the ankle and ligaments, clinical evaluation of instability in the ankle joint, assessment of active and passive mobility in the talo-crual and subtalar joints, and recording of pain, if elicited.

RESULTS

Residual symptoms. At follow-up 30 patients (20.8 per cent) had residual symptoms. Their follow-up period and mean age did not differ from those in the material as a whole. Table 2 gives the residual symptoms. Functional instability was the most important residual symptom, present in 26 patients. Four had merely periodical pain and swelling after strain. Only four patients reported major complaints, having weekly episodes of sprain-

Table 2. Residual symptoms at follow-up of 144 patients

	No. of pts.	Per cent
Pain and swelling	4	2.8
Functional instability (F.I.)	18	12.5
F.I. + pain and swelling	8	5.5
Total	30	20.8

Table 3. Residual symptoms in relation to primary talar tilt, (I-U)°. I=talar tilt in injured foot.
U=talar tilt in uninjured foot.

(I-U)°	No. of pts.	Pts. having residual symptoms
6°-7°	58	10
8°-9°	38	8
10°-23°	48	12
Total	144	30

3 × 2 chi² test, chi²=0.989, degrees of freedom: 2, 0.6 < P < 0.7

ing. One of them had developed reflex dystrophy. Apart from this patient, none had been referred for further orthopaedic therapy. None was using a prophylactic supporting bandage. There was no difference in talar tilt or therapeutic result between the 14 patients treated with a supporting bandage and the 130 treated with a walking cast. In the following, therefore, the two groups will be analysed together.

Table 3 presents the severity of the injuries, assessed by the primary talar tilt (I-U)°, related to the incidence of residual symptoms. In one-third of the patients the difference in talar tilt between the injured and uninjured foot exceeded 10 degrees (maximum 23 degrees). There was no statistically significant difference in the frequency of residual symptoms between the three groups. Further analysis of the group having marked instability failed to disclose a further correlation between the degree of primary instability and the incidence of residual symptoms. Pain elicited by

movement in the talocrural and subtalar joints was present in seven patients, all of whom had residual symptoms. None had reduced mobility. Tenderness of the lateral ligaments was found in 17 patients, 8 of whom had residual symptoms.

Working ability. The patients' work at the time of the accident is graded into heavy, fairly heavy, and light, defined as: walking work with strain, walking work without strain, and mainly sedentary work.

The period off work was assessed according to the sick-leave period. Table 4 sets out the sick-leave period in relation to the heaviness of the work. There was a wide variation, but the mean period of sick-leave was approximately the same for patients with heavy and fairly heavy work and twice that for patients with light work. The difference is statistically significant. Two patients with residual symptoms had stopped working, including the one with reflex dystrophy. Three patients had not been working at the

Table 4. Period reported sick in relation to heaviness of work.

Group	Work	No. of pts.	Mean period reported sick weeks	(range)
I	Heavy	34	8.1	(1-30)
II	Fairly heavy	51	8.5	(1-72)
III	Light	56	3.6	(1-9)
IV	Not working	3		
Total		144		

Group I versus group II: unpaired t-test 0.490 < P < 0.495.

Groups I+II versus group III: unpaired t-test P < 0.0005.

time of the accident and were also not working at follow-up. None of them had residual symptoms. Twenty-nine patients had changed their occupation during the follow-up period. Ten of them had residual symptoms. However, a change to heavier work was equally common as a change to lighter work. There was no difference in the frequency of residual symptoms between the three occupational groups.

Sports performance. At the time of the accident 92 patients had been active in sport. Fifty-one of them (55 per cent) sustained their injury during sports activities, 35 in competitive sport and 16 while exercising. Table 5 gives the relationship between primary talar tilt ($I-U$)°, situation of accident, and residual symptoms. Competitive sport caused the most severe injuries, but not an increased frequency of residual symptoms. Forty-six patients were active football players at the time of the accident and 31 of these (67.3 per cent) sustained their injuries while playing. At follow-up residual symptoms were present in 10, 6 of whom had sustained their injury at football. All those having residual symptoms had had to give up playing football. However, three took up a lighter sport. Only two had problems in everyday activities. The 36 patients who continued playing football could do so after a mean interval of 18 weeks. Twelve of the 17

handball players sustained the injury while playing handball. Five had residual symptoms, but only one had had to give up playing. Among the other 16 patients the interval before resuming handball averaged 9 weeks. Twenty-nine patients were participating in other types of sport at the time of the accident and eight of them (28 per cent) had sustained their injury while doing so. At follow-up five had residual symptoms. All had continued to participate in sport, but two had changed to a lighter type. The mean interval before resuming was 14 weeks.

DISCUSSION

The value of inversion stress radiography is disputed, partly because of the wide physiological variation in talar tilt (Rubin & Witten 1960) and partly because it is often reported to be negative in ligamentous injuries diagnosed by other methods (Broström 1966).

However, a number of authors have found agreement between inversion stress radiographs and operative findings (Ruth 1961, Freeman 1965, Clark et al. 1965, Weber & Hupfauer 1969) and also with experimental findings (Anderson & Anderson et al. 1952). As a diagnostic criterion we used a difference of 6 or more degrees in talar tilt on the injured and uninjured foot (Freeman 1965). Our

Table 5. Primary talar tilt ($I-U$)° in relation to the situation of the accident and residual symptoms (144 patients).

I° = talar tilt in injured foot. U° = talar tilt in uninjured foot.

$(I-U)^\circ$	Competitive sport		Exercising		Other accident situations	
	Total pts.	Pts. having residual symptoms	Total pts.	Pts. having residual symptoms	Total pts.	Pts. having residual symptoms
6°–7°	11	2	8	1	39	7
8°–9°	10	1	2	1	26	6
≥ 10°	14	3	6	1	28	8
Total	35	6	16	3	93	21

therapeutic results accord with the results of some other authors also using conservative treatment (Broström 1966, Clark et al. 1965). Others have reported poorer results of conservative treatment. Thus, Ruth (1961) found residual symptoms in 58 per cent after a follow-up period of 2 years, Freeman (1965) in 44 per cent after a follow-up period of 1 year, and Niethard (1974) in 55 per cent after a 3.5 year follow-up. The treatment consisted, like ours, of a walking cast for 6 weeks; in Broström's cases, however, it was for only 3 weeks. Several authors (Anderson & LeCocq 1954, Ruth 1961, Weber & Hupfauer 1969, Kolind-Sørensen 1975) have recommended operative treatment of these injuries and have reported favourable results. In his 96 operated patients Broström (1966) found functional instability in 3 per cent and dysaesthesia and hypaesthesia at the scar in 7 per cent. In Ruth's material (1961) 50 per cent had symptoms, but only 10 per cent had major complaints. Among Freeman's (1965) patients 68 per cent had symptoms – half in the form of functional instability. Clark et al. (1965) found no difference between patients treated conservatively and by operation. Niethard (1974), in his surgically treated patients, after a follow-up period of 3.5 years, found symptoms in 40 per cent, in half these cases functional instability.

Thus, apart from the result obtained by Broström (1966), the results of operative treatment have not been better than our results of conservative treatment. In the operated patients, moreover, there has occurred wound infection, cutaneous necrosis, hypaesthesia/dysaesthesia, and a restricted range of movement.

The results among the football players indicate that the degree of strain decides whether residual symptoms become manifest. In the papers quoted above no special mention is made of the conditions under severe strain, but according to the varying results – as in the football players – some patients would seem to have latent symptoms which do not manifest themselves until elicited by severe strain on the foot.

CONCLUSION

1. Out of 144 patients treated conservatively for injuries to the lateral ligaments of the ankle 20.8 per cent had residual symptoms after a mean follow-up period of 4.2 years. Only four patients had major complaints.
2. A correlation between residual symptoms and primary talar tilt could not be demonstrated.
3. There was a close relationship between pain on moving the ankle and residual symptoms.
4. The period reported sick was significantly longer in patients having heavy and fairly heavy work than in patients with light work.
5. There was no demonstrable correlation between change of occupation and residual symptoms.
6. Residual symptoms influenced athletic performance only in the branches of sport which severely strain the foot (e.g. football).

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