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COMPRESSION BANDAGE IN THE TREATMENT OF ANKLE SPRAINS

A Comparative Prospective Study

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ABSTRACT. The value of a compression bandage applied for 4 days following ankle sprains was assessed in a comparative study. The effect of the treatment was evaluated by changes in an inflammatory score based on a combination of subjective (pain, function) and objective (swelling, limitation of movement, pain on passive movement) factors. The study included two consecutive series each of 50 patients treated with a compression bandage, and untreated. There was no significant difference in the reduction of the inflammatory score from start to the fourth day ($0.5<p<0.6$) or from start to the eighth day ($0.1<p<0.2$) between the group treated with compression bandage and the untreated group. Analysis of the individual factors included in the inflammatory score demonstrated no difference in the course of pain, function, swelling, or limitation of movement between the two groups.

Key words: ankle, bandages, injuries, rehabilitation, sprain, therapy

Early mobilization is a recognized method of treatment in lateral ankle ligament tears (3, 4, 5, 9, 10, 11). Supplementary anti-inflammatory treatment is often given with the purpose of increasing the speed by which pain and swelling is reduced and function regained. A common element in such a treatment is some kind of bandage. However, the value of bandage treatment has never been investigated. The aim of this study was to evaluate the effect on inflammatory symptoms of a short-term compression bandage treatment in ankle sprains.

METHODS

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

Criteria for entrance

1. injury not more than 24 hours old
2. not combined talar tilt and anterior drawer sign
3. no other acute or chronic immobilizing lesion
4. age 15 years and above
5. living in a defined area around Esbjerg

Criteria for exclusion

1. other treatment received
2. failure to appear for re-examination

The investigation comprised two consecutive series, each of 50 patients. One group was treated with elastic compression bandage around foot, ankle, and leg for 3–5 days (until the night before the first re-examination). The other group received no treatment. Re-examination was made on the 3rd–5th day and 7th–9th day after entering the investigation. Effect of treatment was evaluated by changes in an inflammatory score (Table I). Swelling was measured as difference on injured and uninjured side in sum of circumference on level with malleoli and tarsometatarsal joint. Limitation of movement was measured as difference in range from active dorsiflexion to plantar flexion between injured and uninjured foot.

The compression exerted by the bandage was evaluated by 10 experimental applications of bandage over a slightly distended blood pressure cuff around the ankle joint. Duration of the compressive effect of the bandage was examined up to 3 hours after application.

The investigation was carried out in the period 3.2.–24.7.1983. Of 173 patients fulfilling the criteria for entrance, 100 patients agreed to participate in the investigation. The 73 patients fulfilling the criteria of entrance but not wanting to participate in the investigation were treated with early mobilization with or without compression bandage as desired. Among 61 patients who in the same period did not fulfil the criteria of entrance, three cases were with combined talar tilt and anterior drawer sign. These 3 patients were treated with plaster.

Of the 100 patients entering the study, 87 were followed until the first re-examination (44 in the group treated with bandage and 43 in the untreated group) and 74 to the second re-examination (40 in the group treated with bandage and 34 in the untreated group). The median age was 27 years (17–75 years) and 30 years (16–72 years) in the group treated with or without bandage, respectively. In order to assess any difference in the degree of severity of sprains between the two groups, the inflammatory score on entering the study was compared.

The Mann-Whitney test with 95% significance level was used in the statistical analyses.

Table I. *Inflammatory scoring system*

Subjective factors	max. 24 points
Pain	Points
Pain at rest	12
Pain on weight bearing	9
Walking pain	6
Pain during sports	3
No pain	0
Function	
Unable to stand on the foot	12
Unfit for work	8
Unfit for sports	4
No functional impairment	0
Objective factors	max. 24
Swelling	Points
More than 3 cm	8
Between 2 and 3 cm	6
Between 1 and 2 cm	4
Between 0 and 1 cm	2
No swelling	0
Reduced mobility:	
More than 40°	8
Between 30° and 40°	6
Between 20° and 30°	4
Between 10° and 20°	2
Less than 10°	0
Pain on passive movement	
Pain on any movement	8
Pain in the extreme position	4
No pain	0
Inflammatory score	max. 48 points

RESULTS

The pressure exerted by the bandage averaged 11.6 mmHg (9–16 mmHg) and the bandage was found to exert unchanged pressure 3 hours after application.

The median score upon entering the study was 29 for the group treated with compression bandage and 30 for the untreated group. The difference was not significant. There was a decrease in the median score from 29 to 17 from entering the study to the first re-examination and from 17 to 11.5 from the first to the second re-examination in the bandage-treated group. Similarly, there was a decrease in the median score from 30 to 16 and 14, respectively, in the untreated group. For both groups the difference from start to the first and second re-examinations was statistically significant ($p<0.01$). There was no statistical difference in the difference in inflammatory score from start to the first re-examination between the group treated with and without bandage ($0.5<p<0.6$) or from start to the second re-examination ($0.1<p<0.2$).

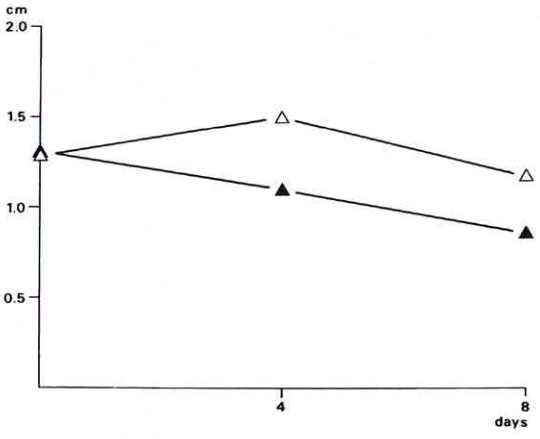

Fig. 1. Average swelling (▲, compression bandage; △, no treatment).

There was an increase in the average swelling from start to the first re-examination in the untreated group, while there was a decrease both to the first and from the first to the second re-examination in the group treated with compression bandage (Fig. 1). The difference was not significant. At the first re-examination a larger percentage of the group treated with compression bandage was free from walking pain than in the untreated group. This difference was greater at the second re-examination (Fig. 2). However, the change in the course of pain for the two groups was not significantly different.

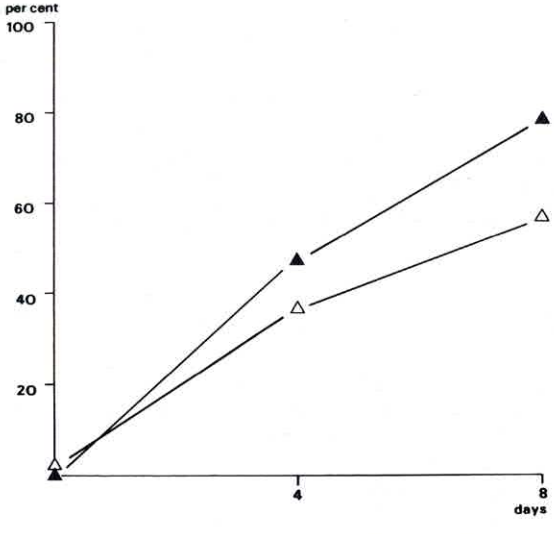

Fig. 2. Percentage of patients free from walking pain (▲, compression bandage; △, no treatment).

There was no difference in the course of the other factors included in the inflammatory score.

DISCUSSION

In conservative treatment of ankle sprains and lateral ligament ruptures, early mobilizing treatment has proved better than plaster treatment (3, 4, 5, 9, 10). When giving early mobilizing treatment, attention is paid to treating the inflammatory symptoms with the aim of reducing pain and regaining function as quickly as possible.

Joint aspiration with injection of local anaesthesia (12), hyaluronidase (7) or cortisone (10), locally applied anti-inflammatory gel (6), cooling (2, 10), and physiotherapy (3) have all, used together with bandage and early mobilization, proved better than bandage and early mobilization alone. No difference in the course of ankle sprains could be demonstrated by the use of a high-quality bandage compared with a more simple bandage (1, 3) as used in this study. However, the value of the hitherto almost obligatorily used bandage has not previously been assessed.

It has been demonstrated that post-traumatic swelling following experimental tibial fractures is reduced by an externally applied pressure of 10 mmHg (8). As shown in this study, a pressure of the same magnitude is obtained by application of an elastic bandage. Thus, there was reason to believe that such a bandage applied to ankle sprains could at least reduce the swelling.

However, our investigation has demonstrated no effect on inflammatory symptoms as assessed by an inflammatory scoring system. There was a larger reduction in swelling in the group treated with compression bandage than in the untreated group, but the difference was not statistically significant. A slightly larger part of the compression bandage group vis-à-vis the untreated group was free of walking pain after 4 and 8 days, but this difference was not significant either.

Based on this investigation there is no reason to recommend elastic compression bandage in order to suppress inflammatory symptoms in ankle sprains.

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