Functional treatments for acute ruptures of the lateral ankle ligament

A systematic review

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ABSTRACT – Our aim with this systematic review was to assess the effectiveness of various functional treatments for acute ruptures of the lateral ankle ligament in adults. We performed an electronic database search using MEDLINE, EMBASE, COCHRANE CONTROLLED TRIAL REGISTER and CURRENT CONTENTS.

We evaluated randomized clinical trials describing skeletally mature subjects with an acute rupture of the lateral ankle ligament and compared functional treatments for inclusion in this study. 9 trials met our inclusion criteria. Two reviewers independently assessed the quality of these trials and extracted relevant data on treatment outcome. Where appropriate, results of comparable studies were pooled. Individual and pooled statistics are reported as relative risks (RR) for dichotomous outcome and (weighted) mean differences ((W)MD) for continuous outcome measures with 95% confidence intervals (95% CI). Heterogeneity between the trials was tested using a standard chi-square test.

Persistent swelling at short-term follow-up was less with lace-up ankle support than with semi-rigid ankle support (RR 4.2 95% CI 1.3–14), an elastic bandage (RR 5.5; 95% CI 1.7–18) and tape (RR 4.1; 95% CI 1.2–14). A semi-rigid ankle support required a shorter period for return to work than an elastic bandage (WMD 4.2; 95% CI 2.4–6.1) (p = 0.7). One trial reported better results for subjective instability using the semi-rigid ankle support than the elastic bandage (RR 8.0; 95% CI 1.0–62). Treatment with tape resulted in more complications, mostly skin problems, than that with an elastic bandage (RR 0.1; 95% CI 0.0–0.8). We found no other statistically significant differences.

We conclude that an elastic bandage is a less effective functional treatment. Lace-up supports seem better, but the data are insufficient as a basis for definite conclusions.

Traditionally, a variety of treatments for acute lateral ankle ligament ruptures are used, the three main methods being (Kannus and Renström 1991):

1) Immobilization with a plaster cast or splint;
2) Functional treatment—i.e., an early mobilization program with use of an external support;
3) Surgical treatment.

Other treatments like ultrasound, cryotherapy, laser or homeopathy are either not effective (Ogilvie-Harris and Gilbart 1995, de Bie et al. 1998, van der Windt et al. 1999) or else the data are too few for conclusions based on the literature (Zell et al. 1988). In several reviews on treatment of acute lateral ankle ligament ruptures, early mobilization and functional treatment are advocated (Kannus and Renström 1991, Tiling et al. 1994, Ogilvie-Harris and Gilbart 1995, Shrier 1995, Kerkhoffs et al. 2001). One publication has shown slightly better results after surgical treatment (Pijnenburg et al. 2000). None of these reviews has permitted a proper comparison of various functional treatments. Therefore, we still do not know which is the best functional treatment.

An adequate state-of-the-art review contributes to the development or revision of evidence-based

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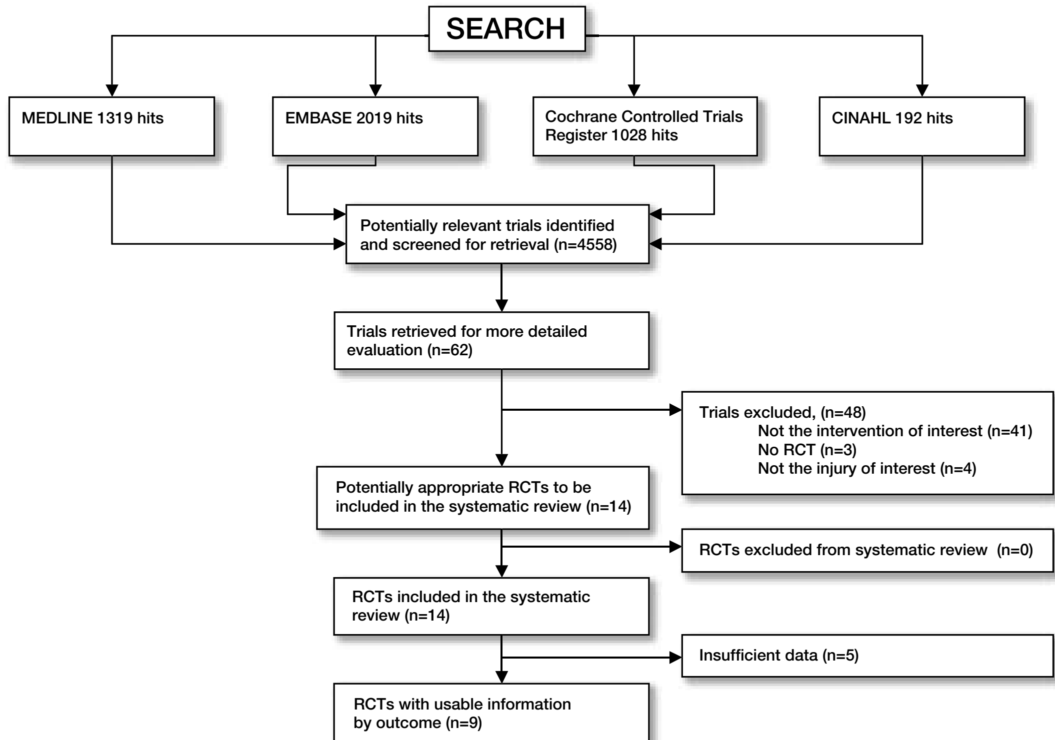

Flow chart selected trials.

recommendations for treatment of acute lateral ankle ligament ruptures. The premise of this review of available randomized controlled trials was that the outcome of various types of functional treatment was the same for acute injuries of the lateral ankle ligament complex.

Methods

Literature search. We obtained all studies comparing various types of functional treatment for acute lateral rupture of the ligament of the ankle by performing a computerized literature search using MEDLINE (from 01/1966 to 12/1999), EMBASE (from 01/1980 to 12/1999), COCHRANE CONTROLLED TRIALS REGISTER (12/1999) and CURRENT CONTENTS (12/99). Unpublished trial reports obtained from the authors were also used and no restrictions were made concerning the language of publication. The Cochrane Collaboration Musculo-skeletal Injuries Group search strategy was used to find all randomized and controlled clinical trials (Mulrow and Oxman 1999). The keywords and related free text words used were: ligaments, ankle injuries, sprains and strains, soft tissue injuries, ankle, injuries, ankle near injury, ankle ligament injury, ankle ligament lateral, ankle ligament treatment, ligament injury, anterior drawer, anterior talofibular ligament, calcaneofibular ligament, posterior talofibular ligament, lateral ligament complex, talar tilt, functional treatment, after treatment near lateral ankle ligament injuries. The reference lists of all incoming papers were checked for missed studies. A search for unpublished or unlisted studies was also done by contacting relevant organisations, for example, medical departments of the defense forces and sport associations. From the title, abstract, or descriptors, 2 reviewers (GK and PS) independently reviewed the literature searches to find relevant trials for full review. The reviewers were not blinded to the study, author, and journal of publication (Dickersin and Berlin 1992).

The results of the extended electronic database search and assessment of selected trials are

Table 1. Characteristics of studies included

Trial	Year	Sample size [a]	Smallest group size	M/F [b] (%)	Age	Injury (grade)	Diagnosis by [d]	Follow-up [e]	Treatment strategies	Outcomes D [g]	Outcomes C [g]
Allen	1985	51 (57)	15	74/26	15–65	I,II,III	PE, SR, AG	S	EB, tape	3	
Jongen	1992	88 (100)	44	67/33	18–50	II,III	PE	I	EB, tape	1,9,10	
Pasila	1975	120 (122)	?	50/50	15–70	II,III	PE	S	EB, tape	9	
Dettori	1994	54 (64)	16	93/7	25.6 [c]	II,III	PE, AG	S, I	EB, SR	7	
Karlsson	1996	86 (86)	40	66/34	16–38	II,III	PE, SR	L	EB, SR	1,2,3,4,5	
Leanderson	1995	58 (73)	?	66/34	15–55	II,III	PE	I	EB, SR		2
Zeegers	1995	243 (243)	59	70/30	15–50	I,II,III	PE, AG	S, I, L	EB, tape, SR, LU	2–6, 8	
Sommer	1993	103 (120)	33	62/38	18–45	III	PE, SR, AG	S, I	Tape, SR	7	2, 6
Twellaar	1993	112 (165)	52	65/35	33 [c]	II,III	PE	L	Tape, LU	3–5	

[a] Number of patients analyzed. The total no. of randomized patients is shown in brackets.
[b] M/F male/female.
[c] Mean.
[d] PE physical examination; SR stress radiograph; AG arthrography.
[e] S short-term; I intermediate-term; L >1-year follow-up.
[f] EB elastic bandage, SR semi-rigid ankle support, LU lace-up ankle support.
[g] D dichotomous, C continuous: 1 return to sports; 2 return to work; 3 pain; 4 swelling; 5 subjective instability; 6 objective instability; 7 recurrent sprain; 8 ROM; 9 complications; 10 satisfaction.

summarized in a flow chart (Moher et al. 1999) (Figure).

The following criteria were used to select randomized clinical trials for inclusion:

Target population. Studies that involved skeletally mature persons, with an acute rupture of the lateral ligament complex of the ankle were included. The diagnosis could be based on the physical examination (positive anterior drawer test, pain, swelling and hematoma) (van Dijk et al. 1996, Klenerman 1998), a stress radiograph (> 5 mm right-left difference on anterior drawer motion) or an arthrogram (leakage of contrast through the joint capsule) of the injured ankle. Trials dealing exclusively with children (where growth plate injuries predominate) or patients with congenital deformities or degenerative disorders were excluded. Trials that aimed at the treatment of chronic instability or postoperative treatment were also excluded. Chronic instability was defined as symptoms of pain, swelling, recurrent sprains and instability for more than 6 months (Karlsson et al. 1997).

Intervention programs. Any inpatient, outpatient, or home-based intervention program was included that comprised functional treatment. The control intervention program included any other type of functional treatment. We evaluated 4 methods with different mechanical characteristics (Cordova et al. 2000):

1) Elastic bandage/stocking, including all those that provide support with an elastic sock-like material (i.e., Malleotrain).
2) Tape, including all types that provide support with adhesive tape.
3) Lace-up ankle support, including all types that provide support using a soft canvas-like or nylon material (i.e., Push-brace).
4) Semi-rigid ankle support, including all those that provide support with a firm thermoplastic material comprising a stirrup or posterior rigid support (i.e., Aircast Sport-Stirrup).

It was assumed in this analysis that various types of lace-up and semi-rigid ankle supports in each group have similar mechanical characteristics (Cordova et al. 2000).

Outcome measures. The following 10 measures were analyzed: return to sports, return to work, pain, swelling, subjective and objective instability, recurrent injury, range of motion (ROM), complications and patient satisfaction. Short-term follow-up was defined as follow-up within 6 weeks of randomization, intermediate-term from 6 weeks to 1 year and more than 1 year.

Description of studies. 14 studies met the inclusion criteria (Table 1). 5 were excluded because

Table 2. Evaluation of methodological quality (Mulrow and Oxman 1999)

A. Was the assigned treatment adequately concealed before allocation?
B. Were the outcomes of patients who withdrew described and included in the analysis (intention to treat)?
C. Were the outcome assessors blinded to the treatment status?
D. Were the treatment and control groups comparable on inclusion?
E. Were the subjects blind to the assignment status after allocation?
F. Were the treatment providers blind to the assignment status after allocation?
G. Were the care program, other than the trial options, identical?
H. Were the inclusion and exclusion criteria clearly defined?
I. Were the outcome measures used clearly defined?
J. Was follow-up active and appropriate?
K. Was the duration of surveillance clinically appropriate?

of insufficient data. Of the remaining 9 studies, 4 were published in the English literature, 2 in German, 1 in Finnish and 2 in Dutch. 2 reviewers performed translation of the articles with the help of a native speaker.

Methodological quality of the studies. 2 reviewers independently assessed the methodological quality of each study, with a modification of the generic evaluation tool used by the Cochrane Collaboration Musculo-skeletal Injuries Group (Mulrow and Oxman 1999). Any disagreement was resolved by consensus. We used 11 items to assess internal and external validity (Table 2). Each item scored 0–2 points. Whenever necessary, we tried to contact the authors of the included trials to obtain more information about these quality items, if they were not adequately described in the article. The initial agreement of the 2 reviewers on the quality assessment of the included trials was 91% (91 of 99 items). The median kappa value (K) for measurement of agreement beyond chance of the separate quality items between these 2 reviewers was 0.81 (range 0–1). Trials with a score of at least 50% of the maximum (11 points) were a priori considered to be a high quality trial.

After our initial assessment, the quality score of included trials ranged from 5 to 15 points, with a mean score of 11 points (SD 3.0) (Table 3). This initial assessment resulted in 5 trials (Pasila et al. 1975, Allen and McShane 1985, Leanderson and Wredmark 1995, Zeegers 1995, Karlsson et al. 1996) being scored as high quality and 4 as low (Jongen et al. 1992, Sommer and Schreiber 1993, Twellaar et al. 1993, Dettori and Basmania 1994). After retrieving additional information from the authors, 1 trial (Jongen et al. 1992) was moved from low to high quality, but the 3 others remained of low quality.

Table 3. Methodological quality of trials included

Author	Methodological quality [a]		Positive validity items [b]
	Initial	After correspondence	
Pasila	15	15	A,B,D,G,H,I,J,K
Zeegers	14	14	A,B,D,G,H,I,J,K
Karlsson	13	13	A,B,D,G,H,I,J,K
Allen	11	11	A,B,D,G,H,I,J
Leanderson	11	11	A,D,G,H,I,J,K
Jongen	10	11	A,B,D,G,H,I,J,K
Dettori	9	9	A,D,G,H,I,J
Twellaar	7	7	A,B,G,I,J,K
Sommer	5	5	A,H,I,J

[a] The validity score consisted of 11 items (see Table 1) for a maximum of 2 per item (range 0–22): a score of 11 was considered high quality.
[b] Positive meant item score of 1 (small/moderate chance of bias) or 2 (no chance of bias).

Data extraction. The data were independently extracted using a pre-piloted data-extraction tool. After consensus, there was no disagreement between the reviewers and no third party adjudication was necessary. Whenever a trial was excluded because of insufficient data, we tried to contact the investigators for clarification.

Analysis. Where appropriate, results of comparable studies were pooled using fixed and random effect models with the help of Review Manager Software (Whitehead and Whitehead 1991). Individual and pooled statistics were reported as relative risks (RR) with 95% confidence intervals (95% CI) for dichotomous outcomes and weighted mean differences (WMD) and 95% CIs for con-

tinuous outcome measures. Statistical heterogeneity between the outcomes of trials was tested using a standard chi-square test. Separate analyses were done for short-term (ST), intermediate-term (IT) and more than 1-year follow-up (LT).

Results

Data extraction. Data were extracted on all relevant outcome measures, as described elsewhere. 6 types of comparisons could be done with the studies retrieved (Table 4):

I) Elastic bandage versus tape.
II) Elastic bandage versus semi-rigid ankle support.
III) Elastic bandage versus lace-up ankle support.
IV) Tape versus semi-rigid ankle support.
V) Tape versus lace-up ankle support.
VI) Semi-rigid ankle support versus lace-up ankle support.

I) Elastic bandage versus tape

4 trials compared the effectiveness of an elastic bandage and tape as treatments (Pasila et al. 1975, Allen and McShane 1985, Jongen et al. 1992, Zeegers 1995). Outcomes concerning pain and occurrence of complications have been reported in 2 trials (Pasila et al. 1975, Jongen et al. 1992), and the results were pooled. Treatment with tape caused in more complications, mostly skin problems, than an elastic bandage (RR 0.1; 95% CI 0.0–0.8). Outcomes regarding return to sports, return to work, pain, swelling, objective instability, subjective instability, range of motion and satisfaction, were reported only in single trials and no statistically significant differences were found.

II) Elastic bandage versus semi-rigid ankle support

4 studies compared treatment with an elastic bandage and a semi-rigid ankle support for acute ruptures of the lateral ankle ligament (Dettori and Basmania 1994, Leanderson and Wredmark 1995, Zeegers 1995, Karlsson et al. 1996). Return to work was the only outcome described in several trials. The results were pooled. The use of a semi-rigid ankle support resulted in a shortened period of return to work as compared to the use of an elastic bandage (WMD 4.2; 95% CI 2.4–6.1) (chi-square 0.2; p = 0.7). Zeegers (1995) reported better results with the semi-rigid ankle support than with an elastic bandage, concerning subjective instability at short-term follow-up (RR 8.0; 95% CI 1.0–62).

III) Elastic bandage versus lace-up ankle support

This comparison was made in 1 study. Zeegers (1995) found better results for persistent swelling, using a lace-up ankle support (RR 5.5; 95% CI 1.7–18). As regards return to work, pain, subjective and objective instability and range of motion, no statistically significant differences were noted.

IV) Tape versus semi-rigid ankle support

2 trials compared the effectiveness of tape with that of a semi-rigid ankle support (Zeegers 1995, Sommer and Schreiber 1993). The variety of outcome measures prevented pooling of the results, but no statistically significant differences were found in the individual trials concerning return to work, pain, swelling, subjective instability, objective instability, recurrent injury and range of motion.

V) Tape versus lace-up ankle support

In 2 trials (Twellaar et al. 1993, Zeegers 1995), treatment with tape was compared to a lace-up ankle support. As regards persistence of swelling at short-term follow-up, the lace-up ankle support was better in one trial (Zeegers 1995) (RR 4.1; 95% CI 1.2–14). At more than 1 year of follow-up, the results were pooled for pain, swelling and subjective instability. No statistically significant differences were found. The results after return to work, pain, subjective instability, objective instability and range of motion were described in individual trials. No differences were found.

VI) Semi-rigid ankle support versus lace-up ankle support

This comparison was described in 1 trial (Zeegers 1995). A better result was reported concerning persistent swelling at short-term follow-up favoring lace-up ankle support versus semi-rigid ankle support (RR 4.2; 95%CI 1.3–14). The outcomes concerning return to work, pain, subjective instability,

Table 4a. Results

Author	Comparison [a]	Outcome measure [a]	Short-term follow-up [b]	Intermediate-term follow-up [b]	>1-year follow-up [b]
Allen	EB vs. tape	Pain (D)	1.2 (0.7–2.1)		
Jongen		Return to sports (D)		1.3 (0.4–3.8)	
		Satisfaction (D)		1.2 (0.4–3.2)	
		Complications (D)		0.1 (0.0–2.0)	
Pasila		Complications (D)		0.1 (0.0–2.0)	
Zeegers		Return to work (D)	1.0 (0.3–2.8)		
		Pain	1.4 (0.6–3.0)	1.0 (0.5–2.0)	1.2 (0.6–2.6)
		Swelling (D)	1.4 (0.7–2.6)	0.3 (0.0–2.9)	1.2 (0.3–4.2)
		Subjective instability (D)	1.9 (0.6–6.0)	1.3 (0.5–3.8)	1.9 (0.6–6.0)
		Objective instability (D)	2.9 (0.6–14)	2.8 (0.3–26)	1.2 (0.3–5.2)
		Range of motion (D)	1.9 (0.2–21)	0.1 (0.0–2.5)	0.9 (0.1–14)
Dettori	EB vs. SR	Recurrent injury (D)	1.1 (0.2–7.1)		
Karlsson		Return to sports (C, days)			Δ 9.6 (6.3–13) [c]
		Return to work (C, days)			Δ 4.6 (2.1–7.1) [c]
		Pain (C, 0–20)			Δ -1.0 (-2.9–0.9)
		Swelling (C, 0–10)			Δ 0.0 (-1.1–1.1)
		Subjective instability (C, 0–25)			Δ -2.0 (-4.1–0.1)
Leanderson		Return to work (C, days)			Δ 3.8 (1.1–6.5)
Zeegers		Return to work (D)	0.7 (0.3–1.8)		
		Pain (D)	0.9 (0.5–1.7)	1.7 (0.7–4.1)	2.2 (0.9–5.3)
		Swelling (D)	1.3 (0.7–2.5)	2.9 (0.1–68)	11.0 (0.6–195)
		Subjective instability (D)	8.0 (1.0–62) [c]	14.2 (0.8–241)	4.0 (0.9–18)
		Objective instability (D)	1.2 (0.4–3.7)	2.8 (0.3–26)	2.0 (0.4–10)
		Range of motion (D)	1.0 (0.2–6.9)	0.1 (0.0–2.5)	1.0 (0.0–15)
Zeegers	EB vs. LU	Return to work (D)	0.7 (0.3–2.0)		
		Pain (D)	1.3 (0.7–2.7)	1.0 (0.5–2.0)	2.1 (0.9–5.2)
		Swelling (D)	5.5 (1.7–18) [c]	0.3 (0.0–2.5)	1.6 (0.4–6.5)
		Subjective instability (D)	3.9 (0.9–18)	1.0 (0.4–2.5)	1.9 (0.6–6.1)
		Objective instability (D)	2.9 (0.6–14)	1.7 (0.3–9.9)	1.2 (0.3–5.0)
		Range of motion (D)	4.8 (0.2–99)	0.1 (0.0–2.3)	2.7 (0.1–64)
Sommer	Tape vs. SR	Recurrent injury (D)		2.0 (0.2–21)	
		Return to work (C, days)		Δ 0.8 (-7.3–8.9)	
		Objective instability (C, °)		Δ 0.8 (-1.0–2.6)	
Zeegers		Return to work (D)	0.7 (0.3–1.9)		
		Pain (D)	0.6 (0.3–1.3)	1.3 (0.6–2.8)	1.8 (0.7–4.5)
		Swelling (D)	1.0 (0.5–2.0) [c]	7.0 (0.4–131)	9.5 (0.5–172)
		Subjective instability (D)	4.2 (0.5–37)	11.0 (0.6–192)	2.1 (0.4–11.1)
		Objective instability (D)	0.4 (0.1–2.1)	1.0 (0.1–15.4)	1.6 (0.3–2.2)
		Range of motion (D)	0.5 (0.1–5.6)	1.0 (0.2–4.6)	1.1 (0.1–17)
Twellaar	Tape vs. LU	Pain (D)			0.9 (0.2–4.1)
		Swelling (D)			1.7 (0.5–6.6)
		Subjective instability (D)			1.1 (0.7–1.7)
Zeegers		Return to work (D)	0.8 (0.3–2.1)		
		Pain (D)	0.9 (0.4–2.1)	1.0 (0.5–2.1)	1.4 (0.6–3.1)
		Swelling (D)	4.1 (1.2–13.7) [c]	0.9 (0.2–3.8)	1.6 (0.6–4.1)
		Subjective instability (D)	2.0 (0.4–10.7)	0.8 (0.3–2.1)	1.1 (0.7–1.7)
		Objective instability (D)	1.0 (0.2–7.0)	0.6 (0.1–6.5)	1.5 (0.8–2.3)
		Range of Motion (D)	3.1 (0.2–73.4)	0.9 (0.2–3.8)	2.9 (0.1–69)
Zeegers	SR vs. LU	Return to work (D)	1.1 (0.5–2.6)		
		Pain (D)	1.5 (0.7–3.1)	0.8 (0.4–1.8)	1.0 (0.3–2.8)
		Swelling (D)	4.2 (1.3–14.0)	0.1 (0.0–2.4)	0.1 (0.0–2.6)
		Subjective instability (D)	0.5 (0.1–5.2)	0.1 (0.0–1.2)	0.5 (0.1–2.5)
		Objective instability (D)	2.4 (0.5–12.0)	0.6 (0.1–6.5)	0.6 (0.1–3.4)
		Range of Motion (D)	4.8 (0.2–98.8)	0.9 (0.2–3.8)	2.7 (0.1–65)

[a] Abbreviations, see Table 1. [b] Relative risk or Δ = difference (95% confidence interval). [c] Significant difference

Table 4b. Statistically significant results

Comparison [a]	Author	Pooled result	Outcome measure	How measured [a]	Follow-up [a]	Results [b]	Favoring
EB vs. tape	Pasila, Jongen	Yes	Complications	D	I	RR 0.1 (0.0–0.8)	EB
EB vs. SR	Karlsson	No	Return to sports	C, days	L	Δ 9.6 (6.3–13)	SR
	Karlsson	No	Return to work	C, days	L	Δ 4.6 (2.1–7.1)	SR
	Leanderson	No	Return to work	C, days	L	Δ 3.8 (1.1–6.5)	SR
	Karlsson, Leanderson	Yes	Return to work	C, days	L	Δ 4.2 (2.4–6.1)	SR
	Zeegers	No	Subjective instability	D	S	RR 8.0 (1.0–62)	SR
EB vs.. LU	Zeegers	No	Swelling	D	S	RR 5.5 (1.7–18)	LU
Tape vs. LU	Zeegers	No	Swelling	D	S	RR 4.1 (1.2–14)	LU
SR vs. LU	Zeegers	No	Swelling	D	S	RR 4.2 (1.3–14)	LU

[a] Abbreviations, see Table 1.
[b] RR = relative risk or Δ = difference (95% confidence interval)

Table 4c. Pooled results

Comparison [a]	Outcome measure	How measured [a]	Follow-up [a]	Results [b]
EB vs. tape	Pain	D	S	RR 1.4 (0.9–2.4)
EB vs. tape	Complications	D	I	RR 0.1 (0.0-0.8) [c]
EB vs. SR	Return to work	C, days	L	Δ 4.2 (2.4–6.1) [c]
Tape vs. LU	Pain	D	L	RR 1.4 (0.6–3.1)
Tape vs. LU	Subjective instability	D	L	RR 1.1 (0.7–1.7)
Tape vs. LU	Objective instability	D	L	RR 1.5 (0.9–2.6)

[a] Abbreviations, see Table 1.
[b] RR = relative risk or Δ = difference (95% confidence interval)

objective instability and range of motion showed no statistically significant differences.

Discussion

The current opinion in the literature on the treatment of acute lateral ankle ligament ruptures in adults is that functional treatment is the best nonoperative treatment, and that is better than immobilization in a cast (Kannus and Renström 1991, Ogilvie-Harris and Gilbart 1995, Shrier 1995, Kerkhoffs et al. 2001). Surgical treatment has other advantages (Pijnenburg et al. 2000), but disadvantages as well (Ogilvie-Harris and Gilbart 1995). A recent meta-analysis showed marginally better results with surgical treatment of acute lateral ankle ligament ruptures (Pijnenburg et al. 2000). However, the authors doubt that surgical treatment is the best treatment in every patient because of higher costs, infra-structural problems, longer sick-leave and good results of secondary repair.

In the literature, various functional treatments are usually analyzed together. Our systematic review examined the best available evidence on the effectiveness of 4 mechanically different functional treatments for the management of uncomplicated acute ruptures of the lateral ankle ligament in adults. We included 9 randomized controlled trials. The quality of these trials was moderate with validity scores between 5 and 15 of a maximum of 22 points, however, most had acceptable scores. Analysis of the results showed a few statistically significant differences between these treatments. The results with a semi-rigid ankle support were better than with an elastic bandage as regards the period to return to work or sports and subjective instability on short-term. Therefore, the use of a semi-rigid ankle support has advantages in terms of indirect costs, as compared to the use of an elastic bandage. Lace-up ankle supports were better

than an elastic bandage as regards the persistence of swelling at short-term follow-up. These findings are mainly based on 1 large, high-quality trial, which should ideally be replicated (Zeegers 1995). However, these results suggest that treatment with an elastic bandage for acute lateral ankle ligament injuries is less desirable.

The use of tape caused more complications than an elastic bandage: itching or eczema due to adhesion of tape to the skin which, however, subsided within a few days. No differences in effectiveness were found between tape and semi-rigid support. Lace-up supports were better as regards swelling over the short-term when compared to tape and semi-rigid ankle supports. Again, these findings are mainly based on a single large, high-quality trial (Zeegers 1995).

Thus, in conclusion, an elastic bandage seems to be the least effective and lace-up supports the most effective functional treatment. However, insufficient data are available to draw definitive conclusions.

Recent publications have questioned the accuracy of the findings in systematic reviews. LeLorier et al. (1997) asserted that there was poor agreement between large clinical trials and such reviews. However, careful examination has shown that the results of mega-trials and these reviews are similar. Systematic reviews of smaller studies show a variation in treatment similar to that we are currently experiencing. Hence, they provide a reliable alternative approach to methods of treatment and most disagreements can be explained.

An obvious drawback of the present systematic review is the limited number of randomized clinical trials available. Consequently, it is difficult to draw definitive conclusions concerning the optimal functional treatment for an acute lateral ankle ligament rupture in adults. In addition, these trials have their limitations in study design. For example, only one study adequately described blinded outcome measurements (Dettori and Basmania 1994) and most studies deal with only short-term, or only intermediate-term or only more than 1-year follow-up results (Pasila et al. 1975, Allen and McShane 1985, Jongen et al. 1992, Twellaar et al. 1993, Karlsson et al. 1996, Leanderson and Wredmark 1995). The great variety and incompleteness of outcome measures hinder adequate comparisons. Therefore, high-quality, sufficiently powered randomized trials using a standard set of outcome measures are needed to compare the effectiveness of various functional methods for treatment of acute rupture of the lateral ankle ligament. Moreover, the cost-effectiveness of various functional therapies should be included, since these costs vary greatly and ankle problems may lead to absenteeism in many patients.

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