Immobilisation and functional treatment for acute lateral ankle ligament injuries in adults (Review)

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TABLE OF CONTENTS

[Intervention Review]

Immobilisation and functional treatment for acute lateral ankle ligament injuries in adults

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ABSTRACT

Background

Acute lateral ankle ligament injuries (ankle sprains) are common problems in acute medical care. The treatment variation observed for the acutely injured lateral ankle ligament complex suggests a lack of evidence-based management strategies for this problem.

Objectives

The objective of this review was to assess the effectiveness of methods of immobilisation for acute lateral ankle ligament injuries and to compare immobilisation with functional treatment methods.

Search methods

We searched the Cochrane Bone, Joint and Muscle Trauma Group specialised register (December 2001); the Cochrane Controlled Trials Register (*The Cochrane Library*, Issue 4, 2001), MEDLINE (1966-May 2000), EMBASE (1988-May 2000), reference lists of articles, and contacted organisations and researchers in the field.

Selection criteria

Randomised and quasi-randomised controlled trials comparing either different types of immobilisation or immobilisation versus functional treatments for injuries to the lateral ligament complex of the ankle in adults were included. Trials which investigated the treatment of chronic instability or post-surgical treatment were excluded.

Data collection and analysis

Data were independently extracted by two authors. Where appropriate, results of comparable studies were pooled using fixed effects models. Individual and pooled statistics were reported as relative risks with 95% confidence intervals for dichotomous outcomes and weighted (WMD) or standardised (SMD) mean differences and 95% confidence intervals for continuous outcome measures. Heterogeneity between trials was tested using a standard chi-squared test.

Main results

Twenty-one trials involving 2184 participants were included. The mean validity score of the included trials increased from 9.1 (SD 3.0) to 10 (SD 2.9) after retrieving further information (maximum 18 points). Statistically significant differences in favour of functional treatment when compared with immobilisation were found for seven outcome measures: more patients returned to sport in the long term (relative risk (RR) 1.86, 95% confidence interval (CI) 1.22 to 2.86); the time taken to return to sport was shorter (WMD 4.88 (days), 95% CI 1.50 to 8.25); more patients had returned to work at short term follow-up (RR 5.75, 95% CI 1.01 to 32.71); the time taken to return to work was shorter (WMD 8.23 days, 95% CI 6.31 to 10.16); fewer patients suffered from persistent swelling at short term follow-up (RR 1.74, 95% CI 1.17 to 2.59); fewer patients suffered from objective instability as tested by stress X-ray (WMD 2.60, 95% CI 1.24 to 3.96); and patients treated functionally were more satisfied with their treatment (RR 1.83, 95% CI 1.09 to 3.07). A separate analysis of trials that scored 50 per cent or more in quality assessment found a similar result for time to return to work only (WMD (days) 12.89, 95% CI 7.10 to 18.67). No significant differences between varying types of immobilisation, immobilisation and physiotherapy or no treatment were found, apart from one trial where patients returned to work sooner after treatment with a soft cast. In all analyses performed, no results were significantly in favour of immobilisation.

Authors' conclusions

Functional treatment appears to be the favourable strategy for treating acute ankle sprains when compared with immobilisation. However, these results should be interpreted with caution, as most of the differences are not significant after exclusion of the low quality trials. Many trials were poorly reported and there was variety amongst the functional treatments evaluated.

PLAIN LANGUAGE SUMMARY

Immobilisation and functional treatment for acute lateral ankle ligament injuries in adults

Ankle sprains are one of the most common injuries of active people. They are usually treated by either a plaster cast being placed around the ankle so that the joint cannot move, or by treatments that only support the ankle. These are known as functional treatments and can include tapes, bandages or wraps. This review of trials found that functional treatment helped patients return to work and sports more quickly, and helped reduce swelling initially. People were more satisfied with functional treatment. There were no differences between treatments for pain, how easily the ankle could move after treatment, or whether it was likely that another sprain would happen.

BACKGROUND

Injuries to the lateral ligament complex of the ankle are common problems in acute care practice. It is estimated that one ankle sprain occurs per 10,000 population per day (Katcherian 1994). Overall, injuries of the lateral ligament complex of the ankle form a quarter of all sports injuries (Keeman 1990). Some sports (e.g. basketball, soccer and volleyball) have a particularly high incidence of ankle injuries (Lindenfeld 1994; Luidinga 1985). The treatment of inversion injuries is performed by emergency and primary health care physicians as well as by orthopaedic and trauma surgeons (Kannus 1991). The total annual costs to society for ankle injuries has been estimated to be approximately 40 million Euro per one million people (Zeegers 1995).

The nomenclature for lesions of the lateral ligament complex of the ankle is variable. Many terms are applied to the injured ligament such as ankle sprain or ankle distortion. Most authors use the term 'sprain' to describe a morphologic condition, representing a diversity of pathology, ranging from overstretching of the ligament to complete rupture with instability of the joint (Watson-Jones 1976). To classify the severity of the lateral ankle ligament injuries a grading system from I to III has been introduced (Bernett 1979; Marti 1982; Kannus 1991; Lassiter 1989; van Dijk 1994). Grade I is a mild stretching of the ligament with no instability, grade II is a partial rupture with mild instability of the joint (such as isolated rupture of the anterior talofibular ligament) and grade III involves complete rupture of the ligaments with instability of the joint.

The most common mechanism of injury is supination and adduction (usually referred to as inversion) of the plantar-flexed foot. It is known that the anterior talofibular ligament is the first or only ligament to sustain injury in 97 per cent of cases (Brostrom 1965; van Dijk 1994). Brostrom (Brostrom 1965) found that combined

ruptures of the anterior talofibular ligament and the calcaneofibular ligament occurred in 20 per cent of the cases and that isolated rupture of the calcaneofibular ligament occurs in only three per cent. The posterior talofibular ligament is usually uninjured unless there is a frank dislocation of the ankle. Together, these three ligaments (anterior talofibular, calcaneofibular, posterior talofibular) form the lateral ligament complex of the ankle (Wiersma 1998).

Many different treatments are used for acute ankle sprain. The three main modalities of treatment are: 1) operative treatment ; 2) conservative treatment with plaster cast immobilisation and 3) functional treatment. The latter is an early mobilisation programme and involves the use of an external support (e.g. tape and/or elastic bandage or orthotic support), combined with co-ordination training.

The treatment practice variation identified for lateral ankle ligament complex injuries suggests a lack of evidence-based management strategies for this problem (Brostrom 1966; Brostrom 1966a; van Dijk 1994; van Moppes 1982). Dehne (Dehne 1933) first reported ankle injury treatment with immobilisation below the knee. Many studies presenting results of this type of immobilisation have since been published (Alder 1976; Leonard 1949). Freeman (Freeman 1965b; Freeman 1965c) introduced a new concept in the conservative treatment of ruptures of the lateral ligaments of the ankle by suggesting that the use of proprioceptive training using co-ordination exercises could reduce the proprioceptive deficit and symptoms of the ankle "giving way". Consequently, many patients were treated functionally with supportive elastic bandage combined with co-ordination training. Functional treatment with tape bandage or orthotic support has become more popular in the last two decades (Jacob 1986; Leonard 1949; Moller-Larsen 1988; Vaes 1985; Stover 1980). The use of laser therapy, ultrasound treatment and/or acupuncture have all been reported, but none are used widely.

Despite all of these options, it is unclear which treatment is most appropriate. Those in favour of functional treatment cite advantages such as lower cost and decreased morbidity with the same probability of ankle stability when compared to operative treatment. However, underestimating the injury severity may lead to chronic instability of the lateral ankle ligament complex. Therefore, the treatment approach to these problems is important to clarify.

Using evidence from randomised controlled trials, this review evaluated the effectiveness of the various methods of immobilisation for acute ankle sprain against each other and functional treatment.

OBJECTIVES

The objectives of this review were to assess the effectiveness of methods of immobilisation for acute lateral ligament injury and to compare immobilisation with functional treatment strategies.

The specific null hypotheses were:

1. No difference exists in outcome between different types or durations of immobilisation for treatment of acute injuries of the lateral ankle ligament complex.

2. No difference exists in outcome between any method of immobilisation and physiotherapy for treatment of acute injuries of the lateral ankle ligament complex.

3. No difference exists in outcome between any method of immobilisation and no intervention for treatment of acute injuries of the lateral ankle ligament complex.

4. No difference exists in outcome between any method of immobilisation and any method of functional treatment for acute injuries of the lateral ankle ligament complex.

The comparison of different types of functional treatment and the comparison of immobilisation with operative treatment for acute injuries of the lateral ankle ligament complex have been undertaken in separate reviews (Kerkhoffs 2002a; Kerkhoffs 2002b).

METHODS

Criteria for considering studies for this review

Types of studies

All randomised and quasi-randomised (methods of allocating participants to a treatment which are not strictly random e.g. date of birth, hospital record number or alternation) controlled trials comparing immobilisation with either another type or duration of immobilisation, or a functional treatment, for injuries to the lateral ligament complex of the ankle.

Types of participants

Studies enrolling skeletally mature individuals who reported an acute injury to the lateral ligament complex of the ankle were eligible for inclusion. The diagnosis could be based on either physical examination (positive anterior drawer test, pain and haematoma), a stress radiograph or an arthrogram of the injured ankle. Trials dealing exclusively with children (where growth plate injuries predominate), patients with congenital deformities or patients with degenerative conditions were excluded. A priori, we decided a mixed population of adults and children could be included if the adult population could be analysed separately, or the proportion of children was small (< 10%).
Trials which focussed on the treatment of chronic instability or post-surgical treatment were excluded. Patients with chronic instability have symptoms of pain, swelling, recurrent sprains and

instability for longer than six months (Karlsson 1997). If studies included participants with chronic ankle sprains or other ankle injuries such as avulsion fractures, then results from these studies were included in the review provided such injuries occurred in under ten per cent of the whole study population.

Types of interventions

Intervention:
Immobilisation, either by plaster cast or special boots.
Comparison:
a) physiotherapy;
b) functional interventions (including: elastic bandage, softcast, tape or orthosis with associated co-ordination training);
c) non-intervention.

Types of outcome measures

The following outcomes were sought and extracted:
1. Return to pre-injury level of sports (yes/no; time to achieve)
2. Return to pre-injury level of work (yes/no; time to achieve)
3. Pain (yes/no) (continuous data)
4. Swelling (yes/no)
5. Subjective instability (e.g. 'giving way') (yes/no)
6. Objective instability (e.g. anterior drawer measures, talar tilt) (yes/no)
7. Recurrent injury (yes/no)
8. Ankle mobility/range of motion (continuous data)
9. Complications (e.g. sensory deficit, infection, arthrosis, osteoarthritis, allergic reaction, stiffness, muscle atrophy) (yes/no)
10. Patient satisfaction (ordinal, continuous or dichotomous data)
Follow-up times were grouped into:
A. Short term - within six weeks of randomisation (to identify early significant complications);
B. Intermediate term - six weeks to one year follow-up;
C. Long term - one to two years after treatment.

Search methods for identification of studies

We searched the Cochrane Bone, Joint and Muscle Trauma Group specialised register (December 2001), the Cochrane Controlled Trials Register (*The Cochrane Library*, Issue 4, 2001), MEDLINE (1966-May 2000), EMBASE (1988-May 2000) and reference lists of articles. Papers outside the English language were considered if translation was possible. We also contacted researchers in the field and the Medical Departments of the Dutch Defence Forces and the Royal Dutch Football Association.
In MEDLINE (OVID Web), the subject specific search was combined with the first two levels of the optimum search strategy (Clarke 2001) (*see* Appendix 1).

Data collection and analysis

Selection of studies

From the title, abstract, or descriptors, three reviewers (GK, PS, CVD) independently reviewed literature searches to identify potentially relevant trials for full review. From the full text, using the above criteria, two reviewers (BR, KK) independently selected trials for inclusion in this review (Dickersin 1992). Disagreement was resolved by consensus or third party adjudication (GK).

Data extraction and management

Data were independently extracted by two review authors (GK, PS) using a pre-piloted data extraction tool. After consensus, there was no disagreement and therefore no third party adjudication was necessary.
Where appropriate, results of similar studies were pooled using fixed effects models, after consideration of the heterogeneity between the trials. Individual and pooled statistics were reported as relative risks (RR) with 95 per cent confidence intervals (CI) for dichotomous outcomes and weighted or standardised mean differences and 95 per cent CI for continuous outcomes. Heterogeneity between trials was tested using a standard chi-squared test.

Assessment of risk of bias in included studies

In this review, risk of bias is implicitly assessed in terms of methodological quality.
Methodological quality for each study was independently assessed, without masking (Jadad 1996; Schulz 1994; Verhagen 1998), by two reviewers (BR, KK) from the group using a piloted, subject-specific modification of the generic evaluation tool used by the Cochrane Bone, Joint and Muscle Trauma Group. Any disagreement was resolved by consensus or third party adjudication (GK). The scoring scheme for the 11 aspects of internal and external validity covered by this tool is given in Table 1. Our cut-off point for high and low-quality trials was arbitrarily set at 50 per cent of the maximum score.

RESULTS

Description of studies

See: Characteristics of included studies; Characteristics of excluded studies.
Fifty potentially eligible trials were identified from the electronic database search and their full texts retrieved. Independent review of these texts resulted in the inclusion of 21 trials and exclusion of

22 trials. The main reason for exclusion was that the intervention of interest was not described. For a more detailed description of the excluded studies, see the Characteristics of Excluded Studies Table.

Seven trials (Rocinski 1991; Grasmueck 1997; Hoogenband 1984; Duwairi 1998; Soosai Nathan 1997; Vitellas 1995; Zwipp 1986) have been placed in Studies Awaiting Assessment. These trials remain potentially eligible for inclusion in our review.

The 21 included studies enrolled a total of 2184 participants. Four trials investigated more than one comparison. Most included trials compared a rigid cast (with or without supplementary treatment at a later time such as a walking cast, braces or physiotherapy) with a form of functional treatment. The latter included semi-rigid casts (Avci 1998); tubigrips (Brakenbury 1983; Brooks 1981); bandages (Lind 1984); elastic bandages (Brostrom 1966; Korkala 1987); taping (Caro 1964; Moller-Larsen 1988; Sommer 1993); bracing (Cetti 1984; Dettori 1994; Klein 1991; Konradsen 1991; Milford 1990; Sommer 1993); wrapping (Gronmark 1978; Hedges 1980; Munk 1995; Roycroft 1983); strapping and mobilisation (Freeman 1965a); immobilisation without a cast (Brooks 1981); and physiotherapy (Brooks 1981).

One study (Eiff 1994) investigated splintage and crutches versus an elastic wrap and another (Regis 1995) compared an immobilisation gutter and weightbearing cast with a group which also used a dynamic brace for a period of time.

In general, participants were likely to be young (<50 years), and trials tended to include a higher percentage of males. Participant numbers ranged from 400 (Brakenbury 1983) to 20 (Regis 1995), with most enrolling 120 or less. For further details of individual included studies, see the Characteristics of Included Studies Table.

Risk of bias in included studies

The results of the methodological quality assessment are described in detail under 'Methods' in the Characteristics of Included Studies Table. The validity assessment comprised 11 items, each for a maximum of two points. However, it was not possible to ascribe points to items E and F in any of the trials, since blinding of patients and care providers proved to be impossible for the treatment strategies assessed. Therefore, a total of 18 points proved to be the maximum score attainable.

The initial agreement of the two reviewers on the quality assessment of the included trials was 86 per cent (163 out of 189 items). The Kappa value (K) for measurement of agreement beyond chance between these two reviewers was 0.78.

After the initial assessment, the quality score of included trials ranged from five to 18 points, with a mean score of 9.1 points (SD 3.0). Trials with a score 50 per cent and more of the maximum (11 and upwards) were categorized as 'high quality'. The initial assessment resulted in seven trials being scored as high quality (Eiff 1994; Klein 1991; Gronmark 1978; Munk 1995; Brostrom 1966; Caro 1964; Brooks 1981). After retrieving additional information from the authors, the mean validity score increased to 10.4 (SD 2.9) and four trials (Avci 1998; Hedges 1980; Korkala 1987; Regis 1995) moved from being categorised as low quality to high quality. An additional six trials improved their score. A total of 11 studies (52%) involving 1098 patients were classified as high quality. After evaluating all results, an additional subgroup analysis was performed on the basis of trial quality.

Effects of interventions

Data were extracted on all relevant outcome measures as described above. Four types of comparisons are presented below;

A) Comparisons between different forms of immobilisation;

B) Comparisons between immobilisation and physiotherapy;

C) Comparisons between immobilisation and no treatment;

D) Comparisons between immobilisation and functional treatment.

A) DIFFERENT FORMS OF IMMOBILISATION

Two studies compared two different types of immobilisation of the ankle joint as a treatment of an acute ankle injury (Brooks 1981; Avci 1998). Avci 1998 compared a cast immobilisation with a semi-rigid cast immobilisation and Brooks 1981 compared cast immobilisation with immobilisation without a cast. At short term follow-up, both studies evaluated time to return to work. Avci 1998 reported a significantly shorter time to work return in the group treated with the semi-rigid cast (WMD 3.80 days, 95% CI 1.16 to 6.44). The results from Brooks 1981 could not be calculated.

Avci 1998 reported no significant differences at short term follow-up for pain, swelling or objective instability between the two immobilisation treatments.

B) IMMOBILISATION VERSUS PHYSIOTHERAPY

Only one study compared the results of immobilisation with physiotherapy (Brooks 1981). Two outcome measures, patient satisfaction and return to work, were reported. The percentage of patients returning to work at short term follow-up could not be calculated, because standard deviations were not reported nor could they be retrieved from the authors. Clear data was also not available for patient satisfaction, with Brooks 1981 reporting that "All patients that received physiotherapy were impressed with their treatment" and "All patients who had had their ankle immobilised in a plaster-of-Paris thought they had good pain relief."

C) IMMOBILISATION VERSUS NO TREATMENT

Only one study compared the results of immobilisation with no treatment (Brooks 1981). Patient satisfaction and return to work were reported. The percentage of patients returning to work at short term follow-up could not be calculated properly, because standard deviations were not reported nor could they be retrieved from the authors. Patient satisfaction was not described adequately and author contact failed to provide additional data.

D) IMMOBILISATION VERSUS FUNCTIONAL TREATMENT

Twenty trials described a type of immobilisation compared with a functional treatment. Seven trials compared immobilisation with use of an orthotic device, known as a brace (Cetti 1984; Dettori 1994; Klein 1991; Konradsen 1991; Milford 1990; Regis 1995; Sommer 1993); five trials compared immobilisation with elastic bandage or grip (Brakenbury 1983; Brooks 1981; Brostrom 1966; Korkala 1987; Lind 1984); four trials compared immobilisation with taping (Caro 1964; Freeman 1965a; Moller-Larsen 1988; Sommer 1993); and five trials compared cast immobilisation to treatment using a softcast or wrap (Eiff 1994; Gronmark 1978; Hedges 1980; Munk 1995; Roycroft 1983). Data were available for the following outcome measures:

1. Return to sports

A total of eight studies described return to sports as an outcome measure. The number of patients who had returned to sports activity at long term follow-up, pooled from five trials, (Korkala 1987; Regis 1995; Moller-Larsen 1988; Klein 1991; Eiff 1994), was significantly higher in the functional treatment compared with the immobilisation group (RR 1.86, 95%CI 1.22 to 2.86). Pooled results from three trials (Milford 1990; Freeman 1965a; Sommer 1993) demonstrate a significantly shorter time to return to sports for the functional treatment group (WMD 4.88 days, 95%CI 1.50 to 8.25).

2. Return to work

A total of nine studies reported on return to work as an outcome. The pooled results from six studies, (Brostrom 1966; Caro 1964; Brakenbury 1983; Cetti 1984; Dettori 1994; Roycroft 1983) demonstrated a significantly shorter time to return to work for the functionally treated group (WMD 8.23 days, 95% CI 6.31 to 10.16). The results of two studies (Eiff 1994; Konradsen 1991) showed a significantly higher percentage of patients had returned to work at short term follow-up in the functionally treated group compared with the immobilisation group (RR 5.75, 95%CI 1.01 to 32.71).

3. Pain

Nine studies reported whether the patient was experiencing pain after treatment. Three studies described short term results (Cetti 1984; Dettori 1994; Eiff 1994), five intermediate results (Cetti 1984; Dettori 1994; Eiff 1994; Hedges 1980; Lind 1984) and five long term results (Eiff 1994; Freeman 1965a; Gronmark 1978; Klein 1991; Munk 1995). No significant differences were found for any follow-up time. Only one study (Hedges 1980) evaluated pain as a continuous score and found no significant differences between the two treatments.

4. Swelling

Six trials reported swelling as an outcome measure (Brakenbury 1983; Freeman 1965a; Hedges 1980; Klein 1991; Eiff 1994; Cetti 1984). At short term follow-up, pooled results from Brakenbury 1983, Cetti 1984 and Eiff 1994 found significantly fewer patients suffered from persistent swelling of the ankle in the functionally treated group (RR 1.74, 95% CI 1.17 to 2.59). At intermediate and long term follow-up these differences were no longer observed. As details of the validity of methods used to measure swelling were unavailable, this difference should be interpreted with caution.

5. Subjective instability or 'giving way'

'Giving way' is a subjective outcome measure to describe the amount of instability in the ankle joint. Seven studies reported this outcome measure (Brostrom 1966; Cetti 1984; Dettori 1994; Eiff 1994; Freeman 1965a; Klein 1991; Korkala 1987). No statistically significant differences were found at short, intermediate or long term follow-up.

6. Objective instability

Objective instability of the ankle joint is either measured using the Talar Tilt Test (TTT) or the Anterior Drawer Test (ADT). Seven trials described the outcomes of either the TTT or the ADT in order to evaluate the success of the two treatment modalities (Brooks 1981; Freeman 1965a; Konradsen 1991; Korkala 1987; Lind 1984; Munk 1995; Sommer 1993). Shortly after an inversion injury with ligament damage, TTT and ADT are almost always positive, hence results at short term are not relevant. Intermediate follow-up results (Sommer 1993) demonstrated a significantly increased instability using the TTT in patients treated with immobilisation, when described as a continuous outcome measure (WMD 2.60 degrees, 95% CI 1.24 to 3.96). Dichotomous results at intermediate (RR 0.69, 95% CI 0.14 to 3.34) as well as long term follow-up (RR 0.91, 95% CI 0.60 to 1.39) failed to demonstrate a significant difference.

7. Recurrent sprain

The frequency of a recurrent sprain is best measured at intermediate or long term follow-up. Eleven trials reported this outcome (Sommer 1993; Munk 1995; Regis 1995; Lind 1984; Klein 1991; Korkala 1987; Brostrom 1966; Cetti 1984; Dettori 1994; Eiff 1994; Konradsen 1991). No significant differences were demonstrated at any follow-up time.

8. Range of motion

An impaired range of motion (ROM) after inversion injury is likely the result of soft tissue swelling and pain. Three studies evaluated ROM as an outcome measure (Brakenbury 1983; Cetti 1984; Munk 1995). In most cases at intermediate or long term follow-up, ROM will be restored in almost all patients, therefore the analysis of ROM as an outcome in this case is mainly relevant at short term follow-up. Two studies (Brakenbury 1983, Cetti 1984) found no difference between treatment group (RR 1.27, 95% CI 0.73 to 2.19). At intermediate follow-up, Cetti 1984 found comparable results (RR 7.00, 95% CI 0.37 to 131.28).

9. Patient satisfaction

Six trials reported patient satisfaction (reported as a dichotomous outcome, satisfied yes/no) to evaluate results (Brooks 1981; Cetti 1984; Klein 1991; Moller-Larsen 1988; Munk 1995; Roycroft 1983). At intermediate follow-up, significantly more patients were satisfied with functional treatment (RR 4.25, 95% CI 1.12 to 16.09). After pooling the results of all studies, ignoring the follow-up period, more patients were satisfied with treatment in the functionally treated group compared with the immobilisation group

(RR 1.83, 95% CI 1.09 to 3.07).

In addition to the evaluation of these results, a sub-group analysis was performed including only those trials which obtained over 50 per cent of the possible methodological quality score.

A) IMMOBILISATION VERSUS FUNCTIONAL TREATMENT: HIGH QUALITY TRIALS

The 11 'high quality' trials (score 50% or more of the quality score) were analysed separately in order to compare the results with the overall results and subsequently determine if publication bias was introduced by low quality trials. The focus was restricted to the comparison of immobilisation versus functional treatment, since immobilisation versus physiotherapy or immobilisation versus an alternative type of immobilisation was already analysed and described by high quality trials only.

Return to sports

Four trials, (Eiff 1994; Klein 1991; Korkala 1987; Regis 1995), contributed to this analysis and a pooled analysis of long term results failed to show a significant difference between groups (RR 1.70, 95% CI 0.98 to 2.95).

Return to work

The time to return to work, as described by two trials (Brostrom 1966; Caro 1964) was shorter in the functionally treated group when results were pooled (WMD 12.89 days, 95% CI 7.10 to 18.67). For the numbers of patients returning to work at short, intermediate and long term follow-up, no significant differences were found.

Pain

Five trials categorised as high quality reported pain as an outcome measure (Eiff 1994; Gronmark 1978; Hedges 1980; Klein 1991; Munk 1995). No significant differences were seen at either short (RR 1.31, 95% CI 0.87 to 1.97), intermediate (RR 1.17, 95% CI 0.66 to 2.09) or long term follow-up (RR 1.23, 95% CI 0.71 to 2.14).

Swelling

Two high quality trials (Eiff 1994; Klein 1991) analysed persistent swelling as a dichotomous outcome measure. No statistically significant differences between the immobilisation group and the functionally treated group were identified at short, intermediate or long term follow-up.

ROM

One high quality trial (Munk 1995) described improvement in ROM as a continuous outcome measure, and found no statistically significant differences between the groups at long term follow-up (WMD -1.00, 95% CI -4.59 to 2.59).

Subjective instability

For short and intermediate term follow-up, only one high quality trial (Eiff 1994) reported this outcome. There were no significant differences between the treatments. Long term results from four trials (Brostrom 1966; Eiff 1994; Klein 1991; Korkala 1987) also failed to demonstrate any significant differences.

Objective instability

Long term results on objective instability (Brostrom 1966; Korkala 1987; Munk 1995) showed no statistically significant differences.

Recurrent sprains

Over the long term, there were no differences in the likelihood of a recurrent sprain after pooling the results of six high quality trials (Eiff 1994; Brostrom 1966; Klein 1991; Korkala 1987; Munk 1995; Regis 1995, RR 1.25, 95% CI 0.84 to 1.85).

Patient satisfaction

Three high quality trials evaluated satisfaction as an outcome measure (Brooks 1981; Klein 1991; Munk 1995). After pooling the results of Klein 1991 and Munk 1995, no statistically significant differences were identified (RR 1.68, 95%CI 0.72 to 3.90).

DISCUSSION

The main objective of this review was to evaluate the effectiveness of the various types of immobilisation as a treatment for acute ankle sprain in adults, using evidence from randomised controlled trials. Twenty-one trials described a type of immobilisation in comparison to a functional treatment. Overall, there appeared to be better results with the functional treatment. No outcomes were shown to be improved by immobilisation treatment.

After evaluation of the results, statistically significant differences were found for seven outcome measures, all in favour of functional treatment: a higher percentage of patients returning to sports; the time to return to work was shorter; fewer patients suffered from persistent swelling; fewer patients suffered from objective instability at intermediate follow-up and range of motion was less limited in those patients treated functionally compared to patients treated with immobilisation. Overall, patients treated functionally were also more satisfied.

The quality of the included studies was acceptable. Our cut-off point for high and low-quality trials was arbitrarily set at 50 per cent of the maximum score. Given this cut-off point, a total of 11 studies (52%) were categorised for the purposes of this review as 'high quality'. A separate analysis of the high quality trials was performed; ten trials increased in quality assessment after we received additional information, which suggests poor reporting to be an important factor in initial validity assessment. When examining the effect of exclusion of lower rated trials, only the pooled result for time to return to work remained significant. However, in both analyses, no results were significantly in favour of immobilisation.

The above described results are in accordance with the current opinion that functional treatment is the treatment of choice for acute lateral ankle ligament injuries. Kannus and Renstrom (Kannus 1991b), Tiling (Tiling 1994), Ogilvie-Harris (Ogilvie-Harris 1995) and Shrier (Shrier 1995) all found functional treatment to be the most effective.

The primary objective of this review was met by our finding that immobilisation should no longer be the non-operative treatment of choice for patients suffering from an acute ankle sprain.

AUTHORS' CONCLUSIONS

Implications for practice

Functional treatment with early mobilisation appears to provide improved outcomes for patients compared with immobilisation.

The relative benefit of functional treatment versus surgical treatment, especially for severe ankle sprains, is beyond the scope of this review. Two further Cochrane reviews (Kerkhoffs 2002a; Kerkhoffs 2002b) present results for comparisons among different functional treatments, and for surgical interventions for acute ankle sprain.

Implications for research

Functional treatment currently seems an appropriate treatment. However, a great variety of functional treatments are described in trials included in this review. Readers are directed therefore to the Cochrane review (Kerkhoffs 2002a) which compares these strategies for this injury.

To enhance existing evidence for effectiveness of physiotherapy as a treatment strategy for acute ankle sprains, a well conducted randomised clinical trial with accurate description of methodology and adequate power is warranted.

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* *Indicates the major publication for the study*

CHARACTERISTICS OF STUDIES

Characteristics of included studies *[ordered by study ID]*

Avci 1998

Methods	Randomisation method: Last digit on patients' chart number. Blinding: no blinding. Loss to FU: 7/64 (11%) A: 0 E: 0 J: 2 B: 1 F: 0 K: 1 C: 0 G: 2 L:2(0) D: 1 H:2 T: 11(9)
Participants	University Hospital, Ankara, Turkey. Skeletally mature patients presenting with an acute grade 3 inversion injury of the ankle. Age range 17-47 years, 65% male. Exclusion criteria: fractures, history of chronic instability
Interventions	Period of study: not stated a) Rigid cast for 2 weeks. b) Semi-rigid cast for 2 weeks. Assigned: 32/32 Analysed: 26/31
Outcomes	Return to work Pain (Dichotomous) Swelling Objective instability ROM
Notes	Diagnosis, Phys. exam.

Risk of bias

Item	Authors' judgement	Description
Allocation concealment?	No	C - Inadequate

Brakenbury 1983

Methods	Randomisation method: not stated. Blinding: no blinding. Loss to FU: 47%, at 14d. in elastic support group, 22% in cast group A:1 E:0 J:2 B:1 F:0 K:1 C:0 G:1 L:0 D:2 H:2 T:10
Participants	Middlesbrough General Hospital, Accident and Emergency department, UK. Men 20-40 years presenting with an acute ankle sprain, (% med. lig. sprain <10%) Excusion criteria: fractures or other pathology of

Brakenbury 1983 (*Continued*)

	ankle joint; other injuries in the same limb; patient taking medication
Interventions	Period of study: not mentioned. a) Cast + enzyme/placebo for 1 week b) Tubigrips + enzyme/placebo for 1 week Assigned: 200/200 Analysed: 106/156
Outcomes	Return to work Swelling ROM
Notes	Diagnosis, Phys. exam X-ray

Risk of bias

Item	Authors' judgement	Description
Allocation concealment?	Unclear	B - Unclear

Brooks 1981

Methods	Randomisation method: not mentioned Blinding: no blinding. Loss to FU: 63/165 (38%) A:2 E:0 J:2 B:1 F:0 K:1 C:1(0)G:2 L:1(0) D:2 H:2 T:14(12)
Participants	Regional accident unit, Edinburgh, Scotland. Skeletally mature individuals presenting with an acute ankle sprain. Exclusion criteria: Age <12, > 65. Fractures.
Interventions	Period of study: not stated a) Cast for period of complaints Assigned: ? Analysed: 26 b) Physiotherapy for period of complaints Assigned: ? Analysed: 21 c) Double tubigrip Assigned: ? Analysed: 28 d) No treatment or only a minimal bandage

Brooks 1981 (*Continued*)

	Assigned: 27 Analysed: 26/21
Outcomes	Return to work Satisfaction
Notes	Diagnosis, Stress X-ray Phys. exam. Due to poor reporting of results, little data could be contributed to the analysis

Risk of bias

Item	Authors' judgement	Description
Allocation concealment?	Unclear	B - Unclear

Brostrom 1966

Methods	Randomisation method: odd/even patient numbers. Blinding: no blinding Loss to FU: 2/188, at mean 3.8 years. A:0 E:0 J:2 B:1 F:0 K:2 C:0 G:2 L:1 D: 2 H:1 T: 11
Participants	Karolinska Hospital, Stockholm, Sweden. Skeletally mature individuals presenting with recent ligament rupture. 76% male, age range not stated. Exclusion criteria: fractures
Interventions	Period of study: 1961-1962 a) Cast for 2 weeks b) Elastic bandage for 2 weeks Assigned: 83/105 Analysed: 82/104
Outcomes	Return to work Subjective instability
Notes	Diagnosis, Arthrography

Risk of bias

Item	Authors' judgement	Description
Allocation concealment?	No	C - Inadequate

Caro 1964

Methods	Randomisation method: 'random allocation'. Blinding: no blinding. Loss to FU: 9/88, at 3 months. A:1 E:0 J:1 B:2 F:0 K:2 C:0 G:1 L:2 D:1 H:1 T:11
Participants	St James' Hospital, London, UK. Individuals aged 20-40 years presenting with an inversion injury (% fractures <10%)
Interventions	a) Cast for 2 weeks b) Tape, strapping for 2 weeks Assigned: 41/47 Analysed: 37/42
Outcomes	Return to work
Notes	Diagnosis, Stress X-ray Phys. exam.

Risk of bias

Item	Authors' judgement	Description
Allocation concealment?	Unclear	B - Unclear

Cetti 1984

Methods	Randomisation method: 'assigned randomly.' Blinding: no blinding. Loss to FU: 0%, at 6 months. A:1 E:0 J:2 B:0 F:0 K:1 C:0 G:0 L:1 D:0 H:1 T: 6
Participants	Frederiksberg University Hospital, Kopenhagen, Denmark. Skeletally mature individuals presenting with an acute ankle sprain. Age range 13-76 yrs, 53% male. Exclusion criteria not stated
Interventions	Period of study: 1981-1982 a) Cast for 6 weeks b) Brace for 6 weeks Assigned: 65/65 Analysed: 65/65
Outcomes	Return to sports Return to work Pain (Dichotomous) Swelling Objective instability

Cetti 1984 (*Continued*)

	ROM Recurrent sprain
Notes	Diagnosis, Stress X-ray Phys.exam.

Risk of bias

Item	Authors' judgement	Description
Allocation concealment?	Unclear	B - Unclear

Dettori 1994

Methods	Randomisation method: not stated. Blinding: adequate blinding of outcome measures. Loss to FU: 8/70, at 1 year. A:1 E:0 J:2 B:0 F:0 K:1 C:0 G:2 L:0 D:1 H:2 T:9
Participants	Madigan Army Medical Centre, Tacoma, USA. Active duty military members presenting with an acute ankle sprain. Exclusion criteria: fractures; injury older than 72 hours; prior ankle sprain within 6 months
Interventions	Period of study: 1991-1992 a) Cast for 2 weeks b) Brace for 2 weeks Assigned: 22/48 Analysed: 16/46
Outcomes	Return to work Pain (dichotomous) Swelling Recurrent sprain
Notes	Diagnosis, Stress X-ray Phys.exam.

Risk of bias

Item	Authors' judgement	Description
Allocation concealment?	Unclear	B - Unclear

Eiff 1994

Methods	Randomisation method: block randomisation. Blinding: no blinding. Loss to FU: 5/82, at 1 year. A:2(1) E:0 J:0 B:1 F:0 K:2 C:0 G:2 L:1 D:2 H:2 T:12(11)
Participants	Oregon, University Hospital, Oregon, USA. Active duty military members, military dependants, retirees presenting with a lateral ankle sprains. Exlusion criteria: time from injury to presentation > 48 hours; residual symptoms prior ankle injury; no swelling or ligamentous tenderness at presentation; ankle instability as measured by stress radiographs was present
Interventions	Period of study: 1989-1990 a) Sugar-tong plaster splint and crutches for 10 days b) Elastic wrap for 2 days, followed by brace (Air-Stirrup) for 1 week. Assigned: 41/41 Analysed: 37/40
Outcomes	Return to sports Return to work Pain (dichotomous) Swelling Subjective instability Recurrent sprain
Notes	Diagnosis, Phys.exam. Stress X-ray

Risk of bias

Item	**Authors' judgement**	**Description**
Allocation concealment?	Yes	A - Adequate

Freeman 1965a

Methods	Randomisation method: 'randomly selected'. Blinding: no blinding. Loss to FU: 0/28, at 1 year. A:1 E:0 J:2 B:1(0) F:0 K:1 C:0 G:1(0) L:1 D:0 H:2 T: 9(7)
Participants	Middlesex Hospital, London, UK. Skeletally mature individuals (mainly young men) presenting with rupture of the lateral ligament of the ankle. Exclusion criteria: fractures
Interventions	Period of study: 1963 a) Cast for 6 weeks

Freeman 1965a (*Continued*)

	b) Strapping and mobilisation for period of complaints Assigned: 16/12 Analysed: 16/12
Outcomes	Return to sports Pain (dichotomous) Swelling Subjective instability Objective instability
Notes	Diagnosis, Phys.exam. X-ray

Risk of bias

Item	Authors' judgement	Description
Allocation concealment?	Unclear	B - Unclear

Gronmark 1978

Methods	Randomisation method: not stated. Blinding: no blinding. Loss to FU: 0%, at 17 months. A:1 E:0 J:1 B:2 F: 0 K:2 C:0 G:2 L:2 D:0 H:1 T: 11
Participants	Telemark Central Hospital, Skien, Norway. Skeletally mature individuals presenting with ruptured lateral ankle ligaments. Age range 14-53 years, 70% male. Exclusion criteria: fractures
Interventions	Period of study: 1976-1977 a) Cast for 2 weeks, walking cast for 4 weeks b) Wrap for 6 weeks Assigned: 33/30 Analysed: 33/30
Outcomes	Pain (dichotomous)
Notes	Diagnosis, Stress X-ray Phys.exam.

Risk of bias

Item	Authors' judgement	Description

Gronmark 1978 (*Continued*)

Allocation concealment?	Unclear	B - Unclear

Hedges 1980

Methods	Randomisation method: by chart number. Blinding: no blinding. Loss to FU: 18% at 1 year. A:0 E:0 J:2 B:0 F:0 K:2(1) C:0 G:2(1) L:1 D:2 H:2 T:11(9)
Participants	Medical College of Pennsylvania Hospital, Philadelphia, Pennsylvania, USA. Skeletally mature individuals (>15, <65 years) presenting with ankle injury. Exclusion criteria: fractures
Interventions	Period of study: 1976-1977 a) Cast for period of complaints b) Wrap for period of complaints Assigned: 61/60 Analysed: 49/44
Outcomes	Pain (not mentioned) Swelling
Notes	Diagnosis, Phys. exam. X-ray

Risk of bias

Item	**Authors' judgement**	**Description**
Allocation concealment?	No	C - Inadequate

Klein 1991

Methods	Randomisation method: not described. Blinding: no blinding. Loss to FU: 10% at 15 months. A:0 E:0 J:2 B:1 F:0 K:1 C:0 G:1 L:2 D:2 H:2 T:11
Participants	University Hospital of Cologne. Cologne, Germany. Skeletally mature basketball players presenting with recent rupture of the fibular ligament of the ankle. Exclusion criteria: fractures
Interventions	Period of study: 1989-1990 a) Cast for 6 weeks b) Brace (Aircast) for 6 weeks Assigned: 39/89

Klein 1991 (*Continued*)

	Analysed: 39/89
Outcomes	Return to sports Pain (dichotomous) Swelling Subjective instability Recurrent sprain Patient satisfaction
Notes	Diagnosis, Stress X-ray Phys. exam.

Risk of bias

Item	Authors' judgement	Description
Allocation concealment?	Unclear	B - Unclear

Konradsen 1991

Methods	Randomisation method: not described. Blinding: no blinding. Loss to FU: 7/80, at 1 year. A:1 E:0 J:2 B:0 F:0 K:2 C:0 G:1 L:1 D:0 H:2 T:9
Participants	Horsholm Hospital, Horsholm, Denmark. Adults presenting with grade III ruptures of lateral ankle ligaments. Exclusion criteria: sprain more than 24 hours old; fractures; history of sprains; no other acute or chronic immobilising lesion
Interventions	Period of study: not described a) Cast for 1 week followed by a walking cast for 5 weeks b) Brace (Aircast) for 6 weeks Assigned: 40/40 Analysed: 37/36
Outcomes	Return to work Return to sports
Notes	Diagnosis, Stress X-ray Phys.exam.

Risk of bias

Konradsen 1991 (*Continued*)

Item	Authors' judgement	Description
Allocation concealment?	Unclear	B - Unclear

Korkala 1987

Methods	Randomisation method: randomly divided by 'closed letters'. Blinding: no blinding. Loss to FU: 33/150, at 2 years. A:2(0) E:0 J:2 B:0 F:0 K:2 C:0 G:2(0) L:1 D:1(0) H:2 T:12(7)
Participants	University Central Hospital, Helsinki, Finland. Skeletally mature patients (>15, <50 y) presenting with severe ankle sprains. Exclusion criteria: alcoholism; serious medical conditions; psychiatric illness; fractures
Interventions	Period of study: not described a) Cast for 4 weeks b) Semi-elastic bandage (Tenoplast) for 1 week, followed by elastic bandage for 1-3 weeks. Assigned: 50/50 Analysed: 47/36
Outcomes	Return to sports Subjective instability Objective instability Recurrent sprain
Notes	Diagnosis, Phys.exam. X-ray

Risk of bias

Item	Authors' judgement	Description
Allocation concealment?	Yes	A - Adequate

Lind 1984

Methods	Randomisation method: drawing of lots. Blinding: no blinding Loss to FU: 10/66, at six months. A:1 E:0 J:2(1) B:1 F:0 K:1 C:0 G:2(0) L:1 D:0 H:2 T:10(7)
Participants	Fra Haderslev Sygehus, Haderslev, Denmark. Skeletally mature patients presenting with lateral ankle ligament rupture. Exclusion criteria: fractures; injury more than 24 hours old
Interventions	Period of study: 1983 a) Cast for 5 weeks b) Bandage (Pronating, supportive) for period of complaints Assigned: 33/33 Analysed: 29/27
Outcomes	Pain (dichotomous) Objective instability Recurrent sprain
Notes	Diagnosis, Arthrography

Risk of bias

Item	Authors' judgement	Description
Allocation concealment?	Unclear	B - Unclear

Milford 1990

Methods	Randomisation method: alternate patients. Blinding: no blinding. Loss to FU: 0%, at 3 months. A:0 E:0 J:2 B:0 F:0 K:0 C:0 G:1 L:0 D:1 H:2 T:6
Participants	Royal Naval Hospital, Gibraltar. Healthy Royal Marine recruits presenting with acute ankle inversion injuries <24h. Exclusion criteria: fractures; significant injury to other soft tissue structures
Interventions	Period of study: not described. a) Cast for 2 weeks, followed by physiotherapy b) Brace (Aircast) with physiotherapy. Assigned: 30/30 Analysed: 30/30

Milford 1990 (*Continued*)

Outcomes	Return to sports
Notes	Diagnosis, Stress X-ray Phys. exam.

Risk of bias

Item	Authors' judgement	Description
Allocation concealment?	No	C - Inadequate

Moller-Larsen 1988

Methods	Randomisation method: concealed envelope drawing. Blinding: no blinding. Loss to FU: 10/130, at 1 year. A:2(0) E:0 J:0 B:0 F:0 K:1 C:0 G:2 L:1 D:2(0) H:2 T:10(6)
Participants	Arhus Municipal Hospital, Arhus, Denmark. Skeletally mature individuals (>15, <50y) presenting with lateral ankle ligament rupture. Exclusion criteria: fractures
Interventions	Period of study: 1983- 1985 a) Cast for 5 weeks b) Tape for 5 weeks Assigned: 60/70 Analysed: 55/65
Outcomes	Return to sports Swelling Satisfaction
Notes	Diagnosis, Arthrography

Risk of bias

Item	Authors' judgement	Description
Allocation concealment?	Yes	A - Adequate

Munk 1995

Methods	Randomisation method: concealed envelope drawing. Blinding: no blinding. Loss to FU: 48/108 at 11 years. A: 2(1) E:0 J:2 B: 1 F:0 K:2 C: 0 G:0 L:2 D:2 H:2 T:13(12)
Participants	Haderslev Hospital, Haderslev, Denmark. Skeletally mature patients presenting with acute ruptured lateral ankle ligaments. Exclusion criteria: injury more than 24h; fractures
Interventions	Period of study: 1979-1982 a) Cast for 5 weeks b) Wrap for 5 weeks Assigned: 75/33 Analysed: 44/16
Outcomes	Pain Recurrent sprain Objective instability
Notes	Diagnosis, Arthrography

Risk of bias

Item	Authors' judgement	Description
Allocation concealment?	Yes	A - Adequate

Regis 1995

Methods	Randomisation method: concealed envelope drawing. Blinding: no blinding. Loss to FU: 0% at a mean of 22 months. A:2(1) E:0 J: 2(0) B:2(0) F:0 K: 2(1) C:0 G:1(0) L:2(1) D:2 H:2 T:15(7)
Participants	Ospedale Policlinico, Verona, Italy. Skeletally mature patients (<30 years) presenting with acute inversion ankle sprains. Exclusion criteria: fractures
Interventions	Period of study: 1993 a) Immobilisation gutter for 3-5 days followed by a weightbearing cast for 25 days b) Immobilisation gutter for 3-5 days followed by a weightbearing cast for 10 days and a dynamic brace for 20 days Assigned: 10/10 Analysed: 10/10

Regis 1995 (*Continued*)

Outcomes	Return to sports Recurrent sprain
Notes	Diagnosis, Stress X-ray Phys. exam.

Risk of bias

Item	Authors' judgement	Description
Allocation concealment?	Yes	A - Adequate

Roycroft 1983

Methods	Randomisation method: not stated. Blinding: no blinding. Loss to FU: 37/80 at 8 to 12 months. A:0 E:0 J:2 B:0 F:0 K:1 C:0 G:1 L:2 D:0 H:2 T:8
Participants	General Hospital, Sligo, Ireland. Skeletally mature individuals presenting with Grade I & II ankle sprains. Exclusion criteria: bony abnormalities
Interventions	Period of study: not mentioned. a) Cast for 2 weeks b) Wrap for 2 weeks Assigned: 37/43 Analysed: 21/22
Outcomes	Return to sports Satisfaction
Notes	Diagnosis, Phys.exam X-ray

Risk of bias

Item	Authors' judgement	Description
Allocation concealment?	Unclear	B - Unclear

Sommer 1993

Methods	Randomisation method: not stated. Blinding: no blinding. Loss to FU: 17/124 at 6 weeks and 18/124 at 1 year. A:1 E:0 J:1 B:0 F:0 K:1 C:0 G:0 L:0 D:0 H:2 T:5
Participants	University Hospital Heidelberg, Heidelberg, Germany. Patients between 18 and 45 years presenting with an acute lateral ligament rupture. Exclusion criteria: previous injury, chronic instability, fractures, competitive sportsmen
Interventions	Period of study: 1989 a) Cast for 3 weeks, followed by brace for 3 weeks b) Brace or tape for 6 weeks Assigned: 41/83 Analysed:33/73
Outcomes	Return to sports Objective instability Recurrent sprain
Notes	Diagnosis, Arthrography Stress X-ray Phys. exam.

Risk of bias

Item	**Authors' judgement**	**Description**
Allocation concealment?	Unclear	B - Unclear

Methodological assessment scores in brackets are those initially allocated, and which changed once further information was received from authors.
T = total

Characteristics of excluded studies *[ordered by study ID]*

Study	Reason for exclusion
Allen 1985	RCT. Three treatment groups: no treatment, tape, tape. Immobilisation was not used as an intervention
Andersson 1983	RCT. Immobilisation was not used as an intervention, all groups received a type of functional treatment

(*Continued*)

Freeman 1965	RCT. Patients with functional instability of the foot were also studied, therefore the population showed too much heterogeneity. No separate analysis was made for the results of patients with acute ligament injury of the ankle
Holmer 1991	RCT. Immobilisation was not used as an intervention, all groups received a type of functional treatment
Johannes 1993	RCT. Immobilisation was not used as an intervention, all groups received a type of functional treatment
Jorgensen 1986	RCT. Comparison of Naprosyne and mobilisation, and placebo and immobilisation as treatment strategies
Karlsson 1996	RCT. Immobilisation was not used as an intervention, all groups received a type of functional treatment
Leanderson 1999	RCT. Immobilisation was not used as an intervention, all groups received a type of functional treatment. Results were published earlier in 1995 (Leanderson 1995)
Makuloluwe 1977	CCT. The type of immobilisation described does not resemble our definition of immobilisation. It resembles a functional treatment strategy
Muwanga 1986	RCT. Immobilisation was not used as an intervention, all groups received a type of functional treatment
Nilsson 1983	RCT. All treatment groups received an elastic wrap and therefore there was no immobilisation group. Only the effect of functional treatment and physiotherapy was described
Oostendorp 1987	RCT. Immobilisation was not used as an intervention, all groups received a type of functional treatment
Otto 1997	RCT. In this study surgery is compared to a functional treatment
Scotece 1992	RCT. Immobilisation was not used as an intervention, all groups received a type of functional treatment
Twellaar 1993	RCT. Immobilisation was not used as an intervention, all groups received a type of functional treatment
Viljakka 1983	RCT. All treatment groups received a bandage, either elastic or layer, and there was no immobilisation group. Only the effect of functional treatment and antiphlogistic drugs was described
Wilkerson 1993	RCT. Evaluation of different forms of compression and cryotherapy. Immobilisation was not used as an intervention

DATA AND ANALYSES

Comparison 1. Immobilisation vs. functional treatment

Outcome or subgroup title	No. of studies	No. of participants	Statistical method	Effect size
1 Numbers not returning to sports	8		Risk Ratio (M-H, Fixed, 95% CI)	Subtotals only
1.1 Short term	3	180	Risk Ratio (M-H, Fixed, 95% CI)	1.01 [0.82, 1.25]
1.2 Intermediate term	4	294	Risk Ratio (M-H, Fixed, 95% CI)	1.32 [0.62, 2.79]
1.3 Long term	5	360	Risk Ratio (M-H, Fixed, 95% CI)	1.86 [1.22, 2.86]
2 Numbers not returning to work	3		Risk Ratio (M-H, Fixed, 95% CI)	Subtotals only
2.1 Short term	2	150	Risk Ratio (M-H, Fixed, 95% CI)	5.75 [1.01, 32.71]
2.2 Intermediate term	3	214	Risk Ratio (M-H, Fixed, 95% CI)	1.14 [0.39, 3.27]
2.3 Long term	1	77	Risk Ratio (M-H, Fixed, 95% CI)	Not estimable
3 Pain	9		Risk Ratio (M-H, Fixed, 95% CI)	Subtotals only
3.1 Short term	3	213	Risk Ratio (M-H, Fixed, 95% CI)	1.42 [0.97, 2.09]
3.2 Intermediate term	5	308	Risk Ratio (M-H, Fixed, 95% CI)	1.28 [0.79, 2.06]
3.3 Long term	5	283	Risk Ratio (M-H, Fixed, 95% CI)	1.17 [0.73, 1.87]
4 Swelling	6		Risk Ratio (M-H, Fixed, 95% CI)	Subtotals only
4.1 Short term	3	260	Risk Ratio (M-H, Fixed, 95% CI)	1.74 [1.17, 2.59]
4.2 Intermediate term	1	77	Risk Ratio (M-H, Fixed, 95% CI)	1.08 [0.07, 16.67]
4.3 Long term	4	280	Risk Ratio (M-H, Fixed, 95% CI)	1.04 [0.57, 1.91]
5 Subjective instability (giving way)	7		Risk Ratio (M-H, Fixed, 95% CI)	Subtotals only
5.1 Short term	1	77	Risk Ratio (M-H, Fixed, 95% CI)	1.51 [0.53, 4.36]
5.2 Intermediate term	3	221	Risk Ratio (M-H, Fixed, 95% CI)	1.24 [0.67, 2.30]
5.3 Long term	5	426	Risk Ratio (M-H, Fixed, 95% CI)	0.91 [0.64, 1.28]
6 Objective instability (talar tilt and/or ADS)	5		Risk Ratio (M-H, Fixed, 95% CI)	Subtotals only
6.2 Intermediate term	2	129	Risk Ratio (M-H, Fixed, 95% CI)	0.69 [0.14, 3.34]
6.3 Long term	3	286	Risk Ratio (M-H, Fixed, 95% CI)	0.91 [0.60, 1.39]
7 Recurrent sprain	11		Risk Ratio (M-H, Fixed, 95% CI)	Subtotals only
7.1 Short term	1	77	Risk Ratio (M-H, Fixed, 95% CI)	0.36 [0.04, 3.31]
7.2 Intermediate term	6	456	Risk Ratio (M-H, Fixed, 95% CI)	1.14 [0.69, 1.90]
7.3 Long term	6	487	Risk Ratio (M-H, Fixed, 95% CI)	1.25 [0.84, 1.85]
8 Decreased ROM	2		Risk Ratio (M-H, Fixed, 95% CI)	Subtotals only
8.1 Short term	2	204	Risk Ratio (M-H, Fixed, 95% CI)	1.27 [0.73, 2.19]
8.2 Intermediate term	1	80	Risk Ratio (M-H, Fixed, 95% CI)	7.0 [0.37, 131.28]
9 Patient satisfaction	5	357	Risk Ratio (M-H, Fixed, 95% CI)	1.83 [1.09, 3.07]
9.1 Intermediate term	2	123	Risk Ratio (M-H, Fixed, 95% CI)	4.25 [1.12, 16.09]
9.2 Long term	3	234	Risk Ratio (M-H, Fixed, 95% CI)	1.47 [0.83, 2.60]
10 Return to sports (days)	3		Mean Difference (IV, Fixed, 95% CI)	Subtotals only
10.1 Return to sports (days)	3	195	Mean Difference (IV, Fixed, 95% CI)	4.88 [1.50, 8.25]
11 Return to work (days)	6		Mean Difference (IV, Fixed, 95% CI)	Subtotals only
11.1 Return to work (days)	6	604	Mean Difference (IV, Fixed, 95% CI)	8.23 [6.31, 10.16]
12 Improvement in pain score	1		Mean Difference (IV, Fixed, 95% CI)	Totals not selected
12.1 Short term	1		Mean Difference (IV, Fixed, 95% CI)	Not estimable
13 Improvement in swelling	1		Mean Difference (IV, Fixed, 95% CI)	Totals not selected
13.1 Short term	1		Mean Difference (IV, Fixed, 95% CI)	Not estimable

14 Improvement in objective instability (difference in TT)	2	Mean Difference (IV, Random, 95% CI)	Totals not selected
14.2 Intermediate term	1	Mean Difference (IV, Random, 95% CI)	Not estimable
14.3 Long term	1	Mean Difference (IV, Random, 95% CI)	Not estimable
15 Improvement in ROM	2	Mean Difference (IV, Fixed, 95% CI)	Totals not selected
15.1 Short term	1	Mean Difference (IV, Fixed, 95% CI)	Not estimable
15.3 Long term	1	Mean Difference (IV, Fixed, 95% CI)	Not estimable

Comparison 2. Immobilisation vs. physiotherapy

Outcome or subgroup title	No. of studies	No. of participants	Statistical method	Effect size
1 Return to work (days)	1		Mean Difference (IV, Fixed, 95% CI)	Totals not selected
1.1 Short term	1		Mean Difference (IV, Fixed, 95% CI)	Not estimable

Comparison 3. Immobilisation vs. other types of immobilisation

Outcome or subgroup title	No. of studies	No. of participants	Statistical method	Effect size
1 Pain	1		Risk Ratio (M-H, Fixed, 95% CI)	Totals not selected
1.1 Short term	1		Risk Ratio (M-H, Fixed, 95% CI)	Not estimable
2 Swelling	1		Risk Ratio (M-H, Fixed, 95% CI)	Totals not selected
2.1 Short term	1		Risk Ratio (M-H, Fixed, 95% CI)	Not estimable
3 Objective instability (talar tilt and/or ADS)	1		Risk Ratio (M-H, Fixed, 95% CI)	Totals not selected
3.1 Short term	1		Risk Ratio (M-H, Fixed, 95% CI)	Not estimable
4 Return to work (days)	1		Mean Difference (IV, Fixed, 95% CI)	Totals not selected
4.1 Short term	1		Mean Difference (IV, Fixed, 95% CI)	Not estimable

Comparison 4. Immobilisation vs. functional treatment (high quality trials)

Outcome or subgroup title	No. of studies	No. of participants	Statistical method	Effect size
1 Numbers not returning to sports	4		Risk Ratio (M-H, Fixed, 95% CI)	Subtotals only
1.1 Short term	2	107	Risk Ratio (M-H, Fixed, 95% CI)	0.71 [0.31, 1.63]
1.2 Intermediate term	1	77	Risk Ratio (M-H, Fixed, 95% CI)	3.24 [0.14, 77.06]
1.3 Long term	4	240	Risk Ratio (M-H, Fixed, 95% CI)	1.70 [0.98, 2.95]
2 Numbers not returning to work	1		Risk Ratio (M-H, Fixed, 95% CI)	Totals not selected
2.1 Short term	1		Risk Ratio (M-H, Fixed, 95% CI)	Not estimable
2.2 Intermediate term	1		Risk Ratio (M-H, Fixed, 95% CI)	Not estimable
2.3 Long term	1		Risk Ratio (M-H, Fixed, 95% CI)	Not estimable
3 Pain	5		Risk Ratio (M-H, Fixed, 95% CI)	Subtotals only

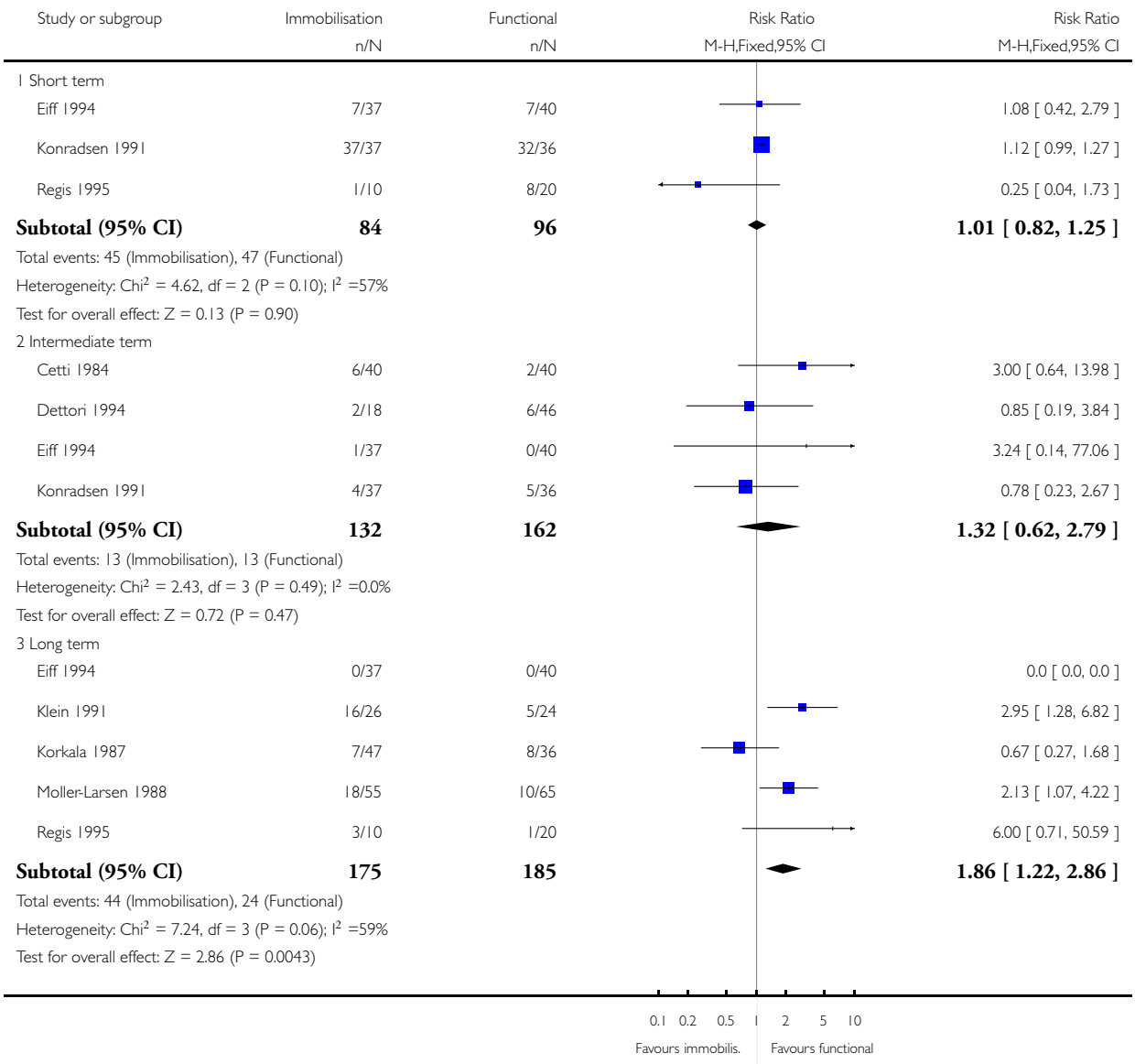
3.1 Short term	1	77	Risk Ratio (M-H, Fixed, 95% CI)	1.31 [0.87, 1.97]
3.2 Intermediate term	2	108	Risk Ratio (M-H, Fixed, 95% CI)	1.17 [0.66, 2.09]
3.3 Long term	4	254	Risk Ratio (M-H, Fixed, 95% CI)	1.23 [0.71, 2.14]
4 Swelling	2		Risk Ratio (M-H, Fixed, 95% CI)	Subtotals only
4.1 Short term	1	77	Risk Ratio (M-H, Fixed, 95% CI)	1.33 [0.75, 2.38]
4.2 Intermediate term	1	77	Risk Ratio (M-H, Fixed, 95% CI)	1.08 [0.07, 16.67]
4.3 Long term	2	131	Risk Ratio (M-H, Fixed, 95% CI)	0.33 [0.01, 7.84]
5 Subjective instability (giving way)	4		Risk Ratio (M-H, Fixed, 95% CI)	Subtotals only
5.1 Short term	1	77	Risk Ratio (M-H, Fixed, 95% CI)	1.51 [0.53, 4.36]
5.2 Intermediate term	1	77	Risk Ratio (M-H, Fixed, 95% CI)	1.08 [0.23, 5.03]
5.3 Long term	4	397	Risk Ratio (M-H, Fixed, 95% CI)	0.89 [0.62, 1.30]
6 Objective instability (talar tilt and/or ADS)	3		Risk Ratio (M-H, Fixed, 95% CI)	Subtotals only
6.3 Long term	3	286	Risk Ratio (M-H, Fixed, 95% CI)	0.91 [0.60, 1.39]
7 Recurrent sprain	6		Risk Ratio (M-H, Fixed, 95% CI)	Subtotals only
7.1 Short term	1	77	Risk Ratio (M-H, Fixed, 95% CI)	0.36 [0.04, 3.31]
7.2 Intermediate term	1	77	Risk Ratio (M-H, Fixed, 95% CI)	1.08 [0.23, 5.03]
7.3 Long term	6	487	Risk Ratio (M-H, Fixed, 95% CI)	1.25 [0.84, 1.85]
8 Patient satisfaction	2		Risk Ratio (M-H, Fixed, 95% CI)	Subtotals only
8.3 Long term	2	114	Risk Ratio (M-H, Fixed, 95% CI)	1.68 [0.72, 3.90]
9 Return to work (days)	2		Mean Difference (IV, Fixed, 95% CI)	Subtotals only
9.1 Return to work (days)	2	262	Mean Difference (IV, Fixed, 95% CI)	12.89 [7.10, 18.67]
10 Improvement in pain score	1		Mean Difference (IV, Fixed, 95% CI)	Totals not selected
10.1 Short term	1		Mean Difference (IV, Fixed, 95% CI)	Not estimable
11 Improvement in swelling	1		Mean Difference (IV, Fixed, 95% CI)	Totals not selected
11.1 Short term	1		Mean Difference (IV, Fixed, 95% CI)	Not estimable
12 Improvement in ROM	1		Mean Difference (IV, Fixed, 95% CI)	Totals not selected
12.3 Long term	1		Mean Difference (IV, Fixed, 95% CI)	Not estimable

Analysis 1.1. Comparison 1 Immobilisation vs. functional treatment, Outcome 1 Numbers not returning to sports.

Review: Immobilisation and functional treatment for acute lateral ankle ligament injuries in adults

Comparison: 1 Immobilisation vs. functional treatment

Outcome: 1 Numbers not returning to sports



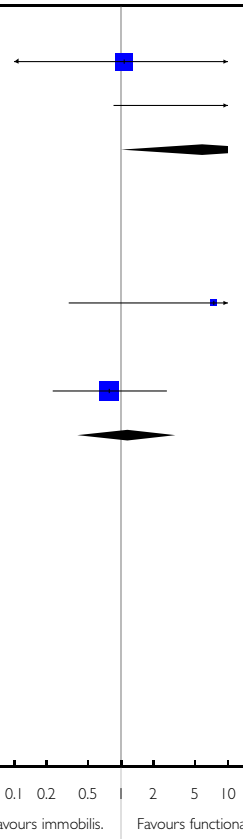
Analysis 1.2. Comparison 1 Immobilisation vs. functional treatment, Outcome 2 Numbers not returning to work.

Review: Immobilisation and functional treatment for acute lateral ankle ligament injuries in adults

Comparison: 1 Immobilisation vs. functional treatment

Outcome: 2 Numbers not returning to work

Study or subgroup	Immobilisation n/N	Functional n/N	Risk Ratio M-H,Fixed,95% CI	Risk Ratio M-H,Fixed,95% CI
1 Short term				
Eiff 1994	1/37	1/40		1.08 [0.07, 16.67]
Konradsen 1991	7/37	0/36		14.61 [0.86, 246.68]
Subtotal (95% CI)	**74**	**76**		**5.75 [1.01, 32.71]**
Total events: 8 (Immobilisation), 1 (Functional)				
Heterogeneity: Chi^2 = 1.85, df = 1 (P = 0.17); I^2 =46%				
Test for overall effect: Z = 1.97 (P = 0.049)				
2 Intermediate term				
Dettori 1994	1/18	0/46		7.42 [0.32, 174.21]
Eiff 1994	0/37	0/40		0.0 [0.0, 0.0]
Konradsen 1991	4/37	5/36		0.78 [0.23, 2.67]
Subtotal (95% CI)	**92**	**122**		**1.14 [0.39, 3.27]**
Total events: 5 (Immobilisation), 5 (Functional)				
Heterogeneity: Chi^2 = 1.72, df = 1 (P = 0.19); I^2 =42%				
Test for overall effect: Z = 0.24 (P = 0.81)				
3 Long term				
Eiff 1994	0/37	0/40		0.0 [0.0, 0.0]
Subtotal (95% CI)	**37**	**40**		**0.0 [0.0, 0.0]**
Total events: 0 (Immobilisation), 0 (Functional)				
Heterogeneity: not applicable				
Test for overall effect: Z = 0.0 (P < 0.00001)				

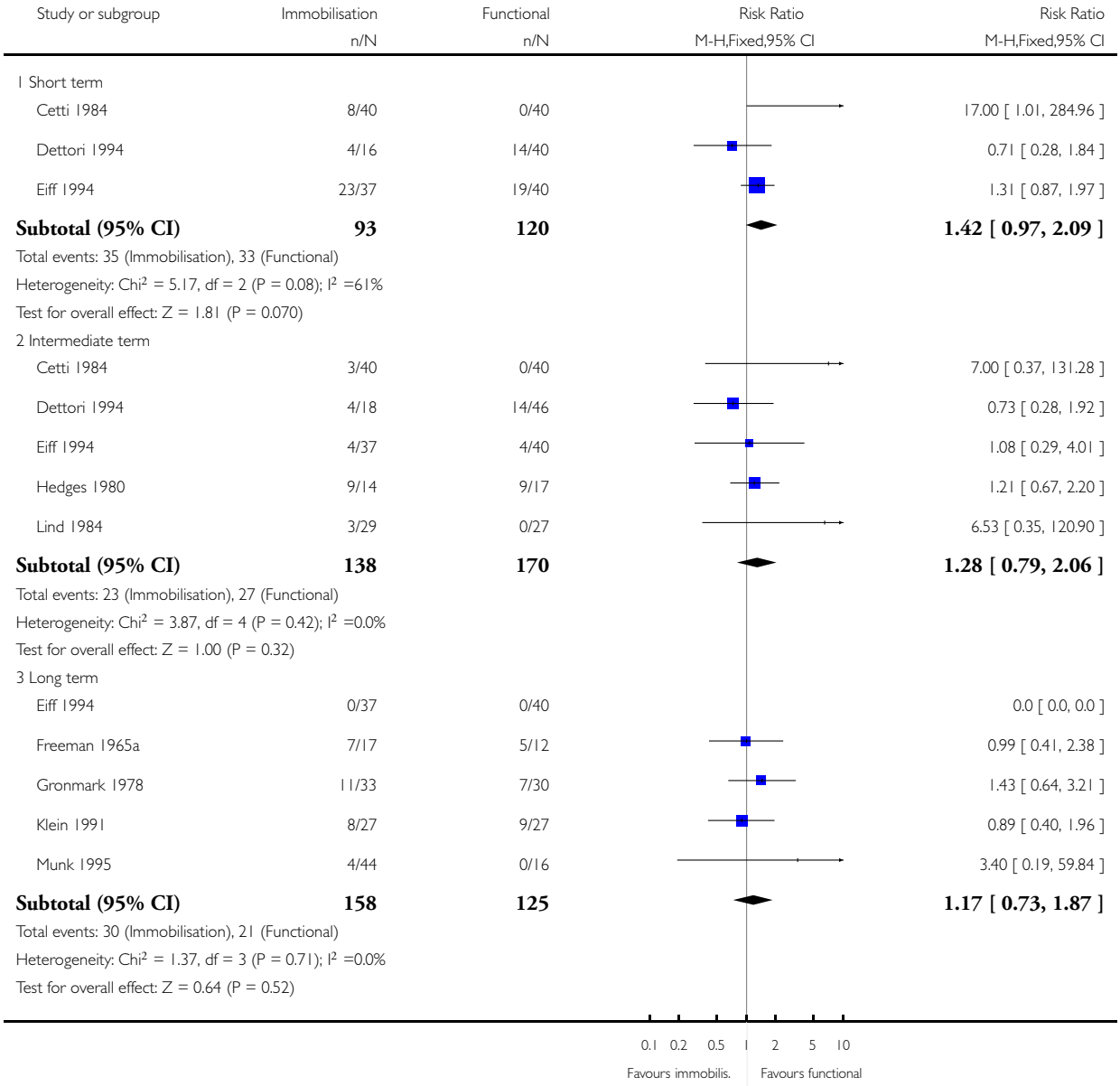


Analysis 1.3. Comparison 1 Immobilisation vs. functional treatment, Outcome 3 Pain.

Review: Immobilisation and functional treatment for acute lateral ankle ligament injuries in adults

Comparison: 1 Immobilisation vs. functional treatment

Outcome: 3 Pain

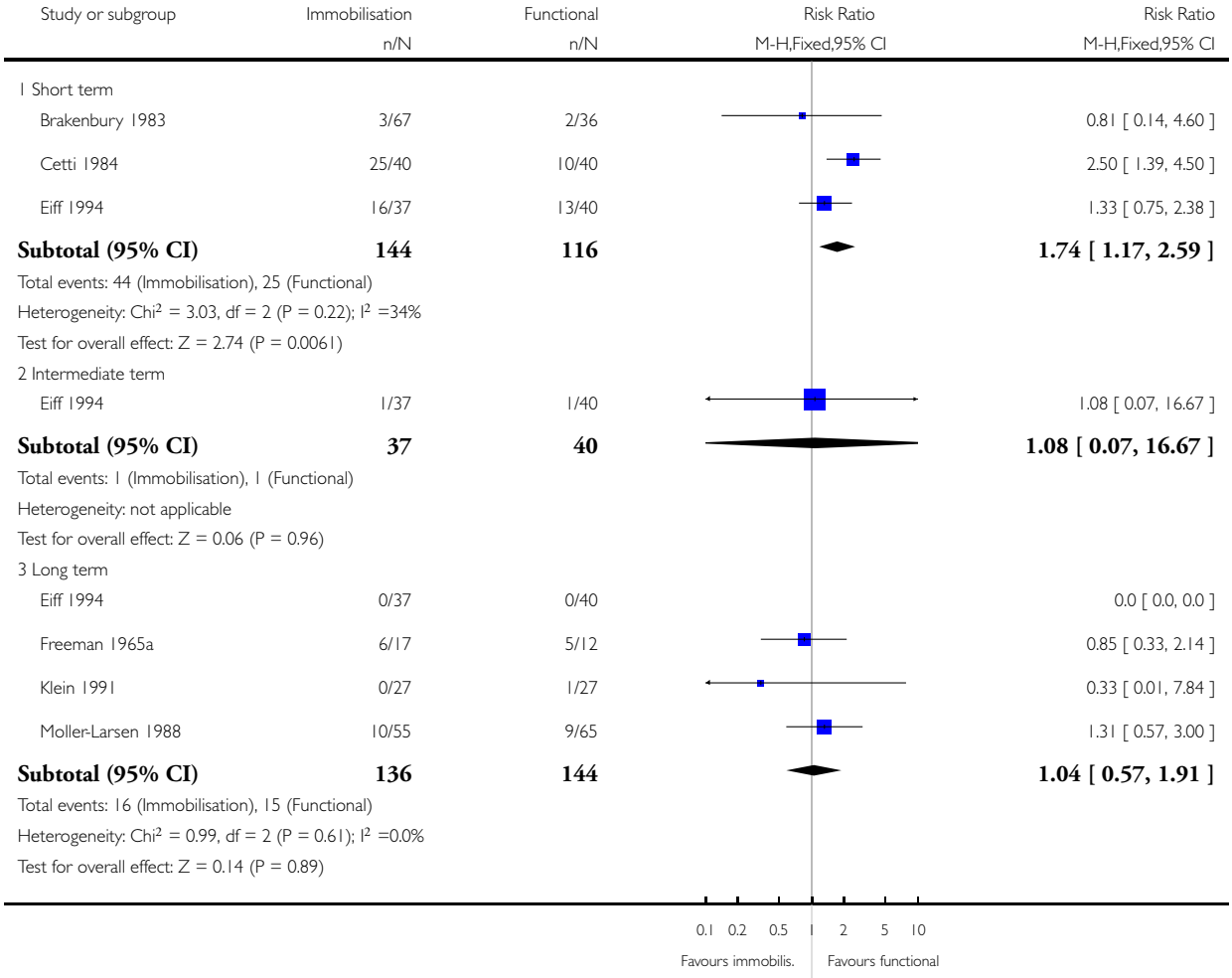


Analysis 1.4. Comparison 1 Immobilisation vs. functional treatment, Outcome 4 Swelling.

Review: Immobilisation and functional treatment for acute lateral ankle ligament injuries in adults

Comparison: 1 Immobilisation vs. functional treatment

Outcome: 4 Swelling



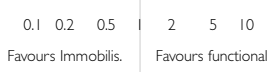
Analysis 1.5. Comparison 1 Immobilisation vs. functional treatment, Outcome 5 Subjective instability (giving way).

Review: Immobilisation and functional treatment for acute lateral ankle ligament injuries in adults

Comparison: 1 Immobilisation vs. functional treatment

Outcome: 5 Subjective instability (giving way)

Study or subgroup	Immobilisation n/N	Functional n/N	Risk Ratio M-H,Fixed,95% CI	Weight	Risk Ratio M-H,Fixed,95% CI
1 Short term					
Eiff 1994	7/37	5/40		100.0 %	1.51 [0.53, 4.36]
Subtotal (95% CI)	**37**	**40**		**100.0 %**	**1.51 [0.53, 4.36]**
Total events: 7 (Immobilisation), 5 (Functional)					
Heterogeneity: not applicable					
Test for overall effect: Z = 0.77 (P = 0.44)					
2 Intermediate term					
Cetti 1984	12/40	6/40		38.4 %	2.00 [0.83, 4.81]
Dettori 1994	3/18	12/46		43.2 %	0.64 [0.20, 2.00]
Eiff 1994	3/37	3/40		18.4 %	1.08 [0.23, 5.03]
Subtotal (95% CI)	**95**	**126**		**100.0 %**	**1.24 [0.67, 2.30]**
Total events: 18 (Immobilisation), 21 (Functional)					
Heterogeneity: Chi^2 = 2.47, df = 2 (P = 0.29); I^2 =19%					
Test for overall effect: Z = 0.69 (P = 0.49)					
3 Long term					
Brostrom 1966	17/81	18/102		33.7 %	1.19 [0.66, 2.16]
Eiff 1994	1/37	1/40		2.0 %	1.08 [0.07, 16.67]
Freeman 1965a	7/17	5/12		12.4 %	0.99 [0.41, 2.38]
Klein 1991	4/27	3/27		6.3 %	1.33 [0.33, 5.40]
Korkala 1987	15/47	19/36		45.5 %	0.60 [0.36, 1.02]
Subtotal (95% CI)	**209**	**217**		**100.0 %**	**0.91 [0.64, 1.28]**
Total events: 44 (Immobilisation), 46 (Functional)					
Heterogeneity: Chi^2 = 3.47, df = 4 (P = 0.48); I^2 =0.0%					
Test for overall effect: Z = 0.57 (P = 0.57)					



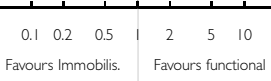
Analysis 1.6. Comparison 1 Immobilisation vs. functional treatment, Outcome 6 Objective instability (talar tilt and/or ADS).

Review: Immobilisation and functional treatment for acute lateral ankle ligament injuries in adults

Comparison: 1 Immobilisation vs. functional treatment

Outcome: 6 Objective instability (talar tilt and/or ADS)

Study or subgroup	Immobilisation n/N	Functional n/N	Risk Ratio M-H,Fixed,95% CI	Weight	Risk Ratio M-H,Fixed,95% CI
2 Intermediate term					
Konradsen 1991	2/37	2/36		56.6 %	0.97 [0.14, 6.54]
Lind 1984	0/29	1/27		43.4 %	0.31 [0.01, 7.33]
Subtotal (95% CI)	**66**	**63**		**100.0 %**	**0.69 [0.14, 3.34]**
Total events: 2 (Immobilisation), 3 (Functional)					
Heterogeneity: Chi^2 = 0.37, df = 1 (P = 0.54); I^2 =0.0%					
Test for overall effect: Z = 0.47 (P = 0.64)					
3 Long term					
Brostrom 1966	21/76	25/80		72.0 %	0.88 [0.54, 1.44]
Korkala 1987	9/40	7/30		23.7 %	0.96 [0.41, 2.29]
Munk 1995	3/44	1/16		4.3 %	1.09 [0.12, 9.74]
Subtotal (95% CI)	**160**	**126**		**100.0 %**	**0.91 [0.60, 1.39]**
Total events: 33 (Immobilisation), 33 (Functional)					
Heterogeneity: Chi^2 = 0.06, df = 2 (P = 0.97); I^2 =0.0%					
Test for overall effect: Z = 0.43 (P = 0.67)					

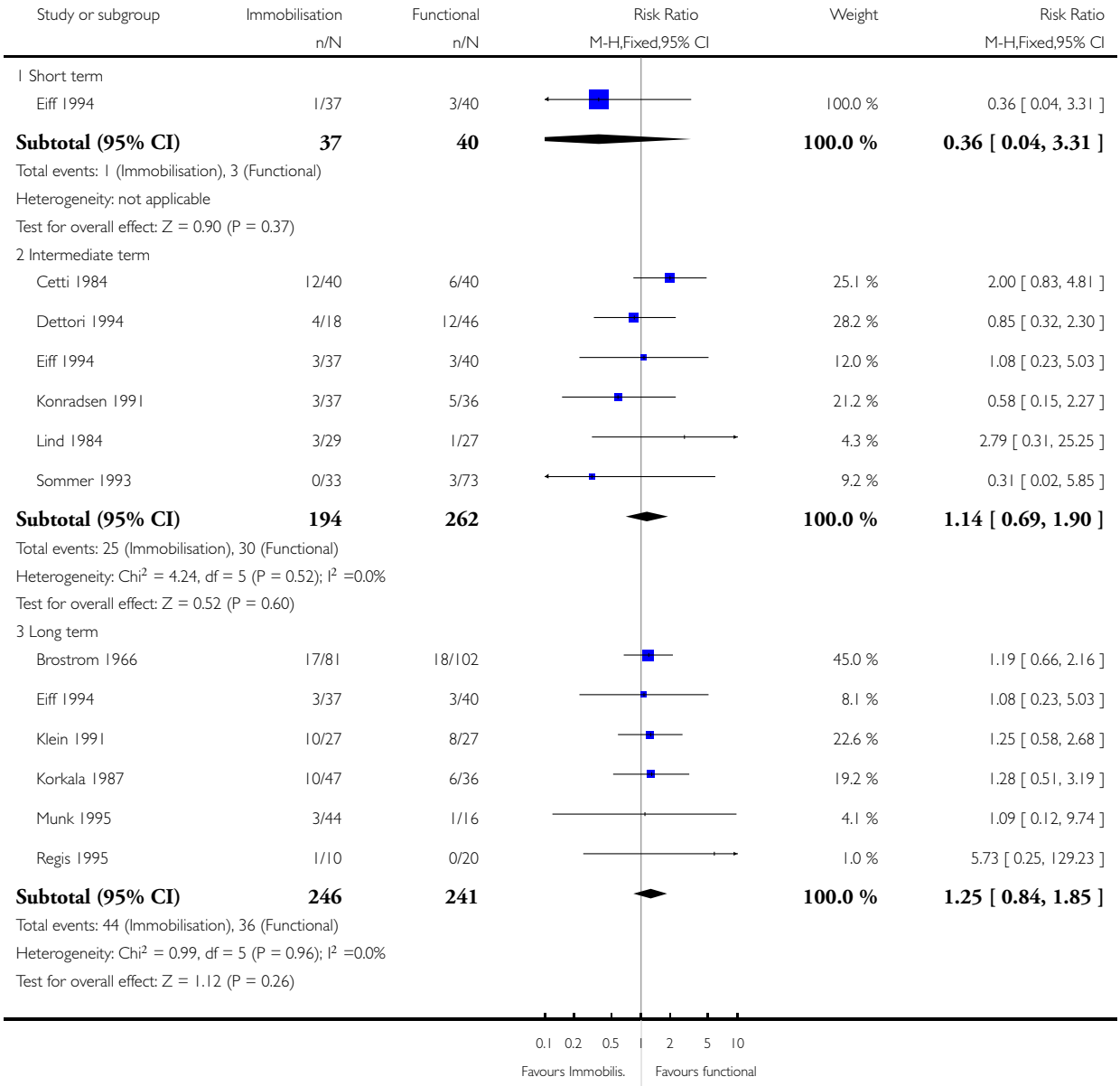


Analysis 1.7. Comparison 1 Immobilisation vs. functional treatment, Outcome 7 Recurrent sprain.

Review: Immobilisation and functional treatment for acute lateral ankle ligament injuries in adults

Comparison: 1 Immobilisation vs. functional treatment

Outcome: 7 Recurrent sprain



Analysis 1.8. Comparison 1 Immobilisation vs. functional treatment, Outcome 8 Decreased ROM.

Review: Immobilisation and functional treatment for acute lateral ankle ligament injuries in adults

Comparison: 1 Immobilisation vs. functional treatment

Outcome: 8 Decreased ROM

Study or subgroup	Immobilisation n/N	Functional n/N	Risk Ratio M-H,Fixed,95% CI	Weight	Risk Ratio M-H,Fixed,95% CI
1 Short term					
Brakenbury 1983	16/77	14/47		97.2 %	0.70 [0.38, 1.30]
Cetti 1984	10/40	0/40		2.8 %	21.00 [1.27, 346.66]
Subtotal (95% CI)	**117**	**87**		**100.0 %**	**1.27 [0.73, 2.19]**
Total events: 26 (Immobilisation), 14 (Functional)					
Heterogeneity: Chi^2 = 7.41, df = 1 (P = 0.01); I^2 =87%					
Test for overall effect: Z = 0.84 (P = 0.40)					
2 Intermediate term					
Cetti 1984	3/40	0/40		100.0 %	7.00 [0.37, 131.28]
Subtotal (95% CI)	**40**	**40**		**100.0 %**	**7.00 [0.37, 131.28]**
Total events: 3 (Immobilisation), 0 (Functional)					
Heterogeneity: not applicable					
Test for overall effect: Z = 1.30 (P = 0.19)					

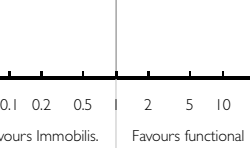
Analysis 1.9. Comparison 1 Immobilisation vs. functional treatment, Outcome 9 Patient satisfaction.

Review: Immobilisation and functional treatment for acute lateral ankle ligament injuries in adults

Comparison: 1 Immobilisation vs. functional treatment

Outcome: 9 Patient satisfaction

Study or subgroup	Immobilisation n/N	Functional n/N	Risk Ratio M-H,Fixed,95% CI	Weight	Risk Ratio M-H,Fixed,95% CI
1 Intermediate term					
Cetti 1984	7/40	2/40		10.5 %	3.50 [0.77, 15.83]
Roycroft 1983	3/21	0/22		2.6 %	7.32 [0.40, 133.66]
Subtotal (95% CI)	**61**	**62**		**13.1 %**	**4.25 [1.12, 16.09]**
Total events: 10 (Immobilisation), 2 (Functional)					
Heterogeneity: Chi^2 = 0.20, df = 1 (P = 0.66); I^2 =0.0%					
Test for overall effect: Z = 2.13 (P = 0.033)					
2 Long term					
Klein 1991	6/27	3/27		15.7 %	2.00 [0.56, 7.19]
Moller-Larsen 1988	11/55	10/65		48.1 %	1.30 [0.60, 2.83]
Munk 1995	12/44	3/16		23.1 %	1.45 [0.47, 4.50]
Subtotal (95% CI)	**126**	**108**		**86.9 %**	**1.47 [0.83, 2.60]**
Total events: 29 (Immobilisation), 16 (Functional)					
Heterogeneity: Chi^2 = 0.32, df = 2 (P = 0.85); I^2 =0.0%					
Test for overall effect: Z = 1.32 (P = 0.19)					
Total (95% CI)	**187**	**170**		**100.0 %**	**1.83 [1.09, 3.07]**
Total events: 39 (Immobilisation), 18 (Functional)					
Heterogeneity: Chi^2 = 2.51, df = 4 (P = 0.64); I^2 =0.0%					
Test for overall effect: Z = 2.29 (P = 0.022)					



Analysis 1.10. Comparison 1 Immobilisation vs. functional treatment, Outcome 10 Return to sports (days).

Review: Immobilisation and functional treatment for acute lateral ankle ligament injuries in adults

Comparison: 1 Immobilisation vs. functional treatment

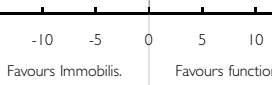
Outcome: 10 Return to sports (days)

Study or subgroup	Immobilisation N	Mean(SD)	Functional N	Mean(SD)	Mean Difference IV,Fixed,95% CI	Weight	Mean Difference IV,Fixed,95% CI
1 Return to sports (days)							
Freeman 1965a	17	154 (56)	12	84 (31.5)		1.1 %	70.00 [37.96, 102.04]
Milford 1990	30	22.9 (11)	30	18.6 (8)		48.1 %	4.30 [-0.57, 9.17]
Sommer 1993	33	28 (10.5)	73	24 (13.5)		50.8 %	4.00 [-0.74, 8.74]
Subtotal (95% CI)	**80**		**115**			**100.0 %**	**4.88 [1.50, 8.25]**

Heterogeneity: Chi^2 = 16.06, df = 2 (P = 0.00033); I^2 =88%

Test for overall effect: Z = 2.83 (P = 0.0046)

Test for subgroup differences: Not applicable



Analysis 1.11. Comparison 1 Immobilisation vs. functional treatment, Outcome 11 Return to work (days).

Review: Immobilisation and functional treatment for acute lateral ankle ligament injuries in adults

Comparison: 1 Immobilisation vs. functional treatment

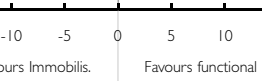
Outcome: 11 Return to work (days)

Study or subgroup	Immobilisation N	Mean(SD)	Functional N	Mean(SD)	Mean Difference IV,Fixed,95% CI	Weight	Mean Difference IV,Fixed,95% CI
1 Return to work (days)							
Brakenbury 1983	75	16.3 (6.9)	43	11.6 (7.2)		52.5 %	4.70 [2.04, 7.36]
Brostrom 1966	81	34 (30)	102	18 (11)		7.9 %	16.00 [9.13, 22.87]
Caro 1964	37	25.3 (17)	42	20 (30.5)		3.2 %	5.30 [-5.43, 16.03]
Cetti 1984	40	37.5 (15.3)	40	12.2 (11)		10.9 %	25.30 [19.46, 31.14]
Dettori 1994	18	31.5 (33)	46	33.5 (16)		1.5 %	-2.00 [-17.93, 13.93]
Roycroft 1983	37	18.6 (10)	43	11.9 (7.5)		24.1 %	6.70 [2.77, 10.63]
Subtotal (95% CI)	**288**		**316**			**100.0 %**	**8.23 [6.31, 10.16]**

Heterogeneity: Chi^2 = 46.96, df = 5 (P<0.00001); I^2 =89%

Test for overall effect: Z = 8.38 (P < 0.00001)

Test for subgroup differences: Not applicable



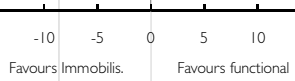
Analysis 1.12. Comparison 1 Immobilisation vs. functional treatment, Outcome 12 Improvement in pain score.

Review: Immobilisation and functional treatment for acute lateral ankle ligament injuries in adults

Comparison: 1 Immobilisation vs. functional treatment

Outcome: 12 Improvement in pain score

Study or subgroup	Immobilisation N	Mean(SD)	Functional N	Mean(SD)	Mean Difference IV,Fixed,95% CI	Mean Difference IV,Fixed,95% CI
1 Short term						
Hedges 1980	49	-2.08 (1.26)	44	-1.84 (1.22)		-0.24 [-0.74, 0.26]



Analysis 1.13. Comparison 1 Immobilisation vs. functional treatment, Outcome 13 Improvement in swelling.

Review: Immobilisation and functional treatment for acute lateral ankle ligament injuries in adults

Comparison: 1 Immobilisation vs. functional treatment

Outcome: 13 Improvement in swelling

Study or subgroup	Immobilisation N	Mean(SD)	Functional N	Mean(SD)	Mean Difference IV,Fixed,95% CI	Mean Difference IV,Fixed,95% CI
1 Short term						
Hedges 1980	49	-0.51 (0.58)	44	-0.34 (0.64)		-0.17 [-0.42, 0.08]

Analysis 1.14. Comparison 1 Immobilisation vs. functional treatment, Outcome 14 Improvement in objective instability (difference in TT).

Review: Immobilisation and functional treatment for acute lateral ankle ligament injuries in adults

Comparison: 1 Immobilisation vs. functional treatment

Outcome: 14 Improvement in objective instability (difference in TT)

Study or subgroup	Immobilisation N	Mean(SD)	Functional N	Mean(SD)	Mean Difference IV,Random,95% CI	Mean Difference IV,Random,95% CI
2 Intermediate term						
Sommer 1993	33	-7.6 (3.1)	73	-10.2 (3.75)		2.60 [1.24, 3.96]
3 Long term						
Freeman 1965a	17	-14.72 (10.77)	12	-9.45 (4.8)		-5.27 [-11.07, 0.53]

Analysis 1.15. Comparison 1 Immobilisation vs. functional treatment, Outcome 15 Improvement in ROM.

Review: Immobilisation and functional treatment for acute lateral ankle ligament injuries in adults

Comparison: 1 Immobilisation vs. functional treatment

Outcome: 15 Improvement in ROM

Study or subgroup	Immobilisation N	Mean(SD)	Functional N	Mean(SD)	Mean Difference IV,Fixed,95% CI	Mean Difference IV,Fixed,95% CI
1 Short term						
Brakenbury 1983	75	10.4 (2.2)	43	9.5 (3.9)		0.90 [-0.37, 2.17]
3 Long term						
Munk 1995	18	51 (6.6)	44	52 (6.4)		-1.00 [-4.59, 2.59]

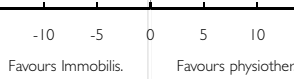
Analysis 2.1. Comparison 2 Immobilisation vs. physiotherapy, Outcome 1 Return to work (days).

Review: Immobilisation and functional treatment for acute lateral ankle ligament injuries in adults

Comparison: 2 Immobilisation vs. physiotherapy

Outcome: 1 Return to work (days)

Study or subgroup	Immobilisation N	Mean(SD)	Physiotherapy N	Mean(SD)	Mean Difference IV,Fixed,95% CI	Mean Difference IV,Fixed,95% CI
1 Short term						
Brooks 1981	26	14 (0)	21	6 (0)		0.0 [0.0, 0.0]



Analysis 3.1. Comparison 3 Immobilisation vs. other types of immobilisation, Outcome 1 Pain.

Review: Immobilisation and functional treatment for acute lateral ankle ligament injuries in adults

Comparison: 3 Immobilisation vs. other types of immobilisation

Outcome: 1 Pain

Study or subgroup	Cast n/N	Soft-cast n/N	Risk Ratio M-H,Fixed,95% CI	Risk Ratio M-H,Fixed,95% CI
1 Short term				
Avci 1998	7/26	4/31		2.09 [0.69, 6.35]

Analysis 3.2. Comparison 3 Immobilisation vs. other types of immobilisation, Outcome 2 Swelling.

Review: Immobilisation and functional treatment for acute lateral ankle ligament injuries in adults

Comparison: 3 Immobilisation vs. other types of immobilisation

Outcome: 2 Swelling

Study or subgroup	Cast n/N	Soft-cast n/N	Risk Ratio M-H,Fixed,95% CI	Risk Ratio M-H,Fixed,95% CI
1 Short term				
Avci 1998	12/26	9/31		1.59 [0.80, 3.17]

Analysis 3.3. Comparison 3 Immobilisation vs. other types of immobilisation, Outcome 3 Objective instability (talar tilt and/or ADS).

Review: Immobilisation and functional treatment for acute lateral ankle ligament injuries in adults

Comparison: 3 Immobilisation vs. other types of immobilisation

Outcome: 3 Objective instability (talar tilt and/or ADS)

Study or subgroup	Cast n/N	Soft-cast n/N	Risk Ratio M-H,Fixed,95% CI	Risk Ratio M-H,Fixed,95% CI
1 Short term				
Avci 1998	2/26	4/31		0.60 [0.12, 3.00]

Analysis 3.4. Comparison 3 Immobilisation vs. other types of immobilisation, Outcome 4 Return to work (days).

Review: Immobilisation and functional treatment for acute lateral ankle ligament injuries in adults

Comparison: 3 Immobilisation vs. other types of immobilisation

Outcome: 4 Return to work (days)

Study or subgroup	Cast N	Mean(SD)	Soft-cast N	Mean(SD)	Mean Difference IV,Fixed,95% CI	Mean Difference IV,Fixed,95% CI
1 Short term						
Avci 1998	17	6.3 (4.6)	19	2.5 (3.3)		3.80 [1.16, 6.44]

Analysis 4.1. Comparison 4 Immobilisation vs. functional treatment (high quality trials), Outcome 1 Numbers not returning to sports.

Review: Immobilisation and functional treatment for acute lateral ankle ligament injuries in adults

Comparison: 4 Immobilisation vs. functional treatment (high quality trials)

Outcome: 1 Numbers not returning to sports

Study or subgroup	Immobilisation n/N	Functional n/N	Risk Ratio M-H,Fixed,95% CI	Risk Ratio M-H,Fixed,95% CI
1 Short term				
Eiff 1994	7/37	7/40		1.08 [0.42, 2.79]
Regis 1995	1/10	8/20		0.25 [0.04, 1.73]
Subtotal (95% CI)	**47**	**60**		**0.71 [0.31, 1.63]**
Total events: 8 (Immobilisation), 15 (Functional)				
Heterogeneity: Chi^2 = 1.87, df = 1 (P = 0.17); I^2 =46%				
Test for overall effect: Z = 0.80 (P = 0.42)				
2 Intermediate term				
Eiff 1994	1/37	0/40		3.24 [0.14, 77.06]
Subtotal (95% CI)	**37**	**40**		**3.24 [0.14, 77.06]**
Total events: 1 (Immobilisation), 0 (Functional)				
Heterogeneity: not applicable				
Test for overall effect: Z = 0.73 (P = 0.47)				
3 Long term				
Eiff 1994	0/37	0/40		0.0 [0.0, 0.0]
Klein 1991	16/26	5/24		2.95 [1.28, 6.82]
Korkala 1987	7/47	8/36		0.67 [0.27, 1.68]
Regis 1995	3/10	1/20		6.00 [0.71, 50.59]
Subtotal (95% CI)	**120**	**120**		**1.70 [0.98, 2.95]**
Total events: 26 (Immobilisation), 14 (Functional)				
Heterogeneity: Chi^2 = 6.98, df = 2 (P = 0.03); I^2 =71%				
Test for overall effect: Z = 1.90 (P = 0.057)				

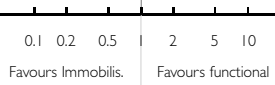
Analysis 4.2. Comparison 4 Immobilisation vs. functional treatment (high quality trials), Outcome 2 Numbers not returning to work.

Review: Immobilisation and functional treatment for acute lateral ankle ligament injuries in adults

Comparison: 4 Immobilisation vs. functional treatment (high quality trials)

Outcome: 2 Numbers not returning to work

Study or subgroup	Immobilisation n/N	Functional n/N	Risk Ratio M-H,Fixed,95% CI	Risk Ratio M-H,Fixed,95% CI
1 Short term				
Eiff 1994	1/37	1/40		1.08 [0.07, 16.67]
2 Intermediate term				
Eiff 1994	0/37	0/40		0.0 [0.0, 0.0]
3 Long term				
Eiff 1994	0/37	0/40		0.0 [0.0, 0.0]



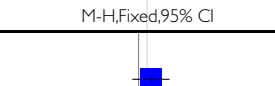
Analysis 4.3. Comparison 4 Immobilisation vs. functional treatment (high quality trials), Outcome 3 Pain.

Review: Immobilisation and functional treatment for acute lateral ankle ligament injuries in adults

Comparison: 4 Immobilisation vs. functional treatment (high quality trials)

Outcome: 3 Pain

Study or subgroup	Immobilisation n/N	Functional n/N	Risk Ratio M-H,Fixed,95% CI	Risk Ratio M-H,Fixed,95% CI
1 Short term				
Eiff 1994	23/37	19/40		1.31 [0.87, 1.97]
Subtotal (95% CI)	**37**	**40**		**1.31 [0.87, 1.97]**
Total events: 23 (Immobilisation), 19 (Functional)				
Heterogeneity: not applicable				
Test for overall effect: Z = 1.28 (P = 0.20)				
2 Intermediate term				
Eiff 1994	4/37	4/40		1.08 [0.29, 4.01]
Hedges 1980	9/14	9/17		1.21 [0.67, 2.20]



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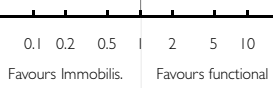
Study or subgroup	Immobilisation n/N	Functional n/N	Risk Ratio M-H,Fixed,95% CI	Risk Ratio M-H,Fixed,95% CI
Subtotal (95% CI)	**51**	**57**		**1.17 [0.66, 2.09]**
Total events: 13 (Immobilisation), 13 (Functional)				
Heterogeneity: Chi^2 = 0.03, df = 1 (P = 0.87); I^2 =0.0%				
Test for overall effect: Z = 0.54 (P = 0.59)				
3 Long term				
Eiff 1994	0/37	0/40		0.0 [0.0, 0.0]
Gronmark 1978	11/33	7/30		1.43 [0.64, 3.21]
Klein 1991	8/27	9/27		0.89 [0.40, 1.96]
Munk 1995	4/44	0/16		3.40 [0.19, 59.84]
Subtotal (95% CI)	**141**	**113**		**1.23 [0.71, 2.14]**
Total events: 23 (Immobilisation), 16 (Functional)				
Heterogeneity: Chi^2 = 1.26, df = 2 (P = 0.53); I^2 =0.0%				
Test for overall effect: Z = 0.73 (P = 0.47)				



Analysis 4.4. Comparison 4 Immobilisation vs. functional treatment (high quality trials), Outcome 4 Swelling.

Review: Immobilisation and functional treatment for acute lateral ankle ligament injuries in adults

Comparison: 4 Immobilisation vs. functional treatment (high quality trials)

Outcome: 4 Swelling

Study or subgroup	Immobilisation n/N	Functional n/N	Risk Ratio M-H,Fixed,95% CI	Risk Ratio M-H,Fixed,95% CI
1 Short term				
Eiff 1994	16/37	13/40		1.33 [0.75, 2.38]
Subtotal (95% CI)	**37**	**40**		**1.33 [0.75, 2.38]**
Total events: 16 (Immobilisation), 13 (Functional)				
Heterogeneity: not applicable				
Test for overall effect: Z = 0.97 (P = 0.33)				
2 Intermediate term				
Eiff 1994	1/37	1/40		1.08 [0.07, 16.67]
Subtotal (95% CI)	**37**	**40**		**1.08 [0.07, 16.67]**
Total events: 1 (Immobilisation), 1 (Functional)				
Heterogeneity: not applicable				
Test for overall effect: Z = 0.06 (P = 0.96)				
3 Long term				
Eiff 1994	0/37	0/40		0.0 [0.0, 0.0]
Klein 1991	0/27	1/27		0.33 [0.01, 7.84]
Subtotal (95% CI)	**64**	**67**		**0.33 [0.01, 7.84]**
Total events: 0 (Immobilisation), 1 (Functional)				
Heterogeneity: Chi^2 = 0.0, df = 0 (P = 1.00); I^2 =0.0%				
Test for overall effect: Z = 0.68 (P = 0.50)				

Analysis 4.5. Comparison 4 Immobilisation vs. functional treatment (high quality trials), Outcome 5 Subjective instability (giving way).

Review: Immobilisation and functional treatment for acute lateral ankle ligament injuries in adults

Comparison: 4 Immobilisation vs. functional treatment (high quality trials)

Outcome: 5 Subjective instability (giving way)

Study or subgroup	Immobilisation n/N	Functional n/N	Risk Ratio M-H,Fixed,95% CI	Weight	Risk Ratio M-H,Fixed,95% CI
1 Short term					
Eiff 1994	7/37	5/40		100.0 %	1.51 [0.53, 4.36]
Subtotal (95% CI)	**37**	**40**		**100.0 %**	**1.51 [0.53, 4.36]**
Total events: 7 (Immobilisation), 5 (Functional)					
Heterogeneity: not applicable					
Test for overall effect: Z = 0.77 (P = 0.44)					
2 Intermediate term					
Eiff 1994	3/37	3/40		100.0 %	1.08 [0.23, 5.03]
Subtotal (95% CI)	**37**	**40**		**100.0 %**	**1.08 [0.23, 5.03]**
Total events: 3 (Immobilisation), 3 (Functional)					
Heterogeneity: not applicable					
Test for overall effect: Z = 0.10 (P = 0.92)					
3 Long term					
Brostrom 1966	17/81	18/102		38.5 %	1.19 [0.66, 2.16]
Eiff 1994	1/37	1/40		2.3 %	1.08 [0.07, 16.67]
Klein 1991	4/27	3/27		7.2 %	1.33 [0.33, 5.40]
Korkala 1987	15/47	19/36		52.0 %	0.60 [0.36, 1.02]
Subtotal (95% CI)	**192**	**205**		**100.0 %**	**0.89 [0.62, 1.30]**
Total events: 37 (Immobilisation), 41 (Functional)					
Heterogeneity: Chi^2 = 3.39, df = 3 (P = 0.34); I^2 =11%					
Test for overall effect: Z = 0.59 (P = 0.55)					

Analysis 4.6. Comparison 4 Immobilisation vs. functional treatment (high quality trials), Outcome 6 Objective instability (talar tilt and/or ADS).

Review: Immobilisation and functional treatment for acute lateral ankle ligament injuries in adults

Comparison: 4 Immobilisation vs. functional treatment (high quality trials)

Outcome: 6 Objective instability (talar tilt and/or ADS)

Study or subgroup	Immobilisation n/N	Functional n/N	Risk Ratio M-H,Fixed,95% CI	Weight	Risk Ratio M-H,Fixed,95% CI
3 Long term					
Brostrom 1966	21/76	25/80		72.0 %	0.88 [0.54, 1.44]
Korkala 1987	9/40	7/30		23.7 %	0.96 [0.41, 2.29]
Munk 1995	3/44	1/16		4.3 %	1.09 [0.12, 9.74]
Subtotal (95% CI)	**160**	**126**		**100.0 %**	**0.91 [0.60, 1.39]**
Total events: 33 (Immobilisation), 33 (Functional)					
Heterogeneity: Chi^2 = 0.06, df = 2 (P = 0.97); I^2 =0.0%					
Test for overall effect: Z = 0.43 (P = 0.67)					

Analysis 4.7. Comparison 4 Immobilisation vs. functional treatment (high quality trials), Outcome 7 Recurrent sprain.

Review: Immobilisation and functional treatment for acute lateral ankle ligament injuries in adults

Comparison: 4 Immobilisation vs. functional treatment (high quality trials)

Outcome: 7 Recurrent sprain

Study or subgroup	Immobilisation n/N	Functional n/N	Risk Ratio M-H,Fixed,95% CI	Weight	Risk Ratio M-H,Fixed,95% CI
1 Short term					
Eiff 1994	1/37	3/40		100.0 %	0.36 [0.04, 3.31]
Subtotal (95% CI)	**37**	**40**		**100.0 %**	**0.36 [0.04, 3.31]**
Total events: 1 (Immobilisation), 3 (Functional)					
Heterogeneity: not applicable					
Test for overall effect: Z = 0.90 (P = 0.37)					
2 Intermediate term					
Eiff 1994	3/37	3/40		100.0 %	1.08 [0.23, 5.03]
Subtotal (95% CI)	**37**	**40**		**100.0 %**	**1.08 [0.23, 5.03]**
Total events: 3 (Immobilisation), 3 (Functional)					
Heterogeneity: not applicable					
Test for overall effect: Z = 0.10 (P = 0.92)					
3 Long term					
Brostrom 1966	17/81	18/102		45.0 %	1.19 [0.66, 2.16]
Eiff 1994	3/37	3/40		8.1 %	1.08 [0.23, 5.03]
Klein 1991	10/27	8/27		22.6 %	1.25 [0.58, 2.68]
Korkala 1987	10/47	6/36		19.2 %	1.28 [0.51, 3.19]
Munk 1995	3/44	1/16		4.1 %	1.09 [0.12, 9.74]
Regis 1995	1/10	0/20		1.0 %	5.73 [0.25, 129.23]
Subtotal (95% CI)	**246**	**241**		**100.0 %**	**1.25 [0.84, 1.85]**
Total events: 44 (Immobilisation), 36 (Functional)					
Heterogeneity: Chi^2 = 0.99, df = 5 (P = 0.96); I^2 =0.0%					
Test for overall effect: Z = 1.12 (P = 0.26)					

Analysis 4.8. Comparison 4 Immobilisation vs. functional treatment (high quality trials), Outcome 8 Patient satisfaction.

Review: Immobilisation and functional treatment for acute lateral ankle ligament injuries in adults

Comparison: 4 Immobilisation vs. functional treatment (high quality trials)

Outcome: 8 Patient satisfaction

Study or subgroup	Immobilisation n/N	Functional n/N	Risk Ratio M-H,Fixed,95% CI	Weight	Risk Ratio M-H,Fixed,95% CI
3 Long term					
Klein 1991	6/27	3/27		40.5 %	2.00 [0.56, 7.19]
Munk 1995	12/44	3/16		59.5 %	1.45 [0.47, 4.50]
Subtotal (95% CI)	**71**	**43**		**100.0 %**	**1.68 [0.72, 3.90]**
Total events: 18 (Immobilisation), 6 (Functional)					
Heterogeneity: Chi^2 = 0.13, df = 1 (P = 0.71); I^2 =0.0%					
Test for overall effect: Z = 1.20 (P = 0.23)					

Analysis 4.9. Comparison 4 Immobilisation vs. functional treatment (high quality trials), Outcome 9 Return to work (days).

Review: Immobilisation and functional treatment for acute lateral ankle ligament injuries in adults

Comparison: 4 Immobilisation vs. functional treatment (high quality trials)

Outcome: 9 Return to work (days)

Study or subgroup	Immobilisation N	Mean(SD)	Functional N	Mean(SD)	Mean Difference IV,Fixed,95% CI	Weight	Mean Difference IV,Fixed,95% CI
1 Return to work (days)							
Brostrom 1966	81	34 (30)	102	18 (11)		70.9 %	16.00 [9.13, 22.87]
Caro 1964	37	25.3 (17)	42	20 (30.5)		29.1 %	5.30 [-5.43, 16.03]
Subtotal (95% CI)	**118**		**144**			**100.0 %**	**12.89 [7.10, 18.67]**
Heterogeneity: Chi^2 = 2.71, df = 1 (P = 0.10); I^2 =63%							
Test for overall effect: Z = 4.36 (P = 0.000013)							
Test for subgroup differences: Not applicable							

Analysis 4.10. Comparison 4 Immobilisation vs. functional treatment (high quality trials), Outcome 10 Improvement in pain score.

Review: Immobilisation and functional treatment for acute lateral ankle ligament injuries in adults

Comparison: 4 Immobilisation vs. functional treatment (high quality trials)

Outcome: 10 Improvement in pain score

Study or subgroup	Immobilisation N	Mean(SD)	Functional N	Mean(SD)	Mean Difference IV,Fixed,95% CI	Mean Difference IV,Fixed,95% CI
1 Short term						
Hedges 1980	49	-2.08 (1.26)	44	-1.84 (1.22)		-0.24 [-0.74, 0.26]

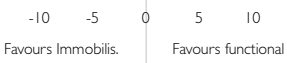
Analysis 4.11. Comparison 4 Immobilisation vs. functional treatment (high quality trials), Outcome 11 Improvement in swelling.

Review: Immobilisation and functional treatment for acute lateral ankle ligament injuries in adults

Comparison: 4 Immobilisation vs. functional treatment (high quality trials)

Outcome: 11 Improvement in swelling

Study or subgroup	Immobilisation N	Mean(SD)	Functional N	Mean(SD)	Mean Difference IV,Fixed,95% CI	Mean Difference IV,Fixed,95% CI
1 Short term						
Hedges 1980	49	-0.51 (0.58)	44	-0.34 (0.64)		-0.17 [-0.42, 0.08]

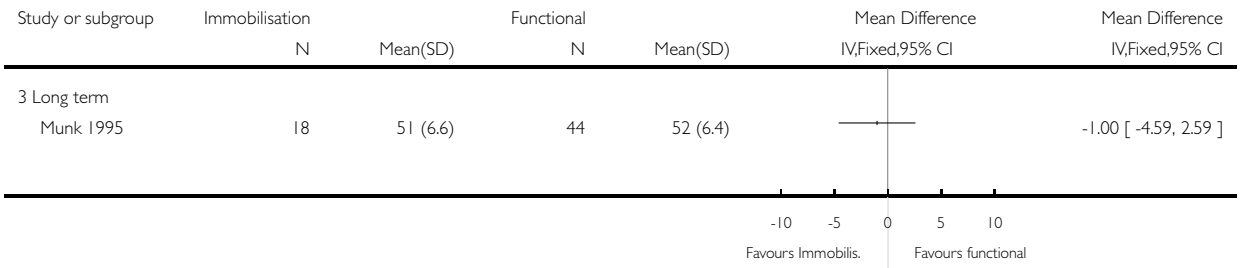


Analysis 4.12. Comparison 4 Immobilisation vs. functional treatment (high quality trials), Outcome 12 Improvement in ROM.

Review: Immobilisation and functional treatment for acute lateral ankle ligament injuries in adults

Comparison: 4 Immobilisation vs. functional treatment (high quality trials)

Outcome: 12 Improvement in ROM



ADDITIONAL TABLES

Table 1. Quality assessment tool

Item	Score	Notes
A. Was the assigned treatment adequately concealed prior to allocation?	2 = method did not allow disclosure of assignment 1 = small but possible chance of disclosure of assignment or unclear 0 = quasi-randomised or open list/tables	Cochrane code: clearly yes = A, not sure = B, clearly no = C
B. Were the outcomes of patients who withdrew described and included in the analysis (intention-to-treat)?	2 = intention-to-treat analysis based on all cases randomised possible or carried out 1 = states number and reasons for withdrawal but intention to treat analysis not possible 0 = not mentioned, or states number of withdrawals only	
C. Were the outcome assessors blinded to treatment status?	2 = effective action taken to blind assessors 1 = small or moderate chance of unblinding of assessors 0 = not mentioned or not possible	
D. Were the treatment and control group comparable at entry?	2 = good comparability of groups, or confounding adjusted for in analysis 1 = confounding small; mentioned but not adjusted for 0 = large potential for confounding, or not discussed	

Table 1. Quality assessment tool (*Continued*)

E. Were the subjects blind to assignment status after allocation?	2 = effective action taken to blind subjects 1 = small or moderate chance of unblinding subjects 0 = not possible, or not mentioned (unless double-blind), or possible but not done	
F. Were the treatment providers blind to assignment status after allocation?	2 = effective action taken to blind treatment providers 1 = small or moderate chance of unblinding of treatment providers 0 = not possible, or not mentioned (unless double-blind), or possible but not done	
G. Were care programmes, other than the trial options, identical?	2 = care programmes clearly identical 1 = clear but trivial differences 0 = not mentioned or clear and important differences in care programmes	
H. Were the inclusion and exclusion criteria clearly defined?	2 = clearly defined 1 = inadequately defined 0 = not defined	
J. Were the outcome measures used clearly defined?	2 = clearly defined 1 = inadequately defined 0 = not defined	
K. Was follow-up active and appropriate?	2 = optimal 1 = adequate 0 = not defined, not adequate	
L. Was the duration of surveillance clinically appropriate?	2 = optimal (short-intermediate-long)1 = adequate (short-intermediate) 0 = not defined, not adequate	

APPENDICES

Appendix 1. Search strategy for MEDLINE (OVID Web)

1. Ankle Injuries/
2. Ligaments, Articular/
3. "Sprains and Strains"/
4. or/1-3
5. ankle$.tw.
6. ligament$.tw.
7. and/5-6
8. (sprain$ or strain$ or injur$ or rupture$ or tear or torn).tw.
9. and/7-8
10. and/4,9
11. Lateral Ligament, Ankle/
12. or/10-11

WHAT'S NEW

Last assessed as up-to-date: 13 May 2002.

Date	Event	Description
5 November 2008	Amended	Converted to new review format.

HISTORY

Protocol first published: Issue 4, 1999

Review first published: Issue 3, 2002

CONTRIBUTIONS OF AUTHORS

This review was initiated by Gino Kerkhoffs (GK), Pim Assendelft (WA) and others (including Helen Handoll)(HH) and some preliminary work done. GK took the role of caretaker. All the results were checked and the analyses restructured to conform to the protocol. Initial trial location was performed by GK and Peter Struijs (PS) and subsequently by GK and Lesley Gillespie (LG). Study selection was done by at least two reviewers and always GK and PS. GK, BR, KK, PS and Niek van Dijk (CVD) participated in quality assessment and data extraction of the included trials. Compilation of the comparisons, structuring the review, data entry into RevMan, and composition of the drafts were shared by all authors. WA, BR, KK, CVD and PS advised on the analysis and content and provided critical feedback on the work at various stages. Gino Kerkhoffs is the guarantor of the review.

DECLARATIONS OF INTEREST

None known.

SOURCES OF SUPPORT

Internal sources

- Orthopaedic Research Center, Department of Orthopaedic Surgery, University of Amsterdam, Amsterdam, Netherlands.
- Division of Emergency Medicine, University of Alberta, Canada.

External sources

- No sources of support supplied

INDEX TERMS

Medical Subject Headings (MeSH)

*Immobilization; *Physical Therapy Modalities; Lateral Ligament, Ankle [*injuries]; Randomized Controlled Trials as Topic; Sprains and Strains [*therapy]

MeSH check words

Humans