Ankle sprain

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ABSTRACT

INTRODUCTION: Injury of the lateral ligament complex of the ankle joint occurs in about one in 10,000 people a day, accounting for a quarter of all sports injuries. METHODS AND OUTCOMES: We conducted a systematic review and aimed to answer the following clinical question: What are the effects of treatment strategies for acute ankle ligament ruptures? We searched: Medline, Embase, The Cochrane Library, and other important databases up to November 2009 (Clinical Evidence reviews are updated periodically, please check our website for the most up-to-date version of this review). We included harms alerts from relevant organisations such as the US Food and Drug Administration (FDA) and the UK Medicines and Healthcare products Regulatory Agency (MHRA). RESULTS: We found 38 systematic reviews, RCTs, or observational studies that met our inclusion criteria. We performed a GRADE evaluation of the quality of evidence for interventions. CONCLUSIONS: In this systematic review we present information relating to the effectiveness and safety of the following interventions: cold treatment, diathermy, functional treatment, homeopathic ointment, immobilisation, physiotherapy, surgery, and ultrasound.

QUESTIONS

INTERVENTIONS

TREATING ANKLE SPRAIN

To be covered in future updates

Non-steroidal anti-inflammatory drugs

Prevention of ankle sprain

Key points

- Injury of the lateral ligament complex of the ankle joint occurs in about one in 10,000 people a day, accounting for a quarter of all sports injuries.

  Pain may be localised to the lateral side of the ankle.

  Residual complaints include joint instability, stiffness, and intermittent swelling, and are more likely to occur after more extensive cartilage damage.

  Recurrent sprains can add new damage and increase the risk of long-term degeneration of the joint.

- Despite consensus views that immobilisation is more effective than no treatment, studies have shown that immobilisation for more than 4 weeks worsens function and symptoms in both the short and long term compared with functional treatment. Immobilisation for up to 10 days may be beneficial for the patient by facilitating decrease in pain and swelling.

  Surgery and immobilisation may have similar outcomes in terms of pain, swelling, and recurrence, but surgery may lead to increased joint stability.

- Functional treatment, consisting of early mobilisation and an external support, improves function and stability of the ankle compared with minimal treatment or immobilisation.

  We don't know which is the most effective functional treatment, or how functional treatments compare with surgery.

- Ultrasound has not been shown to improve symptoms or function compared with sham ultrasound.

  Cold treatment may reduce oedema compared with heat or a contrast bath, but it has not been shown to improve symptoms compared with placebo.

  We don't know whether diathermy, homeopathic ointment, or physiotherapy (physical therapy) improve function compared with placebo, as we found few studies.

DEFINITION

Ankle sprain is an injury of the lateral ligament complex of the ankle joint. The injury is graded on the basis of severity. [1] [2] [3] [4] [5] Grade I is a mild stretching of the ligament complex without joint instability; grade II is a partial rupture of the ligament complex with mild instability of the joint (such as isolated rupture of the anterior talofibular ligament); and grade III involves complete rupture of the ligament complex with instability of the joint. This gradation has limited practical consequences since both grade II and III injuries are treated similarly, and grade I injuries need no specific treatment after diagnosis. [6] Unless otherwise stated, studies included in this review did not specify the grades of injury included, or included both grade II and II.

INCIDENCE/ PREVALENCE

Ankle sprain is a common problem in acute medical care, occurring at a rate of about one injury per 10,000 people a day. [7] Injuries of the lateral ligament complex of the ankle form a quarter of all sports injuries. [7]

AETIOLOGY/ RISK FACTORS

The usual mechanism of injury is inversion and adduction (usually referred to as supination) of the plantar flexed foot. Predisposing factors are a history of ankle sprains, ligament hyperlaxity syndrome, and specific malalignment, such as crus varum and pes cavo-varus.

PROGNOSIS

Some sports (e.g., basketball, football/soccer, volleyball) are associated with a particularly high incidence of ankle injuries. Pain and intermittent swelling are the most frequent residual problems, often localised on the lateral side of the ankle. [4] Other residual complaints include mechanical instability and stiffness. People with more extensive cartilage damage have a higher incidence of residual complaints. [4] In the long term, the initial traumatic cartilage damage can lead to degenerative changes, especially if there is persistent or recurrent instability. Every further sprain has the potential to add new damage.

AIMS OF INTERVENTION

To reduce swelling and pain; to restore the stability of the ankle joint; to regain full functional status.

OUTCOMES

Symptom improvement: ability to walk/bear weight, ankle mobility/range of movement, pain, swelling, patient perception of improvement/satisfaction, quality of life; **Joint stability:** subjective instability; objective instability; **Return to normal activities:** return to pre-injury level of sports; return to pre-injury level of work; **Recurrence**; **Adverse effects of treatment**, including post-intervention complications.

METHODS

Clinical Evidence search and appraisal November 2009. The following databases were used to identify studies for this systematic review: Medline 1966 to November 2009, Embase 1980 to November 2009, and The Cochrane Database of Systematic Reviews 2009, Issue 4 (1966 to date of issue). An additional search within The Cochrane Library was carried out for the Database of Abstracts of Reviews of Effects (DARE) and Health Technology Assessment (HTA). We also searched for retractions of studies included in the review. Abstracts of the studies retrieved from the initial search were assessed by an information specialist. Selected studies were then sent to the contributor for additional assessment, using pre-determined criteria to identify relevant studies. Study design criteria for inclusion in this review were: published systematic reviews of RCTs and RCTs in any language. All RCTs were sent for consideration, so there was no minimum blinding, number of participants, or percentage of participants followed-up. There was no minimum length of follow-up required to evaluate studies. We included systematic reviews of RCTs and RCTs where harms of an included intervention were studied applying the same study design criteria for inclusion as we did for benefits. In addition, we use a regular surveillance protocol to capture harms alerts from organisations such as the US Food and Drug Administration (FDA) and the UK Medicines and Healthcare products Regulatory Agency (MHRA), which are added to the reviews as required. To aid readability of the numerical data in our reviews, we round many percentages to the nearest whole number. Readers should be aware of this when relating percentages to summary statistics such as relative risks (RRs) and odds ratios (ORs). We have performed a GRADE evaluation of the quality of evidence for interventions included in this review (see table, p 16). The categorisation of the quality of the evidence (into high, moderate, low, or very low) reflects the quality of evidence available for our chosen outcomes in our defined populations of interest. These categorisations are not necessarily a reflection of the overall methodological quality of any individual study, because the *Clinical Evidence* population and outcome of choice may represent only a small subset of the total outcomes reported, and population included, in any individual trial. For further details of how we perform the GRADE evaluation and the scoring system we use, please see our website (www.clinicalevidence.com).

QUESTION What are the effects of treatment strategies for acute ankle ligament ruptures?

OPTION IMMOBILISATION

Symptom improvement
Compared with functional treatment Immobilisation for a short period (up to 10 days) with below-knee cast may be more effective than tubular bandage at improving some symptom measures (e.g., ankle function and pain scores) at 1 and 3 months, but we don't know whether it is more effective at 9 months, and we don't know whether immobilisation using Aircast brace or Bledsoe boot are more effective than tubular bandage. Immobilisation for 3 weeks or longer may be less effective than functional treatment at reducing swelling and pain, or increasing patient satisfaction in the short/medium term (less than 6 weeks or 6–12 weeks), but we don't know how immobilisation and functional treatment compare in the longer term (greater than 1 year) (very low-quality evidence).

Compared with surgery We don't know how immobilisation compares with surgery at reducing swelling or pain (low-quality evidence).

Different forms of immobilisation compared with each other We don't know whether semi-rigid casts or rigid casts are more effective at reducing pain or swelling at short-term follow-up (low-quality evidence).

Compared with ultrasound We don't know how immobilisation and ultrasound compare at improving recovery times at 7 days, but immobilisation may be less effective than ultrasound at 14 days (very low-quality evidence).

Joint stability
Compared with functional treatment Immobilisation for at least 3 weeks may be less effective at improving joint stability at 6 to 12 weeks, but we don't know how immobilisation and functional treatment compare in the longer term (greater than 1 year) (low-quality evidence).

Compared with surgery Immobilisation for at least 4 weeks may be less effective at reducing objective joint instability, but may be as effective at reducing subjective joint instability (low-quality evidence).

Different forms of immobilisation compared with each other We don't know whether semi-rigid casts or rigid casts are more effective at short-term follow-up at reducing objective instability (low-quality evidence).

Return to normal activities
Compared with functional treatment Immobilisation for at least 3 weeks may be less effective at reducing the time taken to return to sports, time taken to return to normal physical training, or the proportion of people not returning to sports. Immobilisation for at least 4 weeks is less effective at reducing the time taken to return to work, but, at 1 to 2 years' follow-up, there may no longer be differences between immobilisation and functional treatment in the proportion of people who have returned to work (low-quality evidence).

Compared with surgery Immobilisation seems less effective at reducing the proportion of people not returning to sports or with reduction in sporting activity (moderate-quality evidence).

Different forms of immobilisation compared with each other Semi-rigid casts may be more effective than rigid casts at reducing the time taken to return to work (low-quality evidence).

Recurrence
Compared with surgery We don't know how immobilisation and surgery compare at reducing recurrence of ankle sprains (low-quality evidence).

Note
We found no clinically important results from RCTs about immobilisation compared with no treatment in people with ankle sprain. There is consensus that immobilisation is more effective than no treatment.

For GRADE evaluation of interventions for ankle sprains, **see table, p 16 .**

Benefits:

Immobilisation versus no treatment:
We found no RCTs comparing immobilisation versus no treatment.

Immobilisation versus functional treatment:
We found one systematic review (search date 2001) [8] and two subsequent RCTs. [9] [10]

The systematic review included any inpatient, outpatient, or home-based intervention programme consisting of immobilisation with or without a plaster cast. [8] It included any trials comparing immobilisation versus either another type or duration of immobilisation or a functional treatment for injuries to the lateral ligament complex of the ankle, and it reported outcomes at short-term, intermediate, or long-term follow-up (see comment below). The review analysed a variety of different forms of

functional treatment, including strapping, bracing, use of an orthosis, tubigrips, bandages, elastic bandages, and special shoes, for at least 5 weeks. It found that functional treatment significantly improved seven outcomes measured at different follow-up times compared with immobilisation. At short-term follow-up, it found that functional treatment significantly reduced the proportion of people with persistent swelling compared with immobilisation (3 RCTs; 260 people; 44/144 [31%] with immobilisation *v* 25/116 [22%] with functional; RR 1.7, 95% CI 1.2 to 2.6) and significantly decreased the proportion of people not returning to work (2 RCTs; 150 people; 8/74 [11%] with immobilisation *v* 1/76 [1%] with functional; RR 5.75, 95% CI 1.01 to 32.71). At intermediate follow-up, it found that immobilisation significantly increased objective instability, as assessed with stress x-ray, compared with functional treatment (1 RCT; 106 people; WMD in talar tilt 2.6°, 95% CI 1.2° to 4.0°; absolute results not reported), but that functional treatment significantly increased patient satisfaction compared with immobilisation (proportion of people not satisfied with treatment 2 RCTs; 123 people; 10/61 [16%] with immobilisation *v* 2/62 [3%] with functional treatment; RR 4.2, 95% CI 1.1 to 16.1). At long-term follow-up, it found that functional treatment significantly decreased the proportion of people not returning to sports compared with immobilisation and the time taken to return to sports (immobilisation: 5 RCTs; 360 people; 44/175 [25%] with immobilisation *v* 24/185 [13%] with functional treatment; RR 1.9, 95% CI 1.2 to 2.9; time taken to return to work: 6 RCTs; 604 people; WMD 8.2 days, 95% CI 6.3 days to 10.2 days; absolute results not reported), and the time taken to return to sports (3 RCTs; 195 people; WMD 4.9 days, 95% CI 1.5 days to 8.3 days; absolute results not reported). However, it found that, at long-term follow-up, differences between immobilisation and functional treatment in persistent swelling, objective instability, proportion of people not returning to work, and patient satisfaction were no longer significant (absolute numbers and statistical analysis reported in review). A subgroup analysis using only "high quality" RCTs (defined as scoring at least 50% on a recognised quality-evaluation tool [11]) found that functional treatment significantly reduced the time taken to return to work compared with immobilisation (2 RCTs; 262 people; WMD 12.9 days, 95% CI 7.1 days to 18.7 days; absolute results not reported). [8]

The first subsequent RCT (121 semi-professional sports people with acute grade III lateral ankle ligament) compared 3 weeks of functional treatment (strapping plus early controlled mobilisation) versus immobilisation in a plaster cast. [9] It found that functional treatment significantly reduced time taken to return to normal physical training, and reduced the proportion of people with pain, swelling, and subjective instability at 3 months compared with immobilisation (mean time to return to normal training: 6.3 weeks with immobilisation *v* 5.4 weeks with functional treatment; P = 0.02; pain: 61% with immobilisation *v* 35% with functional treatment; absolute results not reported; P = 0.008; swelling: 49% with immobilisation *v* 16% with functional treatment; absolute results not reported; P less than 0.01; subjective instability: 54% with immobilisation *v* 22% with functional treatment; absolute results not reported; P = 0.001). However, the RCT found no significant difference at 12 months between treatments in the proportion of people with pain, swelling, or subjective instability (pain: 7% with immobilisation *v* 5% with functional; P = 0.6; swelling: 4% with immobilisation *v* 5% with functional; P = 0.8; subjective instability: 7% with immobilisation *v* 9% with functional; P = 0.3; absolute results not reported). [9]

The second subsequent RCT (584 people, aged at least 16 years, with acute severe ankle sprain, no fracture), was a four-armed trial comparing three types of immobilisation (below-knee cast, Aircast ankle brace, Bledsoe boot) versus functional treatment (tubular bandage), each applied for 10 days after randomisation. [10] Acute severe ankle sprain was indicated by inability to weight bear for at least 3 days after injury on presentation to the emergency department and at re-assessment (2–3 days after presentation and following elevation and immobilisation in tubular compression bandage to allow swelling to resolve). Participants were allowed to use any additional treatments during the 9 months' follow-up without restriction, but were asked to report these. The RCT found that, compared with tubular bandage, below-knee cast significantly improved the primary outcome of quality of ankle function (assessed by the Foot and Ankle Score [FAOS] on a scale of 0–100) and also secondary outcomes of pain (assessed by FAOS, scale 0–100), and the physical component of the SF-12 questionnaire (scale 0–100) at 1-month follow-up; however, these improvements were small (FAOS quality: difference 5.9, 95% CI 0.1 to 11.8; FAOS pain: difference 5.1, 95% CI 0.4 to 9.8; SF-12 physical score: difference 2.2, 95% CI 0 to 4.4, all adjusted for age, sex, and baseline scores). It found no significant difference between tubular bandage and below-knee cast in activities of daily living (assessed by FAOS, scale 0–100), ability to do sports (assessed by FAOS, scale 0–100), or the mental component of the SF-12 (scale 0–100) at 1 month (FAOS activities of daily living score: difference +3, 95% CI –0.3 to +6.3; FAOS sports score: difference +5, 95% CI –1.7 to +11.8; SF-12 mental score: difference –1, 95% CI –3.4 to +2.2). It found that below-knee cast significantly improved quality of ankle function and also secondary outcomes of pain, activities of daily living, and ability to do sports compared with tubular bandage at 3 months; but found no significant difference in SF-12 physical or mental health components (FAOS quality: difference 8.7, 95% CI 2.4 to 15.0; results of all other outcomes reported in the RCT). It found no significant difference between groups in quality of ankle function or any secondary outcome at 9 months (FAOS quality: difference +6, 95% CI –0.7 to +13.2, results of all other outcomes reported

in the RCT). The RCT found no significant difference between the Aircast brace and tubular bandage for quality of ankle function or any secondary outcome at 1 month (FAOS quality: difference +5, 95% CI –1 to +10.7; FAOS pain: difference +4, 95% CI –1.2 to +8.2; FAOS activities of daily living score: difference 0, 95% CI –2.7 to +4.0; FAOS sports score: difference 0, 95% CI –1.0 to +12.9; SF-12 physical score: difference –1, 95% CI –3.6 to +0.8; SF-12 mental score: difference 0, 95% CI –2.7 to +3.0). It found that the Aircast brace significantly improved ankle function and the mental health component of the SF-12 questionnaire at 3 months, but it found no significant difference between groups for pain, activities of daily living, and ability to do sports or the physical health component of the SF-12 questionnaire (FAOS quality: difference 8, 95% CI 1.8 to 14.2, results of all other outcomes reported in the RCT). It found no significant difference between Aircast brace and tubular bandage in any outcome at 9 months (FAOS quality: difference +6, 95% CI –0.9 to +13.1, results of all other outcomes reported in the RCT). The RCT found no significant difference between the Bledsoe boot and tubular bandage for quality of ankle function or any secondary outcome at 1-month follow-up (FAOS quality: difference +2, 95% CI –3.9 to +7.6; FAOS pain: difference +1, 95% CI –4.0 to +5.3; FAOS activities of daily living score: difference 0, 95% CI –3.3 to +3.2; FAOS sports score: difference 0, 95% CI –7.0 to +6.4; SF-12 physical score: difference –1, 95% CI –3.5 to +0.8; SF-12 mental score: difference +1, 95% CI –1.8 to +3.8). It also found no significant difference between groups in any outcome at 3 months' or 9 months' follow-up (FAOS quality [3 months]: difference 6, 95% CI 0 to 12.3; [9 months]: difference +4, 95% CI –2.9 to +10.8, results of all other outcomes reported in the RCT). [10] The contributors of this *Clinical Evidence* review advise caution with interpreting the results of this RCT, owing to a number of weaknesses, which they have described in detail in a separate publication. [12] These include uncertainty about inclusion criteria (the authors of the RCT did not use a delayed physical examination 5–7 days after trauma to exclude simple distortions), ill-defined treatment protocol after 10 days (all additional treatments allowed), uncertainty about validity of blinding postal questionnaire-derived outcomes, and high withdrawal rate (17%) at 1 month.

Immobilisation versus surgery:
We found one systematic review (search date 2006) comparing surgery (anatomic reconstruction) versus immobilisation alone for acute injuries to the lateral ligament complex of the ankle (see comment below). [6] It found that, compared with immobilisation, surgery significantly reduced the proportion of people who did not return to sports and who had objective instability (people not return to sports: 3 RCTs; 267 people; 50/139 [36%] with immobilisation *v* 21/128 [16%] with surgery; RR [surgery *v* immobilisation] 0.48, 95% CI 0.31 to 0.76; objective instability: 7 RCTs; 568 people; 54/295 [18%] with immobilisation *v* 17/273 [6%] with surgery; RR [surgery *v* immobilisation] 0.35, 95% CI 0.21 to 0.60). It found no significant difference between surgery and immobilisation in recurrence, pain, subjective instability, or swelling (recurrence: 8 RCTs; 639 people; 66/328 [20%] with immobilisation *v* 55/311 [18%] with surgery; RR [surgery *v* immobilisation] 0.86, 95% CI 0.63 to 1.18; pain: 8 RCTs; 654 people; RR [surgery *v* immobilisation] 0.64, 95% CI 0.33 to 1.23; subjective instability: 8 RCTs; 608 people; RR [surgery *v* immobilisation] 0.77, 95% CI 0.43 to 1.37; swelling: 9 RCTs; 723 people; 75/365 [21%] with immobilisation *v* 48/358 [13%] with surgery; RR [surgery *v* immobilisation] 0.67, 95% CI 0.38 to 1.18).

Immobilisation versus ultrasound:
See benefits of ultrasound, p 10 .

Different forms of immobilisation versus each other:
We found one systematic review (search date 2001, 2 RCTs). [8] One small open label RCT (64 people, aged 17–47 years, with acute grade III inversion injury to the ankle) identified by the review found that a semi-rigid cast for 2 weeks significantly reduced the time taken to return to work compared with a rigid cast (36 people; 6.3 days with rigid cast *v* 2.5 days with semi-rigid cast; WMD 3.80 days, 95% CI 1.16 days to 6.44 days). [8] It found no significant difference in pain, swelling, or objective instability at short-term follow-up (proportion of people with pain: 7/26 [27%] with rigid cast *v* 4/31 [13%] with semi-rigid cast; RR 2.10, 95% CI 0.69 to 6.35; proportion of people with swelling: 12/26 [46%] with rigid cast *v* 9/31 [29%] with semi-rigid cast; RR 1.59, 95% CI 0.80 to 3.17; proportion of people with objective instability: 2/26 [8%] with rigid cast *v* 4/31 [13%] with semi-rigid cast; RR 0.60, 95% CI 0.12 to 3.00).

Harms:

Immobilisation versus no treatment:
We found no RCTs.

Immobilisation versus functional treatment:
The review [8] and the first subsequent RCT did not report on harms. [9] The second subsequent RCT reported similar rates of adverse effects among groups (no further details reported). It reported that three people (1 with Aircast, 1 with tubular compression bandage, 1 with below-knee cast) had a deep venous thrombosis, and two people (1 with tubular compression bandage, 1 with Aircast) had a pulmonary embolism, and two people (1 with Aircast, 1 with Bledsoe) had cellulitis. [10]

Immobilisation versus surgery:
Two RCTs identified by the review found a smaller proportion of cases of deep venous thrombosis after cast immobilisation than after surgery (deep venous thrombosis: 2/47 [4%] after cast immobilisation *v* 3/34 [9%] after surgery in first RCT; 0/33 [0%] after cast immobilisation *v* 1/32 [3%] after surgery in second RCT). [6] [13] A third RCT identified by the review found a similar risk of deep venous thrombosis in both groups (1/50 [2%] after cast immobilisation *v* 1/50 [2%] after surgery). [6] Other RCTs did not specifically address harms. Other known harms of immobilisation include pain and impairment in activities of daily living. [13]

Immobilisation versus ultrasound:
See harms of ultrasound, p 10 .

Different forms of immobilisation:
The review [8] did not report on harms.

Comment:

Immobilisation versus no treatment:
There is consensus that immobilisation is more effective in the treatment of ankle sprain than no treatment.

Immobilisation versus functional treatment:
In the review, follow-up periods for outcome measures were categorised as short term (less than 6 weeks of randomisation), intermediate term (6 weeks to 1 year), or long term (1–2 years after treatment). [8] The review excluded trials that focused on the treatment of chronic instability or post-surgical treatment, unless such injuries occurred in less than 10% of the whole study population. The first subsequent study included only semi-professional sports people, so the results may not be applicable to the general population. [9]

Immobilisation versus surgery:
The review noted that all included RCTs had methodological flaws, and there was insufficient evidence to determine the relative effectiveness of surgical and conservative treatment. [6]

OPTION FUNCTIONAL TREATMENT (EARLY MOBILISATION WITH USE OF AN EXTERNAL SUPPORT)

Symptom improvement
Compared with minimal treatment We don't know whether functional treatment (early mobilisation using an external support) is more effective at reducing residual pain, but mortise separation adjustment may be more effective than detuned ultrasound at reducing pain, increasing range of motion, and improving ankle function at 1 month (low-quality evidence).

Compared with surgery We don't know how functional treatment and surgery compare at reducing pain or swelling (low-quality evidence).

Compared with immobilisation Tubular bandage for a short period (up to 10 days) may be less effective than immobilisation with below-knee cast at improving some symptom measures (e.g., ankle function and pain scores) at 1 and 3 months, but we don't know whether these differences are sustained at 9 months, and we don't know how tubular bandage and immobilisation using Aircast brace or Bledsoe boot compare with each other. Functional treatment may be more effective than immobilisation for at least 3 weeks at improving swelling, pain, or patient satisfaction in the short/medium term (less than 6 weeks or 6–12 weeks), but we don't know whether functional treatment is more effective in the longer term (greater than 1 year) (very low-quality evidence).

Different functional treatments compared with each other We don’t know which functional treatment is the most effective at relieving symptoms of ankle sprain (very low-quality evidence).

Joint stability
Compared with minimal treatment Functional treatment (early mobilisation using an external support) is more effective at reducing the risk of the ankle giving way (moderate-quality evidence).

Compared with immobilisation Functional treatment may be more effective at improving joint stability at 6 to 12 weeks, but we don't know whether functional treatment is more effective in the longer term (greater than 1 year) (low-quality evidence).

Compared with surgery We don't know how functional treatment and surgery compare at reducing joint instability (low-quality evidence).

Different functional treatments compared with each other Semi-rigid ankle support may be more effective than an elastic bandage at increasing subjective joint stability in the short term (less than 6 weeks of treatment), but we don't

know whether it is more effective in the intermediate term (6 weeks to 1 year), or long term (1–2 years after treatment). We don't know whether a semi-rigid device is more effective than tape at improving joint stability (assessed by physical examination, further details not reported) or at reducing the rates of people reporting the sensation of spraining the ankle after 4 weeks' follow-up (very low-quality evidence).

Return to normal activities
Compared with immobilisation Functional treatment may be more effective than immobilisation for at least 4 weeks at reducing the time taken to return to sports, time taken to return to normal physical training, and the proportion of people not returning to sports. Functional treatment may be more effective than immobilisation for at least 4 weeks at reducing the time taken to return to work, but we don't know whether it is more effective in reducing the proportion of people not returning to work (low-quality evidence).

Compared with surgery We don't know how functional treatment and surgery compare at reducing the time taken to return to sports (low-quality evidence).

Different functional treatments compared with each other Early functional treatment with an elastic wrapping, early full weightbearing, and proprioceptive training may be more effective than conventional treatment with an elastic bandage and partial weightbearing until pain subsides at reducing the time taken to return to work and the time taken to return to sports in people with grade II and grade III ankle injuries. Semi-rigid ankle support may be more effective than elastic bandage at reducing the time taken to return to work and the time taken to return to sports (very low-quality evidence).

Recurrence
Compared with surgery We don't know how functional treatment and surgery compare at reducing recurrence of ankle sprains (low-quality evidence).

Different functional treatments compared with each other Semi-rigid devices may be no more effective than tape in reducing recurrence of ankle sprains in people with ankle injures; and early functional treatment may be no more effective than conventional treatment (very low-quality evidence).

For GRADE evaluation of interventions for ankle sprains, see table, p 16 .

Benefits:

Functional treatment versus minimal treatment:
We found one systematic review (search date 1998, 3 RCTs; 214 people) [14] and one subsequent RCT. [15] The review compared functional treatment versus a minimal-treatment policy. It found that functional treatment significantly reduced the risk of the ankle giving way (absolute numbers not reported; RR 0.34, 95% CI 0.17 to 0.71). [14] The review found no significant difference between treatments in the proportion of people with residual pain (absolute numbers not reported; RR 0.53, 95% CI 0.27 to 1.02). [14]

The subsequent RCT (30 people with sub-acute or chronic ankle sprain without gross mechanical instability) compared mortise separation adjustment versus detuned (sham) ultrasound. [15] It found that mobilisation significantly reduced pain, increased ankle range of motion, and improved ankle function at 1 month; results presented graphically).

Functional treatment versus immobilisation:
See benefits of immobilisation, p 3 .

Functional treatment versus surgery:
We found one systematic review (search date 2006) [6] comparing surgery (tenodesis or anatomic reconstruction) versus functional treatment alone (see comment below). The review found no significant difference between functional treatment and surgery in return to sports, recurrence, pain, subjective instability, objective instability, ans swelling (3 RCTs; proportion of people who did not return to sport or with reduction in sporting activity: 22/146 [15%] with functional treatment *v* 14/147 [10%] with surgery; RR [surgery *v* functional] 0.77, 95% CI 0.43 to 1.39; recurrence: 5 RCTs; 38/213 [18%] with functional treatment *v* 46/208 [22%] with surgery; RR [surgery *v* functional] 1.2, 95% CI 0.8 to 1.8; pain: 5 RCTs; 34/207 [16%] with functional treatment *v* 38/206 [18%] with surgery; RR [surgery *v* functional] 1.0, 95% CI 0.7 to 1.6; subjective instability: 6 RCTs; 62/286 [22%] with functional treatment *v* 57/278 [21%] with surgery; RR [surgery *v* functional] 0.9, 95% CI 0.48 to 1.71; objective instability: 4 RCTs; proportion of people with positive talar tilt: 16/117 [14%] with functional treatment *v* 8/105 [8%] with surgery; RR [surgery *v* functional] 0.6, 95% CI 0.3 to 1.2; swelling: 5 RCTs; 28/242 [12%] with functional treatment *v* 25/227 [11%] with surgery; RR [surgery *v* functional] 0.9, 95% CI 0.6 to 1.5; see comment below). [6]

Different types of functional treatment versus each other:
We found one systematic review (search date 2001), [16] three additional, [17] [18] [19] and one subsequent RCT. [20]

The review compared different types of functional treatment (elastic bandage, tape, lace-up ankle support, and semi-rigid ankle support) in people with an acute injury to the lateral ligament complex of the ankle. [16] It reported outcomes at short-term, intermediate, and long-term follow-up (see comment below). At short-term follow-up, it found that lace-up ankle support significantly reduced persistent swelling compared with semi-rigid ankle support (1 RCT; 122 people; 3/60 [5%] with lace-up ankle *v* 13/62 [21%] with semi-rigid ankle support; RR [semi-rigid ankle support *v* lace-up ankle support] 4.2, 95% CI 1.3 to 14.0), elastic bandage (1 RCT; 122 people; 3/60 [5%] with lace-up ankle *v* 17/62 [27%] with elastic bandage; RR [elastic bandage *v* lace-up ankle support] 5.5, 95% CI 1.7 to 17.8), and tape (1 RCT; 119 people; 3/60 [5%] with lace-up ankle *v* 12/59 [20%] with tape; RR [tape *v* lace-up ankle support] 4.1, 95% CI 1.2 to 13.7). It found that a semi-rigid ankle support reduced the proportion of people with subjective instability, the time taken to return to work, and the time to return to sports compared with an elastic bandage (subjective instability: 1 RCT; 124 people; 8/62 [13%] with elastic bandage *v* 1/62 [2%] with semi-rigid ankle support; RR 8.00, 95% CI 1.03 to 62.07; time to return to work: 2 RCTs; 157 people; WMD 4.2 days, 95% CI 2.4 days to 6.0 days; time to return to sports: 1 RCT; 84 people; WMD 9.6 days, 95% CI 6.3 days to 12.8 days). [16] It found no other significant differences in outcomes between treatments (see comment below), and no significant differences between different types of functional treatments at intermediate or long-term follow-up. [16]

The first additional RCT (116 people with all grades of ankle sprain) compared a semi-rigid device versus tape. It found low rates of people reporting the sensation of spraining the ankle after 4 weeks' follow-up, but it did not assess the significance of the comparison between groups (2/57 [4%] with tape *v* 0/59 [0%] with semi-rigid device; statistical assessment not reported). It found no significant difference between groups in the stability of the ankle (assessed by physical examination, no further details reported) after 4 weeks (reported as significant; absolute results not reported). [17]

The second additional RCT (119 people not requiring surgery, treated within 24 hours of injury) compared two types of tape treatment and found no significant differences between treatment groups in pain, swelling, or range of movement 5 to 7 days after treatment (AR for pain: 5/59 [8%] with layer bandage *v* 3/60 [5%] with elastic tape bandage; swelling: 34/59 [58%] with layer bandage *v* 29/60 [47%] with elastic tape bandage; limited range of movement: 21/59 [36%] with layer bandage *v* 28/60 [47%] with elastic tape bandage; all reported as not significant). [18]

The third additional RCT (86 people with grade II and III ankle sprains) compared early functional treatment (elastic wrapping and early full weightbearing and proprioceptive training) versus conventional treatment (elastic bandage and partial weightbearing until pain subsided). [19] After 1 week, further treatment was similar (identical rehabilitation instructions). [19] The RCT found that early functional treatment significantly reduced time taken to return to work and time to return to sports (time taken to return to work: 5.6 days with early functional treatment *v* 10.2 days with conventional treatment; P less than 0.05; time to return to sports: 9.6 days with early functional treatment *v* 19.2 days with conventional treatment; P less than 0.05). It found no significant difference between groups in final functional outcome or in ankle sprain recurrence (reported as not significant; P value not reported).

The fourth subsequent RCT (93 people with grade II ankle sprains) compared elastic wrap, air-stirrup ankle brace, air-stirrup ankle brace plus elastic wrap, and cast immobilisation for 10 days. [20] Of these, 68/93 (73%) people completed the 6-month follow-up. Other than the difference in device, functional treatment strategies were identical. It found no significant difference in outcomes between groups at 6 months' follow-up.

Harms:

Functional treatment versus minimal treatment:
The review [14] and subsequent RCT [15] gave no information on harms.

Functional treatment versus immobilisation:
See harms of immobilisation, p 3 .

Functional treatment versus surgery:
The review [6] gave no information on harms.

Different types of functional treatment versus each other:
Allergic reactions and skin problems have been recorded with tape. [21] Two RCTs identified by the review, which compared different functional treatments, found that tape treatment was associated with significantly more complications compared with elastic bandage (0/104 [0%] with elastic bandage *v* 8/104 [8%] with tape; RR 0.11, 95% CI 0.01 to 0.86). [16] Most of these complications were skin problems (absolute numbers with skin problems not reported). The four additional RCTs did not assess harms. [17] [18] [19] [20]

Comment:

Functional treatment versus surgery:
The review noted that all included RCTs had methodological flaws, and there was insufficient evidence to determine the relative effectiveness of surgical and conservative treatment. [6]

Different types of functional treatment versus each other:
The review reported follow-up periods for outcome measures as short term (less than 6 weeks of treatment), intermediate term (6 weeks to 1 year), or long term (1–2 years after treatment). [16] It noted that definitive conclusions were hampered by the variety of treatments used and the inconsistency of reported follow-up times, and no definite conclusions concerning the optimal functional treatment strategy could be drawn. [16]

OPTION SURGERY

Symptom improvement
Compared with immobilisation We don't know how surgery and immobilisation compare at reducing swelling or pain (low-quality evidence).

Compared with functional treatment We don't know how surgery and functional treatment compare at reducing pain or swelling (low-quality evidence).

Joint stability
Compared with immobilisation Surgery may be more effective at reducing objective joint instability, but we don't know whether it is more effective at reducing subjective joint instability (low-quality evidence).

Compared with functional treatment We don't know how surgery and functional treatment compare at reducing joint instability (low-quality evidence).

Return to normal activities
Compared with immobilisation Surgery is less effective at decreasing the time taken to return to sports (moderate-quality evidence).

Compared with functional treatment Surgery may be no more effective at reducing the time taken to return to sports (low-quality evidence).

Recurrence
Compared with immobilisation We don't know how surgery and immobilisation compare at reducing recurrence of ankle sprains (low-quality evidence).

Compared with functional treatment We don't know how surgery and functional treatment compare at reducing recurrence of ankle sprains (low-quality evidence).

Adverse effects
Surgery is associated with neurological injuries, infections, bleeding, osteoarthritis, and death.

For GRADE evaluation of interventions for ankle sprains, see table, p 16 .

Benefits:

Surgery versus immobilisation:
See benefits of immobilisation, p 3 .

Surgery versus functional treatment:
See benefits of functional treatment, p 6 .

Harms:

Neurological injuries, infections, bleeding, osteoarthritis, and death are known harms of surgery. [13] [22] [23] Other RCTs found dysaesthesia in 4% to 12% of people after surgery. [24] [25] [26] [27] [28] [29] Wound necrosis after surgery was reported in two RCTs (2/73 [3%] with surgery; [27] 3/45 [7%] with surgery [28]). Tenderness of the scar was reported in six RCTs after surgical intervention, occurring in 2% to 19% of people. [25] [26] [29] [30] [31] [32]

Surgery versus immobilisation:
See harms of immobilisation, p 3 .

Surgery versus functional treatment:
See harms of functional treatment, p 6 .

Comment:

None.

OPTION ULTRASOUND

Symptom improvement
Compared with placebo Ultrasound may be no more effective at increasing the proportion of people with general improvement (not further defined) of an ankle sprain or at improving the ability to walk or bear weight at 7 days (low-quality evidence).

Compared with immobilisation We don't know how ultrasound and immobilisation compare for improving recovery times at 7 days, but ultrasound may be more effective at 14 days (very low-quality evidence).

Compared with electrotherapy We don't know how ultrasound and electrotherapy compare for improving swelling, pain, or walking ability at 7 days (low-quality evidence).

For GRADE evaluation of interventions for ankle sprains, see table, p 16 .

Benefits:

Ultrasound versus placebo:
We found one systematic review (search date 2004, see comment below) comparing ultrasound versus sham ultrasound treatment. [33] It found no significant difference in general improvement of symptoms between ultrasound and sham ultrasound at 7 days (3 RCTs; 341 people; 121/169 [72%] with ultrasound *v* 116/172 [68%] with sham ultrasound; RR 1.04, 95% CI 0.92 to 1.17). It also found no significant difference in functional disability (the ability to walk or bear weight) between ultrasound and sham ultrasound at 7 days (2 RCTs; 187 people; 69/95 [73%] with ultrasound *v* 61/92 [66%] with sham ultrasound; RR 1.09, 95% CI 0.92 to 1.30). [33]

Ultrasound versus immobilisation:
We found one systematic review (search date 2004, see comment below), which identified one RCT that compared ultrasound versus immobilisation over 2 weeks' follow-up. [33] It found no significant difference in the proportion of people who recovered with ultrasound compared with immobilisation after 7 days (80 people; 46% with ultrasound *v* 27% with immobilisation; ARR +19%, 95% CI –2% to +40%; absolute results not reported). However, after 14 days, it found a significant difference in the proportion of people who recovered with ultrasound compared with immobilisation (86% with ultrasound *v* 59% with immobilisation; ARR 27%, 95% CI 8% to 46%; absolute results not reported). [33]

Ultrasound versus electrotherapy:
We found one systematic review (search date 2004, see comment below) comparing ultrasound versus other treatment modalities. [33] One RCT identified by the review compared ultrasound versus electrotherapy or sham ultrasound. The review found no significant difference between ultrasound and electrotherapy in the proportion of people with swelling, ability to walk, or who were free of pain at 7 days (60 people; AR for less than 0.5 cm swelling: 13/20 [65%] with ultrasound *v* 17/20 [85%] with electrotherapy; ARR –20%, 95% CI –46% to +6%; AR for ability to walk: 9/20 [45%] with ultrasound *v* 14/20 [70%] with electrotherapy; ARR –25%, 95% CI –55% to +5%; AR for freedom from pain: 15/20 [75%] with ultrasound *v* 18/20 [90%] with electrotherapy; ARR –15%, 95% CI –38% to +8%). [33]

Harms:

Ultrasound versus placebo:
The review reported that one RCT found 8/73 people with ultrasound therapy (plus placebo gel) reported 11 non-serious adverse reactions including gastrointestinal effects and skin reactions. In one person, treatment was discontinued due to skin reactions and the person withdrawn from the trial. [33]

Ultrasound versus immobilisation:
The review gave no information on adverse effects. [33]

Ultrasound versus electrotherapy:
One RCT included in the review RCT found no adverse effects with ultrasound. [34]

Comment:

In the review, the quality of four of the included RCTs was described as "modest", and one as "good". [33] The review reported RCTs in which one or more of pain, swelling, and functional disability because of an acute ankle sprain was present, and in which at least one group was treated with active ultrasound treatment. All the RCTs included follow-up of less than 4 weeks.

OPTION COLD TREATMENT

Symptom improvement
Compared with placebo Cold treatment may be no more effective at relieving symptoms of ankle sprain including pain, range of movement, or swelling, or in increasing ability to weight bear (very low-quality evidence).

Compared with other treatments Cold treatment may be more effective than heat or a contrast bath at reducing oedema at 3 to 5 days after an ankle injury (very low-quality evidence).

For GRADE evaluation of interventions for ankle sprains, see table, p 16 .

Benefits:

Cold treatment versus placebo:
We found one systematic review (search date 1994), [35] which identified one RCT comparing cryotherapy versus placebo (simulated treatment). [36] The RCT (143 people, aged 16–50 years, 79% male) found no significant difference between treatments in pain relief, range of movement, ability to bear weight, or swelling (pain relief or range of movement: reported as not significant, no further details reported; ability to bear weight: proportion of people who improved by 3 or 4 scale units in the diary linear analogue: 36% with cold therapy *v* 29% with placebo; P = 0.15; soft-tissue swelling: proportion of people with improvement at day 7: 46% with cold treatment *v* 40% with placebo; P = 0.07). [36]

Cold treatment versus different treatments:
We found one systematic review (search date 1994), [35] which identified one RCT comparing three treatments: cold pack, heat treatment, or a contrast bath (see comment below). [37] The RCT (30 people, aged 18–22 years) found significantly less oedema with cold pack compared with heat treatment or a contrast bath at 3 to 5 days after injury (mean change in ankle volume from pre-treatment: +3.3 mL with cold treatment *v* +25.3 mL with heat treatment *v* +26.5 mL with contrast bath; P less than 0.05 [cold treatment *v* heat treatment or contrast bath]). [37]

Harms:

Cold treatment versus placebo:
The RCT gave no information on harms from cold pack placement. [36]

Cold treatment versus different treatments:
The RCT gave no information on harms from cold pack placement. [37]

Comment:

The systematic review was narrative in character, and no data were meta-analysed. [35] The systematic review did not report the grades of injuries. In the RCT identified by the systematic review that compared cold with heat or a contrast bath, the injured ankle in the contrast bath group was submerged in warm water for 3 minutes, and then in cold water for 1 minute. This was continued until the ankle had been given five heat and four cold treatments, beginning and ending with heat. [37]

OPTION DIATHERMY

Symptom improvement
Compared with placebo Diathermy may be no more effective at relieving symptoms of ankle sprains such as oedema and pain, or at improving range of movements. High-frequency electromagnetic pulsing may be more effective at improving walking ability, but low-frequency pulsing may be no more effective than placebo (very low-quality evidence).

For GRADE evaluation of interventions for ankle sprains, see table, p 16 .

Benefits:

Diathermy versus placebo:
We found one systematic review (search date 1994, 5 RCTs), [35] which included a range of severity of ankle sprains, but excluded the most severe injuries (avulsion and osteochondral fractures). The systematic review did not meta-analyse the results of the RCTs and the grades of injuries were not clearly described in the identified RCTs.

The first RCT (300 people with time from injury to treatment of no more than 4 days) identified by the review compared two forms of pulsating short-wave treatment versus placebo. [38] The RCT found that high-frequency electromagnetic pulsing improved walking ability significantly more quickly than placebo (change in impairment of gait from day 1 to day 3 of treatment [scale of 0–3 where 0 = normal gait, 3 = need of crutches]: 1.0 with high frequency *v* 0.9 with low frequency *v* 0.7 with placebo; P less than 0.01 for high frequency electromagnetic pulsing *v* placebo). It found that low-frequency pulsing significantly reduced swelling compared with placebo, while there was no significant difference between the high-frequency group and placebo (reduction in circumference of ankle: 4.5 mm with high frequency *v* 5.0 mm with low frequency *v* 2.6 mm with placebo; P less than 0.01 for low frequency *v* placebo).

The second RCT (50 people with acute grade I or II sprain, within 72 hours of injury) found that pulsating short-wave diathermy significantly reduced oedema compared with placebo (% decrease in ankle volume: 4.7% with diathermy *v* 0.96% with placebo; P less than 0.01). [39]

The third RCT (73 people) found no significant difference between treatments for pain, oedema, or range of motion compared with placebo at 15 days (results presented graphically; pain scores P greater than 0.35; oedema P greater than 0.35; range of motion P = 0.35). [40]

The fourth RCT (37 people) found no significant difference between treatments in pain, elevation, number of analgesics a day, or time to weight bearing compared with placebo (mean daily pain score [pain scale 0 = no pain to 10 = worst pain]: 2.37 with diathermy *v* 2.34 with placebo; mean elevation/day: 1.87 hours with diathermy *v* 1.77 hours with placebo; mean number of analgesics/day: 0.44 with diathermy *v* 0.29 with placebo; mean time to weight bearing: 3.78 days with diathermy *v* 2.88 days with placebo; all comparisons reported as not significant; P values and CIs not reported). [41]

The fifth RCT (30 people) found no significant differences between treatments for pain, oedema, or range of motion compared with placebo (pain scale 0 = no pain to 10 = worst pain, change in pain score: –3.70 with ice plus high-frequency high-voltage pulsed stimulation [HVPS] *v* –3.65 with ice plus low-frequency HVPS *v* –2.50 with ice alone; significance not reported; change in active ankle dorsiflexion range of movement: 8° with ice plus high-frequency HVPS *v* 10° with ice plus low-frequency HVPS *v* 7° with ice alone; reported as not significant; change in foot and ankle volume displacement: –35 mm with ice plus high-frequency HVPS *v* –38 mm with ice plus low-frequency HVPS *v* –32 mm with ice alone; reported as not significant). [42]

Harms: **Diathermy versus placebo:**
The review gave no information on harms. [35]

Comment: None.

OPTION HOMEOPATHIC OINTMENT

Symptom improvement
Compared with placebo Homeopathic ointments may be more effective at achieving a better outcome based on a "composite criteria of treatment success" (not further defined) (very low-quality evidence).

For GRADE evaluation of interventions for ankle sprains, see table, p 16 .

Benefits: **Homeopathic ointment versus placebo:**
We found one systematic review (search date 1998), [43] which included one RCT. [44] The review found that people treated with a homeopathic ointment had a significantly better outcome based on a "composite criteria of treatment success" compared with people treated with placebo (69 people with acute ankle sprains; P = 0.028; no further data reported). [43] The number of people initially randomised in the RCT and losses to follow-up were not reported.

Harms: **Homeopathic ointment versus placebo:**
The review gave no information on harms. [43]

Comment: None.

OPTION PHYSIOTHERAPY (PHYSICAL THERAPY)

Symptom improvement
Physiotherapy plus proprioceptive training compared with physiotherapy alone Physiotherapy plus proprioceptive training (star excursion balance training) may be more effective at improving single-leg stance times at 4 weeks (low-quality evidence).

Recurrence
Physiotherapy plus proprioceptive training compared with physiotherapy alone We don't know whether adding physiotherapy to proprioceptive training (star excursion balance training) is more effective than physiotherapy alone at reducing recurrence of ankle strain at 3 months (low-quality evidence).

For GRADE evaluation of interventions for ankle sprains, see table, p 16 .

Benefits: **Physiotherapy (physical therapy) plus proprioceptive training versus physiotherapy alone:**
We found one small RCT (40 males with acute grade II ankle sprains; 32/40 [80%] completed the programme) comparing star excursion balance training plus standard physiotherapy versus standard physiotherapy alone. [45] Standard physiotherapy included superficial heat, ultrasound, range-of-motion exercise, and strengthening and stretching exercises. [45] The star excursion balance test is composed of closed kinetic controlled motion, and the ability to balance on one leg; this was modified in the RCT into a proprioceptive and balance training programme. People balanced on

the sprained ankle while using the other foot to reach as far as it could in eight other directions under direct supervision. The RCT found that star excursion balance training plus physiotherapy significantly improved mean single-leg stance times compared with physiotherapy alone at 4 weeks (eyes closed: 39.9 seconds with balance training plus physiotherapy *v* 18 seconds with standard physiotherapy alone; P = 0.002). After 3 months' follow-up, it found no significant difference in re-current sprains between groups (1/15 [7%] with training *v* 2/17 [12%] with control; reported as no significant difference; P value not reported). The RCT did not report on other outcomes. [45]

Harms: **Physiotherapy (physical therapy) plus proprioceptive training versus physiotherapy alone:** The RCT gave no information on harms. [45]

Comment: The method of randomisation in the RCT was not specifically defined; it noted that "simple random sampling" was used. [45] We have included RCTs on general physiotherapy in this option; we have not included other specific joint manipulations (e.g., chiropractic) in this option.

GLOSSARY

Anatomic reconstruction Surgical reconstruction of lateral ankle ligament complex through suturing of the ligaments.

Crus varum Varus of the lower leg (O-leg).

Diathermy Warming body tissues using electromagnetic radiation, electric current, or ultrasonic waves for the reduction of inflammatory response, oedema, and pain.

Dysaesthesia Decreased sensitivity of the skin for stimuli.

Functional treatment Involves dorsal and plantar flexion exercises of the ankle joint. The main differences between functional treatment strategies are the types of external device applied for treatment. The supports can be divided according to rigidity into elastic bandage, tape, lace-up ankle support, and semirigid ankle support. Functional treatment may involve strapping, bracing, use of an orthosis, tubigrips, bandages, elastic bandages, and the use of special shoes. Propriocepsis training (to enhance joint stability) may also be involved in this regimen.

Immobilisation Limiting the mobility of a joint complex to zero degrees with the use of a plaster cast or soft cast, thus fully immobilising the ankle joint.

Pes cavo-varus Severe high arched, varus foot.

Tenodesis Surgical reconstruction of lateral ankle ligament complex using tendon graft.

Low-quality evidence Further research is very likely to have an important impact on our confidence in the estimate of effect and is likely to change the estimate.

Moderate-quality evidence Further research is likely to have an important impact on our confidence in the estimate of effect and may change the estimate.

Mortise separation adjustment An adjustment technique involving special manual manipulation of the foot and ankle.

Very low-quality evidence Any estimate of effect is very uncertain.

SUBSTANTIVE CHANGES

Functional treatment (early mobilisation with use of an external support) One RCT added, comparing three different types of immobilisation versus functional treatment for 10 days, at 1, 3, and 9 months' follow-up. [10] It found that below-knee cast improved ankle function, pain, and the physical component of the SF-12 questionnaire at 1-month follow-up, and improved ankle function, pain, activities of daily living, and ability to do sports at 3 months' follow-up compared with functional treatment. It found that an ankle brace improved ankle function and the mental health component of the SF-12 questionnaire at 3 months' follow-up compared with functional treatment. However, it found no significant difference between any type of immobilisation and functional treatment for any other outcome at 1, 3, or 9 months' follow-up. One systematic review comparing functional treatment versus surgery updated. [6] It now includes one RCT, previously reported separately in this *Clinical Evidence* review. Categorisation unchanged (Beneficial).

Immobilisation One RCT added, comparing three different types of immobilisation versus functional treatment for 10 days, at 1, 3 and 9 months' follow-up. [10] It found that below-knee cast improved ankle function, pain, and the physical component of the SF-12 questionnaire at 1-month follow-up, and improved ankle function, pain, activities of daily living, and ability to do sports at 3 months' follow-up compared with functional treatment. It found that an ankle brace improved ankle function and the mental health component of the SF-12 questionnaire at 3 months' follow-up compared with functional treatment. However, it found no significant difference between any type of immobilisation and functional treatment for any other outcome at 1, 3, or 9 months' follow-up. One systematic review comparing surgery versus immobilisation updated, search date update, no new evidence added. [6] Categorisation unchanged (Likely to be beneficial).

Surgery One systematic review comparing surgery versus functional treatment or versus immobilisation updated. [6] The review now includes one RCT comparing surgery versus functional treatment, previously reported separately in this *Clinical Evidence* review. Categorisation unchanged (Trade-off between benefits and harms).

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TABLE **GRADE evaluation of interventions for ankle sprains**

Important outcomes	Symptom improvement (pain, swelling, range of motion, walking ability), Joint stability, Return to normal activities (work or sport), Recurrence, Quality of life, Adverse effects								
Number of studies (participants)	**Outcome**	**Comparison**	**Type of evidence**	**Quality**	**Consistency**	**Directness**	**Effect size**	**GRADE**	**Comment**
at least 5 (at least 965) [8] [9] [10]	Symptom improvement	Immobilisation *v* functional treatment	4	–2	–1	–2	0	Very low	Quality points deducted for methodological flaws in one RCT (uncertainty about blinding and poor follow-up). Consistency point deducted for different results at different end points. Directness points deducted for restricted population in one study and uncertainty about inclusion criteria (possible inclusion of simple distortions) in another RCT.
at least 2 (at least 227) [8] [9]	Joint stability	Immobilisation *v* functional treatment	4	0	–1	–1	0	Low	Consistency point deducted for different results at different end points. Directness point deducted for restricted population in one study
at least 9 (at least 875) [8] [9]	Return to normal activities	Immobilisation *v* functional treatment	4	0	–1	–1	0	Low	Consistency point deducted for different results at different end points. Directness point deducted for restricted population in one study
17 (1377) [6]	Symptom improvement	Immobilisation *v* surgery	4	–2	0	0	0	Low	Quality points deducted for methodological flaws and insufficient evidence to compare effects of treatments
14 (1065) [6]	Joint stability	Immobilisation *v* surgery	4	–2	0	0	0	Low	Quality points deducted for methodological flaws and insufficient evidence to compare effects of treatments
3 (267) [6]	Return to normal activities	Immobilisation *v* surgery	4	–2	0	0	+1	Moderate	Quality points deducted for methodological flaws and insufficient evidence to compare effects of treatments. Effect-size point added for RR less than 0.5
8 (639) [6]	Recurrence	Immobilisation *v* surgery	4	–2	0	0	0	Low	Quality points deducted for methodological flaws and insufficient evidence to compare effects of treatments
1 (57) [8]	Symptom improvement	Different forms of immobilisation *v* each other	4	–2	0	0	0	Low	Quality points deducted for methodological flaws and sparse data
1 (57) [8]	Joint stability	Different forms of immobilisation *v* each other	4	–2	0	0	0	Low	Quality points deducted for methodological flaws and sparse data
1 (36) [8]	Return to normal activities	Different forms of immobilisation *v* each other	4	–2	0	0	0	Low	Quality point deducted for methodological flaws and sparse data
4 (244) [14] [15]	Symptom improvement	Functional treatment *v* minimal treatment	4	–1	–1	0	0	Low	Quality point deducted for incomplete reporting of results. Consistency point deducted for conflicting results
3 (214) [14]	Joint stability	Functional treatment *v* minimal treatment	4	–1	0	0	0	Moderate	Quality point deducted for incomplete reporting of results
at least 5 (at least 469) [6]	Symptom improvement	Functional treatment *v* surgery	4	–2	0	0	0	Low	Quality points deducted for methodological flaws and uncertainty about treatment effects
at least 6 (at least 564) [6]	Joint stability	Functional treatment *v* surgery	4	–2	0	0	0	Low	Quality points deducted for methodological flaws and uncertainty about treatment effects
3 (293) [6]	Return to normal activities	Functional treatment *v* surgery	4	–2	0	0	0	Low	Quality points deducted for methodological flaws and uncertainty about treatment effects

Important outcomes	Symptom improvement (pain, swelling, range of motion, walking ability), Joint stability, Return to normal activities (work or sport), Recurrence, Quality of life, Adverse effects								
Number of studies (participants)	**Outcome**	**Comparison**	**Type of evidence**	**Quality**	**Consistency**	**Directness**	**Effect size**	**GRADE**	**Comment**
5 (421) [6]	Recurrence	Functional treatment *v* surgery	4	–2	0	0	0	Low	Quality points deducted for methodological flaws and uncertainty about treatment effects
3 (360) [16] [17] [18]	Symptom improvement	Different functional treatments *v* each other	4	–1	–1	–1	0	Very low	Quality point deducted for inconsistent follow-up times. Consistency point deducted for different results at different end points. Directness point deducted for multiple interventions in comparison
2 (240) [16] [17]	Joint stability	Different functional treatments *v* each other	4	–2	–1	–1	0	Very low	Quality points deducted for inconsistent follow-up times and incomplete reporting. Consistency point deducted for different results at different end points. Directness points deducted for multiple interventions in comparison
3 (243) [16] [20]	Return to normal activities	Different functional treatments *v* each other	4	–3	–1	–2	0	Very low	Quality points deducted for sparse data, incomplete reporting of results, and inconsistent follow-up times. Consistency point deducted for different results at different end points. Directness points deducted for multiple interventions in comparison and differences in grades of injuries
1 (86) [20]	Recurrence	Different functional treatments *v* each other	4	–2	0	–1	0	Very low	Quality points deducted for sparse data and incomplete reporting of results. Directness point deducted for multiple interventions in comparison
3 (341) [33]	Symptom improvement	Ultrasound *v* placebo	4	–1	0	–1	0	Low	Quality point deducted for short follow-up. Directness point deducted for broad outcome
1 (80) [33]	Symptom improvement	Ultrasound *v* immobilisation	4	–3	–1	0	0	Very low	Quality points deducted for sparse data, short follow-up, and incomplete reporting of results. Consistency point deducted for different results at different end points
1 (60) [33]	Symptom improvement	Ultrasound *v* electrotherapy	4	–2	0	0	0	Low	Quality points deducted for sparse data and short follow-up
1 (143) [36]	Symptom improvement	Cold treatment *v* placebo	4	–2	0	–1	0	Very low	Quality points deducted for sparse data and incomplete reporting of results. Directness point deducted for uncertainty of grade of injuries
1 (30) [37]	Symptom improvement	Cold treatment *v* other treatments	4	–2	0	–1	0	Very low	Quality points deducted for sparse data and incomplete reporting of results. Directness point deducted for uncertainty of grade of injuries
5 (490) [38] [39] [40] [41] [42]	Symptom improvement	Diathermy *v* placebo	4	–1	–1	–2	0	Very low	Quality points deducted for incomplete reporting of results. Consistency point deducted for conflicting results. Directness point deducted for uncertainty of grade of injury and inclusion of multiple interventions and outcomes
1 (69) [43]	Symptom improvement	Homoeopathic ointment *v* placebo	4	–3	0	–1	0	Very low	Quality points deducted for incomplete reporting of results, sparse data, uncertainties about follow-up, and randomisation. Directness point deducted for composite outcome
1 (32) [45]	Symptom improvement	Physiotherapy plus proprioceptive training *v* physiotherapy	4	–2	0	0	0	Low	Quality points deducted for sparse data and uncertainty about randomisation

Important outcomes	Symptom improvement (pain, swelling, range of motion, walking ability), Joint stability, Return to normal activities (work or sport), Recurrence, Quality of life, Adverse effects								
Number of studies (participants)	**Outcome**	**Comparison**	**Type of evidence**	**Quality**	**Consistency**	**Directness**	**Effect size**	**GRADE**	**Comment**
1 (32) [45]	Recurrence	Physiotherapy plus proprioceptive training *v* physiotherapy	4	–2	0	0	0	Low	Quality points deducted for sparse data and uncertainty about randomisation

Type of evidence: 4 = RCT; 2 = Observational
Consistency: similarity of results across studies
Directness: generalisability of population or outcomes
Effect size: based on relative risk or odds ratio