


Ankle sprain

Search date March 2005

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Key Messages

Treating ankle sprain

- **Functional treatment (early mobilisation with use of an external support)** One systematic review and one subsequent RCT found evidence that functional treatment reduced the risk of the ankle giving way compared with minimal treatment. One systematic review and one subsequent RCT found that, compared with immobilisation, functional treatment improved symptoms and functional outcomes at short (< 6 weeks), intermediate (6 weeks to 1 year), or long term (> 1 year) follow up. However, effects were found to be less marked at long term follow up. One systematic review and one subsequent RCT provided insufficient evidence to compare functional treatment versus surgery. One systematic review and two additional RCTs provided insufficient evidence to compare different functional treatments.
- **Immobilisation** There is consensus that immobilisation is more effective than no treatment; however one systematic review and one subsequent RCT found that, compared with functional treatment, immobilisation was associated with less improvement in symptoms and functional outcomes at either short (< 6 weeks), intermediate (6 weeks to 1 year), or long term (> 1 year) follow up. Effects were less marked at long term follow up. One systematic review found no significant difference between immobilisation and surgery in pain, swelling, recurrence, or subjective instability. However, the review found that compared with immobilisation, surgery improved stability and increased the proportion of people able to return to sports. One RCT identified by a systematic review provided insufficient evidence to compare ultrasound versus immobilisation.
- **Surgery** One systematic review found no significant difference between surgery and immobilisation in pain, swelling, recurrence, or subjective instability. However, the review found that surgery increased the proportion of people able to return to sports and increased ankle stability compared with immobilisation. One systematic review and one subsequent RCT provided insufficient evidence to compare surgery versus functional treatment. Neurological injuries, infections, bleeding, osteoarthritis, and death are known harms of surgery.
- **Diathermy** One systematic review found insufficient evidence on the effects of diathermy compared with placebo on walking ability and reduction in swelling.
- **Homeopathic ointment** One small RCT identified by a systematic review found limited evidence that homeopathic ointment improved outcome based on a "composite criteria of treatment success" compared with placebo.

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- **Cold treatment** One RCT found no significant difference in symptoms between cold pack placement and placebo (simulated treatment). One RCT found less oedema with cold pack placement compared with heat or a contrast bath at 3–5 days after injury.
- **Ultrasound** One systematic review found no significant difference between ultrasound and sham ultrasound in the general improvement of symptoms or the ability to walk or bear weight at 7 days. Two RCTs identified by the review provided insufficient evidence to compare ultrasound versus immobilisation or electrotherapy.

DEFINITION	Ankle sprain is an injury of the lateral ligament complex of the ankle joint. The injury is graded on the basis of severity. ^{1–5} 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. Practically, this gradation may be considered as purely theoretical, because it has no therapeutic or prognostic consequences. ⁶ Unless otherwise stated, studies included in this topic did not specify the grades of injury included, or included a wide range of grades.
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 and specific malalignment, like <i>crus varum</i> Ⓞ and <i>pes cavo-varus</i> Ⓞ.
PROGNOSIS	Some sports (e.g. basketball, football/soccer, and volleyball) are associated with a particularly high incidence of ankle injuries. Pain is the most frequent residual problem, often localised on the medial side of the ankle. ⁴ Other residual complaints include mechanical instability, intermittent swelling, and stiffness. People with more extensive cartilage damage have a higher incidence of residual complaints. ⁴ Long term 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 OUTCOMES	To reduce swelling and pain; to restore the stability of the ankle joint. Return to pre-injury level of sports; return to pre-injury level of work; pain; swelling; subjective instability; objective instability; recurrent injury; ankle mobility; complications; patient satisfaction.
METHODS	<i>Clinical Evidence</i> search and appraisal March 2005.

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

OPTION IMMOBILISATION

There is consensus that immobilisation is more effective than no treatment; however one systematic review and one subsequent RCT found that, compared with functional treatment, immobilisation was associated with less improvement in symptoms and functional outcomes at either short (< 6 weeks), intermediate (6 weeks to 1 year), or long term (> 1 year) follow up. Effects were less marked at long term follow up. One systematic review found no significant difference between immobilisation and surgery in pain, swelling, recurrence, or subjective instability. However, the review found that compared with immobilisation, surgery improved stability and increased the proportion of people able to return to sports. One RCT identified by a systematic review provided insufficient evidence to compare ultrasound versus immobilisation.

Benefits: **Immobilisation versus no treatment:** We found no RCTs comparing immobilisationⓄ versus no treatment. **Immobilisation versus functional treatment:** We found one systematic review³ and one subsequent RCT.⁹ 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, 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

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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 (search date 2001; 3 RCTs; 260 people; 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; RR 5.75, 95% CI 1.01 to 32.71). At intermediate term 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°) and found that functional treatment significantly increased patient satisfaction compared with immobilisation (proportion of people not satisfied with treatment 2 RCTs; 123 people; 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 (5 RCTs; 360 people; RR 1.9, 95% CI 1.2 to 2.9), the time taken to return to work (6 RCTs; 604 people; WMD 8.2 days, 95% CI 6.3 days to 10.2 days), 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). At longer 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. A subgroup analysis using only "high quality" RCTs (defined as scoring $\geq 50\%$ on a recognised quality evaluation tool) 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).^{8,10} The subsequent RCT 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 pain, swelling, and subjective instability compared with immobilisation at 3 months (121 semiprofessional sports people with acute grade III lateral ankle ligament; mean time to return to normal training: 5.4 weeks with functional treatment v 6.3 weeks with immobilisation; $P = 0.02$; pain: 35% with functional treatment v 61% with immobilisation; $P = 0.008$; AR for swelling: 16% with functional treatment v 49% with immobilisation; $P < 0.01$; AR for subjective instability: 22% with functional treatment v 54% with immobilisation; $P = 0.001$; CI for differences in outcomes not reported). However, the RCT found no significant differences between treatments for pain, swelling, or subjective instability at 12 months ($P \geq 0.3$ for all comparisons).⁹

Immobilisation versus surgery: We found one systematic review, which compared surgery (anatomic reconstruction[Ⓞ]) versus immobilisation alone for acute injuries to the lateral ligament complex of the ankle (see comment below).⁶ It found that surgery significantly reduced the proportion of people who did not return to sports compared with immobilisation (search date 2000; 3 RCTs; 267 people; RR 0.48, 95% CI 0.31 to 0.76) and who had objective instability (6 RCTs; 457 people; RR 0.35, 95% CI 0.21 to 0.60). It found no significant difference between surgery and immobilisation in recurrence (8 RCTs; 639 people; RR 0.86, 95% CI 0.63 to 1.18), pain (8 RCTs; 654 people; RR 0.64, 95% CI 0.33 to 1.23), subjective instability (8 RCTs; 608 people; RR 0.77, 95% CI 0.43 to 1.37), or swelling (9 RCTs; 723 people; RR 0.67, 95% CI 0.38 to 1.18).

Immobilisation versus ultrasound: See benefits of ultrasound, p 6.

Different forms of immobilisation: We found one systematic review.⁶ One RCT identified by the review found that a semirigid cast for 4 weeks significantly reduced the time taken to return to work compared with a rigid cast (search date 2000; 1 RCT; 36 people; WMD 3.80 days, 95% CI 1.16 days to 6.44 days).⁶ It found no significant difference in pain, swelling, or objective instability at short term follow up (1 RCT; 57 people; RR for pain 2.10, 95% CI 0.69 to 6.35; RR for swelling 1.59, 95% CI 0.80 to 3.17; RR for objective instability 0.60, 95% CI 0.12 to 3.00).

Harms:

Immobilisation versus functional treatment: The systematic review⁸ and subsequent RCT did not report on harms.⁹

Immobilisation versus surgery: Two RCTs identified by the review found fewer 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).^{6,11} A third RCT identified by the review found an equal risk of deep vein 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.¹¹

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Comment: **Immobilisation versus no treatment:** There is a consensus that immobilisation is more effective in the treatment of ankle sprain than no treatment. **Immobilisation versus functional treatment:** In the systematic review, follow up periods for outcome measures were categorised as short term (< 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 under 10% of the whole study population. The subsequent study included only semiprofessional sports people so the results may not be applicable to the general population.⁹ **Immobilisation versus surgery:** The systematic review noted that all included RCTs had methodological flaws, and there was insufficient evidence to determine the relative effectiveness of surgical and conservative treatment (see comment under surgery, p 6).⁶

OPTION

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

One systematic review and one subsequent RCT found evidence that functional treatment reduced the risk of the ankle giving way compared with minimal treatment. One systematic review and one subsequent RCT found that, compared with immobilisation, functional treatment improved symptoms and functional outcomes at short (< 6 weeks), intermediate (6 weeks to 1 year), or long term (> 1 year) follow up. However, effects were found to be less marked at long term follow up. One systematic review and one subsequent RCT provided insufficient evidence to compare functional treatment versus surgery. One systematic review and two additional RCTs provided insufficient evidence to compare different functional treatments.

Benefits: **Functional treatment versus minimal treatment:** We found one systematic review¹² and one subsequent RCT.¹³ The review compared functional treatment[ⓐ] versus a minimal treatment policy. It found that functional treatment significantly reduced the risk of the ankle giving way (search date 1998; 3 RCTs; 214 people; RR 0.34, 95% CI 0.17 to 0.71).¹² The review found no significant difference between treatments in the proportion of people with residual pain (RR 0.53, 95% CI 0.27 to 1.02).¹² The subsequent RCT compared mortise separation adjustment[ⓐ] versus detuned ultrasound.¹³ It found that mobilisation significantly reduced pain, increased ankle range of motion, and improved ankle function at 1 month (30 people with subacute or chronic ankle sprain without gross mechanical instability; results presented graphically). **Functional treatment versus immobilisation:** See benefits of immobilisation, p 2. **Functional treatment versus surgery:** We found one systematic review⁶ and one subsequent RCT,¹⁴ which compared surgery (tenodesis[ⓐ] or anatomic reconstruction[ⓐ]) versus functional treatment alone (see comment below). The review found no significant difference between surgery and functional treatment in return to sports (search date 2000; 2 RCTs; 216 people; RR 0.6, 95% CI 0.3 to 1.3), recurrence (5 RCTs; 421 people; RR 1.2, 95% CI 0.8 to 1.8), pain (5 RCTs; 413 people; RR 1.0, 95% CI 0.7 to 1.6), subjective instability (5 RCTs; 464 people; RR 0.9, 95% CI 0.7 to 1.3), objective instability (4 RCTs; 222 people; RR 0.6, 95% CI 0.3 to 1.2), and swelling (5 RCTs; 469 people; RR 0.9, 95% CI 0.6 to 1.5; see comment below).⁶ The subsequent RCT compared functional treatment versus surgery (anatomic reconstruction).¹⁴ Functional treatment consisted of a non-weight bearing cast for 5 days followed by elastic bandaging or taping for 6 weeks. People in both groups received a standard rehabilitation programme. The RCT found that functional treatment was less effective than surgery for residual pain, subjective instability, and recurrent sprains after 6–11 years' follow up (370 people with rupture of at least 1 lateral ankle ligament [317 people analysed]; AR for pain: 25% with functional treatment v 16% with surgery, RR 1.56, 95% CI 1.00 to 2.44; AR for subjective instability: 32% with functional treatment v 20% with surgery, RR 1.61, 95% CI 1.09 to 2.38; recurrent sprains: 34% with functional treatment v 22% with surgery, RR 1.51, 95% CI 1.06 to 2.22). **Different types of functional treatment:** We found one systematic review (search date 2001; 1 RCT; 122 people)¹⁵ and two additional RCTs.^{16,17} The review compared different types of functional treatment (elastic bandage, tape, lace-up ankle support, and semirigid ankle support) in people with an acute injury to the lateral ligament complex of the ankle.¹⁵ It reported outcomes at short, intermediate, and long term follow up (see comment below). At short

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term follow up, it found that lace-up ankle support significantly reduced persistent swelling compared with semirigid ankle support; (RR 4.2, 95% CI 1.3 to 14.0), elastic bandage (1 RCT; 122 people; RR 5.5, 95% CI 1.7 to 17.8), and tape (1 RCT; 119 people; RR 4.1, 95% CI 1.2 to 13.7). It found that a semirigid 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; 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).¹⁵ 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.¹⁵ The first additional RCT compared a semirigid device versus tape and found no significant difference between treatments in the proportion of people with recurrent sprains (116 people with all grades of ankle sprain; 4% with semirigid device v 0% with tape).¹⁶ The second additional RCT compared two types of tape treatment and found no significant differences between treatment groups in pain, swelling, or range of movement 5–7 days after treatment (119 people not requiring surgery, treated within 24 hours of injury; AR for pain: 8% v 5%; swelling: 58% v 47%; limited range of movement: 36% v 47%).¹⁷

Harms: **Functional treatment versus minimal treatment:** The review and additional RCTs did not report on harms. **Functional treatment versus immobilisation:** See harms of immobilisation, p 3. **Different types of functional treatment:** Allergic reactions and skin problems have been recorded with tape.¹⁸ Two RCTs identified by the systematic 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).¹⁵ Most of these complications were skin problems (absolute numbers with skin problems not reported). The two additional RCTs did not assess harms.^{16,17} **Functional treatment versus surgery:** The systematic review⁶ and the subsequent RCT¹⁴ did not assess harms.

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 (see comment under surgery, p 6).⁶ **Different types of functional treatment:** The systematic review reported follow up periods for outcome measures as short term (< 6 weeks of treatment), intermediate term (6 weeks to 1 year), or long term (1–2 years after treatment).¹⁵ 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.¹⁵

OPTION	SURGERY
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One systematic review found no significant difference between surgery and immobilisation in pain, swelling, recurrence, or subjective instability. However, the review found that surgery increased the proportion of people able to return to sports and increased ankle stability compared with immobilisation. One systematic review and one subsequent RCT provided insufficient evidence to compare surgery versus functional treatment. Neurological injuries, infections, bleeding, osteoarthritis, and death are known harms of surgery.

Benefits: **Surgery versus immobilisation:** See benefits of immobilisation, p 2. **Surgery versus functional treatment:** See benefits of functional treatment, p 4.

Harms: Neurological injuries, infections, bleeding, osteoarthritis, and death are known harms of surgery.^{11,19,20} Two RCTs found fewer cases of deep venous thrombosis after cast immobilisation compared with surgery (2/47 [4%] with cast immobilisation v 3/34 [9%] with surgery in first RCT; 0/33 [0%] with cast immobilisation v 1/32 [3%] with surgery in second RCT).^{6,11} One RCT found an equal occurrence of deep vein thrombosis

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in both groups (1/50 [2%] with cast immobilisation v 1/50 [2%] with surgery).⁶ Other RCTs found dysaesthesia[Ⓞ] in 4–12% of people after surgery.^{21–26} Wound necrosis after surgery was reported in two RCTs (2/73 [3%] with surgery;²⁴ 3/45 [7%] with surgery²⁵). Tenderness of the scar was reported in six RCTs after surgical intervention, occurring in 2–19% of people.^{22,23,26–29}

Comment: None.

OPTION ULTRASOUND

One systematic review found no significant difference between ultrasound and sham ultrasound in the general improvement of symptoms or the ability to walk or bear weight at 7 days. Two RCTs identified by the review provided insufficient evidence to compare ultrasound versus immobilisation or electrotherapy.

Benefits: **Ultrasound versus placebo:** We found one systematic review (see comment below) which compared ultrasound versus sham ultrasound treatment.³⁰ 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).³⁰ **Ultrasound versus immobilisation:** We found one systematic review (search date 2001, see comment below), which identified one RCT that compared ultrasound versus immobilisation[Ⓞ] over 2 weeks' follow up.³⁰ 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%). 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%).³⁰ **Ultrasound versus electrotherapy:** We found one systematic review (see comment below) comparing ultrasound versus other treatment modalities.³⁰ The RCT identified by the review compared ultrasound versus electrotherapy or sham ultrasound. It 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 (search date 2001; 60 people; AR for less than 0.5cm 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%).³⁰

Harms: One RCT included in the review RCT found no adverse reactions with ultrasound.³¹

Comment: In the review, the quality of four of the included RCTs was described as "modest" and one as "good".³⁰ The review reported RCTs in which one or more of pain, swelling, and functional disability because of an acute ankle sprain were 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

One RCT found no significant difference in symptoms between cold pack placement and placebo (simulated treatment). One RCT found less oedema with cold pack placement compared with heat or a contrast bath at 3–5 days after injury.

Benefits: **Cold treatment versus placebo:** We found one systematic review (search date 1994), which identified one RCT comparing cryotherapy versus placebo (simulated treatment).³³ The RCT found no significant difference between treatments (143 people; P value reported as not significant).³⁴ **Cold treatment versus different treatments:** We found one systematic review (search date 1994; 1 RCT; 30 people)³³ The RCT found significantly less oedema with a cold pack compared with heat or a contrast bath (see comment below) at 3–5 days after injury (P < 0.05).³⁵

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Harms: None of the RCTs addressed harms from cold pack placement.

Comment: The systematic review was narrative in character and no data were pooled.³³ The systematic review did not report the grade of injuries. In the RCT identified by the review compared cold compared 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.³⁵

OPTION	DIATHERMY
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One systematic review found insufficient evidence on the effects of diathermy compared with placebo on walking ability and reduction in swelling.

Benefits: **Diathermy versus placebo:** We found one systematic review (search date 1994, 5 RCTs).³³ The review included a range of severity of ankle sprains but excluded the most severe injuries (avulsion and osteochondral fractures). The first RCT identified by the review compared two forms of pulsating short wave treatment versus placebo.³⁶ The RCT found that high frequency electromagnetic pulsing improved walking ability significantly more quickly than placebo (300 people with time from injury to treatment of ≤ 4 days; $P < 0.01$). It found no significant difference in walking ability between low frequency electromagnetic pulsing and placebo. 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; $P < 0.01$ for low frequency v placebo). The second RCT found that pulsating short wave diathermy[Ⓞ] significantly reduced oedema compared with placebo (50 people; $P < 0.01$).³⁷ The third RCT found no significant difference between treatments for pain, oedema, or range of motion compared with placebo at 15 days (73 people; results presented graphically; pain scores $P > 0.35$; oedema $P > 0.35$; range of motion $P = 0.35$).³⁸ The fourth RCT found no significant difference between treatments in pain, elevation, number of analgesics a day, or time to weight bearing compared with placebo (37 people; pain scale 0 = no pain to 10 = worst pain, mean daily pain score: 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 non-significant; P values and CIs not reported).³⁹ The fifth RCT found no significant differences between treatments for pain, oedema, or range of motion compared with placebo (30 people; 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 non-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 non-significant).⁴⁰ The grades of injuries were not clearly described in these RCTs and results were not pooled.

Harms: No harms were reported.

Comment: None.

OPTION	HOMEOPATHIC OINTMENT
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One small RCT identified by a systematic review found limited evidence that homeopathic ointment improved outcome based on a “composite criteria of treatment success” compared with placebo.

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Benefits: **Homeopathic ointment versus placebo:** We found one systematic review (search date 1998),⁴¹ which included one RCT.⁴² The RCT 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).⁴¹ The number of people initially randomised in the RCT and losses to follow up were not reported.

Harms: Harms were not addressed in the review.⁴¹

Comment: None.

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. Proprioception 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.

Mortise separation adjustment An adjustment technique involving special manual manipulation of the foot and ankle.¹³

Pes cavo-varus Severe high arched, varus foot.

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

Substantive changes

Surgery Categorisation changed from Likely to be beneficial to Trade off between benefits and harms based on re-evaluation of the evidence.

REFERENCES

- Bernett P, Schirrmann A. Acute sporting injuries of the ankle joint. *Unfallheilkunde* 1979;82:155–160. [In German]
- Lassiter TE, Malone TR, Garret WE. Injuries to the lateral ligaments of the ankle. *Orthop Clin North Am* 1989;20:629–640.
- Marti RK. Bagatellletsels van de voet. 56–61. 1982. *Capita selecta, Reuma Wereldwijd*.
- Van Dijk CN, Bossuyt PM, Marti RK. Medial ankle pain after lateral ligament rupture. *J Bone Joint Surg Br* 1996;78:562–567.
- Watson-Jones R. *Fractures and joint injuries*. London: Churchill Livingstone, 1976.
- Kerkhoffs GMMJ, Handoll HHG, de Bie R, et al. Surgical versus conservative treatment for acute injuries of the lateral ligament complex of the ankle in adults. In: *The Cochrane Library*. 2005, Issue 1. Chichester, UK: John Wiley & Sons, Ltd. Search date 2001; primary sources Cochrane Musculoskeletal Injuries Group specialised register, Cochrane Controlled Trials Register, Medline, Embase, Biosis, Current Contents, hand searches of reference lists of articles, and personal contact with organisations and researchers in the field.
- Katcherian DA. Treatment of Freiberg's disease. *Orthop Clin North Am* 1994;25:69–81.
- Kerkhoffs GMMJ, Rowe BH, Assendelft WJJ, et al. Immobilisation and functional treatment for acute lateral ankle ligament injuries in adults. In: *The Cochrane Library*. 2005, Issue 1. Chichester, UK: John Wiley & Sons, Ltd. Search date 2001; primary sources Cochrane Musculoskeletal Injuries Group specialised register, Cochrane Controlled Trials Register, Medline, Embase, hand searches of reference lists of articles, and personal contact with organisations (Medical Departments of the Dutch Defence Forces and the Royal Dutch Football Association) and researchers in the field.
- Ardevol J, Bolibar I, Belda V, et al. Treatment of complete rupture of the lateral ligaments of the ankle: a randomized clinical trial comparing cast immobilization with functional treatment. *Knee Surg Sports Traumatol Arthrosc* 2002;10:371–377.
- Verhagen AP, de Vet HC, de Bie RA, et al. The Delphi list: a criteria list for quality assessment of randomized clinical trials for conducting systematic reviews developed by Delphi consensus. *J Clin Epidemiol* 1998; 51:1235–1241.
- Korkala O, Rusanen M, Jokipii P, et al. A prospective study of the treatment of severe tears of the lateral ligament of the ankle. *Int Orthop* 1987;11:13–17.
- Pijnenburg AC, Van Dijk CN, Bossuyt PM, et al. Treatment of ruptures of the lateral ankle ligaments: a meta-analysis. *J Bone Joint Surg Am* 2000;82:761–773. Search date 1998; primary sources Cochrane, Medline, Embase, hand searches of references from the published reviews, and personal contact with authors.
- Pellow JE, Brantingham JW. The efficacy of adjusting the ankle in the treatment of subacute and chronic grade I and grade II ankle inversion sprains. *J Manipulative Physiol Ther* 2001;24:17–24.
- Pijnenburg ACM, Bogaard K, Krips R, et al. Operative and functional treatment of rupture of the lateral ligament of the ankle. A randomised, prospective trial. *J Bone Joint Surg Br* 2003;85:525–530.
- Kerkhoffs GMMJ, Struijs PAA, Marti RK, et al. Different functional treatment strategies for acute lateral ankle ligament injuries in adults. In: *The Cochrane Library*. 2005, Issue 1. Chichester, UK: John Wiley & Sons, Ltd. Search date 2001; primary sources Cochrane Musculoskeletal Injuries Group specialised register, Cochrane Controlled Trials Register, Medline, Embase, Biosis, Current Contents, hand searches of reference lists of articles, and personal contact with

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- organisations (Medical Departments of the Dutch Defence Forces and the Royal Dutch Football Association) and researchers in the field.
16. Johannes EJ, Sukul DM, Spruit PJ, et al. Controlled trial of a semi-rigid bandage ("Scotchrap") in patients with ankle ligament lesions. *Curr Med Res Opin* 1993;13:154-162.
 17. Viljakka T, Rokkanen P. The treatment of ankle sprain by bandaging and antiphlogistic drugs. *Ann Chir Gynaecol* 1983;72:66-70.
 18. Zeegers AVCM. Supination injury of the ankle joint [thesis]. Utrecht: University of Utrecht, The Netherlands, 1995.
 19. Biegler M, Lang A, Ritter J. Comparative study on the effectiveness of early functional treatment using special shoes following surgery of ruptures of fibular ligaments. *Unfallchirurg* 1985;88:113-117. [In German]
 20. Sommer HM, Schreiber H. Early functional conservative therapy of fresh fibular capsular ligament rupture from the socioeconomic viewpoint. *Sportverletz Sportschaden* 1993;7:40-46. [In German]
 21. Zwipp H, Hoffmann R, Thermann H, et al. Rupture of the ankle ligaments. *Int Orthop* 1991;15:245-249.
 22. Evans GA, Hardcastle P, Frenyo AD. Acute rupture of the lateral ligament of the ankle. To suture or not to suture? *J Bone Joint Surg Br* 1984;66:209-212.
 23. Delfosse P, Lafontaine D, Hardy D, et al. Rupture of the ankle ligaments: to repair or not to repair? Preliminary results of a randomized study [abstract]. 6th Congress of the European Society of Sports Traumatology, Knee Surgery and Arthroscopy 1994;S66.
 24. Povacz P, Salzberg F, Unger SF, et al. A randomized, prospective study of operative and non-operative treatment of injuries of the fibular collateral ligaments of the ankle. *J Bone Joint Surg Am* 1998;80:345-351.
 25. Prins JG. Diagnosis and treatment of injury to the lateral ligament of the ankle: a comparative clinical study. *Acta Chir Scand Suppl* 1978;486:3-149.
 26. Brostrom L. Sprained ankles V. Treatment and prognosis in recent ligament ruptures. *Acta Chir Scand* 1966;132:537-550.
 27. Niedermann A, Andersen A, Bryde Andersen S, et al. Rupture of the lateral ligaments of the ankle: operation or plaster cast? *Acta Orthop Scand* 1981;52:579-587.
 28. Klein J, Schreckenberger C, Roddecker K, et al. Operative or conservative treatment of recent rupture of the fibular ligament in the ankle. A randomized clinical trial. *Unfallchirurg* 1988;91:154-160. [In German]
 29. Van den Hoogenband CR, Van Moppes FI. Diagnostic and therapeutic aspects of inversion trauma of the ankle joint [thesis]. Maastricht: University of Maastricht, 1982.
 30. Van der Windt DAWM, Van der Heijden GJMG, Van den Berg SGM, et al. Therapeutic ultrasound for acute ankle sprains. In: *The Cochrane Library*. 2005, Issue 1. Chichester, UK: John Wiley & Sons, Ltd. Search date 2001; primary sources Cochrane Musculoskeletal Injuries Group specialised register, Cochrane Controlled Trials Register, Cochrane Rehabilitation and Related Therapies Field database, Medline, Embase, Cinahl, Pedro — Physiotherapy Evidence Database, hand searches of reference lists of articles, and personal contact with colleagues.
 31. Nyanzi CS, Langridge J, Heyworth JR, et al. Randomized controlled study of ultrasound therapy in the management of acute lateral ligament sprains of the ankle joint. *Clin Rehabil* 1999;13:16-22.
 32. Oakland C. A comparison of the efficacy of the topical NSAID felbinac and ultrasound in the treatment of acute ankle injuries. *Br J Clin Res* 1993;4:89-96.
 33. Oglvie-Harris DJ, Gilbart M. Treatment modalities for soft tissue injuries of the ankle: a critical review. *Clin J Sport Med* 1995;5:175-186. Search date 1994; primary sources Medline and Excerpta Medica.
 34. Sloan JP, Hain R, Pownall R. Clinical benefits of early cold therapy in accident and emergency following ankle sprain. *Arch Emerg Med* 1989;6:1-6.
 35. Cote DJ, Prentice WEJ, Hooker DN, et al. Comparison of three treatment procedures for minimizing ankle sprain swelling. *Physical Ther* 1988;68:1072-1076.
 36. Pasila M, Visuri T, Sundholm A. Pulsating shortwave diathermy: value in treatment of recent ankle and foot sprains. *Arch Phys Med Rehabil* 1978;59:383-386.
 37. Pennington GM, Danley DL, Sumko MH, et al. Pulsed, non-thermal, high-frequency electromagnetic energy (DIAPULSE) in the treatment of grade I and grade II ankle sprains. *Mil Med* 1993;158:101-104.
 38. Barker AT, Barlow PS, Porter J, et al. A double-blind clinical trial of low power pulsed shortwave therapy in the treatment of a soft tissue injury. *Physiotherapy* 1985;71:500-504.
 39. McGill SN. The effects of pulsed shortwave therapy on lateral ligament sprain of the ankle. *NZ J Physiother* 1988;16:21-24.
 40. Michlovitz S, Smith W, Watkins M. Ice and high voltage pulsed stimulation in treatment of acute lateral ankle sprains. *J Orthop Sports Phys Ther* 1988;9:301-304.
 41. Cucherat M, Haugh MC, Gooch M, et al. Evidence of clinical efficacy of homeopathy: a meta-analysis of clinical trials. *Eur J Clin Pharmacol* 2000;56:27-33. Search date 1998; primary sources Medline; Embase; Biosis; Psychinfo; Cinahl; British Library Stock Alert Service; Sigle; Amed; hand searches of homeopathy journals, conference abstracts, references provided by colleagues, and reference lists of selected papers; and personal contact with pharmaceutical companies.
 42. Zell R, Connert WD, Mau J, et al. Treatment of acute sprains of the ankle joint. Double-blind study assessing the effectiveness of a homeopathic ointment preparation. *Fortschr Med* 1988;106:96-100. [In German]

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Competing interests: None declared.