Plantar heel pain and fasciitis

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ABSTRACT

INTRODUCTION: Plantar heel pain causes soreness or tenderness of the sole of the foot under the heel, which sometimes extends into the medial arch. The prevalence and prognosis are unclear, but the symptoms seem to resolve over time in most people. METHODS AND OUTCOMES: We conducted a systematic review and aimed to answer the following clinical question: What are the effects of treatments for plantar heel pain? We searched: Medline, Embase, The Cochrane Library and other important databases up to January 2007 (BMJ 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 15 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: casted orthoses (custom-made insoles), corticosteroid injection (alone, or plus non-steroidal anti-inflammatory drugs), extracorporeal shock wave therapy, heel cups, heel pads (alone or with corticosteroid injection), lasers, local anaesthetic injection (alone or with corticosteroid injection), night splints plus non-steroidal anti-inflammatory drugs, stretching exercises, surgery, taping, and ultrasound.

QUESTIONS

INTERVENTIONS

TREATMENTS

Key points

- Plantar heel pain causes soreness or tenderness of the sole of the foot under the heel, which sometimes extends into the medial arch.

  The prevalence and prognosis are unclear, but in most people the symptoms seem to resolve over time.

- Casted orthoses (custom-made insoles) may improve function (but not pain) at 3 months in people with plantar heel pain compared with a sham orthosis, but they may be no better than appropriate prefabricated orthoses.
- Supportivetaping may improve pain in the short term at 1 week, but we found no evidence on its effectiveness beyond 1 week.
- We don't know whether heel pads, heel cups, or night splints reduce pain.
- Corticosteroid injections are commonly used to treat plantar heel pain, but we don't know whether they reduce pain compared with placebo or other treatments.

  Corticosteroid injections have been associated with long-term complications.

  We don't know whether local anaesthetic injections, alone or added to corticosteroids, improve pain relief compared with corticosteroids alone.

- Extracorporeal shock wave therapy may reduce pain, but we don't know for sure that it is beneficial.
- We don't know whether laser treatment, ultrasound, or surgery reduce symptoms compared with sham treatment or no treatment.

- We don't know whether stretching exercises reduce pain compared with no treatment or other treatments.

DEFINITION

Plantar heel pain is soreness or tenderness of the heel that is restricted to the sole of the foot. It often radiates from the central part of the heel pad or the medial tubercle of the calcaneum, but may extend along the plantar fascia into the medial longitudinal arch of the foot. Severity may range from an irritation at the origin of the plantar fascia, which is noticeable on rising after rest, to an incapacitating pain. This review excludes clinically evident underlying disorders; for example, calcaneal fracture, and calcaneal nerve entrapment, which may be distinguished clinically — a calcaneal fracture may present after trauma, and calcaneal nerve entrapment gives rise to shooting pains and feelings of "pins and needles" on the medial aspect of the heel.

INCIDENCE/ PREVALENCE

The incidence and prevalence of plantar heel pain are uncertain. However, it has been estimated that 7% of people aged over 65 years report tenderness in the region of the heel, [1] that plantar heel pain accounts for a quarter of all foot injuries relating to running, [2] and that the diagnosis and treatment of plantar heel pain accounts for over 1 million visits a year to physicians in the USA. [3] The condition affects both athletic and sedentary people, and does not seem to be influenced by gender.

AETIOLOGY/ RISK FACTORS

Unknown. Suggested risk factors include overweight, prolonged standing, and having a reduced range of motion in the ankle and 1st metatarsophalangeal joint. [4]

PROGNOSIS

One systematic review found that almost all of the included trials reported an improvement in discomfort regardless of the intervention received (including placebo), suggesting that the condition is at least partially self-limiting. [5] A telephone survey of 100 people treated conservatively (average follow-up 47 months) found that 82 people had resolution of symptoms, 15 had continued symptoms but no limitations of activity or work, and three had persistent bilateral symptoms that limited activity or changed work status. [6] Thirty-one people said that they would have seriously considered surgical treatment at the time that medical attention was sought. In addition, one recent RCT has observed marked improvement in pain and function over time in 45 people randomised to a sham intervention. [7]

AIMS OF INTERVENTION

To reduce pain and immobility, with minimal adverse effects.

OUTCOMES

Pain reduction (often measured using visual analogue scales); improvement in function or walking distance; quality of life; adverse effects.

METHODS

BMJ Clinical Evidence search and appraisal January 2007. The following databases were used to identify studies for this systematic review: Medline 1966 to January 2007, Embase 1980 to January 2007, and The Cochrane Database of Systematic Reviews and Cochrane Central Register of Controlled Clinical Trials 2006, Issue 4. Additional searches were carried out using these websites: NHS Centre for Reviews and Dissemination (CRD) — for Database of Abstracts of Reviews of Effects (DARE) and Health Technology Assessment (HTA), Turning Research into Practice (TRIP), and NICE. Abstracts of the studies retrieved from the initial search were assessed by an information specialist. Selected studies were then sent to the author for additional assessment, using pre-determined criteria to identify relevant studies. Study design criteria for evaluation in this review were: published systematic reviews and RCTs in any language, and containing more than 20 individuals of whom more than 80% were followed up. There was no minimum length of follow-up required to include stu dies. We excluded all studies described as "open", "open label", or not blinded unless blinding was impossible. We use a regular surveillance protocol to capture harms alerts from organisations such as the FDA and the UK Medicines and Healthcare products Regulatory Agency (MHRA), which are added to the reviews as required. We have performed a GRADE evaluation of the quality of evidence for interventions included in this review (see table, p 16).

QUESTION What are the effects of treatments for plantar heel pain?

OPTION CASTED ORTHOSES (CUSTOM-MADE INSOLES)

Functional improvement

Compared with sham treatment Casted orthoses are more effective than sham treatment at 3 months at improving function in people with plantar heel pain (moderate-quality evidence).

Compared with prefabricated orthoses Casted orthoses are as effective as prefabricated orthoses at 3–12 months at improving function in people with plantar heel pain (moderate-quality evidence).

Pain relief

Compared with sham treatment Casted orthoses are as effective as sham treatment at 3–12 months at relieving pain in people with plantar heel pain (moderate-quality evidence).

Compared with prefabricated orthosis Casted orthoses are as effective as prefabricated orthosis at 3–12 months at relieving pain in people with plantar heel pain (moderate-quality evidence).

Casted orthoses plus pad plus taping compared with heel pad plus pain medication Casted orthosis plus a pad plus taping may be more effective at 3 months than a heel pad plus an analgesic at reducing pain in people with plantar heel pain (low-quality evidence).

Casted orthoses plus stretching exercises compared with heel pad plus stretching exercises Casted orthoses plus stretching exercises are less effective at 8 weeks than heel pads plus stretching exercises at reducing pain in people with plantar heel pain (moderate-quality evidence).

Casted orthoses plus stretching exercises compared with stretching exercises alone Casted orthoses plus stretching exercises are as effective as stretching exercises alone at 8 weeks at improving pain (moderate-quality evidence).

Compared with night splints Casted orthoses may be as effective as night splints at 12 weeks at reducing pain in people with plantar heel pain (very low-quality evidence).

Note

We found no direct evidence relating to the specific effects of casted orthoses compared with no treatment.

For GRADE evaluation of interventions for plantar heel pain and fasciitis, see table, p 16 .

Benefits:

Casted orthoses versus placebo or no treatment or prefabricated orthoses:

We found one systematic review (search date 2002) [5] which found no RCTs, and one subsequent RCT. [7] The subsequent three-armed RCT (135 people) compared: a casted 'customised' thermoplastic orthosis; a prefabricated foam 'Formthotic' orthosis; and a 'sham' orthosis which provided minimal structural support. [7] Results were based on an intention-to-treat analysis. The RCT found that the casted orthosis significantly improved function at 3 months compared with the sham orthosis (91 people, function measured by Foot Health Status Questionnaire [scale 0–100]: between-group mean difference, +7.5 points, 95% CI +0.3 points to +14.7 points). It found no significant difference between the casted orthosis and sham orthosis for pain at 3 months (91 people, pain measured by Foot Health Status Questionnaire [scale 0–100]: between group mean difference, +7.4 points, 95% CI –1.4 points to +16.2 points). The RCT found no significant difference between groups for pain or function at 12 months (pain: between-group mean difference, –0.1 points, 95% CI –7.8 points to +7.7 points; function: between-group mean difference, +4.3 points, 95% CI –3.0 points to +14.7). [7] The RCT found no significant difference in pain or function at 3 months or 12 months between the casted orthosis and prefabricated orthosis (3 months; pain: 89 people, measured by Foot Health Status Questionnaire [scale 0–100]: between-group mean difference, +1.3 points, 95% CI –7.6 points to +10.2 points; function: 89 people, measured by Foot Health Status Questionnaire [scale 0–100]: between-group mean difference, +0.9 points, 95% CI –6.3 points to +8.1 points. [7] It found that the prefabricated orthosis significantly improved function at 3 months compared with sham orthosis (88 people, measured by Foot Health Status Questionnaire [scale 0–100]: between-group mean difference, +8.4 points, 95% CI +1.0 points to +15.8 points), but found no significant difference between groups for pain at 3 months, or between groups for pain or function at 12 months.

Casted orthoses plus heel pad versus corticosteroid plus local anaesthesia injections plus NSAIDs:

See benefits of corticosteroid injections plus local anaesthesia, p 5 .

Casted orthoses plus pad plus taping versus heel pad plus pain medication:

We found one systematic review (search date 2002, 1 RCT, 103 people). [5] The RCT compared three interventions: three injections of corticosteroid plus local anaesthetic into the heel plus NSAIDs (anti-inflammatory treatment); heel pad (viscoelastic) plus paracetamol (acetaminophen) as required (accommodative treatment); and a long metatarsal pad plus taping for 4 weeks before a casted (custom-made) orthosis was fitted (mechanical treatment). Analysis was not by intention to treat and 18 people (17.5%) were lost to follow-up. It found that the orthosis plus pad plus taping significantly reduced pain at 3 months compared with heel pad plus paracetamol (10 cm visual analogue scale: difference –2.2 cm, 95% CI –3.8 cm to –0.5 cm). [8]

Casted orthoses plus stretching exercises versus heel pad plus stretching exercises:

We found one systematic review (search date 2002, 1 RCT, 236 people). [5] The RCT compared four treatments: stretching exercises alone; Achilles tendon stretching and plantar fascia stretching

(for 10 minutes twice daily); custom-made orthoses plus stretching exercises; and three different types of heel pads (prefabricated shoe inserts) made from silicone, rubber, or felt, plus stretching exercises. It found that heel pads plus stretching significantly reduced pain at 8 weeks compared with custom-made orthoses plus stretching (results combined for all materials; P = 0.007). [9]

Casted orthoses plus stretching exercises versus stretching exercises alone:
See benefits of stretching exercises, p 12 .

Casted orthoses versus night splints:
We found one systematic review (search date 2002, 1 RCT, 255 people) [5] and one subsequent RCT. [10] The RCT included in the review compared custom-made orthoses versus night splints. The results were difficult to interpret, owing to a large difference in withdrawals between the groups (26% with night splints *v* 7% with orthoses), and we were not able to report intention-to-treat analysis. [11] The subsequent small RCT compared: a casted thermomouldable foam (ethyl-vinyl-acetate) orthosis (13 people); an anterior night splint (15 people); and an orthosis plus night splint (15 people). [10] It found no significant difference between groups in pain at 12 weeks. It reported that treatment with an orthosis (alone or in combination with a night splint) significantly improved pain compared with the splint alone after 1 year (pain reduction from baseline: 62% with orthosis with or without splint *v* 48% with splint alone, P less than 0.01; statistical analysis of orthosis alone *v* splint alone not reported). [10] There was no participant blinding, and although the RCT conducted a power analysis prior to beginning, the pre-determined sample size (60 people) was not met.

Functional orthoses versus accommodative orthoses:
We found one systematic review which found no RCTs. [5]

Harms:

Most of the RCTs did not report on harms. [11] [8] [9] [7] One RCT found reports of pressure, pain, and sleep disturbance with the splint, orthosis, or the splint plus orthosis during the first week of treatment, and that during weeks 2–12 of the treatment period, 1 person in the orthosis group reported "tiredness of the foot" compared with "2 to 4 people" with the splint plus orthosis and "2 to 5 people" with the splint only (further details not reported, statistical analysis between groups not reported). [10]

Comment:

We found one RCT comparing heel pads versus casted (custom-made) orthoses. [12] However, there was a significant difference in mean weight between the groups at baseline (8.6 kg) and weight was associated with severity of heel pain. This makes the results difficult to interpret.

OPTION CORTICOSTEROID INJECTIONS (SHORT-TERM EFFECTS)

We found no clinically important results about the short-term effects of corticosteroid injections compared with no active treatment, orthoses, heel pads, analgesic medication, or corticosteroid injection plus local anaesthesia. Corticosteroid injections may be associated with a high rate of plantar fascia rupture and other complications, which may lead to chronic disability in some people.

For GRADE evaluation of interventions for plantar heel pain and fasciitis, see table, p 16 .

Benefits:

Corticosteroid injection versus placebo or no treatment:
We found one systematic review (search date 2002), which found no RCTs. [5]

Corticosteroid injection plus heel pad versus placebo plus heel pad:
We found one systematic review (search date 2002) [5] which found one RCT that did not assess the short-term effect of corticosteroid injection.

Corticosteroid injection versus orthoses:
We found one systematic review (search date 2002), which found no RCTs. [5]

Corticosteroid injection versus heel pad:
We found one systematic review (search date 2002), which found no RCTs. [5]

Corticosteroid injection versus analgesic medication alone:
We found one systematic review (search date 2002), which found no RCTs. [5]

Corticosteroid injection versus corticosteroid injection plus local anaesthesia:
We found one systematic review (search date 2002), which found no RCTs. [5]

Harms:

See harms of corticosteroid injection (medium to long term), p 5 .

Comment:

See comment on corticosteroid injection (medium to long term), p 5 .

OPTION CORTICOSTEROID INJECTION IN THE MEDIUM TO LONG TERM (WITH OR WITHOUT HEEL PAD)

We found no clinically important results about the medium- to long-term effects of corticosteroid injections compared with no active treatment, orthoses, heel pads, analgesic medication, or corticosteroid injection plus local anaesthesia. Corticosteroid injections may be associated with a high rate of plantar fascia rupture and other complications, which may lead to chronic disability in some people.

For GRADE evaluation of interventions for plantar heel pain and fasciitis, see table, p 16 .

Benefits:

Corticosteroid injection versus placebo or no treatment:
We found one systematic review (search date 2002), which found no RCTs. [5]

Corticosteroid injection plus heel pad versus placebo plus heel pad:
We found one systematic review (search date 2002, 1 RCT). [5] However, the RCT (19 people with recalcitrant heel pain but not arthritis) was below *BMJ Clinical Evidence* quality criteria of at least 20 people in a study.

Corticosteroid injection versus orthoses:
We found one systematic review (search date 2002), which found no RCTs. [5]

Corticosteroid injection versus heel pad:
We found one systematic review (search date 2002), which found no RCTs. [5]

Corticosteroid injection versus analgesic medication alone:
We found one systematic review (search date 2002), which found no RCTs. [5]

Corticosteroid injection versus corticosteroid injection plus local anaesthesia:
We found one systematic review (search date 2002), which found no RCTs. [5]

Harms:

The RCT identified by the review gave no information on harms. [5] Corticosteroid injections can be painful. Complications observed from local corticosteroid injection throughout the body include infection, subcutaneous fat atrophy, skin pigmentation changes, fascial rupture, peripheral nerve injury, and muscle damage, among others. [13] Observational studies have reported rupture of the plantar fascia in people receiving corticosteroid injections. [14] [15] One study reported a 10% incidence of rupture among 122 injected heels. [15] A second study examined 37 people with a presumptive diagnosis of plantar fascia rupture, all of whom had received corticosteroid injections for plantar fasciitis. [14] Their history revealed that in 13/37 (35%) people the rupture had been a sudden event, whereas in the remainder it seemed to be gradual. The study reported that most had resolution of symptoms, but this often took 6–12 months to occur. [14] Rupture may relieve the original heel pain, but may cause arch and mid-foot strain, lateral plantar nerve dysfunction, stress fracture, deformity, and swelling, all of which may persist.

Comment:

The evidence from observational studies does not allow us to state with certainty whether plantar fascia rupture is caused by corticosteroid injection, or whether it is coincidental. It is also difficult to define the clinical importance of rupture of the plantar fascia from the evidence provided by observational studies. Plantar fascia rupture is not necessarily a harmful phenomenon, as it may be clinically silent in some people. One further trial is awaiting assessment following translation. [16]

OPTION CORTICOSTEROID INJECTIONS PLUS LOCAL ANAESTHESIA (SHORT TERM)

Pain relief

Compared with a local anaesthetic A corticosteroid injection plus a local anaesthetic may be more effective at 1 month than a local anaesthetic alone at improving pain scores in people with plantar heel pain (very low-quality evidence).

Compared with heel pad alone A corticosteroid injection plus a local anaesthetic may be more effective at 1 month than a heel pad alone at improving pain in people with plantar heel pain (very low-quality evidence).

Compared with a corticosteroid injection plus local anaesthetic plus heel pad A corticosteroid injection plus a local anaesthetic may be more effective than a corticosteroid injection, plus a local anaesthetic and a heel pad at improving pain at one month in people with plantar heel pain (very low-quality evidence).

Corticosteroid injection plus local anaesthetic plus heel pad compared with heel pad alone A corticosteroid injection plus a local anaesthetic plus a heel pad may be more effective at 4 weeks than a heel pad alone at reducing pain in people with plantar heel pain (very low-quality evidence).

Note
Corticosteroid injections may be associated with a high rate of plantar fascia rupture and other complications, which may lead to chronic disability in some people.

For GRADE evaluation of interventions for plantar heel pain and fasciitis, see table, p 16 .

Benefits:

Corticosteroid injection plus local anaesthesia versus placebo or no treatment:
We found one systematic review (search date 2002), which found no RCTs. [5]

Corticosteroid injection plus local anaesthesia versus corticosteroid alone:
We found one systematic review (search date 2002), which found no RCTs. [5]

Corticosteroid injection plus local anaesthesia versus local anaesthetic alone:
We found one systematic review (search date 2002, 1 RCT). [5] The RCT (91 people [106 heels, randomisation by heel]) compared a single injection of 1 mL prednisolone acetate 25 mg/mL plus 1 mL lidocaine hydrochloride 2% versus 2 mL lidocaine hydrochloride 2% alone. It found that the combined injection slightly improved pain scores at 1 month, although the clinical importance of this result is unclear (10 cm visual analogue scale: mean difference –0.8 cm, 95% CI –1.5 cm to –0.2 cm). [17]

Corticosteroid injection plus local anaesthesia versus heel pad alone:
We found one systematic review (search date 2002, 2 RCTs). [5] The first RCT (80 people) included people with pain on the plantar aspect of the heel, but excluded people taking anti-inflammatory medication, people who had had a corticosteroid injection during the past 6 months, people with rheumatoid arthritis, and people with pain that radiated along the plantar fascia more distally. [18] It compared three treatments: a heel pad alone; a corticosteroid plus local anaesthetic injection alone (triamcinolone hexacetonide 20 mg plus 2% lidocaine [lignocaine]), and injection plus heel pad (an "antipronatory insole"). Analysis was not by intention to treat, and four people (5%) were lost to follow-up. The first RCT found that corticosteroid plus local anaesthetic injection significantly improved pain at 1 month compared with heel pads (100 mm visual analogue scale: mean difference –45 mm, 95% CI –59 mm to –31 mm). The second RCT (17 people) identified by the review compared triamcinolone 20 mg plus 2% lidocaine injection versus heel pad (prefabricated silicone type). [19] The difference in pain was reported as non-significant at 1 and 2 weeks.

Corticosteroid injection plus local anaesthesia versus corticosteroid plus local anaesthetic plus heel pad:
We found one systematic review (search date 2002, 1 RCT, 80 people). [5] The RCT (for details see Corticosteroid injection plus local anaesthesia versus heel pad alone above) found that corticosteroid injection plus local anaesthesia alone significantly improved pain after 1 month compared with the combined injection plus a heel pad, although the clinical importance of this result is unclear (100 mm visual analogue scale: mean difference 16.0 mm, 95% CI 0.7 mm to 31.2 mm). [18]

Corticosteroid injection plus local anaesthesia plus heel pad versus heel pad alone:
We found one systematic review (search date 2002, 1 RCT, 80 people). [5] The RCT (for details see Corticosteroid injection plus local anaesthesia versus heel pad alone above) found that corticosteroid injection plus local anaesthesia plus heel pad significantly reduced pain at 4 weeks compared with heel pad alone (100 mm visual analogue scale: mean difference –29 mm, 95% CI –44 mm to –14 mm). [18]

Corticosteroid injection plus local anaesthesia plus NSAIDs versus heel pad plus paracetamol:
We found one systematic review (search date 2002) [5] which found no RCTs that reported short-term outcomes.

Corticosteroid injection plus local anaesthesia plus NSAIDs versus heel pad plus orthoses:
We found one systematic review (search date 2002) [5] which found no RCTs that reported short-term outcomes.

Harms:

In the RCT identified in the systematic review, [5] participants' heels were injected through the medial aspect of the heel pad. [17] Half of the 106 randomised heels were given a tibial nerve block and half received local injection only. The RCT found no significant difference between these groups in pain at time of injection. [17] The other RCTs did not report on harms. See also harms of corticosteroid injections, p 4 .

Comment:

The RCTs had many flaws (lack of intention-to-treat analysis, inadequate statistical power, high withdrawal rates, and lack of placebo control). Limitations of the available evidence make the use of corticosteroid injections in heel pain difficult to categorise in terms of benefits and harms. Het-

erogeneity of interventions prevented data pooling. Corticosteroid injections are commonly used.[13] We found evidence from two observational studies of high rates of moderately severe harms from this treatment (see harms of corticosteroid injections, p 4). This is consistent with evidence about harms of corticosteroid injections in other areas.[13] These harms are particularly relevant because the evidence of benefit is poor, and spontaneous resolution of symptoms is common.

OPTION CORTICOSTEROID INJECTION PLUS LOCAL ANAESTHETIC INJECTION IN THE MEDIUM TO LONG TERM (WITH OR WITHOUT NSAIDS OR HEEL PADS)

Pain relief

Compared with a local anaesthetic A corticosteroid injection plus a local anaesthetic may be no more effective at 3–6 months than a local anaesthetic alone at reducing pain in people with plantar heel pain (very low-quality evidence).

Compared with a heel pad alone A corticosteroid injection plus a local anaesthetic may be no more effective at 24 weeks than a heel pad alone at improving pain in people with plantar heel pain (very low-quality evidence).

Compared with a corticosteroid injection plus a local anaesthetic, plus a heel pad A corticosteroid injection plus a local anaesthetic may as effective at 24 weeks as a corticosteroid injection, plus a local anaesthetic and a heel pad at improving pain in people with plantar heel pain (very low-quality evidence).

Corticosteroid injection plus a local anaesthetic plus a heel pad compared with a heel pad alone A corticosteroid injection plus a local anaesthetic plus a heel pad may be more effective at 12 weeks than a heel pad alone at reducing pain in people with plantar heel pain (very low-quality evidence).

A corticosteroid injection plus local anaesthesia plus NSAIDs compared with a heel pad plus paracetamol A corticosteroid injection plus local anaesthesia plus NSAIDs may be no more effective at 3 months than a heel pad plus paracetamol at reducing pain in people with plantar heel pain (very low-quality evidence).

A corticosteroid injection plus local anaesthesia plus NSAIDs compared with an orthosis plus pad plus taping A corticosteroid injection plus local anaesthesia plus NSAIDs may be as effective at 3 months as an orthosis plus pad plus taping at reducing pain in people with plantar heel pain (very low-quality evidence).

Note

Corticosteroid injections may be associated with a high rate of plantar fascia rupture and other complications, which may lead to chronic disability in some people.

For GRADE evaluation of interventions for plantar heel pain and fasciitis, see table, p 16 .

Benefits:

Corticosteroid injection plus local anaesthesia versus placebo or no treatment:
We found one systematic review (search date 2002), which found no RCTs.[5]

Corticosteroid injection plus local anaesthesia versus corticosteroid alone:
We found one systematic review (search date 2002), which found no RCTs.[5]

Corticosteroid injection plus local anaesthesia versus local anaesthetic alone:
We found one systematic review (search date 2002, 1 RCT).[5] The RCT (91 people [106 heels, randomisation by heel]) compared a single injection of 1 mL prednisolone acetate 25 mg/mL plus 1 mL lidocaine hydrochloride 2% versus 2 mL lidocaine hydrochloride 2% alone. It found no significant difference in pain after 3 or 6 months (3 months: mean difference +0.1 cm, 95% CI –1.2 cm to +1.3 cm; 6 months: +0.5 cm, 95% CI –0.8 cm to +1.7 cm).[17]

Corticosteroid injection plus local anaesthesia versus heel pad alone:
We found one systematic review (search date 2002, 2 RCTs).[5] The first RCT (80 people) included people with pain on the plantar aspect of the heel, but excluded people taking anti-inflammatory medication, people who had had a corticosteroid injection during the past 6 months, people with rheumatoid arthritis, and people with pain that radiated along the plantar fascia more distally.[18] It compared three treatments: a heel pad alone; a corticosteroid plus local anaesthetic injection alone (triamcinolone hexacetonide 20 mg plus 2% lidocaine [lignocaine]); and injection plus heel pad (an "antipronatory insole"). Analysis was not by intention to treat, and four people (5%) were lost to follow-up. The first RCT found that there was greater mean pain reduction at 24 weeks with the injection alone compared with the heel pad alone, but the difference between groups was not statistically significant (84% with injection alone *v* 71% with heel pad alone). The second RCT (17 people) identified by the review compared triamcinolone 20 mg plus 2% lidocaine injection versus heel pad (prefabricated silicone type).[19] However, it was below *BMJ Clincial Evidence* quality criteria of at least 20 people in a study.

Corticosteroid injection plus local anaesthesia versus corticosteroid plus local anaesthetic plus heel pad:
We found one systematic review (search date 2002, 1 RCT, 80 people). [5] The RCT (for details see Corticosteroid injection plus local anaesthesia versus heel pad alone above) found that people treated with heel pad plus injection had less pain at 24 weeks compared with injection alone, but the difference was reported as non-significant (94% with heel pad plus injection *v* 85% with injection alone; P greater than 0.05). [18]

Corticosteroid injection plus local anaesthesia plus heel pad versus heel pad alone:
We found one systematic review (search date 2002, 1 RCT, 80 people). [5] The RCT (for details see Corticosteroid injection plus local anaesthesia versus heel pad alone above) found that corticosteroid injection plus local anaesthesia plus heel pad significantly reduced pain compared with heel pad alone at 12 weeks but not at 24 weeks (mean difference at 24 weeks –10.7 mm, 95% CI –25.5 mm to +4.1 mm; AR for pain reduction: 94% with injection plus heel pad *v* 75% with heel pad alone). [18] However, the clinical importance of these results is unclear.

Corticosteroid injection plus local anaesthesia plus NSAIDs versus heel pad plus paracetamol:
We found one systematic review (search date 2002, 1 RCT, 103 people). [5] The RCT compared three interventions: three injections of corticosteroid plus local anaesthetic into the heel plus NSAIDs (anti-inflammatory treatment); heel pads plus paracetamol (acetaminophen) as required (accommodative treatment); and a heel pad before fitting of casted (custom-made) orthoses (mechanical treatment). Treatment in the anti-inflammatory group consisted of etodolac 600 mg and 0.5 mL dexamethasone sodium phosphate 4 mg/mL plus 1 mL of 0.5% bupivacaine hydrochloride without adrenaline (epinephrine). [8] If there was no response, 0.2 mL of dexamethasone acetate 16 mg/mL injection was added cumulatively to the second (2nd week) and third (4th week) injections. Analysis was not by intention to treat and 18 people (17.5%) were lost to follow-up. The RCT found no significant difference at 3 months between injection plus anti-inflammatory drugs and heel pads (10 cm visual analogue scale: mean difference –1.2 cm, 95% CI –2.8 cm to +0.4 cm).

Corticosteroid injection plus local anaesthesia plus NSAIDs versus orthosis plus pad plus taping:
We found one systematic review (search date 2002, 1 RCT, 103 people). [5] The RCT (for details see Corticosteroid injection plus local anaesthesia plus NSAIDs versus heel pad plus paracetamol above) found that both anti-inflammatory treatment (corticosteroid injection plus local anaesthesia plus NSAIDs) and mechanical treatment (pad plus taping plus orthoses) improved pain at 3 months, but the difference was not significant (10 cm visual analogue scale: mean difference –1.0 cm, 95% CI –2.5 cm to +0.5 cm). [8]

Harms:

In the RCT identified in the review, [5] participants' heels were injected through the medial aspect of the heel pad. [17] Half of the 106 randomised heels were given a tibial nerve block and half received local injection only. The RCT found no significant difference between these groups in pain at time of injection. [17] The other RCTs did not report on harms. See also harms of corticosteroid injections, p 4 .

Comment:

The RCTs had many flaws (lack of intention-to-treat analysis, inadequate statistical power, high withdrawal rates, and lack of placebo control). Limitations of the available evidence make the use of corticosteroid injections in heel pain difficult to categorise in terms of benefits and harms. Heterogeneity of interventions prevented data pooling. Corticosteroid injections are commonly used. [13] We found evidence from two observational studies of high rates of moderately severe harms from this treatment (see harms of corticosteroid injections, p 4). This is consistent with evidence about harms of corticosteroid injections in other areas. [13] These harms are particularly relevant because the evidence of benefit is poor, and spontaneous resolution of symptoms is common.

OPTION EXTRACORPOREAL SHOCK WAVE THERAPY (ESWT)

Pain relief
Compared with placebo It seems extracorporeal shock wave therapy may marginally reduce pain in people with heel pain compared with placebo (very low-quality evidence).

For GRADE evaluation of interventions for plantar heel pain and fasciitis, see table, p 16 .

Benefits:

Extracorporeal shock wave therapy (ESWT) versus placebo:
We found one systematic review (search date 2004, 6 RCTs, 897 people), which compared ESWT versus placebo, sham, or low-dose ESWT in people with heel pain. [20] The systematic review found that ESWT significantly reduced heel pain over 12 weeks compared with placebo or low-dose ESWT (pain measured on a 100 mm visual analogue scale: WMD 0.42 mm, 95% CI 0.02 mm

to 0.83 mm). [20] This small effect of less than 0.5 mm reduction on a visual analogue scale is of unknown clinical significance. A sensitivity analysis including only high-quality trials did not detect a significant effect of ESWT. We found two subsequent RCTs. [21] [22] The first subsequent RCT (114 people) compared a single session of ESWT versus placebo/sham ESWT (same procedure as ESWT but with foam cushion placed on therapy head) in people with plantar fasciitis resistant to conservative therapies for at least 6 months. [21] The RCT found that ESWT significantly improved pain (assessed using a visual analogue scale; units of measurement not reported) compared with placebo at 3 months (decrease in mean pain score from baseline to 3 months for visual analogue scale scores during the first few minutes of walking: 7.5 to 3.9 with ESWT *v* 7.9 to 5.3 with placebo, P less than 0.0001). [21] The second subsequent RCT (172 people) compared a single session of ESWT versus placebo in people with proximal plantar fasciitis present for at least 6 months who had undergone at least 4 months of previous conservative treatment. [22] At the 3-month follow-up, it found a borderline significant difference in pain reduction with ESWT compared with placebo (pain assessed using a 10-point visual analogue scale in response to a standardised force applied to the heel: difference between groups, –0.94 points, 95% CI –1.87 points to –0.02 points; P = 0.045). [22] However, as baseline scores and standard deviations were not presented, the absolute magnitude of pain reduction could not be determined for each group.

Harms: ESWT without local anaesthesia is generally considered to be painful. In one RCT, 79% [46/58] of people reported pain during treatment with ESWT compared with 9% [6/56] with placebo (P less than 0.0001). [21] One RCT reported a sensation of heat and numbness or bruising in two people receiving ESWT, and a burning sensation in the heel and ankle in one person receiving placebo. [20] One RCT reported significantly more adverse effects with ESWT than with placebo, sham, or low-dose treatment (OR 2.26, 95% CI 1.02 to 5.18). [20] Adverse effects included skin reddening, pain and local swelling, and less frequently dizziness, sleep disturbance, haematoma, nausea, and hair loss. One RCT reported that 2 people (1.7%) had bruising at the site of shockwave application, and that there were no serious adverse effects reported. [22]

Comment: ESWT produces slightly greater reductions in pain than placebo in people with recalcitrant plantar fasciitis. However, the clinical significance of this difference is questionable. The systematic review of six RCTs indicated that the lower-quality RCTs favoured ESWT, whereas better-quality RCTs did not.

OPTION HEEL PADS AND HEEL CUPS

Compared with a corticosteroid injection plus a local anaesthetic A heel pad may be less effective than a corticosteroid injection plus a local anaesthetic at 1 month but not at 24 weeks at improving pain in people with plantar heel pain (very low-quality evidence).

Compared with a corticosteroid injection plus local anaesthetic plus a heel pad A heel pad may be less effective than a corticosteroid injection, plus a local anaesthetic plus a heel pad at improving pain at one month in people with plantar heel pain (very low-quality evidence).

Compared with a heel pad plus a corticosteroid injection plus a local anaesthetic A heel pad alone may be less effective than a corticosteroid injection plus a local anaesthetic plus a heel pad at 4–12 weeks at reducing pain in people with plantar heel pain (very low-quality evidence).

A heel pad plus a corticosteroid injection, plus a local anaesthetic compared with a corticosteroid injection plus a local anaesthetic A heel pad plus a corticosteroid injection, plus a local anaesthetic may be as effective at 24 weeks as a corticosteroid injection plus a local anaesthetic at improving pain in people with plantar heel pain (very low-quality evidence).

A heel pad plus paracetamol compared with a corticosteroid injection plus local anaesthesia plus NSAIDs A heel pad plus paracetamol may be no more effective at 3 months than a corticosteroid injection plus local anaesthesia plus NSAIDs at reducing pain in people with plantar heel pain (very low-quality evidence).

A heel pad plus stretching exercises compared with stretching exercises alone A heel pad plus stretching exercises is more effective at 8 weeks than stretching exercises alone at improving symptoms of plantar heel pain (high quality-evidence).

A heel pad plus stretching exercises compared with casted orthoses plus stretching exercises A heel pad plus stretching exercises is more effective at 8 weeks than casted orthoses plus stretching exercises at reducing pain in people with plantar heel pain (moderate-quality evidence).

A heel pad plus pain medication compared with a casted orthoses plus pad plus taping A casted orthoses plus pad plus taping may be more effective at 3 months than a heel pad plus an analgesic at reducing pain in people with plantar heel pain (low-quality evidence).

A heel pad plus plantar fascia stretching compared with Achilles tendon stretching plus a heel pad A heel pad plus plantar fascia stretching may be more effective than Achilles tendon stretching plus a heel pad at reducing morning heel pain (first step pain) at 8 weeks in people with chronic proximal plantar fasciitis (low-quality evidence).

Note
Corticosteroid injections may be associated with a high rate of plantar fascia rupture and other complications, which may lead to chronic disability in some people.

For GRADE evaluation of interventions for plantar heel pain and fasciitis, see table, p 16 .

Benefits:

Heel pads and heel cups versus placebo or no treatment:
We found one systematic review (search date 2002), which found no RCTs. [5]

Heel pads and heel cups versus corticosteroid injection:
We found one systematic review (search date 2002), which found no RCTs. [5]

Heel pads and heel cups versus heel pad plus corticosteroid injection:
See benefits of corticosteroid injections, p 4 .

Heel pads and heel cups versus corticosteroid injections plus local anaesthesia:
See benefits of corticosteroid injections plus local anaesthesia, p 5 .

Heel pads plus pain medication versus corticosteroid injection plus local anaesthesia plus NSAIDs:
See benefits of corticosteroids plus local anaesthesia, p 5 .

Heel pads plus stretching exercises versus stretching exercises alone:
See benefits of stretching exercises, p 12 .

Heel pads plus stretching exercises versus orthoses plus stretching exercises:
See benefits of casted orthoses (custom-made insoles), p 2 .

Heel pads plus pain medication versus orthosis plus pad plus taping:
See benefits of casted orthoses (custom-made insoles), p 2 .

Heel pads plus corticosteroid injection plus local anaesthetic versus corticosteroid plus local anaesthetic:
See benefits of corticosteroids plus local anaesthesia, p 5 .

Harms: None of the RCTs reported harms.

Comment: Heel cups and heel pads can be made from several different materials, but rubber, viscoelastic, and silicone can be purchased as prefabricated shoe inserts. Podiatrists or orthotists sometimes use felt and foam to construct heel pads. We found one additional RCT comparing heel pads versus orthoses, but the results were difficult to interpret. See comment on casted orthoses (custom-made insoles), p 2 . [12]

OPTION LASERS

Symptom relief
Compared with placebo Lasers may be nor more effective than placebo at relieving symptoms in people with plantar heel pain (very low-quality evidence).

For GRADE evaluation of interventions for plantar heel pain and fasciitis, see table, p 16 .

Benefits:

Lasers versus placebo:
We found one systematic review (search date 2002, 1 RCT, 32 people). [5] The RCT included people with: pain of at least 1 month's duration; tenderness to pressure at the origin of the plantar fascia; pain at the mid-anterior inferior border of the calcaneus; and sharp shooting and/or localised inferior foot pain made worse with activity or on rising in the morning). [5] It compared low-intensity laser treatment (30 mW continuous wave diode laser) versus placebo (treatment with a disabled laser) and found no evidence of a significant effect between groups (further data not reported). [5]

Harms: The RCT reported that 96% of people had no adverse effects, with 4% reporting a "mild sensation" during or after treatment. [5]

Comment: One further trial is awaiting assessment following translation. [16]

OPTION TAPING (LOW DYE OR ANTI-PRONATORY TAPING) New

Pain relief

Compared with no taping/no treatment Low-dye taping is more effective than no taping at one week at reducing first step pain, and calcaneal taping is more effective than sham taping at improving pain at one week (moderate-quality evidence).

Functional improvement

Compared with no treatment Low-dye taping seems to be as effective as no treatment at one week at improving function (moderate-quality evidence).

For GRADE evaluation of interventions for plantar heel pain and fasciitis, see table, p 16 .

Benefits:

Taping versus placebo or no treatment:

We found two RCTs. [23] [24] The first RCT (92 people) compared a 1-week application of low-dye taping (a taping technique designed to support the foot and limit pronation) plus sham ultrasound versus sham ultrasound alone. [23] Validated participant-reported outcome measures were used (a 100 mm visual analogue scale to measure 'first-step pain' — the pain experienced when first standing after rising from bed in the morning — and the Foot Health Status Questionnaire [0–100 scale] to measure pain, function, and general foot health). Analysis was by intention to treat, and there was no loss to follow-up. The RCT found that taping significantly improved 'first-step' pain at 1 week compared with no taping (mean difference measured by VAS: –12.3 mm, 95% CI –22.4 mm to –2.2 mm; p = 0.017). It found no significant differences between groups in pain, function, or general foot health, measured by the Foot Health Status Questionnaire (pain, P = 0.117; function, P = 0.193; general foot health, P = 0.885). [23] The second small RCT (41 people) compared: calcaneal taping (tape specifically encompassing the heel only) (11 people); sham taping (10 people); no treatment (10 people); and a group that was prescribed plantar fascia stretches (10 people). The RCT found that calcaneal taping significantly improved pain at 1 week compared with sham taping (mean VAS score: 2.7 mm with calcaneal taping *v* 6.0 mm with sham taping, P less than 0.001). It also found that calcaneal taping significantly improved pain compared with no treatment or plantar fascia stretches (mean VAS score: 2.7 mm with calcaneal taping *v* 4.6 mm with stretching *v* 6.2 mm with no treatment; calcaneal taping *v* stretching, P = 0.006, calcaneal taping *v* no treatment, P less than 0.001). However, it was not stated whether the results were based on an intention-to-treat analysis; one participant withdrew from the RCT; and the RCT did not measure outcomes beyond 1 week. [24]

Harms:

The first RCT reported that 13 people (28%) experienced adverse effects with taping compared with one in the sham group. [23] These were: taping too tight (4 people); a new pain in the lower limb (5 people); and allergic reaction to the tape (4 people). Adverse effects were short lived, and resolved following tape removal. The second RCT did not report on harms. [24]

Comment:

None.

OPTION LOCAL ANAESTHETIC INJECTION

Pain relief

Compared with a local anaesthetic plus a corticosteroid injection A local anaesthetic alone may be less effective than a local anaesthetic plus a corticosteroid injection at improving pain scores at one month in people with plantar heel pain (very low-quality evidence).

For GRADE evaluation of interventions for plantar heel pain and fasciitis, see table, p 16 .

Benefits:

Local anaesthetic injection versus placebo or no treatment:

We found one systematic review (search date 2002), which found no RCTs. [5]

Local anaesthetic injection versus corticosteroids plus local anaesthetic:

See benefits of corticosteroid injections plus local anaesthesia, p 5 .

Harms:

See harms of corticosteroid injections plus local anaesthetic, p 5 .

Comment:

Epinephrine (adrenaline) is not recommended in local anaesthetics for procedures that involve the appendages because of the risk of ischaemic necrosis. [25]

OPTION NIGHT SPLINTS

Pain relief

Night splints plus NSAIDs compared with NSAIDs alone Night splinting plus NSAIDs may be no more effective than NSAIDs alone at 3 months at reducing pain in people with recalcitrant heel pain (low-quality evidence).

Compared with casted orthoses Night splints may be as effective as casted orthoses at 12 weeks at reducing pain in people with plantar heel pain (very low-quality evidence).

For GRADE evaluation of interventions for plantar heel pain and fasciitis, see table, p 16 .

Benefits:

Night splint plus NSAIDs versus NSAIDs alone:
We found one systematic review (search date 2002, 1 RCT). [5] The RCT (116 people with recalcitrant heel pain) compared treatment with a night splint that dorsiflexed the ankle joint by 5°, worn nightly for 3 months, versus no night splint. All participants received ankle dorsiflexion exercises and an NSAID. The RCT found no significant difference in pain between night splinting and no splinting (RR 1.0, 95% CI 0.8 to 1.3). [26]

Night splint versus orthoses:
See benefits of casted orthoses (custom-made insoles), p 2 .

Harms:

The RCTs did not assess harms. [5] NSAIDs are associated with well-recognised adverse effects. See review on NSAIDs.

Comment:

The RCT only studied the most symptomatic foot in people with bilateral complaints, because of potential inconvenience and poor compliance from wearing two night splints simultaneously. [5]

OPTION STRETCHING EXERCISES

Pain relief

Compared with orthoses plus stretching exercises Stretching exercises alone are as effective as orthoses plus stretching exercises at 8 weeks at improving pain (moderate-quality evidence).

Compared with heel pad plus stretching exercises Stretching exercises alone are less effective at 8 weeks than a heel pad plus stretching exercises at improving symptoms of plantar heel pain (moderate-quality evidence).

Plantar fascia stretching plus a heel pad compared with Achilles tendon stretching plus a heel pad Plantar fascia stretching plus a heel pad may be more effective than Achilles tendon stretching plus a heel pad at reducing morning heel pain (first step pain) at 8 weeks in people with chronic proximal plantar fasciitis (low-quality evidence).

For GRADE evaluation of interventions for plantar heel pain and fasciitis, see table, p 16 .

Benefits:

Stretching exercises versus no treatment:
We found one systematic review (search date 2002), which found no RCTs. [5]

Stretching exercises versus orthoses plus stretching exercises:
We found one systematic review (search date 2002, 1 RCT, 236 people). [5] The RCT compared four treatments: stretching exercises alone (Achilles tendon stretching and plantar fascia stretching for 10 minutes twice daily); casted (custom-made) orthoses plus stretching exercises; and three types of heel pad (prefabricated shoe inserts made from either silicone or felt) plus stretching exercises. [9] The RCT found no significant difference in pain improvement at 8 weeks between stretching alone and orthoses plus stretching (pain measured by Foot Function Index Pain Subscale: OR 0.82, 95% CI 0.3 to 2.24; see comment below). [9] [5]

Stretching exercises versus heel pad plus stretching exercises:
We found one systematic review (search date 2002, 1 RCT). [5] The RCT (for details see Stretching exercises versus orthoses plus stretching exercises above) found that stretching plus heel pad (silicone, rubber, or felt insert) significantly improved symptoms at 8 weeks compared with stretching alone (40/42 [95%], 95% CI 83.8% to 99.4% with silicone insert *v* 38/43 [88%], 95% CI 74.9% to 96.1% with rubber insert *v* 34/42 [81%], 95% CI 65.9% to 91.4% with felt insert *v* 28/39 [72%], 95% CI 55.1% to 85.1% with stretching alone; results combined for all materials; P = 0.022). [9]

Plantar fascia stretching plus heel pad versus Achilles tendon stretching plus heel pad:
We found one RCT (101 people with chronic proximal plantar fasciitis for at least 10 months), which found that, after 8 weeks, plantar fascia stretching (held for a count of 10 and repeated 3 times daily) plus prefabricated full-length heel pads (soft insoles) reduced first-step pain after rest compared with Achilles tendon stretching (held for a count of 10 and repeated 3 times daily) plus prefabricated full-length soft insoles (change in pain subscale scores of the Foot Function Index from baseline

to 8 weeks: –31.1 with plantar fascia stretching *v* –13.2 with Achilles tendon stretching; P = 0.006). [27] The RCT did not report on adherence to either intervention. [27]

Harms: The RCTs did not report on harms. [9] [27]

Comment: Subgroup analysis in the RCT with five treatment arms found that, among people who stood for more than 8 hours daily, a greater reduction in pain was achieved with stretching alone than with customised orthoses plus stretching exercises. [9] It found no significant difference in people who stood for less than 8 hours daily. This hypothesis requires testing as the primary outcome in an RCT. Only half of the people in this subgroup analysis responded to the pain questionnaire.

OPTION SURGERY

We found no direct information about the effects of surgery in people with heel pain.

For GRADE evaluation of interventions for plantar heel pain and fasciitis, see table, p 16 .

Benefits: We found one systematic review (search date 2002), which identified no RCTs of surgery for heel pain. [5]

Harms: We found no RCTs.

Comment: The systematic review identified many observational studies of surgery for chronically painful heels. [5] One of the largest observational studies (76 people) compared postoperative complication rates after endoscopic fasciotomy versus traditional plantar fasciotomy. [28] It found that serious complications (recurrent pain, neuritis, and infection) were less common in people treated with endoscopic fasciotomy compared with traditional surgery (serious incidents per procedure: 11/66 [17%] with endoscopic fasciotomy *v* 9/26 [35%] with traditional surgery).

OPTION ULTRASOUND

Pain relief
Compared with sham ultrasound Ultrasound is no more effective at 4 weeks than sham ultrasound at reducing pain in people with bilateral heel pain (moderate-quality evidence).

For GRADE evaluation of interventions for plantar heel pain and fasciitis, see table, p 16 .

Benefits: **Ultrasound versus placebo:**
We found one systematic review (search date 2002), which identified one small RCT (19 people, 7 with bilateral heel pain). [5] It compared ultrasound (8 treatments in 4 weeks; dose 0.5 W/cm^2, pulsed 1:4, 3 MHz for 8 minutes) versus the same number of applications of sham ultrasound (only the timer on the machine was activated). Inclusion criteria was pain radiating from the medial tubercle of the calcaneum in response to both pressure and weight bearing first thing in the morning. It found no significant difference in pain between ultrasound and sham ultrasound (10 cm visual analogue scale; mean difference +0.1 cm, 95% CI –1.8 cm to +2.1 cm). [5]

Harms: The RCT did not assess harms. [5]

Comment: None.

GLOSSARY

Extracorporeal shock wave therapy (ESWT) Shock waves are pulsed acoustic waves that dissipate mechanical energy at the interface of two substances with different acoustic impedance.
Plantar fascia stretching A stretch achieved by crossing the affected leg over the other leg from a seated position, placing the fingers of the affected side across the base of the toes (distal to the metatarsal phalangeal joints), and pulling the toes back until a stretch in the arch of the foot can be felt.
Accommodative orthoses Full-length orthoses made of foam or rubber that offload high pressure areas under the foot.
Achilles tendon stretching A stretch achieved by either hanging the heel from a step while keeping the knee straight, or by leaning into the wall from a standing position with the affected leg placed behind the other leg.
Casted orthoses Orthoses fabricated by moulding a thermoplastic or thermomouldable foam material over an impression (or negative cast) of a person's foot.
Heel cups Prefabricated rubber or silicone heel pads that contour the heel, thus surrounding and supporting the fibro fatty heel pad.
Heel pads Padding underneath the heel that may be constructed from semicompressed felt, sponge foam, rubber, or silicone.

High-quality evidence Further research is very unlikely to change our confidence in the estimate of effect
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.
Prefabricated orthoses Orthoses which are already made to a pre-determined size and shape, and which can be used immediately as there is no lengthy fabrication process.
Very low-quality evidence Any estimate of effect is very uncertain.

SUBSTANTIVE CHANGES

Taping (low Dye or anti-pronatory taping) New option added. Two RCTs found. [23] [24] 'Taping (limited evidence of reduced pain at 1 week; no evidence beyond 1 week)' categorised as Likely to be beneficial.
Extracorporeal shock wave therapy (ESWT) Two RCTs added; [22] [21] benefits and harms data enhanced, categorisation unchanged (Unknown effectiveness).
Night splints One RCT added comparing night splints versus orthoses; [10] benefits and harms data enhanced, categorisation unchanged (Unknown effectiveness).
Casted orthoses Two RCTs added; [7] [10] benefits and harms data enhanced. Previous categorisation of Unknown effectiveness changed. 'Casted orthosis (custom-made insoles) (improved function [but not pain] at 3 months compared with sham orthosis, but no difference between casted [custom] orthosis and prefabricated orthosis at 3 months)' categorised as Likely to be beneficial.

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TABLE **GRADE evaluation of interventions for plantar heel pain and fasciitis**

Important outcomes	**Pain relief, functional improvement, quality of life, adverse effects**								
Number of studies (participants)	**Outcome**	**Comparison**	**Type of evidence**	**Quality**	**Consistency**	**Directness**	**Effect size**	**GRADE**	**Comment**
What are the effects of treatments for plantar heel pain?									
1 (91) [7]	Functional improvement	Casted orthoses *v* placebo/no treatment	4	–1	0	0	0	Moderate	Quality point deducted for sparse data
1 (91) [7]	Pain relief	Casted orthoses *v* placebo/no treatment	4	–1	0	0	0	Moderate	Quality point deducted for sparse data
1 (89) [7]	Pain relief	Casted orthoses *v* prefabricated orthoses	4	–1	0	0	0	Moderate	Quality point deducted for sparse data
1 (89) [7]	Functional improvement	Casted orthoses *v* prefabricated orthoses	4	–1	0	0	0	Moderate	Quality point deducted for sparse data
1 (103) [8]	Pain relief	Casted orthoses plus pad plus taping *v* heel pad plus pain medication	4	–2	0	0	0	Low	Quality points deducted for sparse data and no intention-to-treat analysis
1 (236) [9]	Pain relief	Casted orthoses plus stretching exercises *v* heel pad plus stretching exercises	4	–1	0	0	0	Moderate	Quality point deducted for incomplete reporting of results
1(222) [11]	Pain relief	Casted orthoses *v* night splints	4	–2	0	–1	0	Very low	Quality points deducted for incomplete reporting of results and uncertainty about intention-to-treat analysis. Directness points deducted for differences in withdrawal rates between groups
1 (43) [10]	Pain relief	Casted orthoses *v* orthosis plus night splints	4	–3	0	0	0	Very low	Quality points deducted for sparse data, incomplete reporting of results and lack of blinding
1 (91) [17]	Pain relief	Corticosteroid injection plus local anaesthesia *v* local anaesthetic (short term)	4	–3	0	–2	0	Very low	Quality points deducted for sparse data, lack of placebo controls, no intention-to-treat analysis and poor follow-up. Directness points deducted for uncertainty of clinical relevance and heterogeneity between interventions
2 (97) [18] [19]	Pain relief	Corticosteroid injection plus local anaesthesia *v* heel pad alone	4	–3	–1	–1	0	Very low	Quality points deducted for sparse data, lack of placebo controls, no intention-to-treat analysis and poor follow-up. Consistency point deducted for different results at different endpoints. Directness point deducted for heterogeneity between interventions
1 (80) [18]	Pain relief	Corticosteroid injection plus local anaesthesia *v* corticosteroid plus local anaesthetic plus heel pad	4	–3	0	–2	0	Very low	Quality points deducted for sparse data, lack of placebo controls, no intention-to-treat analysis and poor follow-up. Directness points deducted for uncertainty of clinical relevance and heterogeneity between interventions
1 (80) [18]	Pain relief	Corticosteroid injection plus local anaesthesia plus heel pad *v* heel pad	4	–3	0	–1	0	Very low	Quality points deducted for sparse data, lack of placebo controls, no intention-to-treat analysis and poor follow-up. Directness point deducted for heterogeneity between interventions

Important outcomes	Pain relief, functional improvement, quality of life, adverse effects								
Number of studies (participants)	Outcome	Comparison	Type of evidence	Quality	Consistency	Directness	Effect size	GRADE	Comment
1 (91) [17]	Pain relief	Corticosteroid injection plus local anaesthesia *v* local anaesthetic (medium term)	4	–3	0	–2	0	Very low	Quality points deducted for sparse data, lack of placebo controls, no intention-to-treat analysis and poor follow-up. Directness points deducted for uncertainty of clinical relevance and heterogeneity between interventions
1 (80) [18]	Pain relief	Corticosteroid injection plus local anaesthesia *v* heel pad alone	4	–3	0	–1	0	Very low	Quality points deducted for sparse data, lack of placebo controls, no intention-to-treat analysis and poor follow-up. Directness point deducted for heterogeneity between interventions
1 (80) [18]	Pain relief	Corticosteroid injection plus local anaesthesia *v* corticosteroid plus local anaesthetic plus heel pad	4	–3	–1	–2	0	Very low	Quality points deducted for sparse data, lack of placebo controls, no intention-to-treat analysis and poor follow-up. Consistency point deducted for different results at different endpoints. Directness points deducted for uncertainty of clinical relevance and heterogeneity between interventions
1 (103) [8]	Pain relief	Corticosteroid injection plus local anaesthesia plus NSAIDs *v* heel pad plus paracetamol	4	–3	0	–2	0	Very low	Quality points deducted for sparse data, lack of placebo controls, no intention-to-treat analysis and poor follow-up. Directness point deducted for heterogeneity between interventions
1 (103) [8]	Pain relief	Corticosteroid injection plus local anaesthesia plus NSAIDs *v* pad plus taping plus orthoses	4	–3	0	–2	0	Very low	Quality points deducted for sparse data, lack of placebo controls, no intention-to-treat analysis and poor follow-up. Directness point deducted for heterogeneity between interventions
8 (1183) [20] [21] [22]	Pain relief	Extracorporeal shock wave therapy *v* placebo	4	–1	–1	–1	0	Very low	Quality point deducted for incomplete reporting of results. Consistency point deducted for conflicting results. Directness point deducted for uncertainty of clinical relevance of effect
1 (32) [5]	Pain relief	Lasers *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 about outcome measured
2 (133) [23] [24]	Pain relief	Taping *v* placebo/no treatment	4	–1	0	0	0	Moderate	Quality point deducted for sparse data
1 (92) [23]	Functional improvement	Taping *v* placebo/no treatment	4	–1	0	0	0	Moderate	Quality point deducted for sparse data
1 (116) [26]	Pain relief	Night splints plus NSAIDs *v* NSAIDs	4	–2	0	0	0	Low	Quality points deducted for sparse data and incomplete reporting of results
1 (236) [9]	Pain relief	Stretching exercises *v* orthoses plus stretching exercises	4	–1	0	0	0	Moderate	Quality point deducted for incomplete reporting of results
1 (166) [9]	Pain relief	Stretching exercises *v* heel pad plus stretching exercises	4	–1	0	0	0	Moderate	Quality point deducted for sparse data
1 (101) [27]	Pain relief	Plantar fascia stretching plus heel pad *v* Achilles tendon stretching plus heel pad	4	–2	0	0	0	Low	Quality points deducted for sparse data and for not reporting treatment adherence rates

Important outcomes	Pain relief, functional improvement, quality of life, adverse effects								
Number of studies (participants)	**Outcome**	**Comparison**	**Type of evidence**	**Quality**	**Consistency**	**Directness**	**Effect size**	**GRADE**	**Comment**
1 (19) [5]	Pain relief	Ultrasound *v* sham ultrasound	4	–1	0	0	0	Moderate	Quality point deducted for sparse data

Type of evidence: 4 = RCT; 2 = Observational; 1 = Non-analytical/expert opinion. Consistency: similarity of results across studies
Directness: generaliseability of population or outcomes
Effect size: based on relative risk or odds ratio