ClinicalEvidence

Plantar heel pain and plantar fasciitis

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ABSTRACT

INTRODUCTION: Plantar heel pain, also known as plantar fasciitis, causes soreness or tenderness of the sole of the foot under the heel, which sometimes extends into the medial arch. Pain associated with the condition may cause substantial disability and poor health-related quality of life. The prevalence and prognosis are unclear, but the symptoms seem to resolve over time in most people. METHODS AND OUTCOMES: We conducted a systematic overview, aiming to answer the following clinical questions: What are the effects of conservative treatments for plantar heel pain? What are the effects of non-conservative treatments for plantar heel pain? We searched: Medline, Embase, The Cochrane Library and other important databases up to November 2013 (BMJ Clinical Evidence reviews are updated periodically, please check our website for the most up-to-date version of this review). RESULTS: At this update, searching of electronic databases retrieved 162 studies. After deduplication and removal of conference abstracts, 84 records were screened for inclusion in the overview. Appraisal of titles and abstracts led to the exclusion of 39 studies and the further review of 45 full articles. Of the 45 full articles evaluated, five systematic reviews and nine RCTs were included at this update. We performed a GRADE evaluation for 30 PICO combinations. CONCLUSIONS: In this systematic overview, we categorised the efficacy for 12 interventions based on information relating to the effectiveness and safety of corticosteroid injection alone (both short-term and longer-term effects), corticosteroid injections plus local anaesthetic injection (both short-term and longer-term effects), customised foot orthoses, extracorporeal shock wave therapy, heel pads and cups, local anaesthetic injection alone, night splints, stretching exercises, surgery, and taping.

QUESTIONS

INTERVENTIONS

CONSERVATIVE TREATMENTS

NON-CONSERVATIVE TREATMENTS

To be covered in future updates

Oral analgesics

Prevention of heel pain

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.

  Pain associated with the condition may cause substantial disability and poor health-related quality of life.

  Those affected can experience significant limitations in their activities of daily living, ability to exercise, and work-related activities.

  The prevalence and prognosis are unclear, but in most people the symptoms seem to resolve over time, although in some cases this can take years.

- Conservative treatments for plantar heel pain:

- Customised foot orthoses may be more effective than sham orthoses at improving function at up to 12 months in people with plantar heel pain, but we don't know whether they are more effective at reducing pain.

  Customised foot orthoses may be equally effective as prefabricated orthoses at reducing pain or improving function in people with plantar heel pain.

We don’t know whether customised foot orthoses (alone or with taping) are more effective than night splints at reducing pain or improving function or health-related quality of life in people with plantar heel pain as the evidence is weak.

- We don't know whether heel pads and heel cups are effective in people with plantar heel pain as we found no evidence from RCTs meeting our inclusion criteria.
- Taping may be more effective than no taping or sham taping at reducing pain in the short term (at 1 week) in people with plantar heel pain. However, we don’t know whether it is effective in the longer term or whether it is effective at improving function.
- We don't know whether stretching exercises are more effective than no treatment or taping at reducing pain or improving function in people with plantar heel pain as the evidence is weak and inconsistent.
- Non-conservative treatments for plantar heel pain:
- Corticosteroid injections may be more effective than placebo at reducing pain in the short term (4 and 6 weeks) in people with plantar heel pain, but we don’t know whether they are more effective at reducing pain in the longer term (8 and 12 weeks). However, this is based on weak evidence.

  We don’t know whether corticosteroid injections are more effective than placebo at improving function in the short or long term in people with plantar heel pain.

  We don't know whether corticosteroid injection plus local anaesthetic injection are more effective than local anaesthetic injections alone at reducing pain in the short or long term in people with plantar heel pain.

  There is limited evidence that ultrasound-guided corticosteroid injection may be more effective that palpation-guided corticosteroid injection.

  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. However, this is likely related to the solubility and duration of action of the corticosteroid being used.
- Extracorporeal shock wave therapy (ESTW) may be more effective than placebo at reducing pain at 12 weeks in people with chronic heel pain, but this is based on limited evidence.

  We don’t know how low-dose ESWT compares with high-dose ESWT or how ESWT (with or without local anaesthetic injections) compares with corticosteroid injection plus local anaesthetic injection, as the evidence is weak.
- Surgery with endoscopic plantar fasciotomy (partial release) may be equally effective as ESWT at reducing pain and improving function at 1 year in adults with recalcitrant heel pain, but this is based on weak evidence.

Clinical context

GENERAL BACKGROUND

Plantar heel pain, also known as plantar fasciitis, causes soreness or tenderness of the sole of the foot under the heel, which sometimes extends into the medial arch. Pain associated with the condition may cause substantial disability and poor health-related quality of life. Those affected can also have significant limitations in activities of daily living, ability to exercise, and work-related activities. The prevalence and prognosis are unclear, but the symptoms seem to resolve over time in most people.

FOCUS OF THE REVIEW

In this overview, we look at commonly used conservative and non-conservative interventions that patients may receive.

COMMENTS ON EVIDENCE

This overview contributes to the evidence base for treating plantar heel pain by providing a summary of evidence that is of high quality. Importantly, many weak studies have been filtered out by our inclusion criteria, ensuring that estimates of treatment effectiveness and adverse effects are as accurate as possible.

SEARCH AND APPRAISAL SUMMARY

The update literature search for this overview was carried out from the date of the last search, January 2007, to November 2013. For more information on the electronic databases searched and criteria applied during assessment of studies for potential relevance to the overview, please see the Methods section. Searching of electronic databases retrieved 162 studies. After deduplication and removal of conference abstracts, 84 records were screened for inclusion in the overview. Appraisal of titles and abstracts led to the exclusion of 39 studies and the further review of 45 full articles. Of the 45 full articles evaluated, five systematic reviews and nine RCTs were included at this update.

ADDITIONAL INFORMATION

Plantar heel pain and plantar fasciitis

The condition has for many years been known as 'plantar fasciitis', but there was a move away from this name about 10 years ago because research indicated that it wasn't an inflammatory condition. Hence, the term 'plantar fasciosis' was suggested, which means 'degeneration' of the plantar fascia. Since then, some authors have also referred to it as 'plantar fasciopathy', which simply means pathology of the plantar fascia. However, recent imaging studies are increasingly demonstrating that the condition affects more than just the plantar fascia (e.g., the heel bone and surrounding tissues), so the general term 'plantar heel pain' is more appropriate. Medical imaging may subsequently allow use of specific terms that relate to the tissues/structures involved (e.g., delamination of the plantar fascia, a tear of the plantar fascia, bone marrow oedema of the calcaneus).

DEFINITION

Plantar heel pain, also known as plantar fasciitis, 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 calcaneus, but may extend along the plantar fascia into the medial longitudinal arch of the foot. Severity may range from tenderness at the origin of the plantar fascia, which is noticeable on rising after rest, to an incapacitating pain. This overview excludes clinically evident underlying disorders (e.g., calcaneal fracture and 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']). The condition has for many years been known as 'plantar fasciitis', but there was a move away from this name about 10 years ago because research indicated that it was not an inflammatory condition, particularly in its chronic form. As a result of this research, the term 'plantar fasciosis' was suggested, which means 'degeneration' of the plantar fascia. Since then, some authors have also referred to the condition as 'plantar fasciopathy', which simply means pathology of the plantar fascia. However, recent imaging studies are increasingly demonstrating that the condition affects more than just the plantar fascia (e.g., the heel bone and surrounding tissues), so the general term 'plantar heel pain' is more appropriate. Medical imaging may subsequently allow use of specific terms that relate to the tissues/structures involved (e.g., delamination of the plantar fascia, a tear of the plantar fascia, bone marrow oedema of the calcaneus). In this overview we have used the term 'plantar heel pain'; although, when referring to particular studies we have used the authors' terminology

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 in the US report tenderness in the region of the heel, [1] and that plantar heel pain accounts for a quarter of all foot injuries relating to running. [2] In the North West Adelaide Health Study, [3] a population-based study of 3206 people aged 20 years or older, about 4% of the sample indicated that they had pain underneath their heel. A further study from the UK that collected data from 12 primary care settings found that plantar fasciitis accounted for about 8% of musculoskeletal foot and ankle consultations in general practice. [4] In the US from 1995 to 2000, the diagnosis and treatment of plantar heel pain accounted for more than 1 million visits per year to physicians. [5] The condition affects both athletic and sedentary people, and does not seem to be influenced by sex.

AETIOLOGY/ RISK FACTORS

Aetiology is largely unknown. Suggested risk factors include being overweight, older age, prolonged standing, and having a reduced range of motion in the ankle and first metatarsophalangeal joint. [6] A pronated foot posture has also been linked with the condition, but this has not been consistently found to be a risk factor. [7] [8] [9]

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. [10] 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. [11] Thirty-one people said that they would have seriously considered surgical treatment at the time that medical attention was sought. In addition, one RCT has observed marked improvement in pain and function over time in 45 people with plantar fasciitis who were randomised to a sham intervention. [12] Notwithstanding these findings, some people who have plantar heel pain can experience pain and disability for long periods (i.e., years), and these cases are frustrating to treat both from the patient's and practitioner's perspective.

AIMS OF INTERVENTION

To reduce pain and disability, with minimal adverse effects.

OUTCOMES

Pain reduction (often measured using visual analogue scales); **improvement in function** (e.g., walking distance); **health-related quality of life**; **adverse effects**.

METHODS

Search strategy *BMJ Clinical Evidence* search and appraisal November 2013. Databases used to identify studies for this systematic review include: Medline 1966 to November 2013, Embase 1980 to November 2013, The Cochrane Database of Systematic Reviews 2013, Issue 10, the

Database of Abstracts of Reviews of Effects (DARE), and the Health Technology Assessment (HTA) database. **Inclusion criteria** Study design criteria for evaluation in this review were systematic reviews and RCTs published in English, at least single-blinded, and containing more than 20 individuals (10 in each arm), of whom more than 80% were followed up. There was no minimum length of follow-up. We excluded all studies described as 'open', 'open label', or not blinded unless blinding was impossible. *BMJ Clinical Evidence* does not necessarily report every study found (e.g., every systematic review). Rather, we report the most recent, relevant and comprehensive studies identified through an agreed process involving our evidence team, editorial team, and expert contributors. **Evidence evaluation** A systematic literature search was conducted by our evidence team, who then assessed titles and abstracts, and finally selected articles for full text appraisal against inclusion and exclusion criteria agreed a priori with our expert contributors. In consultation with the expert contributors, studies were selected for inclusion and all data relevant to this overview extracted into the benefits and harms section of the overview. In addition, information that did not meet our predefined criteria for inclusion in the benefits and harms section, may have been reported in the 'Further information on studies' or 'Comment' section. **Adverse effects** All serious adverse effects, or those adverse effects reported as statistically significant, were included in the harms section of the overview. Pre-specified adverse effects identified as being clinically important were also reported, even if the results were not statistically significant. Although *BMJ Clinical Evidence* presents data on selected adverse effects reported in included studies, it is not meant to be, and cannot be, a comprehensive list of all adverse effects, contraindications, or interactions of included drugs or interventions. A reliable national or local drug database must be consulted for this information. **Comment and Clinical guide sections** In the Comment section of each intervention, our expert contributors may have provided additional comment and analysis of the evidence, which may include additional studies (over and above those identified via our systematic search) by way of background data or supporting information. As *BMJ Clinical Evidence* does not systematically search for studies reported in the Comment section, we cannot guarantee the completeness of the studies listed there or the robustness of methods. Our expert contributors add clinical context and interpretation to the Clinical guide sections where appropriate. **Data and quality** To aid readability of the numerical data in our overviews, we round many percentages to the nearest whole number. Mean differences taken from systematic reviews may be taken from raw data from an RCT and, as a consequence, may not exactly reflect the actual mean differences reported in that RCT if the authors of the RCT employed any adjustment (e.g., ANCOVA) when calculating between-group differences. Readers should be aware of this when relating percentages to summary statistics such as relative risks (RRs) and odds ratios (ORs). *BMJ Clinical Evidence* does not report all methodological details of included studies. Rather, it reports by exception any methodological issue or more general issue that may affect the weight a reader may put on an individual study, or the generalisability of the result. These issues may be reflected in the overall GRADE analysis. We have performed a GRADE evaluation of the quality of evidence for interventions included in this review (see table, p 44). The categorisation of the quality of the evidence (high, moderate, low, or very low) reflects the quality of evidence available for our chosen outcomes in our defined populations of interest. These categorisations are not necessarily a reflection of the overall methodological quality of any individual study, because the Clinical Evidence population and outcome of choice may represent only a small subset of the total outcomes reported, and population included, in any individual trial. For further details of how we perform the GRADE evaluation and the scoring system we use, please see our website (www.clinicalevidence.com).

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

OPTION CUSTOMISED FOOT ORTHOSES

- For GRADE evaluation of interventions for Plantar heel pain and plantar fasciitis, see table, p 44 .
- Customised foot orthoses may be more effective than sham orthoses at improving function in people with plantar heel pain, but we don't know whether they are more effective at reducing pain.
- Customised foot orthoses and prefabricated orthoses may be equally effective at reducing pain or improving function in people with plantar heel pain.
- We don't know whether customised foot orthoses (alone or with taping) are more effective than night splints at reducing pain, improving function, or improving health-related quality of life in people with plantar heel pain as the evidence is weak.

Benefits and harms

Customised foot orthoses versus placebo/sham or no treatment:

We found one systematic review (search date 2007), [13] that identified one RCT comparing customised foot orthoses with sham orthoses in people with plantar fasciitis. [12]

Pain relief

Customised foot orthoses compared with placebo/sham or no treatment We don't know whether customised orthoses are more effective than sham orthoses at relieving pain (assessed using the Foot Health Status Questionnaire) at 3 and 12 months in people with plantar fasciitis (low-quality evidence).

Ref (type)	Population	Outcome, Interventions	Results and statistical analysis	Effect size	Favours
Pain relief					
[13] Systematic review	135 people with painful plantar fasciitis and with symptoms for at least 4 weeks Data from 1 RCT	**Mean foot pain (assessed using the Foot Health Status Questionnaire, pain domain) , 3 months** 23.4 with customised orthoses 18.3 with sham orthoses 89 people in this analysis 3-armed trial; the remaining arm evaluated prefabricated orthoses	MD +5.15 95% CI –5.19 to +15.39	⟷	Not significant
[13] Systematic review	135 people with painful plantar fasciitis and with symptoms for at least 4 weeks Data from 1 RCT	**Mean foot pain (assessed using the Foot Health Status Questionnaire, pain domain) , 12 months** 34.7 with customised orthoses 37.2 with sham orthoses 88 people in this analysis 3-armed trial; the remaining arm evaluated prefabricated orthoses	MD –2.50 95% CI –12.55 to +7.55	⟷	Not significant

Functional improvement

Customised foot orthoses compared with placebo/sham or no treatment Customised orthoses may be more effective than sham orthoses at improving function (assessed using the Foot Health Status Questionnaire) at 3 and 12 months in people with plantar fasciitis (low-quality evidence).

Ref (type)	Population	Outcome, Interventions	Results and statistical analysis	Effect size	Favours
Functional improvement					
[13] Systematic review	135 people with painful plantar fasciitis and with symptoms for at least 4 weeks Data from 1 RCT	**Mean function (assessed using the Foot Health Status Questionnaire) , 3 months** 21.9 with customised orthoses 11.5 with sham orthoses 89 people in this analysis 3-armed trial; the remaining arm evaluated prefabricated orthoses	MD 10.40 95% CI 2.43 to 18.37	○○○	custom-made orthoses
[13] Systematic review	135 people with painful plantar fasciitis and with symptoms for at least 4 weeks Data from 1 RCT	**Mean function (assessed using the Foot Health Status Questionnaire) , 12 months** 30.0 with customised orthoses 19.6 with sham orthoses 88 people in this analysis 3-armed trial; the remaining arm evaluated prefabricated orthoses	MD 10.40 95% CI 2.43 to 18.37	○○○	custom-made orthoses

Health-related quality of life

No data from the following reference on this outcome. [13]

Adverse effects

No data from the following reference on this outcome. [13]

Customised foot orthoses versus prefabricated orthoses:

We found one systematic review (search date 2007), [13] which identified one RCT meeting *BMJ Clinical Evidence* inclusion criteria comparing customised orthoses with prefabricated orthoses in people with plantar fasciitis. [12] We found one subsequent RCT evaluating pain relief with customised orthoses versus prefabricated orthoses in adults with plantar fasciitis (see Further information on studies). [14]

Pain relief

Customised foot orthoses compared with prefabricated orthoses Customised orthoses may be no more effective than prefabricated orthoses at reducing pain at up to 12 months in people with plantar fasciitis (low-quality evidence).

Ref (type)	Population	Outcome, Interventions	Results and statistical analysis	Effect size	Favours
Pain relief					
[13] Systematic review	135 people with painful plantar fasciitis and with symptoms for at least 4 weeks Data from 1 RCT	**Mean foot pain (assessed using the Foot Health Status Questionnaire) , 3 months** 23.4 with customised orthoses 29.3 with prefabricated orthoses 89 people in this analysis 3-armed trial; the remaining arm evaluated sham orthoses	SMD –0.21 95% CI –0.63 to +0.20 P = 0.31	⟷	Not significant
[13] Systematic review	135 people with painful plantar fasciitis and with symptoms for at least 4 weeks Data from 1 RCT	**Mean foot pain (assessed using the Foot Health Status Questionnaire) , 12 months** 34.7 with customised orthoses 41.7 with prefabricated orthoses 88 people in this analysis 3-armed trial; the remaining arm evaluated sham orthoses	MD –7.00 95% CI –17.2 to +3.2	⟷	Not significant
[14] RCT	142 adults with plantar fasciitis	**Difference from baseline in mean pain score (assessed using a modified subscale of the Foot Function Index; scores ranging from 0–100 with high scores indicating greater pain) , 4 weeks** –24.7 with customised orthoses –20.1 with prefabricated orthoses 117 people in this analysis All orthoses were made from low-cost foam (ethylene vinyl acetate)	MD +4.0 95% CI –4.2 to +12.3 P = 0.337 Adjusted for baseline values by ANCOVA	⟷	Not significant
[14] RCT	142 adults with plantar fasciitis	**Difference from baseline in mean pain score (assessed using a modified subscale of the Foot Function Index; scores ranging from 0–100 with high scores indicating greater pain) , 8 weeks**	MD +3.9 95% CI –4.6 to +12.5 P = 0.363 Adjusted for baseline values by ANCOVA	⟷	Not significant

Ref (type)	Population	Outcome, Interventions	Results and statistical analysis	Effect size	Favours
		–29.4 with customised orthoses –23.2 with prefabricated orthoses 105 people in this analysis All orthoses were made from low-cost foam (ethylene vinyl acetate)			

Functional improvement

Customised foot orthoses compared with prefabricated orthoses Customised orthoses may be no more effective than prefabricated orthoses at improving function at 3 and 12 months in people with plantar fasciitis; however, the evidence is limited (low-quality evidence).

Ref (type)	Population	Outcome, Interventions	Results and statistical analysis	Effect size	Favours
Functional improvement					
[13] Systematic review	135 people with painful plantar fasciitis and with symptoms for at least 4 weeks Data from 1 RCT	**Mean function (assessed using the Foot Health Status Questionnaire) , 3 months** 21.9 with customised orthoses 25.7 with prefabricated orthoses 89 people in this analysis 3-armed trial; the remaining arm evaluated sham orthoses	MD –3.80 95% CI –13.42 to +5.82	⟷	Not significant
[13] Systematic review	135 people with painful plantar fasciitis and with symptoms for at least 4 weeks Data from 1 RCT	**Mean function (assessed using the Foot Health Status Questionnaire) , 12 months** 30.0 with customised orthoses 33.4 with prefabricated orthoses 88 people in this analysis 3-armed trial; the remaining arm evaluated sham orthoses	MD –3.40 95% CI –13.44 to +6.64	⟷	Not significant

No data from the following reference on this outcome. [14]

Health-related quality of life

No data from the following reference on this outcome. [13] [14]

Adverse effects

No data from the following reference on this outcome. [13] [14]

Customised foot orthoses versus night splints:

We found one systematic review (search date 2007), [13] which identified one RCT meeting *BMJ Clinical Evidence* inclusion criteria comparing the effects of customised orthoses with night splints in people with plantar fasciitis. [15]

Pain relief

Customised foot orthoses compared with night splints We don't know whether customised orthoses are more effective than night splints at reducing pain at 6 and 12 weeks in people with plantar fasciitis (low-quality evidence).

Ref (type)	Population	Outcome, Interventions	Results and statistical analysis	Effect size	Favours
Pain relief					
[13] Systematic review	43 people with plantar fasciitis Data from 1 RCT	**Foot pain (assessed using Foot and Ankle Outcome score, pain scale; a normalised score is calculated from 0–100, with 100 = no symptoms and 0 = extreme symptoms) , 6 weeks** 14.93 with customised orthoses 15.82 with night splints 25 people in this analysis 3-armed trial; remaining arm evaluated customised orthoses plus night splints	MD –0.89 95% CI –14.51 to +12.73 P value not reported See Further information on studies	⟷	Not significant
[13] Systematic review	43 people with plantar fasciitis Data from 1 RCT	**Foot pain (assessed using Foot and Ankle Outcome score, pain scale; a normalised score is calculated from 0–100, with 100 = no symptoms and 0 = extreme symptoms) , 12 weeks** 76 with customised orthoses 70 with night splints 23 people in this analysis 3-armed trial; remaining arm evaluated customised orthoses plus night splints There was no between-group difference in compliance	MD +6.00 95% CI –12.72 to +24.72 P value not reported See Further information on studies	⟷	Not significant

Functional improvement

Customised foot orthoses compared with night splints We don't know whether customised orthoses are more effective than night splints at improving function or reducing disability at 6 and 12 weeks in people with plantar fasciitis (low-quality evidence).

Ref (type)	Population	Outcome, Interventions	Results and statistical analysis	Effect size	Favours
Functional improvement					
[13] Systematic review	43 people with plantar fasciitis Data from 1 RCT	**Function (assessed using Foot and Ankle Outcome score, sport and recreation subscale) , 6 weeks** 6.21 with customised orthoses 21.22 with night splints 25 people in this analysis Note: these values are not comparable with those reported at 12 weeks, as these data are based on mean differences while those below are based on actual values 3-armed trial; remaining arm evaluated customised orthoses plus night splints	MD –15.01 95% CI –34.78 to +4.76 P value not reported See Further information on studies	⟷	Not significant

Ref (type)	Population	Outcome, Interventions	Results and statistical analysis	Effect size	Favours
[13] Systematic review	43 people with plantar fasciitis Data from 1 RCT	**Function (assessed using Foot and Ankle Outcome score, sport and recreation subscale) , 12 weeks** 62 with customised orthoses 63 with night splints 23 people in this analysis There was no between-group difference in compliance 3-armed trial; remaining arm evaluated customised orthoses plus night splints	MD –1.00 95% CI –24.38 to +22.38 P value not reported See Further information on studies	⟷	Not significant
Disability					
[13] Systematic review	43 people with plantar fasciitis Data from 1 RCT	**Disability (assessed using Foot and Ankle Outcome score, activities of daily living subscale) , 6 weeks** 13.21 with customised orthoses 12.16 with night splints 25 people in this analysis Note: these values are not comparable with those reported at 12 weeks, as these data are based on mean differences while those below are based on actual values 3-armed trial; remaining arm evaluated customised orthoses plus night splints	MD +1.05 95% CI –14.64 to +16.74 P value not reported See Further information on studies	⟷	Not significant
[13] Systematic review	43 people with plantar fasciitis Data from 1 RCT	**Disability (assessed using Foot and Ankle Outcome score, activities of daily living subscale) , 12 weeks** 76 with customised orthoses 75 with night splints 23 people in this analysis There was no between-group difference in compliance 3-armed trial; remaining arm evaluated customised orthoses plus night splints	MD +1.00 95% CI –16.54 to +18.54 P value not reported See Further information on studies	⟷	Not significant

Health-related quality of life

Customised foot orthoses compared with night splints We don't know whether customised orthoses are more effective than night splints at improving health-related quality of life at 6 and 12 weeks in people with plantar fasciitis (low-quality evidence).

Ref (type)	Population	Outcome, Interventions	Results and statistical analysis	Effect size	Favours
Quality of life					
[13] Systematic review	43 people with plantar fasciitis Data from 1 RCT	**Quality of life (assessed using Foot and Ankle Outcome, quality of life subscale) , 6 weeks** 3.98 with customised orthoses 9.97 with night splints 25 people in this analysis	MD –5.99 95% CI –23.69 to +11.71 P value not reported See Further information on studies	⟷	Not significant

Ref (type)	Population	Outcome, Interventions	Results and statistical analysis	Effect size	Favours
		Note: these values are not comparable with those reported at 12 weeks, as these data are based on mean differences while those below are based on actual values 3-armed trial; remaining arm evaluated customised orthoses plus night splints			
[13] Systematic review	43 people with plantar fasciitis Data from 1 RCT	**Quality of life (assessed using Foot and Ankle Outcome, quality of life subscale) , 12 weeks** 55 with customised orthoses 46 with night splints 23 people in this analysis There was no between-group difference in compliance 3-armed trial; remaining arm evaluated customised orthoses plus night splints	MD +9.00 95% CI –11.35 to +29.35 P value not reported See Further information on studies	⟷	Not significant

Adverse effects

Ref (type)	Population	Outcome, Interventions	Results and statistical analysis	Effect size	Favours
Adverse effects					
[13] Systematic review	43 people with plantar fasciitis Data from 1 RCT	**Adverse effects , 6 weeks** 3/13 (23%) with customised orthoses 9/15 (60%) with night splints Adverse effects reported in the customised orthoses group included pressure-related pain and tiredness of the foot; adverse effects reported in the night splints group included pressure, pain, and sleep disturbance 3-armed trial; remaining arm evaluated customised orthoses plus night splints	RR 0.38 95% CI 0.13 to 1.13 P value not reported See Further information on studies	⟷	Not significant
[13] Systematic review	43 people with plantar fasciitis Data from 1 RCT	**Adverse effects , 12 weeks** 1/9 (11%) with customised orthoses 5/14 (36%) with night splints Adverse effects reported in the customised orthoses group included pressure-related pain and tiredness of the foot; adverse effects reported in the night splints group included pressure, pain, and sleep disturbance There was no between-group difference in compliance. 3-armed trial; remaining arm evaluated customised orthoses plus night splints	RR 0.31 95% CI 0.04 to 2.25 P value not reported See Further information on studies	⟷	Not significant

Customised orthoses plus taping versus night splints:

We found one systematic review (search date 2007), [16] that identified one RCT [17] evaluating customised orthoses plus taping compared with night splints in people with plantar fasciitis.

Pain relief

Customised orthoses plus taping compared with night splints We don't know whether custom-made orthoses plus taping are more effective than night splints in reducing pain at 12 weeks in people with plantar fasciitis (very low-quality evidence).

Ref (type)	Population	Outcome, Interventions	Results and statistical analysis	Effect size	Favours
Pain relief					
[16] Systematic review	255 people with plantar fasciitis Data from 1 RCT	**Daily discomfort (assessed using visual analogue scale ranging from 0–10) , 12 weeks** with custom-made orthoses plus low-Dye tape with posterior tension night splint Absolute results not reported 170 people in this analysis 3-armed trial; the third arm evaluated over-the-counter arch supports plus low-Dye tape	Reported as not significant P value not reported See Further information on studies		
[16] Systematic review	255 people with plantar fasciitis Data from 1 RCT	**First-step pain (assessed using visual analogue scale ranging from 0–10) , 12 weeks** with custom-made orthoses plus low-Dye tape with posterior tension night splint Absolute results not reported 170 people in this analysis 3-armed trial; the third arm evaluated over-the-counter arch supports plus low-Dye tape	Reported as not significant P value not reported See Further information on studies		

Functional improvement

No data from the following reference on this outcome. [16]

Health-related quality of life

No data from the following reference on this outcome. [16]

Adverse effects

No data from the following reference on this outcome. [16]

Further information on studies

[13] The systematic review reported that none of the included trials blinded the investigator (i.e., therapist). However, the review did highlight that investigator blinding in RCTs assessing orthoses would be difficult to achieve, as the investigator would need to fit the orthoses and they would easily be able to differentiate between the different interventions. This is different to assessor blinding, which should be able to be achieved. In one RCT comparing custom-made orthoses with sham orthoses, [12] the study protocol stipulated that other treatments, such as anti-inflammatory drugs or corticosteroid injections, were not permitted. Although some participants broke protocol and took other interventions, there was no significant difference between the two groups at 3 months (4% *v* 9%; RR 0.65, 95% CI 0.11 to 3.71) or 12 months (18% *v* 26%; RR 0.69, 95% CI 0.31 to 1.56) in the proportion of participants self-reporting this break in protocol.

[14] Participants in this RCT were permitted to use a co-intervention, if required. Co-interventions were used by 67% of participants; the majority (40%) carrying out stretching exercises for the Achilles' tendon, and the remainder (28%) using, for example, ice and anti-inflammatory treatment. The RCT reported that there were no differences between the groups in use of co-intervention, but it was highlighted as a potential confounding factor.

[16] The RCT reported by the systematic review did not blind participants to treatment, and treatment allocation was not concealed. The dropout rate was 62/255 (24%) overall; no breakdown of attrition per arm was reported.

Comment: We found one RCT comparing heel pads with casted (custom-made) orthoses. [18] However, there was a significant difference in mean weight between the groups at baseline (8.6 kg) and weight is associated with plantar heel pain. This makes the results difficult to interpret, unless the investigators adjusted for weight (e.g., in an ANCOVA analysis), which they did not.

Clinical guide

Although the evidence is of low quality, it appears that customised foot orthoses are likely to be beneficial in the short and medium term. However, appropriate prefabricated foot orthoses (that are contoured to the heel and arch of the foot) appear to be as beneficial as customised foot orthoses, so prefabricated foot orthoses should be used first, unless a patient specifically requires a customised orthosis due to abnormal foot structure or function. In addition, customised foot orthoses may be as beneficial as night splints, but the evidence is of low quality. Night splints are also associated with a high frequency of adverse effects, so care is needed with their use. Accordingly, it is recommended that foot orthoses should be prescribed first, before night splints.

OPTION HEEL PADS AND HEEL CUPS

- For GRADE evaluation of interventions for Plantar heel pain and plantar fasciitis, see table, p 44 .
- We found no direct evidence from RCTs on the effectiveness of heel pads and heel cups in people with plantar heel pain.

Benefits and harms

Heel pads and heel cups versus placebo/sham or no treatment:

We found no RCTs or systematic reviews evaluating heel pads and heel cups compared with placebo or no treatment in people with plantar heel pain.

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 RCT comparing heel pads with orthoses, but the results were difficult to interpret. See Comment on Customised foot orthoses, p 4 . [18]

OPTION NIGHT SPLINTS

- For GRADE evaluation of interventions for Plantar heel pain and plantar fasciitis, see table, p 44 .

- We don't know how night splints compare with customised orthoses (alone or with taping) at reducing pain, improving function, or improving health-related quality of life in people with plantar heel pain as the evidence is weak.

Benefits and harms

Night splints versus customised foot orthoses:

See option on Customised foot orthoses, p 4 .

Night splints versus customised foot orthoses plus taping:

See option on Customised foot orthoses, p 4 .

Comment: **Clinical guide**

Night splints are occasionally used for plantar heel pain, particularly in cases that are resistant to other conservative treatment. Night splints may be as beneficial as customised foot orthoses, but the evidence is of low quality. Night splints are also associated with a high frequency of adverse effects, such as sleep disturbance, so care is needed with their use. Accordingly, it is recommended that foot orthoses and taping should be used first before night splints.

OPTION STRETCHING EXERCISES

- For GRADE evaluation of interventions for Plantar heel pain and plantar fasciitis, see table, p 44 .
- We don't know whether stretching exercises are more effective than no treatment or taping at reducing pain or improving function in people with plantar heel pain, as the evidence is weak and inconsistent.

Benefits and harms

Stretching exercises versus placebo or no treatment:

We found one systematic review (search date 2010), [19] which identified two RCTs evaluating stretching exercises compared with no treatment in people with plantar fasciitis. [20] [21] The review did not present the between-group results from the RCTs in full; therefore, we have reported directly from the RCTs where appropriate.

Pain relief

Stretching exercises compared with placebo or no treatment We don't know whether stretching exercises are more effective than no treatment at reducing pain at 1 and 2 weeks in people with plantar heel pain (very low-quality evidence).

Ref (type)	Population	Outcome, Interventions	Results and statistical analysis	Effect size	Favours
Pain relief					
[19] Systematic review	41 people with plantar heel pain Data from 1 RCT	**Change in mean pain from baseline (assessed using 10-point visual analogue scale, where 0 = no pain) , 1 week** –1.7 with non-weight-bearing stretching (gastrocnemius/soleus plantar fascia by therapist; 30 seconds, 3 reps on days 1 and 4) –0.1 with no treatment 20 people included in this analysis The differences reported were either calculated by the authors	P = 0.026	○○○	stretching

Ref (type)	Population	Outcome, Interventions	Results and statistical analysis	Effect size	Favours
		of the review or estimated from charts 4-armed trial; the remaining arms evaluated calcaneal taping and sham taping			
[19] Systematic review	92 people with plantar heel pain Data from 1 RCT	**Change in mean first-step pain from baseline (assessed using 100 mm visual analogue scale, where 0 = no pain) , 2 weeks** –19.8 with weight-bearing stretching (calf muscle stretching on step for 5 minutes daily by participant) –13.2 with no treatment Both groups received sham ultra-sound	MD –7.9 mm 95% CI –18.3 mm to +2.6 mm P = 0.138 Adjusted for baseline values by ANCOVA Statistics reported from original RCT [21]	⟷	Not significant

Functional improvement

Stretching exercises compared with placebo or no treatment We don't know whether stretching exercises are more effective than no treatment at improving function at 1 and 2 weeks in people with plantar heel pain (very low-quality evidence).

Ref (type)	Population	Outcome, Interventions	Results and statistical analysis	Effect size	Favours
Functional improvement					
[19] Systematic review	41 people with plantar heel pain	**Change in mean function score from baseline (assessed using Patient Specific Score, where 10 = full function) , 1 week** –0.7 with non-weight-bearing stretching (gastrocnemius/soleus plantar fascia by therapist; 30 seconds, 3 reps on days 1 and 4) –0.5 with no treatment 20 people included in this analy-sis The differences reported were either calculated by the authors of the review or estimated from charts 4-armed trial; the remaining arms evaluated calcaneal taping and sham taping	Significance not assessed		
[19] Systematic review	92 people with plantar heel pain Data from 1 RCT	**Change in mean first-step pain from baseline (assessed using 100 mm visual analogue scale, where 0 = no pain) , 2 weeks** 16.2 with weight-bearing stretch-ing (calf muscle stretching on step for 5 minutes daily by partic-ipant) 8.3 with no treatment Both groups received sham ultra-sound	MD +7.3 mm 95% CI –0.1 mm to +14.8 mm P = 0.052 Adjusted for baseline values by ANCOVA Statistics reported from original RCT [21]	⟷	Not significant

Health-related quality of life

No data from the following reference on this outcome. [19]

Adverse effects

No data from the following reference on this outcome. [19]

Stretching exercises versus taping:

We found one systematic review (search date 2010), [19] which identified one small RCT evaluating non-weight-bearing stretching exercises compared with calcaneal taping in people with plantar heel pain. [20]

Pain relief

Stretching exercises compared with taping We don't know whether non-weight-bearing stretching exercises are more effective than calcaneal taping at reducing pain at 1 week in people with plantar heel pain as the evidence is from a small RCT (low-quality evidence).

Ref (type)	Population	Outcome, Interventions	Results and statistical analysis	Effect size	Favours
Pain relief					
[19] Systematic review	41 people with plantar heel pain Data from 1 RCT	**Change in mean pain from baseline (assessed using 10-point visual analogue scale, where 0 = no pain) , 1 week** –1.7 with non-weight-bearing stretching (gastrocnemius/soleus plantar fascia by therapist; 30 seconds, 3 reps on days 1 and 4) –4.3 with calcaneal taping 21 people in this analysis 4-armed trial; the remaining arms evaluated no treatment and sham taping The differences reported were either calculated by the authors of the review or estimated from charts	P = 0.006	○○○	calcaneal taping

Functional improvement

Stretching exercises compared with taping We don't know how non-weight-bearing stretching exercises and calcaneal taping compare in improving function at 1 week in people with plantar heel pain (low-quality evidence).

Ref (type)	Population	Outcome, Interventions	Results and statistical analysis	Effect size	Favours
Functional improvement					
[19] Systematic review	41 people with plantar heel pain Data from 1 RCT	**Change in mean function from baseline (assessed using Patient Specific Score, where 10 = full function) , 1 week** –0.7 with non-weight-bearing stretching (gastrocnemius/soleus plantar fascia by therapist; 30 seconds, 3 reps on days 1 and 4) +1.7 with calcaneal taping	P = 0.078	⟷	Not significant

Ref (type)	Population	Outcome, Interventions	Results and statistical analysis	Effect size	Favours
		21 people in this analysis 4-armed trial; the remaining arms evaluated no treatment and sham taping The differences reported were either calculated by the authors of the review or estimated from charts			

Health-related quality of life

No data from the following reference on this outcome. [19]

Adverse effects

No data from the following reference on this outcome. [19]

Comment: We found one unblinded 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). [22] The RCT did not report on adherence to either intervention or on harms. [22]

Clinical guide
Although stretching is commonly used in practice, the evidence for it is weak and inconsistent. Essentially, we don't know whether stretching exercises are more effective than no treatment or taping at reducing pain or improving function in people with plantar heel pain. Stretching may also be associated with some adverse effects, such as muscle pain; however, these are generally short-lived. Nevertheless, because stretching has no cost to a patient, other than the time taken to do it, it can still be recommended for plantar heel pain under the proviso that patients are made aware that we don't know if it is effective and that there may be some adverse effects.

OPTION TAPING (LOW-DYE OR ANTIPRONATORY TAPING)

- For GRADE evaluation of interventions for Plantar heel pain and plantar fasciitis, see table, p 44 .
- Taping may be more effective than no taping or sham taping at reducing pain in the short term (at 1 week) in people with plantar heel pain or fasciitis. However, we don't know whether it is effective in the longer term, or whether it is effective at improving function.

Benefits and harms

Taping versus placebo/sham or no treatment:

We found one systematic review (search date 2007), [16] that identified two RCTs comparing taping in the short term (1 week) with no treatment or sham taping in people with plantar fasciitis. [23] [20] The review did not present the results from the RCTs in full, nor did it perform a meta-analysis; therefore, we have reported directly from the RCTs.

Pain relief

Taping compared with placebo/sham or no treatment Taping may be more effective than no treatment or sham taping at reducing first-step pain at 1 week in people with plantar heel pain or fasciitis (low-quality evidence).

Ref (type)	Population	Outcome, Interventions	Results and statistical analysis	Effect size	Favours
Pain relief					
[23] RCT	92 people with plantar fasciitis In review [16]	**First-step pain (assessed using visual analogue scale, ranging from 0–100 mm) , 1 week** 41.4 with low-Dye taping plus sham ultrasound 54.0 with sham ultrasound	MD –12.3 mm 95% CI –22.4 mm to –2.2 mm P = 0.017 Adjusted for baseline values by ANCOVA	○○○	low-Dye taping plus sham ultra-sound
[20] RCT **4-armed trial**	41 people with plantar heel pain In review [16]	**Mean pain score (assessed using visual analogue scale ranging from 0–10) , 1 week** 2.7 (11 people) with calcaneal taping 6.2 (10 people) with no treatment 6.0 (10 people) with sham taping The remaining arm evaluated stretching	P <0.001 (for calcaneal taping *v* no treatment, and for calcaneal taping *v* sham taping)	○○○	taping

Functional improvement

Taping compared with placebo/sham or no treatment We don't know whether taping is more effective than no treatment or sham taping at improving function at 1 week in people with plantar heel pain or fasciitis (low-quality evidence).

Ref (type)	Population	Outcome, Interventions	Results and statistical analysis	Effect size	Favours
Functional improvement					
[23] RCT	92 people with plantar fasciitis In review [16]	**Function (assessed using Foot Health Status Questionnaire, score ranging from 0–100) , 1 week** 72.0 with low-Dye taping plus sham ultrasound 70.9 with sham ultrasound	MD +4.8 95% CI –2.5 to +12.2 P = 0.193 Adjusted for baseline values by ANCOVA	⟷	Not significant
[20] RCT **4-armed trial**	41 people with plantar heel pain In review [16]	**Function (assessed Patient-Specific Functional Scale, ranging from 0–10) , 1 week** 6.2 (11 people) with calcaneal taping 4.8 (10 people) with no treatment 5.4 (10 people) with sham taping 4.9 (10 people) with stretching The remaining arm evaluated stretching	P = 0.078 (among groups)	⟷	Not significant

Health-related quality of life

No data from the following reference on this outcome. [16] [23] [20]

Adverse effects

Ref (type)	Population	Outcome, Interventions	Results and statistical analysis	Effect size	Favours
Adverse effects					
[23] RCT	92 people with plantar fasciitis In review [16]	**Adverse effects** 13/46 (28%) with low-Dye taping plus sham ultrasound 0/46 (0%) with sham ultrasound Reported adverse effects 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 ranged in severity from mild to severe, were short lived, and resolved after removal of taping	Significance not assessed		

No data from the following reference on this outcome. [20]

Taping versus stretching exercises:

See option on Stretching exercises, p 13 .

Taping plus customised orthoses (custom-made insoles) versus night splints:

See option on Customised foot orthoses, p 4 .

Further information on studies

[20] The RCT did not state whether the results were based on an intention-to-treat analysis. The study did not measure outcomes beyond 1 week.

Comment: **Clinical guide**

Taping is frequently used for the early treatment of plantar heel pain, particularly while waiting for customised foot orthoses to be made. Although the evidence is of low quality, it appears that taping is likely to be beneficial in the short term for pain relief. However, it is associated with some minor, short-lived adverse effects, such as potential tightness and skin irritation.

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

OPTION CORTICOSTEROID INJECTIONS (SHORT-TERM EFFECTS)

- For GRADE evaluation of interventions for Plantar heel pain and plantar fasciitis, see table, p 44 .
- Corticosteroid injections may be more effective than placebo at reducing pain in the short-term (at 4 and 6 weeks) in people with plantar fasciitis.
- We don't know whether corticosteroid injections are more effective than placebo at improving function in the short-term in people with plantar fasciitis.
- 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; however, this is likely related to the solubility and duration of action of the corticosteroid being used.

Benefits and harms

Corticosteroid injections versus placebo or no treatment (short-term):

We found two RCTs evaluating the short-term effects of corticosteroid injections compared with placebo or no treatment in people with plantar fasciitis. [24] [25]

Pain relief

Corticosteroid injections compared with placebo or no treatment (short-term) Corticosteroid injections may be more effective than placebo at reducing pain at 4 and 6 weeks in people with plantar fasciitis (very low-quality evidence).

Ref (type)	Population	Outcome, Interventions	Results and statistical analysis	Effect size	Favours
Pain relief					
[24] RCT	82 people with plantar fasciitis confirmed by diagnostic ultrasonography	**Mean first-step pain (assessed using 100 mm visual analogue scale) , 4 weeks** with corticosteroid injection (dexamethasone, ultrasound-guided) with placebo injection (0.9% sodium chloride, ultrasound-guided) Absolute results not reported	MD –11.37 mm 95% CI –20.94 mm to –1.80 mm P = 0.02 Adjusted for baseline values by ANCOVA Difference between groups in pain relief is close to the predetermined minimal clinical important difference (13 points); see Further information on studies	○○○	corticosteroid injection
[24] RCT	82 people with plantar fasciitis confirmed by diagnostic ultrasonography	**Mean change in foot pain from baseline (assessed using Foot Health Status Questionnaire, score ranging from 0 = worst health, to 100 = best health) , 4 weeks** 36.8 to 58.9 with corticosteroid injection (dexamethasone, ultrasound-guided) 35.8 to 47.5 with placebo injection (0.9% sodium chloride, ultrasound-guided) Absolute results not reported	MD 10.9 95% CI 1.4 to 20.4 P = 0.03 Adjusted for baseline values by ANCOVA; see Further information on studies	○○○	corticosteroid injection
[25] RCT **3-armed trial**	65 people with plantar fasciitis	**Mean heel pain (assessed using visual analogue scale) , 6 weeks** 33.1 with corticosteroid injection (methylprednisolone, ultrasound-guided) 50.9 with placebo injection (0.9% sodium chloride, ultrasound-guided) 41 people in this analysis The third arm evaluated unguided corticosteroid injection	Difference –19.7 95% CI –37.0 to –2.5 P = 0.03 Adjusted for baseline values by ANCOVA See Further information on studies	○○○	guided corticosteroid injection
[25] RCT **3-armed trial**	65 people with plantar fasciitis	**Mean heel pain (assessed using visual analogue scale) , 6 weeks** 30.3 with corticosteroid injection (methylprednisolone, unguided) 50.9 with placebo injection (0.9% sodium chloride, ultrasound-guided) 41 people in this analysis The third arm evaluated ultrasound-guided corticosteroid injection	Difference –24.0 95% CI –41.3 to –6.6 P = 0.008 Adjusted for baseline values by ANCOVA See Further information on studies	○○○	unguided corticosteroid injection

Functional improvement

Corticosteroid injections alone compared with placebo or no treatment (short-term) We don't know whether corticosteroid injections are more effective than placebo at improving function at 4 weeks in people with plantar fasciitis (very low-quality evidence).

Ref (type)	Population	Outcome, Interventions	Results and statistical analysis	Effect size	Favours
Functional improvement					
[24] RCT	82 people with plantar fasciitis confirmed by diagnostic ultrasonography	**Mean function (assessed using Foot Health Status Questionnaire; score ranging from 0 = worst health, to 100 = best health) , 4 weeks** with corticosteroid injection (dexamethasone, ultrasound-guided) with placebo injection (0.9% sodium chloride, ultrasound-guided) Absolute results not reported	MD +6.6 95% CI –2.2 to +15.4 P value not reported Adjusted for baseline values by ANCOVA; see Further information on studies	⟷	Not significant

No data from the following reference on this outcome. [25]

Health-related quality of life

No data from the following reference on this outcome. [24] [25]

Adverse effects

No data from the following reference on this outcome. [24] [25]

Further information on studies

[24] To minimise pain during heel injection, both groups received an ultrasound-guided posterior tibial nerve block with 2% lidocaine hydrochloride. The recruitment method for the trial involved advertising in major daily newspapers, which may have led to a sample of participants not fully representative of those seen in general practice. Proportionally, there were more male participants in the RCT (52%) compared with female participants, which is not typical of other plantar fasciitis studies. Participants in both groups were also given a daily stretching programme for 8 weeks to ensure appropriate ethical management and that the trial better represented normal practice. There was no statistically significant difference between treatment groups in adherence to the stretching programme (P = 0.60).

[25] The RCT had unclear method of allocation concealment. The RCT found no statistically significant difference between ultrasound-guided and unguided corticosteroid injection in reduction in pain at 6 or 12 weeks (P = 0.58).

Comment: For more information on adverse effects, see option on Corticosteroid injections (longer-term effects), p 21 .

Clinical guide
Corticosteroid injections are frequently used for plantar heel pain, particularly if conservative interventions do not lead to the desired effect in a reasonable timeframe. Corticosteroid injections may be more effective than placebo at reducing pain in the short- to medium-term (at 4 and 6 weeks)

in people with plantar heel pain, but this is based on weak evidence. There is limited evidence from a systematic review that ultrasound-guided corticosteroid injections are more effective than palpation-guided corticosteroid injections. [26] 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; however, this is likely related to the solubility and duration of action of the corticosteroid being used.

OPTION CORTICOSTEROID INJECTIONS (LONGER-TERM EFFECTS)

- For GRADE evaluation of interventions for Plantar heel pain and plantar fasciitis, see table, p 44 .
- We don't know whether corticosteroid injections are more effective than placebo at reducing pain or improving function in the longer term (at 8 and 12 weeks) in people with plantar fasciitis.
- 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; however, this is likely related to the solubility and duration of action of the corticosteroid being used.

Benefits and harms

Corticosteroid injections versus placebo or no treatment (longer term):

We found two RCTs evaluating the longer-term effects of corticosteroid injections compared with placebo or no treatment in people with plantar fasciitis. [24] [25]

Pain relief

Corticosteroid injections compared with placebo or no treatment (longer term) We don't know how corticosteroid injections compare with placebo at reducing pain at 8 and 12 weeks in people with plantar fasciitis, as the evidence is weak and inconsistent (very low-quality evidence).

Ref (type)	Population	Outcome, Interventions	Results and statistical analysis	Effect size	Favours
Pain relief					
[24] RCT	82 people with plantar fasciitis confirmed by diagnostic ultrasonography	**Mean first-step pain (assessed using 100 mm visual analogue scale) , 8 weeks** with corticosteroid injection (dexamethasone, ultrasound-guided) with placebo injection (0.9% sodium chloride, ultrasound-guided) Absolute results not reported	MD –9.40 mm 95% CI –20.42 mm to +1.63 mm P value not reported Adjusted for baseline values by ANCOVA; see Further information on studies	⟷	Not significant
[24] RCT	82 people with plantar fasciitis confirmed by diagnostic ultrasonography	**Mean change from baseline in foot pain (assessed using Foot Health Status Questionnaire, score ranging from 0 = worst health, to 100 = best health) , 8 weeks** 36.8 to 62.3 with corticosteroid injection (dexamethasone, ultrasound-guided) 35.8 to 56.3 with placebo injection (0.9% sodium chloride, ultrasound-guided)	MD +5.6 95% CI –4.5 to +15.6 P = 0.28 Adjusted for baseline values by ANCOVA; see Further information on studies	⟷	Not significant
[24] RCT	82 people with plantar fasciitis confirmed by diagnostic ultrasonography	**Mean first-step pain (assessed using 100 mm visual analogue scale) , 12 weeks** with corticosteroid injection (dexamethasone, ultrasound-guided) with placebo injection (0.9% sodium chloride, ultrasound-guided) Absolute results not reported	MD –7.34 mm 95% CI –19.32 mm to +4.63 mm P value not reported Adjusted for baseline values by ANCOVA; see Further information on studies	⟷	Not significant

Ref (type)	Population	Outcome, Interventions	Results and statistical analysis	Effect size	Favours
[24] RCT	82 people with plantar fasciitis confirmed by diagnostic ultrasonography	**Mean change from baseline in foot pain (assessed using Foot Health Status Questionnaire; score ranging from 0 = worst health, to 100 = best health) , 12 weeks** 36.8 to 65.4 with corticosteroid injection (dexamethasone, ultrasound-guided) 35.8 to 59.7 with placebo injection (0.9% sodium chloride, ultrasound-guided)	MD +5.3 95% CI –5.7 to +16.3 P = 0.34 Adjusted for baseline values by ANCOVA; see Further information on studies	⟷	Not significant
[25] RCT **3-armed trial**	65 people with plantar fasciitis	**Mean heel pain (assessed using visual analogue scale) , 12 weeks** 28.4 with corticosteroid injection (methylprednisolone, ultrasound-guided) 53.8 with placebo injection (0.9% sodium chloride, ultrasound-guided) 34 people in this analysis The third arm evaluated unguided corticosteroid injection	Difference –25.1 95% CI –43.6 to –6.5 P = 0.009 Adjusted for baseline values by ANCOVA See Further information on studies	○○○	guided corticosteroid injection
[25] RCT **3-armed trial**	65 people with plantar fasciitis	**Mean heel pain (assessed using visual analogue scale) , 12 weeks** 28.2 with corticosteroid injection (methylprednisolone, unguided) 53.8 with placebo injection (0.9% sodium chloride, ultrasound-guided) 39 people in this analysis The third arm evaluated ultrasound-guided corticosteroid injection	Difference –28.4 95% CI –45.7 to –11.1 P = 0.002 Adjusted for baseline values by ANCOVA See Further information on studies	○○○	unguided corticosteroid injection

Functional improvement

Corticosteroid injections compared with placebo or no treatment (longer term) We don't know whether ultrasound-guided corticosteroid injections are more effective than placebo at improving function at 8 and 12 weeks in people with plantar fasciitis (very low-quality evidence).

Ref (type)	Population	Outcome, Interventions	Results and statistical analysis	Effect size	Favours
Functional improvement					
[24] RCT	82 people with plantar fasciitis confirmed by diagnostic ultrasonography	**Mean function (assessed using Foot Health Status Questionnaire; score ranging from 0 = worst health, to 100 = best health) , 8 weeks** with corticosteroid injection (dexamethasone, ultrasound-guided) with placebo injection (0.9% sodium chloride, ultrasound-guided) Absolute results not reported	MD +7.0 95% CI –1.6 to +15.6 P value not reported Adjusted for baseline values by ANCOVA; see Further information on studies	⟷	Not significant

Ref (type)	Population	Outcome, Interventions	Results and statistical analysis	Effect size	Favours
[24] RCT	82 people with plantar fasciitis confirmed by diagnostic ultrasonography	**Mean function (assessed using Foot Health Status Questionnaire; score ranging from 0 = worst health, to 100 = best health) , 12 weeks** with corticosteroid injection (dexamethasone, ultrasound-guided) with placebo injection (0.9% sodium chloride, ultrasound-guided) Absolute results not reported	MD +4.1 95% CI –3.8 to +11.9 P value not reported Adjusted for baseline values by ANCOVA; see Further information on studies	⟷	Not significant

No data from the following reference on this outcome. [25]

Health-related quality of life

No data from the following reference on this outcome. [24] [25]

Adverse effects

Ref (type)	Population	Outcome, Interventions	Results and statistical analysis	Effect size	Favours
Adverse effects					
[24] RCT	82 people with plantar fasciitis confirmed by diagnostic ultrasonography	**Adverse events** with corticosteroid injection (dexamethasone, ultrasound-guided) with placebo injection (0.9% sodium chloride, ultrasound-guided) No adverse events reported in either arm; specifically, no post injection flare or rupture of the plantar fascia			
[25] RCT **3-armed trial**	65 people with plantar fasciitis	**Adverse events , 12 weeks** with corticosteroid injection (methylprednisolone, unguided) with placebo injection (0.9% sodium chloride, ultrasound-guided) No adverse events reported in either arm The remaining arm evaluated ultrasound guided corticosteroid injection			

Further information on studies

[24] To minimise pain during heel injection, both groups received an ultrasound posterior tibial nerve block with 2% lidocaine hydrochloride. The recruitment method for the trial involved advertising in major daily newspapers, which may have led to a sample of participants not fully representative of those seen in general practice. Pro-

portionally, there were more male participants in the RCT (52%) compared with female participants, which is not typical of other plantar fasciitis studies. Participants in both groups were also given a daily stretching programme for 8 weeks to ensure appropriate ethical management, and that the trial better represented normal practice. There was no statistically significant difference between treatment groups in adherence to the stretching programme (P = 0.60). Regarding the lack of adverse events, the authors noted that "trial supports the use of dexamethasone as a safe treatment option, and that the same safety outcome may not have been achieved with acetate compounds".

[25] The RCT had unclear method of allocation concealment. The RCT found no statistically significant difference between ultrasound-guided and unguided corticosteroid injection in reduction in pain at 6 or 12 weeks (P = 0.58).

Comment:

Clinical guide

Corticosteroid injections into the plantar heel 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. [27] Observational studies have reported rupture of the plantar fascia in people receiving corticosteroid injections. [28] [29] One study reported a 10% incidence of rupture among 122 injected heels. [29] A second study examined 37 people with a presumptive diagnosis of plantar fascia rupture, all of whom had received corticosteroid injections for plantar fasciitis. [28] 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 to 12 months to occur. [28]

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. Two recent RCTs had no ruptures recorded; although, one used dexamethasone sodium phosphate, [24] and the other used methylprednisolone acetate [25] as the corticosteroid. Rupture may be related to the duration of action of the corticosteroid used, with ruptures more likely with less soluble, longer acting corticosteroids. 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. Plantar fascia rupture is not necessarily a harmful phenomenon, as it may be clinically silent in some people.

OPTION CORTICOSTEROID INJECTION PLUS LOCAL ANAESTHETIC INJECTION (SHORT-TERM EFFECTS)

- For GRADE evaluation of interventions for Plantar heel pain and plantar fasciitis, see table, p 44 .
- We don’t know whether corticosteroid injection plus local anaesthetic injection are more effective than local anaesthetic injection alone at reducing pain in the short term (at 1 month) in people with plantar heel pain.
- 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; however, this is likely related to the solubility and duration of action of the corticosteroid being used.

Benefits and harms

Corticosteroid injection plus local anaesthetic injection versus local anaesthetic injection alone (short-term):

We found one four-armed RCT that compared a single injection of corticosteroid plus local anaesthetic injection with local anaesthetic injection alone, either with or without tibial nerve block, in people with plantar fasciitis. [30]

Pain relief

Corticosteroid injection plus local anaesthetic injection compared with local anaesthetic injection alone (short-term)

We don’t know whether a single injection of corticosteroid plus local anaesthetic injection is more effective than local anaesthetic injection alone (with or without tibial nerve block) at improving pain in the short term (at 1 month) in people with plantar fasciitis (very low-quality evidence).

Ref (type)	Population	Outcome, Interventions	Results and statistical analysis	Effect size	Favours
Pain relief					
[30] RCT **4-armed trial**	91 people (106 heels, randomisation by heel) with plantar fasciitis	**Mean change from baseline in pain score (assessed using 10 cm visual analogue scale) , 1 month** 5.6 to 2.9 with single corticosteroid injection plus local anaesthetic injection (without tibial nerve block) 5.5 to 4.0 with local anaesthetic injection alone (without tibial nerve block) Number of people in analysis unclear The remaining arms evaluated corticosteroid injection plus local anaesthetic and local anaesthetic alone in people with tibial nerve block Corticosteroid injection plus local anaesthetic comprised 1 mL prednisolone acetate plus 1 mL lidocaine hydrochloride; local anaesthetic injection alone comprised 2 mL lidocaine hydrochloride	Significance between groups not assessed See Further information on studies		
[30] RCT **4-armed trial**	91 people (106 heels, randomisation by heel) with plantar fasciitis	**Mean change from baseline in pain score (assessed using 10 cm visual analogue scale) , 1 month** 5.5 to 4.5 with single corticosteroid injection plus local anaesthetic injection (with tibial nerve block) 5.8 to 5.3 with local anaesthetic injection alone (with tibial nerve block) Number of people in analysis unclear The remaining arms evaluated corticosteroid injection plus local anaesthetic, and local anaesthetic alone in people without tibial nerve block	Significance between groups not assessed See Further information on studies		

Functional improvement

No data from the following reference on this outcome. [30]

Health-related quality of life

No data from the following reference on this outcome. [30]

Adverse effects

Ref (type)	Population	Outcome, Interventions	Results and statistical analysis	Effect size	Favours
Adverse effects					
[30] RCT **4-armed trial**	91 people (106 heels, randomisation by heel) with plantar fasciitis	**Pain , time of injection** with single corticosteroid injection plus local anaesthetic injection (with tibial nerve block) with single injection of corticosteroid plus local anaesthetic injection (without tibial nerve block) with local anaesthetic injection alone (with tibial nerve block) with local anaesthetic injection alone (without tibial nerve block)	Reported as not significant between groups P value not reported		

Corticosteroid injection plus local anaesthetic injection versus extracorporeal shock wave therapy:

See option on Extracorporeal shock wave therapy, p 29 .

Corticosteroid injection plus local anaesthetic injection versus extracorporeal shock wave therapy plus local anaesthetic injection:

See option on Extracorporeal shock wave therapy, p 29 .

Further information on studies

[30] The RCT reported a dropout rate of more than 20% at 3 months and more than 45% at 6 months, and no intention-to-treat analysis was carried out. Participants' perception of pain from corticosteroid injection did not appear to be affected by prior administration of tibial nerve block (P = 0.5). Participants were permitted to continue using orthoses, insoles, pads, or painkillers throughout the study.

Comment: The RCT had many flaws (lack of intention-to-treat analysis, inadequate statistical power, and high withdrawal rates). Limitations of the available evidence make the use of corticosteroid injections in heel pain difficult to categorise in terms of benefits and harms. Corticosteroid injections are commonly used. [27] We found evidence from two observational studies of high rates of moderately severe harms from this treatment (see Comment in Corticosteroid injections [longer-term effects], p 21). However, recent RCT evidence [24] [25] does not support this, and it is now thought that rupture may be related to the duration of action of the corticosteroid used, with ruptures more likely with less soluble, longer acting corticosteroids.

OPTION CORTICOSTEROID INJECTION PLUS LOCAL ANAESTHETIC INJECTION (LONGER-TERM EFFECTS)

- For GRADE evaluation of interventions for Plantar heel pain and plantar fasciitis, see table, p 44 .
- We don't know whether corticosteroid injection plus local anaesthetic injection are more effective than local anaesthetic injection alone at reducing pain in the longer term (3 and 6 months) in people with plantar fasciitis.
- 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; however, this is likely related to the solubility and duration of action of the corticosteroid being used.

Benefits and harms

Corticosteroid injection plus local anaesthetic injection versus local anaesthetic injection alone (longer-term):

We found one four-armed RCT that compared a single injection of corticosteroid plus local anaesthetic injection with local anaesthetic injection alone, either with or without tibial nerve block, in people with plantar fasciitis. [30]

Pain relief

Corticosteroid injection plus local anaesthetic injection compared with local anaesthetic injection alone (longer-term)
We don't know how a single injection of corticosteroid plus local anaesthetic compares with local anaesthetic alone (with or without tibial nerve block) at improving pain in the medium to long term (at 3 to 6 months) in people with plantar fasciitis (very low-quality evidence).

Ref (type)	Population	Outcome, Interventions	Results and statistical analysis	Effect size	Favours
Pain relief					
[30] RCT **4-armed trial**	91 people (106 heels, randomisation by heel) with plantar fasciitis	**Mean change from baseline in pain score (assessed using 10 cm visual analogue scale) , 3 months** 5.6 to 3.6 with single corticosteroid injection plus local anaesthetic injection (without tibial nerve block) 5.5 to 3.7 with local anaesthetic injection alone (without tibial nerve block) Number of people in analysis unclear The remaining arms evaluated corticosteroid injection plus local anaesthetic injection and local anaesthetic injection alone in people with tibial nerve block Corticosteroid injection plus local anaesthetic comprised 1 mL prednisolone acetate plus 1 mL lidocaine hydrochloride; local anaesthetic injection alone comprised 2 mL lidocaine hydrochloride	Significance between groups not assessed See Further information on studies		
[30] RCT **4-armed trial**	91 people (106 heels, randomisation by heel) with plantar fasciitis	**Mean change from baseline in pain score (assessed using 10 cm visual analogue scale) , 3 months** 5.5 to 3.4 with single corticosteroid injection plus local anaesthetic injection (with tibial nerve block) 5.8 to 3.1 with local anaesthetic injection alone (with tibial nerve block) Number of people in analysis unclear The remaining arms evaluated corticosteroid injection plus local anaesthetic injection, and local anaesthetic injection alone in people without tibial nerve block	Significance between groups not assessed See Further information on studies		
[30] RCT **4-armed trial**	91 people (106 heels, randomisation by heel) with plantar fasciitis	**Mean change from baseline in pain score (assessed using 10 cm visual analogue scale) , 6 months** 5.6 to 2.4 with single corticosteroid injection plus local anaes-	Significance between groups not assessed See Further information on studies		

Ref (type)	Population	Outcome, Interventions	Results and statistical analysis	Effect size	Favours
		thetic injection (without tibial nerve block) 5.5 to 3.3 with local anaesthetic injection alone (without tibial nerve block) Number of people in analysis unclear The remaining arms evaluated corticosteroid injection plus local anaesthetic injection and local anaesthetic injection alone in people with tibial nerve block			
[30] RCT **4-armed trial**	91 people (106 heels, randomisation by heel) with plantar fasciitis	**Mean change from baseline in pain score (assessed using 10 cm visual analogue scale) , 6 months** 5.5 to 2.5 with single corticosteroid injection plus local anaesthetic injection (with tibial nerve block) 5.8 to 0.6 with local anaesthetic injection alone (with tibial nerve block) Number of people in analysis unclear The remaining arms evaluated corticosteroid injection plus local anaesthetic injection, and local anaesthetic injection alone in people without tibial nerve block	Significance between groups not assessed See Further information on studies		

Functional improvement

No data from the following reference on this outcome. [30]

Health-related quality of life

No data from the following reference on this outcome. [30]

Adverse effects

Ref (type)	Population	Outcome, Interventions	Results and statistical analysis	Effect size	Favours
Adverse effects					
[30] RCT **4-armed trial**	91 people (106 heels, randomisation by heel) with plantar fasciitis	**Pain , time of injection** with single corticosteroid injection plus local anaesthetic injection (with tibial nerve block) with single injection of corticosteroid plus local anaesthetic injection (without tibial nerve block) with local anaesthetic injection alone (with tibial nerve block)	Reported as not significant between groups P value not reported		

Ref (type)	Population	Outcome, Interventions	Results and statistical analysis	Effect size	Favours
		with local anaesthetic injection alone (without tibial nerve block)			

Corticosteroid injection plus local anaesthetic injection versus extracorporeal shock wave therapy:

See option on Extracorporeal shock wave therapy, p 29 .

Corticosteroid injection plus local anaesthetic injection versus extracorporeal shock wave therapy plus local anaesthetic injection:

See option on Extracorporeal shock wave therapy, p 29 .

Further information on studies

[30] The RCT reported a dropout rate of more than 20% at 3 months and more than 45% at 6 months, and no intention-to-treat analysis was carried out. Participants' perception of pain from corticosteroid injection did not appear to be affected by prior administration of tibial nerve block (P = 0.5). Participants were permitted to continue using orthoses, insoles, pads, or analgesics throughout the study.

Comment: The RCT had many flaws (lack of intention-to-treat analysis, inadequate statistical power, and high withdrawal rates). Limitations of the available evidence make the use of corticosteroid injections in heel pain difficult to categorise in terms of benefits and harms. Corticosteroid injections are commonly used. [27] We found evidence from two observational studies of high rates of moderately severe harms from this treatment (see Comment in Corticosteroid injections [longer-term effects], p 21). However, recent RCT evidence [24] [25] does not support this, and it is now thought that rupture may be related to the duration of action of the corticosteroid used, with ruptures more likely with less soluble, longer acting corticosteroids.

OPTION EXTRACORPOREAL SHOCK WAVE THERAPY

- For GRADE evaluation of interventions for Plantar heel pain and plantar fasciitis, see table, p 44 .
- Extracorporeal shock wave therapy (ESWT) may be more effective than placebo at reducing pain at 12 weeks in people with chronic plantar heel pain, but this is based on limited evidence.
- ESWT may be equally effective as endoscopic plantar fasciotomy (partial release) at reducing pain and improving function at 1 year in adults with recalcitrant plantar fasciopathy, but this is based on weak evidence.
- We don't know how low-dose ESWT compares with high-dose ESWT, or how ESWT (with or without local anaesthetic injections) compares with corticosteroid injection plus local anaesthetic injection, as the evidence is weak.
- We found no direct evidence from RCTs comparing ESWT with corticosteroid injections alone.

Benefits and harms

Extracorporeal shock wave therapy versus placebo:

We found three systematic reviews (search dates 2004; [34] 2010; [35] and 2013 [36]), which identified 19 RCTs between them. The reviews included different RCTs in individual meta-analysis and presented data for different outcomes. For these reasons, we have reported results from the three reviews as we think appropriate. None of the reviews reported on adverse effects in detail. For adverse effects, we have reported directly from some RCTs.

Pain relief

ESWT compared with placebo ESWT without local anaesthetic may be more effective than placebo at reducing overall pain at 12 weeks in people with chronic plantar fasciitis. However, we don't know how effective low to high intensity ESWT is compared with placebo at reducing overall pain in people with heel pain at 12 weeks. ESWT may be more effective than placebo at reducing morning pain in people with plantar heel pain at 12 weeks (very low-quality evidence).

Ref (type)	Population	Outcome, Interventions	Results and statistical analysis	Effect size	Favours
Pain relief					
[35] Systematic review	Adults with heel pain, 6 months or longer in duration (unsuccessful response to conservative care with medications and/or physical therapy) 5 RCTs in this analysis	**Overall pain reduction (assessed using visual analogue scale) , 12 weeks** with low to high intensity ESWT with or without local anaesthetic with placebo with or without local anaesthetic 680 people in this analysis	MD –4.39 95% CI –9.05 to +0.27 P = 0.06 Heterogeneity I^2 = 97% (P <0.001) Reason for heterogeneity not discussed	⟷	Not significant
[36] Systematic review	Adults with chronic plantar fasciitis (symptomatic following at least 3 months of conservative treatment) 2 RCTs in this analysis	**Overall percentage improvement in mean visual analogue scale composite scores (pain in the morning, during daily activities, and dolorimeter application) , 12 weeks** with radial or focused ESWT without local anaesthetic (3 treatments of 0.16 or 0.25 mJ/mm^2) with placebo without local anaesthetic Absolute results not reported Number of people in analysis unclear	SMD 0.38 95% CI 0.05 to 0.72 P = 0.02	○○○	radial or focused ESWT
[36] Systematic review	Adults with chronic plantar fasciitis (symptomatic following at least 3 months of conservative treatment) 2 RCTs in this analysis	**Reduction in overall mean heel pain from baseline (assessed using visual analogue scale) , 12 weeks** with radial ESWT without local anaesthetic (1 or 2 treatments of 0.16 mJ/mm^2) with placebo without local anaesthetic Absolute results not reported Number of people in analysis unclear	SMD 0.60 95% CI 0.34 to 0.85 P <0.00001	○○○	radial ESWT
[34] Systematic review	Adults with plantar heel pain 6 RCTs in this analysis	**Morning pain (10 cm VAS scores) , 12 weeks** with ESWT with placebo 881 people in this analysis	WMD 0.42 95% CI 0.02 to 0.83 P = 0.04	○○○	ESWT

Functional improvement

ESWT versus placebo ESWT seems to be more effective than placebo at decreasing limitation of activity duration in people with heel pain (moderate-quality evidence).

Ref (type)	Population	Outcome, Interventions	Results and statistical analysis	Effect size	Favours
Functional improvement					
[35] Systematic review	Adults with heel pain, 6 months or longer in duration (unsuccessful response to conservative care with medications and/or physical therapy) 5 RCTs in this analysis	**Proportion of people with a decrease in limitation of activity duration (4 point patient self-assessment)** 211/398 (53%) with low to high intensity ESWT 154/392 (39%) with placebo	OR 0.57 95% CI 0.43 to 0.76 P = 0.0001	●○○	low to high intensity ESWT

No data from the following reference on this outcome. [34] [36]

Health-related quality of life

No data from the following reference on this outcome. [34] [35] [36]

Adverse effects

Ref (type)	Population	Outcome, Interventions	Results and statistical analysis	Effect size	Favours
Adverse effects					
[34] Systematic review	Adults with plantar heel pain Data from 1 RCT	**Adverse effects** with ESWT with placebo, sham therapy, or low-dose treatment Adverse effects included skin reddening, pain and local swelling, and, less frequently, dizziness, sleep disturbance, haematoma, nausea, and hair loss	OR 2.26 95% CI 1.02 to 5.18	●●○	placebo
[34] Systematic review	Adults with plantar heel pain Data from 1 RCT	**Adverse effects** with ESWT with placebo, sham therapy, or low-dose treatment 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	Significance not assessed		
[37] RCT	People with plantar fasciitis	**Pain during procedure** 46/58 (79%) with ESWT 6/56 (9%) with placebo	P <0.0001	○○○	placebo
[38] RCT	People with plantar fasciitis	**Adverse effects** with ESWT with placebo 2 people (2%) had bruising at the site of shockwave application,	Significance not assessed		

Ref (type)	Population	Outcome, Interventions	Results and statistical analysis	Effect size	Favours
		and there were no serious adverse effects reported			

No data from the following reference on this outcome. [35] [36]

Low dose versus high dose extracorporeal shock wave therapy:

We found two RCTs evaluating low dose versus high dose ESWT in adults with chronic heel pain. [39] [40]

Pain relief

Low dose compared with high dose ESWT We don't know how low dose and high dose ESWT compare at reducing pain in people with chronic heel pain as the evidence is weak (very low-quality evidence).

Ref (type)	Population	Outcome, Interventions	Results and statistical analysis	Effect size	Favours
Pain relief					
[39] RCT **3-armed trial**	57 adults with chronic unilateral heel pain for at least 3 months	**Mean pain on palpation (assessed using 10 cm visual analogue scale ranging from 0 = no pain, to 10 = pain as bad as it could be) , 3 weeks (end of treatment)** 5.58 with low dose radial ESWT 4.01 with high dose (fixed) radial ESWT 2.14 with high dose (maximum tolerable) radial ESWT 52 adults in this analysis	P <0.001 (between all 3 groups) Statistically significant difference was also reported between the 3 groups at week 2, but not week 1 Statistically significant differences were reported between the low dose and the high dose groups; P values not reported	○○○	high dose radial ESWT
[39] RCT **3-armed trial**	57 adults with chronic unilateral heel pain for at least 3 months	**Mean pain on palpation (assessed using 10 cm visual analogue scale ranging from 0 = no pain, to 10 = pain as bad as it could be) , 6 weeks (follow-up)** 5.71 with low dose radial ESWT 3.72 with high dose (fixed) radial ESWT 1.03 with high dose (maximum tolerable) radial ESWT 49 adults in this analysis	P <0.001 (between all 3 groups) Statistically significant differences were reported between the low dose and the high dose groups; P values not reported	○○○	high dose radial ESWT
[39] RCT **3-armed trial**	57 adults with chronic unilateral heel pain for at least 3 months	**Mean pain (assessed using Foot Function Index, pain subscale) , 3 weeks (end of treatment)** 6.95 with low dose radial ESWT 4.64 with high dose (fixed) radial ESWT 3.48 with high dose (maximum tolerable) radial ESWT 52 adults in this analysis	P <0.001 (between all 3 groups) Difference was reported as not statistically significant between the 3 groups at week 1 Statistically significant differences were reported between the low dose and the high dose groups; P values not reported	○○○	high dose radial ESWT
[39] RCT **3-armed trial**	57 adults with chronic unilateral heel pain for at least 3 months	**Mean change from baseline in pain score (assessed using a visual analogue scale) , 6 weeks (follow-up)** 6.94 with low dose radial ESWT	P <0.001 (between all 3 groups) Statistically significant differences were reported between the low dose and the high dose groups; P values not reported	○○○	high dose radial ESWT

Ref (type)	Population	Outcome, Interventions	Results and statistical analysis	Effect size	Favours
		3.94 with high dose (fixed) radial ESWT 1.95 with high dose (maximum tolerable) radial ESWT 49 adults in this analysis			
[40] RCT	53 (78 heels) adults with plantar fasciitis and pain lasting at least 6 months	**Mean change from baseline in pain score (assessed using a visual analogue scale) , 6 months (follow-up)** 57.4 to 30.9 with low intensity ESWT 50.8 to 27.1 with high intensity ESWT 77 heels in this analysis	Significance between groups not assessed		

Functional improvement

Low dose compared with high dose ESWT We don't know how low dose and high dose ESWT compare at improving function in people with chronic heel pain as the evidence is weak (very low-quality evidence).

Ref (type)	Population	Outcome, Interventions	Results and statistical analysis	Effect size	Favours
Disability					
[39] RCT **3-armed trial**	57 adults with chronic unilateral heel pain for at least 3 months	**Mean disability score (assessed using Foot Function Index, disability subscale) , 3 weeks (end of treatment)** 5.53 with low dose radial ESWT 4.07 with high dose (fixed) radial ESWT 3.16 with high dose (maximum tolerable) radial ESWT 52 adults in this analysis	P = 0.011 (analysis for difference across the 3 groups) Statistically significant differences were reported between the low dose and the high dose groups; P values not reported	○○○	high dose radial ESWT
[39] RCT **3-armed trial**	57 adults with chronic unilateral heel pain for at least 3 months	**Mean disability score (assessed using Foot Function Index, disability subscale) , 6 weeks (follow-up)** 5.51 with low dose radial ESWT 3.45 with high dose (fixed) radial ESWT 1.87 with high dose (maximum tolerable) radial ESWT 49 adults in this analysis	P <0.001 (analysis for difference across the 3 groups) Statistically significant differences were reported between the low dose and the high dose groups; P values not reported	○○○	high dose radial ESWT
[40] RCT	53 (78 heels) adults with plantar fasciitis and pain lasting at least 6 months	**Mean change from baseline in disability score (assessed using the Foot Function Index, disability subscale) , 6 months (follow-up)** 41.9 to 22.7 with low intensity ESWT 37.7 to 18.6 with high intensity ESWT	Significance between groups not assessed		
Activity limitation					
[39] RCT	57 adults with chronic unilateral heel pain for at least 3 months	**Mean activity limitation score (assessed using Foot Function Index, activity limitation sub-**	P = 0.016 (analysis for difference across the 3 groups)	○○○	high dose radial ESWT

Ref (type)	Population	Outcome, Interventions	Results and statistical analysis	Effect size	Favours
3-armed trial		**scale) , 3 weeks (end of treatment)** 2.28 with low dose radial ESWT 1.68 with high dose (fixed) radial ESWT 1.04 with high dose (maximum tolerable) radial ESWT 52 adults in this analysis	Statistically significant differences were reported between the low dose and the high dose groups; P values not reported		
[39] RCT **3-armed trial**	57 adults with chronic unilateral heel pain for at least 3 months	**Mean activity limitation score (assessed using Foot Function Index, activity limitation subscale) , 6 weeks (follow-up)** 2.31 with low dose radial ESWT 1.50 with high dose (fixed) radial ESWT 0.66 with high dose (maximum tolerable) radial ESWT 49 adults in this analysis	P <0.001 (analysis for difference across the 3 groups) Statistically significant differences were reported between the low dose and the high dose groups; P values not reported	○○○	high dose radial ESWT
[40] RCT	53 (78 heels) adults with plantar fasciitis and pain lasting at least 6 months	**Mean change from baseline in activity limitation (assessed using Foot Function Index, activity limitation subscale) , 6 months (follow-up)** 29.0 to 15.4 with low intensity ESWT 25.8 to 13.4 with high intensity ESWT	Significance between groups not assessed		
Walking/standing duration					
[39] RCT **3-armed trial**	57 adults with chronic unilateral heel pain for at least 3 months	**Mean maximum tolerable walking/standing duration (hours) , 3 weeks (end of treatment)** 0.98 with low dose radial ESWT 1.28 with high dose (fixed) radial ESWT 1.76 with high dose (maximum tolerable) radial ESWT 52 adults in this analysis	P <0.001 (analysis for difference across the 3 groups) Statistically significant differences were reported between the low dose and the high dose groups; P values not reported	○○○	high dose radial ESWT
[39] RCT **3-armed trial**	57 adults with chronic unilateral heel pain for at least 3 months	**Mean maximum tolerable walking/standing duration (hours) , 6 weeks (follow-up)** 1.00 with low dose radial ESWT 1.40 with high dose (fixed) radial ESWT 2.32 with high dose (maximum tolerable) radial ESWT 49 adults in this analysis	P <0.001 (analysis for difference across the 3 groups) Statistically significant differences were reported between the low dose and the high dose groups; P values not reported	○○○	high dose radial ESWT

Health-related quality of life

Low dose compared with high dose ESWT We don't know how low dose and high dose ESWT compare at improving quality of life (as assessed using the SF-36) in people with plantar fasciitis and pain lasting at least 6 months (very low-quality evidence).

Ref (type)	Population	Outcome, Interventions	Results and statistical analysis	Effect size	Favours
Quality of life					
[40] RCT	53 (78 heels) adults with plantar fasciitis and pain lasting at least 6 months	**Mean change from baseline in the physical component of the Taiwan Chinese version of the Short Form-36 Health Survey (SF-36) , 6 months (follow-up)** 34.5 to 39.3 with low intensity ESWT 34.0 to 44.3 with high intensity ESWT	Significance between groups not assessed		
[40] RCT	53 (78 heels) adults with plantar fasciitis and pain lasting at least 6 months	**Mean change from baseline in the mental component of the Taiwan Chinese version of the Short Form-36 Health Survey (SF-36) , 6 months (follow-up)** 48.0 to 48.8 with low intensity ESWT 46.7 to 49.1 with high intensity ESWT	Significance between groups not assessed		

No data from the following reference on this outcome. [39]

Adverse effects

Ref (type)	Population	Outcome, Interventions	Results and statistical analysis	Effect size	Favours
Adverse effects					
[40] RCT	53 (78 heels) adults with plantar fasciitis and pain lasting at least 6 months	**Adverse effects , 6 months (follow-up)** with low intensity ESWT with high intensity ESWT Absolute results not reported No ecchymosis or other important adverse effects were reported during follow-up Authors of the study do not recommend the regular therapeutic use of high-intensity ESWT as potential risks outweigh benefits	Significance between groups not assessed		

No data from the following reference on this outcome. [39]

Extracorporeal shock wave therapy versus corticosteroid injection plus local anaesthetic injection:

We found one RCT that compared ultrasound-guided ESWT with ultrasound-guided injection of corticosteroid plus local anaesthetic people with plantar fasciitis with or without perifascial oedema. [33]

Pain relief

ESWT compared with corticosteroid injection plus local anaesthetic injection We don't know how ESWT compares with injection of corticosteroid plus local anaesthetic at reducing pain in people with plantar fasciitis with or without perifascial oedema (very low-quality evidence).

Ref (type)	Population	Outcome, Interventions	Results and statistical analysis	Effect size	Favours
Pain relief					
[33] RCT	64 people with plantar fasciitis refractory to conservative treatment for at least 8 weeks	**Proportion of people with clinical improvement in heel pain (defined as a significant reduction in 10-point VAS score to <4 [score range from 1 = no pain to 10= maximal pain]) , 6 weeks** 6/16 (38%) with ESWT 14/16 (88%) with single injection of corticosteroid plus local anaesthetic Subgroup analysis of 32 people with plantar fasciitis and perifascial oedema ESWT was ultrasound-guided and involved weekly sessions of 2000 shock waves of 0.03 mJ/mm^2 for 4 weeks; injection of corticosteroid plus local anaesthetic were ultrasound guided and comprised a single treatment of 1 mL of methylprednisolone plus 0.6 mL of mepivacaine hydrochloride	Significance not assessed		
[33] RCT	64 people with plantar fasciitis refractory to conservative treatment for at least 8 weeks	**Proportion of people with clinical improvement in heel pain (defined as a significant reduction in 10-point VAS score to <4 [score range from 1 = no pain to 10= maximal pain]) , 6 weeks** 13/15 (93%) with ESWT 5/15 (36%) with single injection of corticosteroid plus local anaesthetic Subgroup analysis of 30 people with plantar fasciitis and without perifascial oedema ESWT was ultrasound-guided and involved weekly sessions of 2000 shock waves of 0.03 mJ/mm^2 for 4 weeks; injection of corticosteroid plus local anaesthetic were ultrasound guided and comprised a single treatment of 1 mL of methylprednisolone plus 0.6 mL of mepivacaine hydrochloride	Significance not assessed		

Functional improvement

No data from the following reference on this outcome. [33]

Health-related quality of life

No data from the following reference on this outcome. [33]

Adverse effects

Ref (type)	Population	Outcome, Interventions	Results and statistical analysis	Effect size	Favours
Adverse effects					
[33] RCT	64 people with plantar fasciitis refractory to conservative treatment for at least 8 weeks	**Complications** with ESWT with single injection of corticosteroid plus local anaesthetic RCT reported that there were no complications in any of the groups			

Extracorporeal shock wave therapy plus local anaesthetic injection versus corticosteroid injection plus local anaesthetic injection:

We found two RCTs that compared ESWT plus local anaesthetic injection with injection of corticosteroid plus local anaesthetic in people with plantar fasciitis (duration of symptoms of longer than 6 months). [31] [32]

Pain relief

ESWT plus local anaesthetic injection compared with corticosteroid injection plus local anaesthetic injection We don't know how ESWT plus local anaesthetic injection compares with injection of corticosteroid plus local anaesthetic at reducing pain in people with plantar fasciitis (very low-quality evidence).

Ref (type)	Population	Outcome, Interventions	Results and statistical analysis	Effect size	Favours
Pain relief					
[31] RCT	60 people with plantar fasciitis (duration of symptoms of >6 months)	**Change from baseline in mean pain score (assessed using 100 mm visual analogue scale) , 3 months** –5.3 with ESWT plus local anaesthetic (given before ESWT) –4.0 with single injection of corticosteroid plus local anaesthetic	P >0.05	⟷	Not significant
[31] RCT	60 people with plantar fasciitis (duration of symptoms of >6 months)	**Change from baseline in mean heel tenderness on palpation (assessed using physician score ranging from 0 = no pain, to 3 = painful, winces, and withdraws) , 3 months** –0.9 with ESWT plus local anaesthetic (given before ESWT) –0.8 with single injection of corticosteroid plus local anaesthetic	P >0.05	⟷	Not significant

No data from the following reference on this outcome. [32]

Functional improvement

ESWT plus local anaesthetic injection compared with corticosteroid injection plus local anaesthetic injection We don't know how ESWT plus local anaesthetic injection compares with injection of corticosteroid plus local anaesthetic at improving function in people with plantar fasciitis (very low-quality evidence).

Ref (type)	Population	Outcome, Interventions	Results and statistical analysis	Effect size	Favours
Functional improvement					
[32] RCT	60 adults with unilateral plantar fasciitis (refractory to conservative treatment for longer than 6 months)	**Mean change from baseline in functional status (assessed using Mayo Clinic scoring system; total 100 points, where 90–100 = excellent results, 80–89 = good, 70–79 = fair, and <70 = poor) , up to 24 weeks** 46.83 to 85.83 with ESWT plus local anaesthetic injection (given before ESWT) 46.66 to 84.00 with single injection of corticosteroid plus local anaesthetic	P = 0.296	⟷	Not significant

No data from the following reference on this outcome. [31]

Health-related quality of life

No data from the following reference on this outcome. [31] [32]

Adverse effects

Ref (type)	Population	Outcome, Interventions	Results and statistical analysis	Effect size	Favours
Adverse effects					
[31] RCT	60 people with chronic plantar fasciitis (duration of symptoms of >6 months)	**Treatment-related pain** 0/27 (0%) with ESWT plus local anaesthetic (given before ESWT) 33/33 (100%) with single injection of corticosteroid plus local anaesthetic 2 people receiving ESWT reported a mild throbbing sensation lasting on average 5 days (range 3-7 days) but not requiring analgesia; people receiving corticosteroid injection had pain lasting on average 5 days (range 2–9 days) after administration of intervention	Significance not assessed		

No data from the following reference on this outcome. [32]

Extracorporeal shock wave therapy versus surgery:

We found one RCT comparing ESWT with endoscopic plantar fasciotomy (partial release) in adults with plantar fasciitis. [41]

Pain relief

ESWT compared with surgery ESWT may be equally effective as endoscopic plantar fasciotomy (partial release) at reducing pain at 1 year in adults with recalcitrant plantar heel pain (fasciopathy), but this is based on limited evidence (very low-quality evidence).

Ref (type)	Population	Outcome, Interventions	Results and statistical analysis	Effect size	Favours
Pain relief					
[41] RCT	65 adults with unilateral recalcitrant plantar fasciopathy	**Median change from baseline in morning pain scores (assessed using 100 mm visual analogue scale ranging from 0 = no pain, to 100 = maximal pain) , 1 year** 71 to15 with ESWT 68 to 16 with endoscopic plantar fasciotomy (partial release) Intention-to-treat analysis with last observation carried forward; 3 participants from the ESWT group and 2 participants from the fasciotomy group did not complete the 1 year assessment	P = 0.20	⟷	Not significant

Functional improvement

ESWT compared with surgery ESWT may be equally effective as endoscopic plantar fasciotomy (partial release) at improving function (assessed using the AOFAS total score) at 1 year in adults with recalcitrant plantar heel pain (fasciopathy), but this is based on limited evidence (very low-quality evidence).

Ref (type)	Population	Outcome, Interventions	Results and statistical analysis	Effect size	Favours
Functional improvement					
[41] RCT	65 adults with unilateral recalcitrant plantar fasciopathy	**Median change from baseline in functional score (assessed using American Orthopedic Foot and Ankle-Hindfoot Scale [AOFAS], total score) , 1 year** 71 to15 with ESWT 68 to 16 with endoscopic plantar fasciotomy (partial release) Intention-to-treat analysis with last observation carried forward; 3 participants from the ESWT group and 2 participants from the fasciotomy group did not complete the 1 year assessment	P = 0.27	⟷	Not significant

Health-related quality of life

No data from the following reference on this outcome. [41]

Adverse effects

No data from the following reference on this outcome. [41]

Further information on studies

[31] Randomisation, allocation concealment, and blinding were unclear in the RCT. In the study, ESWT was given as a single treatment of 3000 shock waves; prilocaine hydrochloride was administered before ESWT. A single injection of corticosteroid plus local anaesthetic comprised betamethasone dipropionate, betamethasone sodium phosphate, and prilocaine hydrochloride.

[32] Randomisation, allocation concealment, and blinding were unclear in the RCT. In the study, ESWT was given at 0.28 mJ/mm^2 over two sessions (2 weeks apart); lidocaine hydrochloride gel was administered before ESWT. Injection of corticosteroid plus local anaesthetic comprised betamethasone diproprionate, betamethasone sodium phosphate, and zylocaine hydrochloride.

[33] In the RCT, people were initially stratified into two groups based on presence or absence of perifascial oedema. People in each group were then randomly allocated to ultrasound-guided ESWT or ultrasound-guided injection of corticosteroid plus local anaesthetic. Methods for allocation concealment and maintenance of masking were unclear.

[39] In the RCT, allocation concealment and maintenance of blinding were unclear. In the 'fixed' energy density group (high dose), a starting energy density of 0.05 mJ/mm^2 was used, which was gradually increased in a 'stepped' manner until the maximum tolerable dose was reached. This dose was then recorded and used in subsequent sessions. The 'maximum tolerable' energy density group (high dose) also had a starting energy density of 0.05 mJ/mm^2. However, in contrast to the 'fixed' energy group, increases in dose were 'staircased' to the person's maximum tolerable level after every 200 impulse application. The low dose group received ESWT at a frequency of 3 Hz with a total of 30 impulses with an energy density fixed at the lowest level of 0.03 mJ/mm^2. ESWT was applied once a week for 3 weeks with a follow-up session 3 weeks later (i.e., at 6 weeks). The RCT identified that the results of the study cannot be generalised to ESWT generated by mechanisms other than a pneumatic-generating system because the physical properties of the generated shock waves and the spatial distribution of the energy density or focus pressure are dependent on the sound source and the focusing device used.

[40] In the RCT, methods to maintain blinding were unclear. The low-dose energy group received 0.12 mJ/mm^2 compared with a dose of 0.56 mJ/mm^2 applied in the high-energy group. Both groups received three sessions of ESWT (2000 shock waves/session) at weekly intervals.

[41] Blinding was unclear in the RCT. People in the ESWT group were given conscious sedation anaesthesia (no local anaesthetic given), and surgery (fasciotomy) was performed under general or spinal anaesthesia. People in the ESWT group received 100 graded shocks (14–18 kV; 0.12–0.22 mJ/mm^2) to assess the effectiveness of the anaesthesia, followed by 1400 shock waves at 18 kV (0.22 mJ/mm^2), for a total of 1500 shock waves, applied at 4 shocks/second. For the median change from baseline in morning pain scores, between-group comparisons were also non-significant at 3 and 12 weeks (P = 0.45 and 0.71, respectively). For the median change from baseline in total AOFAS scores, non-significant between group differences were observed for all time points (3, 12, and 52 weeks) and for all AOFAS subscales (pain, activity limitation, walking surface, sagittal motion, hindfoot motion, ankle/hind foot instability, alignment) except maximum walking distance (significant at 3 weeks, ESWT 4 [4–5] *v* fasciotomy 4 [2–4], P = 0.005) and gait abnormality (significant at 3 weeks, ESWT 4 [4–8] *v* fasciotomy 4 [4–4], P = 0.002).

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. We found a systematic review that presented the results from a network meta-analysis evaluating focused shock wave (FSW) therapy of different intensity levels versus placebo and each other. [42] The review found no significant difference between different intensities of FSW (medium-intensity FSW *v* low-intensity FSW, OR 1.22, 95% CI 0.05 to 6.20; high-intensity FSW *v* low-intensity FSW, OR 1.43, 95% CI 0.03 to 7.60; and high-intensity FSW *v* medium-intensity FSW, OR 1.48, 95% CI 0.14 to 6.07). However, it is unclear which RCTs informed the network and, therefore, the results have not been discussed in detail.

Clinical guide

ESWT is being increasingly used. Although there are few major side effects, patients may complain of pain upon application.

OPTION LOCAL ANAESTHETIC INJECTION

- For GRADE evaluation of interventions for Plantar heel pain and plantar fasciitis, see table, p 44 .

- We don't know whether corticosteroid injection plus local anaesthetic injection are more effective than local anaesthetic injection alone at reducing pain or improving function in people with plantar fasciitis.

Benefits and harms

Local anaesthetic injection alone versus corticosteroid injection plus local anaesthetic injection (short-term effects):

See option on Corticosteroid injection plus local anaesthetic injection (short-term effects), p 24 .

Local anaesthetic injection alone versus corticosteroid injection plus local anaesthetic injection (longer-term effects):

See option on Corticosteroid injection plus local anaesthetic injection (longer-terms effects), p 26 .

Comment:

Clinical guide
Local anaesthetic injection is not frequently used in clinical practice for plantar heel pain. However, the theory behind its use relates to hydrodilation and breaking the pain cycle. Most practitioners would use a corticosteroid injection (or a corticosteroid and local anaesthetic injection) in preference to a local anaesthetic injection alone.

OPTION SURGERY

- For GRADE evaluation of interventions for Plantar heel pain and plantar fasciitis, see table, p 44 .
- Endoscopic plantar fasciotomy (partial release) may be equally effective as extracorporeal shock wave therapy (ESWT) at reducing pain and improving function at 1 year in adults with recalcitrant heel pain, but this is based on weak evidence.

Benefits and harms

Surgery versus ESWT:

See option on Extracorporeal shock wave therapy, p 29 .

Comment:

One of the largest observational studies (76 people) in this area compared postoperative complication rates after endoscopic fasciotomy versus traditional plantar fasciotomy. [43] 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).

Clinical guide
Surgery for plantar heel pain is usually reserved for chronic cases where multiple other interventions have been tried without benefit. There are many potential adverse effects from surgery and because there is, essentially, no evidence that it is beneficial, it should be reserved for extreme cases.

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.

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.

Customised foot orthoses Orthoses fabricated by moulding a thermoplastic or thermomouldable material over an impression (or negative cast) of a person's foot with individual tailoring specific for each individual.

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 semi-compressed felt, sponge foam, rubber, or silicone.

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

Corticosteroid injection plus local anaesthetic injection (longer-term effects) Three RCTs added (they appear in option on ESWT). [31] [32] [33] Categorisation unchanged (likely to be ineffective or harmful).

Corticosteroid injection plus local anaesthetic injection (short-term effects) Three RCTs added (they appear in option on ESWT). [31] [32] [33] Categorisation unchanged (unknown effectiveness).

Corticosteroid injections (longer-term effects) Two RCTs added. [24] [25] Categorisation unchanged (likely to be ineffective or harmful).

Customised foot orthoses Two systematic reviews [13] [16] and one RCT added. [14] Categorisation unchanged (likely to be beneficial).

Extracorporeal shock wave therapy Two systematic reviews [35] [36] and six RCTs added. [31] [32] [33] [39] [40] [41] Categorisation unchanged (unknown effectiveness).

Night splints Two systematic reviews added. [13] [16] Categorisation unchanged (unknown effectiveness).

Stretching exercises One systematic review added. [19] Categorisation unchanged (unknown effectiveness).

Surgery One RCT added. [41] Categorisation unchanged (unknown effectiveness).

Taping (low-Dye or antipronatory taping) Two systematic reviews added. [16] [19] Categorisation unchanged (likely to be beneficial).

Corticosteroid injections (short-term effects) Two RCTs added. [24] [25] Categorisation changed from 'unknown effectiveness' to 'likely to be beneficial'.

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Competing interests: KBL is an author of some references cited in this overview. He is Deputy-editor of the *Journal of Foot and Ankle Research* and a member of the International Advisory Board of *The Foot* journal. In addition, KBL is Chair of the Australian Podiatry Education and Research Foundation, an organisation that funds research projects that relate to podiatry.

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Disclaimer

GRADE **Evaluation of interventions for Plantar heel pain and plantar fasciitis.**

Important outcomes			Functional improvement, Health-related quality of life, Pain relief						
Studies (Participants)	**Outcome**	**Comparison**	**Type of evidence**	**Quality**	**Consistency**	**Directness**	**Effect size**	**GRADE**	**Comment**
What are the effects of conservative treatments for plantar heel pain?									
1 (89) [13]	Pain relief	Customised foot orthoses versus placebo/sham or no treatment	4	–2	0	0	0	Low	Quality points deducted for sparse data and weak methods
1 (89) [13]	Functional improvement	Customised foot orthoses versus placebo/sham or no treatment	4	–2	0	0	0	Low	Quality points deducted for sparse data and weak methods
2 (at least 206) [13] [14]	Pain relief	Customised foot orthoses versus prefabricated orthoses	4	–1	0	–1	0	Low	Quality point deducted for weak methods (incomplete reporting of statistical analysis in one RCT); directness point deducted for use of co-interventions by some participants
1 (at least 88) [13]	Functional improvement	Customised foot orthoses versus prefabricated orthoses	4	–2	0	0	0	Low	Quality points deducted for sparse data and weak methods
1 (25) [13]	Pain relief	Customised foot orthoses versus night splints	4	–2	0	0	0	Low	Quality point deducted for sparse data and weak methods
1 (25) [13]	Functional improvement	Customised foot orthoses versus night splints	4	–2	0	0	0	Low	Quality point deducted for sparse data and weak methods
1 (25) [13]	Health-related quality of life	Customised foot orthoses versus night splints	4	–2	0	0	0	Low	Quality point deducted for sparse data and weak methods
1 (170) [16]	Pain relief	Customised orthoses plus taping versus night splints	4	–3	0	–1	0	Very low	Quality points deducted for sparse data, weak methods, and lack of statistical assessment of between-group differences; directness point deducted for high attrition rate
2 (at least 20) [19]	Pain relief	Stretching exercises versus placebo or no treatment	4	–2	0	–1	0	Very low	Quality points deducted for sparse data and incomplete reporting of results; directness point deducted for difference in stretching exercise (weight bearing *v* non-weight bearing)
2 (at least 20) [19]	Functional improvement	Stretching exercises versus placebo or no treatment	4	–2	0	–1	0	Very low	Quality points deducted for sparse data and incomplete reporting of results; directness point deducted for difference in stretching exercise (weight bearing *v* non-weight bearing)
1 (21) [19]	Pain relief	Stretching exercises versus taping	4	–2	0	0	0	Low	Quality points deducted for sparse data and incomplete reporting of results
1 (21) [19]	Functional improvement	Stretching exercises versus taping	4	–2	0	0	0	Low	Quality points deducted for sparse data and incomplete reporting of results
2 (at least 31) [23] [20]	Pain relief	Taping versus placebo/sham or no treatment	4	–2	0	0	0	Low	Quality points deducted for sparse data and incomplete reporting of results

Important outcomes			Functional improvement, Health-related quality of life, Pain relief						
Studies (Participants)	**Outcome**	**Comparison**	**Type of evidence**	**Quality**	**Consistency**	**Directness**	**Effect size**	**GRADE**	**Comment**
2 (at least 31) [23] [20]	Functional improvement	Taping versus placebo/sham or no treatment	4	–2	0	0	0	Low	Quality point deducted for sparse data and incomplete reporting of results
What are the effects of non-conservative treatments for plantar heel pain?									
2 (122) [24] [25]	Pain relief	Corticosteroid injections versus placebo or no treatment (short-term)	4	–3	0	–1	0	Very low	Quality points deducted for sparse data, weak methods, and incomplete reporting of results in one RCT; directness point deducted for inconsistency between interventions (different corticosteroid injections, and ultrasound-guided versus unguided injections)
1 (82) [24]	Functional improvement	Corticosteroid injections versus placebo or no treatment (short-term)	4	–3	0	0	0	Very low	Quality points deducted for sparse data, weak methods, and incomplete reporting of results
2 (122) [24] [25]	Pain relief	Corticosteroid injections versus placebo or no treatment (longer term)	4	–3	0	–1	0	Very low	Quality points deducted for sparse data, weak methods, and incomplete reporting of results in one RCT; directness point deducted for inconsistency between interventions (different corticosteroid injections; and ultrasound-guided *v* unguided injections)
1 (82) [24]	Functional improvement	Corticosteroid injections versus placebo or no treatment (longer term)	4	–3	0	0	0	Very low	Quality points deducted for sparse data, weak methods, and incomplete reporting of results
1 (unclear: <200) [30]	Pain relief	Corticosteroid injection plus local anaesthetic injection versus local anaesthetic injection alone (short-term)	4	–3	0	–2	0	Very low	Quality points deducted for sparse data, lack of placebo controls, weak methods (no between-group statistical analysis), and poor follow-up; directness points deducted for uncertainty of clinical relevance and heterogeneity between interventions
1 (unclear; <200) [30]	Pain relief	Corticosteroid injection plus local anaesthetic injection versus local anaesthetic injection alone (longer-term)	4	–3	0	–2	0	Very low	Quality points deducted for sparse data, lack of placebo controls, weak methods (no between-group statistical analysis), and poor follow-up; directness points deducted for uncertainty of clinical relevance and heterogeneity between interventions
13 (at least 1307) [34] [35] [36]	Pain relief	Extracorporeal shock wave therapy versus placebo	4	–2	–1	0	0	Very low	Quality points deducted for incomplete reporting of results and unclear number of participants in analysis; consistency point deducted for statistical heterogeneity between RCTs
5 (790) [35]	Functional improvement	Extracorporeal shock wave therapy versus placebo	4	0	0	–1	0	Moderate	Directness point deducted for different intensities of ESWT
2 (53) [39] [40]	Pain relief	Low dose versus high dose extracorporeal shock wave therapy	4	–3	0	–1	0	Very low	Quality points deducted for sparse data, weak methods, and incomplete reporting of results; directness point deducted for differences in interventions (different doses and devices used to generate ESWT)
2 (110) [39] [40]	Functional improvement	Low dose versus high dose extracorporeal shock wave therapy	4	–3	0	–1	0	Very low	Quality points deducted for sparse data, weak methods, and incomplete reporting; directness point deducted for differences in interventions (different doses and devices used to generate ESWT)

Important outcomes	Functional improvement, Health-related quality of life, Pain relief								
Studies (Participants)	Outcome	Comparison	Type of evidence	Quality	Consistency	Directness	Effect size	GRADE	Comment
2 (53) [40]	Health-related quality of life	Low dose versus high dose extracorporeal shock wave therapy	4	–3	0	0	0	Very low	Quality points deducted for sparse data, weak methods, and incomplete reporting
1 (62) [33]	Pain relief	Extracorporeal shock wave therapy versus corticosteroid injection plus local anaesthetic injection	4	–3	0	0	0	Very low	Quality point deducted for sparse data, incomplete reporting of results, and weak methods
1 (60) [31]	Pain relief	Extracorporeal shock wave therapy plus local anaesthetic injection versus corticosteroid injection plus local anaesthetic injection	4	–3	0	0	0	Very low	Quality points deducted for sparse data, incomplete reporting of results, and weak methods
1 (60) [32]	Functional improvement	Extracorporeal shock wave therapy plus local anaesthetic injection versus corticosteroid injection plus local anaesthetic injection	4	–3	0	0	0	Very low	Quality points deducted for sparse data, incomplete reporting of results, and weak methods
1 (65) [41]	Pain relief	Extracorporeal shock wave therapy versus surgery	4	–3	0	0	0	Very low	Quality points deducted for sparse data, incomplete reporting of results, and weak methods
1 (65) [41]	Functional improvement	Extracorporeal shock wave therapy versus surgery	4	–3	0	0	0	Very low	Quality points deducted for sparse data, incomplete reporting of results, and weak methods

We initially allocate 4 points to evidence from RCTs, and 2 points to evidence from observational studies. To attain the final GRADE score for a given comparison, points are deducted or added from this initial score based on preset criteria relating to the categories of quality, directness, consistency, and effect size. Quality: based on issues affecting methodological rigour (e.g., incomplete reporting of results, quasi-randomisation, sparse data [<200 people in the analysis]). Consistency: based on similarity of results across studies. Directness: based on generalisability of population or outcomes. Effect size: based on magnitude of effect as measured by statistics such as relative risk, odds ratio, or hazard ratio.