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Injected corticosteroids for treating plantar heel pain in adults (Review)

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[Intervention Review]

Injected corticosteroids for treating plantar heel pain in adults

Judy A David[1], Venkatesan Sankarapandian[2], Prince RH Christopher[3], Ahana Chatterjee[1], Ashish S Macaden[4]

[1]Department of Physical Medicine and Rehabilitation, Christian Medical College, Vellore, India. [2]LCECU, Christian Medical College, Vellore, India. [3]Family Medicine, Christian Medical College, Vellore, India. [4]Stroke and Rehabilitation Medicine, Raigmore Hospital (NHS Highland), Inverness, UK

Contact address: Judy A David, Department of Physical Medicine and Rehabilitation, Christian Medical College, Ida Scudder Road, Vellore, Tamil Nadu, 632004, India. judy.vellore@gmail.com, judy@cmcvellore.ac.in.

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ABSTRACT

Background

Plantar heel pain, commonly resulting from plantar fasciitis, often results in significant morbidity. Treatment options include nonsteroidal anti-inflammatory drugs (NSAIDs), orthoses, physical therapy, physical agents (e.g. extracorporeal shock wave therapy (ESWT), laser) and invasive procedures including steroid injections.

Objectives

To assess the effects (benefits and harms) of injected corticosteroids for treating plantar heel pain in adults.

Search methods

We searched the Cochrane Bone, Joint and Muscle Trauma Group Specialised Register, the Cochrane Central Register of Controlled Trials (the *Cochrane Library*), MEDLINE, Embase, CINAHL, clinical trials registries and conference proceedings. Latest search: 27 March 2017.

Selection criteria

Randomised and quasi-randomised trials of corticosteroid injections in the treatment of plantar heel pain in adults were eligible for inclusion.

Data collection and analysis

At least two review authors independently selected studies, assessed risk of bias and extracted data. We calculated risk ratios (RRs) for dichotomous outcomes and mean differences (MDs) for continuous outcome measures. We used a fixed-effect model unless heterogeneity was significant, when a random-effects model was considered. We assessed the overall quality of evidence for individual outcomes using the GRADE approach.

Main results

We included a total of 39 studies (36 randomised controlled trials (RCTs) and 3 quasi-RCTs) that involved a total of 2492 adults. Most studies were small (median = 59 participants). Participants' mean ages ranged from 34 years to 59 years. When reported, most participants had heel pain for several months. The trials were usually conducted in outpatient specialty clinics of tertiary care hospitals in 17 countries. Steroid injection was given with a local anaesthetic agent in 34 trials. Follow-up was from one month to over two years. With one exception, trials were assessed at high risk of bias in one or more domains, mostly relating to lack of blinding, including lack of confirmation of allocation concealment. With two exceptions, we rated the available evidence as very low quality, implying in each case that we are 'very uncertain about the estimate'.

The 39 trials covered 18 comparisons, with six of the seven trials with three or four groups providing evidence towards two comparisons.

Eight trials (724 participants) compared steroid injection versus placebo or no treatment. Steroid injection may lead to lower heel pain visual analogue scores (VAS) (0 to 100; higher scores = worse pain) in the short-term (< 1 month) (MD -6.38, 95% CI -11.13 to -1.64; 350 participants; 5 studies; I^2 = 65%; low quality evidence). Based on a minimal clinically significant difference (MCID) of 8 for average heel pain, the 95% CI includes a marginal clinical benefit. This potential benefit was diminished when data were restricted to three placebo-controlled trials. Steroid injection made no difference to average heel pain in the medium-term (1 to 6 months follow-up) (MD -3.47, 95% CI -8.43 to 1.48; 382 participants; 6 studies; I^2 = 40%; low quality evidence). There was very low quality evidence for no effect on function in the medium-term and for an absence of serious adverse events (219 participants, 4 studies). No studies reported on other adverse events, such as post-injection pain, and on return to previous activity. There was very low quality evidence for fewer treatment failures (defined variously as persistent heel pain at 8 weeks, steroid injection at 12 weeks, and unrelieved pain at 6 months) after steroid injection.

The available evidence for other comparisons was rated as very low quality. We are therefore very uncertain of the estimates for the relative effects on people with heel pain of steroids compared with other interventions in:

1. Tibial nerve block with anaesthetic (2 trials); orthoses (4 trials); oral NSAIDs (2 trials); and intensive physiotherapy (1 trial).

2. Physical modalities: ESWT (5 trials); laser (2 trials); and radiation therapy (1 trial).

3. Other invasive procedures: locally injectable NSAID (1 trial); platelet-rich plasma injections (5 trials); autologous blood injections (2 trials); botulinum toxin injections (2 trials); cryopreserved human amniotic membrane injection (1 trial); localised peppering with a needle (1 trial); dry needling (1 trial); and mini scalpel needle release (1 trial).

We are also uncertain about the estimates from trials testing different techniques of local steroid injection: ultrasonography-guided versus palpation-guided (5 trials); and scintigraphy-guided versus palpation-guided (1 trial).

An exploratory analysis involving pooling data from 21 trials reporting on adverse events revealed two ruptures of plantar fascia (reported in 1 trial) and three injection site infections (reported in 2 trials) in 699 participants allocated to steroid injection study arms. Five trials reported a total of 27 participants with less serious short-term adverse events in the 699 participants allocated steroid injection study arms. Reported treatments were analgesia, ice or both. Given the high risk of selective reporting for these outcomes and imprecision, this evidence was rated at very low quality.

Authors' conclusions

We found low quality evidence that local steroid injections compared with placebo or no treatment may slightly reduce heel pain up to one month but not subsequently. The available evidence for other outcomes of this comparison was very low quality. Where available, the evidence from comparisons of steroid injections with other interventions used to treat heel pain and of different methods of guiding the injection was also very low quality. Although serious adverse events relating to steroid injection were rare, these were under-reported and a higher risk cannot be ruled out.

Further research should focus on establishing the effects (benefits and harms) of injected steroids compared with placebo in typical clinical settings, subsequent to a course of unsuccessful conservative therapy. Ideally, this should be preceded by research, including patient involvement, aimed to obtain consensus on the priority questions for treating plantar heel pain.

PLAIN LANGUAGE SUMMARY

Steroid injections for painful soles of heels in adults

Review question

We wanted to assess the effects of injected steroids for treating adults with painful soles of heels (plantar heel pain).

Background

Plantar heel pain is typically noticed when a person takes their first steps after being inactive or after weight bearing. The pain may get better by itself without treatment. However, it can persist for months and be incapacitating. Treatments include painkillers, heel and arch supports, exercises, shock wave therapy and local steroid injections.

We reviewed the evidence from studies assessing the effects of injected steroids for treating adults with painful soles of heel soles (plantar heel pain).

We assessed the effects of injected steroids to treat adults with painful soles of heels (plantar heel pain) compared with fake treatment (placebo - injections of salt water) or no treatment.

Search date

We searched the medical literature for studies (randomised or quasi-randomised controlled trials) up to 27 March 2017.

Study characteristics

We included 39 studies that involved a total of 2492 adults. The average ages of the participants in the studies ranged from 34 years to 59 years. When reported, most participants had heel pain for several months. Studies were usually conducted in outpatient specialty clinics of hospitals in 17 countries. Steroid injections were usually given with a local anaesthetic agent. Study follow-up was from one month to over two years.

The studies compared steroid injection with placebo or no treatment (8 studies); tibial nerve block with anaesthetic (2 studies); heel pads (4 studies); oral anti-inflammatory drugs (NSAIDs) (2 studies); an intensive exercise programme (1 study); shock wave therapy (5 studies); laser (2 studies); radiation therapy (1 study); local NSAID injection (1 study); platelet-rich plasma injections (5 studies); injection of the person's own (autologous) blood (2 studies); botulinum toxin (Botox) injections (2 studies); frozen (cryopreserved) human amniotic membrane injection (1 study); localised peppering involving multiple pricking of the tissues using an inserted needle (1 study); dry needling (1 study); and mini scalpel-needle release (1 study). We also compared different techniques of local steroid injection (5 studies).

Key results

The eight studies comparing steroid injection with placebo or no steroid injection control provided evidence on heel pain, function, serious adverse events and treatment failure. No studies reported on time to return to work or other activities or short-term adverse events, such as injection-site pain. Steroid injection may slightly reduce heel pain for up to one month after treatment, but not in the longer term including up to six months. We are very unsure whether steroid injection affects longer-term function or reduces treatment failure. There were no serious adverse events, such as infection, reported by these studies. However, these are known to be rare events and we looked at the evidence from all of the studies in the review. Of the 21 studies that reported on adverse events, two studies reported three infections and two ruptures of heel tissues in relation to steroid injection.

The evidence for all reported outcomes, including heel pain, for the other comparisons was always very low quality. This means we are very unsure of the results of these trials.

Conclusions

There is low quality evidence that local steroid injections may slightly reduce heel pain up to one month but not subsequently. Although serious complications relating to steroid injection were rare, these were under-reported in the included studies and more cannot be ruled out.

Summary of findings for the main comparison. Local steroid injection compared with placebo or no treatment control for plantar heel pain in adults

What are the effects of local steroid injection compared with placebo or no treatment control for plantar heel pain in adults?

Patient or population: Adults with plantar heel pain[1]

Settings: Various outpatient clinics (associated with orthopaedic, rheumatology, emergency, podiatry hospital services)

Intervention: Local steroid injection[2 3]

Comparison: Placebo or no treatment control[3]

Outcomes	Illustrative comparative risks* (95% CI)		Relative effect (95% CI)	No of Participants (studies)	Quality of the evidence (GRADE)	Comments
	Assumed risk	Corresponding risk				
	Placebo or no treatment control	Local steroid injection				
Heel pain: VAS 0 to 100 (higher scores = worse pain) - short-term follow-up Follow-up: 0 to 4 weeks	Mean VAS score ranged from 40.0 to 72.2 in the control groups	Mean heel pain in the intervention groups was **6.38 mm lower** (11.13 lower to 1.64 lower)	MD -6.38 (-11.13 to -1.64)	350 (5 studies; 6 comparisons)	⊕⊕⊖⊖ **Low**[4]	Data from pain component of FHSQ in 1 study. Based on an MCID of 8, the 95% CI includes a marginal clinical benefit of steroid injection. This potential effect was diminished when data were restricted to the 3 placebo controlled trials (MD -4.21, 95% CI -9.43 to 1.00; 265 participants). It is important to note that most participants in both groups were still experiencing heel pain.
Heel pain: VAS 0 to 100 (higher scores = worse pain) - medium-term follow-up Follow-up: 1 to 6 months	Mean VAS pain score ranged from 31.0 to 65.4 in the control groups	Mean VAS pain score in the intervention groups was **3.47 mm lower** (8.43 lower to 1.48 higher)	MD -3.47 (-8.43 to 1.48)	382 (6 studies; 7 comparisons)	⊕⊕⊖⊖ **Low**[5]	Data from pain component of FHSQ in 1 study. Based on an MCID of 8, the 95% CI includes only a very marginal clinical benefit of steroid injection. There was no evidence of a clinical difference when data were restricted to 4

						placebo controlled trials (MD -2.34, 95% -7.76 to 3.08; 297 participants). It is important to note that most participants in both groups were still experiencing heel pain.
Function: medium-term FFI (0 to 100: higher scores = worse function) FHSQ (0 to 100: higher scores = better function Follow-up: 12 weeks	Mean FFI was 42.26 in the control group	Mean FFI in the intervention group was **1.78 points higher** (4.83 lower to 8.39 higher)	MD 1.78 (-4.83 to 8.39)	82 (1 study)	⊕⊖⊖⊖ **Very low**[6]	Data were available from two trials using different scores. These were not pooled; in both cases the between group differences were small and unlikely to be clinically important with the 95% confidence intervals crossing the line of no effect.
	Not available	Mean FHSQ in the intervention group was **4.1 points higher** (3.8 lower to 11.9 higher)	MD 4.1 (-3.8 to 11.9)	81 (1 study)		
Serious adverse events Follow-up: 1 to 18 months	0 events	0 events	Not estimable	219 (4 studies)	⊕⊖⊖⊖ **Very low**[7]	There were no reports of rare adverse events (injection site infection, plantar fascia rupture) during the study periods of 4 trials.[8]
Return to previous level of activity or work	See comment	See comment				No studies reported this outcome
Other adverse events Short-term	See comment	See comment				No studies testing this comparison specifically referred to short-term adverse events such as post-injection flare, skin flushing that could cause short-term discomfort and pain to the patient.[9]
Treatment failure (Heel pain persists at 8 weeks; subsequent treatment at 12 weeks; no pain relief at 6 months)	**524 per 1000**[10]	**187 per 1000** (137 to 252)	**RR 0.35** (0.26 to 0.48)	363 (3 studies)	⊕⊖⊖⊖ **Very low**[11]	The definition of treatment failure varied among the 3 trials.

Follow-up: 8 weeks to 6 months	

*The basis for the **assumed risk** (e.g. the median control group risk across studies) is provided in footnotes. The **corresponding risk** (and its 95% confidence interval) is based on the assumed risk in the comparison group and the **relative effect** of the intervention (and its 95% CI).
CI: Confidence interval; **FFI:** Foot Function Index**; FHSQ:** Foot Health Status Questionnaire; **MCID:** Minimal clinically important difference; **MD:** Mean difference; **VAS:** Visual Analogue Scale

GRADE Working Group grades of evidence
High quality: Further research is very unlikely to change our confidence in the estimate of effect.
Moderate quality: Further research is likely to have an important impact on our confidence in the estimate of effect and may change the estimate.
Low quality: 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.
Very low quality: We are very uncertain about the estimate.

[1] Participants were typically middle aged (mean age in the trial populations ranged from 43 years to 59 years) with, where reported, long-term (over 6 months) heel pain.
[2] Steroid injections usually included a local anaesthetic agent and/or were preceded by a tibial nerve block.
[3] Interventions provided or advised for both groups varied among trials from no additional intervention (1 trial) to 'conventional care' that comprised anti-inflammatory drugs, heel pad, exercises and extracorporeal shock wave therapy (1 trial)
[4] Quality of evidence downgraded one level for serious risk of bias and one level for inconsistency (substantial heterogeneity: $I^2 = 65\%$) and imprecision.
[5] Quality of evidence downgraded one level for serious risk of bias and one level for inconsistency (moderate heterogeneity: $I^2 = 40\%$) and imprecision (95% CI includes line of no effect).
[6] Quality of evidence downgraded one level for serious risk of bias and two levels for very serious imprecision (95% CI of both results from single small trials includes the line of no effect).
[7] Quality of evidence downgraded one level for serious risk of bias (especially reporting bias) and two levels for very serious imprecision (no events).
[8] An exploratory analysis including data from 21 trials reporting on adverse events of the 39 trials in this review revealed two ruptures of plantar fascia (reported in 1 trial) and 3 injection site infections (reported in 2 trials) in the 699 participants allocated steroid injection of these trials.
[9] An exploratory analysis including data from 21 trials reporting on adverse events of the 39 trials in this review revealed five trials reporting a total of 27 participants with less serious short-term adverse events in the 699 participants allocated steroid injection of these trials. Reported treatments for these were analgesia, ice or both.
[10] The control risk in the median value across studies.
[11] Quality of evidence downgraded two levels for very serious risk of bias and one level for serious indirectness reflecting the outcome definition and variation among the three studies.

BACKGROUND

Description of the condition

Plantar heel pain is pain and tenderness of the heel localised to the sole of the foot. Plantar heel pain commonly results from plantar fasciitis, which is a common condition that causes pain while walking and significant morbidity in adults. It is estimated that nearly one million patient visits to the doctor per year in the USA (Riddle 2004) are due to plantar fasciitis. In a study of running athletes, Knobloch 2008 reported that 12.7% had plantar fasciitis at some time during the study period. The incidence of plantar fasciitis was 10.5 per 1000 person-years among USA military personnel (Scher 2009). Taunton 2002 reported plantar fasciitis (at 7.8% of the total) was the third most common running-related injury. This condition also affects older and less active people (Rompe 2009). Furey 1975 found most people with plantar fasciitis were aged between 40 years and 60 years and that both heels were involved in 29% of people. Chigwanda 1997 reported that a third of patients had bilateral involvement. Plantar heel pain has been reported in children younger than 15 years (De Inocencio 1998).

Children and adolescents have greater incidence of Sever's disease (calcaneal apophysitis), which is a traction apophysitis (Wiegerinck 2014). This may result from a musculoskeletal injury in children and is reported to account for between 2% and 16% of presentation at sports clinics. It is usually a self-limiting condition and presents in children aged between 8 years and 15 years (James 2013). Treatment using injected corticosteroids is not indicated because plantar fasciitis results from mechanical overuse that occurs during growth. This review therefore focused on adults only.

The aetiology of plantar heel pain in adults is poorly understood and may be multifactorial. Poor foot biomechanics and structural variations (Pohl 2009) can lead to inflammation and degeneration at the plantar fascia origin (at the heel) due to repeated microtrauma causing pain (Cornwall 1999; Melegati 2002). According to McPoil 2008, the independent risk factors for plantar fasciitis include reduced ankle dorsiflexion, increased body mass index and work-related weightbearing activities. The increased risk of plantar heel pain in people with diabetes mellitus (Lichniak 1990) may be indirectly linked with an increase in plantar fascia thickness and altered biomechanics (Craig 2008). Plantar heel pain has also been found in conditions associated with inflammation of joints, tendons and ligaments (Gerster 1977; Lehman 1999).

The diagnosis of plantar fasciitis can be made reasonably well clinically. Imaging studies with ultrasound, magnetic resonance imaging and bone scan are usually not needed except if there is a suspicion of other conditions. The following clinical findings are useful for classifying people with heel pain according to the International Statistical Classification of Diseases and Related Health Problems (ICD) category of plantar fasciitis (McPoil 2008):

- pain in the plantar medial heel region on palpation;
- pain most noticeably with initial steps after a period of inactivity but also worse following prolonged weightbearing; and
- pain often precipitated by a recent increase in weightbearing activity.

Although often self-limiting, plantar fasciitis can involve incapacitating pain over several months. Many interventions have been described for treating plantar heel pain. These include arch supports, strapping, heel pads, extracorporeal shock wave therapy, laser, steroid injections, topical applications and surgical interventions (Atkins 1999; McPoil 2008; Osborne 2006).

Description of the intervention

Corticosteroid injections are often reserved for resistant plantar fasciitis after failure of conservative non-invasive interventions. Soluble corticosteroids with short and intermediate durations of action, such as methylprednisolone and hydrocortisone, are often used (Speed 2003). Injections can be administered with or without ultrasound guidance (Tsai 2006).

The side effects associated with corticosteroid injection include plantar fascia rupture, infection, change in skin pigmentation, peripheral nerve injury, muscle damage, post-injection flare (worsening of heel pain) and fat pad atrophy (Acevedo 1998; Speed 2007).

How the intervention might work

Symptoms of plantar fasciitis may resolve completely with conservative management within six months (Roxas 2005; Wolgin 1994) but can take significantly longer (Furey 1975). Corticosteroids may hasten the process of pain relief by their strong anti-inflammatory effects. They can also inhibit fibroblast proliferation and ground substance proteins, both of which may help in the treatment of plantar fasciitis (McMillan 2010).

Why it is important to do this review

Intralesional steroid injection is often recommended by clinicians, despite being a painful procedure associated with serious complications. The withdrawn Cochrane review on 'Interventions for treating plantar heel pain' published in 2003 concluded that injected steroids provided only short-term and marginal pain relief, and that because there was limited evidence, further clinical trials were needed (Crawford 2003). This Cochrane Review aimed to inform practice by producing an up-to-date synthesis of available data on this topic.

OBJECTIVES

To assess the effects (benefits and harms) of injected corticosteroids for treating plantar heel pain in adults.

METHODS

Criteria for considering studies for this review

Types of studies

We included randomised controlled trials (RCTs) and quasi-RCTs (RCTs which use a method of allocating participants that is not strictly random, such as the toss of a coin, days of the week, or date of birth) in which injected corticosteroids for plantar heel pain formed one arm of the study.

Types of participants

We included studies that enrolled adult participants with plantar heel pain due to plantar fasciitis. We excluded trials that exclusively focused on children. We included trials with participants aged under 16 years provided that the proportion of children was small (< 5%) or that separate data were available.

We excluded trials evaluating treatments for heel pain arising from foot fractures, tumours, postoperative pain as a result of foot surgery management, or posterior heel pain such as that involving the Achilles tendon or peroneus longus.

Types of interventions

We compared intralesional, injected corticosteroids at any dose, preparation and method of injection with:

1. placebo injection or no treatment control (no steroid injection);
2. local anaesthetic injection;
3. local anaesthetic nerve block (e.g. of the tibial nerve);
4. orthoses;
5. exercise and other physical therapies (e.g. acupuncture, ultrasound therapy and extracorporeal shock wave therapy);
6. any other medications given locally or systemically aimed at treating heel pain; and
7. combinations of active interventions listed above.

Steroids could be administered with or without local anaesthetic or nerve block. The exceptions were comparison 2 (local anaesthetic injection) and comparison 3 (local anaesthetic nerve block) where steroid injection was administered without local anaesthetic or nerve block respectively. Where used, other co-interventions needed to be applied to both groups in the comparison.

We also compared different methods (including use of ultrasound guidance), doses and analogues of intralesional corticosteroids.

Types of outcome measures

Primary outcomes

1. Heel pain as measured by any standard validated pain scale.
2. Functional measured by any standard validated scale, such as the Foot Health Status Questionnaire (FHSQ).
3. Serious adverse events such as local infection, rupture of plantar fascia, skin changes, heel-pad atrophy or hyperaesthesia.

Secondary outcomes

1. Return to previous level of activity or to work.
2. Treatment failure, typically resulting substantive intervention such as an injection, non-resolution of symptoms and recurrence, reported as the number of cases that relapse after a successful resolution.
3. Other adverse effects (generally short-term) such as post-injection flare, skin flushing, menstrual disorders.
4. Health-related quality of life scores, using any validated measure.
5. Patient rating of acceptability or satisfaction.

The outcome measures were subgrouped into three time periods: short-term (within 1 month of the intervention), medium-term (1 month to 6 months) and long-term (more than 6 months).

Search methods for identification of studies

Electronic searches

We searched the Cochrane Bone, Joint and Muscle Trauma Group Specialised Register (27 March 2017), the Cochrane Central Register of Controlled Trials (CENTRAL) (Cochrane Library 2017 Issue 2), Ovid MEDLINE (including Epub Ahead of Print, In-Process & Other Non-Indexed Citations, and MEDLINE Daily) (1946 to 27 March 2017), Embase (1980 to 2017 Week 13) and the Cumulative Index to Nursing and Allied Health Literature (CINAHL) (1937 to 27 March 2017). We also searched the WHO International Clinical Trials Registry Platform (WHO ICTRP) for ongoing and recently completed studies (18 May 2017).

In MEDLINE, a subject-specific strategy was combined with the sensitivity-maximising version of the Cochrane Highly Sensitive Search Strategy for identifying randomised trials (Lefebvre 2011; Appendix 1). Search strategies for CENTRAL, MEDLINE, Embase, CINAHL and the WHO International Clinical Trials Registry Platform are shown in Appendix 1.

We did not apply any language restrictions.

Searching other resources

We searched references of included studies and attempted to contact experts in the field to identify unpublished studies.

Handsearching

We searched foot and ankle articles in relevant non-indexed journals and conference proceedings (Appendix 2).

Data collection and analysis

Selection of studies

Two pairs of authors (CPRH and VS; JD and AC) independently screened the search results and identified potentially eligible studies. We retrieved the full versions of all articles considered by one or both pairs of authors as those reporting potentially eligible trials. Each pair of authors used a standard eligibility form based on the inclusion and exclusion criteria to assess the trials. We resolved disagreements through discussion with another author (ASM). If eligibility was unclear, we attempted to contact the trial authors for clarification. Each trial report was scrutinised to identify any multiple publications from the same trial and all reports were linked to the original trial in the reference lists of studies.

Data extraction and management

Two authors (JD and AC) extracted data independently using a piloted data extraction form. Any disagreements about data extracted were resolved by referring to the trial report and by discussion. Where data were insufficient or missing, we attempted to contact the trial authors. Data were entered into Review Manager software (RevMan 2014) by two authors (JD and AC) and checked for accuracy by CRPH and VS.

Assessment of risk of bias in included studies

Two authors (JD and AC) independently assessed the risk of bias in the included studies using Cochrane's 'Risk of bias' tool (Higgins 2011). The following domains were assessed: randomisation (sequence generation and allocation concealment), blinding (participants and personnel, and outcome assessors), completeness of reporting outcome data, selective outcome reporting and other sources of bias. Blinding was assessed separately for subjective (patient reported) outcomes and objective (outcome assessor) outcomes. Contrary to our stated intention to assess risk of incomplete outcome data separately for short-term and longer-term follow-up periods, we assessed risk of attrition

bias at final follow-up for each trial. Disagreements were resolved by discussion to achieve consensus.

Measures of treatment effect

We calculated mean differences (MD) together with 95% confidence intervals (CI) for continuous outcome measures (e.g. pain scores and functional improvement). We used final scores in preference to change scores, unless only change scores were provided or these were likely to have a less skewed distribution than final scores (section 9.4.5.2, Higgins 2011). Risk ratios (RR) with their 95% CIs were calculated for dichotomous data.

Difference in pain is a measure often derived from a 100 mm visual analogue scale (VAS). The minimal clinically important difference (MCID) between pre- and post-intervention is taken as 8 mm for average pain and 19 mm for first step pain (Landorf 2010). In this Review we used this MCID and any that were available for other continuous outcome measures as a basis for interpreting mean differences. Should trials have reported reduction in pain dichotomised for proportions of participants in each group experiencing a significant reduction in pain at endpoint, we planned to record the cut-off point used to derive this score.

Unit of analysis issues

We did not identify any cluster-randomised trials (where allocation was by group, such as different clinics, villages or practices). However, we included six studies that involved participants with bilateral heel pain (Blockey 1956; Kane 2001; McMillan 2012; Ryan 2014; Yucel 2009; Yuzer 2006). We noted whether randomisation was according to individual participants or by heels; and if any unit of analysis issue had occurred. We were unable to perform our planned sensitivity analysis by excluding participants with bilateral heel involvement in these studies due to lack of data.

One trial applied a cross-over design (Díaz-Llopis 2012). We used data from the first phase of the trial to avoid carry-over effects.

Dealing with missing data

We attempted to obtain missing data from trial authors. Where possible, we extracted data to enable an intention-to-treat analysis in which all randomised participants were analysed in the groups to which they were originally assigned. We reported the percentage lost to follow-up in each group. We did not make any assumptions about loss to follow-up for continuous data and analysed results for those who completed the trial where the numbers contributing to the outcome were not provided.

We had planned to conduct sensitivity analyses for dichotomous data if drop-outs exceeded 10% for any trial.

Assessment of heterogeneity

We determined the presence of statistical heterogeneity among the same interventions by the visual inspection of the forest plot and by performing the Chi^2 test for heterogeneity using a P value of < 0.10 to determine statistical significance. As described in Differences between protocol and review, instead of applying our previous criterion of an I^2 value of 50% or greater as denoting significant heterogeneity, we decided to interpret I^2 values between 0% to 40% as possibly unimportant, 30% to 60% as possibly moderate, 50% to 90% as possibly substantial and 75% to 100% as possibly very substantial, depending on whether the inconsistency in results was due to differences in the direction of effects estimates between trials rather than due to differences in the magnitude of effect estimates favouring an intervention (Deeks 2011). The I^2 statistic describes the percentage of the variability in effect estimates among trials that is due to genuine differences (heterogeneity) rather than chance
(sampling error).

Assessment of reporting biases

We did not assess the likelihood of publication bias using a funnel plot because there were fewer than 10 trials contributing to the primary outcome for any comparison. All studies were assessed for adequacy of data reporting for pre-stated outcomes and for selective reporting of outcomes. We assessed selective reporting by comparisons with the trial protocol, if available, or searching for each trial in publicly available clinical trials registries for the registration document. We noted the judgments based on the risk of selective reporting in the 'Risk of bias' table for each included study.

Data synthesis

Where appropriate, the results of comparable studies were pooled using the fixed-effect model and 95% CIs. Where heterogeneity was significant (Chi^2 < 0.1) or there was substantial inconsistency (I^2 = 50% to 90%), we also pooled the trials using a random-effects model. If considerable heterogeneity was present (I^2 > 75%) and could not be explained by differences among the trials in terms of clinical or methodological features or by subgroup analyses, we considered not including trials in a meta-analysis and presenting the results narratively.

We presented risk ratios (RRs) for dichotomous outcomes and mean differences (MDs) for continuous outcomes unless the same outcome was measured in different ways or scales (e.g. measures of foot and ankle function) where we used the standardised mean difference (SMD). For SMD, we planned where appropriate to express pooled results using a commonly-used scale, or as odds ratios (OR) and absolute measures using methods described in the *Cochrane Handbook for Systematic Reviews of Interventions* (Higgins 2011, section 12.6).

Subgroup analysis and investigation of heterogeneity

Our planned series of subgroup analyses to investigate heterogeneity described in our protocol is listed below. However, we only undertook one limited subgroup analysis for duration of follow-up (see Differences between protocol and review).

1. Duration of plantar heel pain prior to intervention (acute: up to 3 months; chronic: more than 3 months).
2. Different types of injected steroids used.
3. Intralesional injection with or without ultrasound guidance.
4. Duration of follow-up (short-term, medium-term, long-term follow-up; as defined in Types of outcome measures).
5. Level of activity of the participants (sport-active, athletes; sedentary, non-athletes).
6. Structural foot variations (limited ankle dorsiflexion versus normal).

We investigated whether the results of subgroups were significantly different by inspecting the overlap of confidence intervals and

performing the test for subgroup differences available in Review Manager (RevMan 2014).

Sensitivity analysis

Where possible, we conducted sensitivity analyses for the primary outcomes to evaluate the effects of various aspects of trial and review methodology, including the choice of model for pooling data (fixed-effect versus random-effects). We assessed continuous data to detect skewed data (section 9.4.5.3, Higgins 2011) by performing checks such as those proposed by Altman 1996. Although we performed sensitivity analyses to assess the effects of including trials where there was strong evidence of skewed data, we have not reported on these given the consequence was mainly to reduce the number of trials, sometimes to one. We performed sensitivity analyses to check the effects of unadjusted data from trials that included participants with bilateral involvement.

There were insufficient data to check the effect of missing dichotomous data (we planned to assign the worst outcome to those lost to follow-up), and inclusion of trials at high risk of bias (principally from lack of allocation concealment, blinding or both) or for which only abstracts were obtained. However, we investigated the effects of removing trials with no treatment controls from the main pain analysis for our first comparison (comparison 1).

Should it be appropriate in a future update, we will perform sensitivity analyses to check the effects of including unadjusted data or of using externally sourced intra-class correlation coefficients from cluster-RCTs.

Summarising results and assessing the quality of the evidence

We used the GRADE approach to assess the quality of evidence for each of the key outcomes as high, moderate, low or very low (Schünemann 2011). Judgements on study limitations were based on our risk of bias assessments. GRADE profiler (GRADEpro GDT 2014) was used to import data from Review Manager (RevMan 2014) and to create 'Summary of findings' tables.

We selected the following outcomes for presentation: heel pain (short-term; up to 1 month); heel pain (medium-term: 1 to 6 months); functional outcome (medium-term); serious adverse events (e.g. rupture of the plantar fascia); return to previous activity or work; other adverse events (short-term); treatment failure (persistent pain, recurrence; new substantive treatment).

RESULTS

Description of studies

See Characteristics of included studies; Characteristics of excluded studies; Characteristics of ongoing studies.

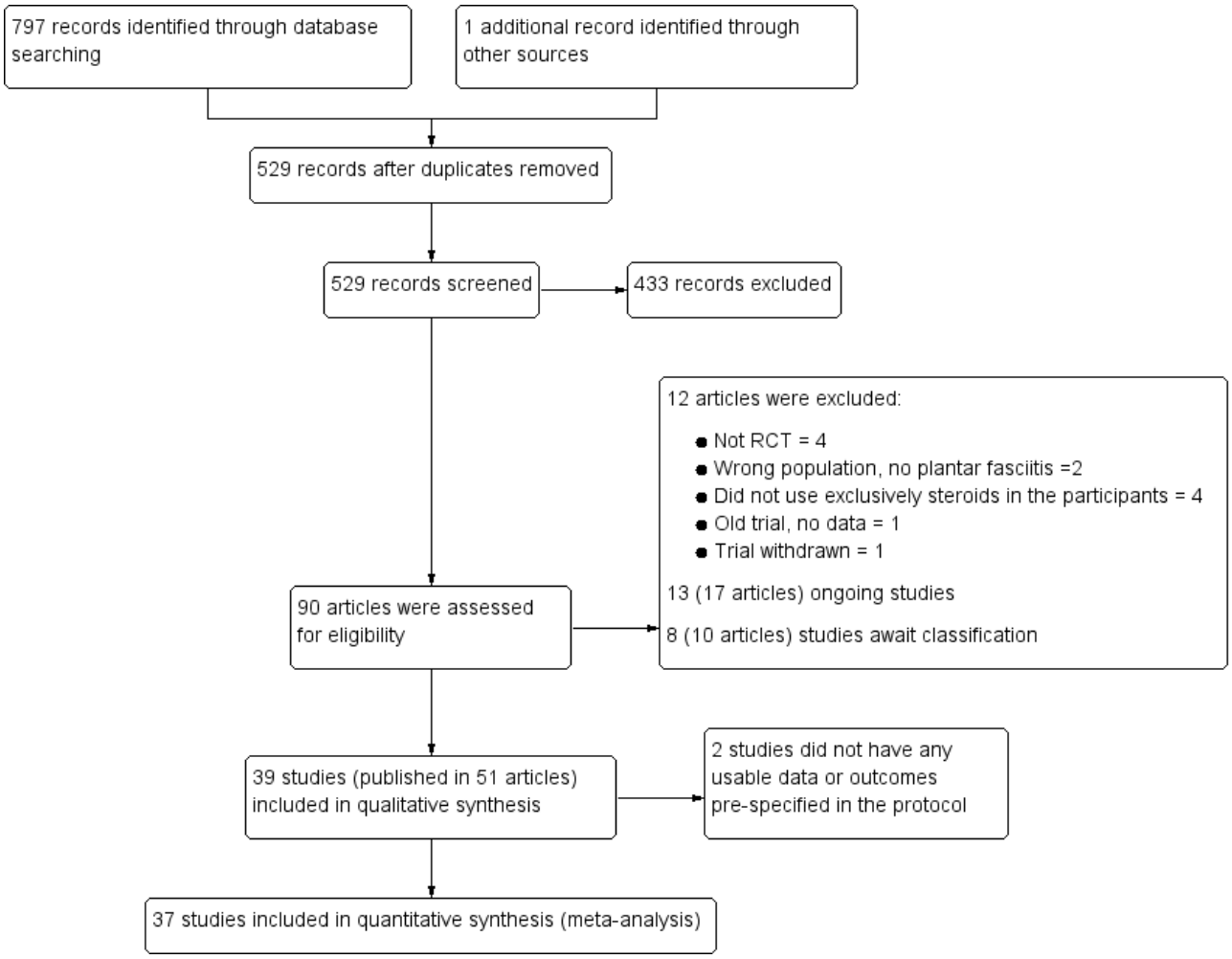
Results of the search

We screened a total of 797 records up to March 2017 from the following databases: Cochrane Bone, Joint and Muscle Trauma Group Specialised Register (25), CENTRAL (95), MEDLINE (197), Embase (222), CINAHL (94), the WHO ICTRP (164).

The search identified a total of 90 articles for potential inclusion, for which (where possible) full reports were obtained. We included 39 studies (see Included studies) and excluded 12 (see Excluded studies). There are 13 ongoing studies (*see* Ongoing studies) and 8 studies await classification (Acosta-Olivo 2011; Celik 2016; Demir 2015; Karimzadeh 2017; Mahindra 2016; Saba 2016; Sherpy 2016; Vahdatpour 2016).

A flow diagram summarising the study selection process is shown in Figure 1.

Figure 1. Study flow diagram



Included studies

All 39 included studies are described in the Characteristics of included studies and are summarised below.

Study design

We included 36 randomised controlled trials (RCTs) and three quasi-RCTs (Biswas 2011; Canyilmaz 2015; Zamani 2014). All included studies were parallel group trials except Díaz-Llopis 2012, which was a partial cross-over design (we used data only from the initial phase of this RCT). Most trials included two arms; six had three arms relevant to this Review (Ball 2012; Kiter 2006; Kriss 2003; Lynch 1998; Mulherin 2009; Yucel 2009); and one had four arms (Crawford 1999). Except for Lynch 1998, the other six trials contributed data to two separate comparisons.

Population

The included studies randomised a total of 2492 adult participants. Most trials were small, recruiting a median of 56 participants (range 17 to 276 participants). Participants were aged from 18 years to 87 years; mean age (36 trials) ranged from 34 years (Saber 2012) to 59 years (Kriss 2003). Most studies recruited both males and females except Omar 2012, which only recruited female participants. Three studies did not report the gender distribution of the participants (Hunt 2004; Lynch 1998; Tiwari 2013). The percentage of female participants ranged from 28% (Black 1996) to 100% (Omar 2012). Where reported, studies used similar criteria for clinical diagnosis of plantar fasciitis and recruited patients who had plantar heel pain for wide range of time; the most extreme was in Kiter 2006, where the duration of symptoms ranged from 6 to 180 months. The mean duration of reported pain in 24 trials ranged from 13.7 weeks (Porter 2005) to 70.4 months (Ryan 2014). The mean baseline body mass index reported by 19 trials ranged from 24.3 kg/m^2 to 39.28 kg/m^2. None of the studies provided details of pre-trial levels of activity.

Ten trials explicitly stated inclusion of participants who had unilateral heel pain only (Biswas 2011; Chen 2013; Guner 2013; Kriss 2003; Li 2014; Saber 2012; Sorrentino 2008; Tsai 2006; Yucel 2013; Zamani 2014). Six studies reported the inclusion of participants with bilateral heel involvement (Blockey 1956, 16%; Kane 2001, 14%; McMillan 2012, 30%; Ryan 2014, 43%; Yucel 2009, 30%; Yuzer 2006, 44%). Blockey 1956 did not specify group allocation for three participants with bilateral involvement. Three (of 21) participants in Kane 2001 and eight (of 27) participants in Yucel 2009 had bilateral heel pain with each heel allotted to different interventions. In McMillan 2012 and Yuzer 2006, equal proportions of participants with bilateral heel pain were randomised to both arms. In Ryan 2014, 12 participants (43%) of each group were treated for bilateral heel pain; only the results of the heel with the more severe pain

were included in the analyses. Twenty-one trials explicitly reported exclusion of participants who had earlier received steroid injection in the heel (Abdihakin 2012; Ball 2012; Chen 2013; Crawford 1999; Díaz-Llopis 2012; Guner 2013; Kane 2001; Kiter 2006; Li 2014; Mardani-Kivi 2015; McMillan 2012; Mulherin 2009; Porter 2005; Ryan 2014; Saber 2012; Sorrentino 2008; Tiwari 2013; Yucel 2009; Yucel 2010; Yucel 2013; Yuzer 2006).

Setting

Included studies were conducted in 17 countries: Australia (McMillan 2012; Porter 2005); Canada (Ryan 2014); China (Li 2014); Egypt (Omar 2012; Saber 2012); India (Biswas 2011; Tiwari 2013); Iran (Mardani-Kivi 2015; Zamani 2014); Ireland (Kane 2001); Italy (Sconfienza 2011; Sorrentino 2008); Kenya (Abdihakin 2012); Malaysia (Lee 2007); Mexico (Elizondo-Rodriguez 2013); Pakistan (Akhtar 2009); Spain (Díaz-Llopis 2012); Taiwan (Chen 2013; Tsai 2006); Turkey (Canyilmaz 2015; Guner 2013; Kiter 2006; Yucel 2009; Yucel 2010; Yucel 2013; Yuzer 2006); United Kingdom (Ball 2012; Black 1996; Blockey 1956; Crawford 1999; Kriss 2003; Mulherin 2009; Jain 2015) and USA (Hanselman 2015; Hunt 2004; Lynch 1998; Monto 2014; Wilson 2013).

In most trials, participants were on follow-up in outpatient specialty clinics of tertiary care hospitals. Follow-up period ranged from 1 month to 24 months.

Interventions

Variations in local steroid preparations used for local injection

Various preparations and doses of corticosteroids were used in the trials. These are listed based on the potency of the steroid used.

Low potency corticosteroids (short duration of action)

- Cortisone (Monto 2014); and
- Hydrocortisone acetate (Blockey 1956).

Intermediate potency corticosteroids (intermediate duration)

- Methylprednisolone acetate (Abdihakin 2012; Akhtar 2009; Ball 2012; Biswas 2011; Canyilmaz 2015; Guner 2013; Hanselman 2015; Hunt 2004; Kiter 2006; Mardani-Kivi 2015; Mulherin 2009; Sorrentino 2008; Tiwari 2013: Zamani 2014);
- Prednisolone (Crawford 1999); and
- Triamcinolone acetonide (Black 1996; Kane 2001; Kriss 2003; Lee 2007; Li 2014; Jain 2015; Wilson 2013).

High potency corticosteroids (long duration)

- Betamethasone (Chen 2013; Díaz-Llopis 2012; Porter 2005);
- Dexamethasone (Ryan 2014; Tsai 2006)
- Dexamethasone isonicotinate (Elizondo-Rodriguez 2013);
- Dexamethasone sodium (McMillan 2012); and
- Dexamethasone sodium phosphate (Lynch 1998).

Combination corticosteroids

- Betamethasone dipropionate (long acting) and betamethasone sodium phosphate (short acting) (Saber 2012; Yucel 2009; Yucel 2010; Yucel 2013; Yuzer 2006).

Unknown steroid

Omar 2012 and Sconfienza 2011 did not report the type of steroid used in the intervention group.

Most trials used some form of local anaesthetic agent with the steroid, except five studies (Blockey 1956; Kriss 2003; McMillan 2012; Monto 2014; Zamani 2014). Tibial nerve block preceded the intervention to reduce the immediate post-intervention pain in McMillan 2012, and in two arms of Crawford 1999 and of Mulherin 2009.

Site of steroid injection

Most studies reported injecting steroid into the maximum area of tenderness in the plantar heel. Exceptions were McMillan 2012, Monto 2014, Sorrentino 2008 and Yucel 2013, where palpation was not used to guide injections (either steroid or saline); injections were administered locally in the region of maximal fascia thickening as seen on ultrasonography for participants in both intervention and control arms. These four studies did not compare injection guidance methods.

Repeat injections of steroids (or other agents)

Most studies involved a single injection of the intervention drug. Seven studies administered repeat injections of the same agent under the following individualised criteria:

- Blockey 1956 administered one more injection from the same intervention after a three-week interval;
- Díaz-Llopis 2012 gave participants who had not improved following the first injection a second injection of the alternate drug a month later;
- Hanselman 2015 offered a second injection of the same intervention after a six-week interval;
- Kiter 2006 gave three more injections at one-month intervals if pain was not relieved (some participants in the steroid group needed a second injection and some in the other two groups needed three injections);
- Lee 2007 offered repeat injections at six-week intervals if pain was not entirely relieved until the participant was satisfied or refused further injections. Only five participants received a second injection of the same intervention three months after the first injection;
- Lynch 1998 gave a maximum of two successive injections, which was offered after a two-week interval; and
- Saber 2012 gave one repeat injection at a two-week interval for all participants.

Comparisons

Injected corticosteroids were compared with the following conditions in the included studies.

1. Placebo or no treatment

Eight trials, involving 721 participants (724 heels) compared:

- Steroid versus no treatment: Akhtar 2009; Kriss 2003; Mulherin 2009; and
- Steroid versus placebo: Abdihakin 2012; Ball 2012; Blockey 1956; Crawford 1999; McMillan 2012.

2. Tibial nerve block with anaesthetic

Two trials, involving 79 participants, compared steroid injection versus tibial nerve block with an anaesthetic agent (Crawford 1999; Mulherin 2009).

3. Orthoses

Four trials, involving 214 participants, compared steroid injection with orthoses:

- Soft anti-pronatory pad: Kriss 2003;
- Viscoelastic heel cup: Black 1996; Lynch 1998;
- Prefabricated full length silicone insole: Yucel 2013; and
- Low dye strapping followed by fabricated orthosis: Lynch 1998.

4. Oral nonsteroidal anti-inflammatory drugs (NSAIDs)

Two trials, involving 153 participants, compared injected steroids with:

- Oral diclofenac + paracetamol: Biswas 2011; and
- Oral naproxen: Hunt 2004.

5. Intensive physiotherapy

One trial compared steroid injection versus intensive physiotherapy in 65 participants (Ryan 2014).

6. Physical modalities

Eight trials compared steroid injection with physical modalities:

- Extracorporeal shock wave therapy (5 trials, 391 participants: Mardani-Kivi 2015; Porter 2005; Saber 2012; Sorrentino 2008; Yucel 2010);
- Laser (2 trials, 94 participants: Yuzer 2006; Zamani 2014); and
- Radiation therapy (1 trial, 128 participants: Canyilmaz 2015).

7. Other invasive procedures

Fourteen trials compared steroid injection with another invasive procedure:

- Locally injectable NSAID (tenoxicam) (1 trial, 64 participants: Guner 2013);
- Platelet-rich plasma injections (5 trials, 206 participants: Jain 2015; Monto 2014; Omar 2012; Tiwari 2013; Wilson 2013);
- Autologous blood injections (2 trials, 94 participants: Kiter 2006; Lee 2007);
- Botulinum toxin injections (2 trials, 96 participants: Díaz-Llopis 2012; Elizondo-Rodriguez 2013);
- Cryopreserved human amniotic membrane injection (1 trial, 24 participants: Hanselman 2015);
- Localised peppering involving multiple pricking of the tissues causing minor bleeds using an inserted needle (1 trial, 30 participants: Kiter 2006);
- Dry needling (1 trial, 50 participants: Sconfienza 2011); and
- Mini scalpel needle release (1 trial, 61 participants: Li 2014).

8. Different techniques of local steroid injection

Five trials compared various techniques to localise the site of injection. Numbers of participants pertain to those randomised in each comparison.

- Steroid injection using ultrasonography versus palpation to localise the site of injection (5 trials,144 participants, 152 heels: Ball 2012; Chen 2013; Kane 2001; Tsai 2006; Yucel 2009); and
- Steroid injection using scintigraphy versus palpation to localise the site of injection (1 trial, 16 participants, 20 heels: Yucel 2009).

9. Local anaesthesia alone

No trials compared local anaesthesia alone with injectable steroids.

Primary outcomes

Heel pain

Heel pain was reported by all trials. All studies, except five, reported pain using the visual analogue scale (VAS). Four trials used the following scores:

- Foot Health Status Questionnaire (FHSQ): Díaz-Llopis 2012;
- Foot Function Index (FFI): Hunt 2004;
- American Orthopedic Foot and Ankle Society score (AOFAS): Monto 2014; and
- Mayo Clinical Scoring System: Saber 2012.

Blockey 1956 did not specify the method used to assess pain no did they define "improvement of pain" and "cure". Data from this study were not used in the meta-analysis.

Function

Foot function was assessed and reported by 15 trials using nine different tools:

- AOFAS (Conceição 2016; Kitaoka 1994) used by Elizondo-Rodriguez 2013, Kiter 2006, Monto 2014 and Jain 2015.
- Five level function score (Heyd 2007; Rowe 1963): used by Canyilmaz 2015.
- Foot and Ankle Ability Measure (FAAM) (Eechaute 2007; Martin 2005; Martin 2007): used by Wilson 2013.
- Foot and Ankle Disability Index (FADI) (Eechaute 2007; Hale 2005; Martin 2007): used by Elizondo-Rodriguez 2013 and Ryan 2014.
- Foot and Ankle Outcome Score (FAOS) (Mani 2013; Roos 2001): used by Yucel 2013.
- FFI score (Agel 2005; Budiman-Mak 2001; Kuyvenhoven 2002; Landorf 2002; Martin 2007; Saag 1996): used by Abdihakin 2012 and Hunt 2004.
- FHSQ (Bennett 1998; Landorf 2002; Martin 2007): used by Díaz-Llopis 2012, Hanselman 2015, McMillan 2012 and Omar 2012.
- Maryland Foot and Ankle score (Attar 2014; Martin 2007): used by Elizondo-Rodriguez 2013.
- Mayo Clinical Scoring System (Tornese 2008): used by Saber 2012.

Adverse effects

Twenty-one studies reported on adverse events (Ball 2012; Biswas 2011; Blockey 1956; Canyilmaz 2015; Chen 2013; Díaz-Llopis 2012; Elizondo-Rodriguez 2013; Guner 2013; Jain 2015; Kane 2001; Kriss 2003; Lee 2007; McMillan 2012; Porter 2005; Saber 2012; Sorrentino 2008; Tiwari 2013; Tsai 2000; Yucel 2010; Yucel 2013; Yuzer 2006).

Follow-up

Length of follow-up was at least three months in most trials. Most also recorded outcomes at six months. Monto 2014 and Yucel 2009 had the longest follow-up of over two years. Seven trials had two months or less follow-up (1 month in Yucel 2013; 6 weeks in Omar 2012, Sorrentino 2008 and Zamani 2014; 2 months in Abdihakin 2012, Akhtar 2009 and Biswas 2011).

Funding sources

Eight trials explicitly mentioned funding sources. These were internal sources in two trials (Chen 2013; Zamani 2014), charity or national funders in five trials (Crawford 1999; Kriss 2003; McMillan 2012; Ryan 2014; Tsai 2006) and industry in one trial (Hanselman 2015).

Excluded studies

We excluded 12 studies following assessment of full text articles (Characteristics of excluded studies).

Four studies were not RCTs or quasi-RCTs (Kalaci 2009 Marabha 2008; Say 2014; Tsai 2000). D'Agostino 2005 did not include participants with plantar heel pain. Al-Bluwi 2011 and Wang 2006 did not present separate injected steroid-related data and further data were not obtainable. Two trials were excluded because corticosteroid injection was used in combination with one or several active interventions (Hammer 2002; Motififard 2008). Hammer 2002 compared extracorporeal shockwave therapy versus "conventional conservative treatment" comprising local steroid injections plus NSAIDs; heel cup; orthoses, shoe modifications or both; and electrotherapy. Motififard 2008 compared corticosteroid injection followed by two weeks of plaster cast immobilisation with heel pad. Helfand 1973 evaluated corticosteroid injection for various foot disorders but did not provide separate data for plantar fasciitis. ISRCTN57762240 was conducted many years ago and no further information is likely to be forthcoming. NCT01127672 was withdrawn prior to enrolment or participants.

Ongoing studies

We identified 13 ongoing studies (*see* the Characteristics of ongoing studies).

Two trials compare injectable steroids with extracorporeal shock wave therapy (IRCT201203069221N1; IRCT201306163217N7). IRCT201306163217N7 was published in September 2016, but we have yet to obtain a copy of the full report (Eslamian 2016). Three trials compare steroids with platelet-rich plasma (ACTRN12610000899044; NCT00758641; NCT01957631). Other trials compare injectable steroids with dextrose (IRCT2015041321744N1), prolotherapy (IRCT201108157323N2), autologous conditioned plasma (NCT01614223), botulinum toxin (NCT03054610), human amniotic allograft (NCT02982226), multi-element exercise programme (NCT01297686), physical training (NCT01994759) and foot orthoses (Whittaker 2017).

Studies awaiting classification

Details of the eight small trials in this category are presented in the Characteristics of studies awaiting classification. All eight trials were found in a search update in March 2017. Final publications are pending for two trials (Acosta-Olivo 2011; Demir 2015); and the other six will be assessed for inclusion in a future update (see Potential biases in the review process).

Four trials (164 participants) compared steroid injection versus platelet-rich plasma injection (Acosta-Olivo 2011; Mahindra 2016; Sherpy 2016; Vahdatpour 2016). Mahindra 2016 also compared steroid versus placebo injection in 50 participants. Steroid injection was compared with: joint mobilisation and stretching exercise in Celik 2016 (43 participants); dextrose prolotherapy or corticosteroid phonophoresis in Demir 2015 (150 participants); and autologous whole blood injection or conservative treatment comprising education and a daily stretching programme in Karimzadeh 2017 (36 participants). Saba 2016 (21 participants) compared ultrasound-guided versus palpation-guided local corticosteroid injections.

Risk of bias in included studies

Assessments for individual trials are detailed in the 'Risk of bias' tables accompanying each study in the Characteristics of included studies table and summarised in Figure 2. An overall summary of the risk of bias for the seven domains is shown in Figure 3.

Figure 2. Risk of bias summary: review authors' judgements about each risk of bias item for each included study

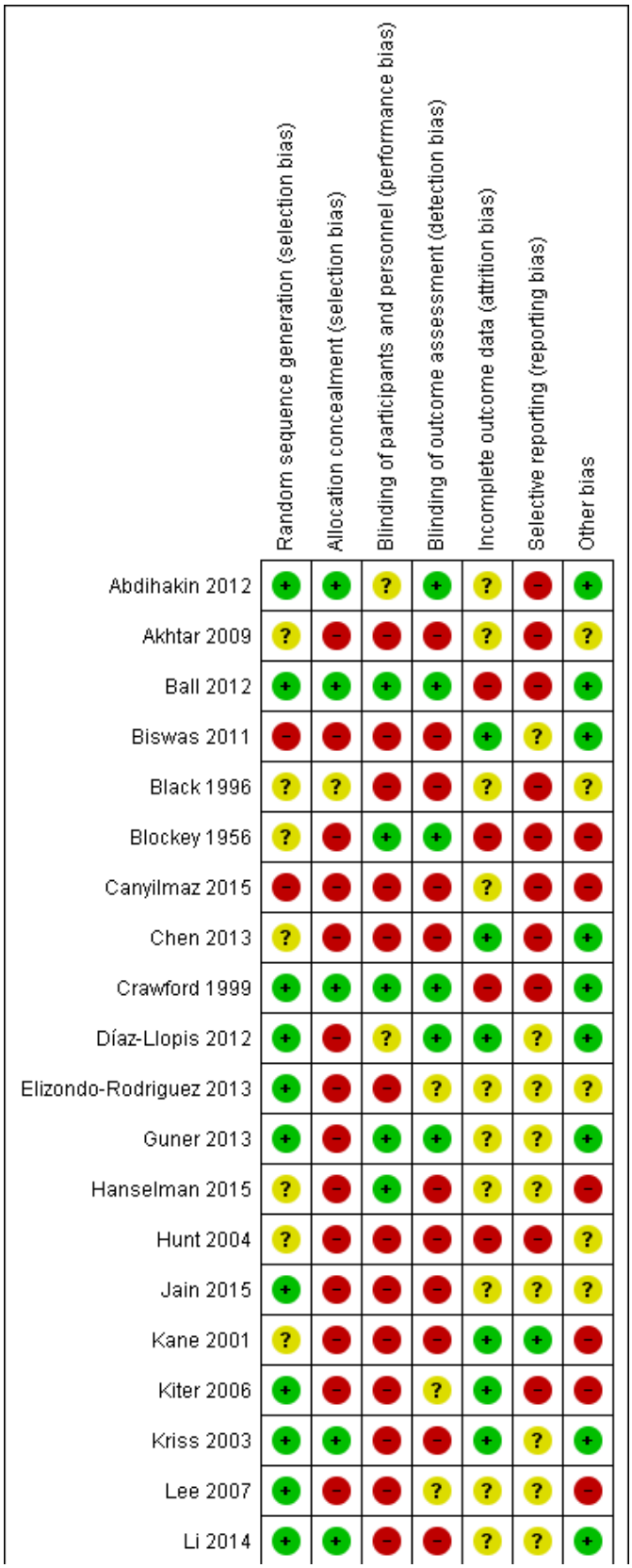


Figure 2. (Continued)

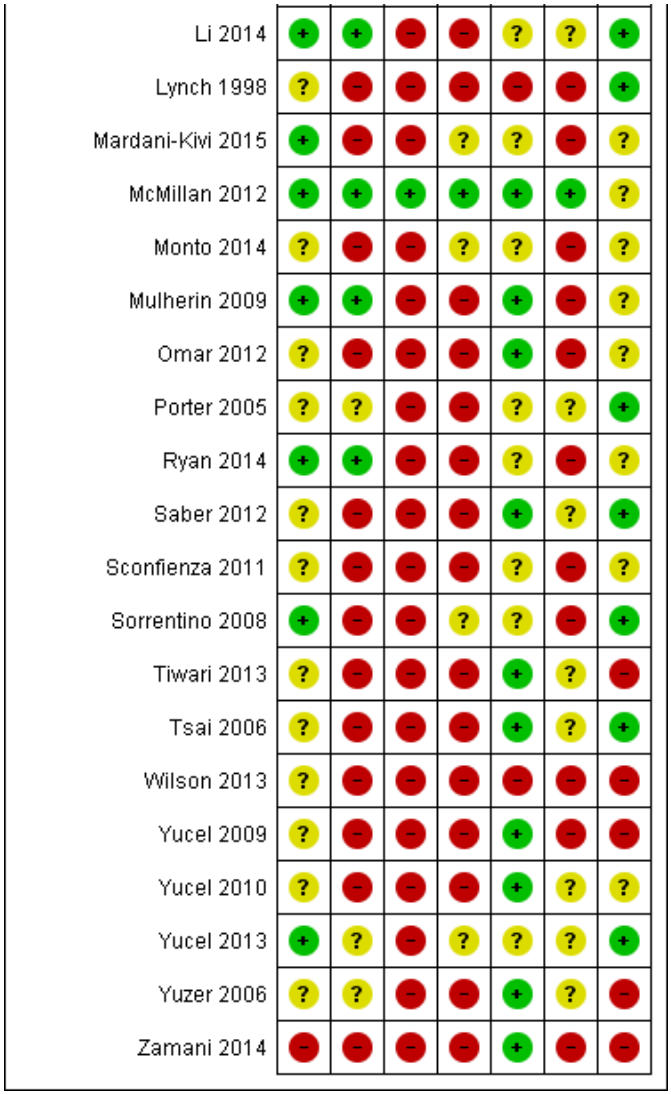
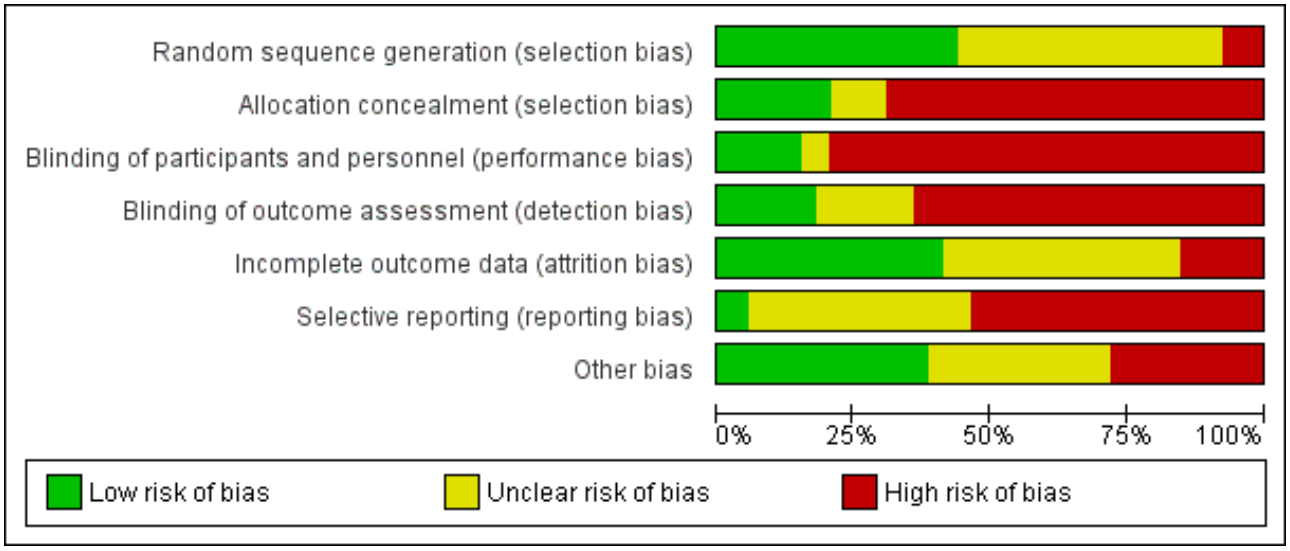


Figure 3. Risk of bias graph: review authors' judgements about each risk of bias item presented as percentages across all included studies



Allocation

Random sequence generation

Only 20 (of 39) studies explicitly reported their method of sequence generation. Of these, 17 studies were rated at low risk of bias because they applied, or appear to have applied, appropriate methods for generating a random sequence using the following methods.

- Computer-generated random numbers: 11 studies (Abdihakin 2012; Crawford 1999; Díaz-Llopis 2012; Elizondo-Rodriguez 2013; Lee 2007; Li 2014; McMillan 2012; Mulherin 2009; Jain 2015; Sorrentino 2008; Yucel 2013).
- Block randomisation: three studies (Ball 2012; Mardani-Kivi 2015; Ryan 2014), two of which referred to computer-generated methods.
- Drawing of lots: Guner 2013; Kiter 2006.
- Using randomisation cards: Kriss 2003.

Three quasi-RCTs used methods that were not considered to generate a random sequence generation: Biswas 2011 and Zamani 2014 used odd and even numbers to generate the sequence, while Canyilmaz 2015 allocated participants based on order of admission. These three studies were judged at high risk of bias for this domain.

The remaining 19 studies did not report the method of randomisation used and were assessed at unclear risk of bias.

Allocation concealment

Of the 10 studies reporting methods of allocation concealment, eight were rated at low risk of bias for this domain. In five, interventions were allocated either by an independent observer (Ball 2012; McMillan 2012; Ryan 2014), a pharmacist (Abdihakin 2012), or a secretary (Crawford 1999), none of whom were involved in the study. Three of the five studies using sealed envelopes to conceal allocation reported adequate safeguards (Kriss 2003; Li 2014; Mulherin 2009), whereas these were not confirmed in two other studies that used sealed envelopes (Porter 2005; Yuzer 2006).

These two studies and two others (Black 1996; Yucel 2013) that reported allocation concealment, but did not report on methods, were assessed at unclear risk of selection bias. The remaining 27 studies were judged at high risk of bias for this domain; none reported any attempt at allocation concealment.

Blinding

Blinding of participants and personnel (performance bias)

Six studies were judged at low risk of performance bias because they attempted to blind both participants and personnel either through sham or placebo interventions (sham ultrasound in Ball 2012), similar-looking solutions (Blockey 1956; Guner 2013; McMillan 2012) or by masking syringes to hide the solutions to be injected (Crawford 1999; Hanselman 2015). Abdihakin 2012 and Díaz-Llopis 2012 attempted to blind both participants and the personnel; however, the nature of the interventions were such that blinding could have been broken. Thus, we rated these two studies at unclear risk of performance bias. The remaining 32 studies were judged at high risk of performance bias because they did not attempt to blind either participants or personnel.

Blinding of outcome assessors (detection bias)

Six studies were rated at low risk of detection bias because there was a separate blinded assessor along with blinded participants (Ball 2012; Blockey 1956; Crawford 1999; Díaz-Llopis 2012; Guner 2013; McMillan 2012). Although subjective outcomes were studied, participants' blinding and the similar nature of the interventions excluded the possibility of detection bias. Abdihakin 2012 was also rated at low risk of bias because only the independent pharmacist knew what intervention had been provided and participants were very unlikely to have guessed.

In seven studies, the outcome assessor was blinded, but it is likely that blinding could have been broken due to the lack of participants' blinding or that the interventions were dissimilar in their application (Elizondo-Rodriguez 2013; Kiter 2006; Lee 2007; Mardani-Kivi 2015; Monto 2014; Sorrentino 2008; Yucel 2013). These were judged at unclear risk of detection bias.

The remaining 25 studies were rated at high risk of detection bias because they did not report blinding of outcome assessment.

Incomplete outcome data

Sixteen studies were rated at low risk of attrition bias (Biswas 2011; Chen 2013; Díaz-Llopis 2012; Kane 2001; Kiter 2006; Kriss 2003; McMillan 2012; Mulherin 2009; Omar 2012; Saber 2012; Tiwari 2013; Tsai 2006; Yucel 2009; Yucel 2010; Yuzer 2006; Zamani 2014); all randomised participants were included in analyses. Although two other studies also reported no losses, both were rated at unclear risk of bias: Monto 2014 because of incomplete data for AOFAS scores and Sorrentino 2008 because of data discrepancies. Six studies were assessed at high risk of attrition bias: five studies (Blockey 1956; Crawford 1999; Hunt 2004; Lynch 1998; Wilson 2013) because of a high rate of attrition and one study (Ball 2012) because those excluded from the analysis had negative outcomes.

The remaining 15 studies were rated at unclear risk for attrition bias because of the uncertain affects on the study findings from: exclusion of a small number of participants (< 10%) (Abdihakin 2012; Black 1996; Canyilmaz 2015; Elizondo-Rodriguez 2013; Guner 2013; Hanselman 2015; Lee 2007; Li 2014; Porter 2005; Yucel 2013); failure to report on numbers of participants who were followed up at each visit (Akhtar 2009; Jain 2015; Sconfienza 2011); exclusion for reasons that would be unlikely to affect outcome (Mardani-Kivi 2015); or a sincere attempt was made to trace those lost to follow-up (Ryan 2014).

Selective reporting

Trial registration documents were available for six studies (Ball 2012; Crawford 1999; Mardani-Kivi 2015; McMillan 2012; Ryan 2014; Zamani 2014). However, registration was retrospective in Ball 2012 and Crawford 1999.

Our key determinant of reporting bias was the failure to record or report on adverse events. Thus, 17 studies were rated at high risk of reporting bias because they did not report on adverse events (Abdihakin 2012; Akhtar 2009; Black 1996; Chen 2013; Crawford 1999; Hunt 2004; Kiter 2006; Lynch 1998; Mardani-Kivi 2015; Monto 2014; Mulherin 2009; Omar 2012; Ryan 2014; Sconfienza 2011; Wilson 2013; Yucel 2009; Zamani 2014). Four other studies were also rated at high risk of bias: Ball 2012 because of concerns in selective reporting of adverse events; Blockey 1956 because of poorly defined outcomes; Canyilmaz 2015 because of incomplete reporting; and Sorrentino 2008 because it was confusingly reported.

We rated two studies at low risk of reporting bias (Kane 2001; McMillan 2012). Although there was no trial registration document for Kane 2001, the trial report provided individual patient data. The remaining 16 studies, none of which had trial registration documents available, were rated at unclear risk of bias although they typically reported all prespecified outcomes including adverse events (Biswas 2011; Díaz-Llopis 2012; Elizondo-Rodriguez 2013; Guner 2013; Hanselman 2015; Jain 2015; Kriss 2003; Lee 2007; Li 2014; Porter 2005; Saber 2012; Tiwari 2013; Tsai 2006; Yucel 2010; Yucel 2013; Yuzer 2006).

Other potential sources of bias

We assessed studies for other potential sources of bias. Fifteen studies were rated at low risk of other bias (Abdihakin 2012; Ball 2012; Biswas 2011; Chen 2013; Crawford 1999; Díaz-Llopis 2012; Guner 2013; Kriss 2003; Li 2014; Lynch 1998; Porter 2005; Saber 2012; Sorrentino 2008; Tsai 2006; Yucel 2013); this included no notable imbalance in the baseline characteristics between groups.

Conversely, 11 studies were assessed at high risk of other bias. Blockey 1956 had no data to assess whether there were any major imbalances in baseline characteristics and included three participants with bilateral heel pain whose distribution and impact were not reported. Blockey 1956 also reported giving a second injection but not to all participants whose pain was not relieved. Canyilmaz 2015 had baseline imbalance and a quarter of participants included an additional intervention of the participant's choice, which contaminated the data. Similarly, Hanselman 2015, Lee 2007 and Zamani 2014 included administration of a second intervention of the participant's choice during follow-up. Yucel 2009 and Yuzer 2006 had included participants with bilateral heel pain in both arms but the potential clustering effect on the analysis was not considered. Kane 2001 also had baseline variability; some participants had prior heel injections. Kiter 2006 deviated from protocol by administering one intervention for some participants without local anaesthetic and some others received an extra injection to the heel. Tiwari 2013 did not report on participants' baseline characteristics, some of whom had used additional interventions such as orthoses, insoles and pads that could have affected the outcomes measured. Wilson 2013 was an interim analysis reporting results for only 13 of 30 participants who had been enrolled.

Thirteen studies were rated at unclear risk of other bias. Baseline characteristics were not mentioned in four studies (Akhtar 2009; Elizondo-Rodriguez 2013; Hunt 2004; Sconfienza 2011) and we could not obtain sufficient details from Black 1996 to assess this risk. Baseline characteristics were only available for those followed-up in Mardani-Kivi 2015 (68 of 84 participants) and Ryan 2014 (56 of 65 participants). Three studies had a baseline imbalance in only one variable (AOFAS scores in Monto 2014; disease duration in Mulherin 2009; and pain scores in Yucel 2010) and we are unsure how these would affect the outcomes measured in these three studies. Similarly, we were unsure of the effects of including only female participants in Omar 2012 and having equal numbers of participants with bilateral heels in Jain 2015. Although McMillan 2012 had taken measures to counteract the effects of including participants with bilateral heel pain in both arms, the potential effect on the results of the measure taken (participants were asked to describe foot function as well as other symptoms without reference to a specific foot) is not known.

Effects of interventions

See: **Summary of findings for the main comparison** Local steroid injection compared with placebo or no treatment control for plantar heel pain in adults

The 39 included trials evaluated comparisons in eight different categories. Below, we present the effects (benefits and harms) of injected corticosteroids for the treatment of plantar heel pain according to these comparisons and the duration of follow-up: short-term (up to 1 month), medium-term (1 to 6 months) and long-term (more than 6 months). In our interpretation of heel pain measured using the VAS 100 mm scale, we took 8 mm to represent the minimal clinically important difference (MCID) (Landorf 2010).

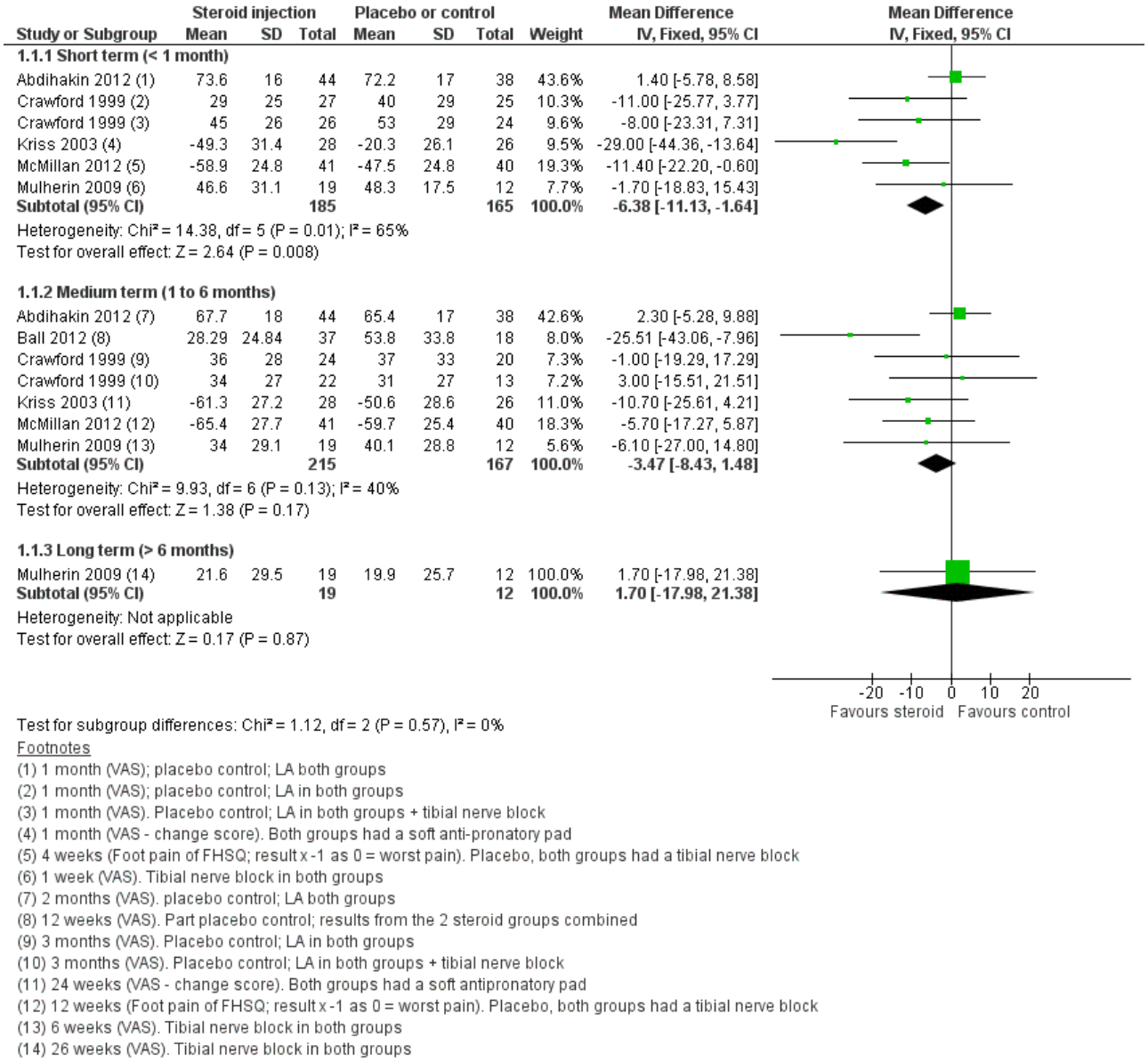
1. Local steroid injection versus placebo or no treatment

Eight trials compared local steroid injection with placebo (Abdihakin 2012; Ball 2012; Blockey 1956; Crawford 1999; McMillan 2012) or no treatment control (Akhtar 2009; Kriss 2003; Mulherin 2009) in 724 participants. Table 1 summarises key participant characteristics of the eight trials and Table 2 summarises the interventions and co-interventions for this comparison. No adjustment was made or was possible for the unit of analysis issue relating to inclusion of three participants with bilateral heel pain in Blockey 1956. Although McMillan 2012 had six participants (12 heels) in each group with bilateral heel involvement, participants reported symptoms (e.g. pain) without reference to a specific foot. An unknown number of participants in Crawford 1999 participated more than once in this trial. None of the trials reported on return to previous activity, health-related quality of life or patient satisfaction.

Heel pain

Heel pain was assessed by VAS (0 to 100; higher scores = worse pain) in all studies. However, VAS pain data from pooling were only provided in six trials. In McMillan 2012 data for pooling were available only from the foot pain component of FHSQ (0 to 100: lower scores = worse pain). Final scores were used, except in Kriss 2003, where change scores were presented. The results for heel pain for short-term, medium-term and long-term follow-up are presented in Figure 4 (Analysis 1.1).

Figure 4. Forest plot of comparison: 1 Local steroid injection versus placebo, outcome: 1.1 Heel pain



Pooled data from six trials showed slightly better pain scores at short-term follow-up after steroid injection (MD -6.38, 95% CI -11.13 to -1.64; 350 participants; I^2 = 65%; low quality evidence downgraded one level for serious risk of bias and one level

for serious inconsistency and imprecision). Although the 95% CI includes the 8 mm MCID, the clinical importance of this result is marginal. The trial results are dominated by Abdihakin 2012; using the random-effects model, which gives a more equal distribution of weights, shows an increased effect in favour of steroid injection (MD -9.22, 95% CI -18.00 to -0.45; analysis not shown). However, a sensitivity analysis presenting data from the four placebo-controlled trials only (thus removing data from Kriss 2003 and McMillan 2012), shows steroid injection made no clear difference to heel pain in the short-term, the 95% CI now including the line of no effect (MD -4.21, 95% CI -9.43 to 1.00; 265 participants, I^2 = 41%; analysis not shown).

At medium-term follow-up, pooled data from seven trials showed no clear between-group differences in heel pain (MD -3.47, 95% CI -8.43 to 1.48; 382 participants; I^2 = 40%; low quality evidence downgraded one level for serious risk of bias and one level for inconsistency and serious imprecision). The 95% CI included the line of no effect but also the possibility of a marginally clinically important reduction in pain after steroid injection. Restricting the data to those from the placebo-controlled trials (thus excluding data from Kriss 2003 and McMillan 2012) showed no benefit from steroid injection in the medium-term (MD -2.34, 95% -7.76 to 3.08; 297 participants; I^2 = 55%; analysis not shown).

Long-term (at 6 months) follow-up data from Mulherin 2009 showed no difference in heel pain between groups (MD 1.70, 95% CI -17.98 to 21.38; 31 participants; very low quality evidence downgraded for serious risk of bias and very serious imprecision; Analysis 1.1). Crawford 1999 also reported there were no between-group differences detected at six months.

A subgroup analysis based on duration of follow-up did not reveal a difference in effect among the subgroups (test for subgroup differences: P = 0.57; I^2 = 0%).

Akhtar 2009 reported fewer participants had heel pain (ranging from mild to severe) in the steroid injection group compared with the no injection group at eight weeks follow-up (pain on weight bearing 29/138 versus 83/138; RR 0.35, 95% CI 0.25 to 0.50; 276 participants; very low quality evidence downgraded two levels for very serious risk of bias and one level for serious indirectness reflecting the suboptimal outcome measure; Analysis 1.2). Blockey 1956 found no difference between steroid and placebo injection groups in numbers of heels with unrelieved pain at six months (3/13 versus 4/9; RR 0.52, 95% CI 0.15 to 1.78; very low quality evidence downgraded two levels for very serious risk of bias and one level for serious imprecision; Analysis 1.2).

Abdihakin 2012 (82 participants) found no between-group difference in first step pain at either short-term (MD -2.80, 95% CI -11.09 to 5.49) or medium-term follow-up (MD 3.00, 95% CI -5.05 to 11.05; Analysis 1.3). McMillan 2012 (81 participants) also reporting on first step pain (measured by VAS) found better (clinically important) pain scores in the steroid injection group at four weeks but not at 12 weeks (Analysis 1.4).

Function

Foot function was reported by two trials (Abdihakin 2012; McMillan 2012). Abdihakin 2012 (82 participants) found no clear difference between groups on the Foot Function Index (scores as 0 to 100; higher scores = worse function) at either one month (MD -0.54, 95% CI -7.55 to 6.47) or two months follow-up (MD 1.78, 95% CI -4.83 to 8.39; very low quality evidence downgraded one level for serious risk of bias and two levels for very serious imprecision; Analysis 1.5). McMillan 2012 (81 participants) also found no clear difference between groups in function measured by FHSQ (very low quality evidence downgraded one level for serious risk of bias and two levels for very serious imprecision; Analysis 1.6).

Serious and minor adverse events and treatment failure

No participant was reported to have developed any serious or minor adverse events in either steroid injection or control groups in four trials (Ball 2012; Blockey 1956; Kriss 2003; McMillan 2012; 219 participants; very low quality evidence downgraded for serious risk of bias including reporting bias and very serious imprecision reflecting the rarity of serious adverse events; Analysis 1.7).

Data from three trials contributing to treatment failure were based on different definitions: in Akhtar 2009, treatment failure was defined as participants with any heel pain (mild to severe) upon weightbearing at eight weeks follow-up; in Ball 2012, the definition was participants receiving steroid injections at 12 weeks follow-up; and in Blockey 1956, it was non-relief of pain at six months. Pooled data from these three trials showed significantly fewer participants experienced treatment failure after steroid injection (39/195 versus 98/168; RR 0.35, 95% CI 0.26 to 0.48; 363 participants; I^2 = 0%; very low quality evidence downgraded two levels for very serious risk of bias and one level for serious indirectness reflecting the diversity in the outcome definition; Analysis 1.8).

2. Local steroid injection versus tibial nerve block

Two trials, involving 79 participants, compared local steroid injection versus tibial nerve block (Crawford 1999; Mulherin 2009). Neither trial reported on function, adverse events, return to previous activity, quality of life or patient satisfaction. Additional data were obtained for each trial from lead trial investigators. The evidence for heel pain was judged at very low quality, downgraded two levels for very serious risk of bias, and one level either because of serious inconsistency for pooled VAS pain in medium-term scores or serious imprecision from too few participants. Three month follow-up data were presented rather than six month data in Crawford 1999 because losses to follow-up were fewer (reported at 25% at 3 months and 48% at 6 months).

Heel pain

Steroid injection gave better pain relief than tibial nerve block in the short-term (MD -19.87 favouring steroid injection, 95% CI -31.72 to -8.02; 77 participants; I^2 = 0%; Analysis 2.1). The minimal clinically important difference of 8 mm, determined by Landorf 2010, is within the confidence interval and hence this result is probably clinically significant. The medium-term results of the two trials were significantly heterogenous, with only Mulherin 2009 showing lower pain in the steroid group (pooled data from both trials: MD -11.71, 95% CI -24.68 to 1.26; 63 participants; I^2 = 84%). Mulherin 2009 found no clear difference between groups at 26 weeks (MD 7.80, 95% CI -12.16 to 27.76; 26 participants, Analysis 2.1).

3. Local steroid injection versus orthoses

Four trials (214 participants) compared local steroid injection with orthoses (Black 1996; Kriss 2003; Lynch 1998; Yucel 2013). These heterogenous trials tested different orthoses: Kriss 2003 tested a soft anti-pronatory pad; Black 1996 and Lynch 1998 tested a visco-

elastic heel cup; Lynch 1998 also tested low dye strapping with a long metatarsal pad for four weeks followed by prefabricated orthosis; and Yucel 2013 tested a fabricated full-length silicone insole. None of the trials reported on return to previous level of activity or to work. The evidence for all outcomes was judged at very low quality, downgraded for serious risk of bias, serious inconsistency for pooled VAS pain scores, and serious imprecision.

Heel pain

All four trials measured heel pain in VAS (0 to 100; higher scores = worse pain). Instead of final scores, Kriss 2003 and Lynch 1998 reported change scores; these are shown as negative scores in Analysis 3.1. The short-term (4 weeks) results of Kriss 2003 and Yucel 2013 are significantly heterogeneous; however, both found lower pain scores in the steroid group (the pooled result should not be considered here). Pooled results using the random-effects model at medium-term follow-up did not show a clear difference between groups (MD -5.35 favouring steroid, 95% CI -19.86 to 9.16; 133 participants, 2 studies; I^2 = 47%). Crawford 2003 reported that Black 1996 (14 participants) found no statistical significant difference between groups in pain scores at three months (final VAS based on a 10 cm scale was 4.0 cm in the steroid group versus 2.4 cm in the orthotics group); these results, however, favoured the orthotics group.

Function and quality of life

Function and quality of life was measured by Yucel 2013 (40 participants) using a standardised 42 item tool: the Foot and Ankle Outcome Score (FAOS). Three FAOS subscales (0 to 100: best outcome) on activities of daily living, sports and recreation function and quality of life are presented in Analysis 3.2. Results for two subscales favoured the orthosis group: activities of daily living (MD 9.80, 95% CI 5.37 to 14.23; 40 participants); and sport and recreation function (MD 9.75, 95% CI 2.59 to 16.91). In contrast, there was no difference between groups in foot and ankle-related quality of life (MD 0.95, 95% CI -5.13 to 7.03).

Lynch 1998 classified final outcome at 12 weeks as excellent, fair or poor measured according to pain and the effect on activities. There was no clear difference between steroid and combined orthoses groups in poor outcome (18/27 versus 24/50; RR 1.39, 95% CI 0.94 to 2.06; Analysis 3.3).

Serious and minor adverse events

Yucel 2013 noted there were no adverse effects due to the steroid injection and no noncompliance with the silicon orthoses; we have assumed the latter is an indicator that there were no adverse effects in the orthosis group. Kriss 2003 noted there had been no complications, such as infection and steroid 'flare', from steroid injections but did not report on complications for the orthotics group.

4. Local steroid injection versus oral NSAIDs

Two trials, reporting data for 153 participants, compared local steroid injection with oral NSAIDs taken twice daily in tablet form: diclofenac was taken with paracetamol in Biswas 2011 and naproxen in Hunt 2004. Neither trial reported on function, return to previous activity, quality of life or patient satisfaction. Hunt 2004 was incompletely reported in a conference abstract. The evidence for all outcomes was judged at very low quality, downgraded for very serious risk of bias and serious imprecision.

Heel pain

Heel pain was assessed using the VAS (0 to 100; higher scores = worse pain) in Biswas 2011, while the pain subscale of the Foot Function Index (0 to 100, higher scores = worse pain) was used in Hunt 2004. Results were not pooled given substantial heterogeneity (Analysis 4.1). Pain scores were much lower at both one month (MD -30.60 favouring steroid, 95% CI -34.79 to -26.41) and two months (MD -38.40, 95% CI -43.53 to -33.27) in Biswas 2011 (120 participants). Hunt 2004 found no clear evidence of a difference between groups at two weeks (MD -12.89 favouring steroid, 95% CI -34.94 to 9.16; 33 participants); a similar pattern was reported without data at 12 weeks.

Adverse events

Biswas 2011 (120 participants) reported the incidences of seven individual complications, three types (plantar fascia rupture, injection site infection and injection site erythema) were associated with steroid injection and four (gastritis, oesophagitis, pruritis and feeling of bloating) with oral NSAID consumption, but did not provide data for the total numbers of participants with complications (Analysis 4.2). The most serious adverse event was plantar fascia rupture, which occurred in two participants (3.3%) from the steroid group. Notably, 40 participants (67%) in the NSAID group had gastritis of unknown duration.

Recurrence

Biswas 2011 found significantly fewer participants in the steroid group had recurrence or increased heel pain after two months than in the NSAID group (6/60 versus 33/60; RR 0.18, 95% CI 0.08 to 0.40; Analysis 4.3).

5. Local steroid injection versus intensive physiotherapy

One trial (65 participants) reporting results at 12 weeks for 56 participants, whose jobs involved prolonged standing, compared local steroid injection with intensive physiotherapy (Ryan 2014). The trial did not report on adverse events, return to previous activity, quality of life or patient satisfaction. The evidence for all outcomes was judged at very low quality, downgraded for serious risk of bias and very serious imprecision, in part reflecting that evidence was from one small trial.

Heel pain

Ryan 2014 found no difference between groups in pain during activity assessed using VAS (0 to 100; higher scores = worse pain) at 12 weeks (MD -2.00, 95% CI -14.25 to 10.25; 56 participants; Analysis 5.1).

Pain and function

Function was assessed using the Foot and Ankle Disability Index which has 26 items; total score ranging from 0 to 124, expressed in percentages (lower scores = better function). Ryan 2014 found no clinically important difference between groups at 12 weeks (MD -5.30, 95% CI -7.13 to -3.47; 1 trial, 56 participants, Analysis 5.2).

6. Local steroid injection versus physical modalities

Five trials with a total of 391 participants compared local steroid injection with extracorporeal shockwave therapy (Mardani-Kivi 2015; Porter 2005; Saber 2012; Sorrentino 2008; Yucel 2010), two trials with a total of 94 participants compared steroid injection

with laser therapy (Yuzer 2006; Zamani 2014) and one trial with 128 participants compared steroid injection with radiation therapy (Canyilmaz 2015).

Local steroid injection versus extracorporeal shockwave therapy (ESWT)

Five trials compared local steroid injection with ESWT (Mardani-Kivi 2015; Porter 2005; Saber 2012; Sorrentino 2008; Yucel 2010). None of the trials reported on return to previous activity, quality of life or patient satisfaction. The evidence was very low quality, downgraded for very serious risk of bias and serious inconsistency reflecting substantial heterogeneity, serious imprecision or both. Only limited pooling was undertaken given the clearly significant heterogeneity.

Heel pain

Heel pain results assessed using VAS (0 to 100 mm (higher scores = worse pain) for three trials were analysed (Analysis 6.1). Mardani-Kivi 2015 (68 participants) found lower pain scores in the steroid group at three weeks (MD -33.00, 95% CI -48.45 to -17.55) and 12 weeks (MD -35.00, 95% CI -51.23 to -18.77). Sorrentino 2008 (60 participants) found contrasting results according to whether or not participants had perifascial oedema at baseline. Yucel 2010 found no difference between groups in pain scores at three months. Porter 2005 (125 participants) reported significantly lower mean pain scores in the steroid group at three months (steroid: 14.8 versus ESWT: 36.9) but similar scores (mean 0.84 in both groups) at 12 months (125 participants; Analysis 6.2).

Function and pain scores

Saber 2012 reported function and pain scores at six months using Mayo Clinic Scoring System (0 to 100; higher score = better function). There was no clear difference in function between steroid injection and ESWT (MD -1.83, 95% CI -5.23 to 1.57; 60 participants; Analysis 6.3).

Serious and other adverse effects

Three trials reported no serious adverse events in either of the study groups, whereas Porter 2005 reported four cases of severe headache or migraine after ESWT (0/157 versus 4/148; RR 0.11, 95% CI 0.01 to 1.93; Analysis 6.4).

Other adverse effects, primarily post-injection or procedure pain requiring analgesia or ice were reported: there was no clear difference in the risk of adverse effects between steroid injection and ESWT (12/127 versus 8/118; RR 1.37, 95% CI 0.58 to 3.20; 245 participants, 3 trials; Analysis 6.4). Notably, all participants in Porter 2005 and Yucel 2010 reported pain during their steroid injection.

Treatment failure and recurrence

The definition of non-response (treatment failure) varied among the four trials reporting this outcome; results for Sorrentino 2008 differed in direction of effect according to whether there was presence or absence of perifascial oedema. There were fewer non-responders in the steroid group (27/161 versus 43/152; RR 0.67, 95% CI 0.24 to 1.89, random-effects model used reflecting substantial heterogeneity $I^2 = 74\%$; Analysis 6.5). Results from two trials showed less recurrence in the steroid group (17/64 versus 29/64; RR 0.57, 95% CI 0.37 to 0.86; Analysis 6.5).

Costs

Porter 2005 implied that the general treatments costs of the interventions from another source applied to their situation: steroid injection (AUD 60 to 70) compared with ESWT (AUD 600 to 800).

Local steroid injection versus laser therapy

Yuzer 2006 (an RCT) and Zamani 2014 (a quasi-RCT) with a total of 94 participants compared steroid injection with laser therapy. Neither trial reported on function, return to previous activity, quality of life or patient satisfaction.The evidence for all reported outcomes was judged at very low quality, downgraded for very serious risk of bias and serious imprecision.

Heel pain

Pooled data from the two trials (94 participants) showed no clear difference between treatments in pain assessed using VAS (0 to 100: worst pain) in the short-term (up to 1 month: MD -2.12, 95% CI -6.34 to 2.10) or medium-term (6 weeks or 6 months: MD -0.79, 95% CI -6.18 to 4.60; Analysis 7.1).

Equal proportions of participants with bilateral heel pain were randomised to both arms in Yuzer 2006.

Serious and other adverse events

Yuzer 2006 specifically reported the absence of adverse events.

Local steroid injection versus radiation therapy

Canyilmaz 2015 (a quasi-RCT), reporting results for 124 participants, compared local steroid injection with radiation therapy. Canyilmaz 2015 did not report on return to previous activity or quality of life. The evidence for all reported outcomes was judged at very low quality, downgraded for very serious risk of bias and serious imprecision, reflecting lack of data.

Heel pain and function

Pain was assessed by VAS (0 to 100; higher score = worse pain) and function by a five level function questionnaire (0 to 100; higher scores = better function). The results at three and six months are shown in Analysis 8.1. Canyilmaz 2015 reported significantly better pain and function results for radiation therapy ($P < 0.001$) at both times.

Adverse events and secondary treatment

The only reported adverse event was an acute injection site infection following local steroid injection; Canyilmaz 2015 confirmed there were no plantar fascia ruptures or adverse effects of radiation therapy (Analysis 8.2). The trial did not report how many of the 31 participants opting for second treatment after 12 weeks, and up to 19 months follow-up, had secondary treatment; only that the requirement "did not significantly differ between the two groups". Their reply to a letter commenting on their 'survival curve' supplied a corrected curve and indicated that (18/64 (28%) steroid group versus 13/60 (22%) radiation therapy group) had events (probably further treatment) during follow-up but the variation of follow-up (6.5 to 18.0 months) makes these results insecure (Canyilmaz 2016; Roos 2016).

7. Local steroid injection versus other invasive procedures

Local steroid injection was compared with invasive procedures: injectable NSAID (Guner 2013); platelet-rich injection (Jain 2015; Monto 2014; Omar 2012; Tiwari 2013; Wilson 2013); autologous blood (Kiter 2006; Lee 2007); botulinum injection (Díaz-Llopis 2012; Elizondo-Rodriguez 2013); cryopreserved human amniotic membrane injection (Hanselman 2015); peppering (Kiter 2006); dry needling (Sconfienza 2011) and mini scalpel release (Li 2014).

Local steroid injection versus injectable NSAID

Guner 2013 (65 participants), reporting results for 61 participants, compared local steroid injection with local anaesthetic versus local tenoxicam (an NSAID) with local anaesthetic (Guner 2013). Guner 2013 did not report on function, return to previous activity or quality of life. The evidence for all reported outcomes was judged at very low quality, downgraded for serious risk of bias and very serious imprecision.

Heel pain

Guner 2013 found no clear difference between groups in heel pain assessed using VAS (0 to 100; higher scores = worse pain) in the medium-term (six months) (MD -0.90, 95% CI -11.84 to 10.04) or long-term (12 months) (MD 2.30, 95% CI -8.65 to 13.25; Analysis 9.1).

Serious and minor adverse events

Guner 2013 explicitly reported that no complications were observed (Analysis 9.2).

Patient satisfaction

Based on the results of a four category patient satisfaction tool, five participants in each group reported a poor outcome that corresponded to "pain limiting activity" (5/30 versus 5/31; RR 1.03, 95% CI 0.33 to 3.21; Analysis 9.2).

Local steroid injection versus platelet-rich plasma injection

Five trials, including a total of 206 participants, compared local steroid injection with platelet-rich plasma injection (Jain 2015; Monto 2014; Omar 2012; Tiwari 2013; Wilson 2013). None of the trials reported on return to previous activity, quality of life or patient satisfaction. The evidence for all outcomes was judged at very low quality, downgraded for serious risk of bias, serious inconsistency reflecting considerable heterogeneity and serious imprecision. Pooling was not undertaken given clear and significant heterogeneity.

Heel pain

The pain results for individual trials, measured using VAS (0 to 100; higher scores = worse pain) for three follow-up periods, are presented in Analysis 10.1. Tiwari 2013 found higher pain scores in the steroid group at one month follow-up (MD 6.00, 95% CI 1.53 to 10.47; 60 participants). Three trials reported medium term follow-up results. Jain 2015 found little difference between groups at six months (-4.20 favouring steroid, 95% CI -24.82 to 16.42; 46 participants); whereas the results at six weeks from Omar 2012 (30 participants) and at six months from Tiwari 2013 (60 participants), both favoured the platelet-rich plasma group (respectively, MD 39.00, 22.09 to 55.91; and MD 8.00, 95% CI 4.84 to 11.16). Twelve month follow-up results from Jain 2015 also favoured platelet-rich plasma (MD 20.30, 95% CI -0.39 to 40.99; 46 participants).

Function and pain scores

Four trials reported on foot function using various scores: Jain 2015 and Monto 2014 reported AOFAS scores (0 to 100, higher scores indicate better function); Omar 2012 reported FHSQ scores (0 to 100, higher scores indicate worse function); and Wilson 2013 reported on the Foot and Ankle Ability Measure (FAAM) subscores of activities of daily living and sports (0 to 100, higher scores indicate better function). The trial results are shown in Analysis 10.2 and Analysis 10.3.

The baseline AOFAS scores for Monto 2014 were significantly in favour of the steroid group but the converse was the case subsequently. Baseline scores were also higher in the steroid group of Wilson 2013, as were scores at 32 weeks.

Three trials provided evidence on medium-term function: Jain 2015 found no clear between-group difference at six months (MD -4.73 favouring platelet-rich plasma, 95% CI -13.73 to 4.27; 46 participants), whereas results favoured platelet-rich plasma in both Monto 2014 (6 months data; 40 participants) and Omar 2012 (6 weeks, MD -23.90 favouring platelet-rich plasma, 95% CI -35.42 to -12.38). Three trials provided evidence on long-term function: results favoured platelet-rich plasma in both Jain 2015 (12 months: MD -13.43, 95% CI -23.41 to -3.45) and Monto 2014 (12 months data; 40 participants), whereas steroid was favoured in Wilson 2013 (32 weeks data, 13 participants; Analysis 10.2).

Serious and minor adverse events

No adverse events were reported in either of the trials that specifically recorded these (Jain 2015; Tiwari 2013); Analysis 10.4.

Local steroid injection versus autologous blood injection

Kiter 2006 and Lee 2007 compared local steroid injection and autologous blood injection in 94 people, reporting results for 90 participants at six months. Neither trial reported on return to previous activity, quality of life or patient satisfaction. Evidence for all outcomes was judged at very low quality, downgraded for very serious risk of bias and very serious imprecision, in part reflecting the low numbers of participants available.

Heel pain

Pooled data on heel pain (VAS 0 to 100; higher scores = worse pain) showed no clear difference between groups at six months (MD -6.70, 95% CI -17.72 to 4.32; 90 participants; I^2 = 29%; Analysis 11.1).

Function

Only Kiter 2006 reported on function, which was assessed using the AOFAS (0 to 100; higher scores = better function). Kiter 2006 found no difference in function between interventions (MD -0.83, 95% CI -12.38 to 10.72; 29 participants; Analysis 11.2).

Serious and other adverse events, and treatment failure

Lee 2007 confirmed the absence of serious adverse events of fat pad atrophy, infection or rupture of the plantar fascia. However, there was evidence of less post-injection flare of pain, requiring analgesia, ice or both, lasting up to seven days after steroid injection (4/31 versus 16/30; RR 0.24, 95% CI 0.09 to 0.64; Analysis 11.3). Kiter 2006 did not report on this outcome. There were fewer treatment failures (non-responders, uptake of a second injection) in the steroid group (10/46 versus 16/45; RR 0.62, 95% CI 0.35 to 1.09; Analysis 11.4).

Local steroid injection versus botulinum toxin (Botox) injection

Díaz-Llopis 2012 and Elizondo-Rodriguez 2013 compared local steroid and botulinum injections in a total of 96 participants. The Botox type A injection site differed: Díaz-Llopis 2012 reported injection to the abductor hallucis and flexor digitorum brevis muscles; while in Elizondo-Rodriguez 2013, the injection was to the medial and lateral gastrocnemius and soleus muscles. In Díaz-Llopis 2012, participants who showed no improvement in pain at one month were given a second injection with the alternative drug (thus, Botox if originally allocated steroid and vice versa). Since data for these participants were then transferred to the new treatment, we also considered only short-term (i.e. one month) follow-up data. Elizondo-Rodriguez 2013 also measured outcomes at six months (medium-term). Neither trial reported on return to previous activity, quality of life or patient satisfaction.

Heel pain

Heel pain was assessed by VAS (0 to 100; higher score = worse pain) in Elizondo-Rodriguez 2013 and the foot pain component of the FHSQ score (0 to 100; higher score = less pain) in Díaz-Llopis 2012. Given the different direction for worse outcome, minus symbols were added to FHSQ scores for the analysis. Pooled data for heel pain at one month follow-up favoured Botox injection (SMD 0.60, 95% CI 0.18 to 1.03; 92 participants; I^2 = 60%; very low quality evidence downgraded for serious risk of bias, imprecision and inconsistency; Analysis 12.1). The 95% CI for both trials included the MCID and so point to a clinically important different in pain in favour of Botox (Analysis 12.2). Elizondo-Rodriguez 2013 also found in favour of Botox injection at six months (MD 27.00; 95% CI 18.32 to 35.68; 36 participants; very low quality evidence downgraded for serious risk of bias and very serious imprecision reflecting the findings are from one small trial; Analysis 12.2)

Function

Function scores, assessed using the FHSQ 2 domain (0 to 100; higher score = better function) in Díaz-Llopis 2012, were higher in the Botox group at one month (MD -7.36, 95% CI -20.61 to 5.89; 56 participants, very low quality evidence downgraded for serious risk of bias and very serious imprecision; Analysis 12.3). The 95% CI includes the 7 point MCID on the function domain of FHSQ according to Landorf 2010.

Elizondo-Rodriguez 2013 used several scores to assess the overall result of the two injections. The results of all favoured Botox as shown at one month (40 participants) and six months (36 participants) follow-up for the AOFAS score (0 to 100: higher score = better outcome); very low quality evidence downgraded for serious risk of bias and very serious imprecision reflecting the evidence being available from one small trial; see Analysis 12.4.

Adverse events, treatment failure and recurrence

Both trials explicitly stated that no adverse events occurred with either injection (2 trials, 92 participants; Analysis 12.5). Treatment failure resulting in a second injection at one month was more frequent in the steroid group of Díaz-Llopis 2012 (10/28 versus 4/28; RR 2.50, 95% CI 0.89 to 7.03; very low quality evidence, downgraded for serious risk of bias and very serious imprecision; Analysis 17.6).

Local steroid injection versus cryopreserved human amniotic membrane injection

Hanselman 2015 made this comparison in 24 people, one of whom was lost to 12 weeks follow-up. Six participants, three in each group, took up the offer of a second injection at six weeks. Hanselman 2015 presented change scores, without standard deviations, from baseline for heel pain (VAS 0 to 100; higher scores = worse pain) and for the seven subscales of the Foot Health Status Questionnaire (FHSQ). The results for heel pain and the foot function subscale of FHSQ are shown in Analysis 13.1. Hanselman 2015 split their analysis according to whether participants accepted the offer of a second injection; and reported that there were no (statistically) significant between-group differences for these two outcomes. Hanselman 2015 explicitly reported that no adverse side effects were experienced. The evidence for all outcomes was judged at very low quality, downgraded for very serious risk of bias and serious imprecision.

Local steroid injection versus peppering injection

Kiter 2006, which made this comparison in 30 people, reported outcomes at six months in 29 participants. Kiter 2006 reported only on heel pain (VAS: 0 to 100; higher scores = worse pain), function (rear foot score of AOFAS: 0 to 100; high scores = better function) and repeat injections (treatment failure). There was no clear between-group difference in heel pain (MD 5.70 favouring peppering, 95% CI -13.13 to 24.53; Analysis 14.1) or function (MD 1.87 favouring steroid, 95% CI -9.24 to 12.98; Analysis 14.2). Fewer participants of the steroid group had repeat injection at one month (7/15 versus 11/15; RR 0.64, 95% CI 0.34 to 1.18; Analysis 14.3). The evidence for all outcomes was judged at very low quality, downgraded for serious risk of bias and very serious imprecision.

Local steroid injection versus dry needling

Sconfienza 2011, which made this comparison in 50 people, was incompletely reported in a conference abstract. Aside from the use of ultrasound for guiding the steroid injection, no details were provided on either intervention. Pain data, measured using VAS - the usual scale of 0 to 10.0 cm; higher scores = worse pain was assumed here - were provided at 7 days and 360 days for both groups. However, the numbers available at these follow-ups were not reported. A converse pattern of effect was found over time (Analysis 15.1; very low quality evidence downgraded two levels for very serious risk of bias and one level for indirectness reflecting the lack of information to judge applicability).

Local steroid injection versus mini-scalpel needle release

Only Li 2014, which recruited 61 participants and reported results for 54 participants, made this comparison. The study reported only on heel pain (measured using VAS (0 to 100: higher scores = worse pain)) and adverse effects related only to the mini-scalpel needle treatment.

Li 2014 assessed morning, active and overall heel pain at one, six and 12 months follow-up. There was very low quality evidence (downgraded for serious risk of bias and serious indirectness (mini-scalpel needle release is a novel device)) of clinically important lower overall pain scores in the mini-scalpel needle release group participants at all three follow-up periods (short-term: MD 24.20, 95% CI 12.08 to 36.32; medium-term: MD 54.20, 95% CI 42.11 to 66.29; and long-term: MD 54.10, 95% CI 41.86 to 66.34; Analysis

13.1). Similar patterns were observed for morning and active pain. Five participants of the MSN group had "mild distending pain" after mini-scalpel needle release and one further participant in the same group had subcutaneous bleeding. All adverse events were minor and lasted under two days.

8. Different techniques for placing local steroid injection

Five trials, involving 144 participants (152 heels), compared ultrasound-guided with palpation-guided local steroid injection (Ball 2012; Chen 2013; Kane 2001; Tsai 2000; Yucel 2009). Yucel 2009 also compared scintigraphy-guided versus palpation-guided local steroid injection (16 participants; 20 feet) and, not considered here, scintigraphy-guided versus ultrasound-guided injection (17 participants, 24 feet). None of the trials reported on function, return to previous activity or patient satisfaction.

Ultrasound-guided versus palpation-guided local steroid injection

Five trials made this comparison in 144 participants (152 heels) (Ball 2012; Chen 2013; Kane 2001; Tsai 2000; Yucel 2009). No adjustment was made or was possible for the unit of analysis issue relating to inclusion of participants with bilateral heel pain in Kane 2001 and Yucel 2009.

Heel pain

Heel pain was assessed by VAS (0 to 100 mm; higher scores = worse pain) in all five trials. There was very low quality evidence (downgraded for very serious risk of bias and serious imprecision) of lower pain scores after ultrasound-guided steroid injection compared with palpation-guided injection at all three follow-up periods (short-term: MD -9.56, 95% CI -19.50 to 0.39; 57 participants, 2 studies; Analysis 17.1; medium-term: MD -3.62, 95% CI -11.31 to 4.07; 118 participants, 4 studies; Analysis 17.2; long-term: MD -15.54, 95% CI -26.47 to -4.61; 51 participants, 2 studies; Analysis 17.3). The confidence intervals of all three analyses include the MCID of 8 mm but also include the possibility of no clinically important difference at short- and long-term follow-up in favour of the palpation group.

Adverse events, treatment failure and recurrence

No adverse events were reported in four trials (118 participants; Analysis 17.4); the reporting of adverse events specifically pertained to an absence of plantar rupture in three trials.

In Ball 2012, fewer participants of the ultrasound-guided group had repeat injection at 12 weeks (3/22 versus 6/22; RR 0.50, 95% CI 0.14 to 1.75; Analysis 17.6). Recurrence was more frequent in the palpation-guided group reported by Tsai 2006 (1/12 versus 6/13; RR 0.18, 95% CI 0.03 to 1.29; Analysis 17.6; very low quality evidence, downgraded for serious risk of bias and very serious imprecision; data not pooled because of clear clinical heterogeneity).

Quality of life

There was very low quality evidence (downgraded for very serious risk of bias and serious imprecision) from Kane 2001 of no clear between-group differences in SF-36 physical component scores (0 to 100: higher scores = better outcome) at short-term (MD 0.60, 95% CI -6.05 to 7.25; 32 participants) and medium-term follow-up (MD 2.38, 95% CI -4.38 to 9.14; 26 participants; Analysis 17.6).

Scintigraphy-guided versus palpation-guided local steroid injection

Yucel 2009 made this comparison in 16 participants (20 heels), reporting only on long-term heel pain from the list of outcomes collected in this review. No adjustment was made for the unit of analysis issue.

Heel pain

Yucel 2009 found lower VAS pain scores (0 to 100; higher scores = worse pain) at two year follow-up in the scintigraphy-guided injection group (MD -14.00, 95% CI -31.44 to 3.44; 20 heels; very low quality evidence downgraded for very serious risk of bias and serious imprecision; Analysis 17.3).

Adverse events relating to steroid injections

Adverse events were under-reported in the included trials and was the main reason for rating 18 studies at high risk of selective reporting bias. Typically, the true risk of rare events such as plantar fascia rupture cannot be determined from small RCTs. Short-term adverse events, such as post-injection flare, and injection-site pain may be overlooked in the context of longer-term effects on heel pain. Data on adverse events were available from 21 trials (Ball 2012; Biswas 2011; Blockey 1956; Canyilmaz 2015; Chen 2013; Díaz-Llopis 2012; Elizondo-Rodriguez 2013; Guner 2013; Jain 2015; Kane 2001; Kriss 2003; Lee 2007; McMillan 2012; Porter 2005; Saber 2012; Sorrentino 2008; Tiwari 2013; Tsai 2000; Yucel 2010; Yucel 2013; Yuzer 2006). Most trials did not describe monitoring processes for identifying or recording complications; and usually limited reporting to a single statement of their absence. Results are presented in the analyses of 11 of the 16 comparisons (Analysis 1.7; Analysis 3.4; Analysis 4.2; Analysis 6.4; Analysis 7.2; Analysis 8.2; Analysis 9.2; Analysis 10.4; Analysis 11.3; Analysis 12.5; Analysis 17.4).

In total, there were 699 participants who had received a steroid injection in the 21 trials. Two plantar fascia ruptures were reported, both occurring in one trial (Biswas 2011). Three injection site infections were recorded, two of which were reported in Biswas 2011 and the third in Canyilmaz 2015. Five trials reported a total of 27 participants with less serious short-term adverse events, such as post-injection pain and erythema (Biswas 2011; Guner 2013; Lee 2007; Porter 2005; Yucel 2010). Reported treatments for these adverse events were analgesia, ice or both.

The high risk of selective reporting bias for these outcomes, and the imprecision reflecting the inadequate numbers to detect rare events, means the evidence for serious and other adverse events is very low quality.

DISCUSSION

Summary of main results

We aimed to identify, synthesise and assess the available evidence from randomised and quasi-randomised controlled trials to answer the following questions:

1. What are the effects (benefits and harms) of injected corticosteroids for treating plantar heel pain in adults?
2. Are injected corticosteroids better than other interventions for plantar heel pain?
3. What is the best method for delivering local steroid injections?

We included 36 randomised and three quasi-randomised trials, that recruited a total of 2492 patients with plantar heel pain. Most trials were small, recruiting a median of 56 participants (range 17 to 276 participants). Except one trial that recruited females only, the trials included both male and female participants; the mean age reported in the trials ranged from 34 years to 59 years.

Steroid injection versus placebo or no treatment

We included eight trials (724 participants) that compared steroid injection with placebo injection or no treatment control (Table 1; Table 2; Summary of findings for the main comparison). There was low quality evidence that local steroid injection may result in lower pain scores in the short-term (< 1 month follow-up). However, the clinical benefit was marginal; the best estimate was less than 8 mm minimal clinically important difference for heel pain. Sensitivity analysis including only placebo-controlled trials reduced the effect. We found low quality evidence that steroid injection may not result in lower pain scores in the medium-term (1 to 6 months follow-up). The 95% confidence interval crossed the line of no benefit and at best indicates the possibility of a very marginal clinical benefit. There was no evidence of a clinically important difference in heel pain when only data from placebo-controlled trials were analysed.

There was very low quality evidence for no effect on function in the medium-term and that risk of serious adverse events is low (none were reported). Other adverse events and return to previous activity were not reported. There was very low quality evidence of less treatment failure (defined variously as persistent heel pain at 8 weeks, steroid injection at 12 weeks, and unrelieved pain at 6 months) after steroid injection.

Steroid injection versus other interventions

Our second question was split into six comparison categories; in all, steroid injection was compared with 15 types of intervention. For all reported outcomes for these comparisons, we rated the evidence as very low quality that usually reflected that the evidence was at serious risk of bias and imprecise. Given we are very uncertain about these results, we decided it was unhelpful to produce sparsely populated summary of findings tables for these comparisons. To illustrate the limitations in the data, even where pooling was undertaken, we have added in the maximum number of participants with data available for the analyses for short-term or medium-term heel pain measured using VAS in the following list.

- Tibial nerve block with anaesthetic (2 trials; recruited 79 participants; data for short-term heel pain 77 participants, 2 trials)
- Orthoses (4 trials; recruited 214 participants; data for medium-term heel pain 133 participants, 3 trials)
- Oral NSAIDs (2 trials; recruited 153 participants; not pooled - heterogeneous separate data for short-term heel pain 120 and 33, 2 trials)
- Intensive physiotherapy (1 trial; recruited 65 participants; data for medium-term heel pain 54 participants)
- Physical modalities (8 trials)
  - Extracorporeal shock wave therapy (ESWT) (5 trials; recruited 391 participants; not pooled - heterogeneous separate data for medium-term heel pain 68 and 28 and 32 and 60 participants, 4 trials)
  - Laser (2 trials; recruited 94 participants; data for medium-term heel pain 94 participants, 2 trials)
  - Radiation therapy (1 trial; recruited 128 participants; incomplete data for medium-term heel pain 124 participants)
- Other invasive procedures (14 trials)
  - Locally injectable NSAID (1 trial; recruited 64 participants; data for medium-term heel pain 61 participants)
  - Platelet rich plasma (PRP) injections (5 trials; recruited 206 participants; not pooled - heterogeneous separate data for medium-term heel pain 46 and 30 and 60 participants, 3 trials)
  - Autologous blood injections (2 trials; recruited 94 participants; data for medium-term heel pain 90 participants, 2 trials)
  - Botulinum toxin injections (2 trials; recruited 96 participants; data for short-term heel pain 92 participants, 2 trials))
  - Cryopreserved human amniotic membrane injection (1 trial; recruited 24 participants; incomplete data for medium-term heel pain 24 participants)
  - Localised peppering (1 trial, recruited 30 participants; data for medium-term heel pain 29 participants)
  - Dry needling (1 trial, 50 participants; incomplete data for short-term heel pain)
  - Mini-scalpel needle release (1 trial, 61 participants; data for medium-term heel pain 54 participants)

Different techniques for placing local steroid injection

Our third question was addressed only in terms of different techniques of local steroid injection. For all reported outcomes for the two comparisons, we rated the evidence as very low quality, indicating that "we are very uncertain about the estimate". Our rating reflected that the evidence was at serious risk of bias and imprecise. As before in our listing, we have added in the maximum number of participants with data available for the analyses for short-term or medium-term heel pain measured using VAS.

Different techniques of local steroid injection

- Ultrasonography guided versus palpation guided (5 trials; recruited 144 participants (152 heels); data for medium-term heel pain 118 participants, 4 trials)
- Scintigraphy guided versus palpation guided (1 trial; recruited 16 participants (20 heels); data for long-term heel pain only 20 participants)

Adverse events

Serious adverse events

Our exploratory analysis including data from the 21 trials (699 participants were allocated steroid injection) reporting on adverse events found two ruptures of plantar fascia (reported in 1 trial) and three injection site infections (reported in 2 trials).

Other (generally short-term) adverse events

Our exploratory analysis including data from the 21 trials reporting on adverse events revealed five trials reporting a total of 27 participants with less serious short-term adverse events, such as post-injection pain, in the 699 participants allocated steroid

injection of these trials. Reported treatments for these were analgesia, ice or both.

Overall completeness and applicability of evidence

Although we included 39 trials, most were small, and the 2492 recruited participants contributed data to 18 comparisons. The largest group of trials (8) and participants (724 recruited) evaluated steroid injection versus placebo or no treatment (our primary comparison). However, the maximum number of participants contributing to any of the analyses for this comparison (and for any comparison in this review) was 382 participants (53% of the total number recruited) for medium-term heel pain visual analogue score (VAS) results. This findings helps illustrate the limitations of the available data.

All the studies reported on heel pain, although some reporting was incomplete. However, physical function was reported less frequently (15 trials), and quality of life and general foot health were each reported in one trial. No studies reported on return to previous level of activity or work, or patient acceptance or satisfaction.

The reporting of adverse events was generally inadequate, with no explicit recording of these in 18 trials. Where adverse events were reported, these often comprised brief reports of the absence of adverse events in the study results without indication of systematic recording.

Where reported, studies applied similar criteria for clinical diagnosis of plantar fasciitis. Three trials used ultrasound for diagnosis of plantar fasciitis and as an inclusion criterion (McMillan 2012; Ryan 2014; Sorrentino 2008). One trial stipulated need for radiologically-proven heel spur (Canyilmaz 2015), which is not typical in clinical practice.

Where reported, the duration of plantar fasciitis prior to injection varied. In clinical practice, local steroid injection is typically used after a trial of conservative treatment. Notably, only one of the eight trials testing steroid injection versus control specified an inclusion criterion requiring participants' failure to respond to eight weeks of conservative treatment. In contrast, five of the eight trials excluded patients who had previous or recent steroid injections. Although an assumption of previous treatment failure could be made, the lack of reporting previous treatment history was unhelpful.

Seven trials compared local steroid injection with conservative treatments (intensive physiotherapy, orthoses and oral NSAIDs). Of these, inclusion criteria specified by Biswas 2011 required that participants had unilateral plantar fasciitis of less than three months duration, without any prior formal treatment. This aspect of the trial by Biswas 2011 was contrary to our expectations of when steroid injection would be offered, particularly given the known potential for adverse events related to steroid injection. It is also noteworthy that Biswas 2011 reported four serious adverse events, including two plantar fascia ruptures.

Among other trials comparing steroid injection with invasive procedures, 13 included participants who had failed conservative treatment (most specified treatment as orthoses, nonsteroidal anti-inflammatory drugs and stretching exercises; an exception was Tsai 2006 which also included physical agents). Duration of failure to conservative treatment prior to randomisation varied from one month to 12 months.

Heel pain intensity is also a consideration and a minimum VAS for inclusion into the trials was specified only in a very few trials.

Intermediate potency corticosteroid injections were used in 22 trials as is common in practice. Also common practice was that steroid injection was given with a local anaesthetic agent in all but five trials. Tibial nerve block was given before steroid injection in two trials to reduce post-injection pain.

Repeat injections were administered in seven trials at intervals ranging from one week to three months. In clinical practice, other conservative co-interventions are often continued following steroid injection; this was the case in most studies.

Quality of the evidence

We assessed the quality of evidence using GRADE framework, which combines considerations of *risk of bias*, *directness*, *heterogeneity*, *precision* and *publication bias*. The GRADE assessments for the main comparison are reported in Summary of findings for the main comparison. The results of our GRADE assessments for all comparisons are presented alongside the quantitative results in Effects of interventions.

With the exception of McMillan 2012, the included studies were at high risk of bias relating to one or more domains, most frequently relating to lack of blinding, including lack of confirmation of allocation concealment (Figure 3). This generally led to a downgrading of the evidence quality for outcomes by two levels for *risk of bias*. Another study limitation is size and the majority of included studies were small and even where data were pooled, the total number of participants was often small with a maximum of 382 participants for pooled data for heel pain for the steroid verus placebo or no treatment comparison. Reflecting the inadequate sample sizes, we generally downgraded for *imprecision* including where confidence intervals were not wide and did not cross the line of no effect. This reflects partly that the evidence from one or two small RCTs should not be considered reliable since positive results, sometimes extreme, can happen randomly. Additionally, as witnessed for several comparisons (e.g. for steroid versus platelet rich plasma), the results for small trials were often statistically heterogeneous; this can again have a chance component but also reflect clinical heterogeneity and bias. In these and similar cases, we also downgraded for *inconsistency*. In a very few cases, we downgraded the evidence for *indirectness* where the applicability and clinical relevance were especially uncertain. As there are insufficient trials and data to test for *publication bias*, we did not downgrade for this item.

Potential biases in the review process

We used the standard methods described in the *Cochrane Handbook for Systematic Reviews of Interventions* (Higgins 2011). Data extracted from study reports were cross-checked and any disagreements were resolved by discussion. Trial authors were contacted for missing data and unpublished trials. We do not know if our search strategy failed to identify studies published in languages other than English (except Yuzer 2006 and Zamani 2014) that may have been eligible for inclusion. An attempt was made to handsearch for unpublished data by writing to some study authors; however, we received no responses.

All trial reports identified up to November 2015 were assessed. Six small trials identified in a search update in March 2017

await classification (Celik 2016; Karimzadeh 2017; Mahindra 2016; Saba 2016; Sherpy 2016; Vahdatpour 2016). This was a pragmatic decision taken in view of the delay that would have resulted from their likely inclusion and after consideration of the potential impact of these trials on review findings. Notably, our exploratory analysis of the inclusion of data from the only one trial testing steroid injection versus placebo (Mahindra 2016) added emphasis to our uncertainty of the effects of steroid injections. We concluded that our decision to postpone the inclusion of these six trials was not an important source of bias.

The results were clinically significant if according to Landorf 2010 these values were more than 8 mm on a 100 mm VAS for average heel pain and 7 points on the function domain of FHSQ, which are the estimated values for minimally clinically important difference (MCID) that can be detected by patients. These are not exact measures and will vary among participants. This is also implicit in the 95% CIs provided for these measures: e.g. that for average heel pain was 4 mm to 12 mm (Landorf 2010). It is notable that this MCID is smaller than the estimate for first step heel pain (19 mm, 95% CI 13 to 25 mm) (Landorf 2010) and those provided by other estimates of MCIDs for other painful conditions. Additionally, while the 8 mm MCID may be helpful to determine a clinically important effect, it may not represent a sufficient effect such that the patient considers themselves much better (even 'cured') and further treatment would not be sought. To examine this, we introduced another outcome, treatment failure, which could be defined in several ways. This post hoc introduction of a crude binary measure of effect could be a source of bias but we have interpreted the results with care. Related to this is the likelihood that for several trials the continuous outcome data for heel pain were not normally distributed despite being provided as means and SDs in the trial reports. Although we checked the effect of excluding trials where there was particularly strong evidence of skewed data from several analyses, we decided the best policy was retain these rather than lose data.

Agreements and disagreements with other studies or reviews

Given the more recent primary research activity in this area, especially of trials comparing other injected agents versus injected steroids, many reviews that assessed interventions for treating plantar heel pain are now out of date (Crawford 2003; Lafuente Guijosa 2007; Uden 2011).

A systematic review and network meta-analysis of 22 RCTs (follow-up data for 1107 participants) compared the effects of at least two different injectable treatments, including placebo, for plantar fasciitis (Tsikopoulos 2016). Tsikopoulos 2016 reported statistically significant benefits in pain relief at two months follow-up for dehydrated amniotic membrane, platelet-rich plasma and Botox injections versus local steroid injections. The clinical significance of these findings was not sufficiently addressed and our assessment of risk of bias was more pessimistic than Tsikopoulos 2016. There were no major adverse effects related to the injection therapies in the 16 RCTs reporting on this outcome.

We included 39 RCTs comparing injected corticosteroids with placebo and various methods of conservative management, physical agents and invasive procedures. With steroid as the common comparator in our review, we have not the same scope as Tsikopoulos 2016, which also compared various agents versus placebo injections. Thus, Tsikopoulos 2016 provides useful context where evidence was available for comparisons of other agents such as Botox or autologous whole blood injections versus placebo injections.

Injected corticosteroid has been stated as a Grade B recommendation for clinical practice by guideline reviews such as Goff 2011 and Thomas 2010 reporting no other interventions with a better level of evidence.

Orchard 2012 reported that extracorporeal shockwave therapy had fewer adverse effects compared with corticosteroids; this differs from our findings, which found no serious adverse effects or significant difference in post-injection flare between the procedures. Orchard 2012 based conclusions on the study by Yucel 2010 where extracorporeal shockwave therapy was given under the cover of a fivefold nerve block (posterior tibial, superficial and deep peroneal nerve, sural and saphenous nerve) unlike the group who received injected corticosteroids. Our conclusion for this comparison was based on additional information from Porter 2005.

Landorf 2015 was similar to our findings of weak evidence for beneficial effect of local steroid injections compared with placebo for short-term pain relief and unclear evidence when compared with extracorporeal shockwave therapy. Although Landorf 2015 did not report on any RCT with serious adverse effects, observational studies were reported on plantar fascia ruptures indicating that this was more likely to occur with less soluble, longer-acting corticosteroids. However, the two RCTs (Biswas 2011; Canyilmaz 2015) reporting serious adverse effects in our Review used intermediate-acting corticosteroid injections (methylprednisolone).

AUTHORS' CONCLUSIONS

Implications for practice

We found low quality evidence that local steroid injections compared with placebo or no treatment may slightly reduce heel pain up to one month but not subsequently. The available evidence for other outcomes of this comparison was very low quality. Where available, the evidence from comparisons of steroid injections with other interventions used to treat heel pain and of different methods of guiding the injection was also very low quality. Although serious adverse events relating to steroid injection were rare, these were under-reported and a higher risk cannot be ruled out.

Implications for research

We identified ongoing trials that aim to compare steroid injection for plantar heel pain with interventions such as platelet-rich plasma, extracorporeal shockwave therapy and prolotherapy. The completion and publication of these may be informative but comparisons of potentially promising interventions with placebo controls, where possible, are preferable to comparisons with steroid. For steroid injections, we also recommend that trials focus on comparing injected steroids with placebo. Although any injection is invasive, the placebo needs to be an injection in order to produce a similar physical effect in both arms. Saline is considered as an inert substance and can therefore be used as a placebo (Linde 2011). Such trials should be conducted in typical clinical settings and subsequent to a course of unsuccessful conservative therapy.

We found major limitations in the current evidence base. Most of the included studies were single centre and under-powered. Many

comparisons were conducted in heterogeneous and sometimes incompletely defined populations. Overall, their results have not yielded sufficient evidence to guide clinical practice. A different approach, with an emphasis on conducting top quality multicentre RCTs, is needed to obtain the definitive evidence required. Ideally, these should be preceded by research to obtain consensus, including consultation with patients on their preferences and values, on what are the priority questions for treating plantar heel pain. This includes identifying the key outcome measures that are most relevant to patients. For example, although most of the pain data for this review is for average pain, it is plausible that first step pain could be more bothersome to patients.

Ongoing patient data collection, and use of past records, could be used to build databases to inform and identify trends in patient characteristics, treatments, treatment pathways and rare adverse events. Such databases could help to identify the main clinical populations that potentially contribute to the underlying heterogeneity in treatment response. Database content could also inform on the selection and rationale for population based subgroup analyses. The databases could help in the selection of and, where clinically appropriate, standardisation of interventions; as shown in the included trials, there are numerous types and applications of corticosteroid in use. Incidentally, this variety applies also to other interventions, such as platelet-rich plasma, used as comparators in this review.

We suggest that future trials investigating the effect of steroid injections on plantar heel pain aim to:

- ensure adequate sample size;
- use and report appropriate randomisation methods;
- conceal allocation adequately without foreknowledge of intervention assignments using standard techniques. Clearly report concealment methods;
- where possible and practical, take measures to blind outcome assessors;
- report baseline and endpoint mean pain scores and provide standard deviations (or medians and interquartile ranges for skewed distributions)
- use standard pain measurement scales (e.g. visual analogue scale);
- analyse endpoint scores, not change in pain scores;
- include outcomes such as functional improvement, return to previous level of activity and quality of life;
- measure systematically and report all adverse events such as local infection, plantar fascia rupture, skin changes, heel pad atrophy or hyperaesthesia, post-injection flare, skin flushing and menstrual disorders;
- measure outcomes at one month, six months, one year and two years if possible. Although dropout rates may be higher at long-term follow-up, information about duration of pain relief with steroid injections is needed;
- record structural foot variations to understand the role of interventions with long-term benefits; and
- provide individual patient data to strengthen future meta-analysis.

Trials should meet the CONSORT criteria for design and reporting of non-pharmacological studies (Boutron 2008) and subsequent developments including adequate reporting of interventions (Hoffmann 2014).

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REFERENCES

References to studies included in this review

Abdihakin 2012 *{published data only}*

Abdihakin M, Wafula K, Hasan s, MacLeod J. A randomised controlled trial of steroid injection in the management of plantar fasciitis. *SA Orthopaedic Journal* 2012;**11**(4):33-8.

Akhtar 2009 *{published data only}*

Akhtar A, Abbasi SH, Shami A, Zimri F, Mateen MA. A comparative study of conventional versus interventional treatment in patients of plantar fasciitis. *Annals of Pakisthan Institute of Medical Sciences* 2009;**5**(2):81-3.

Ball 2012 *{published data only}*

Ball EM, McKeeman HM, Burns J, Yau WH, Moore O, Foo J, et al. Steroid injection in plantar fasciitis: a placebo-controlled trial [abstract]. *Irish Journal of Medical Science* 2012;**181**(Suppl 2):S58-9.

* Ball EM, McKeeman HM, Patterson C, Burns J, Yau WH, Moore OA, et al. Steroid injection for inferior heel pain: a randomised controlled trial. *Annals of Rheumatic Diseases* 2013;**72**(6):996-1002.

Taggart A. A randomised placebo controlled trial to compare ultrasound guided with palpation guided steroid injection in plantar fasciitis. www.isrctn.com/ISRCTN79628180 (accessed 11 November 2013).

Biswas 2011 *{published data only}*

Biswas A, Pal A, Amilta A. A comparative study of efficacy of oral nonsteroidal antiinflammatory agents and locally injectable steroid for the treatment of plantar fasciitis. *Anesthesia, Essays and Researches* 2011;**5**(2):158–61.

Black 1996 *{published data only}*

Black AJ. A preliminary study of the comparative effects of steroid injection versus orthosis (Viscoheel Softspot) on plantar fasciitis [thesis]. Belfast (UK): Queen's University, 1996.

* Crawford F, Thomson CE. Interventions for treating plantar heel pain. *Cochrane Database of Systematic Reviews* 2003, Issue 3. [DOI: 10.1002/14651858.CD000416.pub2]

Blockey 1956 *{published data only}*

Blockey NJ. The painful heel; a controlled trial of the value of hydrocortisone. *British Medical Journal* 1956;**1**(4978):1277-8.

Canyilmaz 2015 *{published data only}*

* Canyilmaz E, Canyilmaz F, Aynaci O, Colak F, Serdar L, Uslu G, et al. Prospective randomized comparison of the effectiveness of radiation therapy and local steroid injection for the treatment of plantar fasciitis. *International Journal of Radiation Oncology Biology Physics* 2015;**92**(3):659-66.

Canyilmaz E, Canyilmaz F, Yoney A. In Reply to Roos and Smith and an Erratum. *International Journal of Radiation Oncology, Biology, Physics* 2016;**94**(1):212-4.

Roos DE, Smith JG. Randomized comparison radiation therapy and steroids for plantar fasciitis: In regard to Canyilmaz et al. *International Journal of Radiation Oncology, Biology, Physics* 2016;**94**(1):211-2.

Chen 2013 *{published data only}*

Chen MC, Chen JS, Tsai WC, Hsu HC, Chen KH, Lin CH. Effectiveness of device-assisted ultrasound-guided steroid injection for treating plantar fasciitis. *American Journal of Physical Medicine and Rehabilitation* 2013;**92**(7):597-605.

Crawford 1999 *{published data only}*

Crawford F. Personal communication 7 September 2014.

Crawford F. A double-blind, controlled study of corticosteroid injection in plantar fasciitis. http://www.isrctn.com/ISRCTN36539116 (accessed 24 September 2013).

* Crawford F, Atkins D, Young P, Edwards J. Steroid injection for heel pain: evidence of short-term effectiveness. A randomized controlled trial. *Rheumatology* 1999;**38**(10):974-7.

Díaz-Llopis 2012 *{published data only}*

Díaz-Llopis IV, Rodríguez-Ruíz CM, Mulet-Perry S, Mondéjar-Gómez FJ, Climent-Barberá JM, Cholbi-Llobel F. Randomized controlled study of the efficacy of the injection of botulinum toxin type A versus corticosteroids in chronic plantar fasciitis: results at one and six months. *Clinical Rehabilitation* 2012;**26**(7):594-606.

Elizondo-Rodriguez 2013 *{published data only}*

Elizondo-Rodriguez J, Araujo-Lopez Y, Moreno-Gonzalez JA, Cardenas-Estrada E, Mendoza-Lemus O, Acosta-Olivo C. A comparison of botulinum toxin a and intralesional steroids for the treatment of plantar fasciitis: a randomized, double-blinded study. *Foot & Ankle International* 2013;**34**(1):8-14.

Guner 2013 *{published data only}*

Guner S, Onder H, Guner S, Ceylan MF, Gökalp MA, Keskin S. Effectiveness of local tenoxicam versus corticosteroid injection for plantar fasciitis treatment. *Orthopedics* 2013;**36**(10):e1322-6.

Hanselman 2015 *{published data only}*

Hanselman AE, Tidwell TE, Santrock RD. Cryopreserved human amniotic membrane injection for plantar fasciitis: a randomized, controlled, double-blind pilot study. *Foot & Ankle International* 2015;**36**(2):151-8.

Hunt 2004 *{published data only}*

Hunt JJ, Sevier TL. Corticosteroid injections in the treatment of plantar fasciitis: a randomized controlled trial [abstract]. *Clinical Journal of Sport Medicine* 2004;**14**(5):310-1.

Jain 2015 *{published data only}*

Jain K, Murphy PN, Clough TM. Platelet rich plasma versus corticosteroid injection for plantar fasciitis: A comparative study. *Foot* 2015;**25**(4):235-7.

Kane 2001 *{published data only}*

Kane D, Greaney T, Shanahan M, Duffy G, Bresnihan B, Gibney R, et al. The role of ultrasonography in the diagnosis and management of idiopathic plantar fasciitis. *Rheumatology* 2001;**40**(9):1002-8.

Kiter 2006 *{published data only}*

Kiter E, Celikbas E, Akkaya S, Demirkan F, Kiliç BA. Comparison of injection modalities in the treatment of plantar heel pain: a randomized controlled trial. *Journal of the American Podiatric Medical Association* 2006;**96**(4):293-6.

Kriss 2003 *{published data only}*

Kriss S. Personal communication 27 July 2013.

* Kriss S. Injectable steroids in the management of heel pain. A prospective randomised trial. *British Journal of Podiatry* 2003;**6**(2):40-2.

Kriss SM. Heel pain: an investigation into its aetiology and management [thesis]. London (UK): Polytechnic of Central London, 1990.

Lee 2007 *{published data only}*

Lee TG, Ahmad TS. Intralesional autologous blood injection compared to corticosteroid injection for the treatment of plantar fasciitis. A prospective randomized controlled trial. *Foot & Ankle International* 2007;**28**(9):984-90.

Li 2014 *{published data only}*

Li S, Shen T, Liang Y, Zhang Y, Bai B. Miniscalpel-needle versus steroid injection for plantar fasciitis: a randomised controlled trial with a 12-month follow-up. *Evidence-Based Complementary and Alternative Medicine* 2014;**2014**:Article ID 164714. [DOI: 10.1155/2014/164714]

Lynch 1998 *{published data only}*

Lynch DM, Goforth WP, Martin JE, Odom RD, Preece CK, Kotter MW. Conservative treatment of plantar fasciitis - a prospective study. *Journal of American Podiatric Medical Association* 1998;**88**(8):375-80.

Mardani-Kivi 2015 *{published data only}*

Mardani-Kivi M. Comparison of therapeutic responses of corticosteroid injection vs extra-corporeal shock-wave treatment in patients with acute plantar fasciitis referred to Rasht Poursina hospital. www.irct.ir/searchresult.php?id=7274&number=1 (accessed 24 September 2013).

* Mardani-Kivi M, Mobarakeh MK, Hassanzadeh Z, Mirbolook A, Asadi K, Ettehad H, et al. Treatment outcomes of corticosteroid injection and extracorporeal shock wave therapy as two primary therapeutic methods for acute plantar fasciitis: A prospective randomized clinical trial. *Journal of Foot and Ankle Surgery* 2015;**54**(6):1047-52.

McMillan 2012 *{published data only}*

McMillan A. Ultrasound guided corticosteroid injection for plantar fasciitis: a randomised controlled trial. www.anzctr.org.au/Trial/Registration/TrialReview.aspx?id=335277 (accessed 6 December 2013).

* McMillan AM, Landorf KB, Gilheany MF, Bird AR, Morrow AD, Menz HB. Ultrasound guided corticosteroid injection for plantar fasciitis: a randomised controlled trial. *BMJ* 2012;**344**:e3260.

McMillan AM, Landorf KB, Gilheany MF, Bird AR, Morrow AD, Menz HB. Ultrasound guided injection of dexamethasone versus placebo for treatment of plantar fasciitis: protocol for a randomised controlled trial. *Journal of Foot and Ankle Research* 2010;**3**:15.

Monto 2014 *{published data only}*

Monto R. Platelet rich plasma is more effective than cortisone injection for chronic plantar fasciitis [abstract]. *Journal of Bone and Joint Surgery - British Volume* 2012;**94**(Suppl XXXVII):212.

Monto RR. Platelet rich plasma efficacy versus corticosteroid injection treatment for chronic severe plantar fasciitis. *Foot & Ankle International* 2014;**35**(4):313-8. [DOI: 10.1177/1071100713519778]

Mulherin 2009 *{published data only}*

Mulherin D. Personal communication 14 November 2012.

Mulherin D. Personal communication 23 August 2013.

* Mulherin D, Price M. Efficacy of tibial nerve block, local steroid nerve injection or both in the treatment of plantar heel syndrome. *Foot* 2009;**19**(2):98-100.

Omar 2012 *{published data only}*

Omar AS, Ibrahim ME, Ahmed AS, Said M. Local injection of autologous platelet rich plasma and corticosteroid in treatment of lateral epicondylitis and plantar fasciitis: Randomised clinical trial. *Egyptian Rheumatologist* 2012;**34**:43-9.

Porter 2005 *{published data only}*

Porter MD, Shadbolt B. Intralesional corticosteroid injection versus extracorporeal shock wave therapy for plantar fasciopathy. *Clinical Journal of Sport Medicine* 2005;**15**(3):119-24.

Ryan 2014 *{published data only}*

* Ryan M, Hartwell J, Fraser S, Newsham-West R, Taunton J. Comparison of a physiotherapy program versus dexamethasone injections for plantar fasciopathy in prolonged standing workers: a randomised clinical trial. *Clinical Journal of Sport Medicine* 2014;**24**(3):211-7.

Taunton J. A clinical trial of a multi-element exercise program for plantar fasciopathy in workers required to stand for prolonged periods of time. clinicaltrials.gov/show/NCT01297686 (accessed 24 September 2013).

Saber 2012 *{published data only}*

Saber N, Diab H, Nasser W, Razaak AH. Ultrasound guided local steroid injection versus extracorporeal shockwave therapy in the treatment of plantar fasciitis. *Alexandria Journal of Medicine* March 2012;**48**(1):35-42.

Sconfienza 2011 *{published data only}*

Sconfienza LM, Ferrero G, Orlandi D, Fabbro E. One-year outcome of ultrasound-guided percutaneous treatment of

plantar fasciitis: a randomised controlled trial [abstract]. *Cardiovascular and Interventional Radiology* 2011;**34**:538.

Sorrentino 2008 *{published data only}*

Sorrentino F, Iovane A, Vetro A, Vaccari A, Mantia R, Midiri M. Role of high-resolution ultrasound in guiding treatment of idiopathic plantar fasciitis with minimally invasive techniques [Ruolo dell'ecografia ad elevata risoluzione nella guida al trattamento della fascite plantare con tecniche mini-invasive]. *Radiologia Medica* 2008;**113**(4):486-95.

Tiwari 2013 *{published data only}*

Tiwari M, Bhargava R. Platelet rich plasma therapy: A comparative effective therapy with promising results in plantar fasciitis. *Journal of Clinical Orthopaedics and Trauma* 2013;**4**(1):31-5.

Tsai 2006 *{published data only}*

Tsai WC, Hsu CC, Chen CPC, Chen MJL, Yu TY, Chen YJ. Plantar fasciitis treated with local steroid injection: comparison between sonographic and palpation guidance. *Journal of Clinical Ultrasound* 2006;**34**(1):12-6.

Wilson 2013 *{published data only}*

Wilson JJ, Lee KS, Swick J. Platelet-rich plasma for the treatment of chronic plantar fasciopathy in adults: a randomized controlled clinical trial [abstract]. *Clinical Journal of Sports Medicine* 2013;**23**(2):131.

Yucel 2009 *{published data only}*

Yucel I, Yazici B, Degirmenci E, Erdogmus B, Dogan S. Comparison of ultrasound-, palpation-, and scintigraphy-guided steroid injections in the treatment of plantar fasciitis. *Archives of Orthopaedic and Trauma Surgery* 2009;**129**(5):695–701.

Yucel 2010 *{published data only}*

Yucel I, Ozturan KE, Demiraran Y, Degirmenci E, Kaynak G. Comparison of high-dose extracorporeal shockwave therapy and intralesional corticosteroid injection in the treatment of plantar fasciitis. *Journal of the American Podiatric Medical Association* 2010;**100**(2):105-10.

Yucel 2013 *{published data only}*

Yucel U, Kucuksen S, Cingoz HT, Anliacik E, Ozbek O, Salli A, et al. Full-length silicone insoles versus ultrasound-guided corticosteroid injection in the management of plantar fasciitis: A randomised clinical trial. *Prosthetics and Orthotics International* 2013;**37**(6):471-6. [DOI: 10.1177/0309364613478328]

Yuzer 2006 *{published data only}*

Yuzer S, Sever A, Gurcay E, Ünlu E, Çakci A. Comparison of the effectiveness of laser therapy and steroid injection in epin calcanei [Topuk Dikeni Tedavisinde Lazer Tedavisi ve Steroid Enjeksiyonunun Etkinliginin Karsılastırılması]. *Turkish Journal of Physical Medicine and Rehabilitation* 2006;**52**(2):68-71.

Zamani 2014 *{published data only}*

Zamani B. Comparison between effect of low-power laser therapy versus local methylprednisolone injection on plantar fascitis in patients refer to rheumatology clinic. www.irct.ir/searchresult.php?id=7877&number=1 (accessed 11 November 2013). [IRCT201110247877N1]

Zamani B, Hadizadeh-Moghdam M, Moravveji SA. Comparing the effect of low-power laser therapy with methylprednisolone injection in unilateral plantar fasciitis. *Feyz, Journal of Kashan University of Medical Sciences* 2014;**17**(6):545-52.

References to studies excluded from this review

Al-Bluwi 2011 *{published data only}*

Al-Bluwi MT, Sadat-Ali M, Al-Habdan IM, Azam MQ. Efficacy of EZStep in the management of plantar fasciitis: a prospective, randomised study. *Foot and Ankle Specialist* 2011;**4**(4):218-21.

D'Agostino 2005 *{published data only}*

d'Agostino MA, Ayral X, Baron G, Ravaud P, Breban M, Dougados M. Impact of ultrasound imaging on local corticosteroid injections of symptomatic ankle, hind- and mid-foot in chronic inflammatory diseases. *Arthritis and Rheumatism* 2005;**53**(2):284-92.

Hammer 2002 *{published data only}*

Hammer DS, Rupp S, Kreutz A, Pape D, Kohn D, Seil R. Extracorporeal shockwave therapy (ESWT) in patients with chronic proximal plantar fasciitis. *Foot & Ankle International* 2002;**23**(4):309-13.

Helfand 1973 *{published data only}*

Helfand AE. A clinical study of methylprednisolone acetate (Depo-Medrol) in the treatment of pain and inflammation associated with various foot disorders. *Journal of the American Podiatry Association* 1973;**63**(7):287-92.

ISRCTN57762240 *{published data only}*

McLauchlan G. Ultrasound guided versus palpation guided steroid injection for plantar fascitis: randomised prospective trial. apps.who.int/trialsearch/Trial2.aspx?TrialID=ISRCTN57762240 (accessed 12 October 2016).

Kalaci 2009 *{published data only}*

Kalaci A, Cakici H, Hapa O, Yanat AN, Dogramaci Y, Sevinç TT. Treatment of plantar fasciitis using four different local injection modalities: a randomised prospective clinical trial. *Journal of the American Podiatric Medical Association* 2009;**99**(2):108-13.

Marabha 2008 *{published data only}*

Marabha T, Al-Anani M, Dahmashe Z, Rashdan K, Hadid A. The relation between conservative treatment and heel pain duration in plantar fasciitis. *Kuwait Medical Journal* 2008;**40**(2):130-2.

Motififard 2008 *{published data only}*

Motififard M, Javdan M, Teimouri M. Comparative study of the therapeutic effects of corticosteroid injection accompanied by casting and heel pad in treatment of heel pain. *Journal of Research in Medical Sciences* 2008;**13**(4):175-80.

NCT01127672 *{published data only}*

Mildren ME, Bunnel WP. Platelet rich plasma injection compared to corticosteroid injection for treatment of plantar fasciitis: a

prospective, randomized control trial. apps.who.int/trialsearch/Trial2.aspx?TrialID=NCT01127672 (accessed 12 October 2016).

Say 2014 *{published data only}*

Say F, Gürler D, İnkaya E, Bülbül M. Comparison of platelet-rich plasma and steroid injection in the treatment of plantar fasciitis. *Acta Orthopaedica et Traumatologica Turcica* 2014;**48**(6):667-72.

Tsai 2000 *{published data only}*

Tsai W, Wang C, Tang F, Hsu T, Hsu K, Wong M. Treatment of proximal plantar fasciitis with ultrasound-guided steroid injection. *Archives of Physical Medicine and Rehabilitation* 2000;**81**(10):1416-21.

Wang 2006 *{published data only}*

Wang CJ, Wang FS, Yang KD, Weng LH, Ko JY. Long-term results of extracorporeal shockwave treatment for plantar fasciitis. *American Journal of Sports Medicine* 2006;**34**(4):592-6.

References to studies awaiting assessment

Acosta-Olivo 2011 *{published data only}*

Acosta-Olivo C, Elizondo-Rodriguez J, Lopez-Cavazos R, Vilchez-Cavazos F, Simental-Mendia M, Mendoza-Lemus O. Plantar fasciitis. A comparison of treatment with intralesional steroids versus platelet-rich plasma (PRP). A randomized, blinded study. Journal of the American Podiatric Medical Association 2016 Oct 11 [Epub ahead of print]:10.7547/15-125. [DOI: 10.7547/15-125]

Celik 2016 *{published data only}*

Celik D, Kuş G, Sırma SÖ. Joint mobilization and stretching exercise vs steroid injection in the treatment of plantar fasciitis: A randomized controlled study. *Foot & Ankle International* 2016;**37**(2):150-6.

Demir 2015 *{published data only}*

Demir G, Okumus M, Karagoz A, Kultur T. Prolotherapy versus corticosteroid injections and phonophoresis for the treatment of plantar fasciitis: A randomized controlled trial [abstract]. *Arthritis and Rheumatology* 2015;**67**(Suppl 10):Abstract no. 1410.

Karimzadeh 2017 *{published data only}*

Karimzadeh A, Raeissadat SA, Erfani FamS, Sedighipour L, Babaei-Ghazani A. Autologous whole blood versus corticosteroid local injection in treatment of plantar fasciitis: A randomized, controlled multicenter clinical trial. *Clinical Rheumatology* 2017;**36**(3):661-9.

Mahindra 2016 *{published data only}*

Mahindra P, Yamin M, Selhi HS, Singla S, Soni A. Chronic plantar fasciitis: Effect of platelet-rich plasma, corticosteroid, and placebo. *Orthopedics* 2016;**39**(2):e285-9.

Saba 2016 *{published data only}*

Saba EKA, El-Sherif SM. Ultrasound-guided versus palpation-guided local corticosteroid injection therapy for treatment of plantar fasciitis. *Egyptian Rheumatologist* 2016;**38**(2):123-31.

Sherpy 2016 *{published data only}*

* Sherpy NA, Hammad MA, Hagrass HA, Samir H, Abu-Elmaaty SE, Mortada MA. Local injection of autologous platelet rich plasma compared to corticosteroid treatment of chronic plantar fasciitis patients: A clinical and ultrasonographic follow-up study. *Egyptian Rheumatologist* 2016;**38**(3):247-52.

Sherpy NA, Hammad MAH, Hagrass EH, Samir H, Abu Elmaaty S, Mortada M. Efficacy of local autologous platelet rich plasma injection compared to local corticosteroid in treatment of plantar fasciitis; an ultrasonographic evaluation [abstract]. *Annals of the Rheumatic Diseases* 2016;**75**(Suppl 2):858-9.

Vahdatpour 2016 *{published data only}*

Kianimehr L, Vahdatpour B. The effect of platelet rich plasma in the treatment of plantar fasciitis. http://www.irct.ir/searchen.php?keyword=2015041821830N1&field=a&lang=en (accessed 25 May 2017).

* Vahdatpour B, Kianimehr L, Moradi A, Haghighat S. Beneficial effects of platelet-rich plasma on improvement of pain severity and physical disability in patients with plantar fasciitis: A randomized trial. *Advanced Biomedical Research* 2016;**5**(179):10.4103/2277-9175.192731.

References to ongoing studies

ACTRN12610000899044 *{published data only}*

Craddock W, Lovell G. Intralesional autologous platelet rich plasma injection compared to corticosteroid injection for the treatment of chronic plantar fasciitis. A prospective, randomised, controlled trial. www.anzctr.org.au/Trial/Registration/TrialReview.aspx?ACTRN=12610000899044 (accessed 24 September 2013).

IRCT201108157323N2 *{published data only}*

Emad M, Shoshtari MJ. Efficacy of prolotherapy vs. methylprednisolone acetate injection in the treatment of chronic plantar fasciitis. www.irct.ir/searchresult.php?id=7323&number=2 (accessed 24 September 2013).

IRCT201203069221N1 *{published data only}*

Maleki N. A prospective comparative study of extracorporeal shock wave and corticosteroid injection in the treatment of plantar fasciitis. www.irct.ir/searchresult.php?id=9221&number=1 (accessed 24 September 2013).

IRCT201306163217N7 *{published data only}*

* Eslamian F, Shakouri SK, Jahanjoo F, Hajialiloo M, Notghi F. Extra corporeal shock wave therapy versus local corticosteroid injection in the treatment of chronic plantar fasciitis, a single blinded randomized clinical trial. *Pain Medicine* 2016;**17**(9):1722-31.

Notghi F, Eslamiyan F. Effectiveness of high energy radial extra corporeal shock wave therapy (ESWT) versus local corticosteroid injection in the treatment of chronic plantar fasciitis, a single blinded randomised clinical trial. www.irct.ir/searchresult.php?keyword=abl&id=3217&field=&number=7&prt=1160&total=10&m=1 (accessed 12 September 2014).

IRCT2015041321744N1 *{unpublished data only}*

Arbabi A, Rassi G. Comparison of ultrasound guided local injections of dextrose and corticosteroid efficacy on pain and daily activity of patients with chronic plantar fasciitis. http://www.irct.ir/searchresult.php?keyword=2015041321744N1&id=21744&number=1&field=a&prt=1&total=1&m=1 (accessed 25 May 2017).

NCT00758641 *{published data only}*

EUCTR2008-001257-18-NL. Use of PRP to treat plantar fasciitis, blinded and randomised as a multi centre study - PRP to treat Plantar fasciitis. apps.who.int/trialsearch/Trial.aspx?TrialID=EUCTR2008-001257-18-NL (accessed 6 December 2013).

Gosens T, Schuller HM. Platelet rich plasma to treat plantar fasciitis. clinicaltrials.gov/ct2/show/NCT00758641 (accessed 24 September 2013).

* Peerbooms JC, van Laar W, Schuller HM, van der Hoeven H, Gosens T. Use of platelet rich plasma to treat plantar fasciitis: design of a multi centre randomised controlled trial. *BMC Musculoskeletal Disorders* 2010;**11**:69. [DOI: 10.1186/1471-2474-11-69]

NCT01297686 *{published data only}*

Taunton J. Exercise versus corticosteroid randomized clinical trial for plantar fasciitis. apps.who.int/trialsearch/Trial2.aspx?TrialID=NCT01297686 (accessed 12 October 2016).

NCT01614223 *{published data only}*

Bryant D. A randomised double-blind clinical trial to investigate the use of autologous conditioned plasma (ACP) for patients with plantar fasciitis. apps.who.int/trialsearch/Trial.aspx?TrialID=NCT01614223 (accessed 11 November 2013).

NCT01957631 *{published data only}*

Aamina MK. Steroid injections vs. platelet rich plasma injections in patients with plantar fasciitis: a comparison of clinical and ultrasound findings. clinicaltrials.gov/show/NCT01957631 (accessed 12 September 2014).

NCT01994759 *{published data only}*

Finn EJ. Optimal treatment of plantar fasciitis: a randomized clinical trial using physical training, glucocorticoid injections or a combination thereof. apps.who.int/trialsearch/Trial2.aspx?TrialID=NCT01994759 (accessed 12 October 2016).

NCT02982226 *{unpublished data only}*

Ng A. ReNu™ vs. corticosteroids for the treatment of plantar fasciitis. https://clinicaltrials.gov/ct2/show/NCT02982226 (accessed 25 May 2017).

NCT03054610 *{unpublished data only}*

Acosta-Olivo C, Elizondo-Rodríguez J. Therapeutic effect of botulinum toxin A for the treatment of plantar fasciitis. https://clinicaltrials.gov/ct2/show/NCT03054610 (accessed 25 May 2017).

Whittaker 2017 *{published data only}*

Whittaker G. Corticosteroid injections compared to foot orthoses for plantar heel pain. www.anzctr.org.au/Trial/Registration/TrialReview.aspx?ACTRN=12615001266550 (accessed 6 April 2017).

* Whittaker GA, Munteanu SE, Menz HB, Elzarka A, Landorf KB. Corticosteroid injections compared to foot orthoses for plantar heel pain: protocol for the SOOTHE heel pain randomised trial. *Contemporary Clinical Trials Communications* 2017;**5**:1-11.

Additional references

Acevedo 1998

Acevedo JI, Beskin JL. Complications of plantar fascia rupture associated with corticosteroid injection. *Foot & Ankle International* 1998;**19**(2):91-7.

Agel 2005

Agel J, Beskin JL, Brage M, Guyton GP, Kadel NJ, Saltzman CL, et al. Reliability of the Foot Function Index: a report of the AOFAS Outcomes Committee. *Foot & Ankle International* 2005;**26**(11):962-7.

Altman 1996

Altman DG, Bland JM. Detecting skewness from summary information. *BMJ* 1996;**313**(7066):1200.

Atkins 1999

Atkins D, Crawford F, Edwards J, Lambert M. A systematic review of treatments for the painful heel. *Rheumatology* 1999;**38**(10):968-73.

Attar 2014

Attar F, Nagare U, Asirvatham R. Long term follow up of Regnauld's procedure for the treatment of hallux valgus. *Orthopedics & Rheumatology* 2014;**1**(1):00003. [DOI: 10.15406/mojor.2014.01.00003]

Bennett 1998

Bennett PJ, Patterson C, Wearing S, Baglioni T. Development and validation of a questionnaire designed to measure foot-health status. *Journal of the American Podiatric Medical Association* 1998;**88**(9):419-28.

Boutron 2008

Boutron I, Moher D, Altman DG, Schulz KF, Ravaud P, CONSORT Group. Extending the CONSORT statement to randomised trials of nonpharmacologic treatment: explanation and elaboration. *Annals of Internal Medicine* 2008;**148**(4):295-309.

Budiman-Mak 2001

Budiman-Mak E, Conrad KJ, Roach KE. The Foot Function Index: a measure of foot pain and disability. *Journal of Clinical Epidemiology* 1991;**44**(6):561-70.

Canyilmaz 2016

Canyilmaz E, Canyilmaz F, Yoney A. In Reply to Roos and Smith and an Erratum. *International Journal of Radiation Oncology, Biology, Physics* 2016;**94**(1):212-4.

Chigwanda 1997

Chigwanda PC. A prospective study of plantar fasciitis in Harare. *Central African Journal of Medicine* 1997;**43**(1):23-5.

Conceição 2016

Conceição CS, Neto MG, Neto AC, Mendes SM, Baptista AF, Sá KN. Analysis of the psychometric properties of the American Orthopaedic Foot and Ankle Society Score (AOFAS) in rheumatoid arthritis. *Revista Brasileira de Reumatologia* 2016;**56**(1):8-13. [DOI: 10.1016/j.rbre.2014.12.003]

Cornwall 1999

Cornwall M, McPoil TG. Plantar fasciitis: etiology and treatment. *Journal of Orthopaedic & Sports Physical Therapy* 1999;**29**(12):756-60.

Craig 2008

Craig ME, Duffin AC, Gallego PH, Lam A, Cusumano J, Hing S, et al. Plantar fascia thickness, a measure of tissue glycation, predicts the development of complications in adolescents with type 1 diabetes. *Diabetes Care* 2008;**31**(6):1201-6.

Crawford 2003

Crawford F, Thomson CE. Interventions for treating plantar heel pain. *Cochrane Database of Systematic Reviews* 2003, Issue 3. [DOI: 10.1002/14651858.CD000416.pub2]

De Inocencio 1998

De Inocencio J. Musculoskeletal pain in primary paediatric care: analysis of 1000 consecutive general paediatric clinic visits. *Pediatrics* 1998;**102**(6):E63.

Deeks 2011

Deeks JJ, Higgins JPT, Altman DG (editors). Chapter 9: Analysing data and undertaking meta-analyses. Cochrane Handbook for Systematic Reviews of Interventions Version 5.1.0 (updated March 2011). The Cochrane Collaboration, 2011. Available from www.cochrane-handbook.org.

Eechaute 2007

Eechaute C, Vaes P, Van Aerschot L, Asman S, Duquet W. The clinimetric qualities of patient-assessed instruments for measuring chronic ankle instability: A systematic review. *BMC Musculoskeletal Disorders* 2007;**8**:6.

Eslamian 2016

Eslamian F, Shakouri SK, Jahanjoo F, Hajialiloo M, Notghi F. Extra corporeal shock wave therapy versus local corticosteroid injection in the treatment of chronic plantar fasciitis, a single blinded randomised clinical trial. *Pain Medicine* 2016;**17**(9):1722-31.

Furey 1975

Furey JG. Plantar fasciitis. The painful heel syndrome. *Journal of Bone and Joint Surgery. American Volume* 1975;**57**(5):672-3.

Gerster 1977

Gerster JC, Vischer TL, Bennani A, Fallet GH. The painful heel. Comparative study in rheumatoid arthritis, ankylosing spondylitis, Reiter's syndrome, and generalized osteoarthrosis. *Annals of the Rheumatic Diseases* 1977;**36**(4):343-8.

Goff 2011

Goff JD, Crawford R. Diagnosis and treatment of plantar fasciitis. *American Family Physician* 2011;**84**(6):676-82.

GRADEpro GDT 2014 [Computer program]

GRADE Working Group, McMaster University. GRADEpro GDT. Version (accessed prior to 12 May 2017). Hamilton (ON): GRADE Working Group, McMaster University, 2014.

Hale 2005

Hale SA, Hertel J. Reliability and sensitivity of the Foot and Ankle Disability Index in subjects with chronic ankle instability. *Journal of Athletic Training* 2005;**40**(1):35-40.

Heyd 2007

Heyd R, Tselis N, Ackermann H, Röddiger SJ, Zamboglou N. Radiation therapy for painful heel spurs: results of a prospective randomised study. *Strahlentherapie und Onkologie* 2007;**183**(1):3-9.

Higgins 2011

Higgins JPT, Green S (editors). Cochrane Handbook for Systematic Reviews of Interventions Version 5.1.0 [updated March 2011]. The Cochrane Collaboration, 2011. Available from www.cochrane-handbook.org.

Hoffmann 2014

Hoffmann TC, Glasziou PP, Boutron I, Milne R, Perera R, Moher D, et al. Better reporting of interventions: template for intervention description and replication (TIDieR) checklist and guide. *BMJ* 2014;**348**:g1687. [http://dx.doi.org/10.1136/bmj.g1687]

James 2013

James AM, Williams CM, Haines TP. Effectiveness of interventions in reducing pain and maintaining physical activity in children and adolescents with calcaneal apophysitis (Sever's disease): a systematic review. *Journal of Foot and Ankle Research* 2013;**6**:16. [DOI: 10.1186/1757-1146-6-16]

Kitaoka 1994

Kitaoka HB, Alexander IJ, Adelaar RS, Nunley JA, Myerson MS, Sanders M. Clinical rating systems for the ankle, hindfoot, midfoot, hallux, and lesser toes. *Foot & Ankle International* 1994;**15**(7):349-53. [DOI: 10.1177/107110079401500701]

Knobloch 2008

Knobloch K, Yoon U, Vogt PM. Acute and overuse injuries correlated to hours of training in master running athletes. *Foot & Ankle International* 2008;**29**(7):671-6.

Kuyvenhoven 2002

Kuyvenhoven MM, Gorter KJ, Zuithoff P, Budiman-Mak E, Conrad KJ, Post MW. The Foot Function Index with verbal rating scales (FFI-5pt): a clinimetric evaluation and comparison with the original FFI. *Journal of Rheumatology* 2002;**29**(5):1023-8.

Lafuente Guijosa 2007

Lafuente Guijosa A, O'mullony Muñoz I, de La Fuente ME, Cura-Ituarte P. Plantar fascitis: evidence-based review of treatment. *Reumatologia Clinica* 2007;**3**(4):159-65.

Landorf 2002

Landorf KB, Keenan AM. An evaluation of two foot-specific, health-related quality-of-life measuring instruments. *Foot & Ankle International* 2002;**23**(6):538-46.

Landorf 2010

Landorf KB, Radford JA, Hudson S. Minimal important difference (MID) of two commonly used outcome measures for foot problems. *Journal of Foot and Ankle Research* 2010;**3**:7. [DOI: 10.1186/1757-1146-3-7]

Landorf 2015

Landorf KB. Plantar heel pain and plantar fasciitis. *Clinical Evidence* 2015;**2015**:pii: 1111.

Lefebvre 2011

Lefebvre C, Manheimer E, Glanville J. Chapter 6: Searching for studies. In: Higgins JPT, Green S (editors). Cochrane Handbook for Systematic Reviews of Interventions Version 5.1.0 (updated March 2011). The Cochrane Collaboration, 2011. Available from www.cochrane-handbook.org.

Lehman 1999

Lehman TJ. Enthesitis, arthritis, and heel pain. *Journal of the American Podiatric Medical Association* 1999;**89**(1):18-9.

Lichniak 1990

Lichniak JE. The heel in systemic disease. *Clinics in Podiatric Medicine and Surgery* 1990;**7**(2):225-41.

Linde 2011

Linde K, Fässler M, Meissner K. Placebo interventions, placebo effects and clinical practice. *Philosophical Transactions of the Royal Society of London. Series B, Biological Sciences* 2011;**366**(1572):1905-12.

Mani 2013

Mani SB, Brown HC, Nair P, Chen L, Do HT, Lyman S, et al. Validation of the Foot and Ankle Outcome Score in adult acquired flat-foot deformity. *Foot & Ankle International* 2013;**34**(8):1140-6. [DOI: 10.1177/1071100713483117]

Martin 2005

Martin RL, Irrgang JJ, Burdett RG, Conti SF, Van Swearingen JM. Evidence of validity for the Foot and Ankle Ability Measure (FAAM). *Foot & Ankle International* 2005;**26**(11):968-83.

Martin 2007

Martin RL, Irrgang JJ. A survey of self-reported outcome instruments for the foot and ankle. *Journal of Orthopaedic and Sports Physical Therapy* 2007;**37**(2):72-84.

McMillan 2010

McMillan AM, Landorf KB, Gilheany MF, Bird AR, Morrow AD, Menz HB. Ultrasound guided injection of dexamethasone versus placebo for treatment of plantar fasciitis: protocol for a randomised controlled trial. *Journal of Foot and Ankle Research* 2010;**3**:15. [DOI: 10.1186/1757-1146-3-15]

McPoil 2008

McPoil TG, Martin RL, Cornwall MW, Wukich DK, Irrgang JJ, Godges JJ. Heel pain - Plantar fasciitis: Clinical practice guidelines linked to the international classification of function, disability, and health from the Orthopaedic Section of the American Physical Therapy Association. *Journal of Orthopaedic and Sports Physical Therapy* 2008;**38**(4):A1-18.

Melegati 2002

Melegati G, Tornese D, Bandi M, Caserta A. The influence of local steroid injections, body weight and the length of symptoms in the treatment of painful subcalcaneal spurs with extracorporeal shock wave therapy. *Clinical Rehabilitation* 2002;**16**(7):789-94.

Orchard 2012

Orchard J. Clinical review: Plantar fasciitis. *BMJ* 2012;**345**:e6603.

Osborne 2006

Osborne HR, Allison GT. Treatment of plantar fasciitis by LowDye taping and iontophoresis: short term results of a double blinded, randomised, placebo controlled clinical trial of dexamethasone and acetic acid. *British Journal of Sports Medicine* 2006;**40**(6):545-9; discussion 549.

Pohl 2009

Pohl M, Hamill J, Davis IS. Biomechanical and anatomic factors associated with a history of plantar fasciitis in female runners. *Clinical Journal of Sport Medicine* 2009;**19**(5):372-6.

RevMan 2014 [Computer program]

The Nordic Cochrane Centre,The Cochrane Collaboration. Review Manager (RevMan). Version 5.3. Copenhagen: The Nordic Cochrane Centre,The Cochrane Collaboration, 2014.

Riddle 2004

Riddle DL, Schappert SM. Volume of ambulatory care visits and patterns of care for patients diagnosed with plantar fasciitis: a national study of medical doctors. *Foot & Ankle International* 2004;**25**(5):303-10.

Rompe 2009

Rompe JD. Plantar fasciopathy. *Sports Medicine and Arthroscopy Review* 2009;**17**(2):100-4.

Roos 2001

Roos EM, Brandsson MD, Karlsson J. Validation of the Foot and Ankle Outcome Score. *Foot & Ankle International* 2001;**22**(10):788-94.

Roos 2016

Roos DE, Smith JG. Randomized comparison radiation therapy and steroids for plantar fasciitis: In regard to Canyilmaz et al. *International Journal of Radiation Oncology, Biology, Physics* 2016;**94**(1):211-2.

Rowe 1963

Rowe CR, Sakellaridis HT, Freeman PA, Sorbie C. Fractures of the os calcis. A long-term follow-up study of 146 patients. *JAMA* 1963;**184**:920-3.

Roxas 2005

Roxas M. Plantar fasciitis: diagnosis and therapeutic considerations. *Alternative Medicine Review* 2005;**10**(2):83-93.

Saag 1996

Saag KG, Saltzman CL, Brown CK, Budiman-Mak E. The Foot Function Index for measuring rheumatoid arthritis pain: evaluating side-to-side reliability. *Foot & Ankle International* 1996;**17**(8):506-10.

Scher 2009

Scher DL, Belmont PJ Jr, Bear R, Mountcastle SB, Orr JD, Owens BD. The incidence of plantar fasciitis in the United States military. *Journal of Bone Joint Surgery. American Volume* 2009;**91**(12):2867-72.

Schünemann 2011

Schünemann HJ, Oxman AD, Vist GE, Higgins JPT, Deeks JJ, Glasziou P, et al. Chapter 12: Interpreting results and drawing conclusions. In: Higgins JPT, Green S (editors), Cochrane Handbook for Systematic Reviews of Interventions Version 5.1.0 (updated September 2011). The Cochrane Collaboration, 2011. Available from www.cochrane-handbook.org.

Speed 2003

Speed CA. Injection therapies for soft-tissue disorders. *Best Practice & Research. Clinical Rheumatology* 2003;**17**(1):167-81.

Speed 2007

Speed CA. Injection therapies for soft-tissue lesions. *Best Practice & Research. Clinical Rheumatology* 2007;**21**(2):333-47.

Taunton 2002

Taunton JE, Ryan MB, Clement DB, McKenzie DC, Lloyd-Smith DR, Zumbo BD. A retrospective case-control analysis of 2002 running injuries. *British Journal of Sports Medicine* 2002;**36**(2):95-101.

Thomas 2010

Thomas JL, Christensen JC, Kravitz SR, Mendicino RW, Schuberth JM, Vanore JV, et al. The diagnosis and treatment of heel pain: a clinical practice guideline-revision 2010. *Journal of Foot and Ankle Surgery* 2010;**49**(3 Suppl):S1-S19.

Tornese 2008

Tornese D, Mattei E, Lucchesi G, Bandi M, Ricci G, Melegati G. Comparison of two extracorporeal shock wave therapy techniques for the treatment of painful subcalcaneal spur. A randomised controlled study. *Clinical Rehabilitation* 2008;**22**(9):780-7.

Tsikopoulos 2016

Tsikopoulos K, Vasiliadis HS, Mavridis D. Injection therapies for plantar fasciopathy ('plantar fasciitis'): a systematic review and network meta-analysis of 22 randomised controlled trials. British Journal of Sports Medicine 2016; Vol. 50, issue 22:1367-75. [DOI: 10.1136/bjsports-2015-095437]

Uden 2011

Uden H, Boesch E, Kumar S. Plantar fasciitis – to jab or to support? A systematic review of the current best evidence. *Journal of Multidisciplinary Healthcare* 2011;**4**:155–64. [DOI: 10.2147/JMDH.S20053]

Wiegerinck 2014

Wiegerinck JI, Yntema C, Brouwer HJ, Struijs PA. Incidence of calcaneal apophysitis in the general population. *European Journal of Pediatrics* 2014;**173**(5):677-9. [DOI: 10.1007/s00431-013-2219-9.]

Wolgin 1994

Wolgin M, Cook C, Graham C, Mauldin D. Conservative treatment of plantar heel pain: long-term follow-up. *Foot & Ankle International* 1994;**15**(3):97-102.

References to other published versions of this review

David 2011

David JA, Chatterjee A, Macaden AS, Sankarapandian V, Christopher PRH. Injected corticosteroids for treating plantar heel pain in adults. *Cochrane Database of Systematic Reviews* 2011, Issue 10. [DOI: 10.1002/14651858.CD009348]

* Indicates the major publication for the study

CHARACTERISTICS OF STUDIES

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

Abdihakin 2012

Methods	RCT
Participants	**Total participants:** 88 participants **Gender (m/f):** 42/46 **Age:** 42.9 years ± 9.1 **Duration of symptoms:** Not reported **BMI:** Mean BMI = 31.7; 54% participants had BMI > 30 kg/m^2

Abdihakin 2012 *(Continued)*

VAS:

- Palpation-guided steroid injection group: mean 8.6 ± 1.3 cm
- Control group: mean 8.74 ± 1.5 cm

Inclusion criteria:

Participants aged over 18 years with clinical diagnosis of plantar fasciitis and failure to respond to 3 weeks of conservative management (oral diclofenac 50 mg 3 times daily or 75 mg twice daily; stretching exercises; orthotics – prefabricated insoles and heel splints, advise to avoid flat shoes and walking barefoot) as shown by < 50% reduction in pain measured on the VAS.

Exclusion criteria: People:

1. with rheumatologic disease
2. who were pregnant
3. steroid injection within 3 months or any steroids for any other condition
4. with foot pain due to trauma, arthritis or neurologic condition
5. unable to give consent

were excluded

Interventions	**Intervention:** Palpation-guided steroid injection (1 mL methylprednisolone acetate 40 mg/mL + 1 mL lidocaine 1%) and conservative management (analgesics, stretch exercises, orthotics, shoe recommendations); N = 47. **Control:** 1 mL saline + 1 mL lidocaine 1% injection and conservative management (analgesics, stretch exercises, orthotics, shoe recommendations); N = 41.
Outcomes	**Length of follow-up**: 2 months **Outcomes used in meta-analysis:** 1. VAS using 10 scale at one and two months 2. Foot Function Index Score at one and two months
Setting	**Period of study:** Not reported **Setting:** Recruited from Accident and Emergency unit, affiliated outreach clinics and at the orthopaedic clinics, Nairobi **Country:** Kenya
Notes	**Bilateral heel involvement**: None **Adverse events:** Not assessed or reported **Lost to follow-up:** Three participants in each group had missing data **Funding source:** No external funding was received

Risk of bias

Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias)	Low risk	Participants were assigned the allocated intervention as per the computer generated randomisation table

Abdihakin 2012 *(Continued)*

Allocation concealment (selection bias)	Low risk	Quote: "The patient was given a prescription without the exact intervention indicated which could only be understood by the pharmacist". Comment: Central allocation (pharmacy controlled)
Blinding of participants and personnel (performance bias) All outcomes	Unclear risk	Quote: "The steroids and saline/lidocaine were packaged in the same manner by the Pharmacy Department". "The patient and the physician were blinded to the intervention." Comment: Blinding of key study participants and personnel attempted, but it is possible that the blinding protocol could have been broken due to difference in the appearance of both the interventions (methylprednisolone is milky white whereas lidocaine and saline are clear solutions) even though the packaging was similar
Blinding of outcome assessment (detection bias) All outcomes	Low risk	Quote: "The patient and the physician were blinded to the intervention." This is likely to be true for patients who were "given a prescription without the exact intervention indicated which could only be understood by the pharmacist."
Incomplete outcome data (attrition bias) All outcomes	Unclear risk	Three participants in both arms were excluded from analysis because follow-up outcome data were missing. The reasons why these reports were missing is not reported. Since missing data were for fewer than 10% of participants, we assessed this as unclear risk of bias
Selective reporting (reporting bias)	High risk	Trial registration and study protocol were not available. Adverse effects not reported although steroid injection is known to cause adverse events
Other bias	Low risk	This trial appears to be free from other sources of bias. There is no imbalance in the baseline characteristics between the groups

Akhtar 2009

Methods	RCT
Participants	**Total participants:** 276 participants **Gender (m/f):** 100/176 **Age:** mean 45.4 years (range 20 years to 70 years) **Duration of symptoms:** Not reported **BMI:** Not reported **VAS:** Not reported **Inclusion criteria:** People with a clinical diagnosis of plantar fasciitis willing to give informed consent, aged between 20 years and 70 years **Exclusion criteria:** People with history of recent foot trauma, history of any bleeding disorder, septic arthritis, rheumatoid arthritis, gout, diabetes and local skin disease
Interventions	**Intervention:**

Akhtar 2009 *(Continued)*

	Local steroid injection: Methylprednisolone (Depomederol) 80 mg with 2% injection lignocaine along with the conventional treatment. N = 138. **Control:** Conventional method: i.e. anti-inflammatory drugs, foam heel pad, exercises and ESWT. N = 138. All participants underwent 10 sessions of physiotherapy.
Outcomes	**Length of follow-up**: 8 weeks after treatment **Outcomes used in meta-analysis:** VAS using 10-point scale at 1, 3 and 8 weeks after treatment. Pain on weight bearing at 8 weeks, categorised into remission, mild pain (VAS 0 to 4), moderate pain (VAS 5 to 7), and severe pain (VAS 8 to 10) **Other outcomes:** Number of steps taken without pain
Setting	**Period of study:** November 2006 to April 2009 **Setting:** Outpatient Department of Orthopaedic Surgery, Pakistan Institute of Medical Sciences, Islamabad **Country:** Pakistan
Notes	**Bilateral heel involvement**: No mention **Adverse events:** Not assessed or reported (except to confirm no abscesses after steroid injection) **Lost to follow-up:** Nil (probably) **Funding source:** Not reported

Risk of bias

Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias)	Unclear risk	Patients were divided into two groups by 'simple random sampling'. Comment: Method of randomisation is unclear
Allocation concealment (selection bias)	High risk	Allocation concealment method not mentioned; probably not done
Blinding of participants and personnel (performance bias) All outcomes	High risk	Blinding was not attempted. Subjective outcomes were used. Outcomes were likely to be influenced by lack of blinding
Blinding of outcome assessment (detection bias) All outcomes	High risk	No blinding of outcome assessment, and the outcome measurement is likely to be influenced by lack of blinding
Incomplete outcome data (attrition bias) All outcomes	Unclear risk	Participants were followed at one week, three weeks and eight weeks. However, the number of participants followed up at each visit is not mentioned in the published data. We were unable to assess the attrition bias in this study
Selective reporting (reporting bias)	High risk	Trial registration and study protocol were not available. Adverse effects not reported although steroid injection is known to cause adverse events. Moreover, only one data set of outcomes were reported but the period of measurement

Akhtar 2009 *(Continued)*

		from the time of intervention was not confirmed. Available data were inadequate for meta-analysis
Other bias	Unclear risk	Aside from gender and age, baseline characteristics were not reported for the two groups

Ball 2012

Methods	RCT
Participants	**Total participants:** 65 participants **Gender (m/f):** 29/36 **Age:** mean 49 ± 11.3 years **Duration of symptoms:** median 6 months (range: 2.5 to 60 months) **BMI:** mean 31.6 ± 5.2 kg/m^2 **VAS:** • Ultrasound-guided steroid injection group: mean 6.2 ± 1.92 cm • Palpation-guided steroid injection group: mean 6.55 ± 1.96 cm • Ultrasound-guided placebo injection group: mean 5.60 ± 2.79 cm **Inclusion criteria:** History of inferior heel pain combined with point tenderness over the medial tubercle of calcaneum and failure to respond to 8 weeks of conservative therapy **Exclusion criteria:** 1. Inflammatory arthritis 2. Prior surgery and trauma to heel 3. Previous steroid injection to heel pad
Interventions	**Interventions:** • Ultrasound-guided steroid injection 0.5 mL (20 mg) of methylprednisolone acetate + 0.5 mL 0.9% saline; N = 22. • Palpation-guided steroid injection 0.5 mL (20 mg) of methylprednisolone acetate + 0.5 mL 0.9% saline; N = 22. **Control:** Ultrasound-guided placebo injection, 1 mL 0.9% saline; N = 21. All injections were performed using the same approach via the posterior heel with the patient lying prone. Using an aseptic technique, the skin and subcutaneous tissues were anaesthetised with 2.5 mL 2% lignocaine using a 25 mm 23 gauge needle. All patients were asked to avoid weight bearing on the heel pad for 48 hours and were permitted to continue with their usual analgesia
Outcomes	**Length of follow-up**: 12 weeks. **Outcomes used in meta-analysis:** 1. VAS using 100 mm scale at 6 and 12 weeks 2. Adverse events 3. Repeat injection (steroid) at 12 weeks

Ball 2012 *(Continued)*

	Other outcomes: 1. Heel tenderness index (0 = no pain, 1 = painful, 2 = painful and winces, 3 = painful, winces and withdraws) at 6 and 12 weeks 2. Plantar fascia thickness (in mm) at 6 and 12 weeks 3. Foot posture index
Setting	**Period of study:** November 2008 to June 2011 **Setting:** Patients referred to Belfast Rheumatology Service, Belfast **Country:** United Kingdom
Notes	**Bilateral heel involvement**: None **Adverse events:** None reported. **Lost to follow-up:** Four participants in the ultrasound-guided steroid group at 12 weeks; two participants in placebo group at six weeks and one at 12 weeks. **Drop-outs:** Two participants in the ultrasound-guided steroid group at 6 weeks because of persistent heel pain. Both received repeat steroid injection at 12 weeks; one participant from the palpation-guided steroid injection group dropped out at 10 weeks due to transport problems **Funding source:** No external funding was received

Risk of bias

Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias)	Low risk	Quote: "Patients were randomised to one of three treatment groups in balanced blocks of six patients." Comment: Computer randomisation mentioned; random sequence generation probably done
Allocation concealment (selection bias)	Low risk	Quote: "Patients were randomised to one of three treatment groups in balanced blocks of six patients by an independent observer not involved in patient enrolment, who had sole access to the restricted randomisation generated." Comment: Allocation concealment done
Blinding of participants and personnel (performance bias) All outcomes	Low risk	Quote: "Unguided injections were carried out under 'sham' ultrasound conditions to maintain patient blinding to the nature of the procedure... Ultrasound guided injections were carried out by a physician with extensive experience of the technique. The physician performing these unguided injections was naive to the technique of ultrasound of the plantar fascia and had no prior experience of ultrasound guided injection. This was done in order to eliminate the potential bias from knowledge of ultrasound which can influence injection technique. The contents being injected were not identifiable to the injecting physician as an independent observer prepared the injections and covered the syringes with sterile masking tape in order to obscure the contents." Comment: Participant blinding done both for the technique and the medication given. However, personnel blinding would not have been entirely possible since the intervention was done by physicians. Physicians were blinded only to medication they gave and not to the technique they used

Ball 2012 *(Continued)*

Blinding of outcome assessment (detection bias) All outcomes	Low risk	Quote: "...assessments were repeated at the follow-up visits, one at six weeks and the other at 12 weeks by a physician who was blinded to details of the patient's treatment group." Comment: Outcome assessor blinding was done
Incomplete outcome data (attrition bias) All outcomes	High risk	Two participants were lost to follow-up from the ultrasound-guided steroid injection group at six weeks (due to persistent pain), and four at 12 weeks (reasons not given). One person withdrew from the palpation-guided steroid injection group due to transport problem. Two participants were lost to follow-up from the ultrasound-guided placebo injection group at six weeks and one at 12 weeks; reasons were not mentioned for either. Comment: There is some degree of imbalance in numbers of participants lost to follow-up. Moreover, those lost to follow-up had poor outcomes or worsening outcomes. There were some small discrepancies in the results (e.g. numbers of participants in groups 2 and 3 were reversed) published as conference abstract and full trial report
Selective reporting (reporting bias)	High risk	All the stated outcomes in the trial registration document - however, this was retrospectively registered - and in the methods section have been reported in the results. However, we were concerned that the study was selective in not reporting the adverse events of this invasive intervention; some participants in the ultrasound-guided steroid injection group dropped out due to side effects of persistent pain which were not reported as adverse events
Other bias	Low risk	The study appears to be free of other sources of bias. There was no imbalance in baseline characteristics among the three groups

Biswas 2011

Methods	Quasi-RCT
Participants	**Total participants:** 120 participants **Gender (m/f):** 72/48 **Age:** mean 40.1 years **Duration of symptoms:** Not reported (< 3 months) **BMI:** Not mentioned **VAS:** • Palpation-guided steroid injection group: mean 8.6 ± 1.3 cm • Control group: mean 8.74 ± 1.5 cm **Inclusion criteria:** Aged 25 years to 60 years with a clinical diagnosis of plantar fasciitis with unilateral plantar fasciitis < 3 months duration, without any prior formal treatment, with moderate to severe intensity of pain (VAS pain score 5 cm to 9 cm) and willing to be followed-up regularly for two months.

Biswas 2011 *(Continued)*

	Exclusion criteria: Patients with significant systemic disorder (The American Society of Anesthesiologists, ASA, grades III or more).
Interventions	**Intervention:** Palpation-guided injectable steroid group: A single injection of 40 mg (1 mL) methylprednisolone (Depomedrol) and 2 mL 0.5% bupivacaine. N = 60. **Control:** NSAID group: Oral tablet diclofenac (50 mg) and paracetamol (500 mg) - one tablet twice a day along with ranitidine (150 mg), one tablet twice a day for 4 weeks; N = 60.
Outcomes	**Length of follow-up**: Two months. **Outcomes used in meta-analysis:** 1. VAS using 10-point scale at 1 week, 2 weeks, 4 weeks, and 8 weeks 2. Complications at 1 month and 2 months 3. Recurrence or increase in severity of heel pain after two months of initiation of treatment
Setting	**Period of study:** Not reported (took place over 9 months) **Setting:** Tertiary level healthcare centre, Kolkata **Country:** India
Notes	**Bilateral heel involvement**: Not selected as participants **Adverse events:** Assessed and reported **Lost to follow-up:** None **Funding source:** No external funding was received

Risk of bias

Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias)	High risk	Quote: "randomisation was done by allocating subjects with odd number to group I and even number to group II." This may have been a quasi-RCT and not a truly randomised sequence generation
Allocation concealment (selection bias)	High risk	Allocation concealment method not mentioned; probably not done
Blinding of participants and personnel (performance bias) All outcomes	High risk	Blinding was not attempted. Subjective outcomes were used. Outcomes were likely to be influenced by lack of blinding
Blinding of outcome assessment (detection bias) All outcomes	High risk	No blinding of outcome assessment; the outcome measurement is likely to be influenced by lack of blinding
Incomplete outcome data (attrition bias) All outcomes	Low risk	There were no drop-outs. Outcomes were reported for all participants at the various time intervals
Selective reporting (reporting bias)	Unclear risk	All prespecified outcomes including heel pain and adverse effects were reported for all participants recruited at 1 week, 2 weeks, 4 weeks and 2 months after

Biswas 2011 *(Continued)*

		the intervention. Functional outcomes were not mentioned. Trial registration and study protocol were not available
Other bias	Low risk	The baseline characteristics of age, gender, weight and "The American Society of Anesthesiologists grading" for systemic disorder for both groups were similar. There was no imbalance in the baseline characteristics between groups. This trial appears to be free from other sources of bias

Black 1996

Methods	RCT
Participants	**Total participants:** 17 **Gender (m/f):** 10/4 (of those followed-up) **Age:** range 21 years to 73 years **Duration of symptoms:** Not available **BMI:** Not available **VAS:** Not available **Inclusion criteria:** Not available: "typical inflammatory characteristics" **Exclusion criteria:** Patients with rheumatoid arthritis
Interventions	**Intervention:** Injectable steroid group: Triamcinolone (Lederspan) 20 mg with 2% plain lignocaine and advice to rest for 48 hours. N = not known. **Control:** Viscoheel Sofspot, a viscoelastic heel orthosis, 6 mm thick with a lower dual durometer plug of 15 mm width placed to correspond with the medial calcaneal tubercle. N = not known. Co-interventions: all participants received an insole for both feet, even when their condition was unilateral, to avoid limb length discrepancies. Patients in the heel aid group were advised to change their shoes to accommodate the device as required
Outcomes	**Length of follow-up**: 1, 2 and 3 months **Outcomes used in meta-analysis:** 10 cm VAS **Other outcomes:** Ritchie tenderness scale
Setting	**Period of study:** Not mentioned **Setting:** Queens University, Belfast **Country:** UK
Notes	**Bilateral heel involvement**: None **Adverse events:** not assessed/reported. **Lost to follow-up:** 3 participants **Funding source:** Information not available.

Black 1996 *(Continued)*

Others: We could not obtain a copy of the original thesis. However, information was obtained from a previously published Cochrane Review (Crawford 2003).

Risk of bias

Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias)	Unclear risk	Method not mentioned based on the information from the previous review by Crawford 2003
Allocation concealment (selection bias)	Unclear risk	Details of the study are not available
Blinding of participants and personnel (performance bias) All outcomes	High risk	Blinding not mentioned and not possible due to the different natures of the interventions
Blinding of outcome assessment (detection bias) All outcomes	High risk	Blinding unlikely (details of the study not available)
Incomplete outcome data (attrition bias) All outcomes	Unclear risk	Three lost to follow (18%). The group they belonged to and the reason for drop out is not available
Selective reporting (reporting bias)	High risk	Trial registration or published protocol not available. Adverse events are not assessed/reported. Only the means of VAS were reported without standard deviations This information was received from Crawford 2003
Other bias	Unclear risk	Details of the study not available. However Crawford 2003 reports that there was no differences in the baseline age, duration of pain or initial pain scores

Blockey 1956

Methods	RCT
Participants	**Total participants:** 19 participants with 22 heels (3 participants had bilateral heel pain) **Gender (m/f):** 9/10 **Age:** mean 55.7 years (range 40 years to 80 years) **Duration of symptoms:** From 6 weeks to 18 months **BMI:** Not reported but descriptions ("short and stocky") indicate most had higher than normal BMI **VAS score:** Not reported **Inclusion criterion:** Pain in one or both heels that could not be attributed to any known cause **Exclusion criteria:** 1. Participants with generalised peri-articular joint pains 2. Those in whom a convincing local cause could be found

Blockey 1956 *(Continued)*

	3. Those whose foot structure was so abnormal as to be, in itself, a likely cause of pain
Interventions	**Intervention:** Injected hydrocortisone acetate 25 mg/mL; N = 13 heels **Control**: Injected normal saline; N = 9 heels. Both groups were given a sponge rubber pad to wear under the painful heel. After 3 weeks, a second injection was given from the same bottle as before
Outcomes	**Length of follow-up**: 6 to 9 months in 6 heels; 9 to 12 months in 7 heels, 12 to 18 months in 7 heels, over 18 months in 2 heels **Outcomes used in the meta-analysis:** Number of heels with "complete cure" at the end of 6 months. "Improvement" in symptoms that proceeded to "complete cure" without recurrence as assessed by the authors at 1, 2, 3, 4 and 6 months to over 18 months in some participants (criteria for complete cure not mentioned) Adverse events
Setting	**Period of study:** Not mentioned **Setting:** Salford Royal Hospital, Salford **Country**: United Kingdom
Notes	**Bilateral heel involvement:** Three participants had bilateral heel involvement (22 painful heels in 19 participants) **Adverse events:** None reported **Lost to follow-up:** Not mentioned **Comment:** Scale or method used to classify outcome as**"**Improvement in pain" and "cure" was not defined in this study **Funding source:** None mentioned

Risk of bias

Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias)	Unclear risk	Quote: “The selection of patients for treatment or for control was a random selection made by the registrar”. Comment: Method of randomisation was not reported
Allocation concealment (selection bias)	High risk	No information provided regarding allocation concealment. Probably not done
Blinding of participants and personnel (performance bias) All outcomes	Low risk	Quote: "I therefore resorted to using one bottle labelled "hydrocortisone suspension A," containing hydrocortisone acetate, 25 mg per ml, and the other labelled " hydrocortisone solution B," containing normal saline. The painful area was injected from either bottle A or bottle B by a registrar who did not know that only one bottle contained an active principle...".

Blockey 1956 *(Continued)*

		Comment: Participants were blinded. Although an attempt was made to blind the personnel it is unclear whether it was so as the injected solutions by nature are different in appearance
Blinding of outcome assessment (detection bias) All outcomes	Low risk	Quote: "...and I, the assessor, did not know from which bottle the patient had been injected." Comment: Outcome assessor was blinded
Incomplete outcome data (attrition bias) All outcomes	High risk	Quote: "The length of follow up was: 6-9 months in 6 heels, 9-12 months in 7, 12-18 months in 7 and over 18 months in 2". Comment: There is no direct mention of drop-outs. However, there is mention of variations in the number of heels that were followed up at the various intervals. Moreover, the final follow-up varied from 6 to over 18 months and thus the final follow-up was not at preset intervals
Selective reporting (reporting bias)	High risk	Trial registration and study protocol are not available. Outcomes poorly defined and poorly quantified
Other bias	High risk	No data were presented to assess if there were major imbalances in baseline characteristics. The distribution and impact of the inclusion of three cases of bilateral heel pain is unknown. While claimed to be ineffectual, a second injection did not appear to be given to all non-relieved participants

Canyilmaz 2015

Methods	Quasi-RCT
Participants	**Total participants:** 128 participants with heel pain, 124 included in final analysis. **Gender:** • Steroid injection group: 13 males, 51 females • Radiation therapy group: 14 males, 46 females **Age:** • Steroid injection group: 54.7 years (range, 40 years to 74 years) • Radiation therapy group: 52.6 years, (range, 40 years to 74 years) **BMI:** • Steroid injection group: 33.1 (21.3 to 43) • Radiation therapy group: 34 (21.9 to 48) **VAS:** • Device-assisted group: mean 7.06 ± 1.12 cm • Palpation-guided group: mean 6.44 ± 1.83 cm **Duration of symptoms:** • Steroid injection group: 14 months (6 to 48)

Canyilmaz 2015 *(Continued)*

- Radiation therapy group:18.6 months (6 to 48)

Inclusion criteria:

1. symptoms and clinical diagnosis of a painful heel spur
2. duration of symptoms > 6 months
3. radiologically proven heel spur
4. Karnofsky performance status 70
5. aged 40 years and above

Exclusion criteria:

Previous radiation therapy, trauma to the foot, severe psychiatric disorders, rheumatic and/or vascular diseases, or were pregnant or breastfeeding were excluded from the study

Interventions	**Intervention:** Palpation-guided injection of 40 mg (1 mL) methyl-prednisolone and 0.5 mL 1% lidocaine in the painful heel spur. N = 64. **Control**: Radiation therapy arm: total dose of 6.0 Gy given over 2 weeks (3 doses of 1.0 Gy each week). N = 64. (In two participants, the application was over three weeks; thus twice weekly doses of 1.0 Gy)
Outcomes	**Length of follow-up**: median 12.5 months, range 6.5 to 18.6 months. **Outcomes used in the meta-analysis:** • Pain intensity with visual analogue scale • Five-level function score. • Adverse events • Second treatment (and time to second treatment) **Other outcomes:** Modified von Pannewitz pain score Outcomes were measured at 3 months, 6 months and up to 18.6 months
Setting	**Period of study:** March 2013 to April 2014 **Setting:** Department of Radiation Oncology, Department of Orthopaedics and Traumatology, Yavuz Selim Bone Disease and Rehabilitation Hospital, Trabzon **Country**: Turkey
Notes	**Bilateral heel involvement**: not explicitly stated **Adverse events**: Assessed and reported **Lost to follow-up:** Four patients allocated radiation therapy arm changed their mind after consenting and were excluded from the analysis **Funding source:** None mentioned

Risk of bias

Bias	Authors' judgement	Support for judgement

Canyilmaz 2015 *(Continued)*

Random sequence generation (selection bias)	High risk	Quote: "Matching patients with the criteria defined in the study protocol were randomised to two groups by the same orthopedist (F.C.) according to their order of admission". Comment: Randomisation was done in order of admission
Allocation concealment (selection bias)	High risk	No information provided regarding allocation concealment. Probably not done
Blinding of participants and personnel (performance bias) All outcomes	High risk	Different nature of the interventions and blinding not attempted
Blinding of outcome assessment (detection bias) All outcomes	High risk	Blinding of outcome assessment was not done
Incomplete outcome data (attrition bias) All outcomes	Unclear risk	Quote: "Four patients in the radiation therapy arm changed their mind after consenting; and they were included to PG steroid arm" and "A total of 4 patients had to be excluded after randomisation". Comment: Four allegedly were moved from the radiation arm to the steroid group - changed their mind. Four were excluded from final analysis without any specific reason. A letter confirms these are the same four participants and so the cross-over participants were actually excluded from the analysis rather than included in the analysis for the steroid group (Canyilmaz 2016). We are unsure how this would have affected the results
Selective reporting (reporting bias)	High risk	No trial registration or published protocol found. Follow-up was done every 6 weeks; however, data are provided for the 3 month and 6 month period only. Adverse events were reported although not mentioned as one of the outcome measures. The duration of follow-up ranged from 6.5 to 18.5 months - probably relating to further treatment, although this was not reported in full
Other bias	High risk	Baseline characteristics were balanced except for the pretreatment VAS scores which were higher in the radiation therapy arm, duration of heel pain (higher in radiation group) and function (better in radiation therapy group). Quote: "In the case of an unfavourable response to radiation therapy or PG-steroid injection after 12 weeks, the patient was offered a second treatment series applying radiation therapy, steroid injection, or other treatment (e.g., extracorporeal shock-wave therapy or ultrasound applications). The patient chose the treatment option. Regardless of the outcome of this second series, these patients remained in their treatment arms, with their results classified as unsatisfactory." Comment: Data at 6 months are contaminated due to the second intervention in 25% of the participants.

Chen 2013

Methods	RCT
Participants	**Total participants:** 33 participants with heel pain, 32 included in final analysis. **Gender (m/f):** 13/19

Chen 2013 *(Continued)*

	Age: Device assisted ultrasound-guided group: mean 55.69 ± 9.38 years Palpation-guided group: mean 54.25 ± 11.70 years **BMI:** Device assisted ultrasound-guided group: mean 27.09 ± 2.58 kg/m^2 Palpation-guided group: mean 28.27 ± 3.04 kg/m^2 **VAS:** Device assisted ultrasound-guided group: mean 7.06 ± 1.12 cm Palpation-guided group: mean 6.44 ± 1.83 cm **Duration of symptoms:** Not mentioned **Inclusion criteria:** 1. Participants must be aged 20 years or over 2. Unilateral inferior foot pain with tenderness to pressure at the origin of the plantar fascia on the medial tubercle of the calcaneus for at least 8 weeks 3. Worsening of inferior foot pain with activity and/or upon arising in the morning 4. Failure after at least 4 weeks of conservative treatments such as orthoses, stretch exercises, NSAIDs, ultrasound diathermy, or transcutaneous electrical stimulation **Exclusion criteria:** 1. Previous local invasive procedures such as injection or operation 2. Systemic inflammatory disease, connective tissue disease, lumbar spine herniated disc, or previous local trauma
Interventions	**Intervention:** Ultrasound-guided (device-assisted) injection of steroid; N = 16 **Control**: Palpation-guided injection of steroid; N = 17. Steroid used: 7 mg (1 mL) betamethasone with 5 mg (0.5 mL) 1% lidocaine
Outcomes	**Length of follow-up**: 3 months **Outcome used in the meta-analysis:** • Pain intensity measured on VAS • SF-36 to measure participant's physical health status • Serious adverse effects (specifically plaster fascia rupture) **Other outcomes:** • Tenderness threshold • Thickness of plantar fascia • Hypo-echogenicity Outcomes were measured at 3 weeks and 3 months
Setting	**Period of study:** Not mentioned **Setting:** Department of Physical Medicine and Rehabilitation, Chang Gung Memorial hospital, Chang Gung University, Taoyuan

Chen 2013 *(Continued)*

	Country: Taiwan
Notes	**Bilateral heel involvement**: Not selected as participants **Adverse events**: Not assessed and not reported **Lost to follow-up:** One person was lost to follow-up from the palpation-guided injection group **Funding source:** The Chang Gung Memorial Hospital research project fund financially supported this research under contract and no conflicts of interest have been reported by the authors or anyone in control of the content of this article

Risk of bias

Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias)	Unclear risk	Quote: "The patients were then randomly divided into device-assisted ultrasound-guided and palpation-guided groups." Comment: There is no mention of the method of randomisation
Allocation concealment (selection bias)	High risk	There is no mention of any method to conceal allocation; probably not done
Blinding of participants and personnel (performance bias) All outcomes	High risk	No method of blinding the participants was mentioned in the study. Subjective outcomes were used. Outcomes were likely to be influenced by lack of blinding
Blinding of outcome assessment (detection bias) All outcomes	High risk	There was no mention of assessor blinding; probably not done
Incomplete outcome data (attrition bias) All outcomes	Low risk	There was one drop-out in the palpation-guided group; although not included in the final analysis, this was unlikely to bias the results
Selective reporting (reporting bias)	High risk	Trial registration and study protocol are not available. All stated outcomes in the methods were reported in the results. However, adverse effects were not reported, although steroid injection is known to cause adverse events
Other bias	Low risk	There was no baseline imbalance between the groups in terms of age, sex or BMI. The study appears to be free of other sources of bias

Crawford 1999

Methods	RCT
Participants	**Total participants:** 106 participants with heel pain. However, as described in Crawford 2003, there were actually 91 participants with 106 episodes of heel pain. **Gender (m/f):** 37/69 **Age:** mean 57 ± 12.9 years (range 30 years to 87 years) **Duration of symptoms:** median 6 months (range 1 month to 120 months) **BMI:** Not mentioned

Crawford 1999 *(Continued)*

	VAS: mean 5.7 ± 2.4 cm **Inclusion criteria:** Pain and tenderness on the medial tubercle of the calcaneum of weight bearing after rest which partly or fully resolves with activity **Exclusion criteria:** 1. Pregnancy 2. Aged less than 18 years 3. Steroid injection within the last 6 months 4. Patients on anticoagulants
Interventions	**Interventions:** • 1 mL 25 mg/mL prednisolone acetate with 1 mL 2% lignocaine; N = 27 • 1 mL 25 mg/mL prednisolone acetate with 1 mL 2% lignocaine given after tibial nerve block; N = 26 **Controls:** • 2 mL 1% lignocaine hydrochloride; N = 27. • 2 mL 1% lignocaine hydrochloride given after tibial nerve block; N = 26.
Outcomes	**Length of follow-up**: 6 months **Outcomes used in the meta-analysis:** • Pain reduction by VAS (0 to 100 mm) at 1, 3 and 6 months post-treatment • Heel injection pain (not reported) **Other outcomes:** • Questionnaire at 6 months asked if participant was cured by their treatment, had sought further treatment, still had heel pain
Setting	**Period of study**: January 1995 to December 1998 **Setting:** Patient referred from general practitioners to a hospital-based rheumatology clinic, Middlesex Hospital, London **Country:** United Kingdom
Notes	**Bilateral heel involvement:** None **Adverse events:** Not assessed and not reported **Lost to follow-up:** The number of patients lost to follow-up at one month was 4% (4). This rose to 25% at three months and by six months was 48% (51 patients). The authors mention that this reduced the power of the trial and made the results inconclusive. **Funding source:** Arthritis Research Campaign (a charity) funded the study **Contact with trial authors:** Denominators at 1, 3, and 6 months received on contact with F Crawford (7 September 2014)

Risk of bias

Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias)	Low risk	Quote: "Patients were allocated to one of four interventions using a computer-generated randomisation schedule stratified to ensure equal numbers of

Crawford 1999 *(Continued)*

		participants in each group. The unit of randomisation was individual episodes of heel pain". Comment: Probably done
Allocation concealment (selection bias)	Low risk	Quote: "Treatment allocation was concealed from both the clinician (DA) who took all outcome measurements and the physician (JE) who administered all injections, by an independent observer (FC) who was responsible for the treatment allocation." "The codes for the allocation schedule were known only to the independent observer and were held in file by the departmental secretary". Comment: Probably done
Blinding of participants and personnel (performance bias) All outcomes	Low risk	Quote: "The independent observer also prepared the injections and, in order to obscure the syringe contents from the physician and patients, masked the syringes using white dressing tape". Comment: Probably done
Blinding of outcome assessment (detection bias) All outcomes	Low risk	Quote: "Treatment allocation was concealed from both the clinician (DA) who took all outcome measurements". "The clinician taking outcome measurements was blind to the administration of the tibial nerve block." Comment: Probably done
Incomplete outcome data (attrition bias) All outcomes	High risk	Quote: "The number of patients lost to follow-up at 1 month was 4%. This rose to 25% at 3 months and by 6 months was 48% (51 patients)". An intention-to-treat analysis was not done. The reason for the high drop out was probably because the assessment was done using a questionnaire which was send to the participants. Comment: high attrition rate
Selective reporting (reporting bias)	High risk	A questionnaire was sent to participants for assessing mean pain, the details are not available. Moreover, adverse effects were not reported even though steroid injection is known to cause adverse events, there is no protocol and the trial was registered retrospectively
Other bias	Low risk	There was no imbalance between the baseline characteristics of the four groups. The study appears to be free of other sources of bias

Díaz-Llopis 2012

Methods	Cross-over RCT
Participants	**Total participants:** 56 **Gender (m/f)**: 19/37 **Age:** • Steroid group: mean 56.36 ± 14.71 years • Botox group: mean 51.50 ± 14.79 years **Duration of symptoms, VAS score:** Not mentioned **BMI:**

Díaz-Llopis 2012 *(Continued)*

- Steroid group: 11/28 (39.28%) were obese (BMI > 30 kg/m^2)
- Botox group: 9/28 (32.14%) were obese

Inclusion criteria:

1. Diagnosis of plantar fasciitis
2. Failure to respond to conventional therapy (NSAIDs, heel pads, insoles, night splints) for 6 months

Exclusion criteria:

1. Heel pain due to other causes like calcaneal fractures, tumours, infection, enthesopathy, nerve entrapment
2. Foot disorders that co-exist with plantar fasciitis such as severe osteoarthritis, Morton's neuroma, metatarsalgia
3. Disabling diseases and cognitive disorders
4. History of steroid injection within the previous 6 months

Interventions	**Intervention:** First phase: 2 mL betamethasone (6 mg/mL) + 0.5 mL mepivacaine in the calcaneal tuberosity and normal saline at the tarsal insertion of plantar fascia and a placebo subcutaneous injection of normal saline was given on the medial side of the fascia to make the interventions look identical in both groups (N = 28) **Control:** First phase: 40 U botulinum toxin injection in the tender region of the heel medial to the insertion of the plantar fascia and 30 U in the area between one inch distal to the talar insertion on the plantar fascia and the mid point of the plantar arch (N = 28). Second phase: For those who did not improve after a month, a second injection with the drug of the other arm of the study was planned
Outcomes	**Length of follow-up**: 6 months **Outcomes used in the meta-analysis:** 1. Foot health status questionnaire at 1 month and 6 months 2. Adverse events Outcome measurements taken at 1 month and 6 months
Setting	**Period of study:** Not reported **Setting:** Patients referred to the Department of Physical Medicine and Rehabilitation, Alicante University General Hospital **Country**: Spain
Notes	**Bilateral heel involvement**: None **Adverse events**: Measured and reported **Lost to follow-up:** None **Funding source:** None **Comment:** Although a cross-over was planned, because all participants improved, none received the alternate drug
Risk of bias	

Díaz-Llopis 2012 *(Continued)*

Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias)	Low risk	Quote: "A computer-generated randomisation table was used to allocate the patients. As this was a small sample, block randomisation was used to ensure the same number of patients in each treatment group." Comment: Probably done
Allocation concealment (selection bias)	High risk	There was no mention of method to conceal the allocation; probably not done
Blinding of participants and personnel (performance bias) All outcomes	Unclear risk	Quote: "Patients did not know which treatment they were to receive and the medication was prepared out of sight of the specialist performing the injection. However, we cannot describe this as a true double-blind study as the injection volumes and the nature of the solution of the two treatments were different and the specialist could therefore guess which one was being given." Comment: There is a possibility of performance bias as the personnel involved in the study were aware of the interventions. However, the participants were blinded
Blinding of outcome assessment (detection bias) All outcomes	Low risk	Quote: "A different doctor evaluated the results" Comment: Outcome assessor was blinded
Incomplete outcome data (attrition bias) All outcomes	Low risk	There were no drop-outs
Selective reporting (reporting bias)	Unclear risk	Trial registration and study protocol are not available. However, all the stated outcomes (including adverse events) in the methods have been reported in the results
Other bias	Low risk	Baseline characteristics of both groups were comparable. This was planned as a cross-over trial but data from the first phase of the study only was used for analysis. The study appears to be free of other sources of bias

Elizondo-Rodriguez 2013

Methods	Double-blinded RCT
Participants	**Total participants:** 40 participants were enrolled in this study, 36 were included in analyses **Gender (m/f):** 16/20 **Age:** • Steroid group: mean 44.5 years (range 32 years to 54 years) • Botulinum group: mean 41.6 years (range 29 years to 53 years) **Duration of symptoms:** Not reported **BMI:** Not reported **VAS**: mean • Steroid group: mean 7.7 ± 1.32 cm

Elizondo-Rodriguez 2013 *(Continued)*

	• Botulinum group: mean 7.1 ± 1.75 cm **Inclusion criteria:** 1. Skeletally mature, with heel pain at the insertion of the plantar fascia or in the anteromedial tuberosity of the calcaneus 2. Failure of conservative treatment for three months, which consisted of pads in ordinary shoe and NSAID and no previous injections **Exclusion criteria:** 1. Knee or ankle dysfunction 2. Osteoarthritis, rheumatoid arthritis, ankylosing spondylitis, Reiter's syndrome 3. Neurological abnormalities 4. Mental retardation or psychiatric abnormalities 5. Cutaneous infection, or a history of infection in the previous three months, at the application site 6. Patients with adverse reactions to the applied components 7. Those who voluntarily asked to leave the study, and those who did not complete the follow-up appointments
Interventions	**Intervention:** 8 mg (2 mL) dexamethasone isonicotinate injections with 2 mL 2% lidocaine (N = 17). **Control:** Botilinium toxin (BTX-A) 100 U each to the medial and lateral gastrocnemius and 50 U to the soleus (N = 19). Stretching exercises for the plantar fascia were demonstrated to both groups. Participants were evaluated 15 days following treatment administration and at 1, 2, 4, and 6 months
Outcomes	**Length of follow-up:** 6 months **Outcomes used in meta-analysis:** 1. VAS 2. American Orthopaedic Foot and Ankle Society (AOFAS) 3. Adverse events **Other outcomes:** 1. Maryland Foot and Ankle scale, 2. Foot and Ankle Disability Index (FADI)
Setting	**Period of study:** Not mentioned **Setting:** Departamento de Ortopedia y Traumatologia, Hospital Universitario **Country**: Mexico
Notes	**Bilateral heel involvement**: None **Adverse events:** None reported **Loss to follow-up**: Of the 40 who were enrolled, four were excluded due to loss to follow-up (1 in the botulinum toxin group and 3 in the steroid group). **Funding source:** No funding was received for the study

Elizondo-Rodriguez 2013 *(Continued)*

Risk of bias

Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias)	Low risk	Quote: "The patients were randomly assigned into either group using the Alea-T-7/33 program." Comment: Random sequence probably done
Allocation concealment (selection bias)	High risk	No mention made regarding allocation concealment. Probably not done
Blinding of participants and personnel (performance bias) All outcomes	High risk	The sites of application for botulinum toxin were two points (medial and lateral) at the site of greatest thickness of each calf muscle, whereas the local steroid injection was administered to one point (the medial plantar surface of the foot). Comment: Nature of the procedure does not allow blinding of participants and personnel
Blinding of outcome assessment (detection bias) All outcomes	Unclear risk	Quote: "The measurements were made by a blinded investigator who was unaware of the patient group assignments." Comment: Blinding was attempted for outcome assessor but not participants. Subjective outcomes were used. It is likely that the blinding could have been broken and the outcome measurement is likely to be influenced by lack of blinding
Incomplete outcome data (attrition bias) All outcomes	Unclear risk	Of the 40 participants, four were lost to follow-up, three in the steroid group and one in the botulinum toxin group. Reasons and times for drop outs not specified. We are unsure if this will affect the effect of the intervention
Selective reporting (reporting bias)	Unclear risk	All stated outcomes in the methods section were reported at the different time intervals. No protocol or trial registration available
Other bias	Unclear risk	The study appears to be free of other sources of bias although the baseline characteristics of the two groups have not been reported

Guner 2013

Methods	Prospective RCT
Participants	**Total participants:** 64 patients, 3 were lost to follow-up; 61 analysed **Gender (m/f):** 14/47 **Age:** mean 41.4 ± 12.23 years (range 18 years to 60 years) **Duration of symptoms:** Not mentioned **BMI:** • Steroid injection group: mean 30.4 ± 2.9 kg/m^2 • Tenoxicam injection group: mean 29.9 ± 1.9 kg/m^2 **VAS scores:** • Steroid injection group: mean 7.97 ± 1.37 cm • Tenoxicam injection group: mean 8.26 ± 1.41 cm

Guner 2013 *(Continued)*

	Inclusion criteria: 1. Adults aged over 18 years and up to 60 years 2. With localised tenderness at the plantar fascia insertion site, start-up pain after rest, and negative radiographic findings to exclude other causes of heel pain 3. Patients who were diagnosed with plantar fasciitis and who had been treated conservatively (e.g. oral NSAIDs, stretching, custom or nonprescription orthoses, heel cups) for more than 3 months but had no signs of improvement were included in the study 4. Patients who reported a visual analogue scale (VAS: 0 to 10) pain score > 6, which was measured after taking initial steps in the morning, were included in the study. **Exclusion criteria:** 1. Patients younger than 18 years or over 60 years 2. Patients with symptoms that lasted less than 3 months or more than 12 months 3. Bilateral plantar fasciitis 4. History of any previous injection treatment or surgery for heel pain, tarsal tunnel syndrome or effusion around the ankle, indicative of intra-articular disease 5. Calcaneal fracture or calcaneal bone cysts 6. Malignancy 7. Osteomyelitis 8. Abnormal erythrocyte sedimentation rate or C-reactive protein level 9. Systemic disorders (e.g. rheumatoid arthritis, haematological diseases, diabetes mellitus, or gout) 10. Pregnancy
Interventions	**Intervention:** Steroid injection: 1 mL injection of 40 mg methylprednisolone acetate and 1 mL injection 2% lidocaine (N = 32; 2 lost to follow-up; analysis on 30 participants) **Control:** NSAID injection: 1 mL injection tenoxicam (20 mg/2 mL) and 1 mL injection 2% lidocaine (N = 32; 1 lost to follow-up; analysis on 31 participants)
Outcomes	**Length of follow-up:** 12 months **Outcomes used in meta-analysis:** 1. VAS 2. Adverse events **Other outcomes:** 1. Roles and Maudsley score for patient satisfaction The outcomes were measured at 6 months and 12 months
Setting	**Period of study:** February 2010 to March 2012 **Setting:** Department of Trauma and Orthopedic Surgery, Medical School of Yuzuncu Yil University, Yuzuncu Yil University, Van **Country**: Turkey
Notes	**Bilateral heel involvement**: None **Adverse events**: none reported **Loss to follow-up:** Three participants (2 in the steroid group and 1 in the tenoxicam group) were lost to follow-up and were not included in the analysis.

Guner 2013 *(Continued)*

Comment: The study authors reported that the absence of a placebo group was a limitation of the study.

Funding source: None

Risk of bias

Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias)	Low risk	Participants were "randomly allocated to the tenoxicam group or the corticosteroid group by the drawing of lots". Comment: Randomisation probably done
Allocation concealment (selection bias)	High risk	No mention was made regarding allocation concealment. Probably not done
Blinding of participants and personnel (performance bias) All outcomes	Low risk	Quote: "All patients and the study investigators were blinded to the patient groups for the duration of the study." Comment: Blinding was probably done; There was no mention if both injection liquids looked the same
Blinding of outcome assessment (detection bias) All outcomes	Low risk	Quote: "Patients were evaluated by physicians who were blinded to the injection type". Comment: Assessor blinding was done
Incomplete outcome data (attrition bias) All outcomes	Unclear risk	Three participants (2 in the steroid group and 1 in the tenoxicam group) were lost to follow-up after randomisation and were excluded from the final analysis. We are unsure if this affected results
Selective reporting (reporting bias)	Unclear risk	All stated outcomes in the methods were reported in the results. Adverse events were assessed. However, no published protocol or trial registration
Other bias	Low risk	The study appears to be free of other sources of bias

Hanselman 2015

Methods	Double-blinded RCT
Participants	**Total participants:** 24 participants were enrolled in this study **Gender:** 30% (7/23) male and 70% (16/23) female. **Age:** 51 years (range 32 years to 65 years) **Duration of symptoms:** Not mentioned **BMI:** Not mentioned **VAS:** Not mentioned **Inclusion criteria:** 1. Aged 18 years to 65 years 2. Clinical diagnosis of plantar fasciitis 3. Symptoms present for a minimum of 3 months but less than 1 year **Exclusion criteria:**

Hanselman 2015 *(Continued)*

1. Co-existing foot or ankle pathology
2. Previous physician intervention within the past 3 months for plantar fasciitis
3. Previous foot surgery or injury
4. Lower extremity neuropathy
5. Known allergy to corticosteroids
6. Allergy to Ciprofloxacin or Amphotericin B
7. Nonambulatory status
8. Currently pregnant or breastfeeding
9. Pregnant within the past 6 months, or
10. Unwilling to receive human tissue injection

Interventions	**Intervention:** Corticosteroid, methylprednisolone (1 mL 40 mg/mL Depo Medrol, 4 mL bupivacaine 0.5%); N = 14 **Control:** Cryopreserved human amniotic membrane (C-HAM), 1 mL AM3 (now Clarix FLO), 4 mL bupivacaine 0.5%); N = 9 A second injection was offered at the end of 6 weeks and taken up by 6 participants
Outcomes	**Length of follow-up:** 12 weeks (from injection) **Outcomes used in meta-analysis:** 1. VAS 2. Foot Health Status Questionnaire (foot function used in this review) 3. Adverse events Outcomes were assessed at 6 weeks, 12 weeks and 18 weeks (for the 6 participants who had a second injection)
Setting	**Period of study:** August 2013 to January 2014 **Setting:** Department of Orthopaedics, West Virginia University School of Medicine, Morgantown, WV **Country**: USA
Notes	**Bilateral heel involvement**: None **Adverse events:** Reported **Loss to follow-up**: One participant was lost to follow-up from the C-HAM group **Funding source:** Financial support for the research, authorship, and/or publication of this article was received from Amniox Medical Inc (Atlanta, GA) Data were provided separately for the 17 participants who had just 1 injection and the 6 participants who had 2 injections. We merged data from 2 subgroups for 6 weeks and 12 weeks from the first injection

Risk of bias

Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias)	Unclear risk	Quote: "Patients considered qualified for participation were randomised into 1 of the 2 groups". Comment: Method of random sequence generation not reported

Hanselman 2015 *(Continued)*

Allocation concealment (selection bias)	High risk	Allocation concealment method not reported. Probably not done
Blinding of participants and personnel (performance bias) All outcomes	Low risk	Quote: "The syringe barrel was covered and its contents were blinded to both the investigators and the patients." Comment: Participants and personnel were probably blinded
Blinding of outcome assessment (detection bias) All outcomes	High risk	No mention about who did the outcome measurements. Probably not done
Incomplete outcome data (attrition bias) All outcomes	Unclear risk	1/24 dropped out. We are not sure which arm the drop-out came from, nor the effect on the study outcome
Selective reporting (reporting bias)	Unclear risk	All potential outcomes (heel pain, function and adverse events) were reported. However, trial registration and study protocol were not available
Other bias	High risk	Quote: "Following their baseline visit, they were reevaluated at 6 weeks. At that time, they were given an option of receiving second injection at their own discretion. If they decline the injection, they were reevaluated again in another 6 weeks." Comment: There is a bias introduced here as only few participants received second injections, according to the patient's preference

Hunt 2004

Methods	RCT
Participants	**Total participants:** 50 randomised; 33 completed the study. **Baseline foot function index (FFI) score**: • Steroid group: mean 61.75 ± 17.94 • Traditional treatment group: mean 55.75 ± 20.62 **Age, gender distribution, duration of symptoms, BMI, VAS score:** Not mentioned **Inclusion criteria**: Diagnosis of plantar fasciitis **Exclusion criteria**: None mentioned
Interventions	**Intervention**: Corticosteroid injection group was injected with a mixture of 80 mg methylprednisolone and 2 mL bupivacaine on day one of the study. N = 19. **Control**: NSAID: Naproxen sodium 500 mg twice daily for 14 days. N = 14. All participants were treated with heel cups to be worn in the footwear and aggressive stretching of the gastroc-soleus complex
Outcomes	**Length of follow up**: 12 weeks **Outcome used in the meta-analysis:**

Hunt 2004 *(Continued)*

	Validated pain subscale of the FFI
Setting	**Period of study:** 12 weeks **Setting:** Not mentioned **Country**: Probably USA, as this was an American meeting and a publication with these authors in 2003 had the following address: Ball Memorial/Central Indiana Sports Medicine, 3600 West Bethel Avenue, Muncie, IN 47304, USA.
Notes	**Bilateral heel involvement**: None mentioned **Adverse events**: None mentioned **Loss to follow-up**: 50 participants were randomised but only 33 completed the study. The details of reasons for drop-outs, which groups had more drop-outs and how the authors accounted for drop-outs in the analysis, were not provided. **Funding source:** No information **Comment**: We extracted the data above from an abstract published in the journal as the American medical society for sports medicine research abstracts. We were unable to find a full text report and received no responses to our emails sent to the society and the publishers

Risk of bias

Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias)	Unclear risk	Quote: "we randomised 50 patients... into two groups" Comment: Method of randomisation not mentioned.
Allocation concealment (selection bias)	High risk	Not mentioned how allocation was concealed. Probably not done.
Blinding of participants and personnel (performance bias) All outcomes	High risk	Oral drugs and local injections were compared. Blinding was not attempted
Blinding of outcome assessment (detection bias) All outcomes	High risk	Oral drugs and local injections were compared. Blinding was not attempted. Subjective outcomes (heel pain measured by Foot Function Index) were used
Incomplete outcome data (attrition bias) All outcomes	High risk	17/50 (34%) were lost to follow-up. High attrition rate
Selective reporting (reporting bias)	High risk	Abstract only with no trial registration or published protocol. Adverse events were not reported. Both interventions are known to cause adverse events
Other bias	Unclear risk	Baseline characteristics are not mentioned. Inadequate data available to determine presence or absence of other bias

Jain 2015

Methods	Prospective RCT
Participants	**Total participants:** 46 participants; 14 had bilateral symptoms.

Jain 2015 *(Continued)*

Gender (m/f): 16/30

Age: mean 55.6 years; range 31 years to 79 years

Duration of symptoms:

All participants had symptoms for at least 12 months

VAS (0 to 10; worst pain):

- Steroid group: mean 8.27 ± 1.95
- Platelet-rich plasma: mean 8.30 ± 0.88

BMI: Not reported

Inclusion criteria:

Patients with intractable plantar fasciitis, which had not responded to cushioned insoles, a full course of eccentric stretching exercises and physiotherapy were included in the study. All patients had symptoms for at least 12 months.

Exclusion criteria:

Not reported

Interventions	**Intervention:** Triamcinolone (Kenalog) 40 mg and levo bupivacaine hydrochloride (Chirocaine) injection. N = 22 (30 heels) **Control:** 2.5 mL buffered platelet-rich plasma. N = 24 (30 heels) Steroid and platelet-rich plasma were injected under aseptic technique in theatre, directly into the area of maximal tenderness at the heel, via a peppering technique. All patients were advised to continue eccentric stretching programme and cushioned insoles following the injection
Outcomes	**Length of follow-up**: 12 months **Outcomes used in meta-analysis:** 1. VAS 2. AOFAS Ankle and Hind foot score 3. Adverse events. **Other outcomes** 1. Roles-Maudsley score Outcome assessments at 3, 6 and 12 months
Setting	**Period of study:** Not reported **Setting:** Wrightington Hospital, Wigan **Country**: United Kingdom
Notes	**Bilateral heel involvement**: 14 participants (8 in the steroid group; 6 in the platelet-rich plasma group) **Adverse events**: reported **Lost to follow-up:** Not reported

Jain 2015 *(Continued)*

Funding source: None received.

Risk of bias

Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias)	Low risk	"The patients were randomised into one of the two treatment arms via computer." Comment: Randomisation was probably done
Allocation concealment (selection bias)	High risk	Allocation concealment method was not mentioned. Probably was not done
Blinding of participants and personnel (performance bias) All outcomes	High risk	Blinding was not done
Blinding of outcome assessment (detection bias) All outcomes	High risk	Blinding was not done
Incomplete outcome data (attrition bias) All outcomes	Unclear risk	Participants were followed at 3, 6 and 12 months. However, the number of participants followed up at each visit is not mentioned in the published data. Moreover it is not exactly clear what the denominators are but is likely to be heels rather than participants, resulting in unit of analysis issues
Selective reporting (reporting bias)	Unclear risk	There is no trial registration or protocol available. Although, all the outcome measures (including adverse events and functional outcomes measures) mentioned in the "Methods" were reported in the results, there is insufficient detail on the trial methods and analysis of participants with bilateral involvement
Other bias	Unclear risk	There was no imbalance in the baseline characteristics of the two groups. However there were 8 participants in the steroid group and 6 in the PRP who received bilateral heel injections. We are unsure how this would affect the outcomes measured

Kane 2001

Methods	RCT
Participants	**Total participants:** 21 patients with 24 heels. Three participants had bilateral heel involvement. **Gender (m/f):** 9/14 (data included 2 patients who declined participation) **Age:** mean 58 ± 2.19 years **Duration of symptoms:** median 32 weeks, range 8 to 204 weeks **BMI:** mean 30.4 kg/m^2 **VAS score:** • Ultrasound-guided injection group: mean 6.05 ± 0.67 cm • Palpation-guided injection group: mean 5.97 ± 0.6 cm **Inclusion criteria:**

Kane 2001 *(Continued)*

	Patients with plantar fasciitis, unresponsive to the conservative treatment (NSAID, heel cup, cushion) for a minimum of 8 weeks. All participants had ultrasonography and scintigraphic assessment. **Exclusion criteria:** • History of acute heel trauma preceding the onset of plantar fasciitis. • Previous surgical intervention to the heel. • Corticosteroid injection of the heel within six weeks.
Interventions	**Intervention:** Ultrasound-guided injection of 0.5 mL triamcinolone acetonide (10 mg/mL) with 0.5 mL 2% xylocaine (N = 14 heels). **Control:** Palpation-guided injection 0.5 mL triamcinolone acetonide (10 mg/mL) with 0.5 mL 2% xylocaine (N = 10 heels). All participants continued to receive physiotherapy
Outcomes	**Length of follow-up**: Mean duration 13.4 weeks (range: 6 to 48 weeks). **Outcomes used in meta-analysis:** 1. VAS (100 mm) for pain after six weeks. 2. Serious adverse effects (specifically plaster fascia rupture). **Other outcomes:** 1. Heel tenderness index 2. Ultrasonography for plantar fascia thickness
Setting	**Period of study:** Not reported **Setting:** Rheumatology outpatient clinic, St Vincent's University Hospital, Dublin **Country:** Ireland
Notes	**Bilateral heel involvement**: Three patients with bilateral heel involvement. One patient received USG guided injection for both heels. The other two had received USG guided for one heel and palpation-guided for the other heel. **Adverse events:** Measured; no reported adverse events. **Lost to follow-up:** None reported **Funding source:** None

Risk of bias

Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias)	Unclear risk	Quote: "The patients were randomised to either palpation- or ultrasound-guided injection under a protocol approved by St Vincent's University Hospital ethics committee." Comment: No further information regarding method of randomisation provided
Allocation concealment (selection bias)	High risk	Allocation concealment is not mentioned. Probably not done

Kane 2001 *(Continued)*

Blinding of participants and personnel (performance bias) All outcomes	High risk	There was no mention about blinding of the participants and personnel
Blinding of outcome assessment (detection bias) All outcomes	High risk	Outcome assessor was not blinded for this subjective outcome
Incomplete outcome data (attrition bias) All outcomes	Low risk	All randomised participants were included in the analysis
Selective reporting (reporting bias)	Low risk	Heel pain is reported for all patients. But ultrasound to rule out plantar fascia rupture was done only in 16 out of 24 heels. Other adverse events are not reported. Functional outcomes not reported. Trial registration and study protocol are not available but individual patient data reported
Other bias	High risk	Quote: "Of 21 patients with 24 painful heels, 14 heels were randomised to ultrasound guided injection and 10 to palpation guided injection". Comment: Heels were randomised than individual patients leading to a cluster effect and this was not addressed in the discussion section. Quote: Eight patients had prior heel injection, five were randomised to USG guided group and three were randomised to palpation-guided group". Comment: This baseline imbalance introduces another potential bias

Kiter 2006

Methods	RCT
Participants	**Total participants**: 45 consequent patients with plantar heel pain were enrolled, 44 patients completed the study. **Gender (m/f):** 14/31 **Age:** mean 50.7 years (range 26 to 70 years) **Duration of symptoms:** mean 19.3 months (range 6 to 180 months) **VAS:** • Steroid injection group: mean 7.28 ± 1.2 cm • Peppering technique group: mean 6.4 ± 1.1 cm • Autologous blood group: mean 7.6 ± 1.3 cm **BMI:** Not mentioned. **Inclusion criteria:** Patients with plantar heel pain whose conservative treatment (heel pads and NSAIDs) for six months failed. **Exclusion criteria:** • Presence of inflammatory arthritis or severe metabolic disease • History of corticosteroid injection in the past one year • Morbid obesity according to BMI • Presence of lower limb deformity or functional deficits

Kiter 2006 *(Continued)*

Interventions	**Intervention**: Corticosteroid injections with 40 mg of methylprednisolone acetate mixed with 1 mL 2% prilocaine. N = 15. **Controls:** • Peppering technique group: Infiltration with 1 mL 2% prilocaine and then peppered the site with multiple re-insertions of the needle without leaving the skin. N = 15. (However, anaesthetic was not used at the start) • 3. Autologous blood injection 2 mL, withdrawn from the contralateral/ipsilateral upper extremity given with 1 mL 2% prilocaine. N = 15. Number of injections: First and second injections were given for steroid group at an interval of one month, third was not required. Three injections for peppering technique were required, at monthly intervals. Three injections for autologous blood injection were required, at monthly intervals
Outcomes	**Length of follow-up**: 6 months **Outcome used in meta-analysis:** 1. Pain by VAS 10 cm scale 2. Rear foot score of AOFAS 3. The outcomes were measured at six months.
Setting	**Period of study:** Not mentioned. **Setting:** Department of Orthopedics, Pamukkale University School of Medicine **Country**: Turkey
Notes	**Bilateral heel involvement:** None **Adverse effects**: Not measured **Lost to follow-up:** One patient dropped out of the steroid group at three months (moved to another city) **Funding source:** None

Risk of bias

Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias)	Low risk	Quote: "Patients were allocated to one of three groups by drawing lots" Comment: randomisation done
Allocation concealment (selection bias)	High risk	Allocation concealment is not mentioned. Probably not done
Blinding of participants and personnel (performance bias) All outcomes	High risk	Blinding was not done as the peppering technique involved reinserting the needle 10 to 15 times without withdrawing the needle from the skin. The arm with the autologous blood involved withdrawing blood from the patient's ipsilateral or contralateral arm. Comment: Not blinded to participants and personal

Kiter 2006 *(Continued)*

Blinding of outcome assessment (detection bias) All outcomes	Unclear risk	Quote: "Results were collected by an independent observer who had no information about the patients." Comment: Blinding was attempted. But the interventions are very different (peppering and autologous blood can be differentiated from steroid injection by the outcome assessor). Subjective outcomes were used. It is likely that the blinding could have been broken and the outcome measurement is likely to be influenced by lack of blinding
Incomplete outcome data (attrition bias) All outcomes	Low risk	Quote: "Findings from the remaining 44 patients were evaluated.One of the patients from the corticosteroid group withdrew from the study at three months and the reason being, that person had moved to another city". Comment: Low risk for attrition bias
Selective reporting (reporting bias)	High risk	Adverse events are not reported. Steroid injection is known to cause adverse events like plantar fascia rupture, heel pad atrophy, cutaneous depigmentation and post-injection flare. Trial registration and study protocol are not available
Other bias	High risk	Quote: "7 of 15 in the peppering technique and 10 of 15 in the autologous group received three injections while none received a third injection in the corticosteroid group". Comment: The indication for the repeat injections were not very clear. This could have introduced detection bias and altered the outcome measurement. Quote: "Early in the study, we performed the technique without local anaesthetic and pain was a major complaint of the patients." Comment: No mention was made of how many patients underwent peppering without anaesthetic agent.There is deviation from the protocol causing performance bias

Kriss 2003

Methods	RCT
Participants	**Total participants**: 76 participants **Gender (m/f):** 30/46 **Age**: mean 59.33 years **Duration of symptoms:** mean 7.56 months; range: 0 to 65 months. **BMI:** 60 (78.9%) were obese by the Quetelet index of obesity. **VAS score:** • Steroid injection group: mean 7.61 ± 1.43 cm • Pronatory pad group: mean 7.17 ± 1.81 cm • Both: mean 6.63 ± 2.51 cm **Inclusion criteria:** 1. Unilateral plantar heel pain 2. Central or medially localised heel pain 3. Anti-inflammatory medication specifically given for heel pain must be stopped six weeks prior to inclusion.

Kriss 2003 *(Continued)*

	4. No diagnosis of inflammatory joint disease **Exclusion criteria:** 1. Distal heel pain 2. Inflammatory joint pain
Interventions	**Interventions:** • Single injection of triamcinolone hexacetonide, 20 mg/ml, administered through plantar approach into tender spot (N = 22). • Steroid injection + anti-pronatory pad (Frelen base with medial heel wedge lateral heel cushion with 5 mm Molefoam and valgus filler); N = 28 **Control:** • Soft anti-pronatory pad: Frelen base with medial heel wedge lateral heel cushion with 5 mm Molefoam and valgus filler (N = 26).
Outcomes	**Length of follow-up**: 24 weeks **Outcome used in meta-analysis:** Visual analogue pain scores; change scores from baseline at 1, 2, 3, 4, 8, 12, 16, 20 and 24 weeks post treatment. Adverse events (but only reported for steroids injections)
Setting	**Period of study**: Not mentioned **Setting**: Not mentioned **Country:** Probably, United Kingdom; this is the address for study author communication
Notes	**Bilateral heel involvement**: None **Adverse events:** It was measured; no adverse events reported. **Lost to follow-up:** Not mentioned. Probably none. **Funding source:** Study supported by Arthritis and Rheumatism Council.

Risk of bias

Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias)	Low risk	Quote: "patients opened pre-randomised cards" Comment: randomisation done
Allocation concealment (selection bias)	Low risk	Although not mentioned in the article; on email communication with the author we were informed that sealed envelopes were used for concealing allocation to the groups
Blinding of participants and personnel (performance bias) All outcomes	High risk	Blinding was not attempted. Subjective outcomes were used. Outcomes were likely to be influenced by lack of blinding
Blinding of outcome assessment (detection bias)	High risk	No blinding of outcome assessment, and the outcome measurement is likely to be influenced by lack of blinding

Kriss 2003 *(Continued)*

All outcomes		
Incomplete outcome data (attrition bias) All outcomes	Low risk	All randomised participants are included in analysis
Selective reporting (reporting bias)	Unclear risk	Heel pain and adverse events were measured. Functional outcomes were not measured. Trial registration and study protocol are not available
Other bias	Low risk	There is no imbalance in the baseline characteristics between the groups. This trial appears to be free from other sources of bias

Lee 2007

Methods	Prospective, observer blinded RCT
Participants	**Total participants:** 64 participants; three were lost to follow up in the autologous blood group and 61 were included in the analysis. **Gender (m/f):** 6/57 (Data provided for the 61 participants in the analysis; however, data provided for 32 not 30 in the autologous blood group in Table 3 of the trial report.) **Age**: • Steroid group: mean 49.2 ± 11.1 years (range: 29 to 66 years) • Autologous blood group: mean 48.3 ± 10.5 years (range: 28 to 65 years) **Duration of symptoms:** • Steroid group: 8.3 ± 7.7 months (range: 2 to 24 months) • Autologous blood group: 7.6 ± 5.6 months (range: 2 to 24 months) **VAS:** • Steroid group: mean 6.9 ± 1.7 cm • Autologous blood group: mean 7.3 ± 1.8 cm **BMI:** Not mentioned. **Inclusion criteria:** 1. Plantar heel pain worse on rising in the morning and/or after periods of sitting or lying and present for more than 6 weeks. 2. Maximal tenderness at the attachment of the plantar fascia on the medial tubercle of the calcaneus. **Exclusion criteria:** Previous surgery for heel pain, nerve related symptoms, regional pain syndrome, Achilles tendon pathology, rheumatoid arthritis, diabetes Mellitus, local or systemic infection, peripheral vascular disease, metabolic disorder like gout, clotting disorder, anticoagulant therapy, pregnancy, dysfunctions of the knee, ankle or foot and work-related or compensatable injury
Interventions	**Intervention:** Triamcinolone acetate, 20 mg (0.5 mL 40 mg/mL solution) with 2 mL 1% lignocaine hydrochloride. N = 31. **Control:** Autologous blood, 1.5 mL, taken from the ante cubital vein and mixed with 1 mL 2% lignocaine.

Lee 2007 *(Continued)*

	Repeat injection was offered at six week intervals for both groups if pain was not entirely relieved until the patient was satisfied or refused further injections. N = 33. All participants were advised after injection, to avoid impact loading activities such as running and jumping. Non steroidal anti-inflammatory drugs, NSAIDs, were prescribed for not more than three days. All were advised to perform a standardized stretching program for the Achilles tendon and plantar fascia.
Outcomes	**Length of follow-up**: 6 months **Outcome used in meta-analysis:** 1. Heel pain on rising in the morning or after periods of inactivity or sitting (rated on VAS), whichever was worse. 2. Adverse events: specific mention in regard to fat pad atrophy, infections, rupture of plantar fascia and post injection pain (flare). **Other outcomes:** Tenderness threshold using a pressure algometer. Outcome assessments done at six weeks, three and six months.
Setting	**Period of study:** From June 2005 to May 2006. **Setting:** Orthopedic clinic of University of Malaya Medical Centre, Kuala Lumpur. **Country**: Malaysia
Notes	**Bilateral heel involvement**: None **Adverse events**: Reported. **Lost to follow-up:** Three were lost to follow-up from the autologous blood group. **Funding source:** None.

Risk of bias

Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias)	Low risk	Quote: "Each heel was randomly allocated to either of the treatment groups using computer-generated randomisation. Comment: Randomisation done.
Allocation concealment (selection bias)	High risk	Allocation concealment is not mentioned. Probably not done.
Blinding of participants and personnel (performance bias) All outcomes	High risk	Blinding was not attempted. Group A received their own blood (red colour) as an injection after it was taken by a venepuncture and the Group B received a injectable medication that probably was colourless and no venepuncture was done on them. Subjective outcomes were used and the outcome is likely to be influenced by lack of blinding.
Blinding of outcome assessment (detection bias) All outcomes	Unclear risk	Quote: "Assessment was performed by a doctor who was blinded to the type of injection that each of these patients had received". Comment: Blinding of the outcome assessment was attempted, but likely that the blinding could have been broken, as the two interventions were very different. (It is possible for the assessor to ask the patients about withdrawal of

Lee 2007 *(Continued)*

		blood and the colour of injections).The outcome measurement is likely to be influenced as subjective outcomes were used.
Incomplete outcome data (attrition bias) All outcomes	Unclear risk	Three participants were lost to follow-up in the autologous blood injection group (3/33) and their results were not included in the analysis. We are unsure if this will affect the effect of the intervention.
Selective reporting (reporting bias)	Unclear risk	Heel pain and adverse events were reported. Functional outcomes are not reported. However, trial registration and study protocol are not available.
Other bias	High risk	The link between repeat injections and non-response was not made clear; nor the effect of this on outcome at 6 months

Li 2014

Methods	Prospective, observer blinded RCT
Participants	**Total participants:** 61 participants; analysed 54 participants **Gender:** (totals do not agree with numbers allocated) • Steroid group; 7 males: 25 female • MSN group; 10 male: 19 female **Age**: • Steroid group; mean 56.93 ± 9.25 years • MSN (Mini scalpel needle) group; mean 54.74 ± 10 years **Duration of symptoms:** • Steroid group; mean 9.80 ± 2.94 months • MSN group; mean 8.81 ± 2.79 months **VAS:** (morning pain) • Steroid group: mean 7.57 ± 2.10 cm • MSN group mean 7.13 ± 1.82 cm **BMI:** Not mentioned. **Inclusion criteria:** Patients aged 18 to 70 years and who had plantar fasciitis that failed to respond to at least 6 months of conservative treatments including physical therapy, NSAIDs, stretch exercise, and heel cushion were recruited. **Exclusion criteria:** Patients were excluded if they had fracture or arthritis of the ankle and knee, previous foot surgery or trauma, nerve injury, a severe systemic disease, contralateral heel pain, or a history of MSN release treatment or local steroid injection into the heel pad or if they were pregnant.
Interventions	**Intervention:** Triamcinolone acetonide, 2 mL (20 mg) plus 2% lidocaine 2 mL was injected into the most painful tender point. N = 30 **Control:**

Li 2014 *(Continued)*

	Mini scalpel needle release: performed by moving the MSN up and down 3 to 5 times without rotation. All patients were asked to avoid bearing weight on the heel pad for 2 days. N = 31
Outcomes	**Length of follow-up**: 12 months **Outcome used in meta-analysis:** 1. Morning heel pain (the pain experienced during the first steps in the morning) measured using VAS 2. Active heel pain (heel pain during activity), VAS 3. Overall heel pain, VAS **Other outcomes:** Adverse effects - but only reported for MSN group Outcome assessment was done after 1 month, 6 months and 12-month follow-up period and data were collected by telephone interview
Setting	**Period of study:** July 2010 to July 2011. **Setting:** Outpatient clinic of the First Affiliated Hospital of the Guangzhou Medical University, **Country**: China
Notes	**Bilateral heel involvement**: Not reported **Adverse events**: Reported. **Lost to follow-up:** Two participants in the MSN group and 5 participants in the steroid injection group dropped out during the 12-month follow up **Funding source:** None

Risk of bias

Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias)	Low risk	"The allocation sequence was computer-generated with a simple randomisation." Comment: Probably done.
Allocation concealment (selection bias)	Low risk	"The sequence was placed into sealed, consecutively numbered, and opaque envelopes" Comment: Allocation concealment was probably done.
Blinding of participants and personnel (performance bias) All outcomes	High risk	Blinding was not done.
Blinding of outcome assessment (detection bias) All outcomes	High risk	Blinding was not done.
Incomplete outcome data (attrition bias) All outcomes	Unclear risk	"Two patients in the MSN group and 5 patients in the steroid injection group dropped out during the 12 month follow up." Comment: The time and reason for drop out have not been specified. We are unsure if this will affect the effect of the intervention.

Li 2014 *(Continued)*

Selective reporting (reporting bias)	Unclear risk	Trial registration and study protocol are not available. All the outcome measures (including adverse events) mentioned in the "Methods" have been reported in the results, however the functional outcome measures have not been included in this study.
Other bias	Low risk	There was no imbalance in baseline characteristics (age, sex, duration of symptoms, and VAS scores) for the two groups.

Lynch 1998

Methods	Prospective RCT
Participants	**Total participants:** 105 participants; one participant was found ineligible because that participant had a heel cup inside his shoe while another had a pathology in the foot radiograph. Furthermore, 13 participants had incomplete follow-up and five had no follow-up, leaving 85 participants who completed the study. **Gender:** Not mentioned **Age**: mean 49 years; range 19 to 81 years. **Duration of symptoms**: mean 26.5 weeks for the right foot and 46 weeks for the left foot. **BMI, VAS score:** Not mentioned. **Inclusion criteria:** 1. Plantar heel tenderness 2. History of pain upon arising in the morning or after rest **Exclusion criteria:** 1. History of trauma to the heel in the previous three months 2. Treatment, self or professional within one month prior to entry into the study 3. Radiological abnormalities (except presence of intra calcaneal spur)
Interventions	**Intervention:** 0.5 mL dexamethasone sodium phosphate 4 mg/mL together with 1 mL 0.5% bupivacaine hydrochloride without epinephrine injected at the area of maximum tenderness. Patients also took two 300 mg capsules of etodolac per day and if it was contra-indicated, piroxicam 20 mg per day was substituted (N = 35). At week 2 and at week 4, the patient was offered second and third injections if there was no adequate pain relief. **Controls:** • Accommodative therapy with visco-elastic heel cup. The patient was allowed to take paracetamol capsules only on an as-needed basis for pain but no NSAIDs were allowed (N = 33). This was used in the review. • Mechanical therapy: Custom made orthosis after four weeks of strapping (N = 35). The four weeks were needed for fabricating the orthosis.
Outcomes	**Length of follow-up**: 3 months **Outcomes used in meta-analysis:** Visual analogue scale (VAS: 0 to 10; worst pain)

Lynch 1998 *(Continued)*

	Effect of heel pain on three type of activities: leisure, work, exercise. • No effect: no pain relief on any of the three activities • Minimal effect: pain relief in one category • Occasional effect: pain relief in two categories • Constant effect: pain relief in all three categories Treatment failure (no improvement or worsened pain at 6 weeks) Follow-up visits occurred at 2 weeks, 4 weeks, 6 weeks and 3 months.
Setting	**Period of study**: Not mentioned **Setting**: Not mentioned; however the author is affiliated to the Department of Podiatry, Dpartment of Surgery, Texas A&M University Health Science Centre, College of Medicine, Temple, Texas. **Country**: USA
Notes	**Bilateral heel involvement**: If the condition was bilateral or developed in the second foot, the same treatment was provided for both feet; the foot with highest degree of pain on study entry was considered the study foot. **Adverse events**: Not measured. **Lost to follow-up:** 20. One participant was found ineligible because that participant had a heel cup inside his shoe while another had a pathology in the foot radiograph. Furthermore, 13 participants had incomplete follow up and five had no follow-up. **Funding source:** Not mentioned.

Risk of bias

Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias)	Unclear risk	Quote: "Subjects were randomly assigned to one of the three groups". Comment: Method of sequence generation is not mentioned.
Allocation concealment (selection bias)	High risk	Method of allocation concealment is not mentioned. Probably not done
Blinding of participants and personnel (performance bias) All outcomes	High risk	Blinding was not attempted. Subjective outcomes were used. The outcome is likely to be influenced by lack of blinding;
Blinding of outcome assessment (detection bias) All outcomes	High risk	No blinding of outcome assessment. The subjective outcome used is likely to be influenced by lack of blinding.
Incomplete outcome data (attrition bias) All outcomes	High risk	20 participants out of 105 (19%) were excluded from the final analysis, 13 because of incomplete follow-up and five because of no follow-up. Twenty five of the 85 patients had their randomised treatment terminated because of refusal of further treatment, drug reaction, intolerance, or treatment failure. We assessed this as high attrition rate.
Selective reporting (reporting bias)	High risk	No trial registration of published protocol available. Adverse events are not measured and reported. But adverse drug reaction and intolerance to the interventions were the reasons for drop outs.

Lynch 1998 *(Continued)*

Other bias	Low risk	There is no imbalance in the baseline characteristics between the groups. This trial appears to be free from other sources of bias.

Mardani-Kivi 2015

Methods	RCT
Participants	**Total participants:** 84 participants, results including baseline characteristics given for 68 participants **Gender (m/f):** 11/57 • ESWT group: 5 males and 29 females **Age:** • Steroid group: 44.68 ± 9.20 • ESWT group: 43.91± 7.96 **Duration of symptoms:** Not mentioned **Baseline VAS score**: • Steroid group: 8.82 ± 1.26 • ESWT group: 9.16 ± 1.02 **BMI:** • Steroid group: 30.21± 3.85 kg/m^2 • ESWT group: 29.10 ± 4.22 kg/m^2 **Inclusion criteria:** Adults aged > 18 years, with morning heel pain that was relieved after a short walk, localised tenderness at the tuberosity of calcaneus in dorsiflexion, a symptomatic duration of < 6 weeks, and a heel pain score of 5 of the visual analogue scale (VAS) present at the first steps taken in the morning **Exclusion criteria:** 1. Osteoarthritis, diabetes mellitus, peripheral vascular disease, a history of trauma or calcaneal fracture, chronic heart disease, neurologic, hepatic, and/or metabolic disease, or dermatologic infections or trauma at the heel region; 2. Clinical features suggestive of seronegative spondyloarthropathy, nerve-related diseases (e.g. radiculopathy, tarsal tunnel syndrome), or coagulopathy disorders; 3. Undergoing anticoagulant therapy; or had undergone previous surgery for plantar fasciitis or a spur, steroid injection, SWT, or physiotherapy for heel pain. 4. Those for whom ESWT was contraindicated, such as pregnant women, and patients with a hypersensitivity to lidocaine or corticosteroids
Interventions	**Intervention:** 1 mL methylprednisolone acetate (40 mg) and 1 mL lidocaine 2% were injected into the site of maximal tenderness at the infra medial calcaneal tuberosity. N = 41. **Control:** Intermediate shockwave therapy was with an electro hydraulic shock wave system to apply an energy level of 0.15 mJ/mm. Two thousand shock wave impulses were applied for 3 times at weekly intervals. The total dose of 900 mJ/mm was considered for each patient (23, 30, 31). The patient lay down in a comfortable position; the area of maximum tenderness was marked with a skin marker, and ultra-

Mardani-Kivi 2015 *(Continued)*

	sound gel was applied to the patient's heel as the coupling medium.Intrafascial injection of 1 ml of normal saline. N = 43. The patients in both groups were instructed to not participate in any running or long walks for 10 days after the treatment and to not undergo any other alternative therapy such as night splints, massages, and/or narcotic or NSAID use
Outcomes	**Length of follow-up:** 12 weeks **Outcomes used in meta-analysis:** Visual analogue scale (VAS: 0 to 10; worst pain) **Other outcomes:** Recurrence was defined as an increase of 2 points in the VAS score after recovery. The outcomes were measured at 3, 6, and 12 weeks.
Setting	**Period of study:** July 2011 to June 2012 **Setting:** Orthopedic Department, Guilan University of Medical Sciences, Kerman University of Medical Sciences and Baqiyatallah Hospital, Tehran **Country:** Iran
Notes	**Bilateral involvement:** None reported **Adverse events**:None reported **Lost to follow-up:** • Steroid group: Two lost to follow-up and five on analgesics • ESWT group: Three lost to follow-up and six on analgesics **Funding source**: Not mentioned.

Risk of bias

Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias)	Low risk	Quote: "84 eligible patients were randomly assigned using random blocks to ESWT or CSI". Randomisation probably done.
Allocation concealment (selection bias)	High risk	Allocation concealment and the number of participants in each block is not mentioned. Probably not done.
Blinding of participants and personnel (performance bias) All outcomes	High risk	Blinding was not attempted. Subjective outcomes were used and the outcome is likely to be influenced by lack of blinding.
Blinding of outcome assessment (detection bias) All outcomes	Unclear risk	Quote: "All the patients were examined using the VAS to measure pain at 3, 6, and 12 weeks by another physician who was unaware of the study details." Comment: Blinding was attempted but likely to have been broken as participant is aware of the intervention (ESWT or CSI). Subjective outcomes were used and the outcome measurement is likely to be influenced by lack of blinding.
Incomplete outcome data (attrition bias) All outcomes	Unclear risk	84 patients were randomised. But 68 patients were included in analysis. 9 patients in ESWT group and 7 patients from CSI group were excluded from the

Mardani-Kivi 2015 *(Continued)*

		study after randomisation because 5 were inaccessible and 11 were taking analgesics. We are unsure if this will affect the effect of the intervention.
Selective reporting (reporting bias)	High risk	Trial registration available and outcomes reported (registration while recruiting). However, both interventions are known to cause adverse events but these were not reported on.
Other bias	Unclear risk	There is no imbalance in the baseline characteristics between the groups; however, these were provided only for 68 of 84 participants. This trial appears to be free from other sources of bias.

McMillan 2012

Methods	Parallel placebo-controlled RCT
Participants	**Total participants:** 82 participants. 24 participants had bilateral heel involvement. **Gender:** • Steroid group: 19 males and 22 females • Placebo group: 24 males and 17 females **Age:** mean 51.7 years in steroid group and 53.6 years in placebo arm **Duration of symptoms:** median • Steroid group: 9 months • Placebo group: 12 months **Baseline pain score** (according to FHSQ: 0 to 100: best health): • Steroid group: mean 36.8 • Placebo group: mean 35.8 **BMI:** • Steroid group: mean 31.4 ± 5.5 kg/m^2 • Placebo group: mean 30.9 ± 5.4 kg/m^2 **Inclusion criteria:** 1. History of inferior heel pain for at least eight weeks 2. Minimum heel pain of 20 mm on a 100 mm Visual Analogue Scale 3. Pain on palpation of medial calcaneal tubercle or proximal plantar fascia 4. Plantar fascia thickness of at least 4.0 mm or greater in the diagnostic ultrasonography at a standard location where the fascia crosses the anterior aspect of the inferior calcaneal border. **Exclusion criteria:** 1. Pregnancy 2. Corticosteroid injection for plantar fasciitis within the previous six months 3. Known hypersensitivity to lidocaine or corticosteroids 4. Current skin or soft tissue infection near the injection site 5. Posterior heel pain 6. Systemic inflammatory disease 7. Diabetes Mellitus 8. Previous local surgery 9. History of local trauma

McMillan 2012 *(Continued)*

	10.Unable to walk household distances without use of an aid 11.On any treatment regimen for plantar fasciitis within four weeks of enrolment
Interventions	**Intervention:** Intrafascial injection 1 mL 4 mg/mL dexamethasone sodium. N = 41. **Control:** Intrafascial injection 1 mL normal saline. N = 41. In both groups, the procedure was done under ultrasound guidance and preceded by a tibial nerve block. Participants in both groups were advised to complete a daily stretching programme for initial eight weeks of the trial and recorded their adherence to stretching programme in a log sheet.
Outcomes	**Length of follow-up:** 12 weeks **Outcomes used in meta-analysis:** 1. Pain was measured by pain component of foot health status questionnaire 2. Function as measured by function domain of the foot health status questionnaire. 3. Adverse events and complications: prespecified recording of nerve injury from needle penetration, post-injection flare, soft tissue infection and rupture of the plantar fascia **Other outcomes:** 1. First step pain measured on 100 mm visual analogue scale (only MDs and 95% CIs reported) 2. Plantar fascia thickness measured by ultrasound. Outcomes were measured at 4, 8 and 12 weeks from the enrolment.
Setting	**Period of study:** June 2010 to February 2011 **Setting:** La Trobe University Health Sciences Clinic, Melbourne. **Country:** Australia
Notes	**Bilateral involvement:** 12 participants in each arm (29.3%) had bilateral involvement. For those participants treated for bilateral plantar fasciitis, they were asked to describe the foot function as well as other symptoms without reference to a specific foot so that bilateral foot was evaluated as one independent sample. 12 / 41 patients in each arm had bilateral heel pain and both heels were allotted same intervention. **Adverse events**:None reported **Lost to follow-up:** 1 patient in the placebo group was lost to follow-up therefore 81 participants completed the trial. **Funding source**: Australian podiatry education and research foundation funded the study. No conflicts of interest mentioned.

Risk of bias

Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias)	Low risk	Quote: "Treatment allocation was done according to a computer generated randomised number sequence". Page 2 , under the sub heading 'Randomization, treatment allocation and blinding. Comment: Randomisation done.

McMillan 2012 *(Continued)*

Allocation concealment (selection bias)	Low risk	Quote: "The investigator who generated the random number sequence (KBL) had no contact with participants throughout the trial. Allocation was concealed in a password protected computer file only accessible by investigators not involved in collecting data from participants (KBL and ADM)." Comment: Participants and investigators enrolling participants could not foresee assignment because of central allocation.
Blinding of participants and personnel (performance bias) All outcomes	Low risk	Quote: "The contents of the syringe did not require masking as both treatment solutions were clear liquids. This protocol also ensured that trial participants were blinded to their treatment allocation throughout enrolment." Comment: The participants and personnel were blinded and unlikely that the blinding could have been broken.
Blinding of outcome assessment (detection bias) All outcomes	Low risk	Quote: "ADM also prepared the syringe before heel injection, thereby ensuring that the investigator (AMcM) who carried out injections, measured outcomes, and processed data was blinded throughout the trial." Comment: Outcome assessors also were blinded.
Incomplete outcome data (attrition bias) All outcomes	Low risk	Quote: "One participant in the placebo group was lost to follow-up (before the four week assessment) therefore 81 participants completed the trial." Comment: Plausible effect size (difference in means or standardized difference in means) among missing outcomes not enough to have a clinically relevant impact on observed effect size.
Selective reporting (reporting bias)	Low risk	Prospectively registered. The study protocol is available and all of the study's pre-specified (primary and secondary) outcomes that are of interest in the review including adverse events have been reported in the trial.
Other bias	Unclear risk	Twelve participants in each arm (29.3%) had bilateral heel pain and both heels were allotted same intervention. Bilateral heels were evaluated as one independent sample as the participants were asked to describe the foot function as well as other symptoms without reference to a specific foot. We are not sure whether there was clustering effect in those patients with bilateral heel pain.

Monto 2014

Methods	RCT
Participants	**Total participants:** 40 participants **Gender (m/f):** 17/23 **Age:** • Cortisone group: mean 59 years; range 24 to 74 years. • Platelet-rich plasma group: mean 51 years; range 21 to 67 years. **Duration of symptoms:** • Cortisone group: median 5.4 months; range 4 to 24 months. • Platelet-rich plasma group: median 5.7 months; 4 to 26 months. **AOFAS score,** baseline**:** • Cortisone group: 52; range 24 to 60.

Monto 2014 *(Continued)*

- Platelet-rich plasma group: 37; range 30 to 56.

BMI:

- Cortisone group: mean 27.87 kg/m^2; range 23.0 to 29.9.
- Platelet-rich plasma group: mean 29.5 kg/m^2; range 25.1 to 36.9.

Inclusion criteria:

Chronic unilateral refractory plantar fasciitis was defined as those patients who had experienced at least 4 months of heel pain despite a standardised trial of traditional non-operative treatment including rest, physical therapy (minimum 6 weeks), silicone heel lifts (minimum 4 weeks), CAM walker bracing or cast immobilisation (minimum 4 weeks), night splinting (minimum 4 weeks), and nonsteroidal medication. All patients were screened with plain radiographs and MRI to confirm the diagnosis of plantar fasciitis.

Exclusion criteria:

None mentioned.

Interventions	**Intervention:** Single ultrasound-guided injection of 40 mg DepoMedrol cortisone. N = 20. **Control:** Single ultrasound-guided injection of 3 cc autologous platelet-rich plasma. N = 20. Both groups received 6 cc of 0.5% bupivacaine prior to intervention.
Outcomes	**Length of follow-up:** 24 months **Outcomes used:** AOFAS hind foot scoring Mean scores with only ranges have been mentioned with no standard deviations. The outcomes were measured at 3, 6, 12, and 24 months.
Setting	**Period of study:** Not mentioned **Setting:** Nantucket Cottage Hospital Partners Healthcare System, Nantucket, Massachusetts. **Country:** USA
Notes	**Bilateral heel involvement:** None **Adverse events**: Not measured **Lost to follow-up:** None **Funding source**: Did not receive any funding for the study.

Risk of bias

Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias)	Unclear risk	Quote: "randomised into two groups" Comment: Randomisation sequence generation method is not mentioned.
Allocation concealment (selection bias)	High risk	No method of allocation concealment is mentioned. Probably not done.

Monto 2014 *(Continued)*

Blinding of participants and personnel (performance bias) All outcomes	High risk	Blinding was not attempted. In the PRP arm, autologous blood was taken and in cortisone arm, that was not needed. As subjective outcomes are used, it is likely to be influenced by lack of blinding.
Blinding of outcome assessment (detection bias) All outcomes	Unclear risk	Quote: "Interval AOFAS, hindfoot scoring data and physical examinations were completed by an investigator blinded to the treatment modality immediately prior to injection, then repeated at 3, 6, 12, and 24 months after treatment." Comment: Blinding of the outcome assessor was attempted, but it is likely that the blinding could have been broken, and the outcome measurement is likely to be influenced by lack of blinding of participants.
Incomplete outcome data (attrition bias) All outcomes	Unclear risk	There were no drop-outs reported in the study. The data for the AOFAS scores were incomplete.
Selective reporting (reporting bias)	High risk	Trial registration and study protocol are not available. Both interventions are known to cause adverse events but the study has not reported adverse events in both arms.
Other bias	Unclear risk	Cortisone group had pre-treatment AOFAS score of 52 and the PRP group had pre-treatment AOFAS score of 37. There is a baseline imbalance between both groups. We are not sure of this risk on the outcome measured.

Mulherin 2009

Methods	Randomised clinical trial.
Participants	**Total participants:** 45 participants **Gender (m/f)**: 18/27 **Age:** median 55 years; (10^{th} to 90^{th} percentile = 33 to 68 years) **Duration of symptoms**: median 10 months (10^{th} to 90^{th} percentile 4 to 36 months) **VAS**: mean 7.0 cm (range: 3.9 to 9.3 cm) **BMI:** Not mentioned. **Inclusion criteria:** Patients with plantar heel pain syndrome, defined as a centralised plantar heel pain with soreness and tenderness of the heel. **Exclusion criteria:** History of gout, ankylosing spondylitis, orthotic intervention, recent steroid therapy or recent trauma within the previous three months.
Interventions	**Interventions:** • Steroid injection to heel (80 mg methylprednisolone with 1 mL 1% lignocaine) directly at the point of maximum pain). N = 14. • Steroid injection to heel (80 mg methylprednisolone with 1 mL 1% lignocaine) along with local anaesthetic block to tibial nerve (2 mL 1% xylocaine to tibial nerve). N = 19. **Control:**

Mulherin 2009 *(Continued)*

	Local anaesthetic block to tibial nerve (2 mL 1% lignocaine to tibial nerve from a medial approach). N = 12.
Outcomes	**Length of follow-up:** 26 weeks **Outcome used:** Pain by Visual Analogue Scale (Discomfort from injections: VAS) **Other outcomes:** Heel tenderness index. Measurements were done at baseline, 1, 6 and 26 weeks.
Setting	**Period of study**: 12 months, exact dates not mentioned **Setting:** Podiatric Surgery Department of the primary care organisation in the English Midlands. **Country:** United Kingdom
Notes	**Bilateral heel involvement**: None **Adverse events:** Not measured. **Lost to follow-up:** None **Funding source**: None mentioned. **Contact with trial authors:** Additional information and data received upon contact with D Mulherin on 14 November 2012 and 23 August 2013. We received information from the author regarding method of randomisation, clarification of other treatment and blinding, and VAS data for pain at 1, 6 and 26 weeks.

Risk of bias

Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias)	Low risk	Quote: "randomly assigned to one of the three treatment groups". Comment: On e-mail communication with the author it was informed that "Random number tables were used to assign treatment group".
Allocation concealment (selection bias)	Low risk	Author responded by e-mail that sealed envelopes were used and the researcher was unaware of its contents and hence the allocation to the treatment groups.
Blinding of participants and personnel (performance bias) All outcomes	High risk	Blinding was not attempted even though the interventions are very different. Subjective outcomes were used and the outcome is likely to be influenced by lack of blinding..
Blinding of outcome assessment (detection bias) All outcomes	High risk	Not reported. High risk of detection bias because of subjective outcomes.
Incomplete outcome data (attrition bias) All outcomes	Low risk	There were no drop-outs reported in the study.

Mulherin 2009 *(Continued)*

Selective reporting (reporting bias)	High risk	Trial registration and study protocol are not available. Adverse events were not reported even though steroid injection is known to cause adverse events. All other pre-specified outcomes have been reported in the study but without providing data for outcomes (just P values)
Other bias	Unclear risk	There was baseline imbalance in the duration of symptoms prior to enrolment. "Disease duration was longer in group 3 (P < 0.05)"

Omar 2012

Methods	RCT
Participants	**Total participants:** 30 participants **Gender**: 30 female **Age:** • Steroid group: mean 44.5 ± 15.5 years. • Platelet-rich plasma group: mean 42.5 ± 17.5 years. **VAS, baseline**: • Steroid group: mean 8.8 ± 0.9 • Platelet-rich plasma group: mean 8.2 ± 1.3 **Duration of symptoms and BMI:** Not mentioned. **Inclusion criteria:** Adults aged over 18 years, having inferior heel pain that was usually worse with their first steps in the morning or after a period of inactivity, with maximal tenderness over the anteromedial aspect of the inferior heel. Not received local steroid injections or NSAIDs four weeks prior to the study **Exclusion criteria:** 1. Participants with history of anaemia (haemoglobin < 7 g/dL). 2. Thrombocytopenia (platelets < 150 X 10^3 µL) or bleeding diathesis. 3. Significant cardiovascular, renal or hepatic disease, (local) malignancy. 4. Previous surgery for plantar fasciitis. 5. Vascular insufficiency or neuropathy causing heel pain. 6. Bony abnormalities in the calcaneum, diabetes and hypothyroidism.
Interventions	**Intervention:** Participants received local steroid injection into the heel; the study does not mention the name of the steroid used as intervention. N = 15. **Control arm:** Participants received autologous platelet rich plasma injection into the heel. The study does not mention the volume of platelet-rich plasma injected as control. N = 15.
Outcomes	**Length of follow-up:** 6 weeks **Outcomes used:** 1. Pain by visual analogue scale 2. Functional status by FHSQ

Omar 2012 *(Continued)*

	Both were measured at baseline and six weeks later.
Setting	**Period of study:** October 2009 to May 2010 **Setting:** Rheumatology and Rehabilitation out patient clinic in Suez Canal University Hospital, Ismailia. **Country:** Egypt
Notes	**Bilateral heel involvement**: None **Adverse events:** Not measured. **Lost to follow-up:** No participants were lost to follow-up. **Funding source:** None mentioned.

Risk of bias

Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias)	Unclear risk	Quote: "patients were allocated randomly" Comment: No method of randomisation is mentioned.
Allocation concealment (selection bias)	High risk	No method of concealment was reported. Probably not done.
Blinding of participants and personnel (performance bias) All outcomes	High risk	Not reported. Blinding is not attempted. Subjective outcomes were used and the outcome is likely to be influenced by lack of blinding.
Blinding of outcome assessment (detection bias) All outcomes	High risk	Not reported. High risk of detection bias in view of subjective outcomes.
Incomplete outcome data (attrition bias) All outcomes	Low risk	There were no drop out or participants lost to follow up in the study.
Selective reporting (reporting bias)	High risk	Adverse events were not reported even though steroid injection is known to cause adverse events. All other pre-specified outcomes have been reported in the study. No trial registration or published protocol.
Other bias	Unclear risk	All the participants were females.

Porter 2005

Methods	RCT
Participants	**Total participants:** 132 participants; seven were lost to follow-up, 125 included in final analysis. **Gender** (of 125): 42 males and 83 females. **Age:** mean 39.3 years (range 18 to 81). **Duration of symptoms:** mean 13.7 weeks (range 6 to 54 weeks). **VAS:** mean • Steroid injection group: mean 5.47 (2 to 8)

Porter 2005 *(Continued)*

- Platelet-rich plasma injection group: mean 5.52 (3 to 8)

BMI: Not mentioned.

Inclusion criteria:

Adults with symptoms of unilateral plantar fasciitis for at least six weeks satisfying the following criteria:

1. Plantar heel pain, worse on rising in the morning and/or after sitting or lying, present for at least six weeks.
2. On examination, the site of maximal tenderness was at the calcaneal attachment of the plantar fascia.
3. Pain aggravated by hopping on the foot and relieved with tie beam taping.

Exclusion criteria:

1. Age < 18 years
2. Previous surgery, corticosteroid injection, or extracorporeal shockwave therapy
3. Clinical features suggestive of seronegative spondyloarthropathy
4. Rheumatoid arthritis, diabetes mellitus, local infection, peripheral vascular disease, metabolic diseases, cardiac pacemaker
5. Clinical features suggestive of regional pain syndrome
6. Pregnant
7. Nerve related symptoms
8. Dysfunction of knee, ankle or foot
9. Work-related or compensatable injury

Interventions	**Intervention:** Injection of 1 mL betamethasone with 2 mL 1% lignocaine in the site of maximal tenderness (N = 64) **Control:** Three applications of 1000 pulses of energy flux density of 0.08/mm^2, administered three times at weekly intervals without local anaesthesia or sedation (N = 61). All participants were instructed to perform a standardised stretching programme
Outcomes	**Length of follow-up:** 12 months **Outcomes used:** 1. Pain on rising in the morning or after periods of sitting, via Visual Analogue Scale (0 to 10). 2. Adverse events: Participants were asked to report any possible side effects: infections, rupture of plantar fascia, post injection pain. 3. Treatment failure: non-responders **Other outcomes:** Heel tenderness by pressure algometer to measure tenderness threshold, maximum pressure applied was 11 kg/cm^2. Participants were assessed before treatment, at 3 months and 12 months post treatment.
Setting	**Period of study:** Not mentioned; recruitment over 5 years **Setting:** Orthopaedic Department, Ipswich Hospital, Queensland **Country:** Australia
Notes	**Bilateral heel involvement**: None

Porter 2005 *(Continued)*

Adverse events: Measured and none of the participants reported any adverse events

Lost to follow-up: Seven

Funding source: none

The study reported results of an additional 19 participants who refused both the treatments and performed exercises only - this formed a non-randomised control group. Data from this group are not considered in this review.

Risk of bias

Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias)	Unclear risk	Quote: "randomly allocated to either of the treatment groups" Comment: No method of randomisation mentioned.
Allocation concealment (selection bias)	Unclear risk	Quote: "Each heel was randomly allocated to either of the treatment groups using identical envelopes" Comment: Inadequate safeguards but baseline characters in terms age, sex, baseline pain scores shows equal distribution in both groups.
Blinding of participants and personnel (performance bias) All outcomes	High risk	Not reported. Open label trial. Probably not done.
Blinding of outcome assessment (detection bias) All outcomes	High risk	Not reported. Subjective outcomes used. Comment: Probably not done.
Incomplete outcome data (attrition bias) All outcomes	Unclear risk	Quote: "seven of the patients were lost to follow up and their results were not included in the analysis". Comment: The details from which group they were lost is not mentioned.
Selective reporting (reporting bias)	Unclear risk	No trial registration or published trial protocol available. It is clear that the published report includes all expected outcomes, including those that were prespecified in the methods section.
Other bias	Low risk	The study appears to be free of other sources of bias.

Ryan 2014

Methods	Parellel group, non-blinded, RCT
Participants	**Total participants:** 65 enrolled in the study; 9 did not return for any follow-up; thus 56 participants were included in final analysis. Baseline data for 56 participants. **Gender (m/f):** 24/32 **Age:** • Steroid group: mean 46.2 ± 8.5 years • Physiotherapy group: mean 52.4 ± 7.5 years **Duration of symptoms:**

Ryan 2014 *(Continued)*

- Steroid group: mean 71.4 ± 100.3 months
- Physiotherapy group: mean 69.4 ± 86.2 months

BMI:

- Steroid group: mean 26.2 ± 4.7 kg/m^2
- Physiotherapy group: mean 24.3 ± 3.6 kg/m^2

VAS score:

- Steroid group: at work mean 6.51 ± 0.4 cm; with ADL (activities of daily living) mean 6.75 ± 0.36 cm
- Physiotherapy group: at work mean 6.3 ± 0.37 cm; with ADL mean 6.16 ± 0.46 cm

Inclusion criteria:

Workers who had to stand for prolonged periods of time (> 5 hours/day) who:

1. Had a history of inferior heel pain for at least 12 months
2. Reported a minimum heel pain of 20 mm on a 100 mm visual analogue scale (VAS)
3. Had pain through direct palpation of the medial calcaneal tubercle or proximal plantar fascia
4. Had diagnostic ultrasound confirmation of the diagnosis of plantar fasciopathy

Exclusion criteria:

1. Had received a corticosteroid injection for plantar heel pain within the previous 6 months
2. Had a known hypersensitivity to lidocaine hydrochloride or corticosteroids
3. Current skin or soft tissue infection near the possible injection site
4. Inflammatory disease
5. Diabetes mellitus
6. Previous local surgery
7. History of local trauma
8. Other musculoskeletal condition that might impair function of the foot or ankle
9. Individuals who are involved in litigation for their heel pain or on worker's compensation benefits

Interventions	**Intervention:** Steroid group: Palpation-guided injection with 22-guage, 1.5 inch needle, and 3 cm^3 syringe with 1 mL dexamethasone mixed with 0.5 mL 1% lidocaine; administered by the same physician to all participants. Both feet of participants with bilateral involvement were injected at the same appointment. Participants in the injection group were also asked to complete a daily calf-stretching programme to ensure that the trial better represented normal clinical practice. Advice to avoid high impact activities, such as running, for two weeks. N = 31 (analysed: 28). **Control:** Physiotherapy group: Participants multi-element exercise regimen included seven exercises performed on both right and left sides daily over a 12-week period. N = 34 (analysed: 28): 1. Karaoke: lateral side step movement involving crossing 1 foot over the next for 5 sets of 15 crossovers in each direction. 2. Balance walking, or walking along a straight line on the ground, for 5 sets of 30 strides. 3. Forefoot extension exercise: participant stands feet shoulder width apart with 1 foot ahead of the other and then, contracting only calf muscles of the back leg, lifts the heel of the back leg until the metatarsophalangeal joint of that foot is maximally extended for 5 sets of 15 repetitions. 4. Standing 1-legged balance exercise: performed initially with eyes open, then with eyes closed on the ground, then on an unstable surface for 1 minute. 5. Ankle inversion/eversion exercise: foot is placed sideways at the edge of a step. After stabilising the remainder of the foot and leg, the ankle is inverted and everted to the limits of the range for 3 sets of 15 repetitions. 6. Gastrocnemius and soleus stretching: while standing in a neutral position and the knee extended the foot is placed on top of a ramp elevating the forefoot on the rearfoot (talocrural dorsiflexion) and held

Ryan 2014 *(Continued)*

	for 3 sets of 30 seconds each. Next the foot is again placed on top of a phone book with the knee flexed approximately 15 to 20 degrees and held for 3 sets of 30 seconds each. 7. Tissue-specific plantar fascia stretch: in a sitting position the right foot is crossed over the left while 1 hand passively extends the right forefoot. The left hand then applies light to moderate pressure in 3- to 5-second intervals along the length of the medial longitudinal arch. Compliance with the physiotherapy regimen was confirmed with an online training log participants submitted on a weekly basis.
Outcomes	**Length of follow-up:** 12 weeks **Outcomes used:** 1. Pain scores using the visual analogue scale, VAS, scores for worst pain over 7 days during activities of daily living 2. Foot and Ankle disability index (FADI) **Other outcomes:** 1. Pain scores: VAS scores at work 2. Sonographic outcomes such as plantar fascial thickness and the presence and size of focal anechoic areas within the plantar fascia 3. Treatment compliance 4. Use of analgesics The outcomes were assessed at 6 and 12 weeks.
Setting	**Period of study:** May 2011 to March 2012 **Setting:** Outpatient clinic, Allan McGavin Sports Medicine Centre, University of British Columbia, Vancouver, British Columbia **Country:** Canada
Notes	**Bilateral heels:** 12 participants in each group; only the data from more painful heel at allocation was included in the analysis. Both heels from a single participant were not used. 12 / 28 participants had bilateral heel involvement. Even though there were patients with bilateral heel involvement in each arm, only one heel (most severely affected) was included in the study. **Adverse events**: Not measured **Lost to follow-up:** Nine did not come for even one follow-up visit and thus had no post intervention outcome measures. Five more were lost to follow-up after the first post intervention contact at 6 weeks; 1 in the injection group and 4 in the physiotherapy group. Data for these were imputed using the last value carried forward strategy. **Funding source:** The research was supported with funds from WorkSafeBC through the Focus on Tomorrow program.

Risk of bias

Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias)	Low risk	Quote: "Treatment allocation was performed using a computer generated block (block size 4) random number sequence". Probably done.
Allocation concealment (selection bias)	Low risk	Quote: "The investigator who generated the random number sequence had no contact with participants throughout the trial".

Ryan 2014 *(Continued)*

		Probably done.
Blinding of participants and personnel (performance bias) All outcomes	High risk	Quote: "parallel group non blinded randomised controlled trial" Since the interventions were very obviously different, the trial authors did not blind either the participants or the personnel.
Blinding of outcome assessment (detection bias) All outcomes	High risk	Quote: "Allocation was not concealed to the investigator collecting participant outcome measures." The outcome assessor was not blinded to the interventions.
Incomplete outcome data (attrition bias) All outcomes	Unclear risk	Quote: "Sixty-five individuals were enrolled in the study and underwent initial baseline testing and randomisation, but from this sample nine participants did not return for any follow-up testing despite repeated efforts from study personnel and were considered drop outs for the purpose of analysis. Comment: Of the 65 randomised, final analysis was carried out on 56 participants; nine (14%) dropped out. No attempt was made to include the missing data in the analysis. We are unsure if this will affect the effect of the intervention. Quote: Further "Five participants, one in the steroid injection group and four in the physiotherapy group, were lost to follow-up (unable to contact after five attempts) after the six week follow-up point; data from these participants were included in the final analysis after applying an intention-to-treat approach. Missing data from these five participants was imputed using a last value carried forward strategy" Comment: There was an sincere attempt to account for the missing data. We are unsure if this will affect the effect of the intervention.
Selective reporting (reporting bias)	High risk	Prospective trial registration. Adverse events were not reported even though steroid injection is known to cause adverse events. All other pre-specified outcomes have been reported in the study.
Other bias	Unclear risk	Baseline characteristics only reported for 56 participants in the analyses. The injection group were significantly younger (MD = 6.2 years; reported P < 0.01). The study appears to be free of other sources of bias.

Saber 2012

Methods	RCT
Participants	**Total participants:** 60 participants **Gender (m/f):** 27/33 **Age:** • Palpation-guided steroid injection group: mean 34.23 years • Shockwave treatment group: mean 34.27 years **BMI:** • Palpation-guided steroid injection group: mean 28.8 kg/m^2 • Shockwave treatment group: mean 29.23 kg/m^2 **VAS, Duration of symptoms:** Not mentioned.

Saber 2012 *(Continued)*

	Inclusion criteria: 1. Symptomatic heel pain of greater than six months duration 2. Unsuccessful response to conservative treatment with NSAIDs and stretch exercises. **Exclusion criteria**: 1. Systemic inflammatory disease 2. Connective tissue disease 3. Herniated intervertebral disc of the lumbar spine 4. Previous local trauma 5. Those with bilateral plantar fasciitis 6. Patients with overt tarsal tunnel syndrome 7. History of recent administration of local steroid injection within last three months.
Interventions	**Intervention:** Palpation-guided steroid (2 mL 4 mg/mL betamethasone dipropionate and betamethasone sodium phosphate) injection combined with local anaesthetic (0.5% xylocaine hydrochloride) for two sessions with two weeks interval (N = 30). **Control**: Medium energy density (0.28 mJ/mm^2) shock wave therapy in the area of maximal tenderness and positive finding by ultrasound for two sessions with two weeks interval (N = 30)
Outcomes	**Length of follow-up:** Mean follow-up of 4.3 months; range 3 to 6 months. **Outcome used:** Functional assessment of pain and its impact on functional status, footwear requirement and effect on the gait by the Mayo clinical scoring system (total 100 points) which comprises six parameters • degree of pain • activity limitations • footwear or orthotic requirement • plantar heel tenderness • neuropathy • antalgic gait. Scoring is classified as excellent results (90 - 100 points), good results (80 - 89), fair (70 - 79), poor (< 70). 2. Adverse events. 3. Recurrence **Other outcomes:** Thickness of plantar fascia with ultrasound imaging. Outcomes were assessed at 12 weeks and 6 months.
Setting	**Period of study**: May 2009 to May 2010 **Settings**: Patients were selected from the outpatient clinic of Orthopaedic and Physical Therapy departments of Ain Shams University, Cairo. **Country**: Egypt
Notes	**Bilateral heel involvement:** Not included in the trial **Adverse events:** Measured and reported **Lost to follow-up:** None

Saber 2012 *(Continued)*

Funding source: None.

Risk of bias

Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias)	Unclear risk	Quote: "Patients were randomly assigned to two equal treatment groups". Comment - the method of randomisation not mentioned.
Allocation concealment (selection bias)	High risk	Not mentioned, probably not done.
Blinding of participants and personnel (performance bias) All outcomes	High risk	No blinding of participants and personnel reported. Open label trial.
Blinding of outcome assessment (detection bias) All outcomes	High risk	Outcome assessors not blinded; subjective outcomes used.
Incomplete outcome data (attrition bias) All outcomes	Low risk	All randomised participants were included in the analysis.
Selective reporting (reporting bias)	Unclear risk	No trial registration or published protocol. However, the published report includes all expected outcomes, including those that were pre-specified in the methods section.
Other bias	Low risk	There was no baseline imbalance based on the features given in the published data. The study appears to be free of other sources of bias.

Sconfienza 2011

Methods	RCT
Participants	**Total participants:** 75 participants (50 used in review so far) **Gender:** • Steroid group: mean age: 11 males 14 females • Steroid and dry needling group: 12 males 13 females • Dry needling group: 12 males 13 females **Age:** • Steroid group: mean age: 52.7±10.0 years • Steroid and dry needling group: 43.8±7.6 years • Dry needling group: 46.2± 12.3 years **BMI, duration of symptoms, VAS:** Not mentioned. **Inclusion criteria** Patients clinically diagnosed with plantar fasciitis. Informed consent. **Exclusion criteria**

Sconfienza 2011 *(Continued)*

	Not available
Interventions	**Interventions:** • Ultrasound-guided steroid injection: N = 25 • Ultrasound-guided steroid injection with dry needling; N = 25 (not used in the review - see Notes) **Control:** Dry needling only; N = 25 The abstract report does not mention the name of the steroid used nor details of the method of dry needling.
Outcomes	**Length of follow-up**: 360 days **Outcome used in meta-analysis:** Changes in pain using VAS scores at 7, 14, 30, 90, 180, 360 days after the procedure; **Other outcomes:** Change in fascial thickness was measured with US scanning at 180 and 360 days.
Setting	**Period of study**: Not mentioned **Setting**: San Donato Polyclinic and Evangelical Hospital International, Genoa **Country**: Italy
Notes	**Bilateral heel involvement:** None **Adverse events:** Not measured **Loss to follow up**: None mentioned **Funding source**: Not mentioned **Comments**: This was an abstract presented in a post conference abstract publication of the Cardiovascular and Interventional Radiological Society of Europe conference conducted in Munich, Germany on September 2011. We were unable to contact the authors for details of the full study. The details mentioned here are very minimal. **Note:** We did not use the data from the combined intervention in the comparison of Steroid versus no treatment control (dry needling in both groups) as there was no information on which to judge whether dry needling on its own could be considered a no treatment control - we suggest that the possibility of interaction is too great.

Risk of bias

Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias)	Unclear risk	The title of the abstract says randomised controlled trial but no other part of the abstract mentions this. We do not know the method used in randomising the participants.
Allocation concealment (selection bias)	High risk	There is no mention of allocation concealment. Probably not done.
Blinding of participants and personnel (performance bias) All outcomes	High risk	There is no mention of participant or personnel blinding. Probably not done.

Sconfienza 2011 *(Continued)*

Blinding of outcome assessment (detection bias) All outcomes	High risk	There is no mention of outcome assessor blinding. Probably not done.
Incomplete outcome data (attrition bias) All outcomes	Unclear risk	There is no mention of any loss to follow-up of participants.
Selective reporting (reporting bias)	High risk	Trial registration and study protocol are not available. Adverse events were not reported even though steroid injection is known to cause adverse events. All other pre-specified outcomes have been reported in the study.
Other bias	Unclear risk	There are not enough data to assess any other forms of bias from the abstract published.

Sorrentino 2008

Methods	Single blinded RCT
Participants	**Total participants:** 60 participants with ultrasound confirmed diagnosis **Gender (m/f):** 26/34 **Age:** mean 54.3 years **BMI:** mean 27.9 kg/m^2 **Duration of symptoms:** mean 4 months (No standard deviation mentioned) **VAS** (0 to 10)**:** mean 7.2 ± 0.7 **Inclusion criteria** 1. Aged > 18 years 2. Heel pain for at least eight weeks. 3. High resolution ultrasound confirmation of plantar fasciitis by: • fascial thickness > 5 mm • biconvex morphology • abnormal echo structure like hypoechogenicity, heterogeneity and ill defined margins **Exclusion criteria** 1. Previous traumatic heel disorders 2. Systemic diseases (seronegative spondylitis, rheumatoid arthritis, psoriatic arthritis, Reiter's syndrome etc) 3. Heel surgery 4. Severe degenerative disease of the lumbosacral spine 5. ESWT contraindications (pregnancy, pacemaker, coagulation disorders etc) 6. Heel infection or malignancy 7. Previous treatment with steroid or ESWT. 8. Bilateral heels involved.
Interventions	**Intervention** Ultrasound-guided steroid injection with 1 mL methylprednisolone with 0.6 mL of 3% mepivacaine hydrochloride; N = 30, 16 participants had perifascial oedema and 14 did not.

Sorrentino 2008 *(Continued)*

	Control Four sessions of ESWT at weekly intervals with 2000 shock waves of 0.03 mJ/mm^2 via piezo electric device; N = 30, 16 participants had perifascial oedema and 14 did not.
Outcomes	**Length of follow-up**: 6 weeks. **Outcome used in meta-analysis:** Pain using VAS scores (0 to 10: higher scores = worst pain) **Other outcomes:** Sonographic examination for thickness and oedema. The outcomes were assessed only at six weeks.
Setting	**Period of study**: 18 months, the exact dates/months not mentioned **Setting**: Participants were those referred to a physiatric assessment after failure of conservative treatment and needed radiologic assessment; thus probably done in a referral centre with radiological facilities under the University of Palermo. We could not get details of the actual location of recruitment or treatment. **Country**: Italy
Notes	**Bilateral heel involvement:** None **Adverse events:** None reported **Loss to follow up:** None mentioned **Funding source**: None mentioned Participants were grouped into whether there was presence or not of perifascial oedema prior to randomisation. There was a conflicting definition of oedema status of the A2 and B2 groups in the Methods and Results of this paper - we used the Results definition.

Risk of bias

Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias)	Low risk	Quote: "allocation of patients to either of the two subgroups was performed by using a randomisation list". Comment: Randomisation was probably done.
Allocation concealment (selection bias)	High risk	Not reported. Probably not done.
Blinding of participants and personnel (performance bias) All outcomes	High risk	Quote: Sonography "was performed by the same radiologist, who was blinded to the clinical findings". Personnel were blinded but the participants were not as the interventions were very different.
Blinding of outcome assessment (detection bias) All outcomes	Unclear risk	Quote: "All ultrasonography examinations were performed by a single operator, who was blinded to possible clinical improvements." Comment: Probably done. However, as the interventions are different there is a possibility of the blinding to be broken.

Sorrentino 2008 *(Continued)*

Incomplete outcome data (attrition bias) All outcomes	Unclear risk	All randomised participants were included in the analysis. However, no participant flow diagram and the denominators for two subgroups were stated to be 15 rather than 14 (which is compatible with % calculations)
Selective reporting (reporting bias)	High risk	No trial registration or published protocol available. Confusingly reported trial and so there is some risk of misinterpretation.
Other bias	Low risk	The article reported "There were no significant differences in age, BMI, VAS score or plantar fascia thickness on the symptomatic side among the four subgroups". However, these data were not shown. This trial appears to be free from other sources of bias.

Tiwari 2013

Methods	Randomised study; method of randomisation not mentioned
Participants	**Total participants:** 60 participants **VAS:** mean 5.9 ± 0.8 cm **Age, gender, duration of symptoms & BMI**: Not mentioned **Inclusion criteria:** 1. > 18 years of age 2. Have pain and tenderness centred on the medial tubercle of the calcaneum on weight bearing after rest, which resolved either partly or fully after activity. 3. Patient using orthoses, insoles, pads were also included in the study. 4. Written consent. **Exclusion criteria:** 1. Received local steroid injection within the previous six months 2. NSAIDs within the previous one week prior to therapy 3. Patients who were having significant cardiovascular disease, renal or hepatic disease, pregnancy, any local malignancy, anaemia "(Hb < 5 g %)", previous surgery for plantar fasciitis, diabetes, hypothyroidism, diagnosis of vascular insufficiency or neuropathy
Interventions	**Intervention:** Injection methylprednisolone acetate 40 mg/1 mL at the site of maximum tenderness on the medial side of heel; N = 30. **Control:** Injection of 5 mL platelet-rich plasma, derived from the participants own blood, with a platelet count > 1,000,000/µL; N = 30.
Outcomes	**Length of follow-up:** 6 months **Outcome used in meta-analysis:** Pain scores using the visual analogue scale (VAS Scores) Adverse events (soft tissue infection, osteomyelitis, loss of function and presence of stiffness) The outcomes were measured at one, three and six months.
Setting	**Period of study**: December 2010 to October 2011 **Setting**: Department of orthopaedics, NIMS Medical College, Jaipur, Rajasthan

Tiwari 2013 *(Continued)*

	Country: India
Notes	**Bilateral heel involvement:** Not included as participants. **Adverse events:** Measured **Lost to follow-up:** None **Funding source**: None

Risk of bias

Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias)	Unclear risk	Quote: "sixty patients were randomly divided in two groups" Comment: Method of randomisation is not mentioned.
Allocation concealment (selection bias)	High risk	Not mentioned. Probably not done.
Blinding of participants and personnel (performance bias) All outcomes	High risk	Quote: "In one group about 30 to 50 ml of venous blood is obtained from the antecubital vein". This strongly suggests that only the group who received platelet rich plasma had blood taken from them and the other group did not. Thus it is possible that the participants knew the group they were allocated to.
Blinding of outcome assessment (detection bias) All outcomes	High risk	Not mentioned. Probably not done.
Incomplete outcome data (attrition bias) All outcomes	Low risk	All randomised participants were included in the analysis.
Selective reporting (reporting bias)	Unclear risk	It is clear that the published report includes all expected outcomes, including those that were pre-specified in the methods section. However, there is no trial registration of published protocol available
Other bias	High risk	The baseline characteristics of the participants have not been mentioned. Moreover, the study quotes, "Patient using orthoses, insoles, pads were also included in our study". These can affect the outcomes that are studied independent of the interventions used. The distribution of these participants are not mentioned. Thus there is a possibility of a baseline imbalance and therefore judged high risk of bias.

Tsai 2006

Methods	RCT
Participants	**Total participants:** 25 participants. **Gender (m/f):** 8/17 **Age:** • Ultrasound-guided steroid injection group: mean 53.0 ± 11.4 years • Palpation-guided steroid injection group: mean 49.8 ± 10.8 years

Tsai 2006 *(Continued)*

Duration of symptoms: mean 8 months (range: 2 months to 4 years)

BMI:

- Ultrasound-guided steroid injection group: mean 25.1 ± 1.3 kg/m²
- Palpation-guided steroid injection group: mean 26.9 ± 4.8 kg/m²

VAS:

- Ultrasound-guided steroid injection group: mean 6.04 ± 2.26 cm
- Palpation-guided steroid injection group: mean 5.46 ± 2.1 cm

Inclusion criteria:

All patients with unilateral plantar fasciitis; the diagnosis of plantar fasciitis was made upon the finding of tenderness to pressure at the origin of the plantar fascia on the medial tubercle of the calcaneus, as well as complaint of sharp, shooting inferior foot pain made worse with activity and/or upon arising in the morning. All patients received conservative treatment of plantar fasciitis, including NSAIDs, ultrasound diathermy, transcutaneous electric nerve stimulation or stretching exercise for at least two months without significant improvement. They were then randomised into the two arms of the study.

Exclusion criteria:

1. Systemic inflammatory disease
2. Connective tissue disease
3. Herniated intervertebral disc of the lumbar spine
4. Previous local trauma
5. Bilateral plantar fasciitis

Interventions	**Intervention:** Sonographically-guided injection group. The needle was inserted through the posterior heel parallel to the long axis of the transducer and entered the thickened hypoechoic proximal plantar fascia under real-time sonographic guidance. N = 12. **Control:** Palpation-guided injection group. The needle was inserted 2–3 cm anteromedial to the most tender point in the inferior heel near the calcaneal tuberosity. N = 13. 1 mL (7 mg) dexamethasone mixed with 0.5 mL 1% lidocaine used in both techniques.
Outcomes	**Length of follow-up:** 1 year **Outcome used in meta-analysis:** 1. Heel pain measured by VAS scores. 2. Serious adverse events (specifically plaster fascia rupture) **Other outcomes:** 1. 'Tenderness threshold' defined as the minimum pressure for eliciting pain using a pressure algometer 2. Reccurrence. Assessments were done at two weeks, two months, and one year after steroid injection.
Setting	**Period of study:** Not mentioned **Setting**: Outpatient clinic of Department of Physical Medicine and Rehabilitation, Chang Gung Memorial Hospital, Kweishan, Taoyuan.

Tsai 2006 *(Continued)*

	Country: Taiwan
Notes	**Bilateral heel pain:** Not included as participants **Adverse events:** Measured and none reported **Lost to follow-up:** No participant was reported to have lost to follow-up **Funding source**: National Science Council of the Republic of China (Taiwan)

Risk of bias

Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias)	Unclear risk	Quote: "Patients were randomly assigned to two treatment groups" Comment: No method of randomisation was explicitly mentioned.
Allocation concealment (selection bias)	High risk	Allocation concealment not reported. Probably not done.
Blinding of participants and personnel (performance bias) All outcomes	High risk	Quote: "The VAS and TT measured pain level was evaluated by the same clinician in all patients at all time points" and "The same sonographer performed sonographic examinations on all patients at all time points". There is no mention of blinding of the personnel. Comment: Blinding was not done for the participants and personnel
Blinding of outcome assessment (detection bias) All outcomes	High risk	Open label trial. Blinding of the outcome assessor not reported. Subjective outcomes used.
Incomplete outcome data (attrition bias) All outcomes	Low risk	All randomised participants were included in the analysis.
Selective reporting (reporting bias)	Unclear risk	Trial registration and study protocol are not available. However, the published report includes all expected outcomes, including those that were pre-specified in the methods section.
Other bias	Low risk	The baseline characteristics reported have no imbalance. The study appears to be free of any other sources of bias.

Wilson 2013

Methods	RCT; interim analysis
Participants	**Total participants:** 30 subjects have been enrolled by the time the study was presented in the conference; 13 participants had completed the 32 week follow-up period. **Gender (m/f):** 4/9 **Age:** Mean 46.6 years **Duration of symptoms, BMI, VAS:** Not mentioned **Inclusion criteria**: Adults with at least six months of chronic plantar fasciopathy who failed at least 3 months of conservative therapy were enrolled.

Wilson 2013 *(Continued)*

	Exclusion criteria: Not mentioned.
Interventions	**Intervention**: Steroid group: A single ultrasound-guided corticosteroid injection (1 mL triamcinolone 40 mg with 2 mL 1% lidocaine) injected into the proximal plantar fascia. **Control**: Platelet-rich plasma group: A single ultrasound-guided injection of 3 mL platelet-rich plasma injected into the proximal plantar fascia.
Outcomes	**Length of follow-up:** 32 weeks **Outcome used in meta-analysis:** Foot and Ankle Ability Measure (FAAM) - ADL (activities of daily living) and FAAM - Sports: both as a measure of foot function.
Setting	**Period of study**: Not mentioned **Setting**: The affiliation of the authors was to the University of Wisconsin School of Medicine and Public Health, Department of Orthopedics and Rehabilitation, Division of Sports Medicine, Madison, Wisconsin. We could not obtain details of the actual place where participants were recruited and where the study took place. **Country**: USA
Notes	The study was presented as it was recruiting participants in a conference (22nd Annual Meeting of the American Medical Society for Sports Medicine San Diego, CA United States) and was published as a conference proceeding in the Clinical Journal of Sport Medicine. We could retrieve only a conference abstract and not been able to track the completed study. We are unsure of the fact whether it was published at all. We have unsuccessfully tried to obtain the contact details of the author or the conference organisers. HH (editor) contacted JJ Wilson at wilson@ortho.wisc.edu on 6/1/2017; no response. **Bilateral heel pain:** Not mentioned **Adverse events:** Not measured **Lost to follow-up:** Not mentioned **Funding source**: Not mentioned

Risk of bias

Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias)	Unclear risk	Quote: "Randomised clinical trial" and "Subjects were randomised to receive either..." Comment: The method of randomisation was not mentioned.
Allocation concealment (selection bias)	High risk	Not mentioned in the published document. Probably not done.
Blinding of participants and personnel (performance bias)	High risk	Not mentioned in the published document. Probably not done.

Wilson 2013 *(Continued)*

All outcomes		
Blinding of outcome assessment (detection bias) All outcomes	High risk	Not mentioned in the published document. Probably not done.
Incomplete outcome data (attrition bias) All outcomes	High risk	Interim analysis. Results reported for only 13 of 30 enrolled participants. The 13 had completed the 32 week follow-up period.
Selective reporting (reporting bias)	High risk	Adverse events were not reported even though steroid injection is known to cause adverse events. They have reported the functional outcomes using one measure (FAAM). We do not know if any other outcome was planned and not mentioned. No protocol or trial registration identified.
Other bias	High risk	Interim analysis reporting result for only 13 participants (5 versus 8). There were clinically significant between group differences in the baseline scores for the FAAM-sports and the FAAM-ADL sub scales.

Yucel 2009

Methods	RCT
Participants	**Total participants:** 27 participants. Eight participants had bilateral heel involvement. **Gender:** 5 males and 22 females **Age:** mean 45.8 ± 12 years **BMI:** mean 29 ± 4.1 kg/m^2 **VAS:** • Palpation-guided group: mean 5.6 ± 2.5 cm • Ultrasound-guided group: mean 6.4 ± 2.7 cm • Scintigraphy-guided group: mean 4.9 ± 2.0 cm **Duration of symptoms:** Not mentioned **Inclusion criteria:** Plantar fasciitis, diagnosed by tenderness localised to the medial tubercle of the calcaneus and pain, which started with the first step in the morning, receded thereafter, and worsened with weight-bearing activity. The enrolled patients had undergone unsuccessful conservative treatment with NSAIDs, foot orthoses, and stretching exercises. **Exclusion criteria:** 1. previous surgical intervention 2. previous corticosteroid injection within six weeks of the start of the study 3. acute heel trauma 4. systemic inflammatory disease 5. connective tissue disease 6. lumbar herniated nucleus pulposus 7. local infections 8. coagulation disorders

Yucel 2009 *(Continued)*

	9. pregnancy
Interventions	**Intervention:** • Ultrasound-guided steroid injection. Real time ultrasound, drug injected at the point of maximum thickness with hypoechoic changes. N = 11 (15 feet). • Scintigraphy-guided steroid injection. Following intravenous administration of 20 mCi ^{99m}Tc methylene diphosphonate three phase bone scintigraphy was performed and the injection site decided on the area of maximum uptake. N = 6 (9 feet). **Control:** Palpation-guided steroid injection. Steroid injected at point of maximal tenderness. N = 10 (11 feet). In all groups, 0.5 mL betamethasone dipropionate (6.43 mg/mL) and betamethasone sodium phosphate (2.63 mg/mL) combination and 0.5 mL prilocaine hydrochloride (20 mg/mL) was used.
Outcomes	**Length of follow-up:** 25.3 months (range 22.2 to 27.2 months) **Outcome used in meta-analysis:** Pain using visual analogue scale (VAS) **Other outcomes:** Plantar fascia thickness (mm) Fat pad thickness (mm) Fascial hypoechogenicity
Setting	**Period of study:** 2003 to 2006 (months not mentioned) **Setting:** Tertiary care hospital; Department of Orthopaedics and Traumatology, University of Duzce, Duzce **Country:** Turkey
Notes	**Bilateral heel involvement:** Eight participants had bilateral heel pain, data not given separately. • Ultrasound-guided group: 4 out of 11 participants • Scintigraphy-guided group: 3 out of 6 participants • Palpation-guided group: 1 out of 10 participants **Adverse events:** Not measured. **Lost to follow-up:** None **Funding source:** None

Risk of bias

Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias)	Unclear risk	Quote: "The patients were randomly assigned to the following injection groups". Comment: the method of randomisation not mentioned.
Allocation concealment (selection bias)	High risk	Allocation concealment not reported. Probably not done.

Yucel 2009 *(Continued)*

Blinding of participants and personnel (performance bias) All outcomes	High risk	Not blinded for participants and personnel. Open label trial
Blinding of outcome assessment (detection bias) All outcomes	High risk	Outcome assessors not blinded; subjective outcomes used.
Incomplete outcome data (attrition bias) All outcomes	Low risk	All randomised participants were included in the analysis.
Selective reporting (reporting bias)	High risk	Trial registration and study protocol are not available. Adverse events were not reported even though steroid injection is known to cause adverse events. All other pre-specified outcomes have been reported in the study.
Other bias	High risk	Quote from: "A total of 27 patients with the diagnosis of plantar fasciitis [35 feet, 16 left (45.7%) and 19 right (54.3%); 19 unilateral (70.4%), eight bilateral (29.6%)] were included in the study". There were eight patients with bilateral involvement that could lead to clustering effect. This can cause baseline imbalance and selection bias. There was however no difference in the baseline characters of both groups in terms of age, sex, BMI, baseline VAS score.

Yucel 2010

Methods	RCT
Participants	**Total participants:** 60 participants **Gender (m/f)**: 18/42 **Age**: mean 43.9 ± 8.33 years (range 31 to 65 years) **Duration of symptoms:** • Injected corticosteroid group: mean 39.4 ± 10.2 weeks • Extracorporeal shockwave therapy group: mean 37.7 ± 8.6 weeks **VAS:** • Injected corticosteroid group: mean 5.1 ± 2.1 cm • Extracorporeal shockwave therapy group: mean 6.5 ± 2.5 cm **BMI:** Not mentioned **Inclusion criteria** 1. Aged > 18 years 2. Duration of symptoms more than six months 3. Single site of tenderness and pain over the medial calcaneal tuberosity 4. Six months history of failed conservative therapy **Exclusion criteria** 1. Previous surgery, steroid injections, or extracorporeal shockwave therapy

Yucel 2010 *(Continued)*

2. Calcaneal fracture
3. Generalised inflammatory arthritis
4. Local infection and cellulitis, peripheral vascular disease, metabolic diseases, cardiac pacemakers
5. Reflex sympathetic dystrophy
6. Pregnancy
7. Nerve related symptoms
8. Dysfunction of knee, ankle and foot
9. Known malignancy, bleeding disorders

Interventions	**Intervention:** Steroid injection: combination of 0.5 mL betamethasone dipropionate (6.43 mg/mL) and betamethasone sodium phosphate (2.63 mg/mL) and 0.5 mL prilocaine HCl (20 mg/mL) was injected at the most tender point; N = 33. **Control:** Extracorporeal shockwave therapy; single application of 3000 shock waves after a five fold nerve block with 20 mL 2% prilocaine, on the posterior tibial, superficial and deep peroneal, sural,and saphenous nerves; N = 27.
Outcomes	**Length of follow-up**: 3 months **Outcomes used in meta-analysis:**. Heel pain by VAS (0 to 100; worst pain) Adverse events: Pain after procedure, erythema, infections and others (none was mentioned by name) Treatment failure: converse of therapeutic response rate (> 50% decrease in VAS or heel tenderness) **Other outcomes:** Heel tenderness index
Setting	**Period of study:** 1 January 2005 to 31 December 2006 **Setting:** Outpatient services of a tertiary care hospital; Department of Orthopaedics and Traumatology, University of Duzce, Duzce **Country:** Turkey
Notes	**Bilateral heel involvement**: None **Adverse events:** Measured and reported; No adverse events in the ESWT group; two patients in the steroid group experiences erythema and two more reported mild throbbing pain in the site that lasted for five days and did not require any analgesia. **Lost to follow-up:** None **Funding source:** None Inclusion criteria included duration of symptoms greater than 6 months but lower end of range of duration of symptoms was 23 weeks in the steroid group and 22 weeks in the ESWT group.

Risk of bias

Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias)	Unclear risk	Quote: "Patients were randomly assigned into two groups." page 106, under the materials and methods.

Yucel 2010 *(Continued)*

		Comment: The method of randomisation not described. So it is unclear how the authors randomised the participants.
Allocation concealment (selection bias)	High risk	Allocation concealment not reported and not attempted at all; probably not done.
Blinding of participants and personnel (performance bias) All outcomes	High risk	Not blinded for participants and personnel. Open label trial.
Blinding of outcome assessment (detection bias) All outcomes	High risk	Outcome assessors not blinded; subjective outcomes used. Probably not done
Incomplete outcome data (attrition bias) All outcomes	Low risk	All randomised participants were included in the analysis.
Selective reporting (reporting bias)	Unclear risk	No trial registration or published protocol. However, the published report includes all expected outcomes, including adverse events and those that were pre-specified in the methods section
Other bias	Unclear risk	There was a statistically significant difference (P = 0.02) in baseline VAS pain scores (5.1 versus 6.5). Otherwise there was no difference in the baseline characters of both groups in terms of age, duration of symptoms, plantar heel spur. The study appears to be free of other sources of bias.

Yucel 2013

Methods	RCT
Participants	**Total participants:** 44 participants randomised, analysis on 40; 2 participants lost to follow up in each group. Baseline data for 40. **Gender (m/f)**: 8/32 **Age:** mean 46.4 ± 8.7 years **Duration of symptoms:** • Steroid injection group: mean 6.8.± 3.6 months • Silicone insole group: mean 7.8 ± 4.1 months **BMI:** • Steroid injection group: mean 30.8.± 5 kg/m^2 • Silicone insole group: mean 29.3 ± 5.5 kg/m^2 **VAS score:** • Steroid injection group: mean 6.45.± 1.23 cm • Silicone insole group: mean 6.95 ± 0.94 cm **Inclusion criteria:** Participants between the ages of 18 and 65 years, with a primary report of unilateral plantar heel pain for more than 3 months, with pain score in the morning by first steps more than 4 on the 0 to 10 cm visual analogue scale (VAS).

Yucel 2013 *(Continued)*

	Exclusion criteria: 1. Previous surgical intervention, corticosteroid injection or shock-wave treatment 2. Presence of foot deformity 3. Acute heel trauma 4. Plantar fasciitis due to systemic rheumatic disease 5. Radicular or neuropathic pain 6. Local infections 7. Coagulation disorders 8. Pregnancy
Interventions	**Intervention:** Ultrasound-guided steroid injection was performed via a medial approach using a 4 cm 21-gauge needle; 1 mL of betamethasone dipropionate (6.43 mg/mL) and betamethasone sodium phosphate (2.63 mg/mL) combination plus 1 mL lidocaine HCl. N = 22; 2 lost to follow-up; 20 participants in analysis. **Control:** Patients in insole group were asked to wear a prefabricated full-length silicone insole in their daily lives for 1 month both indoors and outdoors as possible. N = 22; 2 lost to follow-up; 20 participants in analysis.
Outcomes	**Length of follow-up**: One month **Outcome used in meta-analysis:** 1. Heel pain by VAS 2. Adverse events. 3. Function and quality of life were measured using the Foot and Ankle Outcome Score (FAOS) **Other outcomes:** Heel tenderness index Measurement of plantar fascia thickness
Setting	**Period of study:** 1 January 2005 to 31 December 2006 **Setting:** Outpatient clinic of Physical Medicine and Rehabilitation Department, Necmettin Erbakan University Medical Faculty, Konya **Country:** Turkey
Notes	**Bilateral heel involvement**: None **Adverse events:** measured and none reported **Lost to follow-up:** 2 patients were lost to follow-up in each arm **Funding source:** None

Risk of bias

Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias)	Low risk	Quote: "patients were randomly assigned to injection or insole group. Concealed allocation was performed by using a computer-generated randomised table of numbers created prior to the beginning of the study". Probably done.

Yucel 2013 *(Continued)*

Allocation concealment (selection bias)	Unclear risk	Quote: "Concealed allocation was performed by using a computer-generated randomised table of numbers created prior to the beginning of the study". Probably done.
Blinding of participants and personnel (performance bias) All outcomes	High risk	Since the interventions are obviously different and there is no mention of blinding, probably no blinding was done.
Blinding of outcome assessment (detection bias) All outcomes	Unclear risk	Quote: "All outcome measures were collected by a researcher blinded to the patient's group assignment at the beginning of the study and at the follow-up of 1 month." Comment: Blinding of the outcome assessor was attempted, but it is likely that the blinding could have been broken, and the outcome measurement is likely to be influenced by lack of blinding of participants
Incomplete outcome data (attrition bias) All outcomes	Unclear risk	Quote: "Forty-four patients satisfied the eligibility criteria, and 40 completed the 1-month follow-up". Two participants in each group were lost to follow-up and there was no attempt made by the trial authors to include them in the analysis. We are unsure if this will affect the effect of the intervention.
Selective reporting (reporting bias)	Unclear risk	No trial registration or published study protocol available. However, the published report includes all expected outcomes, including those that were prespecified in the methods section.
Other bias	Low risk	The baseline characteristics were equal in both groups. The study appears to be free of other sources of bias.

Yuzer 2006

Methods	RCT
Participants	**Total participants:** 54 participants; 24 participants had bilateral heel involvement. **Gender (m/f)**: 8/46 **Age:** • Steroid injection group: mean 51.53 ± 11.5 years • Laser group: mean 49.58 ± 1.2 years **Duration of symptoms:** • Steroid injection group: mean 12.36 ± 17.5 months • Laser group: mean 30.45 ± 57.3 months **BMI:** • Steroid group: mean 32.53 ± 5 kg/m^2 • Laser group: mean 32.25 ± 4.7 kg/m^2 **VAS:** • Steroid injection group: mean 7.6 ± 1.5 cm • Laser group: mean 8.0 ± 1.2 cm

Yuzer 2006 *(Continued)*

	Inclusion criteria Patients presenting to the clinic with pain in the plantar heel region that lasted at least for one month between January 2004 and January 2005, after a lateral radiograph of the subcalcaneal region of the foot. Mentoin of heel spurs. **Exclusion criteria** 1. Systemic inflammatory disease 2. Local trauma 3. History of steroid injection within six months
Interventions	**Intervention:** Local steroid injections to the affected heel (6.43 mg betamethasone dipropionate and 2.63 mg betamethasone sodium phosphate and 20 mg 2% prilocaine). N = 30. **Control:** Infrared Gallium-Arsenide (Ga-As) laser therapy with 904 NM wavelength was applied for 30 seconds for 10 sessions). N = 24.
Outcomes	**Length of follow-up**: 6 months **Outcome used in meta-analysis:** Pain intensity measured by 100 mm visual analogue scale Adverse events **Other outcomes:** Heel tenderness measured by palpation All measurements were done at one, three and six months
Setting	**Period of study:** participants were enrolled between January 2004 and January 2005 **Setting:** Outpatient department of Physical Therapy and Rehabilitation clinic, Ankara Training and Research Hospital, Ministry of Health, Ankara **Country:** Turkey
Notes	**Bilateral heel involvement**: 24 patients had bilateral involvement but both heels were randomised together into the same arm. The participant was randomised and not either heel alone. No information given about the number of participants with bilateral heel pain in each arm. It is not mentioned whether a single heel or both heel received the intervention; nor is the unit of analysis clear. **Adverse events:** measured and none reported **Lost to follow-up:** Measured and none reported **Funding source:** None **Comment:** The article was originally published in Turkish language and was translated to English using Google translate.

Risk of bias

Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias)	Unclear risk	Quote: "..randomly divided into two groups..". Comment: method not mentioned.

Yuzer 2006 *(Continued)*

Allocation concealment (selection bias)	Unclear risk	Quote: "...closed envelope method". Comment: Allocation was concealed by sealed envelopes but other protections (opaque etc) not mentioned
Blinding of participants and personnel (performance bias) All outcomes	High risk	Not blinded for participants and personnel. Open label trial.
Blinding of outcome assessment (detection bias) All outcomes	High risk	Blinding of the outcome assessor was not done and the subjective outcome used is likely to be influenced by lack of blinding.
Incomplete outcome data (attrition bias) All outcomes	Low risk	All randomised participants were included in the analysis.
Selective reporting (reporting bias)	Unclear risk	No trial registration or published protocol available. Pre-specified outcomes have been reported in the study.
Other bias	High risk	24 of 54 participants (44%) had bilateral heel involvement and there is no mention of their distribution within the groups and no adjustment for clustering was done. Moreover, we do not know if one or both heels received the interventions. The study had a higher percentage of women than men. It is not clear if the groups had a equal distribution of the men and women. Mean duration of symptoms was twice as long in the laser group - but this and other baseline characteristics were reported not to be significantly different in the two groups

Zamani 2014

Methods	Quasi-RCT. Participants were assigned into two groups based on odd and even numbers
Participants	**Total participants:** 40 participants **Gender (m/f)**: 17/23 **Age**: mean 52.98 years • Steroid injection group: mean 52.95 ± 8.76 years • Laser therapy group: mean 53 ± 7.8 years **Duration of symptoms**: median 32.38 weeks. • Steroid group: 28.5 ± 22.5 weeks • Laser therapy group: 36.25 ± 19.01 weeks **BMI:** • Steroid group: mean 32.53 ± 5 kg/m^2 • Laser therapy group: mean 32.25 ± 4.7 kg/m^2 **VAS, mean:** • Steroid group: mean 36.2 ± 24.1 • Laser therapy group: mean 40.5 ± 23.3

Zamani 2014 *(Continued)*

	Inclusion criteria: Adults with unilateral plantar fasciitis, based on history and clinical examination **Exclusion criteria:** None mentioned.
Interventions	**Intervention:** Intralesional injection of methylprednisolone, 40 mg; N = 20 **Control:** Low power laser therapy, 10 sessions, alternate days, each lasting for 15 minutes; N = 20
Outcomes	**Length of follow-up**: one week and at six weeks **Outcome used in meta-analysis:** Pain intensity measured by 100 mm visual analogue scale (VAS) **Other outcomes:** Plantar fascia thickness
Setting	**Period of study:** Not reported **Setting:** Out-patient department, Rheumatology clinic, Tertiary care centre, Kashan University **Country:** Iran
Notes	**Bilateral heel involvement**: None. **Adverse events:** Not measured. **Lost to follow-up:** None. **Funding source:** Kashan University of Medical Sciences **Comment:** The article was originally published in Arabic and translated into English using Google Translate and checked by a translator.

Risk of bias

Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias)	High risk	Quote: "randomly with the odd and even numbers were assigned to two groups of 20". Comment: no randomisation done.
Allocation concealment (selection bias)	High risk	None mentioned. Comment: Allocation concealment probably not done.
Blinding of participants and personnel (performance bias) All outcomes	High risk	There is no mention of an attempt to blind and the interventions are obviously different in nature. Comment: Blinding probably not done.
Blinding of outcome assessment (detection bias) All outcomes	High risk	No mention about outcome assessor being blinded to the interventions. Comment: Blinding probably not done.

Zamani 2014 *(Continued)*

Incomplete outcome data (attrition bias) All outcomes	Low risk	All randomised participants were included in the analysis at set times.
Selective reporting (reporting bias)	High risk	Trial registration available during recruitment. However, adverse events were not reported even though steroid injection is known to cause adverse events. All other pre-specified outcomes have been reported in the study.
Other bias	High risk	Baseline characteristics were equal. However, there is an indication in the translated text that two injections were given. It is not clear what were the criteria for this second injection and which of the participants received. We are also unsure if this had an effect on the outcomes measured.

BMI: body mass index
ESWT: extracorporeal shockwave treatment
FHSQ: foot health status questionnaire
NSAID: nonsteroidal anti-inflammatory drug
RCT: randomised controlled trial
VAS: visual analogue scale

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

Study	Reason for exclusion
Al-Bluwi 2011	RCT randomised participants into 2 groups: "group 1 (study group) received nonsteroidal anti-inflammatory drugs (NSAIDs; 4-6 weeks) and EZStep (a foot brace) whereas group 2 (control group) received either NSAID and physiotherapy alone (2A) or NSAID, physiotherapy, and local steroid injection (2B)." There was no randomisation between steroid injection + physiotherapy versus physiotherapy alone
D'Agostino 2005	All included participants had rheumatoid arthritis and seronegative spondyloarthropathy and not plantar fasciitis
Hammer 2002	RCT compared ESWT versus 'conventional conservative treatment' comprising local steroid injections plus NSAIDs, heel cup, orthoses or shoe modifications or both and electrotherapy. It was excluded because corticosteroid injection was used in combination with several active interventions
Helfand 1973	Participants in this trial had various foot diagnoses of tendonitis, bursitis, traumatic synovitis and mono-articular joint inflammation. We received no response to our request for separate data on participants with plantar fasciitis
ISRCTN57762240	Trial was to have been conducted over 10 years ago (start date 2003) and no further information is likely to be forthcoming
Kalaci 2009	Not RCT. Participants were consecutively recruited into one of four groups in turn. Thus the first 25 consecutive patients were treated by local injection of 2 mL of autologous blood alone, the second 25 by local injection of 2 mL of lidocaine with peppering, the third 25 by local injection of 2 mL of triamcinolone alone, and the last 25 by local injection of 2 mL of triamcinolone with peppering
Marabha 2008	Not RCT; prospective cohort study
Motififard 2008	RCT compared corticosteroid injection followed by two weeks of plaster cast immobilisation versus with heel pad. Study excluded because corticosteroid injection was used in combination with another active intervention
NCT01127672	Study withdrawn prior to enrolment

Study	Reason for exclusion
Say 2014	Not RCT or quasi-RCT; participants were permitted to choose the treatment arm
Tsai 2000	Not RCT; cohort study
Wang 2006	This RCT compared ESWT versus conservative therapy consisting of NSAIDs orthotics, physical therapy, exercise programme "and/or corticosteroid injection". The steroid injection was an optional component of the control intervention and not randomly allocated

ESWT = Extracorpeal shockwave therapy
NSAIDs = nonsteroidal anti-inflammatory drugs
RCT = randomised controlled trial

Characteristics of studies awaiting assessment *[ordered by study ID]*

Acosta-Olivo 2011

Methods	Randomised controlled trial: allocation using sealed envelopes
Participants	32 skeletally-mature patients with heel pain at the insertion of the plantar fascia, failure of conservative treatment for 3 months, and no previous infiltrations
Interventions	1. Steroid injection: 8 mg of dexamethasone plus 2 mL lidocaine 2. Platelet-rich plasma injection, with a 5 mL syringe along with 2 mL of lidocaine
Outcomes	Follow-up: 2, 4, 8, 12 and 16 weeks Pain (VAS) Foot and Ankle Disability Index (FADI) American Orthopedic Foot and Ankle Society (AOFAS) scale
Notes	Country: Mexico Article is in press and final version may differ from the final published version

Celik 2016

Methods	Randomised controlled trial, single blinded, prospective: computer-generated random numbers table and pre-labelled sealed envelopes
Participants	43 adults with unilateral plantar fasciitis
Interventions	1. Steroid injection 2. Joint mobilisation and stretching exercise
Outcomes	Follow-up: 3, 6 and 12 weeks, and 1 year Foot and Ankle Ability Measure (FAAM) Pain measured on VAS
Notes	Country: Turkey Article located in search update (March 2017); pending processing.

Demir 2015

Methods	Randomised controlled trial
Participants	150 patients with clinically-determined plantar fasciitis
Interventions	1. Corticosteroid injection, single injection 2. Dextrose prolotherapy, baseline and second injection two weeks later 3. Corticisteroid phonophoresis All participants underwent an exercise programme
Outcomes	Follow-up: 1 and 3 months VAS (probably for pain) Heel Sensitivity Index (THI) Foot Function Index (FFI) Foot and Ankle Outcome Score (FAOS) SF-36 Plantar fascia thickness
Notes	Country: Turkey Abstract only available; awaiting publication of a full report

Karimzadeh 2017

Methods	Randomised using the "block covariate adaptive randomisation method" (minimisation)
Participants	36 participants with chronic plantar fasciitis
Interventions	1. Corticosteroid injection of 40 mg methyl prednisolone and 1 mL lidocaine for a total of 3 mL volume 2. Autologous whole blood injection and 1 mL 1% lidocaine in a single syringe 3. Conservative treatment: education and daily stretching programme (no injection)
Outcomes	Follow-up: 4 and 12 weeks Pain measured on VAS Pressure pain threshold (PPT) Plantar fasciitis pain/disability scale (PFPS)
Notes	Country: Iran Article located in search update (March 2017); pending processing

Mahindra 2016

Methods	Randomised trial: "computer-derived random charts"

Mahindra 2016 *(Continued)*

Participants	75 participants with chronic plantar fasciitis who had not responded to at least 3 months of conservative therapy
Interventions	1. Corticosteroid injection: 2 mL 40 mg of methylprednisolone 2. Platelet-rich plasma injection 3. Placebo injection (saline) All participants underwent physical therapy
Outcomes	Follow-up: 3 weeks and 3 months Pain measured on VAS American Orthopaedic Foot and Ankle Society (AOFAS) Ankle and Hindfoot score
Notes	Country: India Article located in search update (March 2017); pending processing

Saba 2016

Methods	Randomised trial: "randomly assigned"
Participants	21 female patients with unilateral chronic idiopathic plantar fasciitis
Interventions	1. Ultrasound-guided local corticosteroid injection (0.5 mL of triamcinolone acetonide (40 mg/mL)) 2. Palpation-guided local corticosteroid injection (0.5 mL of triamcinolone acetonide (40 mg/mL))
Outcomes	Follow-up: 2 weeks and 4 weeks Pain measured on VAS (0 to 100) Plantar Fasciitis Pain/Disability Scale Ultrasonography Side effects
Notes	Country: Egypt Article located in search update (March 2017); pending processing

Sherpy 2016

Methods	Randomised trial: "simple randomisation method (odd for PRP and even for steroid)"
Participants	50 participants, aged > 18 years, with chronic plantar fasciitis (duration > 3 months), with plantar fascia thickness > 4 mm on ultrasonography
Interventions	1. Corticosteroid as 2 ml triamcinolone acetonide (40 mg/mL) with local anaesthesia 2. Platelet-rich plasma injection, 3 mL, after local anaesthesia
Outcomes	Follow-up: 6 weeks and 3 months Pain measured on VAS (0 to 100) Foot Health Status Questionnaire (FHSQ) Ultrasonography

Sherpy 2016 *(Continued)*

Notes	Country: Egypt Article located in search update (March 2017); pending processing

Vahdatpour 2016

Methods	Randomised trial: computer-generated random sequence
Participants	32 participants, aged > 18 years, with chronic plantar fasciitis (duration > 3 months), and lack of effect from conservative treatment
Interventions	1. Corticosteroid as methylprednisolone 1 mL plus lidocaine 1 mL 2. Platelet-rich plasma injection
Outcomes	Follow-up: 1, 3 and 6 months Pain measured on VAS Modified Roles and Maudsley score (RMS) (for assessing pain and limitation of activity)
Notes	Country: Iran Article located in search update (March 2017); pending processing

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

ACTRN12610000899044

Trial name or title	Intralesional autologous platelet-rich plasma injection compared to corticosteroid injection for the treatment of chronic plantar fasciitis
Methods	Prospective, parallel design, randomised controlled trial
Participants	**Country:** Australia **Recruitment target:** 75 participants **Inclusion criteria:** • Presenting complaint of plantar heel pain worse on rising in the morning and/or after periods of sitting or lying, which have been present for longer than six weeks • On examination, site of maximal tenderness at the attachment of the plantar fascia on the medial tubercle of the calcaneus • Plantar fascial thickness > 4 mm at the area of maximal tenderness • Failed conservative management of at least 4 weeks duration consisting of calf stretching, tibialis posterior and flexor hallucis longus strengthening, and the use of an off-the-shelf orthotic with heel cut-out and plantar fascial groove • Males and females above the age of 18 years **Exclusion criteria:** • Previous injections or surgery for heel pain • Nerve-related symptoms • Regional pain syndrome • Achilles tendon pathology • Rheumatoid arthritis

ACTRN12610000899044 *(Continued)*

	• Spondyloarthropathy (including ankylosing spondylitis, reactive arthritis, enteropathic arthritis, and psoriatic arthritis) • Diabetes mellitus • Local infection • Peripheral vascular disease • Gout • Coagulopathy or anti-coagulant therapy • Pregnancy • Dysfunction of the knee, ankle, or foot • Work-related or compensation injury
Interventions	1. One peri-fascial cortisone injection (1 mL Celestone Chronodose) followed by two non-therapeutic placebo injections of saline guided by ultrasound, by a medial approach following injection of local anaesthetic into the skin, and at weekly intervals. 2. Three intra-fascial PRP injections (2 mL PRP each) guided by ultrasound, by a medial approach following injection of local anaesthetic into the skin, and at weekly intervals. Three mL of platelet rich plasma will be obtained using a single step centrifugation procedure and XC-2000 laboratory bench top centrifuge. 25.5 mL of autologous blood will be divided equally between three 8.5 mL ACD BD Vacutainer venous blood collection tubes and centrifuged at 2000 rpm (447 g) for 10 minutes. The lowest 1 mL of the plasma, the platelet rich plasma (PRP), is then harvested from each tube avoiding contamination by the buffy coat and red cell layers. Two mL will be collected for injection into the patient and 1 mL will be collected for laboratory analysis of platelet numbers. Each sample will be 'activated' with 0.05 mL calcium chloride 10% per 1 mL plasma.
Outcomes	**Primary outcomes:** 1. American Orthopaedic Foot and Ankle Society (AOFAS) Hindfoot and Ankle Clinical Rating Scale 2. Foot Function Index (FFI) 3. Manchester Foot Pain and Disability Index (MFPDI) **Secondary outcomes:** 1. Daily analgesic requirements (daily patient diary) 2. Foot Health Status Questionnaire (FHSQ) 3. Plantar fascial thickness on ultrasound scanning 4. VISA-A Questionnaire
Starting date	01/11/2010 (anticipated)
Contact information	Dr William Craddock, PO Box 612 Waverley NSW 2024, Australia; email: williamc@bigpond.net.au
Notes	Emailed author for further details. **Registered:** 22/10/2010 **Status** (16.11.2015)**:** not yet recruiting

IRCT201108157323N2

Trial name or title	Efficacy of prolotherapy vs. methylprednisolone acetate injection in the treatment of chronic plantar fasciitis
Methods	Randomised clinical trial
Participants	**Country:** Iran **Recruitment target:** 30 participants

IRCT201108157323N2 *(Continued)*

	Inclusion criteria: Aged 18 to 70 years, clinical diagnosis of plantar fasciitis in the past six months. Diagnosis of plantar fasciitis was on the basis of pain at, or around, the plantar surface of the heel or the medial longitudinal arch. **Exclusion criteria**: chronic plantar fasciitis with systemic symptoms, evidence of pathologic disorders in laboratory data or radiograph of foot, steroid or prolotherapy drug solution injection in three months prior to the study, severe co-existing disease such as diabetes, inflammatory arthritis or previous foot surgery
Interventions	1. Corticosteroid: 2.5 mL syringe is filled with 1 mL steroid solution injection contained 40 mg/mL methylprednisolone and 1 mL 2% lidocaine 2. Prolotherapy: 2.5 mL syringe is filled with 1 mL 2% lidocaine (20 mg/mL) and 1 mL 50% dextrose (25 g/50 mL) (dextrose monohydrate 500 mg) giving a 25% dextrose solution. Injection is performed through tender point with a rigid 27G needle.
Outcomes	**Primary outcomes**: Pain intensity at two and six weeks after intervention. Method of measurement: VAS **Secondary outcomes**: Side effects: rupture of ligament, heel pad atrophy, hypopigmentation
Starting date	7 October 2011
Contact information	Dr Mohammadreza Emad Email: emadm@sums.ac.ir Affiliation: Shiraz University of Medical Sciences and Health Services
Notes	Emailed author for further details. **Registered:** 15/11/2011 **Status** (16.11.2015)**:** completed recruitment

IRCT201203069221N1

Trial name or title	A prospective comparative study of extracorporeal shock wave and corticosteroid injection in the treatment of plantar fasciitis.
Methods	Randomised, double blind, parallel design.
Participants	**Country:** Iran **Recruitment target:** 74 participants **Inclusion criteria:** • Aged > 18 years • Heel pain > four weeks • Nonresponsive to conservative treatments • Pain intensity more than two in VAS domains • No evidence of calcaneal fractures • Patients be able to follow the study for three months after intervention **Exclusion criteria:** • Heel surgery • Nerve injury or achillis tendon injury • Rheumatoid arthritis

IRCT201203069221N1 *(Continued)*

	• Diabetes mellitus • Local infection or systemic infection • Peripheral vascular disease • Coagulation disorders • Pregnancy or breast feeding • Corticosteroid injection in the last six months or NSAIDS consumption in the last seven days • History of sensitivity to injection solution.
Interventions	1. 40 mg of methyl prednisolone and 2 cc lidocaine 2% injection 2. Three sessions of 2000 pulses, 2.5 bar 10 Hz shock wave therapy
Outcomes	**Primary outcomes:** Pain in standing and morning pain before intervention, at one week, one and three months after intervention, measured on VAS. **Secondary outcomes:** Ameliorating in ADL and sportive activity before intervention, and at one week, one and three months after intervention measured by visual analogue scale foot and ankle (VASFA)
Starting date	23/09/2011
Contact information	Nafiseh Maleki, Army University of Medical Sciences, Tehran, Iran Email: dr_maleki@mut.ac.ir, mnafism@yahoo.com
Notes	Emailed author for further details. **Registered:** 11/04/2014 **Status** (16.11.2015)**:** completed recruitment

IRCT201306163217N7

Trial name or title	Comparison of high energy radial extra corporeal shock wave therapy with local corticosteroid injection in the treatment of plantar fasciitis
Methods	Randomised single blind
Participants	**Country:** Iran **Recruitment target:** 40 participants **Inclusion criteria:** • Patients with chronic plantar fasciitis and heel pain and local tenderness > 2 months. • Aged 20 years to 65 years **Exclusion criteria:** • History of systemic inflammatory diseases • Infective or malignant diseases • History of direct trauma with or without foot bones fracture • Previous physiotherapy in the past 3 months or local steroid injection in the past 6 months • Active S1 radiculopathy (which could be justify the cause of plantar fascia pain) • Heel pain related to Achilles bursitis • Presence of myofascial pain syndrome and trigger points in gastrocnemius muscle

IRCT201306163217N7 *(Continued)*

Interventions	1. One local injection of 40 mg triamcinolone in tender point of medial zone of heel (Amp triamhexal "made by Germany"). 2. Radial extracorporeal shock wave therapy using high energy radial shock wave with energy flux intensity of 0.25 mJ/mm^2, 2000 impulse (4 Bar) and frequency of 10 Hz twice a week for five sessions.
Outcomes	**Primary outcomes:** 1. Daily foot functional ability. Timepoint: Before treatment and 4 and 8 weeks after treatment measured on the Foot Function Index. 2. Pain intensity: VAS (0 to 100) 3. Satisfaction rate: 4 grades (excellent, good, moderate and poor)
Starting date	22/11/2013
Contact information	Faraz Notghi Physical Medicine and Rehabilitation Ward, Imam Reza Hospital, Tabriz, Iran email: faraz.notghi@yahoo.com
Notes	**Registered:** 04/03/2014 **Status** (16.11.2015)**:** completed recruitment. Literature search in March 2017 found that this trial was published September 2016 but we have yet to obtain a copy (Eslamian 2016)

IRCT2015041321744N1

Trial name or title	Comparison of ultrasound guided local injections of dextrose and corticosteroid efficacy on pain and daily activity of patients with chronic plantar fasciitis
Methods	Randomised clinical trial
Participants	**Country:** Iran **Recruitment target:** 40 **Inclusion criteria:** A history of plantar fasciitis; heel pain for more than 2 months with a VAS (visual analogue scale) more than 4; fascia hypoechogenicity and thickness more than 4 mm in sonography **Exclusion criteria:** A history of direct trauma; positive Tinel sign; a history of systemic inflammatory or soft tissue diseases; disk herniation with S1 radiculopathy; a history of gout; diabetes mellitus; a history of surgery or injection in fascia since 6 months ago, existence of cyst/mass in pain site; coincidence of paraesthesia or numbness; coagulopathy; pregnancy; hypersensitivity to corticosteroids; infection of injection site, posterior heel pain; any treatment for the condition since 4 weeks ago; patients who receive physiotherapy, splint, Ionophoresis and shockwave during 2 months after injection
Interventions	1. Injection of 1 cc methylprednisolone 40 mg and 1 cc saline 0.9% 2. Injection of 2 cc of dextrose 20%
Outcomes	**Primary outcomes:** **Pain VAS (2 and 8 weeks post injection)** Foot and Ankle Ability Measure (FAAM) questionnaire (daily living and sport activity) Secondary outcomes:

IRCT2015041321744N1 *(Continued)*

	Thinkness of plantar fascia (sonography)
Starting date	05/06/2015 (anticipated)
Contact information	Amin Arbabi, Firoozgar Hospital, Tehran, Iran Email: arbabiamin0123@yahoo.com
Notes	**Registered:** 1 June 2015 (allegedly prospective) **Status** (June 2015)**:** Recruitment complete

NCT00758641

Trial name or title	Use of platelet rich plasma to treat plantar fasciitis: design of a multicentre randomised controlled trial
Methods	Randomised controlled trial. Randomisation using computer-generated block randomisation of 10 patients. Treatment sequence in opaque envelopes
Participants	**Country:** The Netherlands **Recruitment target:** 120 participants **Inclusion criteria:** • Aged > 18 years • Plantar fasciitis with 6 months to 12 months of failed conservative management • Able to understand the informed consent • VAS pain score in mornings at first step higher than 5 (scale 0 to 10) **Exclusion criteria:** • History of steroid injection within 6 months • Physio- or occupational therapy within 4 weeks or NSAIDs within 1 week prior to randomisation • Cardiac, renal or hepatic disease • Pregnancy • Local malignancy • Anaemia (Hb < 5) • History of surgery for plantar fasciitis • Active bilateral plantar fasciitis • Vascular insufficiency or neuropathy • 1Hypothyroidism and diabetes. Sample size of 120 calculated with 60 in each arm.
Interventions	First local field block with bupivacaine 0.05 cc in area of maximum tenderness in both groups. 1. Steroid injection, Kenacort 40 mg/mL (triamcinolone acetate) 5 to 6 cc by peppering technique (single followed by 5 penetrations) 2. 5 to 6 cc autologous platelet concentrate injection by peppering technique (single followed by 5 penetrations) Post intervention: Limited use of feet for 48 hours followed by stretching exercise for 2 weeks and strengthening exercises. After 4 weeks proceed with normal activities without any foot orthosis.
Outcomes	All patients will be followed-up at 4, 8,12 and 52 weeks. **Primary outcome:** pain by VAS score of the foot function index will be used (0 to 10).

NCT00758641 *(Continued)*

	Secondary outcomes: 1. Treatment is successful if reduction after 6 months is over 25%. 2. Function and satisfaction measured with AOFAS foot questionnaire, Foot function index, WHO-QOL questionnaires. 3. VAS and AOFAS completed for each patient at all follow-ups.
Starting date	September 2009
Contact information	t.gosens@elisabeth.nl
Notes	Emailed authors for details. **Registered:** 22/09/2008 **Status** (16.11.2015)**:** ongoing but not recruiting. There is a published protocol for this study.

NCT01297686

Trial name or title	A clinical trial of a multi-element exercise program for plantar fasciopathy in workers required to stand for prolonged periods of time
Methods	Open label, parallel assignment, randomised clinical trial
Participants	**Country:** Canada **Recruitment target:** 56 participants **Inclusion criteria:** • Adults aged 19 years to 60 years • Adults required to stand for 6 or more hours in workplaces • Diagnosed with plantar fasciopathy (plantar fasciitis). All diagnoses made by a physiotherapist based on presentation of palpable pain at or around the plantar medial heel, in addition to pain during weight-bearing activities and the presence of morning pain • Only adults with pain > 12 months included. **Exclusion criteria:** • History of plantar fascia surgery • Osteoarthritis or other degenerative musculoskeletal disorders affecting the lower extremity • Corticosteroid injections into affected plantar fascia at any time in the past
Interventions	1. Steroid injection: Dexamethasone 2. Multi-element exercise programme (karaoke exercise, balance walking exercise, forefoot extension exercise, standing one-legged balance exercise, ankle inversion/eversion exercise, gastrocnemius and soleus stretching, tissue-specific plantar fascia self massage)
Outcomes	**Primary outcomes:** • Change from baseline in Foot and Ankle Disability Index (FADI) at six weeks (Patient-centered health-related quality of life indicator measuring disability at the foot and ankle • Change from baseline in Foot and Ankle Disability Index (FADI) at 12 weeks (patient-centred health-related quality of life indicator measuring disability at the foot and ankle) **Secondary outcomes:** • Change in ultrasound-based grading of pathology at 12 weeks • Change in acousto-elastographic analysis of plantar fascia elasticity at 12 weeks

NCT01297686 *(Continued)*

	• Change in VAS for pain at 12 weeks
Starting date	May 2011
Contact information	Dr Jack Taunton, University of British Columbia, Vancouver, British Columbia, Canada
Notes	**Registered:** 14/02/2011 **Status** (16.11.2015)**:** trial completed. Email ID of the author not found or provided by the trial registry.

NCT01614223

Trial name or title	A randomised double-blind clinical trial to investigate the use of autologous conditioned plasma (ACP) for patients with plantar fasciitis
Methods	Randomised double-blind trial
Participants	**Country:** Canada **Recruitment target:** 140 participants **Inclusion criteria:** • Aged > 18 years • Painful inner heel pain > 3 months • At least 6 weeks since last corticosteroid injection • 4 weeks since the last anaesthetic injection, iontophoresis, ultrasound and electromyostimulation • 1 week since the last NSAIDs taken • 2 days since the last analgesic, heat, ice, message, stretching, or modification of night splints and orthosis • Scores ≥ 5 on the VAS PFPD scale • Scores ≥ 30 on the AOFAS scale • Scores ≥ 5 on the VAS PFPD scale and 30 on the AOFAS scale **Exclusion criteria:** • Tendon rupture • Neurological or vascular insufficiencies in the painful heel • Bilateral heel pain • Paget's disease or calcaneal fat pad atrophy • Osteomyelitis, fracture of the calcaneus, ankle inflammation • Recent infection in the treatment area, history of rheumatic diseases • Collagenosis or metabolic disorders • Immunosuppressive therapy or coagulation disturbance and/or therapy, long-term treatment with corticosteroids • Previous heel surgery • Malignant disease, diabetes mellitus, severe cardiac or respiratory disease, significant abnormalities in hepatic function • Significant abnormalities in hepatic function
Interventions	1. Corticosteroid (celestone) injection 2. Autologous conditioned plasma (ACP) injection
Outcomes	Plantar fasciitis pain/disability scale

NCT01614223 *(Continued)*

Starting date	4 June 2012
Contact information	Dianne Bryant, PhD University of Western Ontario, Canada Email: dianne.bryant@uwo.ca
Notes	Emailed authors for details. **Registered:** 04/06/2012 **Status** (16.11.2015)**:** currently recruiting

NCT01957631

Trial name or title	Steroid injections versus platelet rich plasma injections in patients with plantar fasciitis: A comparison of clinical and ultrasound findings
Methods	Randomised, parallel, single blinded
Participants	**Country:** Bahrain **Recruitment target:** 60 participants **Inclusion criteria:** • Patients aged 18 years + • Patients with plantar fasciitis for at least 6 months which has not responded to 6 weeks of conservative therapy • Patients with VAS > 5 in the morning • Patients must be able to understand the informed consent and have the ability to follow up. **Exclusion criteria:** • Patients who have had repeated corticosteroid injections within the past 3 months, or have taken a non-steroid anti inflammatory drug during the 1 week prior to receiving an intervention • BMI > 40 • Patients with a previous foot deformity • Patients who have had previous foot surgery • History of anaemia (Hb < 7) • Confirmed diagnosis of neuropathy • Patients who have the inability to follow up
Interventions	1. Corticosteroid injection (Bupivacaine and Depo Medrol) 2. Platelet rich plasma injection
Outcomes	**Primary outcome:** Pain (time frame: 6 months **Secondary outcome:** Ultrasound findings (time frame: 3 months)
Starting date	June 2013
Contact information	Aamina M Khan aaminamkhan@hotmail.com
Notes	**Registered:** 30/09/2013

NCT01957631 *(Continued)*	**Status** (16.11.2015)**:** unknown

NCT01994759	
Trial name or title	Optimal Treatment of Plantar Fasciitis: A Randomized Clinical Trial Using Physical Training, Glucocorticoid Injections or a Combination Thereof
Methods	Randomised, parallel, single blinded
Participants	**Country:** Denmark **Recruitment target:** 90 participants **Inclusion criteria:** • Pain at the medial attachment of fascia plantaris. • First step pain in the morning • Symptoms for at least 3 months. • Aged 20 years to 65 years • Ultrasound scanning at the first visit shows thickness of the fascia above 4 mm. • Patient can read and understand Danish **Exclusion criteria:** Known arthritis, inflammatory bowel disease, psoriasis or clinical signs of any of these • Leg ulcerations • Long lasting oedema of the leg and foot • Palpatory decreased pulse in the foot • Diabetes • Reduced sensibility in the foot • Infections in the foot • Daily use of pain killers • Pregnancy or planning to become pregnant • Earlier operations on the foot, that is judged to complicate training • Patient assessed not to be able to participate in the training for other reasons • Glucocorticosteroid injection to the diseased plantar fascia within the last 6 months.
Interventions	1. Glucocorticosteroid injection (Injection of 40 mg methylprednisolone) 2. Training (strengthening and stretching exercises) 3. Training and glucocorticosteroid injections.
Outcomes	**Primary outcomes:** 1. 100 mm VAS score pain at function. Average pain during everyday living. (Time frame: 6 months) 2. Foot Function Index **Secondary outcomes:** 1. 100 mm VAS score for morning pain 2. 100 mm VAS score pain at function. Average pain during everyday living. (Time frame: 3 months, 12 months, 24 months) 3. Ultrasound scanning thickness measure 4. Foot Function Index (time frame: 3 months, 12 months, 24 months)
Starting date	September 2013

NCT01994759 *(Continued)*

Contact information	Finn E Johannsen, MD Email: f.e.johannsen@dadlnet.dk
Notes	**Registered:** 10/11/2013 **Status** (16.11.2015)**:** ongoing not recruiting

NCT02982226

Trial name or title	A comparative study of injectable human amniotic allograft (ReNu™) versus corticosteroids for plantar fasciitis: A prospective, randomized, blinded study
Methods	Crossover randomised clinical trial (4 centres)
Participants	**Country:** United States **Recruitment target:** 150 **Inclusion criteria:** 1. Ages 18 to 75 inclusive 2. BMI less than 40 3. Actively practicing a contraception method, abstinent, surgically sterile, or post-menopausal (defined as no menses for a minimum of 12 months) 4. Reporting heel pain of >6 on a verbally administered 1-10 pain scale where 1 is no pain and 10 is extreme pain 5. Diagnosed with plantar fasciitis in either foot 6. Completed a minimum of two months of conservative, non-injection treatment/therapies (i.e., activity modification, icing, NSAIDs, orthotics, physical therapy, etc.) **Exclusion criteria:** • Prior surgery on the affected foot • Prior injection treatment for plantar fasciitis within the past 6 months with steroids or tissue engineered materials just in the site seeking treatment • Clinical signs and symptoms of infection of foot in question • Evidence of significant neurological disease of either foot • Non-ambulatory • Presence of comorbidities that can be confused with or can exacerbate the condition including, but not limited to the following: Calcaneal stress fracture; nerve entrapment syndrome, such as Baxter's Nerve Entrapment or Tarsal Tunnel Syndrome; plantar fascial rupture; systemic disorders associated with enthesiopathy, i.e., gout, Reiter's syndrome, rheumatoid arthritis, etc; Achilles tendonitis; fat pad atrophy; fibromyalgia; and diabetic neuropathy • Pregnant, pregnant within the past six (6) months, breast feeding and/or desire to become pregnant during the course of the study, as verified by urine pregnancy test within one week prior to injection. • Has taken NSAID medication within the past 14 days, or other pain medication in the past day • History of more than two (2) weeks treatment with immuno-suppressants, including systemic corticosteroids or cytotoxic chemotherapy within one month prior to initial screening, or has receive such medications during the screening period, or are anticipated to require such medications during the course of the study. • Taking any investigational drug(s) or therapeutic device(s) within 30 days preceding screening • History of radiation therapy of the affected foot • Known history of having Acquired Immunodeficiency Syndrome (AIDS) or HIV • Involved in a Worker's Compensation Claim of any kind

NCT02982226 *(Continued)*

	• Unable to understand the objectives of the trial • Presence of any condition(s) which, in the opinion of the investigator, would compromise the subject's ability to complete this study • Having a known history of poor adherence with medical treatment. • Express an unwillingness to receive human allograft tissue
Interventions	1. Corticosteroid injection 2. ReNu injection: ReNu is an allograft tissue composed of particularised amniotic membrane and cell from the amniotic fluid
Outcomes	**Primary outcomes:** 1. Change in AOFAS score from baseline **Secondary outcomes:** 1. Change in VAS pain score from baseline (Time frame: 6 months) 2. Change in SANE function score from baseline (Time frame: 6 months) 3. Return to normal function (Time frame: 6 months)
Starting date	October 2016
Contact information	Alan Ng Email: bigalng@aol.com
Notes	**Registered:** 29/11/2016 **Status** (November 2016)**:** study is currently recruiting

NCT03054610

Trial name or title	Therapeutic effect of botulinum toxin A for the treatment of plantar fasciitis
Methods	Parallel assignment randomised clinical trial
Participants	**Country:** Mexico **Recruitment target:** 60 **Inclusion criteria:** • Patients with chronic pain in the heel at the insertion of the plantar fascia in the posteroinferior tuberosity of the calcaneus. • Patients who agreed to be part of the study and signed informed consent. • Patients older than 18 years. • Patients with two or more weeks of evolution. **Exclusion criteria:** • Patients with another associated pathology such as knee or ankle dysfunction, osteoarthritis, rheumatoid arthritis, ankylosing spondylitis, etc. • Neurological abnormalities: mental retardation or some psychiatric abnormality. • Pregnant patients. • Previous surgery on the heel.
Interventions	1. Intralesional steroids and local anaesthetic (ropivacaine 7.5%) 2. Botulinum toxin A

NCT03054610 *(Continued)*

	3. Local anaesthetic (ropivacaine 7.5%) Stretching exercise are probably applied to all three groups.
Outcomes	**Primary outcomes:** (Time frame: 6 months) 1. Foot and Ankle Disability Index **Secondary outcomes:** (Time frame: 6 months) 1. Maryland Foot Score 2. Ankle-Hindfoot Scale 3. Visual Analogue scale (pain) 4. Ultrasound scanning thickness measure 5. Dorsiflexion
Starting date	January 2015
Contact information	Dr Carlos Acosta-Olivo, Universidad Autonoma de Nuevo Leon, Mexico Email: dr.carlosacosta@gmail.com
Notes	**Registered:** 13/02/2017 **Status** (February 2017): study currently recruiting participants

Whittaker 2017

Trial name or title	Corticosteroid injections compared to foot orthoses for plantar heel pain
Methods	Randomised via remote telephone service using adaptive stratification (i.e. minimisation) and permuted block randomisation with uneven random block sizes
Participants	**Country:** Australia **Recruitment target:** 100 participants **Inclusion criteria:** • Aged 18 years and over • Clinical diagnosis of plantar heel pain in accordance with the clinical practice guidelines linked to the International Classification of Function, Disability and Health from the Orthopaedic Section of the American Physical Therapy Association, includes: pain the plantar medial heel region that is aggravated by weightbearing activities or worse in the morning and/or after a period of rest; pain upon palpation of them medial calcaneal tubercle • Duration of plantar heel pain for at least 4 weeks • Average pain over the last seven days as at least 30 mm on a 100 mm VAS • Willing to regularly wear foot orthoses for the duration of the trial • Willing and have no contraindications to receive a corticosteroid injection in the plantar heel • Willing not to implement any other forms of treatment during the trial (with the exception of paracetamol 4 g/day) **Exclusion criteria:** • Unable to understand the English language • Unable to walk household distances unaided • Treatment for PHP in the last four weeks • Corticosteroid injection in the previous six months • History of surgery to the heel

Whittaker 2017 *(Continued)*	• Systemic medical condition such as a connective tissue disease, degenerative neurological disorder or inflammatory disorder • Unwilling to wear footwear that can accommodate foot orthoses • Have regularly worn foot orthoses within the previous six months
Interventions	1. Single corticosteroid injection: 1 mL betamethasone (Celestone Chondrose) mixed with 1 mL bupivacaine (Marcaine 0.5%) injected peri-fascially by a radiologist under ultrasound guidance. 2. Prefabricated foot orthoses
Outcomes	Follow-up: 4, 8 and 12 weeks **Primary outcome** Foot pain domain of the Foot Health Status Questionnaire (at 4 and 12 weeks) **Secondary outcomes** 1. Severity of 'first step' pain and average pain over the last seven days, measured on a 100 mm VAS 2. Foot function measured on the foot function domain of the FHSQ 3. Generic health-related quality of life will be measured with the EQ-5D questionnaire and Short Form 36 version 2 (SF-36) 4. Self-reported physical activity measured using the 7-day Physical Activity Recall Questionnaire 5. Fear-avoidance beliefs measured using the Fear-avoidance Components Scale (FACS) 6. Global perceived rating of change measured with a 15-point Likert scale 7. Days off work lost over the previous week due to heel pain 8. Sessions of sports or exercise lost over the previous week 9. Use of co-interventions for foot pain 10. Plantar fascia thickness measured sonographically
Starting date	28/04/2016
Contact information	Glen Whittaker Email: g.whittaker@latrobe.edu.au Discipline of Podiatry, School of Allied Health, La Trobe University, Bundoora, Victoria, 3086, Australia
Notes	There is a published protocol for this study.

Abbreviations:

DATA AND ANALYSES

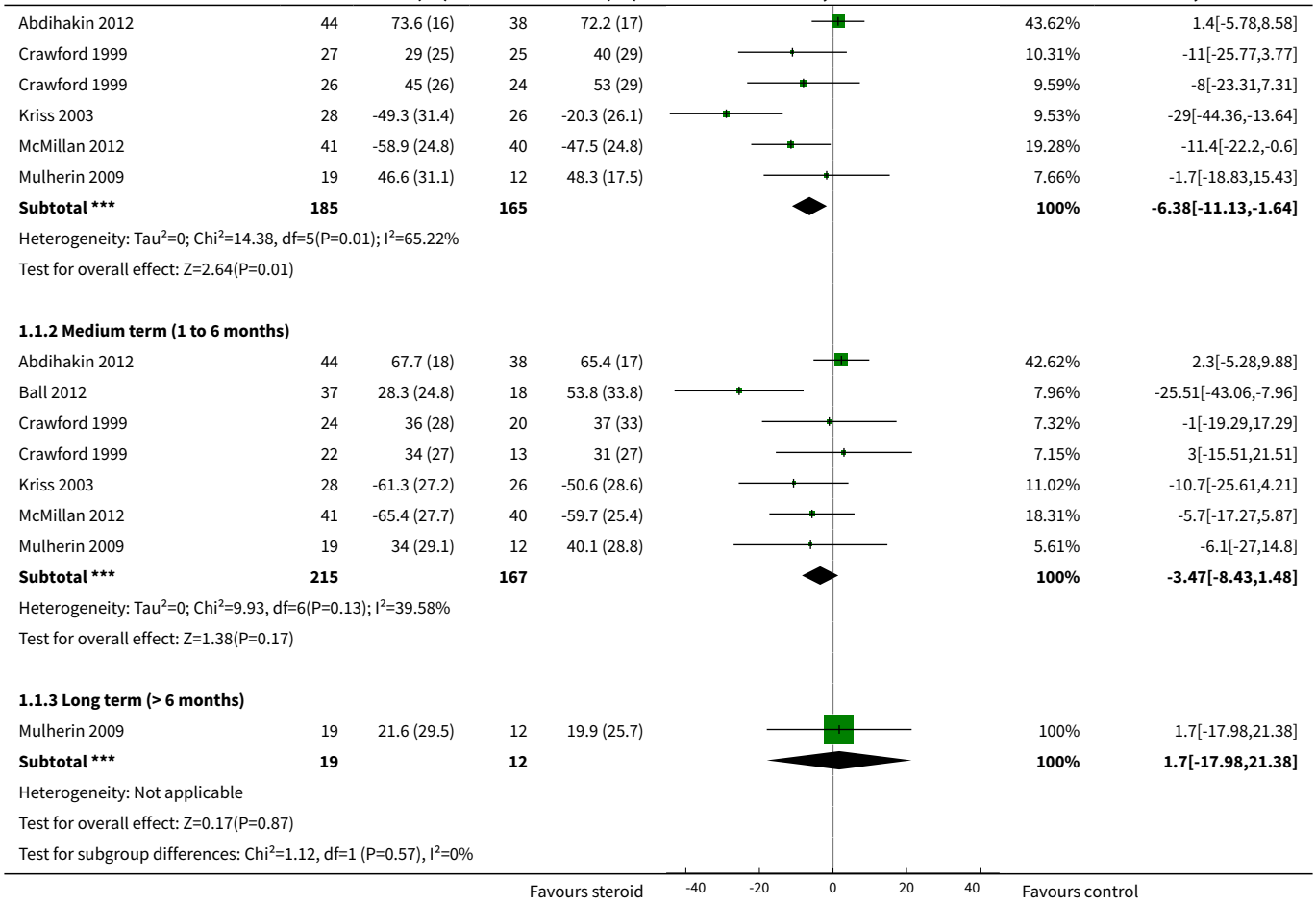
Comparison 1. Local steroid injection versus placebo or no treatment control

Outcome or subgroup title	No. of studies	No. of participants	Statistical method	Effect size
1 Heel pain (VAS: 0 to 100; worst pain) or (Foot pain of FHSQ: 0 to 100; no pain)	6		Mean Difference (IV, Fixed, 95% CI)	Subtotals only
1.1 Short term (< 1 month)	5	350	Mean Difference (IV, Fixed, 95% CI)	-6.38 [-11.13, -1.64]

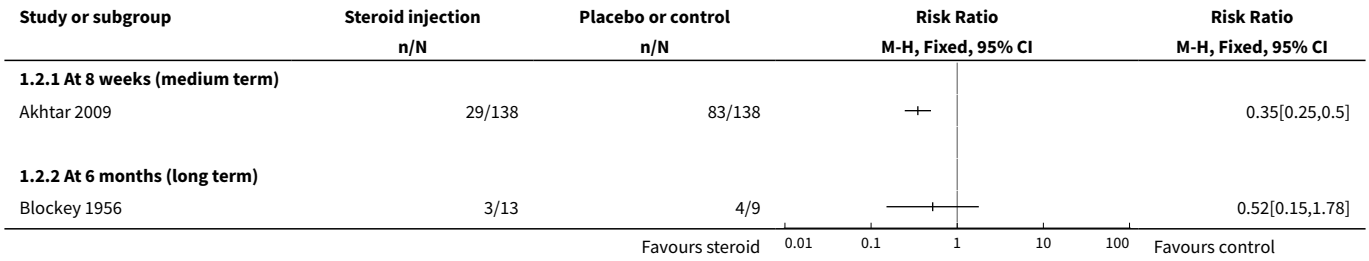
Outcome or subgroup title	No. of studies	No. of participants	Statistical method	Effect size
1.2 Medium term (1 to 6 months)	6	382	Mean Difference (IV, Fixed, 95% CI)	-3.47 [-8.43, 1.48]
1.3 Long term (> 6 months)	1	31	Mean Difference (IV, Fixed, 95% CI)	1.70 [-17.98, 21.38]
2 Heel pain at follow-up	2		Risk Ratio (M-H, Fixed, 95% CI)	Totals not selected
2.1 At 8 weeks (medium term)	1		Risk Ratio (M-H, Fixed, 95% CI)	0.0 [0.0, 0.0]
2.2 At 6 months (long term)	1		Risk Ratio (M-H, Fixed, 95% CI)	0.0 [0.0, 0.0]
3 First step pain (VAS; 0 to 100; higher scores mean worst pain)	1		Mean Difference (IV, Fixed, 95% CI)	Totals not selected
3.1 Short term (< 1month)	1		Mean Difference (IV, Fixed, 95% CI)	0.0 [0.0, 0.0]
3.2 Medium term 1 to 6month	1		Mean Difference (IV, Fixed, 95% CI)	0.0 [0.0, 0.0]
4 First step pain: VAS 0 to 100; higher scores = worse pain			Other data	No numeric data
5 Function: Foot Function Index (0 to 100; worst outcome)	1		Mean Difference (IV, Fixed, 95% CI)	Totals not selected
5.1 Short term	1		Mean Difference (IV, Fixed, 95% CI)	0.0 [0.0, 0.0]
5.2 Medium term	1		Mean Difference (IV, Fixed, 95% CI)	0.0 [0.0, 0.0]
6 Function: FHSQ 0 to 100; higher scores = better function			Other data	No numeric data
7 Serious adverse events	4	219	Risk Ratio (M-H, Fixed, 95% CI)	0.0 [0.0, 0.0]
8 Treatment failure and/or recurrence	3	363	Risk Ratio (M-H, Fixed, 95% CI)	0.35 [0.26, 0.48]

Analysis 1.1. Comparison 1 Local steroid injection versus placebo or no treatment control, Outcome 1 Heel pain (VAS: 0 to 100; worst pain) or (Foot pain of FHSQ: 0 to 100; no pain).

Study or subgroup	Steroid injection N	Steroid injection Mean(SD)	Placebo or control N	Placebo or control Mean(SD)	Mean Difference Fixed, 95% CI	Weight	Mean Difference Fixed, 95% CI
1.1.1 Short term (< 1 month)							

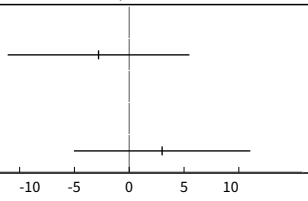


Analysis 1.2. Comparison 1 Local steroid injection versus placebo or no treatment control, Outcome 2 Heel pain at follow-up.



Analysis 1.3. Comparison 1 Local steroid injection versus placebo or no treatment control, Outcome 3 First step pain (VAS; 0 to 100; higher scores mean worst pain).

Study or subgroup	Steroid injection N	Steroid injection Mean(SD)	Placebo or control N	Placebo or control Mean(SD)	Mean Difference Fixed, 95% CI	Mean Difference Fixed, 95% CI
1.3.1 Short term (< 1month)						
Abdihakin 2012	44	61.5 (18)	38	64.3 (20)		-2.8[-11.09,5.49]
1.3.2 Medium term 1 to 6month						
Abdihakin 2012	44	57.8 (18)	38	54.8 (19)		3[-5.05,11.05]

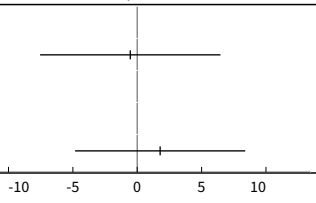


Analysis 1.4. Comparison 1 Local steroid injection versus placebo or no treatment control, Outcome 4 First step pain: VAS 0 to 100; higher scores = worse pain.

Study	Follow-up	First step pain: VAS 0 to 100; higher scores = worse pain Mean difference (95% CI) Steroid - placebo (N = 81)	P value
McMillan 2012	4 weeks (short term)	-11.37 (-20.94 to -1.80)	P = 0.02
McMillan 2012	12 weeks (medium term)	-7.34 (-19.32 to 4.63)	Not significant

Analysis 1.5. Comparison 1 Local steroid injection versus placebo or no treatment control, Outcome 5 Function: Foot Function Index (0 to 100; worst outcome).

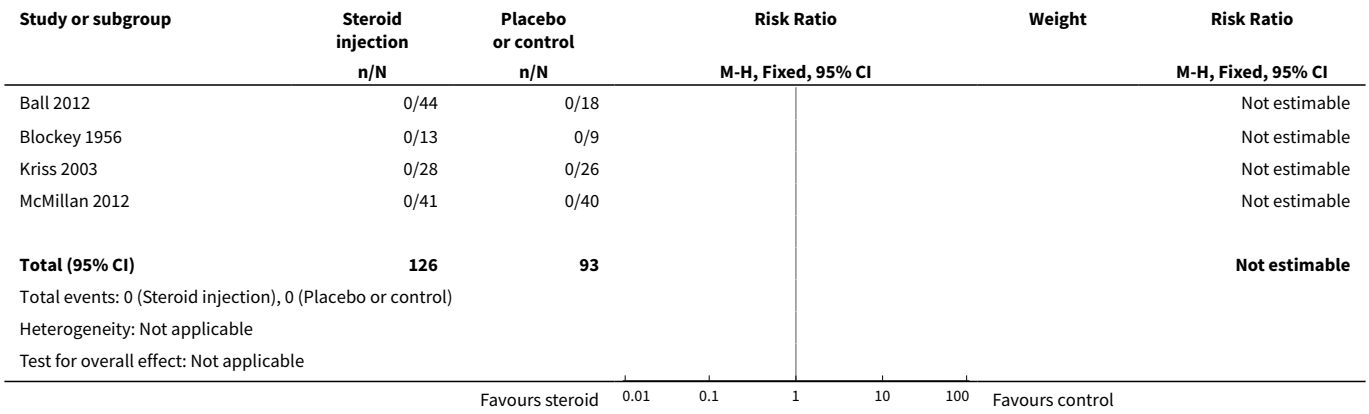
Study or subgroup	Steroid injection N	Steroid injection Mean(SD)	Placebo or control N	Placebo or control Mean(SD)	Mean Difference Fixed, 95% CI	Mean Difference Fixed, 95% CI
1.5.1 Short term						
Abdihakin 2012	44	43.3 (17.6)	38	43.8 (14.7)		-0.54[-7.55,6.47]
1.5.2 Medium term						
Abdihakin 2012	44	42.3 (17.2)	38	40.5 (13.3)		1.78[-4.83,8.39]



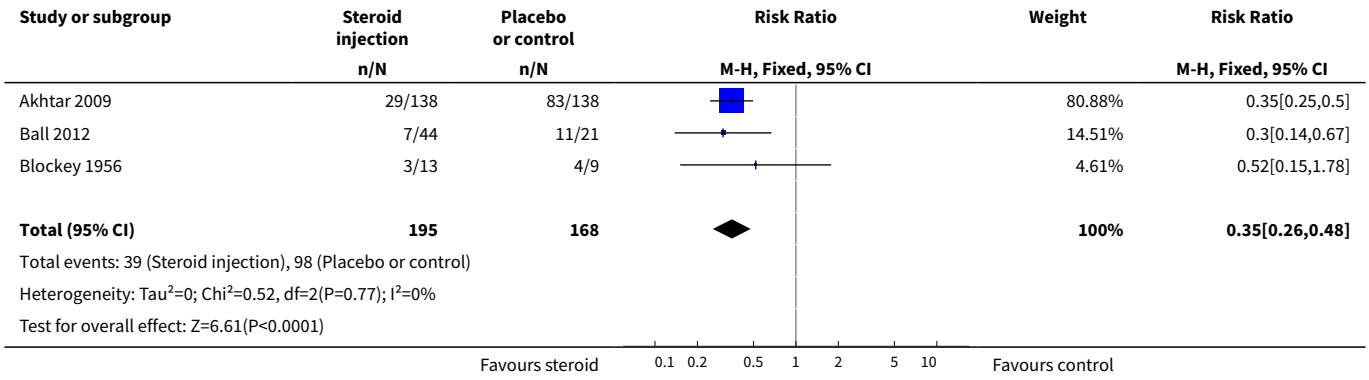
Analysis 1.6. Comparison 1 Local steroid injection versus placebo or no treatment control, Outcome 6 Function: FHSQ 0 to 100; higher scores = better function.

Study	Follow-up	Function: FHSQ 0 to 100; higher scores = better function Mean difference (95% CI) Steroid - placebo N = 81	P value
McMillan 2012	4 weeks (short term)	6.6 points (-2.2 to 15.4)	Not significant
McMillan 2012	12 weeks (medium term)	4.1 points (-3.8 to 11.9)	Not significant

Analysis 1.7. Comparison 1 Local steroid injection versus placebo or no treatment control, Outcome 7 Serious adverse events.



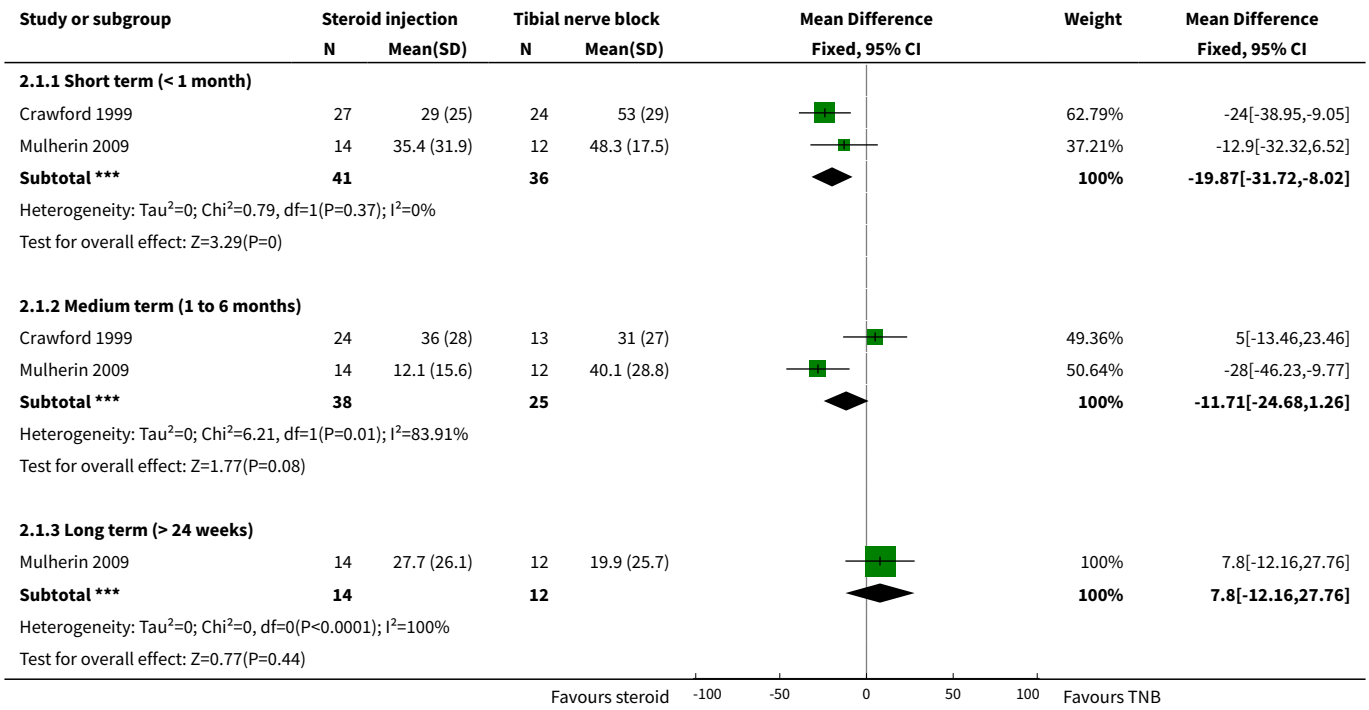
Analysis 1.8. Comparison 1 Local steroid injection versus placebo or no treatment control, Outcome 8 Treatment failure and/or recurrence.



Comparison 2. Local steroid injection versus tibial nerve block (TNB)

Outcome or subgroup title	No. of studies	No. of participants	Statistical method	Effect size
1 Heel pain (VAS: 0 to 100; worst pain)	2		Mean Difference (IV, Fixed, 95% CI)	Subtotals only
1.1 Short term (< 1 month)	2	77	Mean Difference (IV, Fixed, 95% CI)	-19.87 [-31.72, -8.02]
1.2 Medium term (1 to 6 months)	2	63	Mean Difference (IV, Fixed, 95% CI)	-11.71 [-24.68, 1.26]
1.3 Long term (> 24 weeks)	1	26	Mean Difference (IV, Fixed, 95% CI)	7.80 [-12.16, 27.76]

Analysis 2.1. Comparison 2 Local steroid injection versus tibial nerve block (TNB), Outcome 1 Heel pain (VAS: 0 to 100; worst pain).



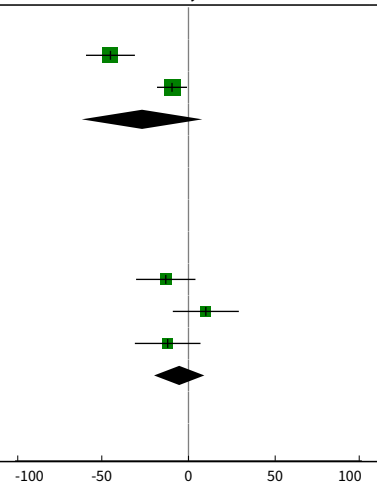
Comparison 3. Local steroid injection versus orthoses

Outcome or subgroup title	No. of studies	No. of participants	Statistical method	Effect size
1 Heel pain (VAS: 0 to 100; worst pain)	3		Mean Difference (IV, Random, 95% CI)	Subtotals only
1.1 Short term (< 1 month)	2	88	Mean Difference (IV, Random, 95% CI)	-26.80 [-61.57, 7.98]
1.2 Medium term (1 to 6 months)	2	133	Mean Difference (IV, Random, 95% CI)	-5.35 [-19.86, 9.16]
2 FAOS (foot and ankle outcome score): subscales (0 to 100; best outcome)	1		Mean Difference (IV, Fixed, 95% CI)	Totals not selected
2.1 Activities of daily living	1		Mean Difference (IV, Fixed, 95% CI)	0.0 [0.0, 0.0]
2.2 Sport and recreation function	1		Mean Difference (IV, Fixed, 95% CI)	0.0 [0.0, 0.0]
2.3 Foot- and ankle-related quality of life	1		Mean Difference (IV, Fixed, 95% CI)	0.0 [0.0, 0.0]

Outcome or subgroup title	No. of studies	No. of participants	Statistical method	Effect size
3 Poor final assessment of outcome (pain and activity) at 12 weeks	1		Risk Ratio (M-H, Fixed, 95% CI)	Totals not selected
4 Serious and other adverse events	1		Risk Ratio (M-H, Fixed, 95% CI)	Subtotals only
5 Treatment failure	1		Risk Ratio (M-H, Fixed, 95% CI)	Totals not selected

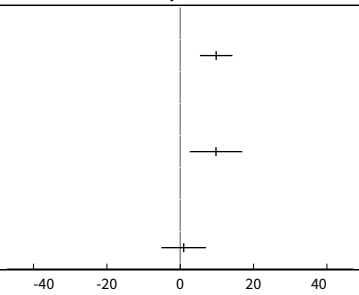
Analysis 3.1. Comparison 3 Local steroid injection versus orthoses, Outcome 1 Heel pain (VAS: 0 to 100; worst pain).

Study or subgroup	Steroid injection N	Steroid injection Mean(SD)	Orthoses N	Orthoses Mean(SD)	Mean Difference Random, 95% CI	Weight	Mean Difference Random, 95% CI
3.1.1 Short term (< 1 month)							
Kriss 2003	22	-65.3 (23.7)	26	-20.3 (26.1)		48.72%	-45[-59.1,-30.9]
Yucel 2013	20	37 (14.5)	20	46.5 (13.4)		51.28%	-9.5[-18.15,-0.85]
Subtotal ***	**42**		**46**			**100%**	**-26.8[-61.57,7.98]**
Heterogeneity: Tau^2=594.51; Chi^2=17.69, df=1(P<0.0001); I^2=94.35%							
Test for overall effect: Z=1.51(P=0.13)							
3.1.2 Medium term (1 to 6 months)							
Kriss 2003	22	-63.7 (31.4)	26	-50.6 (28.6)		35.78%	-13.1[-30.22,4.02]
Lynch 1998	15	-34 (30)	28	-44 (31)		32.01%	10[-9.04,29.04]
Lynch 1998	16	-34 (30)	26	-22 (31)		32.22%	-12[-30.92,6.92]
Subtotal ***	**53**		**80**			**100%**	**-5.35[-19.86,9.16]**
Heterogeneity: Tau^2=76.91; Chi^2=3.76, df=2(P=0.15); I^2=46.76%							
Test for overall effect: Z=0.72(P=0.47)							



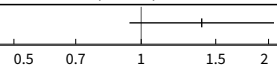
Analysis 3.2. Comparison 3 Local steroid injection versus orthoses, Outcome 2 FAOS (foot and ankle outcome score): subscales (0 to 100; best outcome).

Study or subgroup	Steroid injection N	Steroid injection Mean(SD)	Orthoses N	Orthoses Mean(SD)	Mean Difference Fixed, 95% CI	Mean Difference Fixed, 95% CI
3.2.1 Activities of daily living						
Yucel 2013	20	74.6 (7.9)	20	64.8 (6.3)		9.8[5.37,14.23]
3.2.2 Sport and recreation function						
Yucel 2013	20	70 (12.1)	20	60.3 (10.9)		9.75[2.59,16.91]
3.2.3 Foot- and ankle-related quality of life						
Yucel 2013	20	67 (7.7)	20	66.1 (11.6)		0.95[-5.13,7.03]



Analysis 3.3. Comparison 3 Local steroid injection versus orthoses, Outcome 3 Poor final assessment of outcome (pain and activity) at 12 weeks.

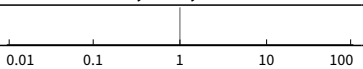
Study or subgroup	Steroid injection n/N	Orthoses n/N	Risk Ratio M-H, Fixed, 95% CI	Risk Ratio M-H, Fixed, 95% CI
Lynch 1998	18/27	24/50		1.39[0.94,2.06]



Favours steroid — Favours orthosis

Analysis 3.4. Comparison 3 Local steroid injection versus orthoses, Outcome 4 Serious and other adverse events.

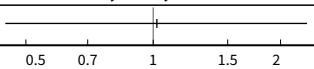
Study or subgroup	Steroid injection n/N	Orthoses n/N	Risk Ratio M-H, Fixed, 95% CI	Weight	Risk Ratio M-H, Fixed, 95% CI
Yucel 2013	0/20	0/20			Not estimable



Favours steroid — Favours orthosis

Analysis 3.5. Comparison 3 Local steroid injection versus orthoses, Outcome 5 Treatment failure.

Study or subgroup	Steroid injection n/N	Orthoses n/N	Risk Ratio M-H, Fixed, 95% CI	Risk Ratio M-H, Fixed, 95% CI
Lynch 1998	7/31	12/54		1.02[0.45,2.31]



Favours steroid — Favours orthosis

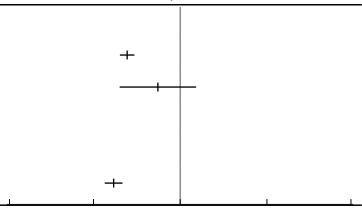
Comparison 4. Local steroid injection versus oral NSAIDs

Outcome or subgroup title	No. of studies	No. of participants	Statistical method	Effect size
1 Heel pain (VAS)	2		Mean Difference (IV, Fixed, 95% CI)	Totals not selected
1.1 Short term	2		Mean Difference (IV, Fixed, 95% CI)	0.0 [0.0, 0.0]
1.2 Medium term	1		Mean Difference (IV, Fixed, 95% CI)	0.0 [0.0, 0.0]
2 Adverse events	1		Risk Ratio (M-H, Fixed, 95% CI)	Totals not selected
2.1 Plantar fascia rupture	1		Risk Ratio (M-H, Fixed, 95% CI)	0.0 [0.0, 0.0]
2.2 Injection site infection	1		Risk Ratio (M-H, Fixed, 95% CI)	0.0 [0.0, 0.0]
2.3 Injection site erythema	1		Risk Ratio (M-H, Fixed, 95% CI)	0.0 [0.0, 0.0]
2.4 Gastritis	1		Risk Ratio (M-H, Fixed, 95% CI)	0.0 [0.0, 0.0]
2.5 Esophagitis	1		Risk Ratio (M-H, Fixed, 95% CI)	0.0 [0.0, 0.0]
2.6 Pruritus	1		Risk Ratio (M-H, Fixed, 95% CI)	0.0 [0.0, 0.0]
2.7 Feeling of bloating	1		Risk Ratio (M-H, Fixed, 95% CI)	0.0 [0.0, 0.0]

Outcome or subgroup title	No. of studies	No. of participants	Statistical method	Effect size
3 Recurrence at 2 months	1		Risk Ratio (M-H, Fixed, 95% CI)	Totals not selected

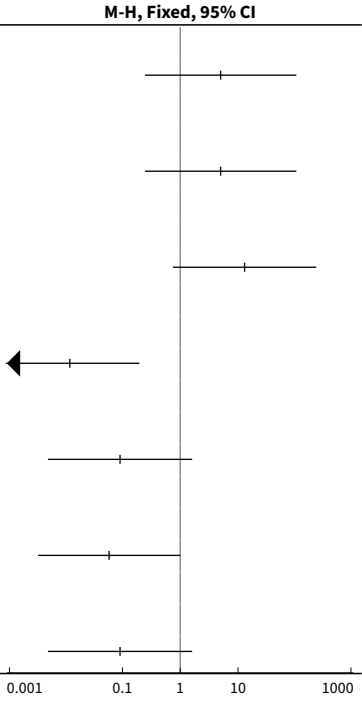
Analysis 4.1. Comparison 4 Local steroid injection versus oral NSAIDs, Outcome 1 Heel pain (VAS).

Study or subgroup	Steroid injection N	Steroid injection Mean(SD)	Oral NSAID N	Oral NSAID Mean(SD)	Mean Difference Fixed, 95% CI	Mean Difference Fixed, 95% CI
4.1.1 Short term						
Biswas 2011	60	10.9 (11.6)	60	41.5 (11.8)		-30.6[-34.79,-26.41]
Hunt 2004	19	36.6 (24.2)	14	49.5 (36.6)		-12.89[-34.94,9.16]
4.1.2 Medium term						
Biswas 2011	60	19.2 (12.2)	60	57.6 (16.2)		-38.4[-43.53,-33.27]



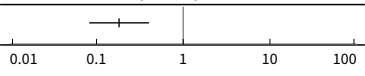
Analysis 4.2. Comparison 4 Local steroid injection versus oral NSAIDs, Outcome 2 Adverse events.

Study or subgroup	Steroid injection n/N	Oral NSAID n/N	Risk Ratio M-H, Fixed, 95% CI	Risk Ratio M-H, Fixed, 95% CI
4.2.1 Plantar fascia rupture				
Biswas 2011	2/60	0/60		5[0.25,102]
4.2.2 Injection site infection				
Biswas 2011	2/60	0/60		5[0.25,102]
4.2.3 Injection site erythema				
Biswas 2011	6/60	0/60		13[0.75,225.75]
4.2.4 Gastritis				
Biswas 2011	0/60	40/60		0.01[0,0.2]
4.2.5 Esophagitis				
Biswas 2011	0/60	5/60		0.09[0.01,1.61]
4.2.6 Pruritus				
Biswas 2011	0/60	8/60		0.06[0,1]
4.2.7 Feeling of bloating				
Biswas 2011	0/60	5/60		0.09[0.01,1.61]



Analysis 4.3. Comparison 4 Local steroid injection versus oral NSAIDs, Outcome 3 Recurrence at 2 months.

Study or subgroup	Steroid injection n/N	Oral NSAID n/N	Risk Ratio M-H, Fixed, 95% CI	Risk Ratio M-H, Fixed, 95% CI
Biswas 2011	6/60	33/60		0.18[0.08,0.4]

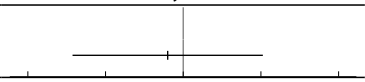


Comparison 5. Local steroid injection versus intensive physiotherapy

Outcome or subgroup title	No. of studies	No. of participants	Statistical method	Effect size
1 Heel pain (VAS: 0 to 100; worst pain)	1		Mean Difference (IV, Fixed, 95% CI)	Totals not selected
1.1 Medium term (12 weeks)	1		Mean Difference (IV, Fixed, 95% CI)	0.0 [0.0, 0.0]
2 Function and pain (Foot and ankle disability index: 0 to 100; best outcome)	1		Mean Difference (IV, Fixed, 95% CI)	Totals not selected
2.1 Medium term (12 weeks)	1		Mean Difference (IV, Fixed, 95% CI)	0.0 [0.0, 0.0]

Analysis 5.1. Comparison 5 Local steroid injection versus intensive physiotherapy, Outcome 1 Heel pain (VAS: 0 to 100; worst pain).

Study or subgroup	Steroid injection N	Steroid injection Mean(SD)	Intensive physiotherapy N	Intensive physiotherapy Mean(SD)	Mean Difference Fixed, 95% CI	Mean Difference Fixed, 95% CI
5.1.1 Medium term (12 weeks)						
Ryan 2014	28	29.2 (21.2)	28	31.2 (25.4)		-2[-14.25,10.25]



Analysis 5.2. Comparison 5 Local steroid injection versus intensive physiotherapy, Outcome 2 Function and pain (Foot and ankle disability index: 0 to 100; best outcome).

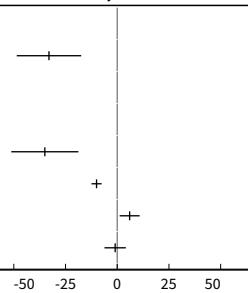
Study or subgroup	Steroid injection N	Steroid injection Mean(SD)	Intensive physiotherapy N	Intensive physiotherapy Mean(SD)	Mean Difference Fixed, 95% CI	Mean Difference Fixed, 95% CI
5.2.1 Medium term (12 weeks)						
Ryan 2014	28	84 (15.4)	28	78.7 (21.2)		5.3[-4.39,14.99]

Comparison 6. Local steroid injection versus extracorporeal shock wave therapy (ESWT)

Outcome or subgroup title	No. of studies	No. of participants	Statistical method	Effect size
1 Heel pain: VAS (higher score = worse pain)	3		Mean Difference (IV, Fixed, 95% CI)	Totals not selected
1.1 Short term	1		Mean Difference (IV, Fixed, 95% CI)	0.0 [0.0, 0.0]
1.2 Medium term	3		Mean Difference (IV, Fixed, 95% CI)	0.0 [0.0, 0.0]
2 Heel pain: VAS (1 to 100: higher score = worse pain)			Other data	No numeric data
3 Pain and function: Mayo CSS (0 to 100: higher score = better function)	1		Mean Difference (IV, Fixed, 95% CI)	Totals not selected
3.1 Medium term	1		Mean Difference (IV, Fixed, 95% CI)	0.0 [0.0, 0.0]
4 Serious and other adverse events	4		Risk Ratio (M-H, Fixed, 95% CI)	Subtotals only
4.1 Serious events	4	305	Risk Ratio (M-H, Fixed, 95% CI)	0.11 [0.01, 1.93]
4.2 Other events	3	245	Risk Ratio (M-H, Fixed, 95% CI)	1.37 [0.58, 3.20]
5 Treatment failure (no response)	5		Risk Ratio (M-H, Random, 95% CI)	Subtotals only
5.1 Non-responsive	4	313	Risk Ratio (M-H, Random, 95% CI)	0.67 [0.24, 1.89]
5.2 Recurrence or non-responsive	2	128	Risk Ratio (M-H, Random, 95% CI)	0.57 [0.37, 0.86]

Analysis 6.1. Comparison 6 Local steroid injection versus extracorporeal shock wave therapy (ESWT), Outcome 1 Heel pain: VAS (higher score = worse pain).

Study or subgroup	Steroid injection N	Steroid injection Mean(SD)	ESWT N	ESWT Mean(SD)	Mean Difference Fixed, 95% CI	Mean Difference Fixed, 95% CI
6.1.1 Short term						
Mardani-Kivi 2015	34	23 (32)	33	56 (33)		-33[-48.57,-17.43]
6.1.2 Medium term						
Mardani-Kivi 2015	34	34 (37)	34	69 (31)		-35[-51.23,-18.77]
Sorrentino 2008	16	30 (4)	16	40 (3)		-10[-12.45,-7.55]
Sorrentino 2008	14	38 (6)	14	32 (7)		6[1.17,10.83]
Yucel 2010	33	11 (9)	27	12 (11)		-1[-6.16,4.16]

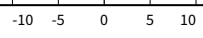


Analysis 6.2. Comparison 6 Local steroid injection versus extracorporeal shock wave therapy (ESWT), Outcome 2 Heel pain: VAS (1 to 100: higher score = worse pain).

Study	Time point	Heel pain: VAS (1 to 100: higher score = worse pain)			
		Steroid (N = 64) Mean	Steroid Range	ESWT (N = 61) Mean	ESWT Range
Porter 2005	Medium term (3 months)	14.8	0 to 70	36.9	0 to 80
Porter 2005	Long term (12 months)	8.4	0 to 7	8.4	0 to 40

Analysis 6.3. Comparison 6 Local steroid injection versus extracorporeal shock wave therapy (ESWT), Outcome 3 Pain and function: Mayo CSS (0 to 100: higher score = better function).

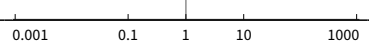
Study or subgroup	Steroid injection		ESWT		Mean Difference	Mean Difference
	N	Mean(SD)	N	Mean(SD)	Fixed, 95% CI	Fixed, 95% CI
6.3.1 Medium term						
Saber 2012	30	84 (6.6)	30	85.8 (6.8)		-1.83[-5.23,1.57]



Favours ESWT | Favours steroid

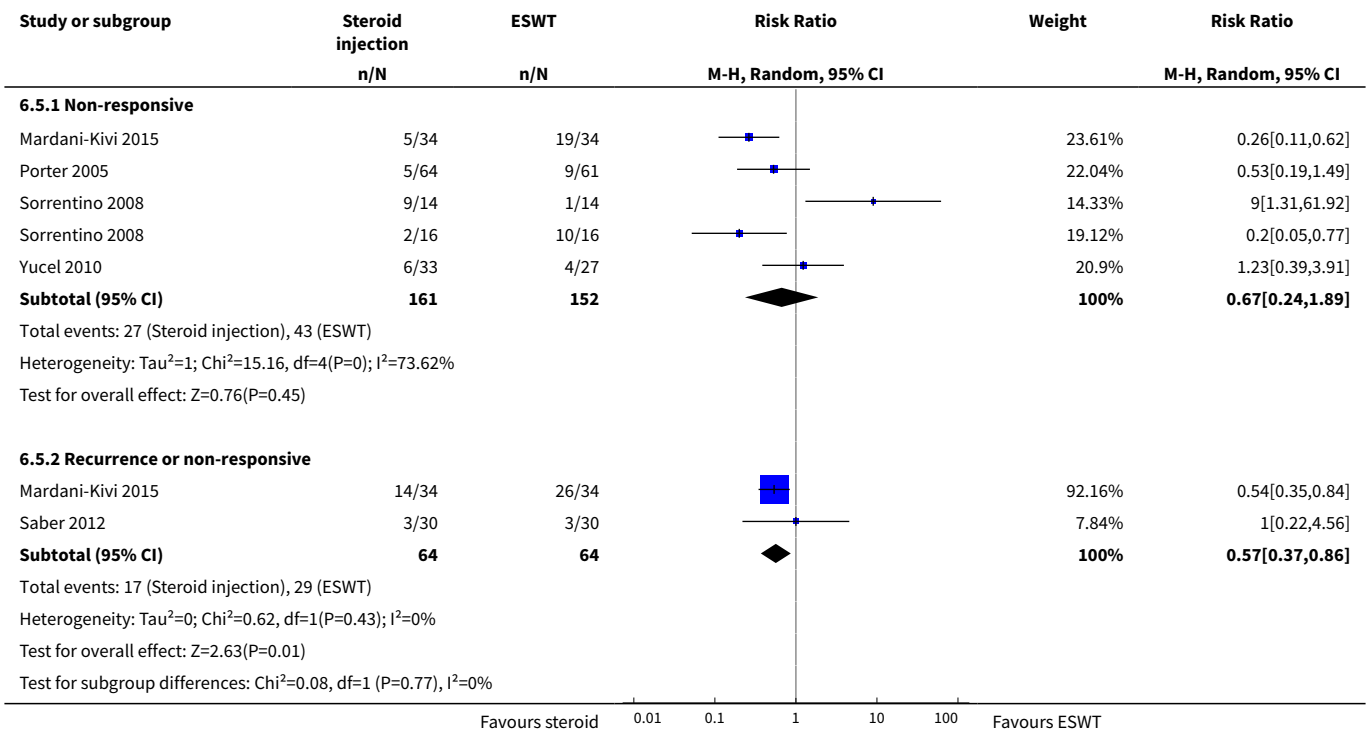
Analysis 6.4. Comparison 6 Local steroid injection versus extracorporeal shock wave therapy (ESWT), Outcome 4 Serious and other adverse events.

Study or subgroup	Steroid injection n/N	ESWT n/N	Risk Ratio M-H, Fixed, 95% CI	Weight	Risk Ratio M-H, Fixed, 95% CI
6.4.1 Serious events					
Porter 2005	0/64	4/61		100%	0.11[0.01,1.93]
Saber 2012	0/30	0/30			Not estimable
Sorrentino 2008	0/30	0/30			Not estimable
Yucel 2010	0/33	0/27			Not estimable
Subtotal (95% CI)	**157**	**148**		**100%**	**0.11[0.01,1.93]**
Total events: 0 (Steroid injection), 4 (ESWT)					
Heterogeneity: Not applicable					
Test for overall effect: Z=1.52(P=0.13)					
6.4.2 Other events					
Porter 2005	8/64	6/61		73.63%	1.27[0.47,3.45]
Saber 2012	0/30	0/30			Not estimable
Yucel 2010	4/33	2/27		26.37%	1.64[0.32,8.26]
Subtotal (95% CI)	**127**	**118**		**100%**	**1.37[0.58,3.2]**
Total events: 12 (Steroid injection), 8 (ESWT)					
Heterogeneity: Tau^2=0; Chi^2=0.07, df=1(P=0.79); I^2=0%					
Test for overall effect: Z=0.72(P=0.47)					



Favours steroid | Favours ESWT

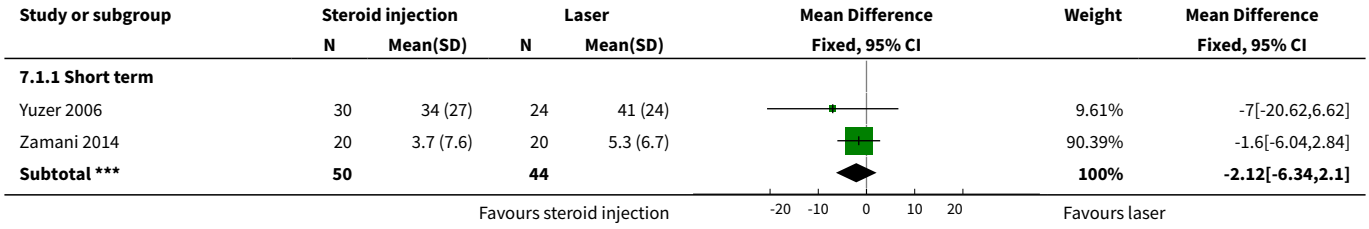
Analysis 6.5. Comparison 6 Local steroid injection versus extracorporeal shock wave therapy (ESWT), Outcome 5 Treatment failure (no response).

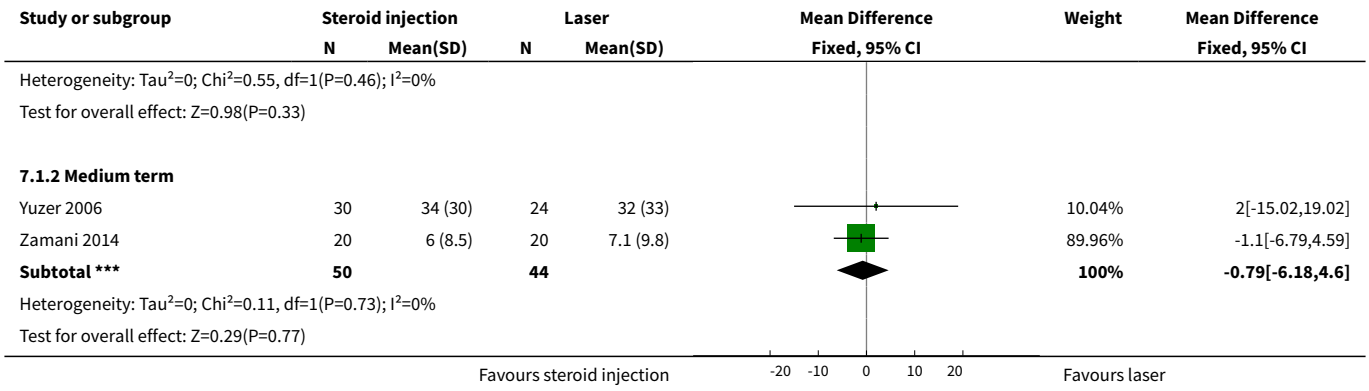


Comparison 7. Steroid injection versus laser therapy

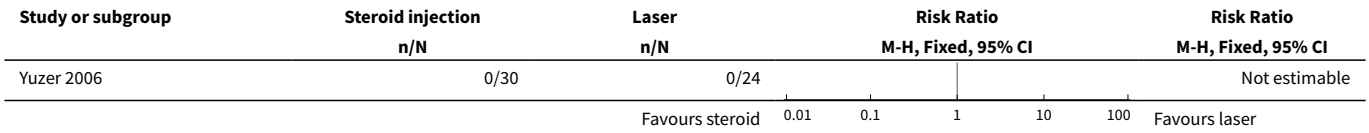
Outcome or subgroup title	No. of studies	No. of participants	Statistical method	Effect size
1 Heel pain (VAS 0 to 100 mm: worst pain)	2		Mean Difference (IV, Fixed, 95% CI)	Subtotals only
1.1 Short term	2	94	Mean Difference (IV, Fixed, 95% CI)	-2.12 [-6.34, 2.10]
1.2 Medium term	2	94	Mean Difference (IV, Fixed, 95% CI)	-0.79 [-6.18, 4.60]
2 Adverse events	1		Risk Ratio (M-H, Fixed, 95% CI)	Totals not selected

Analysis 7.1. Comparison 7 Steroid injection versus laser therapy, Outcome 1 Heel pain (VAS 0 to 100 mm: worst pain).





Analysis 7.2. Comparison 7 Steroid injection versus laser therapy, Outcome 2 Adverse events.



Comparison 8. Steroid injection versus radiation

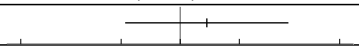
Outcome or subgroup title	No. of studies	No. of participants	Statistical method	Effect size
1 Pain and Function			Other data	No numeric data
1.1 Pain (VAS: 0 to 100; worst pain)			Other data	No numeric data
1.2 Function (5 level function: 0 to 100; best function)			Other data	No numeric data
2 Adverse events	1		Risk Ratio (M-H, Fixed, 95% CI)	Totals not selected

Analysis 8.1. Comparison 8 Steroid injection versus radiation, Outcome 1 Pain and Function.

Study	Follow-up	Pain and Function: Steroid injection Mean (range); N	Pain and Function: Radiation therapy Mean (range); N
Pain (VAS: 0 to 100; worst pain)			
Canyilmaz 2015	3 months	46 (0 to 100); 64	28 (0 to 90); 60
Canyilmaz 2015	6 months	46 (0 to 100); 64	27 (0 to 100); 60
Function (5 level function: 0 to 100; best function)			
Canyilmaz 2015	3 months	60 (6 to 100); 64	78.3 (30 to 100); 60
Canyilmaz 2015	6 months	59 (0 to 100); 64	78.7 (35 to 100); 60

Analysis 8.2. Comparison 8 Steroid injection versus radiation, Outcome 2 Adverse events.

Study or subgroup	Steroid injection n/N	Radiation therapy n/N	Risk Ratio M-H, Fixed, 95% CI	Risk Ratio M-H, Fixed, 95% CI
Canyilmaz 2015	1/64	0/60		2.82[0.12,67.8]



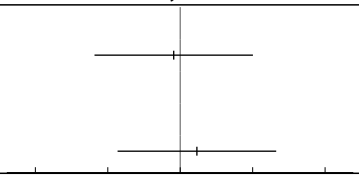
Favours steroid injection | Favours radiation therapy

Comparison 9. Steriod injection versus NSAID injection

Outcome or subgroup title	No. of studies	No. of participants	Statistical method	Effect size
1 Heel pain (VAS: 0 to 100: worst pain)	1		Mean Difference (IV, Fixed, 95% CI)	Totals not selected
1.1 At 6 months (medium term)	1		Mean Difference (IV, Fixed, 95% CI)	0.0 [0.0, 0.0]
1.2 At 12 months (long term)	1		Mean Difference (IV, Fixed, 95% CI)	0.0 [0.0, 0.0]
2 Adverse events and pain limited activity	1		Risk Ratio (M-H, Fixed, 95% CI)	Totals not selected
2.1 Adverse events	1		Risk Ratio (M-H, Fixed, 95% CI)	0.0 [0.0, 0.0]
2.2 Pain limiting activity	1		Risk Ratio (M-H, Fixed, 95% CI)	0.0 [0.0, 0.0]

Analysis 9.1. Comparison 9 Steriod injection versus NSAID injection, Outcome 1 Heel pain (VAS: 0 to 100: worst pain).

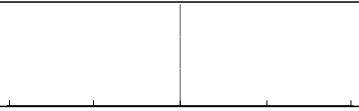
Study or subgroup	Steroid injection N	Steroid injection Mean(SD)	NSAID injection N	NSAID injection Mean(SD)	Mean Difference Fixed, 95% CI	Mean Difference Fixed, 95% CI
9.1.1 At 6 months (medium term)						
Guner 2013	30	29.7 (24.1)	31	30.6 (19.1)		-0.9[-11.84,10.04]
9.1.2 At 12 months (long term)						
Guner 2013	30	31.7 (23.1)	31	29.4 (20.4)		2.3[-8.65,13.25]



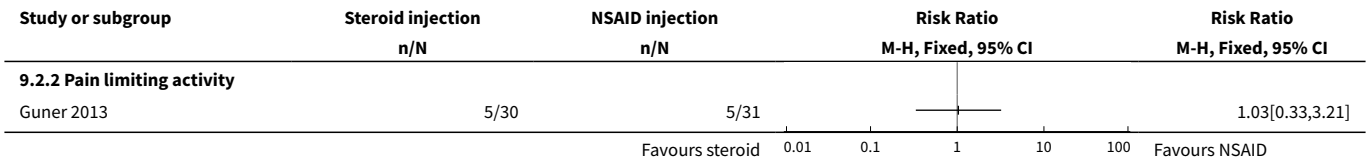
Favours steroid | Favours NSAID

Analysis 9.2. Comparison 9 Steriod injection versus NSAID injection, Outcome 2 Adverse events and pain limited activity.

Study or subgroup	Steroid injection n/N	NSAID injection n/N	Risk Ratio M-H, Fixed, 95% CI	Risk Ratio M-H, Fixed, 95% CI
9.2.1 Adverse events				
Guner 2013	0/30	0/31		Not estimable



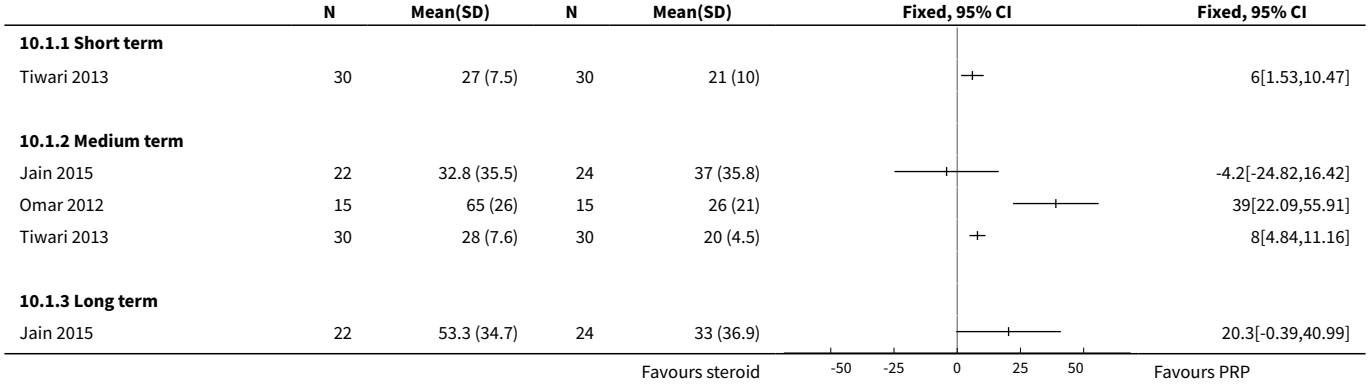
Favours steroid | Favours NSAID



Comparison 10. Steroid injection versus platelet-rich plasma (PRP) injection

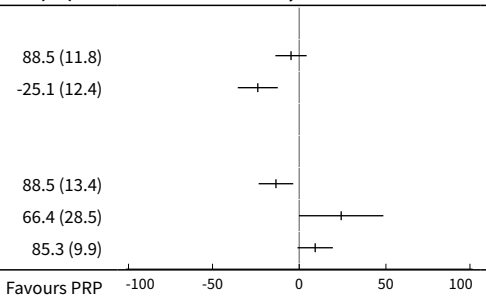
Outcome or subgroup title	No. of studies	No. of participants	Statistical method	Effect size
1 Heel pain (VAS: 0 to 100; worst pain)	3		Mean Difference (IV, Fixed, 95% CI)	Totals not selected
1.1 Short term	1		Mean Difference (IV, Fixed, 95% CI)	0.0 [0.0, 0.0]
1.2 Medium term	3		Mean Difference (IV, Fixed, 95% CI)	0.0 [0.0, 0.0]
1.3 Long term	1		Mean Difference (IV, Fixed, 95% CI)	0.0 [0.0, 0.0]
2 Function	3		Mean Difference (IV, Fixed, 95% CI)	Totals not selected
2.1 Medium term	2		Mean Difference (IV, Fixed, 95% CI)	0.0 [0.0, 0.0]
2.2 Long term	2		Mean Difference (IV, Fixed, 95% CI)	0.0 [0.0, 0.0]
3 Foot function: AOFAS score (0 to 100; best function)			Other data	No numeric data
4 Serious and other adverse effect	2	106	Risk Ratio (M-H, Fixed, 95% CI)	0.0 [0.0, 0.0]

Analysis 10.1. Comparison 10 Steroid injection versus platelet-rich plasma (PRP) injection, Outcome 1 Heel pain (VAS: 0 to 100; worst pain).



Analysis 10.2. Comparison 10 Steroid injection versus platelet-rich plasma (PRP) injection, Outcome 2 Function.

Study or subgroup	Steroid injection		PRP injection		Mean Difference	Mean Difference
	N	Mean(SD)	N	Mean(SD)	Fixed, 95% CI	Fixed, 95% CI
10.2.1 Medium term						
Jain 2015	22	83.8 (18.3)	24	88.5 (11.8)		-4.73[-13.73,4.27]
Omar 2012	15	-49 (19.1)	15	-25.1 (12.4)		-23.9[-35.42,-12.38]
10.2.2 Long term						
Jain 2015	22	75.1 (20.1)	24	88.5 (13.4)		-13.43[-23.41,-3.45]
Wilson 2013	5	90.6 (16.2)	8	66.4 (28.5)		24.2[-0.12,48.52]
Wilson 2013	5	94.5 (8.6)	8	85.3 (9.9)		9.2[-0.99,19.39]

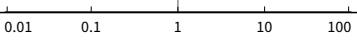


Analysis 10.3. Comparison 10 Steroid injection versus platelet-rich plasma (PRP) injection, Outcome 3 Foot function: AOFAS score (0 to 100; best function).

		Foot function: AOFAS score (0 to 100; best function)			
Study	Heading 1	Steroid N = 20 Mean	Steroid Range	PRP N = 20 Mean	PRP Range
Monto 2014	Baseline score (note imbalance favouring steroid)	52	24 to 60	37	30 to 56
Monto 2014	Medium term (6 months)	74	54 to 87	94	87 to 100
Monto 2014	Long term (12 months)	58	45 to 77	94	86 to 100

Analysis 10.4. Comparison 10 Steroid injection versus platelet-rich plasma (PRP) injection, Outcome 4 Serious and other adverse effect.

Study or subgroup	Steroid injection	PRP injection	Risk Ratio	Weight	Risk Ratio
	n/N	n/N	M-H, Fixed, 95% CI		M-H, Fixed, 95% CI
Jain 2015	0/22	0/24			Not estimable
Tiwari 2013	0/30	0/30			Not estimable
Total (95% CI)	**52**	**54**			**Not estimable**
Total events: 0 (Steroid injection), 0 (PRP injection)					
Heterogeneity: Not applicable					
Test for overall effect: Not applicable					



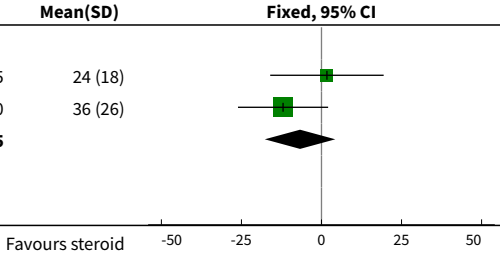
Comparison 11. Steroid injection versus autologous blood injection

Outcome or subgroup title	No. of studies	No. of participants	Statistical method	Effect size
1 Heel pain (VAS 0 to 100; worst pain)	2		Mean Difference (IV, Fixed, 95% CI)	Subtotals only

Outcome or subgroup title	No. of studies	No. of participants	Statistical method	Effect size
1.1 Medium term	2	90	Mean Difference (IV, Fixed, 95% CI)	-6.70 [-17.72, 4.32]
2 Function (AOFOS rearfoot score) (0 to 100: best function) at 6 months	1		Mean Difference (IV, Fixed, 95% CI)	Totals not selected
3 Other adverse events	1		Risk Ratio (M-H, Fixed, 95% CI)	Totals not selected
4 Treatment failure (second injection / no resolution)	2	91	Risk Ratio (M-H, Fixed, 95% CI)	0.62 [0.35, 1.09]

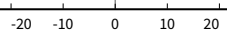
Analysis 11.1. Comparison 11 Steroid injection versus autologous blood injection, Outcome 1 Heel pain (VAS 0 to 100; worst pain).

Study or subgroup	Steroid injection N	Steroid injection Mean(SD)	Autologous blood N	Autologous blood Mean(SD)	Mean Difference Fixed, 95% CI	Weight	Mean Difference Fixed, 95% CI
11.1.1 Medium term							
Kiter 2006	14	25.7 (29)	15	24 (18)		38.7%	1.7[-16.01,19.41]
Lee 2007	31	24 (30)	30	36 (26)		61.3%	-12[-26.07,2.07]
Subtotal ***	**45**		**45**			**100%**	**-6.7[-17.72,4.32]**
Heterogeneity: Tau²=0; Chi²=1.41, df=1(P=0.24); I²=29.01%							
Test for overall effect: Z=1.19(P=0.23)							



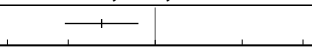
Analysis 11.2. Comparison 11 Steroid injection versus autologous blood injection, Outcome 2 Function (AOFOS rearfoot score) (0 to 100: best function) at 6 months.

Study or subgroup	Steroid injection N	Steroid injection Mean(SD)	Autologous blood N	Autologous blood Mean(SD)	Mean Difference Fixed, 95% CI	Mean Difference Fixed, 95% CI
Kiter 2006	14	80.1 (17.5)	15	80.9 (13.9)		-0.83[-12.38,10.72]

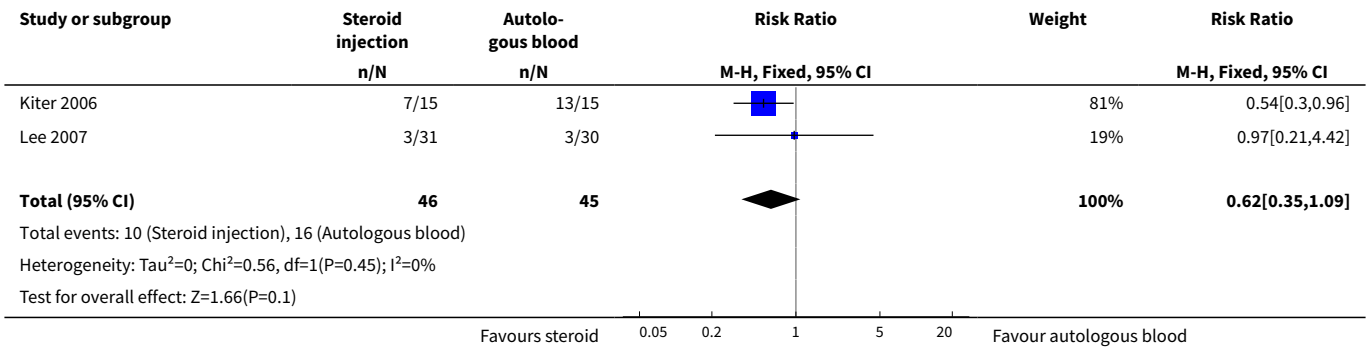


Analysis 11.3. Comparison 11 Steroid injection versus autologous blood injection, Outcome 3 Other adverse events.

Study or subgroup	Steroid injection n/N	Autologous blood n/N	Risk Ratio M-H, Fixed, 95% CI	Risk Ratio M-H, Fixed, 95% CI
Lee 2007	4/31	16/30		0.24[0.09,0.64]



Analysis 11.4. Comparison 11 Steroid injection versus autologous blood injection, Outcome 4 Treatment failure (second injection / no resolution).

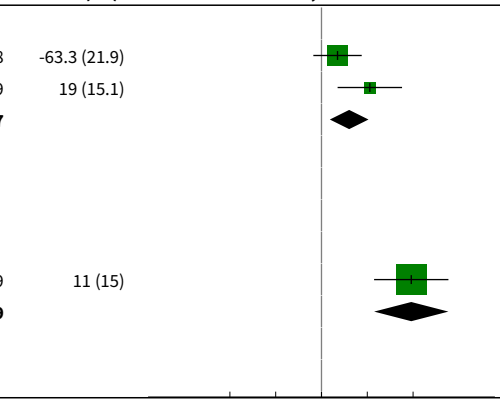


Comparison 12. Steroid injection versus botulinum toxin (Botox) injection

Outcome or subgroup title	No. of studies	No. of participants	Statistical method	Effect size
1 Heel pain (mixed scales)	2		Std. Mean Difference (IV, Fixed, 95% CI)	Subtotals only
1.1 Short term	2	92	Std. Mean Difference (IV, Fixed, 95% CI)	0.60 [0.18, 1.03]
1.2 Medium term	1	36	Std. Mean Difference (IV, Fixed, 95% CI)	1.96 [1.15, 2.77]
2 Heel pain (mixed scales) - no pooling	2		Mean Difference (IV, Fixed, 95% CI)	Totals not selected
2.1 Short term	2		Mean Difference (IV, Fixed, 95% CI)	0.0 [0.0, 0.0]
2.2 Medium term	1		Mean Difference (IV, Fixed, 95% CI)	0.0 [0.0, 0.0]
3 Foot function: FHSQ2 (0 to 100: higher score = better function)	1		Mean Difference (IV, Fixed, 95% CI)	Totals not selected
3.1 Short term	1		Mean Difference (IV, Fixed, 95% CI)	0.0 [0.0, 0.0]
4 Overall measure: AOFAS (foot pain, function & alignment) (0 to 100: higher score = better result)	1		Mean Difference (IV, Fixed, 95% CI)	Totals not selected
4.1 Short term	1		Mean Difference (IV, Fixed, 95% CI)	0.0 [0.0, 0.0]
4.2 Medium term	1		Mean Difference (IV, Fixed, 95% CI)	0.0 [0.0, 0.0]
5 Adverse events	2	96	Risk Ratio (M-H, Fixed, 95% CI)	0.0 [0.0, 0.0]
6 Treatment failure	1		Risk Ratio (M-H, Fixed, 95% CI)	Totals not selected

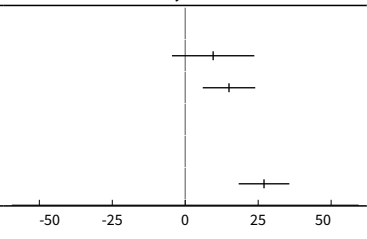
Analysis 12.1. Comparison 12 Steroid injection versus botulinum toxin (Botox) injection, Outcome 1 Heel pain (mixed scales).

Study or subgroup	Steroid injection N	Steroid injection Mean(SD)	Botox injection N	Botox injection Mean(SD)	Std. Mean Difference Fixed, 95% CI	Weight	Std. Mean Difference Fixed, 95% CI
12.1.1 Short term							
Díaz-Llopis 2012	28	-53.7 (31.2)	28	-63.3 (21.9)		63.96%	0.35[-0.18,0.88]
Elizondo-Rodriguez 2013	17	34 (12.4)	19	19 (15.1)		36.04%	1.06[0.35,1.76]
Subtotal ***	**45**		**47**			**100%**	**0.6[0.18,1.03]**
Heterogeneity: Tau²=0; Chi²=2.47, df=1(P=0.12); I²=59.51%							
Test for overall effect: Z=2.81(P=0.01)							
12.1.2 Medium term							
Elizondo-Rodriguez 2013	17	38 (11.5)	19	11 (15)		100%	1.96[1.15,2.77]
Subtotal ***	**17**		**19**			**100%**	**1.96[1.15,2.77]**
Heterogeneity: Not applicable							
Test for overall effect: Z=4.74(P<0.0001)							



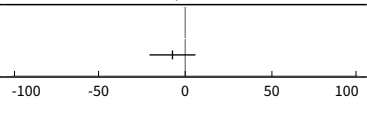
Analysis 12.2. Comparison 12 Steroid injection versus botulinum toxin (Botox) injection, Outcome 2 Heel pain (mixed scales) - no pooling.

Study or subgroup	Steroid injection N	Steroid injection Mean(SD)	Botox injection N	Botox injection Mean(SD)	Mean Difference Fixed, 95% CI	Mean Difference Fixed, 95% CI
12.2.1 Short term						
Díaz-Llopis 2012	28	-53.7 (31.2)	28	-63.3 (21.9)		9.57[-4.54,23.68]
Elizondo-Rodriguez 2013	17	34 (12.4)	19	19 (15.1)		15[6.01,23.99]
12.2.2 Medium term						
Elizondo-Rodriguez 2013	17	38 (11.5)	19	11 (15)		27[18.32,35.68]



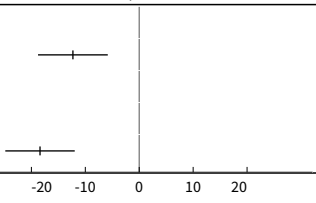
Analysis 12.3. Comparison 12 Steroid injection versus botulinum toxin (Botox) injection, Outcome 3 Foot function: FHSQ2 (0 to 100: higher score = better function).

Study or subgroup	Steroid injection N	Steroid injection Mean(SD)	Botox injection N	Botox injection Mean(SD)	Mean Difference Fixed, 95% CI	Mean Difference Fixed, 95% CI
12.3.1 Short term						
Díaz-Llopis 2012	28	63.6 (24.1)	28	71 (26.4)		-7.36[-20.61,5.89]



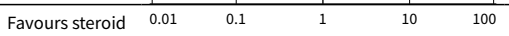
Analysis 12.4. Comparison 12 Steroid injection versus botulinum toxin (Botox) injection, Outcome 4 Overall measure: AOFAS (foot pain, function & alignment) (0 to 100: higher score = better result).

Study or subgroup	Steroid injection N	Steroid injection Mean(SD)	Botox injection N	Botox injection Mean(SD)	Mean Difference Fixed, 95% CI	Mean Difference Fixed, 95% CI
12.4.1 Short term						
Elizondo-Rodriguez 2013	17	77.1 (9.9)	19	89.4 (9.9)		-12.3[-18.77,-5.83]
12.4.2 Medium term						
Elizondo-Rodriguez 2013	17	74.8 (10.3)	19	93.2 (9.3)		-18.4[-24.84,-11.96]



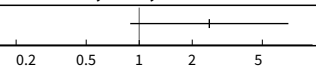
Analysis 12.5. Comparison 12 Steroid injection versus botulinum toxin (Botox) injection, Outcome 5 Adverse events.

Study or subgroup	Steroid injection n/N	Botox injection n/N	Risk Ratio M-H, Fixed, 95% CI	Weight	Risk Ratio M-H, Fixed, 95% CI
Díaz-Llopis 2012	0/28	0/28			Not estimable
Elizondo-Rodriguez 2013	0/20	0/20			Not estimable
Total (95% CI)	**48**	**48**			**Not estimable**
Total events: 0 (Steroid injection), 0 (Botox injection)					
Heterogeneity: Not applicable					
Test for overall effect: Not applicable					



Analysis 12.6. Comparison 12 Steroid injection versus botulinum toxin (Botox) injection, Outcome 6 Treatment failure.

Study or subgroup	Steroid injection n/N	Botox injection n/N	Risk Ratio M-H, Fixed, 95% CI	Risk Ratio M-H, Fixed, 95% CI
Díaz-Llopis 2012	10/28	4/28		2.5[0.89,7.03]



Comparison 13. Steroid injection versus cryopreserved human amniotic membrane (C-HAM) injection

Outcome or subgroup title	No. of studies	No. of participants	Statistical method	Effect size
1 Heel pain and foot function			Other data	No numeric data

Analysis 13.1. Comparison 13 Steroid injection versus cryopreserved human amniotic membrane (C-HAM) injection, Outcome 1 Heel pain and foot function.

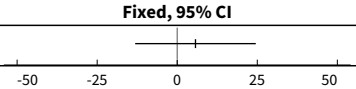
		Heel pain and foot function			
Study	Outcome (Follow-up)	Steroid	Steroid	C-HAM	C-HAM
Hanselman 2015	**Pain: VAS (0 to 100: worst pain)** Mean change score	**Mean =**	**N =**	**Mean =**	**N =**
Hanselman 2015	At 6 weeks	-15.13	14	-10.77	9
Hanselman 2015	At 12 weeks	-21.98	14	-27.77	9
Hanselman 2015	**Foot function of FHSQ (0 to 100: best function)** Mean change score				
Hanselman 2015	At 6 weeks	26.76	14	11.1	9
Hanselman 2015	At 12 weeks	30.38	14	25.7	9

Comparison 14. Steroid injection versus peppering technique

Outcome or subgroup title	No. of studies	No. of participants	Statistical method	Effect size
1 Heel pain (VAS: 0 to 100: worst pain) at 6 months	1		Mean Difference (IV, Fixed, 95% CI)	Totals not selected
2 Function (AOFOS rearfoot score) (0 to 100: best function) at 6 months	1		Mean Difference (IV, Fixed, 95% CI)	Totals not selected
3 Treatment failure (second injection)	1		Risk Ratio (M-H, Fixed, 95% CI)	Totals not selected

Analysis 14.1. Comparison 14 Steroid injection versus peppering technique, Outcome 1 Heel pain (VAS: 0 to 100: worst pain) at 6 months.

Study or subgroup	Steroid injection		Peppering		Mean Difference	Mean Difference
	N	Mean(SD)	N	Mean(SD)	Fixed, 95% CI	Fixed, 95% CI
Kiter 2006	14	25.7 (29)	15	20 (22)		5.7[-13.13,24.53]

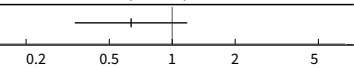


Analysis 14.2. Comparison 14 Steroid injection versus peppering technique, Outcome 2 Function (AOFOS rearfoot score) (0 to 100: best function) at 6 months.

Study or subgroup	Steroid injection		Peppering		Mean Difference	Mean Difference
	N	Mean(SD)	N	Mean(SD)	Fixed, 95% CI	Fixed, 95% CI
Kiter 2006	14	80.1 (17.5)	15	78.2 (12.4)		1.87[-9.24,12.98]

Analysis 14.3. Comparison 14 Steroid injection versus peppering technique, Outcome 3 Treatment failure (second injection).

Study or subgroup	Steroid injection n/N	Peppering n/N	Risk Ratio M-H, Fixed, 95% CI	Risk Ratio M-H, Fixed, 95% CI
Kiter 2006	7/15	11/15		0.64[0.34,1.18]



Comparison 15. Local steroid injection versus dry needling

Outcome or subgroup title	No. of studies	No. of participants	Statistical method	Effect size
1 Heel pain (0 to 10; higher scores = worse pain)			Other data	No numeric data

Analysis 15.1. Comparison 15 Local steroid injection versus dry needling, Outcome 1 Heel pain (0 to 10; higher scores = worse pain).

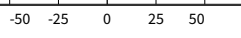
		Heel pain (0 to 10; higher scores = worse pain)		
Study	Follow-up	Steroid	Dry needling	Comment
Sconfienza 2011	7 days	mean 1.2; SD 0.6; N = 25?	mean 5.7; SD 0.5; N = 25?	"quick decrease in pain that was not permanent on a long-term basis"
Sconfienza 2011	360 days	mean 5.2; SD 0.4; N = ?	mean 0.1; SD 0.2; N = ?	"had a permanent but very slow decrease in symptoms"

Comparison 16. Steroid injection versus mini scalpel-needle

Outcome or subgroup title	No. of studies	No. of participants	Statistical method	Effect size
1 Heel pain (overall pain) (VAS 0 to 100 mm: worst pain)	1		Mean Difference (IV, Fixed, 95% CI)	Totals not selected
1.1 Short term (1 month)	1		Mean Difference (IV, Fixed, 95% CI)	0.0 [0.0, 0.0]
1.2 Medium term (6 months)	1		Mean Difference (IV, Fixed, 95% CI)	0.0 [0.0, 0.0]
1.3 Long term (12 months)	1		Mean Difference (IV, Fixed, 95% CI)	0.0 [0.0, 0.0]

Analysis 16.1. Comparison 16 Steroid injection versus mini scalpel-needle, Outcome 1 Heel pain (overall pain) (VAS 0 to 100 mm: worst pain).

Study or subgroup	Steroid injection N	Steroid injection Mean(SD)	Mini-scalpel needling N	Mini-scalpel needling Mean(SD)	Mean Difference Fixed, 95% CI	Mean Difference Fixed, 95% CI
16.1.1 Short term (1 month)						
Li 2014	25	40.3 (23.7)	29	16.1 (21.4)		24.2[12.08,36.32]
16.1.2 Medium term (6 months)						
Li 2014	25	63.2 (26.4)	29	9 (17.2)		54.2[42.11,66.29]
16.1.3 Long term (12 months)						
Li 2014	25	64.8 (27)	29	10.7 (16.9)		54.1[41.86,66.34]



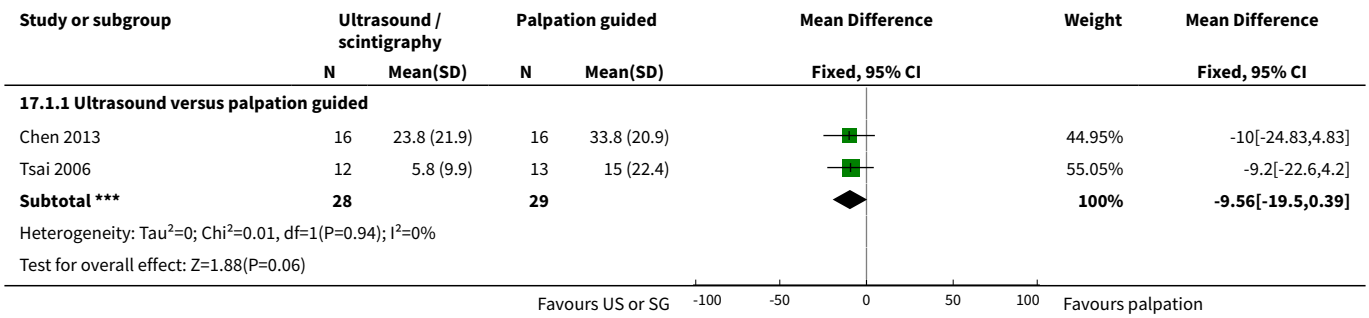
Favours steroid injection — Favours MSN

Comparison 17. Different techniques (ultrasound, scintography, palpation) to guide local steroid injections

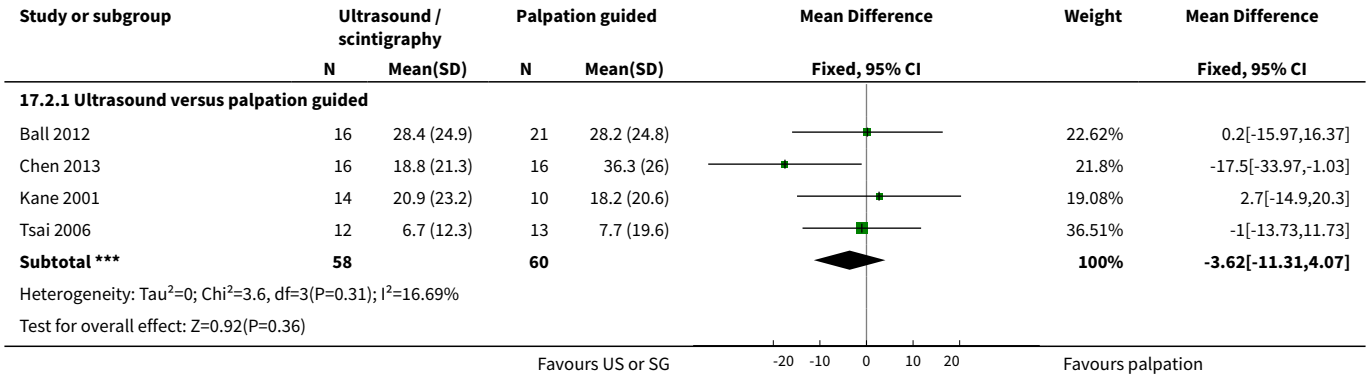
Outcome or subgroup title	No. of studies	No. of participants	Statistical method	Effect size
1 Heel pain (VAS 0 to 100 mm: worst pain); short term follow-up (< 1 month)	2		Mean Difference (IV, Fixed, 95% CI)	Subtotals only
1.1 Ultrasound versus palpation guided	2	57	Mean Difference (IV, Fixed, 95% CI)	-9.56 [-19.50, 0.39]
2 Heel pain (VAS 0 to 100 mm: worst pain); medium term follow-up (1 to 6 months)	4		Mean Difference (IV, Fixed, 95% CI)	Subtotals only
2.1 Ultrasound versus palpation guided	4	118	Mean Difference (IV, Fixed, 95% CI)	-3.62 [-11.31, 4.07]
3 Heel pain (VAS 0 to 100 mm: worst pain); long term follow-up (> 6 months)	2		Mean Difference (IV, Fixed, 95% CI)	Subtotals only
3.1 Ultrasound versus palpation guided	2	51	Mean Difference (IV, Fixed, 95% CI)	-15.54 [-26.47, -4.61]
3.2 Scintigraphy versus palpation guided	1	20	Mean Difference (IV, Fixed, 95% CI)	-14.0 [-30.15, 2.15]
4 Serious and other adverse events	4	118	Risk Ratio (M-H, Fixed, 95% CI)	0.0 [0.0, 0.0]
4.1 Ultrasound versus palpation guided	4	118	Risk Ratio (M-H, Fixed, 95% CI)	0.0 [0.0, 0.0]
5 Treatment failure and/or recurrence	2		Risk Ratio (M-H, Fixed, 95% CI)	Totals not selected
5.1 Ultrasound versus palpation guided	2		Risk Ratio (M-H, Fixed, 95% CI)	0.0 [0.0, 0.0]

Outcome or subgroup title	No. of studies	No. of participants	Statistical method	Effect size
6 Quality of life: SF-26 physical component (0 to 100: best outcome)	1		Mean Difference (IV, Fixed, 95% CI)	Totals not selected
6.1 Short term follow-up (3 weeks)	1		Mean Difference (IV, Fixed, 95% CI)	0.0 [0.0, 0.0]
6.2 Medium term follow-up (3 months)	1		Mean Difference (IV, Fixed, 95% CI)	0.0 [0.0, 0.0]

Analysis 17.1. Comparison 17 Different techniques (ultrasound, scintography, palpation) to guide local steroid injections, Outcome 1 Heel pain (VAS 0 to 100 mm: worst pain); short term follow-up (< 1 month).

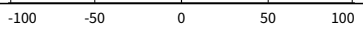


Analysis 17.2. Comparison 17 Different techniques (ultrasound, scintography, palpation) to guide local steroid injections, Outcome 2 Heel pain (VAS 0 to 100 mm: worst pain); medium term follow-up (1 to 6 months).



Analysis 17.3. Comparison 17 Different techniques (ultrasound, scintography, palpation) to guide local steroid injections, Outcome 3 Heel pain (VAS 0 to 100 mm: worst pain); long term follow-up (> 6 months).

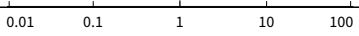
Study or subgroup	Ultrasound / scintigraphy N	Mean(SD)	Palpation guided N	Mean(SD)	Mean Difference Fixed, 95% CI	Weight	Mean Difference Fixed, 95% CI
17.3.1 Ultrasound versus palpation guided							
Tsai 2006	12	3.3 (8.8)	13	24.6 (26)		53.19%	-21.3[-36.28,-6.32]
Yucel 2009	15	13 (12)	11	22 (25)		46.81%	-9[-24.97,6.97]
Subtotal ***	**27**		**24**			**100%**	**-15.54[-26.47,-4.61]**
Heterogeneity: Tau^2=0; Chi^2=1.21, df=1(P=0.27); I^2=17.46%							
Test for overall effect: Z=2.79(P=0.01)							
17.3.2 Scintigraphy versus palpation guided							
Yucel 2009	9	8 (10)	11	22 (25)		100%	-14[-30.15,2.15]
Subtotal ***	**9**		**11**			**100%**	**-14[-30.15,2.15]**
Heterogeneity: Not applicable							
Test for overall effect: Z=1.7(P=0.09)							
Test for subgroup differences: Chi^2=0.02, df=1 (P=0.88), I^2=0%							



Favours US or SG — Favours palpation

Analysis 17.4. Comparison 17 Different techniques (ultrasound, scintography, palpation) to guide local steroid injections, Outcome 4 Serious and other adverse events.

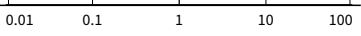
Study or subgroup	Ultrasound / scintigraphy n/N	Palpation guided n/N	Risk Ratio M-H, Fixed, 95% CI	Weight	Risk Ratio M-H, Fixed, 95% CI
17.4.1 Ultrasound versus palpation guided					
Ball 2012	0/21	0/16			Not estimable
Chen 2013	0/16	0/16			Not estimable
Kane 2001	0/10	0/14			Not estimable
Tsai 2006	0/12	0/13			Not estimable
Subtotal (95% CI)	**59**	**59**			**Not estimable**
Total events: 0 (Ultrasound / scintigraphy), 0 (Palpation guided)					
Heterogeneity: Not applicable					
Test for overall effect: Not applicable					
Total (95% CI)	**59**	**59**			**Not estimable**
Total events: 0 (Ultrasound / scintigraphy), 0 (Palpation guided)					
Heterogeneity: Not applicable					
Test for overall effect: Not applicable					



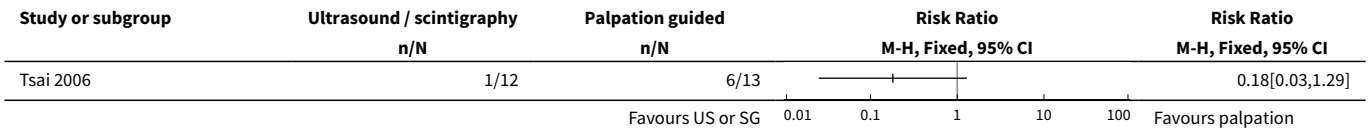
Favours US or SG — Favours palpation

Analysis 17.5. Comparison 17 Different techniques (ultrasound, scintography, palpation) to guide local steroid injections, Outcome 5 Treatment failure and/or recurrence.

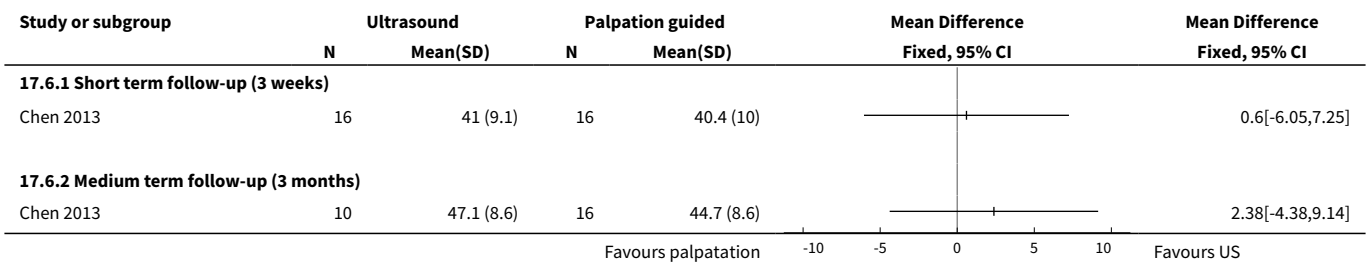
Study or subgroup	Ultrasound / scintigraphy n/N	Palpation guided n/N	Risk Ratio M-H, Fixed, 95% CI	Risk Ratio M-H, Fixed, 95% CI
17.5.1 Ultrasound versus palpation guided				
Ball 2012	3/22	6/22		0.5[0.14,1.75]



Favours US or SG — Favours palpation



Analysis 17.6. Comparison 17 Different techniques (ultrasound, scintography, palpation) to guide local steroid injections, Outcome 6 Quality of life: SF-26 physical component (0 to 100: best outcome).



ADDITIONAL TABLES

Table 1. Local steroid injection versus placebo or no treatment control: Participants' characteristics

Study ID	Gender % male	Age	Duration of symptoms	Inclusion criteria relating to prior treatment
Abdihakin 2012	42 males; 46 females 48% male	Mean 43 years	N/A	Excluded: steroid injection within past 3 months
Akhtar 2009	100 males; 176 females 36% male	Mean 45.4 years	N/A	N/A
Ball 2012	29 males; 36 females 45% male	Mean 49 years	Median 6 months; range 2.5 to 60 months	Failure to respond to 8 weeks of conservative therapy. Excluded: previous steroid injection to heel pad
Blockey 1956	9 males; 10 females 47% male	Mean 56 years	Range 6 weeks to 18 months	None
Crawford 1999	37 males; 69 females 35% male	Mean 57 years	Median 6 months, range 1 to 120 months	Excluded: steroid injection within past 6 months
Kriss 2003	30 males; 46 females 39% male	Mean 59 years	Mean 7.6 months, range 0 to 65 months	Excluded: anti-inflammatory mediation for heel pain must be stopped 6 weeks prior to inclusion
McMillan 2012	43 males; 39 females 52% male	Mean 53 years	Heel pain for at least 8 weeks	Excluded: steroid injection within past 6 months

Table 1. Local steroid injection versus placebo or no treatment control: Participants' characteristics *(Continued)*

			Medians in the two groups: 9 and 12 months	Excluded: on any treatment regimen for heel pain within 4 weeks of enrolment
Mulherin 2009	18 males; 27 females 40% male	Median 55 years	Median 10 months; 10th to 90th percentile 4 to 36 months	Excluded: recent steroid therapy

Abbreviation: N/A - not applicable

Table 2. Local steroid injection versus placebo or no treatment control: interventions and co-interventions

Study ID	Steriod	Local anaesthetic	Control	Co-interventions
Abdihakin 2012	Palpation-guided steroid injection	Lidocaine	Placebo: saline + lidocaine injection	Analgesics, stretch exercises, orthotics, shoe recommendations
Akhtar 2009	Local steroid injection	Lignocaine	No steroid control	Anti-inflammatory drugs, foam heel pad, exercises and extracorporeal shock wave therapy
Ball 2012	Two groups: • Ultrasound-guided steroid injection • Palpation-guided steroid injection	Lignocaine	Placebo: ultrasound-guided saline injection + lignocaine injection	Usual analgesia
Blockey 1956	Local steroid injection	No	Placebo: saline injection	Sponge rubber pad for wearing under the painful heel
Crawford 1999	First comparison Local steroid injection	Lignocaine	Placebo: lignocaine injection	
	Second comparison Local steroid injection	Lignocaine	Placebo: lignocaine injection	Both injections preceded by a tibial nerve block
Kriss 2003	Local steroid injection	No	No steroid control	Soft anti-pronatory pad
McMillan 2012	Ultrasound-guided steroid injection group	No	Placebo: ultrasound-guided saline injection	Both injections preceded by a tibial nerve block. Advice to complete a daily stretching programme
Mulherin 2009	Local steroid injection	Lignocaine	No steroid control	Both injections preceded by a tibial nerve block

APPENDICES

Appendix 1. Search strategies

CENTRAL (Wiley Online Library)

#1 MeSH descriptor: [Fasciitis, Plantar] this term only (145)
#2 MeSH descriptor: [Fasciitis] explode all trees (175)
#3 MeSH descriptor: [Foot Diseases] this term only (134)
#4 #2 and #3 (19)
#5 (plantar near/3 fasci*):ti,ab,kw (328)
#6 plantar* near/3 (pain* or inflam*):ti,ab,kw (174)
#7 (calcaneodynia or calcaneal periosteitis or enthesopathy or heel spur):ti,ab,kw (70)
#8 (heel* or foot* or arch*) near/3 (pain* or inflam*):ti,ab,kw (782)
#9 (#1 or #4 or #5 or #6 or #7 or #8) (1020)
#10 MeSH descriptor: [Adrenal Cortex Hormones] explode all trees (12859)
#11 (glucocorticoid* or predniso* or corticoster* or hydrocortisone or corticosteroid* or methylpredisno* or betamethasone or triamcinolone or cortisone or dexamethasone):ti,ab,kw (38283)
#12 (steroid* near/2 inject*):ti,ab,kw (819)
#13 (#10 or #11 or #12) (41002)
#14 #9 and #13 in Trials (95)

MEDLINE (Ovid Online)

1 Fasciitis, Plantar/ (665)
2 exp Fasciitis/ (5550)
3 Foot Diseases/ (11711)
4 and/2-3 (245)
5 (plantar adj3 fasci*).tw. (1552)
6 (plantar adj3 (pain* or inflam*)).tw. (655)
7 (calcaneodynia or calcaneal periosteitis or enthesopathy or heel spur).tw. (710)
8 ((heel* or foot or arch*) adj3 (pain* or inflam*)).tw. (3512)
9 or/1,4-8 (5548)
10 exp Adrenal Cortex Hormones/ (371473)
11 (glucocorticoid* or predniso* or corticoster* or hydrocortisone or corticosteroid*or methylpredniso* or betamethasone or triamcinolone or cortisone or Dexamethasone).tw. (264116)
12 (steroid* adj2 inject*).tw. (4222)
13 or/10-12 (473849)
14 and/9,13 (341)
15 Randomized controlled trial.pt. (457038)
16 Controlled clinical trial.pt. (93360)
17 randomized.ab. (397069)
18 placebo.ab. (186927)
19 Drug therapy.fs. (1967607)
20 randomly.ab. (276538)
21 trial.ti,ab. (488378)
22 groups.ab. (1703085)
23 or/15-22 (4069686)
24 exp Animals/ not Humans/ (4364156)
25 23 not 24 (3520521)
26 and/14,25 (197)

Embase (Ovid Online)

1 Plantar Fasciitis/ or Heel Pain/ (2210)
2 Fasciitis/ (3009)
3 Foot Disease/ or Plantaris Muscle/ (12146)
4 and/2-3 (182)
5 (plantar adj3 fasci*).tw. (1940)
6 (plantar adj3 (pain* or inflam*)).tw. (805)
7 (calcaneodynia or calcaneal periosteitis or enthesopathy or heel spur).tw. (932)
8 ((heel* or foot or arch*) adj3 (pain* or inflam*)).tw. (4591)
9 or/1,4-8 (7711)
10 exp Corticosteroid/ (834871)

11 Steroid Therapy/ or Corticosteroid Therapy/ (66602)
12 (glucocorticoid* or predniso* or corticoster* or hydrocortisone or corticosteroid*or methylpredniso* or betamethasone or triamcinolone or cortisone or Dexamethasone).tw. (339223)
13 (steroid* adj2 inject*).tw. (5979)
14 or/10-13 (893138)
15 and/9,14 (839)
16 Randomized controlled trial/ (485705)
17 Clinical trial/ (1050400)
18 controlled clinical trial/ (483509)
19 Randomization/ (85347)
20 Aingle blind procedure/ (30408)
21 Double blind procedure/ (141279)
22 Crossover procedure/ (55798)
23 Placebo/ (330321)
24 Prospective study/ (405707)
25 ((clinical or controlled or comparative or placebo or prospective* or randomi#ed) adj3 (trial or study)).tw. (1008981)
26 (random* adj7 (allocat* or allot* or assign* or basis* or divid* or order*)).tw. (249514)
27 ((singl* or doubl* or trebl* or tripl*) adj7 (blind* or mask*)).tw. (202569)
28 (cross?over* or (cross adj1 over*)).tw. (87755)
29 ((allocat* or allot* or assign* or divid*) adj3 (condition* or experiment* or intervention* or treatment* or therap* or control* or group*)).tw. (335858)
30 RCT.tw. (23662)
31 or/16-30 (2523027)
32 Case Study/ or Abstract Report/ or Letter/ (1100358)
33 31 not 32 (2469412)
34 and/15,33 (222)

CINAHL (Ebsco)

S1 (MH "Plantar Fasciitis") (946)
S2 (MH "Fasciitis") (218)
S3 (MH "Foot Diseases") (1,802)
S4 S2 and S3 (14)˜S5 TX plantar N3 fasci* (1,250)
S6 TX ((plantar N3 (pain* or inflam*)) or (heel N3 (pain* or inflam*)) or (foot N3 (pain* or inflam*)) or (arch* N3 (pain* or inflam*))) (1,954)
S7 TX calcaneodynia or calcaneal periosteitis or enthesopathy or heel spur (197)
S8 S1 or S4 or S5 or S6 or S7 (2,928)
S9 (MH "Adrenal Cortex Hormones") (10,228)
S10 TX glucocorticoid* or predniso* or corticoster* or hydrocortisone or corticosteroid*or methylpredniso* or betamethasone or triamcinolone or cortisone or dexamethasone (34,104)
S11 TX steroid* N2 inject* (1,324)
S12 S9 or S10 or S11 (40,523)
S13 S8 and S12 (163)
S14 (MH "Clinical Trials+") (211,417)
S15 (MH "Evaluation Research+") (48,850)
S16 (MH "Comparative Studies") (112,640)
S17 (MH "Crossover Design") (14,443)
S18 PT Clinical Trial (79,990)
S19 (MH "Random Assignment") (42,740)
S20 S14 or S15 or S16 or S17 or S18 or S19 (345,473)
S21 TX ((clinical or controlled or comparative or placebo or prospective or randomi?ed) and (trial or study)) (998,233)
S22 TX (random* and (allocat* or allot* or assign* or basis* or divid* or order*)) (91,266)
S23 TX ((singl* or doubl* or trebl* or tripl*) and (blind* or mask*)) (904,466)
S24 TX (crossover* or 'cross over') or TX cross n1 over (19,363)
S25 TX ((allocat* or allot* or assign* or divid*) and (condition* or experiment* or intervention* or treatment* or therap* or control* or group*)) (120,601)
S26 S21 or S22 or S23 or S24 or S25 (1,735,918)
S27 S20 or S26 (1,745,903)
S28 S13 and S27 (94)

WHO International Clinical Trials Registry Platform

1. plantar fasciitis = 118
2. plantar and inject* = 46

Appendix 2. Non-indexed journals and conference proceedings searched

Conference proceedings

No	Name	Date	Place
1	Australian Pain Society 31st Annual Scientific Meeting	12 to 16 June 2011	Darwin Convention Centre, Northern Territory, Australia
2	The Australian Musculoskeletal Medicine Conference	17 to 10 October 2008	Melbourne, Victoria, Australia

Non-indexed Journals

No	Name	Date
1	Journal of Orthopaedic and Sports Physical Therapy	1979 to 22 July 2013
2	Clinics in Podiatric Medicine and Surgery	January 2002 to April 2013
3	Foot and Ankle Clinics of North America	March 2002 to June 2013

CONTRIBUTIONS OF AUTHORS

The topic was conceived by Dr Venkatesan Sankarapandian and Dr Prince Christopher. Dr Ashish Macaden, Dr Ahana Chatterjee and Dr Judy David were involved with them in developing the protocol and drafting this review. Dr Judy David has been identified as the guarantor for this review.

DECLARATIONS OF INTEREST

Judy A David: none known
Prince RH Christopher: none known
Ahana Chatterjee: none known
Ashish S Macaden: none known
Venkatesan Sankarapandian: none known

SOURCES OF SUPPORT

Internal sources

- Christian Medical College, Vellore, India.

  For providing us with the time needed to work on this review

External sources

- South Asian Cochrane Network and Centre, India.

  This review was initiated in a workshop conducted by the South Asian Cochrane Network & Centre that was partly funded by the Effective Health Care Research Programme Consortium with funds from the Department for International Development (DFID), UK and the Indian Council of Medical Research (ICMR).

DIFFERENCES BETWEEN PROTOCOL AND REVIEW

- We revised the comparison groups in Types of interventions to clarify that a control group could not comprise an injection of local anaesthesia if this was not also given with the steroid injection. We added local anaesthetic injection as a new comparator.

- We added an extra secondary outcome: Treatment failure, resulting substantive intervention such as an injection, or noted lack of effect, and recurrence, reported as the number of cases that relapse after a successful resolution. This in part reflected that participants having a second injection because their pain was unresolved were excluded from the analyses in some trials.
- When assessing risk of bias relating to incomplete outcome data (Assessment of risk of bias in included studies), we dropped our plans to group outcomes into short-term (within 1 month of the intervention) and long-term (beyond 1 month) outcomes. Instead, we assessed risk of attrition bias at final follow-up for each trial. This occurred because of an oversight.
- We had planned to interpret a I^2 value of 50% or greater to denote significant heterogeneity. This cut-off was arbitrary and we decided to interpret I^2 values between 0% to 40% as possibly unimportant, 30% to 60% as possibly moderate, 50% to 90% as possibly substantial and 75% to 100% as possibly very substantial (or considerable) (Deeks 2011).
- We were unable to perform most of our intended subgroup analyses because of insufficient data.
- While we carried out some investigations, we did not report our sensitivity analyses for the inclusion of trials with [strong evidence of] skewed data. This is partly because of the few trials already available for each comparison and partly that the other trials also had distributions that were suggestive of skew.
- We reconsidered our initial intention to select primary outcomes only for presenting in Summary of findings tables. Our selection reflects considerations of clinical practice (further treatment is likely where heel pain persists in the long term) and the aspects that would have an important, although possibly short-term effect on patients.
- We presented a Summary of findings table for the main comparison only. We considered that the very low quality evidence for all outcomes and low numbers of participants available for the other comparisons did not warrant the production for these comparisons.

INDEX TERMS

Medical Subject Headings (MeSH)

*Heel; Adrenal Cortex Hormones [*administration & dosage]; Anesthetics, Local [administration & dosage]; Foot Diseases [*drug therapy]; Non-Randomized Controlled Trials as Topic [statistics & numerical data]; Pain [*drug therapy]; Pain Measurement; Publication Bias; Randomized Controlled Trials as Topic [statistics & numerical data]; Treatment Failure

MeSH check words

Adult; Humans; Middle Aged