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# Podiatry interventions to prevent falls in older people: a systematic review and meta-analysis



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# Podiatry interventions to prevent falls in older people: a systematic review and meta-analysis


## Abstract:

**Background:** The growing number of trials evaluating podiatry interventions to prevent falls in older people indicates that evidence synthesis to determine effectiveness is timely. This systematic review examined podiatry interventions for falls prevention delivered in the community and in care homes.

**Methods:** Systematic review and meta-analysis. We searched multiple electronic databases with no language restrictions. Randomised controlled trials (RCTs) or quasi-RCT studies documenting podiatry interventions in older people (aged 60+) were included. Two reviewers independently applied selection criteria and assessed methodological quality. TiDieR guidelines guided data extraction and meta-analysis was conducted where homogeneity allowed.

**Results:** From 32 717 titles and 3 118 screened abstracts, nine studies involving 6502 participants (range 40-3 727) met the inclusion criteria. Overall, risk of bias was low apart from participant and intervention provider blinding. Podiatry interventions were multifaceted (n=3), single component (n=2) or multifactorial, involving only podiatry assessment or referral (n=4). Seven studies were conducted in the community and two in care homes. Combining falls rate data showed significant effects for multifaceted podiatry interventions compared to usual care (n=3): falls rate ratio 0.77 [95% CI 0.61, 0.99]; and multifactorial interventions including podiatry (n=3): falls rate ratio: 0.73 [95% CI 0.54, 0.98]. Single component podiatry interventions demonstrated no significant effects on falls rate. Heterogeneity in other outcomes precluded meta-analysis.

**Conclusions:** Evidence suggests multifaceted podiatry interventions and multifactorial interventions involving referral to podiatry provide small but significant reductions in falls rate. Further evaluation of the effectiveness of podiatry within care home settings is required.

## Introduction

Falls are common among older people in community and care home settings. They are one of the most common causes of hip fracture, unplanned hospitalisation and death [1]. Falls often lead to a cycle of fear, anxiety and depression, resulting in loss of function and greater risk of falling [2]. Financially, falls are the most costly injury in older people [3]. Annually, falls cost the National Health Service (NHS) in the UK more than £2 billion per annum [4], and in the United States, this figure is as much as $100 billion [3].

The diverse risk factors leading to falls means that preventative interventions have typically included strengthening and balance exercises, medication review, physiotherapy, occupational therapy, or detecting and treating visual impairment [5]. More recently, common foot problems in older people [6, 7] have been shown to be associated with falls [8, 9].

Independent foot-related risk factors include foot pain, reduced ankle joint range of motion, hallux valgus deformity (bunion), reduced toe plantar flexor muscle strength, increased shoe heel height, the absence of a strap, lace or other retaining medium on the shoe, and reduced shoe-sole contact area [8-11]. These factors have led to the development of podiatry interventions to reduce falls [12, 13].

Previous systematic reviews have shown encouraging effects of foot and ankle exercises alone on balance and falls. Furthermore, footwear and orthoses interventions have been shown to have a beneficial effect on balance only in community-dwelling older people [14, 15]. A systematic evaluation of multifaceted podiatry intervention packages (callus debridement, exercise, footwear, orthoses) on falls or falls rate has not been undertaken however. Given the multifactorial nature of falls in older people, this evaluation is now a priority.

Older people living in care homes are around three times as likely to fall compared with those living in the community, therefore understanding effective ways to reduce falls in care homes is important [16]. Evidence for reducing care home falls remains equivocal [17] and other than footwear assessment, the effects of podiatry interventions on falls have not been evaluated in this setting.

The aim of this systematic review is to determine the effectiveness of podiatry interventions for falls reduction in older adults aged 60 years or more, residing in the community and in care homes compared to usual care, no intervention, a placebo intervention or another falls prevention intervention up to one-year post-intervention (≤ 12 months), and more than one-year post-intervention (>12 months).

## Methods

The review was conducted according to the Cochrane Handbook for Systematic Reviews (Version 5.1.0) [18] and reported using PRISMA statement guidance [19]. Methods were pre-specified in a protocol [20].

### Search strategy and selection criteria

Ten electronic databases (Medline, AMED, PeDRO, CINAHL, Embase, Cochrane Central Register of Controlled Trials, CDSR, DARE, HTA and ZETOC) were searched for randomised controlled trials (RCTs) and quasi-RCTs published between inception and 30 March 2017. No date or language restrictions were employed. An example search string is shown Supplementary Table 1. Clinical trial registries (e.g. WHO ICTRP), grey literature (Google scholar, EThOS), podiatry specific journals (such as Journal of the American Podiatric Medical Association) and reference lists of included studies were also searched.

RCTs or quasi-RCTs conducted with ambulatory adults (≥ 60 years), living in the community or in care home settings of any type were included. Interventions had to be delivered by podiatrists or staff trained in delivering podiatry interventions (for example, footwear provision) to reduce pain, improve balance or preserve or improve foot health. Foot and ankle exercises were included only in the context of a podiatry intervention, not as a primary falls prevention intervention [21].

### Data collection and extraction

One reviewer (PC) examined searches and eliminated irrelevant titles**.** Two reviewers (CT and GW) independently screened remaining abstracts and full texts that met selection criteria. Disagreements were resolved through discussion, and a third reviewer (PC or HF) if required. Data was extracted to a standardised, pre-piloted form based on TIDieR reporting guidelines [22]. One reviewer extracted data (CT), another independently checked all data extraction (PC, GW). Missing information was requested from study authors.

### Assessing methodological quality of included studies

Risk of bias was independently assessed by two reviewers (PC, CT) using the Cochrane risk of bias tool [23]. Disagreements were resolved by discussion, with involvement of a third review author where necessary.

### Statistical analysis

Where suitable statistical summary data were available, we combined selected outcome data in pooled meta-analyses employing a random-effects model using the Cochrane statistical package RevMan [24]. Rate ratios and 95% confidence intervals

were used to examine falls rate, and risk ratios (RR) with 95% CI for dichotomous data (number of people who fell once or more; had one or more fractures).

**RESULTS**

Our systematic search identified 32 717 records, of which 32 413 were excluded. Reasons for exclusion were due to the study design not meeting the selection criteria or the intervention was not a podiatry intervention. A list of excluded studies can be found in Supplementary Table 5. Nine RCTs (17 reports) were eligible for inclusion [12, 13, 25-31]. Results of the study flow are displayed in Figure 1.

**Included studies**

Studies employed a number of different designs including: quasi-experimental (n=2), parallel-RCT (n=3), RCT (n=2), cluster-RCT (n=1) and pilot RCT (n=1). Table 1 summarises the key characteristics of the included reviews. Studies were carried out in Australia; USA; Canada; Spain and the UK and Ireland (Table 1). Seven trials were conducted in the community and in participants' homes [12, 13, 25-28, 31]; two trials took place in care homes [29, 30].

**Participants**

The number of randomised participants (n=6 502) ranged from 40 to 3 727 in each trial. The age of participants ranged between 69-87 years. Both sexes participated in each trial, the percentage of women (65.2%) taking part in the trials was higher than men. Six studies were conducted with people who had fallen or were at risk of falls, and three were conducted with participants who had existing health conditions such as peripheral sensory loss [25] and foot pain [13, 31] (Table 1).

**Interventions**

Three types of intervention were identified based on the falls taxonomy developed by Lamb and colleagues [32]:

(i) single component podiatry interventions (n=2 trials, 167 participants) [25, 31], using insoles [25] or off-the-shelf footwear in addition to routine podiatry care [31];
(ii) multifaceted podiatry interventions (n=3 trials, 1358 participants) [12, 13, 30]. A package of podiatry interventions was given to every participant and included routine podiatry, the provision of advice and information, footwear and/ or orthoses if required and home-based foot and ankle exercises;
(iii) multifactorial interventions (n=4 trials, 4 984 participants) [26-29]. These were assessment and referral based and carried out by a multi-disciplinary team (MDT), all included a podiatry risk assessment and referral to podiatry. It is unclear if referral led to podiatry treatment or not.

Intervention details profiled using the TiDieR guidelines [22] are summarised in Supplementary Table 2.

Of the 9 RCTs, 8 compared an 'active' intervention with usual care [12, 13, 26-31], and one with an inert insole [25]. The interventions were typically delivered by a podiatrist. In four trials, a podiatrist facilitated the intervention as part of a wider multi-disciplinary team delivering the intervention (Supplementary Table 2). One trial did not identify the interventionist. There was limited information about intervention content, dose or frequency. The length of the intervention period ranged from 12 weeks [25, 29, 30] to 104 weeks [27]. Assessment of intervention fidelity regarding referral, participant attendance at podiatry, and adoption of recommendations was conducted in four studies [12, 13, 26, 27].

**Study Quality and Risk of Bias**

Risk of bias is summarised for individual trials in Figure 2. Risk of bias judgements are detailed in Supplementary Table 3. Overall study quality was high. The majority of included studies had comparable intervention and control groups on key demographic variables and study outcomes at baseline. All reported inclusion and exclusion criteria. Allocation concealment and methods of randomisation sequence generation were adequately reported in all but two studies [25, 27]. However, lack of blinding (participants and personnel) was a source of bias in 6 studies [12, 13, 27, 28, 30, 31]. Only five trials reported blinding of outcome assessors [13, 26, 28-30].

Studies reported a low level of withdrawals, overall approximately 89% of participants were retained over the follow-up period this was similar in both intervention and control groups. One study did not report the number of withdrawals [27].

**Synthesis of results and effectiveness for podiatry interventions**

The included trials used a large number of heterogeneous validated and non-validated outcome measures (Table 1) and were recorded at multiple time points during and after the intervention period (Table 1).

**Primary outcome: falls rate**

Fall rate, that is, number of falls over a defined period, was the primary outcome in 7 trials (Table 1) [12, 13, 26-30]. Self-report methods using monthly falls calendars or diaries were used to report on falls rate, number of falls, time to first fall, proportion of fallers and proportion of multiple fallers. This diversity of assessment methods made comparison across the studies challenging. Two trials reported lateral balance [25] and foot pain [31] as the primary outcome with falls as a secondary or

exploratory outcome. However, it was possible to calculate rate ratios for falls across multiple component podiatry interventions (n=3 trials), multifactorial multi-disciplinary interventions (n=3) and for one single component podiatry intervention. Findings are reported below with the forest plot in Figure 3.

***Multifaceted podiatry interventions***

Combining data from the three multiple component podiatry interventions [12, 13, 30], (n = 1 339 participants) demonstrated a significant benefit for falls rate (rate ratio 0.77 [95% CI 0.61, 0.99]).

***Multifactorial interventions***

Data for falls rate were also combined from the three multifactorial trials which included podiatry referral as an intervention component [26, 28, 29] and showed a significantly beneficial effect when compared to usual care on falls rate (rate ratio 0.73 [95% CI 0.54, 0.98]) (Figure 3). However, it is unclear what (if any) podiatry interventions were received by those participants who were referred.

***Single component interventions***

Falls rate data were available only for one trial for single component intervention [31], and showed no significant effect on falls rate (rate ratio 1.58 [95% CI 0.69, 3.60]) (Figure 3).

***Falls prevention in care homes***

Two studies examined podiatry interventions for falls prevention in care homes [29, 30]. Data could not be pooled for care home interventions alone and evidence was therefore not robust enough to make any conclusions about effectiveness in this sub-group. One study involved a multifactorial intervention including podiatry referral [29] and although study findings significantly favoured the intervention, there was no detail about the actual podiatry treatment received. The other was a small pilot study examining a multifaceted podiatry intervention [30]. Although showing a small effect on falls rate, small sample size and high variability of scores meant no definitive conclusions about effectiveness could be drawn.

***Time to first fall***

Time to first fall was only measured in multifaceted podiatry interventions. None showed statistically significant differences between intervention and control groups [12, 13, 30].

**Secondary outcomes**

There was a diverse range of secondary outcomes therefore meta-analysis was not appropriate. Studies examining number of fractures [12, 13, 26, 27], functional

ability [13, 20, 31], activities of daily living [12, 13, 28] and health-related quality of life did not demonstrate any significant differences [12, 13, 30, 31]. However, significant positive effects on a range of balance measures were demonstrated in some single component [25] and multifactorial interventions [29]. Although one multiple component intervention demonstrated some between-group differences in balance, these were inconclusive [13]. Significant effects of single component interventions on foot pain and function were found using the Foot Health Status Questionnaire [31], but not the Manchester Foot Pain and Disability Index used in both single and multifaceted podiatry intervention studies [13, 31].

***Economic analysis***

One trial reported economic data [12]. The study used the EQ-5D, demonstrating 0.0129 enhancement of quality adjusted life years (QALYs) over 12 months. The cost per QALY ranged between £19494 and £20,593. The cost per fall averted was £1,254 [33].

***Adverse events***

Five studies examined adverse events [12, 13, 25, 30, 31]. In single component interventions, bruising, ankle pain and blisters [25, 31] were experienced by participants wearing insoles and off-the-shelf shoes. Discomfort reduced over time, however, with no reports of discomfort at 12 weeks [25]. One multiple component intervention study [12] reported greater foot pain at 12 months in intervention participants.

***Adherence***

Intervention adherence and reporting of adherence was suboptimal across the trials. Six trials reported adherence using self-report methods [12, 25, 26, 28, 30, 31]. Participants in these trials reported wearing foot orthoses or footwear most or all of the time (between 37% and 56%) [13, 30]. Similarly, a third of participants reported completing exercises at the prescribed frequency of three times per day [12, 30]. Podiatry referral rates varied significantly within multifactorial interventions, the highest in one trial, at 59% of intervention group participants [29] and lowest at 32% [28]. Data for actual uptake of the podiatry intervention in the multifactorial trials was not reported.

***Completion rate***

The odds ratio for drop out rate was no higher in intervention than control groups, indicating that participants tolerate the podiatry interventions well as control group participants receiving usual care (Supplementary Table 4).

**DISCUSSION**

To our knowledge, this is the first systematic review and meta-analysis to specifically examine the role of podiatry in falls prevention. By combining the results of nine trials, we found a falls rate ratio of 0.77 [95%CI 0.61, 0.99] for multifaceted podiatry interventions and 0.73 [95%CI 0.54, 0.98] for multifactorial interventions. This is broadly in line with effects of other similar interventions identified in a Cochrane Review of falls prevention interventions in community dwelling older people [35]. Only two studies were conducted in care homes, and study heterogeneity prevented any conclusions being drawn about effectiveness in that setting.

Study quality was generally good, but lack of participant and intervention provider blinding was a source of bias, a common issue in studies in which care providers deliver interventions. Blinding of outcome assessors was undertaken in most included studies, thus detection bias was likely to be low. Seven studies recorded falls and timescales over which falls were recorded; these ranged from one to 12 months. This heterogeneity meant data pooling was possible for three multifaceted podiatry interventions, and three multifactorial interventions at 6 months only. Statistically significant effects were found for both multifacteted and multifactorial interventions, but the diverse care home and community settings mean that conclusions relevant to each setting are limited.

Published recommendations for standardisation of outcome and intervention reporting in falls trials are well established [32, 34]. These consensus studies clearly suggest that falls rate per person per year should be the main study outcome [34]. Furthermore, it is recommended that a taxonomy of intervention domains [32] are recorded to ensure full intervention description. Few of the included studies adhered to all elements of current reporting recommendations. The control arm was also poorly defined in many trials. For multifactorial interventions it was unclear if the podiatry component, usually referral or assessment, was usual care, or in addition to usual care. Furthermore, in the multifactorial studies, although podiatry was an intervention component it was not clear how many participants actually received podiatry referrals, or what intervention activities were undertaken. This detail is essential in trying to tease out the true effectiveness of the podiatry intervention. For example, in one study [29], a 59% referral rate to podiatry was recorded, but it is unclear how many people actually received the intervention or what the intervention involved. Consequently, it is not possible to be certain whether the referral and delivery system was successful or whether the treatment had any impact on the outcome.

Generally falls were recorded by self-report falls calendar or accident reports. Both methods rely on accurate completion of written records, that may not be reliably

completed. Alternative objective approaches to falls assessment should be pursued to increase accuracy and reliability of reporting.

Two studies evaluated effects of podiatry on falls within care homes. One multifactorial study involved exercise and unspecified podiatry for foot problems, with environmental modification and staff education within the homes [29]. The other small pilot study involved nail care and callus debridement, foot and ankle exercises, orthoses and footwear provision, versus usual care [30]. Diverse outcome assessment and interventions means comparison is difficult and data pooling unfeasible. Dyer [29] reported significantly increased podiatry assessment frequency, but no detail about actual assessment and treatment. Conclusions about the contribution of podiatry to falls reduction in that study is therefore not possible. Wylie [30] detailed the podiatry intervention, but the study was not powered to assess effectiveness, although effect sizes were provided suggesting evidence of benefit of the intervention in care homes. A full scale trial to examine this in more detail is warranted. Another Cochrane Review identified possible benefits of multifactorial interventions in care homes, and although footwear assessment was a component of some interventions, the wider package of podiatry components including foot assessment, insole provision and related foot and ankle exercise was not evaluated in any of the included 43 trials [17]. Thus, although the present review has shown effectiveness for podiatry interventions in community settings, the evidence for podiatry interventions in care homes is inconclusive.

Economic analysis of interventions including podiatry is very limited. Only one study of a multifaceted podiatry intervention reported economic analysis [12], which suggested that the intervention could be a cost-effective option for falls prevention with the incremental cost per QALY between £18 494 and £20 593. Economic evaluation to support future service implementation should be routinely included.

The findings of this review need to be considered in the context of several limitations. First, despite employing comprehensive search strategies, we may not have identified all trials. Second, we undertook meta-analysis on falls rate on data from three multifaceted podiatry trials, however we combined data from trials conducted in care homes and the community, thereby limiting the generalisability to each setting of the findings. Finally, planned sub-group analysis for residential setting, level of care, intervention dose, cognitive impairment and immediate and sustained effects were not possible because of study heterogeneity and/or lack of adherence to reporting guidelines [22].

*Conclusion*

This systematic review and meta-analysis provides evidence that multifaceted podiatry interventions can prevent falls in community dwelling older people. However, evidence to support podiatry interventions in care homes is scant. Addressing the complexity of conducting studies in care homes and ensuring good intervention adherence and reporting is a future priority. Future studies should define the degree of disability and cognitive status of the population and follow recommended guidelines for measuring and reporting falls prevention trials.

**TABLE AND FIGURE LEGENDS**



**SUPPLEMENTARY TABLES AND FIGURES**

**Figure 1. PRISMA flow diagram**

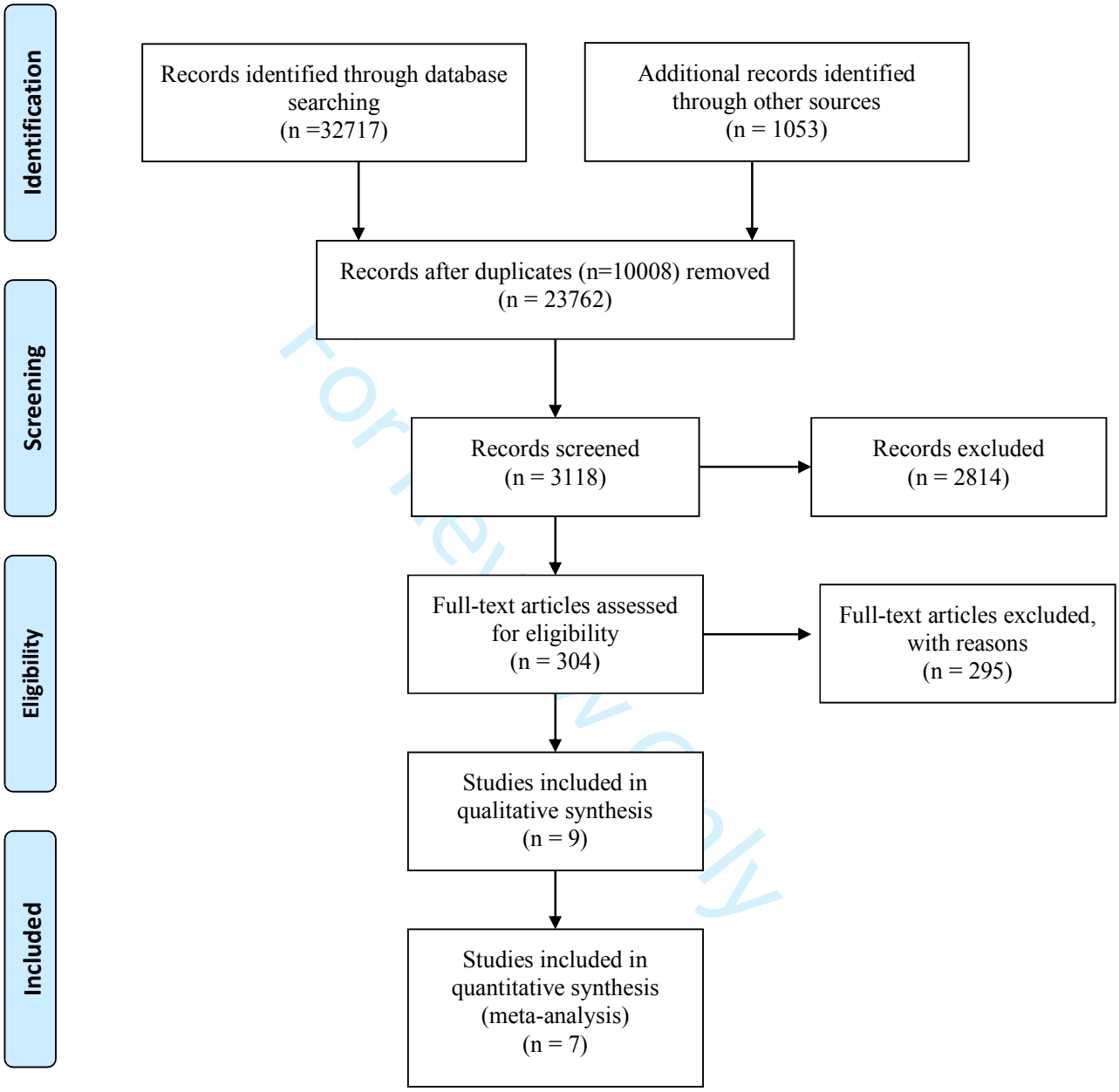
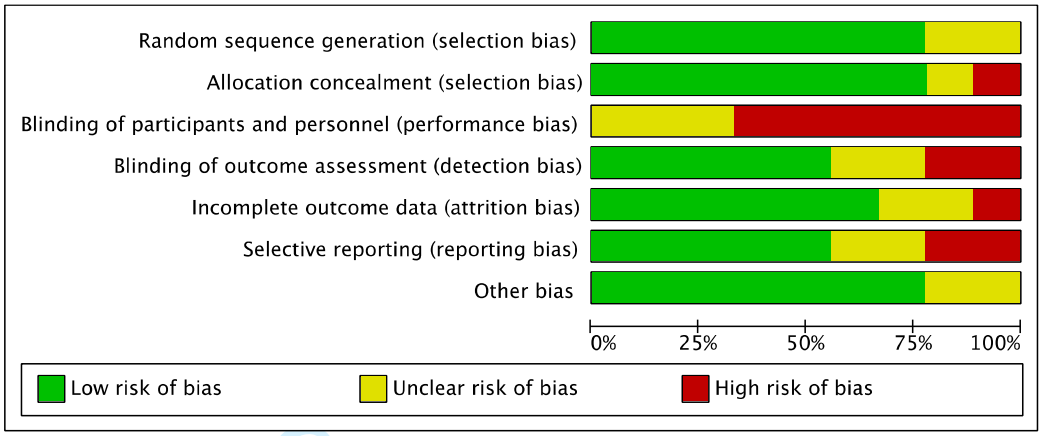


**Figure 2. Risk of bias graph.**

A. Review authors' judgements about each risk of bias item presented as percentages across all included studies.




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

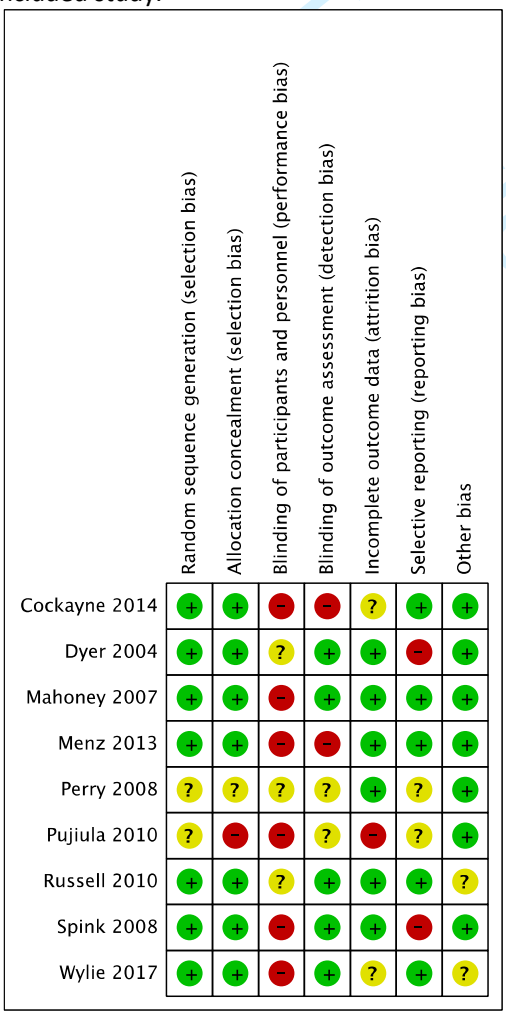


***Figure 3. Forest plot: Pooled results of single, multifactered, and multidisciplinary interventions vs. usual care: falls rate***

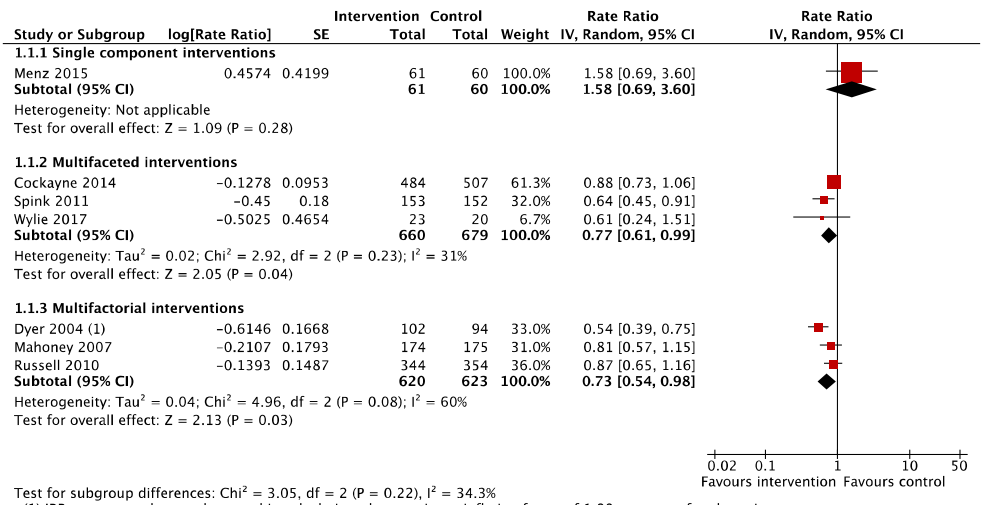


**Table 1. Characteristics of included studies**

| Study (year) | Aim | Methods | Participants | Falls risk at study entry | Comparison | Intervention | Outcomes (OM) |
|---|---|---|---|---|---|---|---|
| Cockayne 2014 (UK; Ireland) REFORM Study | Reduce falls among people at high risk of falling. | Parallel-RCT | Community dwelling men and women aged 65 years and over.<br><br>1010 (996 Analysis) Participants<br><br>F: 610 M: 400<br>$\bar{x}$ Age (yrs): I: 78.1(SD: 7.2); C:77.7(SD: 7.0) | | UC | "Multifaceted Podiatry intervention" | Primary:<br>Falls Rate (Falls Calendar)<br><br>Secondary:<br>Health Status/ QALYs (EQ-5D); Health Service Utilisation (No. reviews/ Assessments); Fear of Falling (Single Question; Short FES-I); ADL (FAI); Foot Pain Severity (100mm VAS); Proportion of single & multiple fallers; Time to first fall; Proportion of participants with fracture<br><br>Other:<br>Adverse events; Adherence |
| Dyer 2004 (England) | Reduce Falls in older adults in residential homes | Cluster-RCT | People aged 60 years or more living in residential care homes in Western Wilshire.<br><br>20 Residential Homes<br>196 Participants<br><br>F: 153 M: 43<br>$\bar{x}$ Age (yrs): I: 87.2(SD:6.9); C: 87.4(SD:6.9) | | No Intervention | "Multifactorial Risk Factor Modification Programme" | *Primary:*<br>Falls Rate/ Recurrent Falls Rate (Falls Calendar)<br><br>*Secondary:*<br>Number of oral medications; Gait and Balance (Tinetti Gait & Balance Scale); Number of injurious falls<br><br>*Other:*<br>Gait and Balance (TUG; 180$^{o}$ Turn; OLS; TUSS); Condition of feet/ Condition of footwear (Observational Scale); Visual Acuity; Osteoporosis Treatment |
| Mahoney 2007 (USA) Kenosha County falls Prevention Project | Reduce Falls in in high-risk community-dwelling older adults. | RCT | Community-dwelling older adults.<br><br>349 Participants<br><br>F: 274 M: 75<br>$\bar{x}$ Age (yrs): I: 79.6(7.2); C: 80.3(7.7) | | In-home assessment | Intermedite-intensity, Individual Multifactorial Intervention (Linking to existing medical care & service networks) | *Primary:*<br>Falls Rate (Falls diary/ calendar)<br><br>*Secondary:*<br>Hospitalisations/ Nursing home utilisation (No. admissions/ No. days); ADL (BI); Depression (GDS-15)<br><br>*Other:*<br>Adherence |

| Study (year) | Aim | Methods | Participants | Falls risk at study entry | Comparison | Intervention | Outcomes (OM) |
|---|---|---|---|---|---|---|---|
| Menz 2013 (Australia) | Reduce Foot Pain in ambulatory, community-dwelling older people over a 16 week period. | Parallel-RCT | Ambulatory community-dwelling older people with disabling foot pain.<br><br>120 Participants<br><br>F: 48 M: 72<br>$\bar{x}$ Age (yrs): Total: 82(SD:8), Range: 65- 96 years. | | UC | Podiatry Treatment plus off-the-shelf Extra Depth footwear | *Primary:*<br>Foot Pain & Function (FHSQ-Pain)<br><br>*Secondary:*<br>Foot Pain & Function (FHSQ-Function; MFPDI-Functional Limitation; MFPDI-Pain Intensity; Presence of keratotic lesions; MFPDI-Concern about appearance; No. DVA funded podiatry Consultations; HRQOL (SF-12); No. of Falls; Function: TUG; No. participants using co-interventions (Diary); Participants perception of treatment effect (5-point Likert scale)<br><br>*Other:*<br>Adherence; Adverse Events |
| Perry 2008 (Canada) | Improve Lateral Balance control using a balance-enhancing insole in healthy older adults | Quasi-RCT | Community-dwelling older adults with moderate loss of foot-sole sensation<br><br>40 Participants<br><br>F: 19 M: 21<br>$\bar{x}$ Age (yrs): I: 69(SD:3.6), Range: 65–75; C:69(SD:3.1), Range: 65–75 years. | | Conventional Insole | Balance Enhancing Facilitatory Insole | *Primary:*<br>Lateral Stability (Gait perturbation protocol)<br><br>*Other:*<br>Falls Rate; Discomfort; No. of hours insoles worn (All by Postcards). |
| Pujula Blanch 2010 (Spain) | To reduce falls and their complications in the >70 years population in a community. | Quasi-RCT | People aged 70 years or more from two communities in Spain.<br><br>3727 Participants (707 Analysis)<br><br>F: 418 M: 283<br>$\bar{x}$ Age (yrs): NR | | UC | Community-Based Multifactorial Intervention –<br><br>"Program for the prevention of falls in the elderly" | *Primary:*<br>Falls Rate; Average Number of Falls per Year; Number of Multiple Fallers (All by Telephone Survey).<br><br>**Falls-related Consequences:**<br>Falls-related Fractures; Medical Care; Hospital Admissions; Days of recovery; Falls with total disability; Falls with temporary disability; Days of temporary disability in ADLs (All by Telephone Survey). |

| Study (year) | Aim | Methods | Participants | Falls risk at study entry | Comparison | Intervention | Outcomes (OM) |
|---|---|---|---|---|---|---|---|
| Russell 2010 (Australia) | Reduce Falls in older people presenting to an ED after a fall and discharged directly home from the ED. | RCT | Older people living in the community.<br><br>712 (698 analysis) Participants<br><br>F: 500 M: 112<br>x̄ Age (yrs): I:74.9(SD:70.9); C: 75.8 (SD:8.6);<br>Total: 75.4(SD:8.6) | | UC | Standard Care plus Targeted Multifactorial Falls Prevention Programme. (links to existing community services) | *Primary:*<br>Falls Rate; Falls Injuries (Falls Calendar)<br><br>*Secondary:*<br>Serious Injury (AIS); Peripheral Fractures; All-Cause ED Presentations; Fall-related ED Presentations; All-Cause Days in Hospital; Fall-Related Days in Hospital; No. Contacts with HP (All by medical records)<br><br>*Other:*<br>Adherence |
| Spink 2008 (Australia) | Reduce Falls in older community dwelling people with disabling foot pain. | Parallel-RCT | Older community dwelling people with disabling foot pain.<br><br>305 Participants<br><br>F: 211 M: 94<br>x̄ Age (yrs): Total: 73.9 (SD:5.9), Range: 65-93 years. | | UC | Routine Podiatry Plus Multifaceted Podiatry Intervention | *Primary:* Proportion of Fallers/ Multiple Fallers; Fall Rate; Time to First Fall (Falls Calendar)<br><br>*Secondary:*<br>Foot Strength (Dynamometer/PGT); Ankle Strength (Dynamometer); Foot ROM (Goniometer); Balance (PPA/Sway Meter/ Coordinated Stability; Lateral Stability); Functional Ability (Sit-to-Stand/ Alternate Stepping/ 6 MWT); Falls Risk (PPA); Foot Pain & Function (MFPDI-Pain; MFPDI-Function); Fear of Falling (Short FES-I); HRQOL (SF-12). |
| Wylie 2017 (Scotland) PIRFECT | Reduce Falls in care home residents | Pilot-RCT | Care Home Residents<br><br>43 Participants<br><br>F: 35 M: 8<br>x̄ Age (yrs): I: 86.9 (SD: 6.2) C: 85.9 (SD: 7.8) Total: 86.4 (SD: 6.9) | | UC | "Multifaceted Podiatry Intervention" | *Primary:*<br>No. of Falls; Time to first Fall (Accident Records); Feasibility (Recruitment, retention, adherence, & missing data)<br><br>*Secondary:*<br>Current Foot Problems (POCS); Balance (BBS); Mobility (TUG); ADL (BI); HRQOL (EQ-5D); Falls Efficacy (NHFSS); Ankle Joint Muscle Strength (Dynamometer) |

**Abbreviations:** 6MWT – 6 Metre Walk Test; ADL-Activities of Daily Living; AIS-Abbreviated Injury Scale; BBS- Berg Balance Scale; BI-Barthel Index; C-Control/ Comparator; DVA- Department of Veterans' Affairs; ED – Emergency Department; EQ-5D – Euro-Qol 5 Dimension Questionnaire; FAI- Frenchay Activity Index; FHSQ-Foot Health Status Questionnaire; FROP-Com – Falls Risk for Older People-Community Setting Screen; GDS-15- Short form Geriatric Depression Scale; HP- Health Professionals; HRQOL-Health-Related Quality of Life; I-Intervention; MFPDI-Manchester Foot Pain & Disability Index;NHFSS - Nursing Home Falls Self-Efficacy Scale; NS = not specified; OT-Occupational therapy/ therapist; PGT – Paper Grip Test; PIRFECT- Podiatry Intervention to Reduce Falls in Elderly Care Trial; PPA-Physiological Profile Assessment; POCS- Podiatry Objective Clinical Score; PT-Physical Therapist/ Physiotherapist; RCT = Randomised Controlled Trial;

REFORM- REducing Falls with ORthoses and a Multifaceted podiatry intervention; ROM – Range of Motion; SD – Standard Deviation; SF-12- Short Form 12 Health Survey; Short FES-I –Short Falls Efficacy Scale-International; TUG-Timed Up and Go Test; UC- Usual Care/ Standard Care; VAS- Visual Analogue Scale

Explanation of falls outcomes: *Number of fallers* - Number of participants sustaining a fall; *Falls incidence* – number of falls; *Falls rate* – expressed as either the number of falls per person or with an additional time denominator; *Time to first fall* – falls free survival time

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**S1. Example search strategy**

Ovid MEDLINE(R) In-Process & Other Non-Indexed Citations <March 17, 2017>
Ovid MEDLINE(R) 1946 to Present with Daily Update

1. Accidental Falls/
2. (falls or faller$1).tw.
3. or/1-2
4. exp Aged/
5. (senior$1 or elderly or older).tw.
6. or/4-5
7. randomized controlled trial.pt.
8. controlled clinical trial.pt.
9. randomized.ab.
10. placebo.ab.
11. randomly.ab.
12. trial.ab.
13. groups.ab.
14. 7 or 8 or 9 or 10 or 11 or 12 or 13
15. Shoes/
16. Orthotic-Devices/
17. (Braces or foot orthos* or foot orthot* or afo or footwear or shoe* or inlay* or insole*).tw.
18. (Braces or foot orthos* or foot orthot* or afo or footwear or shoe* or inlay* or insole*).ab.
19. Foot orthosis/
20. Arch support.tw.
21. Arch support.ab.
22. (Ankle adj3 foot).tw.
23. (Ankle adj3 foot).ab.
24. (Podiatr* or Chiropod* or Footcare or Foot care or Foot-care).tw.
25. (Podiatr* or Chiropod* or Footcare or Foot care or Foot-care).ab.
26. (Lower limb rehabilitation or Dorsiflexion or Plantarflexion).tw.
27. (Lower limb rehabilitation or Dorsiflexion or Plantarflexion).ab.
28. 15 or 16 or 17 or 18 or 19 or 20 or 21 or 22 or 23 or 24 or 25 or 26 or 27
29. 3 or 28
30. 6 and 14 and 29

## S2. Descriptions of Interventions and Key Results

| Study (year) | Intervention | | | | | | | Key results reported by authors |
|---|---|---|---|---|---|---|---|---|
| | *Name of intervention* | *Procedures* | *Intervention provider (Training/ Qualifications)* | *Mode of delivery* | *Location* | *interventiopn duration* | *Dose and frequency* | |
| Cockayne (2014) | "Multifaceted podiatry intervention" | Routine podiatry care plus falls prevention leaflet; footwear advice & provision –orthoses fitted and if indicated, modified. Home-based foot & ankle exercise programme demonstrated by podiatrist & supplemented with DVD & booklet. | Podiatrist<br><br>(Employed by NHS & given additional training before start of trial) | Face-to-face; 1:1; Telephone | Community/ Home | 12 months | 2 podiatry appointments - 1 soon after randomisation & another 2-4 weeks later. (Further appointments could be offered if required.)<br><br>Foot & Ankle Exercise 30 mins/ day, 3 x/ week for 12 months (Clinical judgement to advise type & freq.) | "…a 12% reduction in the rate of falls per person-year and an absolute reduction of 5% in the number of participants who had one or more falls over the 12 months from randomisation."<br><br>No statistically significant difference in incidence rate of falls/ time to first fall. Proportion of those with at least one fall or two or more falls was statistically significant.<br><br>"…the economic evaluation… suggests that the multifaceted intervention could be a cost-effective option for falls prevention …" |
| Dyer (2004) | "Multifactorial Risk Factor Modification Programme" | Exercise programme; Staff education; Medical reviews-Residents with suspected medical risk factors examined & recommendations by letter to GP. Environmental modification; Optician assessment; Podiatry assessment. | Exercise Assistants, Physiotherapist; occupational therapy assistant Environmental Health Teams; Podiatrist; Optician (NS) | Face-to-Face; Group; 1:1 | Residential Care Home | 3 months. | Group exercise 40 minutes, 3x/ week for 12-14 weeks.<br><br>Individual home visits and/ or assessments within 12-14 weeks: Optician assessment (visual acuity of 6/12 or less/ not seen an optician in the previous year); Podiatry assessment (foot condition a concern at baseline assessment).<br><br>1 OT visit. | "There were 27% fewer falls in residents receiving exercise programs and multifactorial intervention compared with controls, which did not reach statistical significance."<br><br>Risk factors (medication; no. of podiatry/ optician reviews; gait and balance) for falls can be reduced in residents of care homes. |
| Mahoney (2007) | Intermedite-intensity, Individual multifactorial intervention | Algorithm-based Assessment - medications, distant vision, balance & gait, some neurological deficits, cognition, mood, home functioning, & home safety. Recommendations & referrals (ophthalmology, podiatry, PT, OT) posted to primary care physicians.<br>Balance & leg strengthening exercises | Assessment: Nurse/ Therapist (Received 3 days of additional training from a geriatrician and PT on the intervention's multidisciplinary components.) | Face-to-Face; Group; 1:1; Telephone | Community | 12 months. | Assessment visit 2x first 3 weeks after enrollment then 11 monthly telephone calls.<br>Review of recommendations with primary physician within 1 month. | "An intermediate-intensity, community-based multifactorial intervention is not effective in decreasing falls in community-dwelling older adults, although it appears effective in certain subgroups. An exploratory analysis found that the rate of falls was 45% |

| Study (year) | Intervention | | | | | | | Key results reported by authors |
|---|---|---|---|---|---|---|---|---|
| | | given to those where PT was not recommended. All participants given longer-term exercise as a recommendation (walking & standing balance). | Referrals/ Recommendtions: GP; Ophthalmologist; Podiatrist; OT; PT (NR) | | | | Longer term exercise – walking ≥4-5 days/ week; Standing balance exercises 2-3 days/week | lower for those with a MMSE score less than 28." |
| Menz (2013) | Podiatry Treatment plus off-the-shelf Extra Depth footwear | Podiatry Treatment (DVA Funded) as clinically required. Off-the- shelf footwear 'Brian' style for men & 'Annie' style for women. Research staff measured participants' feet using a Brannock Device to ensure appropriate length and width. | Podiatrist; Research staff | Face-to-Face; 1:1 | Community | 16 weeks. | NR. | "…Wearing appropriately fitting, off-the-shelf, extra-depth footwear significantly reduces foot pain, improves foot function, and is associated with the development of fewer keratotic lesions over a 16 week period compared to usual podiatry care."<br><br>No significant difference in the proportion of fallers or number of Falls. |
| Perry (2008) | Balance Enhancing Facilitatory Insole | Participants fitted with walking shoes and both facilitatory and conventional insoles at baseline.<br><br>The intervention group wore the facilitatory insoles for 12 consecutive weeks. | NR | Face-to-Face; 1:1 | Community | 12 weeks | NR | "The facilitatory insole influenced the ability to control body motion when walking over uneven terrain…the magnitude of the effect was not significantly diminished after 12 weeks of wearing the facilitatory insole in daily life…"<br><br>"The insole appeared to reduce the incidence of falling from 45% to 25%; however, there is a need for a larger sample to verify this outcome." |
| Pujiula Blanch (2010) | Community-Based Multifactorial Intervention –<br><br>"Program for the prevention of falls in the elderly" | Interventions were integrated into the usual healthcare activity of the primary care team. Patients aged 70+ years attending a medical, nursing or social service, the programme was triggered in the electronic clinical history and recalled outstanding actions.<br><br>Community-based activities(information &advice, media, exercise programme, environmental changes, contacts with community reps).<br><br>Individual activities: Assessment & recommendations: medication | Professionals – Medical, Nursing or Social services<br><br>(Presentation & discussion of educational material. Specific training was provided). | Face-to-Face; Media | Community | 2 years | NR | "A multifactorial community intervention programme in people >70 years did not reduce the number of falls at 2 years, but a tendency to reduce their consequences was observed, and could be integrated within routine care activities." |

| Study (year) | Intervention | | | | | | | Key results reported by authors |
|---|---|---|---|---|---|---|---|---|
| | | control, Sensory assessment, physical exercise, nutrition, family, podiatry (footwear), home hazard prevention. | | | | | | |
| Russell (2010) | Standard Care plus Targeted Multifactorial Falls Prevention Programme.<br><br>(links to existing community services) | Standard care plus individualised referrals based on FROPCom Assessment to existing community services (PT, OT, podiatry, dietetics, and family physician) and health promotion recommendations.. Participants at high risk of falls (FROP-Com score >=25) were referred to a falls clinic for a comprehensive multidisciplinary assessment. | Assessment: physiotherapist, occupational therapist, doctor, or research Fellow<br><br>Referrals: physiotherapy, OT, podiatry, dietetics, family physician | Face-to-Face; 1:1 | Home | 12 months. | NR | "…a targeted intervention program based on a single multifactorial falls risk assessment and referrals to existing community services was not effective for preventing further falls and fall-related injury in older people discharged directly from home from an ED after a fall." |
| Spink (2008) | Routine Podiatry Plus Multi-faceted Podiatry Intervention | Routine podiatry plus intervention package: foot orthoses (for participants not currently wearing customised or prefabricated orthoses). Advice and provision of footwear (subsidised). Home based foot and ankle exercise programme. Education in falls prevention- booklet with overview of risk factors for falls and strategies to prevent falls. | Podiatrist (NS) | Face-to-Face; 1:1 | Community | 6 months | Home-based Exercise Programme:<br><br>30 minutes 3x per week for 6 months | "A multifaceted podiatry intervention was effective in reducing falls in community dwelling older people with disabling foot pain, suggesting that this approach may be a useful addition to existing falls prevention programmes."<br><br>"The observed 36% reduction in falls rate is similar to the reduction achieved with individually prescribed multiple component home based exercises…" |
| Wylie 2017 | Routine Podiatry Plus Multi-faceted Podiatry Intervention | Routine podiatry plus intervention package: foot orthoses (for participants not currently wearing customised or prefabricated orthoses). Advice and provision of footwear (subsidised). Home based foot and ankle exercise programme | Podiatrist supplies and fits footwear and orthoses; podiatrist trains care home staff or care home resident in foot and ankle exercises | Face to face; group or 1:1 sessions as appropriate | Care homes for older people | 3 months | Exercise programme:<br><br>Ankle exercises: 30 repetitions 3x per week; toe Exercise: 20 repetitions each foot 3x per week | "A podiatry intervention to reduce falls can be delivered to care home residents within a pilot randomised controlled trial of the intervention. Although not powered to determine effectiveness, these preliminary data provide justification for a larger trial" |

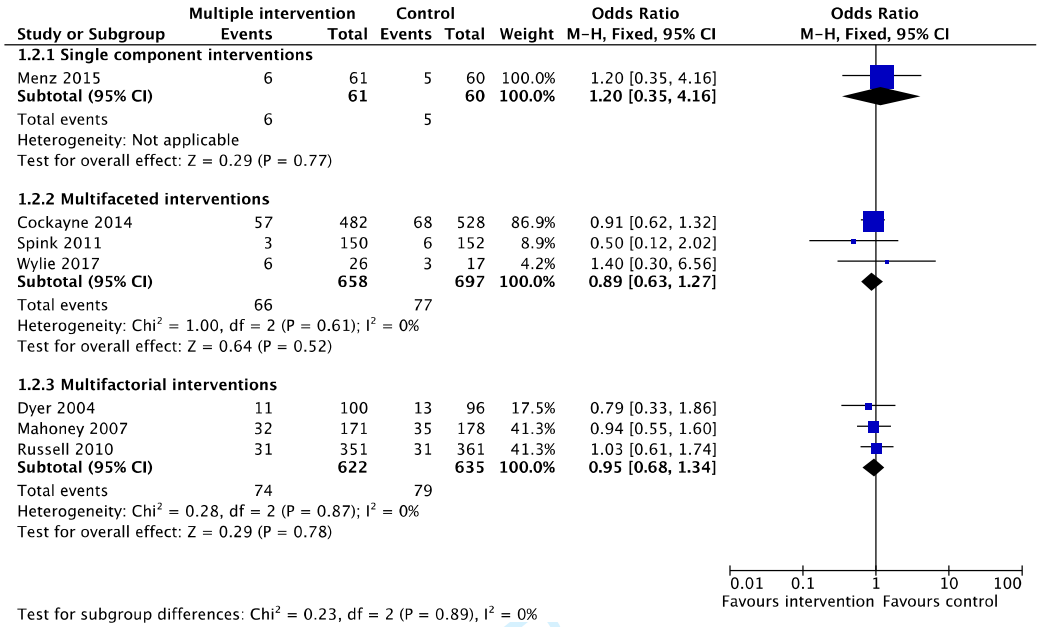
## S3. Risk of Bias Assessment with judgement details

| ***First author (year)*** | ***Randomisation (Selection bias)/*** *Support for judgement* | ***Allocation concealment (selection bias)/***Support for judgement | ***Blinding (Participants, Personnel) (performance bias/*** *Support for judgement* | ***Blinding (Outcomes) (detection bias)/****Support for judgement* | ***Incomplete outcome data (attrition bias)/****Support for judgement* | ***Selective reporting (reporting bias/****Support for judgement* | ***Other bias/****Support for judgement* |
|---|---|---|---|---|---|---|---|
| Cockayne, (2014,2017) | **LOW**/ Block randomisation to allocate participants. Participants mainly randomised 1:1; however, where sites had the capacity to see more or less than half the block size, an appropriate alternative allocation ratio was used | **LOW**/ Randomisation was carried out by the York Trials Unit (YTU) secure, remote computer randomisation service…. Prediction of allocated group by clinicians was not possible due to the dynamic nature of the randomisation and the use of a remote service; thus allocation concealment was maintained. | N/A | **HIGH**/ Open-RCT; Owing to the nature of the intervention, blinding of participants will not feasible. Blinding of members of the study team who are actively involved in the administration of the study and may collect primary outcome falls data or undertake data queries on secondary outcomes, or the health economist will not be possible. Members of the study team responsible for data entry and the statistical analysis of the study will be kept blind to group allocation... | **LOW**/Modified intention-to-treat (ITT) basis - some participants in both control and intervention groups excluded from analysis as did not return any fall diaries post-randomisation - similar numbers in both groups | **LOW**/All primary and secondary outcomes reported and timelines of 6 and 12 month results reported. Protocol published. | **LOW**/No other source of bias indicated. |
| Spink (2008, 2011) | **LOW** permuted block randomisation with mixed block lengths of four and six participants. | **LOW** : used an interactive voice response telephone service provided by the National Health and Medical Research Council Clinical Trials Centre at the University of Sydney | **HIGH**: but due to the nature of the trial, the participants will not be blinded to group allocation One podiatrist carried out all intervention work and control participants continued with routine podiatry | **LOW**/Participants were initially screened by phone for eligibility then assessed at baseline and at six months after baseline by an assessor blind to group allocation… Assessors will be blinded to group allocation | **LOW**/During analysis it was identified that one participant who should have been excluded from the study (owing to Parkinson's disease) was inadvertently included and allocated to the control group. To satisfy the intention to treat principle, 37 data for this participant were included in the analyses (this participant did not report any falls during the trial period). | **HIGH**/Limited data on secondary outcomes reported despite the large number of outcomes/ outcome measures reportedly used within the study. | **LOW**/ No other source of bias indicated. |
| Dyer (2004) | **LOW** Allocation sequence generated from computer-generated random number tables, and homes | **LOW**: The allocation sequence was performed and kept secure by a researcher independent of the study, and blinded to baseline assessment | UNCLEAR/ No details of participants or practitioners being blinded to allocation…cluster-RCT may make | **LOW** /A physiotherapist, nurse and an occupational therapist conducted baseline assessments of all participating residents and homes prior to randomisation. This team was independent of the teams employed for the | **LOW**/Analysis, where possible, has been implemented on an intention-to-treat analysis basis - appears to be all participants included in analysis | **HIGH**/ Not all secondary outcomes reported - number of injurious falls not reported. Process measures not indicated | **LOW** /No other source of bias indicated. |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| | ordered alphabetically and allocated according to odd and even numbers and size of home. | results | unblinding more likely… | intervention, and masked to allocation. | | initially reported as part of the results. | |
| Russell (2010) | **LOW** Randomization was performed using a computer-generated randomization list. | **LOW**: A researcher otherwise not involved in the project generated and held the randomization sequence. Randomization was performed at completion of the baseline assessment. | **UNCLEAR**/ Did not specify if participants/ personnel blinded to allocation | **LOW** /A research staff member unaware of group allocation telephoned participants who did not return their falls calendars… The research officers collecting the 12-month fol**LOW**-up data were unaware of randomization status | **LOW**/ All data were analyzed based on the intention-to-treat analysis principle, with the limitation that some participants withdrew or died after randomization but before data collection started... One deviation from protocol (reported) occurred when one standard care participant received the intervention protocol because of an assessor's error. This participant was included in the standard care group for analysis purposes | **LOW**/No protocol however all outcomes listed in methods reported within results section and table. | UNCLEAR/Hawthorne effect indicated however suggests that the falls calendars and regular fol**LOW**-up telephone calls could have influenced the outcome but such monitoring has been undertaken in a number of studies that found an intervention effect |
| Menz (2013, 2014) | **LOW** Permuted block randomization with random block sizes - mixed block lengths of six, and eight participants stratified by sex | **LOW**: Permuted block randomization with random block sizes will be undertaken using an interactive voice response telephone service provided by the NHMRC Clinical Trials Centre at the University of Sydney, New South Wales, Australia to ensure allocation concealment. | **HIGH** Due to the nature of the intervention, it was not possible to blind the participants or assessors. | **HIGH**/ However, data entry was performed by an assessor blinded to group allocation by ensuring that each assessor entered data for participants they did not assess at baseline. | **LOW**/ All analyses will be conducted on an intention-to-treat principle using all randomized participants | **LOW**/All primary and secondary outcome measures listed protocol and methods reported in the results section/ table | **LOW**/ No other source of bias indicated. |
| Perry (2008) | **UNCLEAR**/ Each participant performed the gait-perturbation protocol described below with both types of insoles, and was then randomly assigned to either the test or control group. | **UNCLEAR/** No details reported. | **UNCLEAR/** No details reported | **UNCLEAR/**No details provided. | **UNCLEAR/**Randomisation of participants into intervention and control groups not clear. Although exclusions/ withdrawals reported there is not comparison between the two groups. | **UNCLEAR/**Primary and secondary outcomes are not clearly stated within the methods section. Therefore it is difficult to know if all outcomes were reported. No protocol available. | **LOW**/ No other source of bias indicated. |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Mahoney (2007) | **LOW**/randomization to intervention or control groups was based on a computer-generated randomization table. | **LOW**/After baseline assessment, a research staff member opened a sealed envelope with study group assignment. | **HIGH**/Single-blinded | **UNCLEAR/** The study researcher, blinded to treatment assignment, called subjects who did not return calendars… a range of outcomes both subjective and objective could introduce bias | **LOW** /All analyses were conducted based on intention-totreat principle. All tests were two-tailed. A nominal P-value | **LOW** /All follow-up outcomes reported in methods recorded in results section. | **LOW**/ No other source of bias indicated. |
| Wylie (2017) | **UNCLEAR/**No details provided about randomisation sequence. | **LOW/** Randomisation was conducted via a concealed, web-based randomisation service provided by UK Clinical Research Collaboration (UKCRC) registered Tayside Clinical Trials Unit at the University of Dundee. | **HIGH/** Given the nature of the intervention it was not possible to blind participants and care home staff to group allocation… The rater maintained a diary of visits throughout the follow up period, and reported 11 instances of unblinding. | **LOW**/follow up measures were conducted by a rater who was a physiotherapist of 20 years experience (SM), trained in the conduct of all measures and who was unaware of participant allocation… however blinding of the rater was maintained by ensuring that access to research records indicating group allocation was restricted and by asking participants not to reveal their group allocation to the rater at the outset of each fol**LOW** up visit. | **UNCLEAR**/Analyses were carried out using the intention to treat principle, by multiple imputation of missing at random data | **LOW**/ All follow-up outcomes reported in methods recorded in results section. | **LOW**/No other source of bias indicated. |
| Pujiula (2010) | **UNCLEAR**/ No details provided about randomisation sequence. | **HIGH/**No random assignment | **HIGH/** Community-based intervention in two areas - integrated into routine healthcare | **UNCLEAR/**No details provided. | **HIGH**/ Randomised samples of the population were given the survey to complete therefore not all participants were included in outcome assessment. | **UNCLEAR/**Outcomes and outcome measures poorly reported in the text therefore difficult to determine if all outcomes reported. Protocol indicated but no details provided in the text. | **LOW**/ not other sources of bias indicated |

## S4. Forest plot: odds ratios for drop-out rates in included studies



**S5. Table of excluded studies**

| First author (Year) [Ref] | Reason for exclusion |
|---|---|
| Adams (2015) [1] | Not Podiatry |
| Abou-Raya (2013) [2] | Not Falls |
| Abreu (2015) [3] | Not Falls |
| Agmon (2014) [4] | Systematic Review – Not RCT/ q-RCT |
| Aizen (2015) [5] | Not Community/ Care Home |
| Al-Aama (2011) [6] | Systematic Review – Not RCT/ q-RCT |
| Albert (2015) [7] | Not Podiatry |
| Albert (2014) [8] | Not Podiatry |
| Albert (2016) [9] | Not RCT/ q-RCT |
| Alkalay (1984) [10] | Not Podiatry |
| Allen (1999) [11] | Not Podiatry |
| Allen (1986) [12] | Not Podiatry |
| Allen (2004) [13] | Not RCT/ q-RCT |
| Anderson (2012) [14] | Not Podiatry |
| Anon (2007) [15] | Not RCT/ q-RCT |
| Anon (2009) [16] | Not RCT/ q-RCT |
| Anon (2010) [17] | Not RCT/ q-RCT |
| Anon (2011) [18] | Not RCT/ q-RCT |
| Anon (2012) [19] | Not RCT/ q-RCT |
| Apfel (1992) [20] | Not RCT/ q-RCT |
| Arkkukangas (2015) [21] | Not Podiatry |
| Ashburn (2007) [22] | Not Podiatry |
| Assantachai (2002) [23] | Not Podiatry |

| First author (Year) [Ref] | Reason for exclusion |
|---|---|
| Atchison (1994) [24] | Not RCT/ q-RCT |
| Auais (2016) [25] | Not RCT/ q-RCT |
| Bae (2014) [26] | Not Falls |
| Ballard (2004) [27] | Not Podiatry |
| Balzer (2012) [28] | Systematic Review – Not RCT/ q-RCT |
| Barker (2015) [29] | Not Podiatry |
| Barry (2002) [30] | Not RCT/ q-RCT |
| Batchelor (2012) [31] | Not Podiatry |
| Batchelor (2009) [32] | Not Podiatry |
| Battle (2005) [33] | Not Podiatry |
| Beauvais (2014) [34] | Not RCT/ q-RCT |
| Becker (2003) [35] | Not Podiatry |
| Becker (2010) [36] | Not RCT/ q-RCT |
| Beling (2009) [37] | Not Podiatry |
| Berggren (2008) [38] | Not Community/ Care Home |
| Bernick (1999) [39] | Not RCT/ q-RCT |
| Bighea (2011) [40] | Not Podiatry |
| Black (2007) [41] | Not RCT/ q-RCT |
| Blake (2013) [42] | Not RCT/ q-RCT |
| Boehm (2014) [43] | Systematic Review - Not RCT/ q-RCT |
| Boninger (1998) [44] | Not Falls |
| Booth (2015) [45] | Systematic Review - Not RCT/ q-RCT |
| Borowicz (2016) [46] | Not RCT/ q-RCT |

| First author (Year) [Ref] | Reason for exclusion |
|---|---|
| Bourke (2008) [47] | Not Falls |
| Bowers (2013) [48] | Not RCT/ q-RCT |
| Bowling (1992a) [49] | Not Podiatry |
| Bowling (1992b) [50] | Not Podiatry |
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