CRD summary
This review assessed the effectiveness of podiatry interventions in patients with rheumatoid arthritis. The authors reported that foot orthoses and adaptations to hosiery and footwear design appear to have a beneficial effect in terms of foot pain. However, the paucity and poor quality of the evidence precludes firm conclusions being drawn. Further research is required.

Authors' objectives
To assess the effectiveness of podiatry interventions in patients with rheumatoid arthritis (RA).

Searching
The following electronic databases were searched from 1984 up to June 2004: PubMed, EMBASE, CINAHL, the Cochrane Database of Systematic Reviews, DARE, the Cochrane CENTRAL Register, the Cochrane Database of Systematic Reviews, the Cochrane Methodology Register, HTA and NHS EED; the search terms were reported. In addition, several journals were searched by hand: the British Journal of Podiatry (1998 to 2004), the Foot (1992 to 2004) and the Journal of British Podiatric Medicine (1991 to 1997). Only publications in the English language were included; unpublished data from conference presentations (oral and poster) and consultations with experts were excluded from the review.

Study selection
Study designs of evaluations included in the review
Randomised controlled trials (RCTs), controlled clinical trials, case-control studies, cohort studies and single-case studies or qualitative studies (including surveys and questionnaires) were eligible for inclusion. The duration of the studies varied from 1 day to 3 years.

Specific interventions included in the review
Studies assessing any mainstream podiatry interventions aimed at treating foot problems in people with RA were eligible for inclusion. Studies involving surgical interventions and corticosteroid injection therapy were excluded as they were not classed as mainstream interventions. The interventions included in the review were foot orthoses (including leg-hindfoot orthoses), footwear, physical therapy, callus debridement, hosiery, and combinations of these interventions. Where relevant, comparative groups included placebo, no intervention control, standard treatment (e.g. regular footwear, regular socks) and other interventions.

Participants included in the review
Studies that included adult patients (at least 18 years old) with RA were eligible for inclusion. The diagnosis of RA could be clinical or definitive; only 7 studies in the review reported that patients had RA according to the 1987 baseline criteria of the American College of Rheumatology. Most of the studies included in the review (12 studies) had both male and female participants; one study was dominated by male participants. Where reported, 86 participants were male and 221 were female (male-to-female ratio of 1:2.5) and the overall mean age was 59.15 years (range: 49.70 to 73). The mean duration of RA was 14.17 years (range: 3 to 30) with the mean age of disease onset being 44.98 years.

Outcomes assessed in the review
The authors did not state which types of outcome measure were eligible for inclusion. The types of outcomes included in the review were gait assessment, pain measurement, assessment of physical function, measurement of plantar foot pressure, treatment tolerance, structural assessment, range of motion, physical examination, visual observation, assessment of foot sensation and material compression.

How were decisions on the relevance of primary studies made?
The authors did not state how the papers were selected for the review, or how many reviewers performed the selection.

**Assessment of study quality**

The validity of the studies was not formally assessed. However, the evidence from the studies was graded using a system adopted by the Society of Chiropodists and Podiatrists. This awards a grade from A (high) to D (low) according to the study design used: i.e. evidence from RCTs (grade A), well-conducted clinical studies (grade B), non-experimental descriptive studies (grade C) and expert report/opinion/experience (grade D). The authors did not state how many reviewers performed the validity assessment, or how any discrepancies were resolved.

**Data extraction**

One reviewer extracted standard categories of data from the included studies using a predefined extraction form. The outcome data were recorded as reported in the original study reports and evidence statements were drafted for each study.

**Methods of synthesis**

**How were the studies combined?**

Given the significant heterogeneity between studies in terms of their populations, study designs, interventions and outcome measures, the studies were combined in a qualitative synthesis. The studies were grouped according to intervention type: foot orthoses; footwear; foot orthoses in combination with footwear; foot orthoses, footwear and physical therapy; padded hosiery; callus debridement; and referral to podiatrists as the source of footwear interventions.

**How were differences between studies investigated?**

Some differences between the studies were evident from the data tables and were discussed within the text of the review.

**Results of the review**

Sixteen studies (n=609) were included.

The evidence from 4 studies was classed as grade A, seven as grade B, two as grade C and three as grade D. The majority of the studies were small in size with most having fewer than 40 participants; only 5 studies had more than 80 participants.

**Foot orthoses (3 RCTs, 1 clinical trial, 2 repeated measure studies and 1 case report).**

All of the studies used different designs and types of foot orthoses; different outcome measures were also used. Three RCTs (all grade A) compared rigid custom-made foot orthoses with placebo foot orthoses. One RCT reported a significant improvement in Foot Function Index scores for the intervention group compared with the control group (P=0.026), but no significant differences in global pain score, Disease Activity Score, Health Assessment Questionnaire and Larsen radiological scores for hands and feet. Another RCT reported that intervention participants were 73% less likely to experience progression of hallux valgus (P=0.04). However, both this study and the third RCT reported little or no significant differences in measures of pain, disability and function.

Significantly reduced foot pressures and foot pain were also observed with different foot orthoses (as compared with regular shoes) in the repeated measures study (grade B). Similarly, pain, step length, stride length and physiological cost index were significantly improved with custom-made orthoses (compared with no orthoses) in one study (grade B). One repeated measures study (grade B) measuring velocity, cadence and stride, showed that only the level of change reported for stride was significantly improved (P<0.05) for the foot orthoses group in comparison with regular shoes. Finally, a case study (grade D) reported that a patient experienced substantial pain relief immediately and 22 months after having custom-formed leg/hindfoot orthoses fitted; increased in velocity, cadence, stride length and single limb stance were also reported (significance not assessed).

**Footwear (1 RCT with repeated measures and 2 questionnaires).**
One small RCT (grade B) showed that participants in the intervention group (extra-depth shoes for 2 months) showed significant improvements in the following outcomes when compared with a no treatment control group: physical function (P=0.0001), walk pain (P=0.0002), stair pain (P=0.0001) and pain-free walk time (P=0.0007). There was no increase in the use of arthritis medication or walking aids when compared with the control group. The 2 studies using questionnaires reported that, overall, most patients were satisfied with the intervention footwear (78.8%), but women were more dissatisfied with the style of the footwear (P=0.0004). Participants also reported problems with the weight of the footwear (28%), calefaction (heat) (49%) and comfort (42%).

Foot orthoses in combination with footwear (1 RCT and 1 prevalence study).

The prevalence study (grade B) showed that of the 99 participants, 95 had no special shoes or inserts, 1 had an orthotic insert and 3 had custom-made shoes. The RCT (grade A) showed that pain scores were improved in patients who wore semi-rigid insoles in extra depth shoes for 12 weeks in comparison with extra depth shoes alone. However, there was no difference in pain scores when soft insoles in extra depth shoes were compared with extra depth shoes alone. Both interventions were associated with significant material compression (P<0.002) and neither intervention had a significant effect on synovitis or function. Just over half of the participants showed a preference for semi-rigid over soft orthoses.

Foot orthoses, footwear and physical therapy (2 case reports).

The specific details of the interventions varied between the 2 studies (both grade D). However, both studies reported that patients had improvements in gait (significance not assessed) and complete pain relief.

Padded hosiery (1 RCT with repeated measures).

Improvements in pressure relief (P<0.001) were reported for the 2 intervention groups (medium- and high-density padded hosiery) in comparison with bare feet (grade B). Painful symptoms (P<0.01) also decreased in the intervention groups in comparison with the patients' own socks. The participants indicated that they were satisfied with the interventions and would continue to wear them.

Callus debridement (1 clinical trial).

This grade B study reported significant reduction in forefoot pain immediately post-treatment. Peak pressures, peak forces and contact times on the painful forefoot were also reduced after callus removal, but the differences were not statistically significant. There was no change in global arthritis pain and the treatment effects were reported to disappear 7 days post-treatment.

Referral to podiatrists as the source of footwear interventions (1 questionnaire).

One Dutch questionnaire (grade C) reported that orthopaedists and rehabilitation practitioners strongly agreed with the prescription of orthopaedic footwear being considered for RA patients. The rate of prescription appeared to be related to beliefs about the advantages or disadvantages and satisfaction of the intervention, and not the desirability of prescription.

Authors’ conclusions

Firm conclusions about the effectiveness of podiatry interventions in people with RA could not be drawn because of the lack of good-quality evidence. However, foot orthoses and adaptations to hosiery and footwear design all appear, either alone or in combination with other interventions, to have a beneficial effect in terms of foot pain. The evidence for callus debridement was inconclusive.

CRD commentary

This review was based on a clear research question which defined inclusion criteria for the population, intervention and study design, but not outcome measures. A wide search of electronic databases was performed using detailed search terms, but studies might have been missed by the inclusion of only studies in English. In addition, publication bias might be a problem as the authors excluded unpublished work. Overall, it was difficult to assess the robustness of the
review methodology as the authors did not report how studies were assessed for inclusion and their quality assessed. They did, however, state that only one reviewer extracted data from the studies, which increases the risk of introducing bias and error. From the data presented, the assessment of quality also appears to have been purely a grading of evidence based on study design rather than a detailed study of individual study methodology, although the authors commented on the use of small sample sizes.

Given the heterogeneity between the included studies in terms of the intervention, population, study design and outcome measures, the authors were justified in using a narrative synthesis. This was supplemented by tables summarising details of the studies. However, it is sometimes difficult for the reader to assess the robustness of the authors’ interpretations, as details of sample sizes, comparators, participant characteristics and outcome data are not always reported for each individual study. Overall, given the data presented, the authors are justified in their cautious conclusions and are correct to recommend that further research is carried out.

**Implications of the review for practice and research**

**Practice:** The authors stated that foot orthoses and hosiery appear beneficial when used alone or in combination with other physical therapies. However, these recommendations are not supported by good-quality evidence.

**Research:** The authors stated that further research is required to fully assess the effectiveness of podiatry interventions in patients with RA. Future studies should provide baseline data; provide details of the intervention; directly compare interventions with other alternative podiatric interventions; use larger sample sizes; recruit participants based on the 1987 baseline criteria of the American College of Rheumatology; provide baseline details of the study population (i.e. age, gender, disease duration, disease status according to 1996 EULAR core criteria); use standardised outcome measures which include measures of local pain, global pain, foot function and general function (e.g. activities of daily living); use a prospective design which measures fluctuating disease changes (e.g. in RA) over time; and include qualitative research into the views of patients and practitioners.

**Bibliographic details**


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This is a critical abstract of a systematic review that meets the criteria for inclusion on DARE. Each critical abstract contains a brief summary of the review methods, results and conclusions followed by a detailed critical assessment on the reliability of the review and the conclusions drawn.