

## Appraisal

## Critically appraised paper: Stable supportive shoes improved knee pain more than flat flexible shoes in people with moderate to severe radiographic medial knee osteoarthritis

## Synopsis

Summary of: Paterson KL, Bennell KL, Campbell PK, Metcalf BR, Wrigley TV, Kasza J, Hinman RS. The effect of flat flexible versus stable supportive shoes on knee osteoarthritis symptoms: a randomized trial. *Ann Intern Med.* 2021;174:462–471.

**Question:** Are flat flexible shoes superior to stable supportive shoes in improving walking knee pain and physical dysfunction in people with moderate to severe radiographic medial knee osteoarthritis? **Design:** Superiority randomised controlled trial with concealed allocation and blinded outcome assessment. **Setting:** Community participants from Melbourne, Australia. **Participants:** Adults aged  $\geq 50$  years with knee pain on most days of the past month; knee pain during walking in the past week of  $\geq 4$  on an 11-point numerical rating scale; and moderate to severe radiographic tibiofemoral osteoarthritis (Kellgren-Lawrence grade 3 to 4). Main exclusion criteria were: lateral  $\geq$  medial joint space narrowing, recent (past 6 months) or planned (next 6 months) knee surgery, and/or currently using shoe orthoses or customised shoes. Randomisation of 164 participants allocated 82 to flat flexible footwear and 82 to stable supportive footwear. **Interventions:** Flat flexible shoes had heel height  $< 15$  mm, shoe pitch  $< 10$  mm, no arch support, minimal sole rigidity and weighed  $\leq 200$  grams. Stable supportive shoes had heel height  $> 30$  mm, shoe pitch  $> 10$  mm, arch support, rigid sole and weighed  $> 300$  grams. Participants chose two different pairs within their allocated group and were advised to increase shoe wear by 1 hour/day until wearing the shoes as much as possible ( $\geq 6$  hours/day) for 6 months. **Outcome measures:** Primary outcomes were 6-month change in: average walking pain over the previous week via an 11-point numerical rating scale (0 = no pain, 10 = worst pain possible); and

physical function via the Western Ontario and McMaster Universities Osteoarthritis Index function subscale (0 = no dysfunction, 68 = maximum dysfunction). Secondary outcome measures were Knee Injury and Osteoarthritis Outcome Score subscales, pain in back/hips/knees/feet/ankles, health-related quality of life, physical activity and global changes in pain and physical function. **Results:** In total, 161 (98%) participants completed the study. There was no evidence found at 6 months that flat flexible shoes were superior to stable supportive shoes regarding any primary or secondary outcome. There was evidence showing a between-group difference in change in pain favouring stable supportive shoes (1.1 units, 95% CI 0.5 to 1.8), but not function (2.3 units, 95% CI  $-0.9$  to 5.5). Fewer participants reported adverse events with stable supportive shoes ( $n = 12$ , 15%) compared with flat flexible shoes ( $n = 26$ , 32%) (risk difference  $-0.17$ , 95% CI  $-0.30$  to  $-0.05$ ). **Conclusion:** Flat flexible shoes were not superior to stable supportive shoes. Stable supportive footwear resulted in greater reductions in walking knee pain over 6 months and may be a useful self-management strategy in this subgroup of patients with knee osteoarthritis.

**Provenance:** Invited. Not peer reviewed.

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## Commentary

A recent overview of international guideline recommendations on nonpharmacological and nonsurgical interventions for osteoarthritis reported conflicting advice on shoes for knee osteoarthritis.<sup>1</sup> This timely, high-quality randomised controlled trial addressed this issue by comparing two types of shoes for knee osteoarthritis patients. The authors hypothesised that flat flexible shoes would lead to greater improvements in knee pain and physical function compared to stable supportive shoes over 6 months. Interestingly, contrary to what they expected, stable supportive footwear led to greater reductions in knee pain during walking.

The study was well conducted with high internal validity. However, there were some limitations. First, the authors concluded that stable supportive footwear led to greater reductions in knee pain, but the differences with the flat flexible shoes did not meet the pre-specified minimum clinically important difference.<sup>2</sup> Second, the generalisability to clinical practice is limited, as guidelines state that you do not need radiography for non-surgical treatment of knee osteoarthritis.<sup>3</sup> Approximately half of the eligible patients with no or mild radiographic or non-medial osteoarthritis were excluded. The authors justified these inclusion criteria because people with moderate to severe knee osteoarthritis are more likely than those with mild disease to benefit from

footwear designed to reduce medial knee loading. However, this contradicts their statement in the discussion that it is unlikely that their findings would differ in the subgroup with mild knee osteoarthritis.

Overall, this high-quality randomised controlled trial brings us a step closer to answering the question of which shoes are most suitable in reducing pain in knee osteoarthritis.

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2. Chan LS. *Am J Public Health.* 2013;103:e24–e25.
3. Sakellariou G, et al. *Ann Rheum Dis.* 2017;76:1484–1494.