THE EFFECTS OF SHOES ON KNEE PAIN AND MEDIAL JOINT LOADING IN PERSONS WITH KNEE OSTEOARTHRITIS: A SYSTEMATIC REVIEW WITH META-ANALYSIS

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Purpose: Osteoarthritis (OA) is common in the medial knee, where mechanical load, as measured by the external knee adduction moment during walking (KAM), can worsen knee pain and accelerate joint damage. A variety of shoe types have been tried for their effects on knee pain and KAM in persons with knee OA, including: 1) shoes with rocker bottom soles, 2) shoes with variable stiffness midsoles, 3) mobility shoes designed to mimic barefoot gait, and 4) conventional shoes of varying heel height and stability. A summary of trial findings would valuably inform footwear prescription for knee OA and guide future investigation. The purpose of this systematic review was to determine, across published trials, the effects of these four shoe types on knee pain and KAM in persons with knee OA, and to characterize the methodological quality of these trials.

Methods: Following PRISMA recommendations, a systematic search of English and Portuguese language publications from the past 30 years was conducted within PubMed, Ovid Medline, Cumulative Index to Nursing and Allied Health Literature (CINAHL), and Embase. Citation lists of all previous reviews and included studies were hand searched. Two readers, blinded to author and journal, scored each study’s methodological quality 0–10 using the PEDro scale (Inter-reader ICC = 0.80 for total score, k= 0.58–1.00 for item scores). Disagreements were adjudicated in the presence of a third reader. Data were extracted using a modified Cochrane form, and results from each trial’s last follow-up assessment were pooled for each shoe type using random effects meta-analysis, and presented as standardized mean differences (SMD) with 95% confidence intervals (CIs) indicating the effects of shoe type on knee pain and peak KAM.

Results: Among 13 eligible trials, mean +/- sd PEDro score was 5.23 +/- 1.42 (range: 3.0, 8.0). Higher methodological quality scores were recorded for RCTs of variable stiffness shoes, and lower scores were recorded for single group before-after trials of conventional and mobility shoes. Based on limited evidence of moderate quality, conventional shoes increase peak KAM compared to barefoot walking [pooled SMD = 0.33 (95% CI: 0.18, 0.48) % body weight (BW)*height (ht)], with the greatest increases observed for stiffer shoes and shoes with elevated heels. Compared to walking in low heel conventional shoes, the effects on peak KAM of innovative shoe types are summarised with elevated heels. Compared to walking in low heel conventional shoes, the effects on peak KAM of innovative shoe types are summarised with elevated heels. Compared to walking in low heel conventional shoes, the effects on peak KAM of innovative shoe types are summarised with elevated heels. Compared to walking in low heel conventional shoes, the effects on peak KAM of innovative shoe types are summarised with elevated heels. Compared to walking in low heel conventional shoes, the effects on peak KAM of innovative shoe types are summarised with elevated heels. Compared to walking in low heel conventional shoes, the effects on peak KAM of innovative shoe types are summarised with elevated heels. Compared to walking in low heel conventional shoes, the effects on peak KAM of innovative shoe types are summarised with elevated heels. Compared to walking in low heel conventional shoes, the effects on peak KAM of innovative shoe types are summarised with elevated heels. Compared to walking in low heel conventional shoes, the effects on peak KAM of innovative shoe types are summarised with elevated heels. Compared to walking in low heel conventional shoes, the effects on peak KAM of innovative shoe types are summarised with elevated heels. Compared to walking in low heel conventional shoes, the effects on peak KAM of innovative shoe types are summarised with elevated heels. Compared to walking in low heel conventional shoes, the effects on peak KAM of innovative shoe types are summarised with elevated heels. Compared to walking in low heel conventional shoes, the effects on peak KAM of innovative shoe types are summarised with elevated heels. Compared to walking in low heel conventional shoes, the effects on peak KAM of innovative shoe types are summarised with elevated heels. Compared to walking in low heel conventional shoes, the effects on peak KAM of innovative shoe types are summarised with elevated heels.