

Longitudinal association between foot and ankle symptoms and worsening of symptomatic radiographic knee osteoarthritis: data from the osteoarthritis initiative



K.L. Paterson ^{†*}, J. Kasza [‡], D.J. Hunter ^{§||}, R.S. Hinman [†], H.B. Menz [¶], G. Peat [#],
K.L. Bennell [†]

[†] Centre for Health, Exercise and Sports Medicine, The University of Melbourne, Melbourne, Australia

[‡] Department of Epidemiology and Preventive Medicine, Monash University, Melbourne, Australia

[§] Institute of Bone and Joint Research, University of Sydney, Rheumatology Department, Royal North Shore Hospital Australia, Sydney, Australia

^{||} Kolling Institute, University of Sydney, Rheumatology Department, Royal North Shore Hospital Australia, Sydney, Australia

[¶] School of Allied Health, La Trobe University, Melbourne, Australia

[#] Arthritis Research UK Primary Care Centre, Research Institute for Primary Care & Health Sciences, Keele University, Keele, United Kingdom

ARTICLE INFO

Article history:

Received 20 January 2017

Accepted 2 May 2017

Keywords:

Knee osteoarthritis

Arthritis

Epidemiology

Foot

Ankle

Pain

SUMMARY

Objective: To assess whether foot and/or ankle symptoms are associated with an increased risk of worsening of knee pain and radiographic change in people with knee osteoarthritis (OA).

Methods: The presence and laterality of foot/ankle symptoms were recorded at baseline in 1368 participants from the Osteoarthritis Initiative (OAI) with symptomatic radiographic knee OA. Knee pain severity (measured using the Western Ontario and McMaster Universities Osteoarthritis Index pain subscale) and minimum medial tibiofemoral joint space (minJSW) width measured on X-ray were assessed yearly over the subsequent 4 years. Associations between foot/ankle symptoms and worsening of (1) knee pain, and (2) both knee pain and minJSW (i.e., symptomatic radiographic knee OA) were assessed using logistic regression.

Results: Foot/ankle symptoms in either foot/ankle significantly increased the odds of knee pain worsening (adjusted OR 1.54, 95% CI 1.25 to 1.91). Laterality analysis showed ipsilateral (adjusted OR 1.50, 95% CI 1.07 to 2.10), contralateral (adjusted OR 1.44, 95% CI 1.02 to 2.06) and bilateral foot/ankle symptoms (adjusted OR 1.61, 95% CI 1.22 to 2.13) were all associated with knee pain worsening in the follow up period. There was no association between foot/ankle symptoms and worsening of symptomatic radiographic knee OA.

Conclusion: The presence of foot/ankle symptoms in people with symptomatic radiographic knee OA was associated with increased risk of knee pain worsening, but not worsening of symptomatic radiographic knee OA, over the subsequent 4 years. Future studies should investigate whether treatment of foot/ankle symptoms reduces the risk of knee pain worsening in people with knee OA.

© 2017 Osteoarthritis Research Society International. Published by Elsevier Ltd. All rights reserved.

Knee osteoarthritis (OA) is a major public health problem that causes substantial pain, physical dysfunction and impaired quality-of-life. There is no cure for knee OA and the disease often progresses to advanced stages. Although there is a discordance

between knee pain and joint deterioration¹, both are drivers of costly joint replacement surgery². Therefore, it is important to identify risk factors that are associated with the worsening of knee symptoms, with and without concurrent structural deterioration, in an attempt to prevent disease progression.

Researchers have identified a number of risk factors for the worsening of knee OA symptoms and structure, such as age, ethnicity and malalignment^{3,4}, however modifiable risk factors are required to prevent progression to advanced disease and/or surgery. To date, the strongest known modifiable risk factors for worsening of knee pain in people with knee OA are a higher body

* Address correspondence and reprint requests to: K.L. Paterson, Centre for Health Exercise and Sports Medicine, Department of Physiotherapy, School of Health Sciences, University of Melbourne, Parkville, Victoria, 3010, Australia. Fax: 61-3-8344-4188.

E-mail address: kade.paterson@unimelb.edu.au (K.L. Paterson).

mass index (BMI) and infrapatellar fat pad or intercondylar synovitis⁴, whilst a recent meta-analysis identified greater knee pain at baseline as the only modifiable risk factor associated with structural progression³. Although these risk factors are potentially modifiable, weight loss interventions have poor compliance and limited long-term success⁵ and the remaining risk factors are likely to be symptoms or sequelae of OA and thus it is unclear whether targeted treatment would slow disease progression.

A potential risk factor for worsening knee OA that has not been investigated is foot/ankle symptoms. Concurrent symptoms at the foot, ankle and knee occur more often than any other multi-joint pain presentation, and their co-occurrence substantially increases the risk of problems with walking, standing and rising from sitting compared to single- and other multi-joint symptoms⁶. In people with knee OA, cross-sectional studies have shown that the presence of foot/ankle symptoms is also associated with worse knee symptoms, health-related quality-of-life, depressive symptoms and functional abilities⁷. More recently, our longitudinal study showed that foot/ankle symptoms are an independent risk factor for developing knee OA in people free of the disease but at risk⁸. Potential mechanisms linking foot/ankle symptoms and incident knee OA, such as foot pronation, inappropriate footwear or widespread pain⁸, may also increase the risk for worsening in those with OA. However, as incident disease is a different phenomenon to worsening OA and risk factors may not be consistent across both, it is necessary to separately establish the association of foot/ankle symptoms with worsening OA. This is important as worse knee pain and greater radiographic severity are predictors of progression to arthroplasty². Knowledge of risk factors in those with knee OA can provide insight into why the disease progresses in some individuals but not others and help identify potential new treatment targets for future clinical trials⁹. Therefore, the aim of this study was to investigate whether the presence of foot/ankle symptoms at baseline is associated with an increased risk of worsening of (1) knee pain, and (2) both knee pain and radiographic change, in people with symptomatic radiographic knee OA.

Methods

Study population

Data were obtained from the Osteoarthritis Initiative (OAI), an online and publically available database (<http://www.oai.ecsf.edu/>). The OAI is a prospective multi-centre cohort study of 4796 participants aged between 45 and 79 years who have existing knee OA, or who are considered at-risk of the disease. The participants were recruited from four sites throughout the United States including Baltimore, Maryland; Columbus, Ohio; Pittsburgh, Pennsylvania; and Pawtucket, Rhode Island. The institutional review board at each site approved all protocols and procedures and all participants provided informed consent. Further details regarding the wider OAI study protocols can be found online¹⁰. Our study included OAI participants with established symptomatic radiographic knee OA ($n = 1368$), defined as both knee symptoms (pain, aching or stiffness in and around the knee on most days of the month for at least 1 month in the previous year¹¹) and radiographic evidence of knee OA (Kellgren and Lawrence [KL] grade ≥ 2) in at least one knee. If knee OA was present in both knees then both were included in the analyses.

Demographic characteristics and covariates

Demographic characteristics collected included age, sex and race (White, Black/African American or Asian/other non-white). Covariates included BMI, baseline Western Ontario and McMaster

Universities Osteoarthritis Index (WOMAC) pain, depression measured using the Centre for Epidemiological Studies Depression Scale (CES-D)¹², worst baseline KL grade, baseline minimum medial tibiofemoral joint space width (minJSW), baseline tibial rim distance (defined as the distance between the anterior or posterior margin of the tibia, and the tibial margin of the joint space), and comorbidities assessed using the questionnaire version of the Charlson comorbidity index (CCI)¹³. The CCI derives a weighted score based on the presence or absence of 14 different comorbidities such as stroke, diabetes, asthma, and kidney failure, amongst others, and we dichotomised the cohort into those with 'no comorbidities' (CCI = 0) and those with 'one or more comorbidities' (CCI ≥ 1) based on the total CCI score. Data on individual comorbidities is provided in [Supplementary Table 1](#). For descriptive purposes, we also classified participants as obese ($>30 \text{ kg/m}^2$), overweight (≥ 25 and $\leq 30 \text{ kg/m}^2$) or healthy weight ($<25 \text{ kg/m}^2$). Scores on the CES-D were summed and a score of ≥ 16 was used to indicate significant depressive symptoms¹².

Foot/ankle symptoms

Self-reported foot/ankle symptoms were recorded for each of the left and right feet at baseline. Foot/ankle symptoms were defined as pain, aching or stiffness in the foot and/or ankle on more than half of the days during the past 30 days, consistent with previously published definitions^{6,14}. We classified participants as having or not having foot/ankle symptoms, as well as classifying foot/ankle symptoms as ipsilateral, contralateral or bilateral relative to the affected knee.

Outcomes

We investigated worsening of (1) knee pain and; (2) both knee pain and radiographic knee OA. Knee pain severity was determined using the WOMAC pain subscale at baseline and the 12, 24, 36 and 48 month follow-up visits¹⁵. The WOMAC pain subscale is comprised of five items and responses are recorded on a 5-point Likert scale. Scores were summed (range of 0–20) and converted to a 0–100 normalised scale, with higher scores indicating worse pain. We defined knee pain worsening as an increase of at least 9 points on the 0–100 WOMAC pain scale from baseline at any of the subsequent follow up visits, based on previously published smallest detectable difference values^{16,17}, and consistent with recent definitions used by others investigating risk factors for symptomatic progression in knee OA¹⁸. People with a baseline WOMAC pain score >91 (and thus unable to worsen according to this definition) were excluded from these analyses.

To assess worsening of radiographic knee OA, weightbearing fixed-flexion posteroanterior radiographs of each knee were taken at baseline and at the 12, 24, 36 and 48 month visits. Radiographs were read centrally and automated software was used to identify the tibial and femoral margins of the knee joint from digitised copies of the radiographs¹⁹. To determine the minJSW, the software measured the smallest distance between the tibia and the femur in the medial knee joint compartment in millimeters. Worsening of radiographic knee OA was defined as a medial tibiofemoral minJSW decrease of ≥ 0.7 mm from baseline, based on the Osteoarthritis Research Society International and Outcome Measures in Rheumatology minimal detectable difference cut-off value²⁰. People with a baseline minJSW score of <0.7 mm (and thus unable to worsen according to this definition) were also excluded from this analysis. A detailed outline of participant inclusion for each of the two aims is presented in [Fig. 1](#).

Download English Version:

<https://daneshyari.com/en/article/5669234>

Download Persian Version:

<https://daneshyari.com/article/5669234>

[Daneshyari.com](https://daneshyari.com)