ORAL PRESENTATION





Foot kinematics in people with medial compartment knee osteoarthritis

Pazit Levinger^{1*}, Hylton B Menz¹, Adam D Morrow¹, Julian A Feller¹, John R Bartlett², Neil Bergman²

From Australasian Podiatry Council Conference 2011 Melbourne, Australia. 26-29 April 2011

Background

Foot orthoses are commonly used in the management of knee osteoarthritis (OA), although the relationship between foot function and knee OA is still unclear. Therefore, the aim of this study was to compare tibial, rearfoot and forefoot motion during gait in people with and without medial compartment knee OA.

Methods

Motion of the tibia, rearfoot and forefoot in 32 patients with clinically and radiographically-confirmed medial compartment knee OA (mean age 65.84 ± 7.57 , height 168.83 ± 9.54 cm, body mass 85.13 ± 13.67 kg) and 28 age-matched controls (mean age 65.22 ± 11.41 , height 168.61 ± 10.64 cm, body mass 73.12 ± 15.49 kg) was investigated using a three dimensional motion analysis system incorporating a multisegment foot model (the Oxford Foot Model). Multivariate analysis was used to investigate the differences between the groups for peaks and ranges of motion with gait velocity entered as a covariate.

Results

The knee OA group demonstrated greater peak rearfoot eversion (-3.8° ± 4.6 vs -0.7° ± 3.9; p < 0.001), contacted the ground with a more everted rearfoot at initial contact ($0.6^{\circ}\pm 5.4$ vs $3.8^{\circ}\pm 3.7$; p < 0.001) and exhibited reduced rearfoot frontal plane range of motion ($8.6^{\circ}\pm 2.7$ vs $10.4^{\circ}\pm 2.6$; p = 0.02) and rearfoot peak inversion ($4.8^{\circ}\pm 5.4$ vs $9.6^{\circ}\pm 3.6$; p < 0.001). The tibia was more internally rotated throughout the gait cycle with reduced range of motion ($9.7^{\circ}\pm 4.2$ vs $14.4^{\circ}\pm 4.0$; p = 0.001) and peak external rotation compared to the control group (-20.1° ± 6.5 vs -27.6° ± 6.4; p = 0.002). Moreover,

* Correspondence: p.levinger@latrobe.edu.au

¹Musculoskeletal Research Centre, Faculty of Health Sciences, La Trobe University, Melbourne, Vic, 3086, Australia

Full list of author information is available at the end of the article



the tibia was tilted significantly more laterally in the knee OA group (7.8° \pm 3.4 vs 4.0° \pm 1.9; p < 0.001) indicating a genu varum malalignment.

Conclusions

People with medial compartment knee OA exhibit altered foot kinematics during gait that are indicative of a less mobile, flat foot deformity. Given that genu varum is a common feature in medial compartment knee OA, it is likely that the kinematic pattern observed occurs as a result of compensatory foot pronation to enable the foot to be plantigrade during gait.

Author details

¹Musculoskeletal Research Centre, Faculty of Health Sciences, La Trobe University, Melbourne, Vic, 3086, Australia. ²Warringal Medical Centre, Melbourne, Vic, 3084, Australia.

Published: 20 May 2011

doi:10.1186/1757-1146-4-S1-O27

Cite this article as: Levinger *et al.*: Foot kinematics in people with medial compartment knee osteoarthritis. *Journal of Foot and Ankle Research* 2011 4(Suppl 1):O27.

Submit your next manuscript to BioMed Central and take full advantage of:

- Convenient online submission
- Thorough peer review
- No space constraints or color figure charges
- Immediate publication on acceptance
- Inclusion in PubMed, CAS, Scopus and Google Scholar
- Research which is freely available for redistribution

) Bio Med Central

Submit your manuscript at www.biomedcentral.com/submit

© 2011 Levinger et al; licensee BioMed Central Ltd. This is an open access article distributed under the terms of the Creative Commons Attribution License (http://creativecommons.org/licenses/by/2.0), which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.