Reviewer's report

Title: Pedobarographic and kinematic analysis in the functional evaluation of two post-operative forefoot offloading shoes

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Reviewer: Malindu Eranga Fernando

Reviewer's report:

I commend the authors on this paper which aimed to compare the effects on lower limb joint kinematics and kinetics of a full-outsole forefoot offloading shoe (FOS) with a traditional half-shoe, while a normal comfortable shoe was used as a control. I believe the authors are attempting to add to the body of evidence with respect to kinematic data in the presence of a lot of emphasis placed on plantar pressures in the literature. I believe the methods section can be further justified and needs to have some more clarity surrounding a few points I have raised below. The data seems to be sound, however more clear explanations of what was compared to what needs to be made within context of the below comments and their limitations. The figures supplement the work and to my knowledge, the standards of reporting have been consistent with requirements. I believe there are several grammatical errors within the paper however, which warrants review by an editor. The conclusions and discussion can be further supported by elaborating on the methodological limitations and additional factors of relevance in the study which have not been clearly justified as it currently stands.

Major Compulsory revisions;

1. The authors state in the introduction that ‘In order for the results not to be affected by different clinical histories and treatments, the study was conducted on a population of healthy participants.’ I think the authors need to make a clearer justification of what this study adds to the literature and why studying a healthy female cohort is likely to assist in understanding how FOS work? This is especially important as the authors make several references in the discussion to the implications of the footwear in elderly people. Although the shoe might work effectively in healthy ‘female’ controls it could be argued that differences in kinematics and kinetics which occur due to pathology and in the case of surgery which occur post-surgery would affect these parameters. How can the current study be rationalised within the context of why the shoes are used for in the first place?

2. Secondly, my opinion is that a more clear explanation of the control used needs to be made. I.e. I understand that the authors used an interventional shoe on one limb and a control shoe on the contralateral limb. However, I am not quite sure what was being compared to what. I.e. were comparisons made between left and right? If not why not? This needs to be made somewhat clearer. Can the authors also specify the corrected alpha value to determine significance within the text? I think this would give the reader an idea of what the new p-value is for
comparison as opposed to p<0.05. The corrected alpha value used in Bonferroni correction along with its limitations also needs to be stated and clarified to give context of significant differences in outcomes between comparisons here.

3. Lastly, as the primary aim of this study is to add to the literature regarding kinematic parameters concerning the use of FOS, some justification of the marker placement issues at the foot needs to be given within the context of this being a major limitation of this study. So can the authors clarify how the reflective markers on the foot were placed during gait while wearing the shoe in the methods section? Perhaps some elaboration is needed here in regards to methods. I can see that some reference to it is made in the discussion but a small deviation in the lateral malleolus marker can have a profound impact on the kinematic chain and I believe warrants some elaboration. The same applies to the foot markers.

Minor essential revisions;

4. Abstract line 53; should read ‘treatment.’
5. Results section line 70; should be ‘at the rearfoot’
6. Line 71; should read ‘highest’
7. Line 85; should read ‘lesser toe’ rather than ‘toes’
8. Line 96; not sure what ‘appropriate and ‘inappropriate use’ is, please define and make more clear
9. Line 110-112; the authors propose that the ‘FOS should work by having minimum kinematic and kinetic alterations which may cause discomfort while walking’ I would like some clarity about what the authors mean here, i.e. how do they propose the shoe works to reduce fore foot plantar pressure in this case for example without altering these characteristics?
10. Line 125; should read as ‘a control.’
11. Methods section; Can the authors justify why walking speed wasn’t controlled as a pathological condition was not being studied in this study? It could be argued that a more comfortable shoe vs. a less comfortable shoe is likely to alter Temporo-spatial parameters, although in the current study this does not seem to be the case. I think some clarity and justification about why walking speed wasn’t controlled might be useful in detailing the methods.
12. Line 192; should read ‘Man-Whitney U test’
13. Lines 208 and 214; should read to ‘the control’
14. Line 227; I understand the only significant pressure variable on the contralateral limb was an elevated PTI on the contralateral foot when using the half-shoe. Can the authors elaborate on the implications of this for patients for example?
15. Results section, kinetic data; I understand the authors state that they investigated kinetics of the lower limb. However, I do not see any reference to measured ground reaction force for example. Can authors clarify whether this data was measured and why it was not reported?
16. Line 265 should read ‘distal’ or ‘plantar’ depending on what the meaning the authors intend is an not anterior as anterior refers to the dorsal surface in this instance.
17. Line 283 should read ‘joint’ not ‘joints’
18. Line 291; should read ‘helped in shifting’
19. Line 292; should read ‘at the forefoot’
20. Line 295; should read ‘than the control’

Discretionary Revisions;
21. In the discussion the authors make reference to the difference of height in the intervention shoe compared to the control shoe. I wonder whether any measurements concerning inherent limb length was performed to see whether the participant’s had any differences in limb length which was likely to influence results.

Level of interest: An article whose findings are important to those with closely related research interests

Quality of written English: Needs some language corrections before being published

Statistical review: Yes, and I have assessed the statistics in my report.

Declaration of competing interests:

I declare that I have no competing interests’