Reviewer’s report

Title: Comparison of dynamic navicular motion measured using the stretch-sensor between barefoot, shod, treadmill and over-ground walking and running: A cross sectional study

Version: 2
Date: 30 October 2014

Reviewer: Ian Mathieson

Reviewer’s report:

This is a well conducted study that is focused and clearly written and presented. The inclusion of an appendix considering how the study fares against the STROBE statement is a useful inclusion. The authors have taken some steps to improve the quality of the measurements and to minimise the risk of bias, and is written in a style that will encourage reader engagement. The data are presented clearly, and from table 2 it is easy to see the origin of the p values returned. These test results inform appropriate conclusions that are in keeping with the aims and objectives of the study.

No major compulsory revisions

No minor essential revisions

Discretionary revisions:

1. Reconsider the title so that as opposed to listing a series of states, a series of comparisons are presented. Only one barefoot condition - treadmill walking at the same pace as over-ground walking - was performed and I feel that the title does not reflect this as it suggests that barefoot running was also recorded.

2. In the 2nd paragraph of the background I recommend stating that the stretch sensor may be a valuable tool in evaluating the efficacy of interventions designed to control motion.

3. By including further labelling of figures 2 and 3, please provide details of the precise derivation of magnitude and peak velocity of navicular motion.

4. Please provide a few more details on the poor quality data. Was data recorded in these trials at all, or did the sensor become completely detached? Would you recommend the use of a sticky skin preparation to improve adhesion?

5. The data analysis section states that, depending on the condition assessed, between 40 - 120 steps were analysed. Given that reliability figures from only one previous study are presented, and this is a new technology, I wonder if more details of the reliability could have been included in this paper to build a more detailed understanding of reliability? It would also be useful to signify in table 2 the number of steps upon which the data are based for each condition.
6. The study is described as being of a cross-sectional design. I would expect to see such a description of a study in which, for example, diagnosis was being assessed and subjects with and without the condition of interest were evaluated. Could the authors please explain the rationale for describing the study as a cross-sectional one, and why 'experimental' is unsuitable?

7. It is a shame that a semi-randomised test condition order was not used, although the discussion does quite rightly point out that this could have led to a systematic error due to fatigue. Suggestions for how this could be overcome in future studies could be presented.

8. Comparison against STROBE is a useful inclusion, and some good points certainly emerge from this. However, the rationale for the selection of this tool requires explanation. For example, elements of the CONSORT statement might also be useful, e.g. the benefits of the use of an independent, blinded, researcher for recording and analysing data, which could also minimise a potential source of bias and so apply equally. Information on the study personnel recording and analysing data should also be provided.

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

**Quality of written English:** Acceptable

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

**Declaration of competing interests:**

I declare that I have no competing interests