Reviewer's report

Title: A comparison of lower limb EMG and ground reaction forces between barefoot and shod gait in participants with Diabetic Neuropathic and Healthy controls

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Reviewer: George S Murley

Reviewer's report:

This study investigated lower limb EMG and ground reaction forces between barefoot and shoe gait in participants with diabetic neuropathy and in healthy controls. The authors investigated whether there were interactions between the participants groups and shod/unshod gait and the effect of lower limb EMG and ground reaction forces.

1. Is the question posed by the authors new and well defined?
   Yes

2. Are the methods appropriate and well described, and are sufficient details provided to replicate the work?
   Partially

3. Are the data sound and well controlled?
   Yes

4. Does the manuscript adhere to the relevant standards for reporting and data deposition?
   Yes

5. Are the discussion and conclusions well balanced and adequately supported by the data?
   Partially

6. Do the title and abstract accurately convey what has been found?
Yes

7. Is the writing acceptable?
Partially

Major Compulsory Revisions (which the author must respond to before a decision on publication can be reached)

Background section:
1. Page 3 – second paragraph: ‘Kinetic during gait’ does not make sense. Is this meant to read ‘kinetics’ or ‘kinetic parameters’?

2. Page 3 – second paragraph: The following sentence requires careful revision by the authors because as it is written, it implies that altered biomechanics have been shown to have a ‘cause and effect’ relationship with neuropathic ulceration:

3. All of these alterations play an important role in foot ulcer formation, in addition to other autonomic complications (Cavanagh et al, 1993; Salsich and Mueller, 2000).

4. Page 4 – end of first paragraph. The use of ‘therefore’ at the start of the last sentence is incorrect. The sentences proceeding the last sentence do not explain why the ‘biomechanical adjustments during shod gait in patients with diabetic neuropathy are not yet clear’.

5. Page 4 – second paragraph, line 5 – this should be a new sentence.

6. Page 4 – The 3rd paragraph needs a short introduction because it does not link with paragraph 2. Something like: There are several mechanisms by which footwear may influence lower biomechanics. It has been suggested that less ankle range motion...

7. Page 4 – 4th paragraph, line 2. Change to ‘higher’ plantar arch.

8. Page 5 – last paragraph of background section. Change to ‘aimed to compare’ to ensure past tense.


Methods section:
11. 1st paragraph – ‘The volunteers have assigned an informed consent’ does not make sense.

12. 1st paragraph – Change to: …due to alterations ‘in gait’.

Results section:
14. The structure of the results section is awkward and difficult to follow. At the very least, I suggest presenting the ‘group’ effects first so that the reader gets an initial impression as to whether the groups are fundamentally different in their gait. Also, why have the authors chosen to include the ‘trend’ of an interaction effect under this heading?

15. 1st paragraph. ‘Stance phase time’ and ‘cadence’ are not the same parameter. Please use consistent terminology.

16. The title ‘Condition effect’ should not be underlined

17. Under title ‘group’ effect – square brackets should be used as per section ‘condition effect’ above it.

18. Page 8 – last sentence – change to: …‘compared to controls’.

19. In the results section it would be useful to state that there were ‘no significant Group x Condition interaction effects’.

20. The finding of a significantly group effect for the 2nd vertical peak is not described in the results section but is later commented on in the discussion section.

Discussion
21. Page 9 – 2nd paragraph, line sentence. What is meant by ‘once gait can be considered a usual task’. How did the authors investigate this?

22. Page 10 – final paragraph, first line. Can the authors justify why they believe that the alteration in muscle activity with shoes was ‘different’ comparing the controls and diabetic participants when there were no significant group x condition interaction effects found in this study? I can see that the shoes sometimes caused significant changes for the diabetic group and not the control group and vice-versa, however this does not mean that footwear influences the groups in a significantly different manner.


24. The last two paragraphs of the discussion are vague and speculative.

Conclusions
25. The last two sentences should be reversed.

Figures 1 and 2
26. It is almost impossible to tell the difference in the line patterns used for CGbare and DGbare.

27. None of the arrow lines in the figures are straight.
28. There is an in-text space missing in the caption for figure 1.
29. In the caption for figure 1 and 2, capitals should not be used for the muscles.

Table 1

30. Why are the effect sizes only presented for the group comparisons? What about the ‘condition’ effects and the ‘group x condition’ effects?

Table 2

31. Text alignment and formatting of this table is inconsistent.

**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:** No, the manuscript does not need to be seen by a statistician.

**Declaration of competing interests:**

I declare that I have no competing interests