Reviewer's report

Title: Lower limb EMG and ground reaction forces comparison between barefoot and shod gait in Diabetic Neuropathic subjects

Version: 1 Date: 15 September 2009

Reviewer: Michael Hahn

Reviewer's report:

This manuscript reports on an investigation of whether biomechanical changes occur in diabetic subjects during shod gait, as compared to healthy controls. The authors have established that this particular gap in the literature does indeed exist, and have completed a straightforward study to address it. However, there are many aspects of the manuscript that negate the potential impact of this study. Much can be done to make this paper more readable, and enhance its impact in the scientific literature.

Major Compulsory Revisions:

Abstract:
1. The abstract need revised much in the same way that the whole manuscript needs revised.
   - Section leads need capitalized (editorial detail)
   - nomenclature describing ground reaction force data need to be revised to better match what is in the gait literature (eg. ‘first antero-posterior peak’ and ‘load attenuation’ are usually referred to as the ‘braking force’ … and vertical GRF is not generally referred to as ‘propulsion’)
   - The conclusions section needs completely re-written. At present it makes little sense. Again this is also reflected in the conclusions section of the manuscript’s main body.

Background: 2. Page 3, 3rd paragraph; This is not really a paragraph as it has only one sentence. Suggest moving it to be the last sentence of the previous paragraph.
3. End of Page 3 and beginning of Page 4; This text is repeated word-for-word in a later section on Page 5 (last paragraph of Background section).
4. Page 5, last paragraph of the Background section; There is no reference in this paragraph is EMG or ground reaction forces mentioned. A purpose statement specific to the title’s two main areas would be good. Furthermore, specific hypotheses would be nice.

Methods:
5. Page 5, last line; What is the justification for excluding subjects for
being over 65 years of age?

6. Page 7, Statistical analysis paragraph: This section is a bit vague, with no reasoning or justification as to why the various statistical tests were performed. For example, why were two separate post-hoc tests performed? The confusion of this section actually comes out later in the Results section as well, when the reader is left wondering why the author is switching back and forth between different tests to reveal their findings. The study design doesn’t appear to be complex enough to warrant these analytical meanderings.

Results:

7. Page 8, last sentence of 2nd paragraph: This is clearly an interpretive statement. Such statements belong in the Discussion section, not the Results section. Please revise entire section accordingly.

8. As mentioned above in the Methods section, the Results section is quite difficult to wade through, due to the meandering nature of reporting given to the statistical tests. I think these can be substantially minimized and enhance the readability of both sections.

Discussion:

9. Page 12, first paragraph: Please revise sentences that start with “In despite of that, …” This needs to be remedied in the Results section as well.

10. Page 12, last sentence of first paragraph: This statement really has no valuable contribution as it is currently written.

11. Page 12, 2nd paragraph: This paragraph gives very little attention to the TA. While the present study did not show an effect of diabetes or shoe condition, the fact that other studies have presented contradictory findings indicates that some discussion should be provided as to why these differences in research outcomes are coming about.

Conclusions:

12. Page 12, 2nd sentence of last paragraph: This statement does not follow the first sentence. The authors have not established a connection between a lack of delay in vastus lateralis and both a diminished 2nd vertical GRF peak and reduced braking force in early stance. To state that “Therefore, it diminishes the second vertical force peak, …” is very over-reaching, and in fact not logical in regards to the data presented.

13. Page 12, 2nd paragraph: A sentence or two should be added to discuss possible future avenues of research. Additionally, there should be some statements to address how these findings could be applied to the diabetic neuropathy population. How will these findings inform any aspect of their clinical life? Minor Essential Revisions:

1. Page 4, 3rd paragraph, last sentence: A reduced range of motion cannot ‘damage’ eccentric control, however it may result in a ‘loss of’
eccentric control. 2. Page 4, 3rd paragraph, last sentence; Also, when the authors say ‘flat foot phase’ do they mean the phase from ‘foot-flat’ to ‘heel-off’, or from ‘heel-strike’ to ‘foot-flat’? From the surrounding context, I would guess it is the eccentric dorsiflexor control of the plantarflexing motion occurring from heel-strike to foot-flat.

3. Page 4, 2nd line from the end; What exactly is an “unknown inability”? This wording is exceptionally confusing.

4. Page 6, 2nd paragraph of ‘Procedure’ section; The word ‘trichotomy’ seems inappropriately used. My definition of trichotomy is: a splitting into three parts. What did you intend to say? Perhaps exfoliation? Or shaving? Or abrading?

5. Discretionary Revisions:
   1. It seems odd that there would not be a figure for the Antero-posterior GRF data. If a primary finding of reduced braking force is presented in the results and discussed, then it would warrant a figure similar to Figures 1-4.

What next?
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Based on your assessment of the validity of the manuscript, what do you advise should be the next step?

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- Yes, and I have assessed the statistics in my report.

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