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

Version: 2 Date: 9 December 2009

Reviewer: Michael Hahn

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Overall, the manuscript is much improved. The authors have addressed most of my concerns with the initial submission. There remain a few areas within the manuscript that could use re-wording. The tables need some formatting, and some of the conclusions could still be improved upon.

Minor Essential Revisions:
- Throughout the manuscript, the word ‘breaking’ is used to describe the first phase of the antero-posterior GRF curve. I believe this word should be ‘braking’.
- Also, throughout the manuscript, the authors refer to a Gastrocnemius Lateralis. I believe the more commonly used nomenclature is “Lateral Gastrocnemius”.

Abstract
- line 11-13; replace sentence with “Diabetic individuals had a delay in the lateral gastrocnemius EMG activity with no delay in the vastus lateralis.”
- last sentence; Please revise to “Though changes in motor strategy were apparent, the biomechanical did not support the argument that the use of shoes contributes to altered motor responses during gait.”

Background
- Page 3, line 3-4; Should read “The previously described gait alterations are suspected …”
- Page 3, line 11; Should read “Kinetic changes during gait have also been observed, including altered ground reaction …”
- Page 4, 2nd paragraph; This paragraph is really very bad. It is not a paragraph, but a very long run-on sentence. The first statement speaks of footwear and prevention of diabetic ulcers, then the remainder goes into the effect of shoes on every condition except diabetes.
- Page 5, 2nd line; ‘aims’ should be ‘aimed’.
- Page 5, line 4-5; Should read “It was hypothesized that walking with shoes influences the plantar sensory information available, resulting in altered ground reaction forces and delayed muscle activity.”
- Page 5, last sentence of Background section; The authors mention that changes may be smaller in diabetic participants compared to controls … Is this a tested hypothesis in this paper? I don’t think it is. If not, then it should be saved
for the Discussion section. Otherwise, it waters down the hypothesis that is stated and tested in this paper.

Methods
- Page 5, line 4-5 of the ‘subjects’ sub-section; Sentence should read “The volunteers provided written informed consent …”
- Page 6, Procedure sub-section; When referencing the location of AMTI, you should provide both city and state (eg. Watertown, MA, USA)
- Page 6, Numerical and Statistical analysis sub-section; Was the zero lag 4th order low-pass filter used for the EMG a Butterworth filter?
- Page 6, 2nd line of Numerical and Statistical analysis sub-section; ‘filtered’ should be ‘filter’
- Page 6, 2nd line from the bottom; should read “…with a cutoff frequency of 100 Hz, and then normalized …”
- Page 7, 1st line; should read “… a custom-written program using Matlab …”
- Alpha levels are usually in probability form, not percentage (et. 0.05, not 5%)

Results
- 2nd line of section; If something is not statistically significant, you should either give the actual p-value (if you want to talk about a trend for example), or give no p-value.
- Page 8, Group effect sub-section; ‘comparing’ should be ‘compared’ in this case

Discussion
- Page 9, 5th line; remove “presented evidence to”
- Page 9, 6th line; ‘delayed’ should be ‘delays’
- Page 9, 7th line; ‘altered’ should be ‘alters’
- Page 9, 8th line; should read “…adjustments during shod gait compared to controls since …”
- Page 9, last sentence in 2nd paragraph; This sentence makes no sense to me.
- Page 10, 1st line; remove ‘be’ and change ‘increasing’ to ‘increase
- Page 10, 2nd paragraph; This paragraph is a bit too much inference. Not having calculated ankle moments, the gap between gastrocnemius activation and the 2nd vertical GRF peak, is not directly linked enough to give this argument the full strength that the authors have given it.
- Page 10, 3rd paragraph; After the thorough discussion given to the other primary findings in previous paragraphs, it seems that this paragraph on A-P GRF peaks is overly brief. I suggest expanding it to discuss why the diabetic group had a higher horizontal braking force. Furthermore, the authors should explicitly state why the A-P GRF is similar to the higher vertical GRF peak.
- Page 11, 9th line; Suggest replacing 'Although' with 'However'
- Page 12, 3rd line; The reference to ‘frequency of activation’ does not make sense? What exactly do you mean to refer to here?
- Page 12, 5th line; Should read, “The altered patterns exhibited by neuropathic participants in adapting motor strategies with or without …”
- Page 12, 11th line; Should read, “ … therapeutic intervention that aims for a better …”

Conclusion

- Page 12, 2nd line of section; Should read, “ … lateralis activity compared with the non-diabetic participants. However there was a …”
- Page 12, 5th line of section; Should read, “ … data to support the notion that diabetic participants adjust their motor response due to the use of shoes.”

Tables

- Tables should not be Full justified. Keep either Left or Center justification.

- For both tables, the last sentence of the caption should read, “Effect size (mean difference (95% CI)) is also provided for each variable.

- When listing the Group cross Condition, I would suggest using the ‘x’ character to signify ‘cross’. The current asterisk appears to indicate a superscripted footnote.

- The symbol descriptions beneath each table are not really needed, as the ANOVA section of each table lists out the p-values for Group, Condition and Group X Condition. The reader should be able to take the known alpha level of 0.05 in to account when perusing these tables.

- In both tables, the sample size is incompletely listed (n=??).