Author's response to reviews

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

Authors:

Isabel CN Sacco (icnsacco@usp.br)
Paula MH Akashi (p.akashi@usp.br)
Ewald M Hennig (ewald.hennig@uni-due.de)

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Author's response to reviews: see over
Dr Rikki Graham, PhD
Senior Assistant Editor BMC-series journals

We, the authors, would like to resubmit the present paper “A comparison of lower limb EMG and ground reaction forces between barefoot and shod gait in participants with Diabetic Neuropathic and Healthy controls” in a revised form, as suggested. We also sent a covering letter responding to the reviewers comments on a point-by-point basis.

Sincerely,

Paula Akashi
Responses to the reviewers' comments on a point-by-point basis

**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:** 3  
**Date:** 4 January 2009

**Reviewer #1:** Michael Hahn

We thank the reviewer for the constructive comment on our manuscript. Your suggestions and remarks have helped us to reflect on the manuscript and make a better version. We thank you for your commitment and effort.

Below we respond to your remark on point-by-point basis. First your comment is given in **Bold**, subsequently we provide our answer. In the text we **underlined** the changes we made to this version.

**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’.
  
The correction was made along the text. The word “breaking” was substituted by “braking”.

- Also, throughout the manuscript, the authors refer to a Gastrocnemius Lateralis. I believe the more commonly used nomenclature is “Lateral Gastrocnemius”.
  
The correction was made along the text. The word “Gastrocnemius Lateralis” was substituted by “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.”

The reviewer’s suggestion was made along the abstract.

- 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.”

The reviewer’s suggestion was made at the end of the abstract.

Background
- Page 3, line 3-4; Should read “The previously described gait alterations are suspected …”

The reviewer’s suggestion was made along these lines.

- Page 3, line 11; Should read “Kinetic changes during gait have also been observed, including altered ground reaction …”

The reviewer’s suggestion was made in the line 11. The second reviewer also had suggested the words “kinetic parameters”. The sentence now is: “Kinetic parameter changes …”

- 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.

Because the authors have not found any biomechanical study comparing diabetic individuals and their shoes when walking, the authors have decided to bring those studies with other populations. The paragraph was re-written in the text.

- Page 5, 2nd line; ‘aims’ should be ‘aimed’.

We corrected this word in the text.
- 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.”
The sentence was corrected according to the suggestion.

- 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.
We agree with the Reviewer and the last sentence was taken off from the background section.

Methods
- Page 5, line 4-5 of the ‘subjects’ sub-section; Sentence should read “The volunteers provided written informed consent ...”
The sentence was corrected according to the suggestion.

- Page 6, Procedure sub-section; When referencing the location of AMTI, you should provide both city and state (eg. Watertown, MA, USA)
The state MA was included according to the suggestion.

- Page 6, Numerical and Statistical analysis sub-section; Was the zero lag 4th order low-pass filter used for the EMG a Butterworth filter?
Yes, it was. We included this information in the text.

- Page 6, 2nd line of Numerical and Statistical analysis sub-section; ‘filtered’ should be ‘filter’
The correction was made in the text.
- Page 6, 2nd line from the bottom; should read “…with a cutoff frequency of 100 Hz, and then normalized …”
The correction was made in the text.

- Page 7, 1st line; should read “ … a custom-written program using Matlab …”
The correction was made in the text.

Alpha levels are usually in probability form, not percentage (et. 0.05, not 5%)
The correction was made in the text.

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.
We included the p-value for both comparisons made.

- Page 8, Group effect sub-section; ‘comparing’ should be ‘compared’ in this case.
- 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 …”
All of the above suggestions were corrected in the text.

- Page 9, last sentence in 2nd paragraph; This sentence makes no sense to me.
We agree with the Reviewer that this sentence sounds awkward and was taken off the manuscript.

- Page 10, 1st line; remove ‘be’ and change ‘increasing’ to ‘increase’
The correction was made in the text.
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.

We agree with the Reviewer and we added, by the end of this paragraph, the sentence “and may have influenced its magnitude” in order to soften the inference of the relationship between the gastrocnemius activation and 2nd vertical GRF peak.

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.

We agree with the Reviewer that this referenced discussion was superficial and a deeper discussion was added about the AP GRF.

Page 11, 9th line; Suggest replacing ‘Although’ with ‘However’

The correction was made.

Page 12, 3rd line; The reference to ‘frequency of activation’ does not make sense?

What exactly do you mean to refer to here?

We meant recruitment firing rate. This was corrected in the text.

Page 12, 5th line; Should read, “The altered patterns exhibited by neuropathic participants in adapting motor strategies with or without …”

The word “showed” was replaced by “exhibited”.

Page 12, 11th line; Should read, “ … therapeutic intervention that aims for a better …”

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.”

All of the above suggestions were corrected in the text.

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

The tables are all Center justified.

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

We added the sentence at the caption as you recommended.

- 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.

We added the “X” in the table as you recommended.

- 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.

We excluded the symbols used to represent differences between groups and conditions.

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

We completed the sample size properly.
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 #2: George S Murley

We thank the reviewer for the constructive and extended comments on our manuscript. Your suggestions and remarks have helped us to reflect on the manuscript and make a better version. We thank you for your commitment and effort.

Below we respond to your remark on point-by-point basis. First your comment is given in **Bold**, subsequently we provide our answer. In the text we *underlined* the changes we made to this version.

**Major Compulsory Revisions**

1. **Page 3 – second paragraph:** ‘Kinetic during gait’ does not make sense. Is this meant to read ‘kinetics’ or ‘kinetic parameters’?
   The word “parameters” was added to the text.

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: 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).
   All of the biomechanical alterations described may predispose to foot ulceration, but they are not the only factor. The sentence was rephrased to minimize the “cause and effect” implication that may be confused.
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’.

The word “therefore” was taken off the sentence.

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

This paragraph was rewritten according to the suggestion of the reviewer. Please check in the new text.

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...

We agree with the reviewer’s suggestion and the sentence that introduces the paragraph is now in the text.

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

The word “increased” was changed by “higher”.

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

The change was made in the text, as suggested.


Manufacteur and city were added to the text.


The change was made in the text, as suggested.
11. 1st paragraph – ‘The volunteers have assigned an informed consent’ does not make sense.
The sentence was changed to “The volunteers provided written informed consent to participate in the study” as it was suggested by the other reviewer.

12. 1st paragraph – Change to: …due to alterations ‘in gait’.
The change was made in the text as suggested.

The sentence that defines “habitual shoes” was insert in the first paragraph of the procedure section.

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?
We agree with the reviewer and Group effect is now presented first in the results section.
The authors have decided to use a “trend” on interaction effect because the trend was really strong - marginally significant (as statistians used to write) (p = 0.06). The p values that we considered a “trend” – marginally significant - were added in the end of last paragraph in Numerical and Statistical analysis section.

15. 1st paragraph. ‘Stance phase time’ and ‘cadence’ are not the same parameter. Please use consistent terminology.
The intention of verify if the stance phase time was similar between the groups was to assure that both of them presented similar gait cadence, once differences in stance phase could be caused by different cadences adopted by the subjects.
16. The title ‘Condition effect’ should not be underlined
The title “Condition effect” is no longer underlined.

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

18. Page 8 – last sentence – change to: ‘compared to controls’.
The sentence was taken off the results section, as it was suggested by the other reviewer.

19. In the results section it would be useful to state that there were ‘no significant Group x Condition interaction effects’.
The reviewer’s suggestion was made among the text.

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.
It is described in the last sentence, just before the condition effect section title.

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?
The authors did not investigate if gait is considered a usual task, it is just a general opinion. We decided to take this opinion off the manuscript.

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.

Apparently, the interaction between the use of shoes and altered afferent sensory information has lead to adjustments in efferent muscular responses, which modified the lower limb biomechanical kinetic parameters. It was not only the use of shoes that caused these changes, nor the sensorial deficit; it was their interaction. We included this discussion in the revised text.

The change was made in the text, as suggested.

24. The last two paragraphs of the discussion are vague and speculative.
These last two paragraphs lead to future investigations that can be done with the diabetic population.

Conclusions
25. The last two sentences should be reversed.
Changes were made in the conclusion section.

Figures 1 and 2
26. It is almost impossible to tell the difference in the line patterns used for CGbare and DGbare.
We changed the line patterns in the figures, so the difference between them could be better noticed.

27. None of the arrow lines in the figures are straight.
The arrows were corrected in the figures.

28. There is an in-text space missing in the caption for figure 1.
It was corrected in the new revised caption.
29. In the caption for figure 1 and 2, capitals should not be used for the muscles. It was corrected in the new revised caption.

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?
The ‘condition’ effects is now showed in the new table but we opt not to show the effect size for interaction since there was no significant difference in this effect. The table would be very busy if one more effect size (not significant) were added.

Table 2

31. Text alignment and formatting of this table is inconsistent
We correct the formatting and alignment as suggested by both reviewers.