Author's response to reviews

Title: Classification of the midfoot; neutral, low arched or high arched

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Author's response to reviews: see over
Dear Editorial board, Editor, Mr. Mathieson, Mr. Martin, and Mr. Murley

Re.: Coverletter giving point-by-point response to the concerns by the Editor, Mr. Mathieson, Mr. Martin and Mr. Murley.

The submitted manuscript entitled "Classification of the foot; neutral, low arched or high arched" to Journal of Foot and Ankle Research was reviewed by editor, Mr. Murley, Mr. Martin, and Mr. Mathieson. We would like to thank the editor and the 3 referees for some useful and relevant comments on the paper.
We are convinced that a revised manuscript based on these comments will improve the paper significantly.
We have revised the manuscript and added a point-by-point response to the comments by the editor and the referees. You will find this on the following pages.

We look forward to hearing from you in due cause.

Yours faithfully

Mette K. Nilsson, Rikke Friis, Maria S. Michaelsen, Patrick A. Jakobsen and Rasmus Ø. Nielsen.
Point-by-point response to the concerns by referee 1: The editor:

Can the authors please:

General comments:

1. Submit their manuscript using the outline recommended by the journal. A template can be found at: http://www.jfootankleres.com/info/instructions/

AUTHORS RESPONSE: We apologize for the mistakes in the previous submissions. We hope that current submission has been submitted correctly.

2. Review the manuscript for spelling and grammatical errors. The manuscript has significantly improved since the previous submission. However, it is not acceptable for publication in its current form. I strongly urge the authors to consider using an English editing service such as 'EDANZ' (http://edanzediting.com/).

AUTHORS RESPONSE: We apologize for the spelling and grammatical errors. An English editing service has revised the manuscript.

3. Revise manuscript to not start any sentences with abbreviations or numbers.

AUTHORS RESPONSE: Corrected

4. Replace the word 'subjects' with 'participants'.

AUTHORS RESPONSE: Corrected

5. Review the use of 'et al [ref]' which should be 'et al. [ref]' .

AUTHORS RESPONSE: Corrected

6. Review in text references. When referencing an article, add 'et al. [ref]' if there are more than two authors (e.g., Williams [4] should be Williams et al. [4]).

AUTHORS RESPONSE: Corrected

7. Tables
   i. remove vertical lines from all tables

AUTHORS RESPONSE: Added
   ii. when referring to the min-max (the range), replace - with to (e.g., 18-64 should be 18 to 64).
AUTHORS RESPONSE: Corrected

8. Figures
   i. Please refer to the Figures in the manuscript

AUTHORS RESPONSE: Corrected

ii. Please add a figure legend for each figure in the 'Figure legends' section of the manuscript. Please elaborate on the 'numbers' used for each landmark.

AUTHORS RESPONSE: Corrected

iii. Remove the date that the photo was taken for each image

AUTHORS RESPONSE: Corrected

Specific comments:

Abstract:
Methods: Were the measurements taken in a non-weightbearing and weightbearing position? Or were they both taken in a weight-bearing position, one in subtalar joint neutral and the other in a resting position?

AUTHORS RESPONSE: Very good point, the range of motion was taken in both weightbearing. This is corrected throughout the article.

Results section: specify if it is the 68 or 95% prediction limits/intervals.

AUTHORS RESPONSE: Corrected

Introduction:
Page 2, 4th last line: Clarify if ROM is taken by measuring subtalar neutral versus subtalar resting position (BOTH weightbearing).

AUTHORS RESPONSE: Corrected

Page 3, 7th last line: delete the word 'on'.

AUTHORS RESPONSE: Corrected

Page 3, 4th last line: replace the word 'article' with 'study'.

AUTHORS RESPONSE: Corrected

Methods:
Page 4, paragraph 2: It is unclear if all measurements were taken in a weightbearing position (subtalar neutral versus resting position).

AUTHORS RESPONSE: Corrected
Page 4, paragraph 3: Replace all instances of the word 'caput' with 'head'.
Replace 'metatarsi' with 'metatarsal'.

AUTHORS RESPONSE: Corrected

When referring to previous studies regarding the reliability of the measurements, the authors need to include exact values (e.g., ICCs = 0.88) in addition to stating 'good reliability' etc.

AUTHORS RESPONSE: Corrected

Statistics:
Multiple regression analysis: Clarify if it was multivariate linear regression analysis (as opposed to logistic regression analysis). State that B coefficients (with SE) were determined. State p-values < 0.05 were statistically significant for these analyses. Was R squared determined for each model?

AUTHORS RESPONSE: Corrected in the methods section and in table 4. R squared was determined in each model. Currently, we have not reported the R squared value. Please let us know if we should add the R value in table 4.

Results:
Replace 'persons included' with 'participants'.

AUTHORS RESPONSE: Corrected

List p-values to three decimal points (e.g., 0.00204 should be 0.002).

AUTHORS RESPONSE: Corrected

Replace the word 'merged' with 'pooled'.

AUTHORS RESPONSE: Corrected

Why has the abbreviation 'ND' been used. Should it be 'NH ROM'?

AUTHORS RESPONSE: Very good consideration. Navicular Drop is a commonly used term throughout the literature. Therefore, we believe that Navicular Drop is a more well known term than Navicular Height range of motion (NH ROM). As a consequence ND is used instead of Navicular Height range of motion.

Use subsections for the results (e.g., participant characteristics; multivariate linear regression analyses).

AUTHORS RESPONSE: Corrected

The authors use the word 'arch'...should it be 'MLA'?
AUTHORS RESPONSE: Corrected

The authors use the word 'LAA neutral'...what is the meaning of the word neutral?

AUTHORS RESPONSE: In this study the term “Neutral” refers to the range between the 16 and 84 percentile (68 % prediction limit). This definition is used for LAA, Feiss line, and Navicular Height. However, the word neutral is now replaced by normal according to comments below.

Multivariate linear regression analyses: Please state the direction of your associations.

AUTHORS RESPONSE: Corrected

Tables:
The tables should be embedded within the document (using the template previously advised), rather than inserted as 'Additional files'.

AUTHORS RESPONSE: Tables are now embedded.

There are several unacceptable spelling and formatting errors in the tables.

AUTHORS RESPONSE: We apologize for the spelling and grammatical errors. An English editing service has revised the manuscript.

Table 1: Delete the 'weight / height 2' in the BMI cell. The values in the rows for the variable 'Previous injuries during the last 12 months' are unclear. Remove the square brackets from the column titled '95% CI'.

AUTHORS RESPONSE: Corrected

Table 2: Add '95%' before the word 'CI' in the titles.

AUTHORS RESPONSE: Corrected

Clarify: 'Range of motion represents the difference between subtalar neutral position and weight bearing position'. Is it subtalar joint neutral and resting in a weight-bearing position?

AUTHORS RESPONSE: Corrected

The word 'normal' should be used to describe the 'normal values' rather than the word 'neutral'.

AUTHORS RESPONSE: Corrected except when describing “subtalar neutral position”.

Table 3, title" Replace the word 'neutral' with 'normal'.
Table 4: should 'N' be 'n'? Is there a need to report p-values for the intercept variables?

**AUTHORS RESPONSE:** Corrected. P values for the intercept deleted.

Discussion:
Please review the spelling and grammar thoroughly.

**AUTHORS RESPONSE:** We apologize for the spelling and grammatical errors. The English editing service Edanz has revised the manuscript.

Replace the word 'neutral' with 'normal' when referring to normal ranges of values for your measures.

**AUTHORS RESPONSE:** Corrected

Revise the use of the word 'ND' as suggested previously.

**AUTHORS RESPONSE:** This concern has been addressed previously

The limitations of the study need to be acknowledged. I suggest calculating normal range of values with cut-offs for a normalised measure of NH (as suggested by reviewer Dr Murley).

**AUTHORS RESPONSE:** We have now rewritten the discussion. In the discussion an equation to calculate the cut off values for Navicular Height (and the other tests) is presented. By using this equation a normalized range for navicular height (and other measures) can be calculated by taking into account foot size. We believe that such equation provides a better way to present cut off values than a table or a graph. However, the authors are willing to add a table and / or move the equation to the results section if this improves the quality of the article?

References:
Please review reference 9. Is there a journal name

**AUTHORS RESPONSE:** Reference now updated with journal name: American Journal of the Medical Sciences.
Point-by-point response to the concerns by referee 1: Mr. Mathieson:

This submission constitutes a substantial revision of the original manuscript that addresses the issues expressed in the original review. The article is now appropriately focused and warrants publication.

I have no major compulsory revisions.

I have several minor essential revision:

1. The method should provide more information on the origin of the subjects. Specifically, information on the actual rather than general origin of the subjects should be provided. For example, were they accessed via a specific database, how were they contacted, and where were they brought for data collection?

**AUTHORS RESPONSE:** We have now provided information on the origin of the subjects in the methods section: “Thirteen different companies in Jutland, Denmark were contacted and asked to let employees with standing work participate in the study. Eight companies accepted to take part and their employees were asked to participate during their working hours. The sample population was adult citizens from Central and Northern Denmark who was able to stand with the subtalar joint in neutral position. Informed written consent was obtained from the participants prior to the measurements. A total of 258 agreed to participate. Four participants were excluded because of data loss. Finally, 254 volunteers aged 18 to 68 years were included.”

2. Page 4 'procedure' paragraph: What is meant by 'definitive information'?

**AUTHORS RESPONSE:** Words deleted.

3. Discussion: There are several grammatical errors:
   - P.6. ’...Brody reported normal amounts of ND to APPROXIMATE...' not '...to approximately...

**AUTHORS RESPONSE:** Corrected

- p.6. ’...Previously Dahle...' line 3 of this paragraph '...from were...'. Needs revision.

**AUTHORS RESPONSE:** Revised

- p.6. Final paragraph line 4: '...rear foot angle measured BY experienced foot care specialists...'  

**AUTHORS RESPONSE:** Corrected
It is clear that the authors intend using the measures for which they have presented normative values for prospectively investigating the association between arch height / arch movement and the development of injuries. Although the authors argue that for assessment of standing work situations measurement of arch height is sound, I have a conceptual issue with this that leads me to sound a warning: contemporary research (examples provided below) reveal the foot to be a complex multi-segmented unit, where motion does not just occur at certain sites that have classically been considered important. Therefore, focusing on the medial longitudinal arch in isolation may be flawed. As such I would urge the authors to seriously consider the inclusion of additional measures - such as the Foot Posture Index, that considers motion at additional segments - in such studies. We do not have the perfect 'foot-type' assessment tool yet, and therefore the issue of the validity of measures is one of the prime research considerations in research such as that proposed.


AUTHORS RESPONSE: We thank Mr. Mathieson for the concerns regarding single segment and multisegment issue. We are aware of the importance of the Foot Posture Index – therefore, we have now addressed how our findings could possibly benefit the Foot Posture Index. See the discussion section in the article for further details.

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

Quality of written English: Acceptable

Statistical review: Yes, but I do not feel adequately qualified to assess the statistics.

Declaration of competing interests:
I declare that I have no competing interests
Point-by-point response to the concerns by referee 1: Mr. Murley:

This study collected foot posture measurements from a relatively large cohort of adults. This data would then allow the investigators to quantify and objectively classify the distribution of foot posture among working adults in Central and Northern Denmark. A secondary aim was to investigate the relationship between hours worked, age and other anthropometric characteristics compared with the foot posture measurements obtained.

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

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

3. Are the data sound and well controlled?
   Partially

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)

There are several grammatical and formatting errors throughout the manuscript (including incorrect formatting of references).

AUTHORS RESPONSE: We apologize for the spelling and grammatical errors. An English editing service has revised the manuscript.

The underlined section of the following comment was not adequately addressed
in the author’s response to my first review (previously comment #6):

1. The final part of the introduction raises issues with ‘visual’ methods of foot classification. While I think some of these issues are fair ones, some arguments are based on old/out-dated references. There is a missed opportunity to incorporate well-recognised and current techniques (i.e. the Foot Posture Index). Relating to this issue, the authors have not acknowledged in either the Introduction or Discussion that there is already published work reporting ‘normative’ data for human foot posture, such as:

• Thomas JL, Kunkel MW, Lopez R, Sparks D. Radiographic values of the adult foot in a standardized population. Journal of Foot and Ankle Surgery 2006;45:3-12.

AUTHORS RESPONSE: In this article we wanted to present normative data for MLA in the sagittal plane only. We are aware of the importance of the Foot Posture Index as a multisegment assessment tool with normative values – therefore, we have now tried to discuss how our findings could possibly benefit the Foot Posture Index. Please refer to the discussion section in the article for further details.

2. The authors have acknowledged in their response that normalising measures of arch height is important; especially since they have also shown foot length significantly influences arch height alone. So why don’t they include a table showing ‘cut off values’ for ‘normalised’ navicular height, so that the reader can use these values to inform future research design?

AUTHORS RESPONSE: The discussion is now rewritten. In the discussion an equation to calculate the cut off values for Navicular Height (and the other tests) is presented. By using this equation a normalized range for navicular height (and other measures) can be calculated by taking into account foot size. We believe that such equation provides a better way to present cut off values than a table or a graph. However, the authors are willing to add a table and / or move the equation to the results section if this improves the quality of the article?

3. Page 1 — Introduction. The comment that prospective studies cannot be conducted without cut off values does not seem accurate. Prospect studies could include continuous measures and correlate occurrences of injury with foot posture, that is, without dichotomising foot posture into distinct groups.

AUTHORS RESPONSE: We thank Mr. Murley for a very nice consideration. This is clearly a flaw and the sentence is now deleted.

4. Page 5 – Results section. Pooling data from the left and right leg/s (i.e. ‘double dipping’) is problematic because it violates the assumption of independence with the statistical analysis. Refer to the article by Menz below.

Menz HB. Two feet, or one person? Problems associated with statistical analysis of paired data in foot and ankle medicine. Foot 2004;14:2-5.
AUTHORS RESPONSE: First and foremost we would like to thank Mr. Murley again. We have been looking for such a reference for quite some time. Based on the article by Mr. Menz we have now dropped pooling data from right and left foot. Instead we present data from one foot only (either left or right) for each participant. Therefore, the methods and the results section of the article are now changed due to the new findings.

5. Page 7 — second paragraph. The finding that age has no clinically significant affect on foot posture is an important finding/issue, and is not in agreement with other research. Again, the authors should refer to the work of: Redmond AC, Crane YZ, Menz HB. Normative values for the Foot Posture Index. Journal of Foot and Ankle Research 2008;1:1-6

AUTHORS RESPONSE: We have added this to the discussion section: “The results of the multivariate linear regression analysis revealed that age only had an influence on LAA MV among males. However, the change in estimate per year was rather small. The influences of age are therefore considered clinically insignificant. This is in contrast to previous findings were a U-shaped patterns exists between age and foot posture among children, general population, and older adults {412 Redmond,A.C. 2008}. However, since no children and older adults were included in the current study, the insignificant influence of age of most midfoot measures may be explained by different age groups included in the two studies.”

Level of interest: An article of importance in its field

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'
**Point-by-point response to the concerns by referee 1: Mr. Martin:**

Overall the authors are commended for addressing the reviewers’ comments to create a much improved revised manuscript. The methods and results I think are clear and do not require any substantial changes. However the introduction and discussion need to be revised.

The introduction currently looks like one large paragraph that does not flow well. While I believe it contains of the necessary information it should be rewritten. I suggest the Introduction contain a total of 3 or 4 paragraphs. The first paragraph should clearly outline the problems or questions and their importance. The second and third should provide a brief rational for each question. The fourth paragraph should state the hypothesis or purpose.

**AUTHORS RESPONSE:** The introduction has been rewritten. Please refer to the manuscript for further details.

The Discussion likewise needs to be re-written. Similar to the Introduction I believe it contains all of the necessary information. However, the Discussion currently contains a number of one sentence paragraphs that do not flow well together. I suggest the opening paragraph of the Discussion should restate the problem or question with a brief summary of findings. The second paragraph should outline limitations of the study. The paragraphs that follow should then integrate the findings of this current study with available literature.

**AUTHORS RESPONSE:** The discussion has been rewritten. Please refer to the manuscript for further details.

With these changes, the manuscript should be a nice contribution to the current literature.

**Level of interest:** An article of outstanding merit and interest in its field

**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'