Author's response to reviews

Title: Foot kinematics in patients with two patterns of pathological plantar hyperkeratosis

Authors:

Andrew Findlow (a.h.findlow@salford.ac.uk)
Christopher J Nester (c.j.nester@salford.ac.uk)
Peter Bowker (P.Bowker@salford.ac.uk)

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Author's response to reviews: see over
Editors Changes:
1. The manuscript has not been submitted using the JFAR template as instructed in the author guidelines.
   Template downloaded and used.
2. Remove unnecessary capital letters from title. Also, fix typographical error - hyperkAratosis (hyperkeratosis).
   Both changes made.
3. Remove commas after abstract subheadings and replace with colons (:).
   Colons placed after abstract subheadings although, these were not in the template downloaded.
4. Page 3, Methods: must provide more detail regarding process of ethical approval.
   More information has been included regarding ethical approval.
5. Page 3, Methods: Figure 1 specifies an image of hyperkeratosis, but this is not in the manuscript, as Figure 1 demonstrates the marker set. Please add hyperkeratosis image and renumber figures accordingly.
   A new figure has been included with an example of the callus pattern for the two PPH groups. However, the quality/resolution is not that brilliant (taken with low resolution camera), this is why we decided to omit this figure from the original manuscript.
6. Page 4, Discussion paragraph 2- please change “Ho” to “HO”.
   Change made.
7. Tables - remove all vertical lines from all tables, and place table caption above table, not below it.
   Both changes made.
   All journal names updated inline with PubMed journals database abbreviations.
9. Figures: Figures 2-8 appear highly pixelated. This may be a limitation of the software used to produce them, however if there is an option to print to high resolution PDF from the software, we recommended doing this to ensure optimum clarity. The Figures will not be edited if the manuscript is accepted for publication.
   Unfortunately, I have tried the entire file format for saving figures in Matlab and this is the best quality where all the information/item/detail is kept in the correct proportion.
10. Please ensure that ALL changes made to the title and abstract are made to BOTH the manuscript file and the textboxes in the online submission system.
Reviewer: Ian Mathieson

Minor essential revisions:
1. Background, paragraph 1, line 1: ‘...on a the widely accepted...’. Revise to read fluently.
   Change made. – tracked changes
2. Background, paragraph 2, line 5; ‘...provides...' does not require an 's'.
   Change made. – tracked changes
3. Background, paragraph 3, line 8: ‘...that it is the clinically known to be...'. Revise to read fluently.
   Change made. – tracked changes
4. Results, paragraph 1, line 5: ‘...and but less than...'. Revise to read fluently.
   Change made. – tracked changes
5. Tables 2 & 4 refer to the groups as ‘group 1’ and ‘group 2’ whilst table 3 refers to the groups as ‘PPH 2,3,4’ and ‘PPH 1 and 5’. The groups should be labeled consistently.
   Change made. – tracked changes
6. There is no information on participants other than the number, limbs included, and confirmation of a negative history of lower limb injury or systemic disease. 'Foot-type' is a likely a continuum, and some information on the severity, duration, frequency of treatment, participant age and sex, and perhaps some other factors relevant to the extent of the lesions, would be useful in helping determine whether the two groups lay be positioned at the extreme ends of the foot type continuum or were perhaps closer together. Some comment on this issue is warranted as it may partially explain the findings of the study.
   Change made. – tracked changes
   An additional table (table 1) has been included and more description/information has been included in the main body/narrative
7. It may be difficult for many readers to understand the segment definitions and the angles evaluated and the authors should consider including an additional diagram illustrating this information, together with details on which direction of movement constitutes a +ve and -ve angular value. This will enhance understanding of the graphs and allow a wider readership to engage with the study.
   Change made. – tracked changes
   In formation has been included in the legends of table 3 and 4
8. The method states that a 'self-selected pace' was used. Was this established prior to data collection for each subject, and were any steps taken to assess consistency of speed between trials?
   Change made. – tracked changes
   An explanation is included in the main body of text/narrative
9. Including 95% confidence intervals of the difference between groups for the variables measured would be helpful in interpreting the results.
   The 95% confidence intervals for each group are included in the significant results tables (tables 3 and 4).
10. Is information available on the standard error of measurement of the kinematic technique?
    Change made. – tracked changes
    Information on measurement error is included in the main body of text/narrative
11. The conclusion should perhaps state that even though the differences in motion are small they are more considerable when interpreted in the context
of the total amount of motion occurring, and that the significance of these differences is unknown and warrants further investigation.

Change made. – tracked changes
Included in the main body of text/narrative
Reviewer: Kirsten Tulchin  
Reviewer's report:

Major Compulsory Revisions - None

Minor Essential Revisions
1) Methods section: paragraph 1 – there is a reference to figure 1 to display a callus. This was not included in the manuscript and the Figure 1 displays the marker set (and was referenced in paragraph 2.

   A new figure has been included with an example of the callus pattern for the two PPH groups. However, the quality/resolution is not that brilliant (taken with low resolution camera), this is why we decided to omit this figure from the original manuscript.

2) Methods section: last paragraph – there is mention of ANOVA as two-factor interaction including ‘side’. While this is included in Table 4, there is no comment to these results in the text.

   Change made. – tracked changes
   Included in the main body of text/narrative

3) Results section: paragraph 1 and throughout – I suggest consistency in terminology for the transverse plane. The text reads external and internal rotation, but your graphs read abduction and adduction.

   Change made. – tracked changes
   Main body of text/narrative has been changed to read abduction/adduction

Discretionary Revisions
1) My primary critique/comment of this paper involves the use of relaxed standing to define the zero position. First, to note, the authors have made reference to this potential limitation several times in their discussion. However, more thought should be given to this topic. Stating (in the discussion) that some differences may be missed by use of the relaxed position of the foot as zero, leads me to question the abundant use of the angular orientation data, which is presented in Table 2, and heavily discussed throughout the manuscript. I can comment on the continued debate of the “neutral” position in multi-segment foot kinematics for pages, however, my point is that this particular manuscript appears to be currently written and focused more on the angular orientation data than the ROM data (table 3), which I think weakens its quality. The differences between the two groups should be in both angular orientation and ROM, and therefore, with an acknowledged potential limitation to the orientation data the manuscript should focus more on the ROM data.

   Change made. – tracked changes. We make explicit reference to the range of motion data in specific paragraphs in the discussion, and repeatedly differentiate this data from the use “absolute” angular values. We have therefore ensured that there is clarity in terms of when we are talking about absolute and range of motion data in the discussion, but not added new text extensively on this issue.

2) One other related issue to the relaxed standing “neutral position”: Rigid is often thought to implicate less motion. Is it possible that the “rigidity” of a segment can be refer more to the apparent fixed mis-aligned “neutral” orientation, even with proper range of motion? For example, according to the noted paradigm, the rigid foot should have a more inverted heel and the mobile foot a more everted heel. Perhaps the more rigid foot appears “rigid” because of its inability to each an anatomically neutral position— a fixed position of the heel, rather than its actual ROM. If that is the case, the relaxed standing position in a rigid foot would remain in a more inverted position (for
example -5 °), and using this as a zero position would subsequently cause the
kinematic pattern to appear less inverted over the gait cycle (shifted towards
eversion). The more mobile foot which may be able to assume a more
anatomically neutral position during the static loading (during a less loaded,
double limb standing posture) and therefore may not be offset as much during
the dynamic loading of walking. My comment here is to emphasize that
angular orientation angles of one group (rigid) may be more greatly affected
by the potential limitation of using the standing position as neutral. (i.e. There
is more “error” in representing the bone alignment in the rigid group compared
to the mobile group.)

3) Discussion or comment should be added regarding some the differences
seen in the ankle neutral to heel off region. In some cases, as in the rearfoot
sagittal plane, the pattern and slope of motion seems to the identical between
groups, and the reported differences in ROM appear to be solely due to the
8.4% difference in duration of this phase. In comparison, group 1 seems to
demonstrate a slightly different pattern in rearfoot motion in the frontal plane
compared to group 2, which may be more likely the cause of differences in
ROM. It is recommended that this be mentioned in the text.

4) Figures 4, 6, 8 are referenced only briefly in the discussion. It is the opinion
of this reviewer that these figures be removed from the manuscript. Their
results are not discussed in the text (results section) and the commentary on
these figures in the discussion is not critical to the points being made. The
additional graphs may overwhelm the reader with non-essential data.
Minor Issues not for publication

Removed figures 6 and 8

1) TYPO Results Section: Paragraph 2: midfoot motion at time of maximum
hallux dorsiflexion - 10.8 compared to 2.9 - Table 2 lists Group to have -
7.9 degs

2) TYPO - Table 2: Leg/Heel – FF sagittal – text in the results section indicates
Group 2 had -3.3 degrees not +3.3 degs.