Author’s response to reviews

Title: The effects of textured insoles on quiet standing balance in four stance types with and without vision

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We would like to thank the reviewers for taking their time to review our submission and we appreciate their insight on how the article can be improved. Please find the revised manuscript attached with suggested revisions made (as outlined below). There are two copies available, one with highlights for your convenience and another without. In addition, a minor correction has been made; percentage corrected (discussion; page 11 and line 34).

Reviewer 1
1.1. ABSTRACT Please avoid the use of commercial mark in the description of used equipment (abstract row 15) (Force platform instead of Kistler); Row 17: definite the acronyms that you intend to follow latter to characterize the smooth insole (SI) or the Texture insoles (TI).

RESPONSE: Deleted ‘Kistler’ from abstract; line 15. Included acronyms for textured and smooth insoles; line 17

1.2. PROCEDURE The study evidence that a statistical significant effect is induced by the TIs. How long was the adaptation phase of the subject using this specific Tis? Did the author evaluate the effect on postural control of this kind of insole only in "acute" (with the TIs just worn)? Did the author think that after a period of adaptation the effect of the improvement observed for this kind of soles will disappear? Why the author didn't consider to make other session (after some days of usability) in this actual study, in order to check if the changes are maintained or loosed? The authors evidenced this consideration as possible further development, but more details about this consideration are required in the study design.
RESPONSE: We thank the reviewer for their suggestion regarding the duration of exposure to the textured insole: indeed, this was a factor we considered in depth at the outset of the study. We have now included information within the procedure section to state all testing was performed in a single session and why an immediate assessment was preferred to a longitudinal study; Page 7 line 46. The reviewer highlights the potential for dissipating effects, which we have not assessed in the current study. The aim of the study was to measure the initial effects of textured insoles over four stances types – which has not been reported previously. The study was concerned with the possible initial effect of textured insoles in the four stance types, with and without vision, rather than a longitudinal effect.

We did not include a retention test for a number of reasons. First, we anticipated that participants would be less likely to habituate to the novel sensory stimulus if they were exposed to the textured insoles, during a brief testing period (~1.5hr) on a single occasion. Furthermore, a core strength of our research design was the repeated measures, cross-over nature of the study. It was crucial to fully randomise the order of insole, visual and stance conditions to minimise order or learning effects. This provided a robust test of our experimental hypotheses, within which it was not possible to also assess performance in a retention test. We prioritised this design feature over the question of habituation effects, which should be addressed in future studies. In our current study, we aimed to establish a baseline measure for insole effects within each stance type and assess their effectiveness across a reduced base of support, which is the novel aspect of our work. We agree that habituation to the sensory stimulus may prevent the accrual of beneficial effects on balance – this was beyond the scope of our current study.

1.3: Results In table 1 No measurements units are provided. Please add them.

RESPONSE: Table 1 description now includes (mm) to show measurement units

Reviewer 2

2.1: The interpretation is a bit of a stretch based on the study design and findings. The link between reduced A-P sway, improved balance, and reducing injury is mentioned in the conclusion, but seems beyond the scope of the work.

RESPONSE: Based on the suggestion of the reviewer we have altered the conclusion to read “a reduction in fall risk” rather than “reduced injury prevalence”; page 14 line 7. Abstract also changed to reflect this, “falls risk” replaces “injury prevalence”; line 54. Finally, the end of a sentence in the discussion section which stated injury prevalence was also removed; page 12, line 23.

2.2: Table 2 in particular is very busy and cumbersome to read in its current format.

RESPONSE: Table 2 provides detailed information regarding the effect of vision in each stance type. It provides clarity as to the magnitude of the effect of vision on postural sway measures across the four stance types. In addition, it further highlights the importance of vision for postural control. We are inclined to report all of these aspects of our data in detail, for the benefits of transparency and reproducibility. We feel Table 2 communicates this information as effectively as possible. Moreover, previous experiments have often assessed balance within a singular stance type OR within a singular vision condition. We would argue that the level of detail in Table 2 would therefore be of interest to those wishing to compare our total data set to those presented across different studies. Finally, this could be of importance for later researchers who may wish to complete meta-analyses on such data.
2.3: I'm not sure this study contributes much to the literature. Similar results have been found and documented already. Also, the findings are derived from a young, healthy population, so there is little clinical relevance in terms of application to patient populations.

RESPONSE: Our paper is the first to assess textured insole effects for multiple stance types within a single study. The stance types selected incrementally challenge the postural control system by reducing the base of support. In particular, no previous study has assessed effects in the tandem Romberg stance, and we believe this does make a valid and important contribution to the existing literature. Indeed, such stance types are comparable to sporting activities (e.g. gymnastics). Unlike in most previous studies, which typically assess insole effects during bipedal and/or unipedal stance types, our assessment of balance in all four stance types provides the most comprehensive assessment of insole effects for increasing difficulty in the balance task.

With regards to the application of our findings to a clinical population, we are very careful in the discussion to avoid stating that our findings are directly relevant to this group. Instead we suggest our findings ‘may have wider implications for clinical populations’. A young healthy population was assessed due to the demanding testing protocol required for the multiple stance types. We acknowledge there are many key differences between a young healthy adult population, and patient populations. Finally, there is value to assessing insole usage under these specific circumstances to investigate novel questions regarding the effect of insoles on balance per se.

2.4: Finally, while postural sway is certainly an impairment-based measures of balance, it is not a substitute for a functional balance measure, which would have more clinical importance.

RESPONSE: The use of a force platform was preferred to a functional balance measure as it is comparable to previous literature and has no ceiling effects. Furthermore, it allows us to quantify the magnitude of sway in specific directions which may be important to future research.

2.5: I think a copy editor could help, but there are several instances of odd comma use that required me to re-read particular passages to glean the intended meaning. Detracts from the clarity of the paper.

RESPONSE: We thank the reviewer for highlighting some grammatical errors within the manuscript. We have re-read the paper, corrected all obvious grammatical errors (i.e. comma placement) and believe the article is now presented to a high standard. If the manuscript is accepted for publication, we would be happy for the work to be referred to a copy editor within the journal team to offer any specific guidance.