Reviewer’s report

Title: Reliability of analysis of the bone mineral density of the second and fifth metatarsals using dual-energy x-ray absorptiometry (DXA)

Version: 0 Date: 27 Sep 2017

Reviewer: Catherine Bowen

Reviewer's report:

The paper is concisely written and explores the reliability of scoring DXA scans of the 2nd and 5th metatarsal shafts in recreationally active individuals. The conclusion that the method used is reliable indicates that the methods descriptions within the paper will support researchers in the future who wish to determine the risk of metatarsal fracture in different populations. There are a number of comments and questions that I have related to the readability of the paper for readers of the Journal of Foot and Ankle Research.

Title: As it stands this does not make sense. Are there words missing? I suggest rewording the title to reflect the aim of the study (to reliably score of the regions of interest in the 2MT and 5MT). For example:

"Reliability of analysis of the bone mineral density of the second and fifth metatarsals using dual energy x-ray absorptiometry".

(Please note that any changes to title must be changed in BOTH the manuscript file and the relevant section in the online submission system).

Abstract: The results section would benefit from some figures being added. If word count is an issue, then I suggest shortening the background section in favour of more information in the results.

Please also note that JFAR headings in the abstract should be Background, Methods, Results, Conclusion. Therefore, please rephrase the discussion section.

Background, line 63-64: The statement 'as a result, athletes may be forced to miss half, … etc" requires a supportive reference.

Background, line 75: ROI is used for the first time and requires being written in full. This then can be altered on line 104 in the following page.
Materials and Methods, line 81: Please change to JFAR heading of Methods

Methods, line 82: please add the number as well as percentage of men. Note that male is an adjective and that male and female should only be used as descriptors. For example, use male /female participants or men / women.

Methods, line 91: please clarify the protocol. Did you scan the left foot only for all participants? If yes, why was the left foot selected and not the right foot?

Methods, line 93: "the technician's side of the with their feet" does not make sense. Please clarify.

Methods, lines 91-97: I am not clear on how you ensured that the foot position was the same between each scan session? Please could you add more detail here to explain this.

Methods, line 96: please clarify "the vertical axis" …. Of what?

Methods line 97: please clarify "the horizontal axis" …. of what?

Methods, line 99: Why / how was a cloth placed under the lateral side of the foot? A picture may help explain this better.

Methods, line 100: please explain who performed the scans? Were they performed by the investigators? Raters? Or an independent radiographer?

Methods, line 101: Please be more explicit in who the raters were. How were they trained and what level of experience did they have in analysing DXA scans?

Methods, lines 105-113: please can you elaborate on the approach taken to analysing the scans using the spine analysis software? Can you provide references to support this approach?

Methods, line 112: The software was used to analyse Bone Mineral Content (BMC) as well as bone mineral density. This is the first time that readers have been introduced to the concept of analysing BMC. Please can you ensure that the relevance of this analysis is also explained and justified within the background and aims.

Methods, line 119: please explain how randomisation took place.

Results, line 147 - 148: there appears to be inconsistency in the numbers presented. Please check the figures and rewrite as in your previous sentences.

Discussion, line 152: As per the title, you may be overstating what you have done. Consider changing the sentence to state that your scoring of BMD was reliable.
Discussion, lines 190-198: Your conclusion nicely summarises your work therefore I am not sure what this paragraph adds to the discussion of your findings? It appears to take the reader along a tangent away from the work related to reliability of scoring. It is possible that you are attempting to emphasise why understanding of metatarsal BMD is important, however is this not part of your background section?

Conclusion, line 201: in light of comments above please consider changing this to " In summary, a reliable technique for assessing bone mineral density of the shaft and sub-regions of the shaft of the second and fifth metatarsals was performed. This could be repeated in laboratories to screen...."

Other comments:

Please provide a legend for the Tables to detail abbreviations used (eg 5th met, 2nd met, ICC, SEM.

Please provide a key for Figure 1 that details the ROIs.

Please ensure that the square bracket references are inserted BEFORE punctuation with a space inserted before the preceding text, eg:

There have been several previous studies in this area [1, 2-5].

Please avoid the use of "subjects" and use "participants" instead throughout the manuscript.

**Level of interest**

Please indicate how interesting you found the manuscript:

An article whose findings are important to those with closely related research interests

**Quality of written English**

Please indicate the quality of language in the manuscript:

Acceptable

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