Reviewer's report

Title: A Method for Determining Skeletal Sizes from DXA Images

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Reviewer: Sami KOLTA

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General
In this paper the authors deal with another utilisation of DXA devices (other than Bone Mineral Density measurement); that is bone size measurement. Several papers have already studied the utilisation of DXA scans to measure the size of parts of the bones. The originality of this paper is that it deals with measurement of the whole spine or whole bones or even the patient height, from one DXA scan (whole body scan). It also suggests to use this method for other applications beyond the osteoporosis field.

Major Compulsory Revisions (that the author must respond to before a decision on publication can be reached)
1. Title: .....Skeletal "sizes" ..... Authors only evaluated bone length not width. Please comment.
2. In the abstract, method section: "90 normal caucasian females ....". The authors didn't mention that among these, scans of 50 women were used to calculate the reproducibility. Please add this information in the abstract.
3. Introduction: 4th paragraph, 4th line: "Nevertheless, DXA scans clearly do contain unused information on bone size (i.e. length and width)". Authors only studied bone "length" measurement and ignored bone "width". Bone width can be easily calculated by dividing bone area (given by the DXA scan) / bone length (LPC X scan line spacing)). However, it is well known (as the authors mentioned), that in fan beam DXA devices (as Hologic QDR 4500), due to the fan-beam geometry, there is an error in width measurement (magnification error), that is not present in length measurement. However, the magnification error exists also in X-rays and authors have estimated it and corrected it. The magnification error can therefore also be calculated and corrected for DXA scans. This will allow measurement of bone width (together with bone length) and gives more informations on skeletal sizes. Please comment on that.
4. Results section, reproducibility: 1st paragraph, last sentence: "For RET, 1mm was equivalent to approximately 2.06 cm .... On Hologic devices, there are many ways of presenting the results on the printouts (1 page, 2 pages, ....) according to the models. Did the authors check that the image size is always the same. If this is not the case, these figures apply only to a certain form of results printing and should be specified in the paper.
5. Discussion section, last paragraph: the horizontal distorsion in case of forearms that could not be positioned parallel to the long axis of the table. The authors didn't discuss how they corrected for this error. Another problem for LPC in that case will be the form of the subregion of interest. Was it rectangular but positioned diagonally ? OR was it trapezoidal in shape (as the 2 black lines delimitating the forearm in figure 1). In case of trapezoidal subregions, the LPC that appears below the subregion is that of the longer side. Can the authors discuss how they did for LPC in that case (longer side ? shorter side ? or the mean of the 2 sides ?
6. Figure 1: the short black lines for humerus measurement are not parallel. Can the authors discuss why they are not parallel and how they measured humerus length by both methods (LPC and RET) in that case.
7. Height was measured from "crown to heel". Can the authors discuss how the defined the "heel" that is not apparent on the DXA scans. The short black lines on the feel show the ankle joint more than the "heel" itself (however, I do agree that the difference is not significant on that view).
8. Figure 2: Are the long term inter-observer CVs (%) better than short term inter observer CVs ? If yes, please comment.

Minor Essential Revisions (such as missing labels on figures, or the wrong use of a term, which the author can be trusted to correct)
1. Results section, 1st paragraph: the results given in this paragraph are repeated in table 1. Please either add SD values and delete table 1 OR delete the 3rd and 4th sentences.

Discretionary Revisions (which the author can choose to ignore)
What next?: Unable to decide on acceptance or rejection until the authors have responded to the major compulsory revisions

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

Quality of written English: Acceptable

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.