Reviewer’s report

Title: Psychometric Properties of Instrumented Postural Sway Measures Recorded in Community Settings in Independent Living Older Adults

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Reviewer: Amal Wanigatunga

Reviewer's report:

OVERALL

The paper examines the use of trunk-placed accelerometry to extract metrics related to postural sway measures. To verify these metrics, participants were instructed to perform various balance and performance tasks with the accelerometer on. The authors conducted reliability and validity statistical testing between accelerometer metrics for these various tasks and found that the trunk accelerometer data can be used to extract standing postural measures that were relatively reliability. I believe the paper is well written but the statistical approach lacked sensitivity analyses that were covariate adjusted. See my comments below. Also, a minor comment but the authors should replace the word "subject" with "participants".


ABSTRACT

-Well written

INTRODUCTION

-Well written

METHODS

-It is not clear how the participants completed the walking tests with eyes closed. Can the authors add this information?
-Were any of the statistical tests adjusted for covariates? If not, why not? The SD of age is quite large (7 years, give or take). Also a good proportion of the final analytic sample has 3 or more chronic conditions. I would also think body weight or some measure of it (e.g. BMI) would need to be adjusted because of confounding due to mechanical load on balance and adverse biological underpinnings (e.g., inflammation) that may affect the circulatory and skeletal muscular systems.

RESULTS

-Well written

DISCUSSION

-There is no limitations and strengths paragraph. Please add.

-One limitation, somewhat indirectly mentioned in the first paragraph, is a practice effect of physical function measures. This should be mentioned. Better performance on the functional measures one week later may attenuate the ability to detect sway variability within the accelerometer metrics presented in the paper. Otherwise, do the authors have citations that state one week is enough to guard against practice effects?

-I think the discussion needs more implications. The paper shows EO and EC results but little was discussed on the similarities and differences. Same goes for level versus foam flooring. Implications on these types of results are helpful, particularly when thinking about assessing balance in clinical settings but also perhaps in at-home settings in which certain scenarios of flooring and vision may occur independently but even jointly.

-The audience is typically not aware of the utility of accelerometry. The authors could add a little more about how important ML and AP are. Give examples such as AP is particularly thought of as gait forward and backwards. ML may perhaps be more inline with "sway" when walking forward and backwards (e.g., wobble when walking). Providing context to the measures will help the readers.

-Many studies use wrist accelerometry at a large scale. The authors could explain whether the results are translatable to wrist accelerometry or whether there is a need for further research for accelerometry on different body locations.

TABLE 1

-Is there information on weight and height? Could BMI be reported?
TABLE 2
-No comments.

TABLE 3
-No comments.

FIGURE 1
-Were EO and EC tested for statistical differences?

Are the methods appropriate and well described?
If not, please specify what is required in your comments to the authors.

Yes

Does the work include the necessary controls?
If not, please specify which controls are required in your comments to the authors.

Yes

Are the conclusions drawn adequately supported by the data shown?
If not, please explain in your comments to the authors.

Yes

Are you able to assess any statistics in the manuscript or would you recommend an additional statistical review?
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