Reviewer's report

Title: Association between spatial-temporal gait parameters and history of falls in men and women aged 65 to 91 years: results of the cross-sectional KORA-Age study

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Reviewer: Bettina Wollesen

Reviewer's report:

Overall the main topic of the article is highly relevant for research and clinical practice. The huge database is pleasing and might result in well grounded findings.

However, there are major concerns due to some methodological issues. I will summarize them by answering the main questions.

1. Is the question posed by the authors well defined?

The background leads to the main subject of the article, however the study aims should be described in more detail. In addition, the authors cited some literature e.g. about Dual-Task-Testing but did not reflect on what kind of gait changes can be observed in comparison of single vs. dual-task conditions and which task-complexity and stimulus-response condition should be used in a dual-task-situation. This leads to one major concern of the methodological part.

2. Are the methods appropriate and well described?

Overall the participants are not described sufficiently. A subject description with body height and body mass is missing. These are important aspects regarding gait kinematics because body compositions show influence in step width and step length. The authors should describe how they integrated this aspect into data analysis.

Second, people using walking aids were integrated into the observing group. People who used a walking aid should be analyzed separately or be excluded, because the use of a walking aid e.g. limits step length and reduces the swinging movements of the arms.

Third, the dual-task condition has to be discussed reflecting the complexity of the task condition (counting backwards in twos might be not challenging enough) and the rhythm that might result out of this kind of task and lead to a better walking performance.

Additionally there might be learning effects regarding the cognition task because the participants were asked to do the same task four times with the same starting point (counting backwards in twos starting at 50).

3. Are the data sound?

Regarding the methodological concerns the data should be analyzed again. In addition, one reason why there were no changes in the dual task condition might
be because of the non challenging, rhythmic task condition.

4. Do the figures appear to be genuine, i.e. without evidence of manipulation?
There were no figures in the text.

5. Does the manuscript adhere to the relevant standards for reporting and data deposition?
Reflecting APA-guidelines additional descriptives of the statistics (e.g. t-values for a t-test) should be reported for all statistics.

6. Are the discussion and conclusions well balanced and adequately supported by the data?
The discussion should be rewritten after the new data analysis and integrate the methodological problems. Moreover the decreased step length and step width is one common aspect of gait analysis which was reported e.g. by xyz. The authors should discuss their findings regarding previous research- what is new? The dual-task part should be reflected considering the mentioned methodological problems.

7. Are limitations of the work clearly stated?
There are no limits reported. This should be added.

8. Do the authors clearly acknowledge any work upon which they are building, both published and unpublished?
Yes

9. Do the title and abstract accurately convey what has been found?
Yes

10. Is the writing acceptable?
Yes

In conclusion, the authors have to do major compulsory revisions (which the authors must respond to before a decision on publication can be reached).
These are:
• Reflecting important literature
• Integration of the description of body height and body mass
• Excluding the people who walked with a walking aid or analyze them separately
• Adding a critical reflection of the dual-task which was used in this study
• Adding a limitation section
• Rewrite the discussion

Additional minor advices are reported by answering the questions above.
Literature which should be included and discussed:


Level of interest: An article of limited interest

Quality of written English: Acceptable

Statistical review: Yes, and I have assessed the statistics in my report.

Declaration of competing interests:

I declare that I have no competing interests'