Reviewer’s report

Title: Validation of Automatic Wear-time Detection Algorithms in a Free-living Setting of Wristworn and Hip-worn ActiGraph GT3X+

Version: 0 Date: 02 Oct 2018

Reviewer: Nicole Proudfoot

Reviewer's report:

This manuscript compares two algorithms for detection of wear of waist- and wrist-worn accelerometers to that of a wear time diary filled out by the participants (athletes). The proper detection of wear time is an important component to accelerometry analysis; however, I do have some comments for the authors to consider, which are outlined below:

Major comments:

1. Objective 3 (comparison of wear compliance between wrist and waist) cannot be appropriately addressed with this study design. A wear period of 2-3 days is atypical of population health studies. Even with a longer wear period, it would be difficult to ascertain how wearing of both devices at the same time impacts the compliance of each device individually. In particular, if part of the rationale in choosing athletes was their high compliance with filling out a diary of wear times, one would also assume that these athletes would also be more compliant in wearing the device, and therefore not an appropriate sample for assessing device compliance.

2. What was the average physical activity and sedentary time? Given that 'non-wear time' may be improperly classified as sedentary time, or visa versa, the amount of sedentary time for this sample of athletes seems very relevant.

3. Line 148-149. "There were no significant differences in total wear-times between wrist-worn and hip worn devices (see Table 1)." I didn't see in the methods what statistics were used for this.

4. The authors should discuss the limitations of the study.
Minor comments:

1. Line 7-12: I don't think the Freedson commentary provides reasons for the higher wear for wrist accelerometers in comparison to the hip-worn in NHANES.

2. Line 21: Do you mean 'consensus' not 'consent'? I do not believe that there is a consensus for how accelerometry should be analyzed.

3. The paper would benefit from including information about the algorithms in the introduction or methods.

4. Figure 1: Legend should describe the meaning of the lines (i.e. bias and 95% LOA). The axis titles could be clearer. E.g. x-axis "Mean wear time (minutes) of wrist-worn Actigraph (diary and Troiano)" the y-axis "Troiano - diary" instead of "Actigraph - diary" better reflects the graphs.

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?
If an additional statistical review is recommended, please specify what aspects require further assessment in your comments to the editors.

I am able to assess the statistics

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