Reviewer's report

Title: A biomechanical study of gait initiation in Down syndrome

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Reviewer: Andrea Bandini

Reviewer's report:

In this paper, the authors characterized gait initiation (GI) in individuals with Down syndrome (DS) by using center of pressure (CoP) and center of mass (CoM) parameters and comparing them with a group of healthy control subjects. Overall, the manuscript is well structured and easy to read. However, I have major concerns regarding the actual impact that this work may have in the fields of biomechanics and physical therapy. This impact is relegated at the bottom of discussion with a couple of sentences (P16, L18-21). I would like the authors to elaborate a bit more on this, expanding the impact and future steps of this work. Also, there are some grammar mistakes that I reported below in the detailed list. I would recommend a proofreading by a native speaker of English anyway.

ALL SECTIONS:

- Avoid the use of "DS subjects" or "DS people". Replace with "individuals with DS"

- Keep consistency in the use of acronyms throughout the paper (e.g., CoP or COP? CoM or COM?)

ABSTRACT:

- L7-8: Rephrase the first sentence of the "Methods" section: "17 individuals with DS (…age…) and 19 healthy subjects (..age…) were enrolled in the study."

- L20-22: Rephrase. "DS group also presented longer CoP excursion during the second anticipatory phase, whereas a shorter excursion was present during the first anticipatory and locomotor phases."

- The Conclusions paragraph (L23 onwards) looks like a repetition of results and discussion. Add the impact of this work instead.
BACKGROUND:

- P5, L6: "main motor milestones"

- P5, L9-11: Add references to this statement (which previous studies?)

- P5, L15: change to "… typical development. In addition, these individuals have "clumsy" movements and …"

- P5, L18: "… allowing to achieve a greater balance overall." Greater than what? Than normal?

- P5, L20: "… different balance control WITH respect to healthy subjects"

- P5, L22-23: rephrase "… found instabilities in both lateral and anterior-posterior directions."

- P6, L9-10: "… and occurS prior to gross …".

- P7, L1-2: rephrase "… using parameters DERIVED FROM the …"

METHODS:

- P7, L8-10: Please, use lowercase "k" to indicate kilograms. "K" is the unit of temperature (Kelvin) according to the International System of Units.

- P7, L12-15: Regarding the inclusion criteria: did the authors perform any cognitive assessment on the participants with DS?

- P8, L7: "… includes an optoelectronic MOTION CAPTURE system …"

- P8, L8: Disabbreviate the acronym "TVC" the first time it's introduced in the text.

- P8, L22-23: "Acquisition of force platform …" I am not sure about the meaning of this sentence. Please rephrase it to make it clearer.
- P9, L1-2: Rephrase "6 GI trials were requested for each participant (i.e., three starting with the left foot and three with the right foot)"

DATA ANALYSIS:

- P9, L5: the acronym APAs was already introduced. There is no need to redefine it again. (Same at P14, L16,17)

RESULTS:

- Tables 1 and 2: I wonder why the authors reported length and excursion measures in "mm/m" and "m/m". Since these measures were normalized by the subjects' height, these parameters should be adimensional. So, the authors can either convert the parameters (length and excursion) to the same unit of height, or report the height to the same unit of the parameters, and then perform the normalization. Either way, avoid the use of mm/m and m/m or justify the reasons why these units are used.

DISCUSSION AND CONCLUSION:

- P14, L17-18: rephrase "Our results demonstrated that DSG exhibited longer durations than CG during all phases"

- P15, L9: "people WITH DS"

- P16, L18-21: This part should be expanded, providing more details regarding the usefulness and impact of the results. Also, a few sentences on the impact of this work must be added in the conclusion.
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?
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