Reviewer's report

Title: A biomechanical study of gait initiation in Down syndrome

Version: 2 Date: 29 Dec 2018

Reviewer: Hans Ulrich Bucher

Reviewer's report:

This paper reports results of an investigation of gate initiation in 17 adults with Down syndrome compared with 19 healthy adults. Subjects with Down syndrome showed significantly higher duration and lower velocity of the center of mass during gait initiation, a higher medio-lateral excursion during the shift towards the stance foot phase and a shorter displacement of the center of mass. With a literature research in MEDLINE and SCOPUS I was not able to find a similar study and therefore think these results are new.

The paper is well written and can be easily understood even by a non-specialist for gate-investigation as myself.

I have one concern which the authors addressed themselves in the discussion (page 17, lines 3-4). In fact body mass index (BMI) of subjects with Down syndrome is much higher than that of the controls. Ideally the control group should have the same BMI as the target group. This was attempted in a paper comparing children with Prader Willi Syndrome with "healthy" subjects with about the same BMI (Vismara L et al. Clinical implications of gait analysis in the rehabilitation of adult patients with "Prader-Willi" Syndrome: a cross-sectional comparative study ("Prader-Willi" Syndrome vs matched obese patients and healthy subjects) J Neuroeng Rehabil. 2007 May 10;4:14.

Specific comments:

Page 6, lines 16-18: these features are already described page 5, lines 12 ff.

Page 7, lines 5ff: Sample size seems to fixed by chance or by availability. There is no power calculation based on a hypothesized difference.

Page 7, lines 7-9: Median and quartiles or range for age, height and BMI would be more appropriate.

Page 7, lines 13-14: What does "absence of congenital disturbances" mean?
Page 8, lines 1-3: I guess the majority of the participants gave informed consent itself. Therefore I would change the order: All participants were volunteers and gave written consent which was confirmed by parents if necessary.

Page 9, line 21: The pattern for 1st max and for 2nd min can hardly be distinguished (perhaps because of poor print quality). See also figures 2 and 3.

Page 11, lines 24 ff: For statistical comparison multivariate analysis with BMI, sex and age as cofactors would be advisable.

Page 12, lines 2ff: As the parameters are not normally distributed in all tables the first and third quartile should be given in number, not as ± which is commonly used for standard deviation. Example in Tab. 1: dAPA1 0.21 (0.11, 0.31) if parameter distribution is symmetrical.

Page 16, lines 18-21: I especially like this paragraph on possible usefulness for rehabilitation.

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.

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