Reviewer's report

Title: Development of spasticity with age in a total population of children with cerebral palsy

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Reviewer: Ilona Autti-Rämö

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General comment:
The idea of trying to investigate the natural development of spasticity by following a large cohort is good. However, the results of a national register have to be evaluated with some uncertainty as 1) no good (valid, reliable, sensitive to change) measurement for spasticity still exists, 2) the spasticity was measured with modified Ashworth scale with seemingly now inter- or intrarater reliability testing in between the years, 3) the follow-up didn’t concern a consistent group of children and, 4) the children were examined in several sites and data entered by a large amount of PTs. The author’s should discuss the problems of the study more carefully before this manuscript can be published. The Swedish CP register seems to allow interesting possibilities to study the natural course of this heterogeneous disorder. The results are strengthened and are clinically more valid when they are presented for homogenous subgroups and for a cohort with long-term individual trajectory data.

Several specific points that need clarifications before decision on publication can be made:

1. How many sites were involved and how many physiotherapists entered the data?

2. A manual doesn’t mean that the test is done correctly. How were the PTs trained and were there any reliability testing during the years? It’s not always clear to decide the level of spasticity, especially in young children who may be afraid of the situation. The older the children get the more relaxed they are when examined and the easier it is to have a more objective evaluation of the underlying level of spasticity. This may have an effect especially on the levels 1+ and 2. This should be discussed. Now the authors state that they have solved the problem of validity and reliability through dichotomizing the scale but it may not solve the problem.

3. The number of children was 547 and the number of examinations 6218. 45 % of the examinations were done before the age of 6 when the children were assessed twice a year. It’s not clear how many individual trajectories were included in the analysis eg. how many children were examined from infancy to young adolescence? The number of adolescents is so small that one wonders how it affects the statistical analysis? As the children were examined in several sites and by many PTs the reliability of the testing results is fairly weak. If there
would be a subgroup of children examined at one site, with same PTs (having regular reliability checking) the results would be much more convincing.

4. The amount of children having Ashworth 2 to 4 in the dystonic group is quite confusing. Are these truly dystonic cases or mixed ones? They definitely are no pure dystonic cases. These results suggest that the reliability of the testing is not so good. This needs clarification.

5. How many measurements did the PTs have to do at various age, is it constant or does the number of required measurements increase with age? If the number of measurements increases with age the focus may be more on the age relevant issues (spasticity of the thigh muscles is very relevant when starting to walk and treatment with BTX-A is a true choice). It’s quite human that those issues not regarded to be so important at a different age may not be measured with the same accuracy (spasticity of thigh muscles when already walking)

6. About one fifth of the children were injected with BTX-A. The percentage of children being treated with BTX (spastic type) is according to table 3 and figure 1 about the same between the ages 3 to 9 (the absolute number is highest in children aged 3 to 5 as written in discussion but not the percentage which has an effect on the overall analysis). Many children use spasticity for compensation in upright position. After BTX-A treatment they may be able to activate the TA muscles better and have a better postural control of their ankle in general. This may lessen their need to use spasticity, especially in walking children. The role of BTX in this cohort remains slightly unclear.

7. Is inhibitive casting or other interventions focusing on toe walking (orthotic devices, night splints, electrical stimulation) used in Sweden? Now only BTX-A, surgery and IT-baclofen are mentioned

8. Is it possible to compare the functional level (GMFM) with the changes in spasticity level?

**Level of interest:** An article whose findings are important to those with closely related research interests

**Quality of written English:** Acceptable

**Statistical review:** Yes, but I do not feel adequately qualified to assess the statistics.

**Declaration of competing interests:**

I declare that I have no competing interests'.