Reviewer's report

Title: Characteristics of children with hip displacement in cerebral palsy

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Reviewer: Kerr Graham

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The authors report the characteristics of children with hip displacement in cerebral palsy in a large study which is population based and combines the strengths of a population based cerebral palsy register and a longitudinal health care programme for children with cerebral palsy (CPUP).

The authors use a number of descriptors for the motor type and gross motor function in their population of children with cerebral palsy. As they note in a very balanced way, the descriptions of motor type and distribution are not fully agreed and are not always reliable. However the Gross Motor Function Classification System (GMFCS) is known to be valid, reliable, relatively stable over time and is now internationally accepted.

The almost complete ascertainment of the population “at risk” results in findings which are authoritative and of great significance to those involved in the care of children with cerebral palsy. The failure to find a correlation between hip range of motion and hip displacement determined radiologically is very important and novel. The relationship of risk of hip displacement to cerebral palsy subtype and GMFCS level is critically important to the understanding of relative risk for the individual child with cerebral palsy and to the design of hip surveillance programmes.

The authors' recommendations and conclusions from their data are important and should be widely adopted.

This is a landmark study utilising the unique advantages of a cerebral palsy register combined with careful systematic longitudinal follow-up.

I have a number of minor criticisms which might improve the readability of the manuscript:

1. In the Abstract under the section labelled Results, two figures are quoted for the “risk of displacement directly related to the level of gross motor function” eg “0-5% in children in GMFCS level I, to 64-66% in GMFCS level V”. Do these two numbers refer to the risk of displacement of MP 33-39% and MP>40%?

2. On Page 1 in the section titled Background, the reference to the incidence of hip dislocation is a paper by some of the same authors. Given that this reference
is to the “risk of progression to hip dislocation” it does not seem relevant to refer to a highly treated population and it might be better to refer to one of the more “natural history studies” in the literature.

3. In Page 2 under Methods the description of the measurement of Migration Percentage (MP) refers to using the midpoint of the arch “according to Cooke et al”. The paper by Cooke refers to acetabular anteversion and does not describe the “Gothic arch”. To the best of my knowledge, the choice of the midpoint of the Gothic arch was first described by our group in 2002 (Reference No 15).

4. In terms of inclusion and exclusion criteria, it is notable that about 8% of the possible study population were excluded as “not participating in CPUP”. It would be interesting to know the characteristics of these children in terms of their hip displacement and outcome. It might be better to consider reporting the entire “population at risk” than excluding the non-participants.

5. In Page 3 in the Results section, there is a typographical error in the fourth paragraph, GMFC, for “GMFCS”. In addition in this paragraph, it was noted that no child with spastic hemiplegia developed an MP of >40%. Other groups have reported that it is the Winters, Gage and Hicks Type IV hemiplegia that is at risk of hip displacement. It would be interesting if the authors could describe their hemiplegic population in terms of the Winters, Gage and Hicks classification. In particular were their any children with Type IV hemiplegia?

6. Table I gives a summary of the criteria for the Gross Motor Function Classification System (GMFCS) however the descriptors for the GMFCS differ according to the age band which in this population would cover at least three or possibly sets of descriptors. This point should be explained and the table re-labelled for the appropriate age band, which I think is aged 6-12 years.

7. In the figure legends there is a legend for Figure 3A and Figure3B which is the proportion of children with various levels of MP related to subdiagnosis (A) and GMFCS level (B). However the figures are actually labelled Figure 3 and Figure 4. In the interest of clarity this should be harmonised and it would probably be simpler to have a separate legend for Figure 3 and Figure 4.

Summary

This is an excellent study by a very well credentialed group of investigators, reporting novel findings of very substantial clinical significance. I recommend publication of this paper following some minor revisions.

In relation to your specific “Guidance for reviewers”:

1. The question is new and well defined
2. The methods are appropriate and well described
3. The data are sound and reliable
4. The manuscript adheres to appropriate standards for reporting and deposition
5. The discussion and conclusions are well balanced and supported by the data.
6. The title and abstract accurately convey the study design and findings.
7. The writing is clear and balanced.