Reviewer’s report

Title: Change in basic motor abilities, quality of movement and everyday activities following an intensive physiotherapy program in a group setting for children with cerebral palsy

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Reviewer: Virginia V Wright

Reviewer’s report:

Overall this paper contributes to our understanding of the impact of intensive PT interventions on short-term functional outcomes in young children who have cerebral palsy. The choice of outcome measures was strong and the paper has many merits in terms of the repeated measures study design used and efforts to reduce assessor bias (e.g., the use of independent assessors and the blinding of the assessors to the order of the video clips for the QUEST and GMPM is a study strength. The inclusion of a focus on the relationship between changes in gross motor function and quality of movement was justified well and is one of the first papers in pediatric CP to take a look at this important issue.

Major compulsory revisions:

Methods: I am not clear as to why the first author and PT videographer constructed the GAS based on goals set by parents/child and the PT who tested the child in collaboration. The authors should note why the goal levels were not set in the usual way, i.e., by the treating PT with the parent. Perhaps it was so that the goal levels would be amenable to measurement by observation rather than parent report? This does somewhat restrict the possible breadth of achievement options, and perhaps may have resulted in some measurement bias (activity vs performance types of goals?).

Results:

The method summarizing the GMPM is a bit unusual – the authors decided to create a Total quality score although this is not something that was done for the original GMPM and as such has not been evaluated within the validation work. It is unclear as to why the authors did not also report each of the GMPM’s 5 attributes since they noted in the analysis that they did summarize the results according to the attributes as well as their computed Total score. For example, it is relevant to know the extent that alignment or stability or co-ordination have changed. They may not all change!!!! A similar concern and need for clarification also exists for the QUEST.

The idea of looking doing a subanalysis for GMPM scores in relation to items that changed on the GMFM/those that did not change on the GMFM is an interesting one and fits with testing the authors’ hypothesis (which should have been stated
at the outset) that GMFM items that are stable should be the ones that show
differences in quality of movement. I also don’t understand why the two GMPM
assessors’ scores were presented separately when the GMFM scores. While
there were presumably several assessors (p. 10) for the GMFM (the authors
noted that the same assessor did the pre- and post-test on an individual child)
these results were amalgamated across assessors.

While the idea of looking at the relationship between improvement and function
and quality is important, the results are difficult to interpret. Does this mean for
example if the child improved in their 20 second stand by at least 1 point on the
GMFM that the pre and post scores of the 3 attributes that were connected to
that item would be used within a GMPM total score for that child? This needs to
be clarified! Similar concerns and need for clarification exist for the QUEST.

Discussion: In the discussion of GMPM/GMFM change results (P. 18), the
authors make a point about the possibility that “that assessors tend to judge
quality of movement to be improved when abilities of basic motor function
improve, could also be interpreted as if the assessors confuse ability with
quality.” If however the assessor of the GMPM tape was looking at just a isolated
clip of the child’s performance of a particular item (either pre- or post) this frame
of reference-based scoring bias should not have happened.

While the authors then go on to note that “The difference between the twin
instruments GMFM and GMPM may, in addition, not be straightforward since
GMFM clearly captures change in some aspects of quality of movement like
weight shift (item 12/13) and stability (item 56)”, they could capitalize more on
this observation. Indeed, what I have been observing as a PT researcher who is
currently doing work on refinement of the GMPM, is that it may be the changes in
balance or alignment that actually permit the child to move up to the next level of
GMFM ability, i.e., if they are stronger and straighter and their stability is better,
then they are more likely to be able to do the 20 second stand for longer. This
possibility could be noted in this paper.

Minor essential revisions:

Abstract – Suggest that evaluation of the impact of the intensive intervention on
quality of movement should also be noted (as the authors clearly are looking at
the dual effect on function and quality of movement.

The authors should define ‘intensive’ physiotherapy, e.g., three hours of training,
five days a week in a three weeks period in a group setting) in the abstract.

The reporting of GAS scores as mean change is a bit unusual – more typical with
this system to look at the final attainment score and see if it is in the 45.0 to 55.0
range that represents accomplishment of goals at the targeted level (i.e., the 0
level). Indeed the post-test GAS T-score was 51.3 so satisfies this criterion
without having to look at P values.

The P value for the PEDI’s 6 scales should be adjusted (0.05/6 subscales), and
the number that had P values less than this reported as all are highly correlated!
According to Table 4, 3 of the scales showed significant change at a P < 0.01
level.
The two aims of the study are clearly presented on p. 5. The basic components and foundation of the PT program are described well and the outline of the components of the intervention in the Appendix is excellent – a clear model for others to follow and enhances the external validity of the study. Research hypotheses could also have been presented – this would have been particularly useful for the question pertaining to the relationship between changes in function and quality of movement (the authors did note their expectations on p. 18).

Am I correct in thinking that the GMFM (1e outcome measure), GMPM and QUEST were evaluated at all 5 assessment points, while the PEDI and GAS (p. 11) were just evaluated at baseline 3 and follow-up 2?

I am not clear as to why the PEDIs were scored by experienced PTs and OTs at the various centres (were these the treating PTs and OTs - I assume this was the case as they would be the only ones who would have sufficient knowledge of the child)? Why were the parents not the respondents to the PEDI? They would have a much better awareness of exactly what their child was doing in a variety of real-life environments, and this is what we really need to know. This limitation at least needs to be noted in the discussion so that the reader is fully aware of it!

A brief comment should be made on p. 9 on the published evidence of the psychometric strength of each of the QUEST, GMPM, PEDI and GAS when used with young children with CP.

Analysis: The authors explained in considerable depth including the approach for handling missing data (and in the results on p. 13, the extent of missing data was noted for GMPM, GMFM and QUEST – the extent of missing data in the PEDI should be noted as well). As noted earlier, the setting of the P value at 0.05 for the multiple scales within each of the measures may be problematic. Did the authors consider some type of alpha adjustment to account for correlated outcomes? A Bonferroni adjustment was made for the repeated measures testing (Table 3) but not for the correlated scales.

Discretionary revisions:

On p. 13, suggest using the word “adherence” rather than ‘compliance”. Less negative association with that word.

On p. 15, I am confused by the word ‘action’ goals – would the word ‘activity’ goals be more appropriate?

Probably better to refer to the GMPM as a sibling measure to the PM, not a twin measure (P. 18)

**Level of interest:** An article of importance in its field

**Quality of written English:** Needs some language corrections before being published

**Statistical review:** No, the manuscript does not need to be seen by a
statistician.

Declaration of competing interests:
I declare that I have no competing interests