Fact Sheet
Stretching in Children with Cerebral Palsy

The TRIPSCY Evidence-based Journal Club is a means for Vermont Pediatric Physical and Occupational Therapy Practitioners and others to stay abreast of research literature and develop strategies to apply this new knowledge to benefit children, their parents and school teams. From specific journal club topics, participants prepare factsheets.

PICO Question:
In children with spastic cerebral palsy, what is the effectiveness of stretching on range of motion?

How was the review conducted?
A literature search of databases including CINAHL, Ovid Medline, PsycINFO, and PubMed was conducted several times using the keywords child*, cerebral palsy, stretching, contractures, and range of motion. Reference lists of articles were reviewed for other relevant references. The Cochrane Library and the Center on Personnel Studies on Special Education were also searched. Only studies published in peer reviewed journals were considered. Three articles were selected for review. One of these was a systematic review of the literature and 2 were studies specifically evaluating the effects of stretching and range of motion.
SECTION 1 – SUMMARIES OF ARTICLES REVIEWED


The purpose of this study was to compare changes in lower extremity passive range of motion in children with severe limitations during periods of intervention (school-based physical therapy) and naturally occurring periods of rest (school vacations). A multi-case time-series design was used to measure hip and knee passive range of motion (PROM) for each of seven students aged four to eighteen years over a seven-month period. The Wilcoxon signed rank test was used to evaluate the graphed PROM changes during intervention and non-intervention phases, both individually and as a group. The only significant trend that was shown from the pooled data was a decrease in PROM after the first non-intervention phase (summer vacation) and only two children showed significant decreases in PROM following the first non-intervention phase. It was concluded that children and youth with severe limitations in self-mobility may be at risk to lose PROM following periods of non-intervention greater than five weeks. For individual students, there was only weak support for the stretching program. This study had a small sample size, limited power and did not account for other factors such as growth.


This single-subject design study incorporated 2 multiple baseline designs. The subjects were older, 20-44 years, all with spastic quadriplegic CP and lower extremity (LE) contractures. During Phase A, one group continued with PROM 3x/week and the other group had no PROM. The groups switched for Phase B. The authors determined reliability with goniometric measurements very thoroughly before the study. Multiple joints were measured and the data were analyzed using visual analysis and C statistic. No consistent differences were observed in the phasing protocol and as a result of this study PROM exercises were discontinued for all participants. The authors “suggest that therapists reconsider programs that focus only on PROM because of both clinical usefulness and social validity”. This study had a small sample size but was well designed and reflects the situations and tools we have in clinical practice.


This review article was designed to address the clinical question, “Does passive stretching improve PROM effectively in children with CP?” The literature search was thorough and the inclusion criteria were as follows: studies needed to have children less than 18 years old, use quantitative measurements and be published in peer reviewed journals. The review included 7 studies, though 2 addressed spasticity levels only. Only the 5 studies that examined PROM were reviewed. Each study was assessed for levels of evidence (AACPDM evidence levels for single case designs) and for quality (PEDro scales). Two of the studies ranked at a Level 1 (with randomized groups), though there were some methodological weaknesses. One study was a Level II, another a Level III and one a level V. The studies included different stretching protocols and a couple included positioning for more sustained stretching. The results showed only small changes in PROM, close to the measurement error. The authors state, “There is no conclusive evidence to definitely state that passive stretching can increase PROM” and they suggest we “rethink the use of passive stretching in clinical settings”. There is some evidence to suggest that sustained stretching may be more effective than manual stretching. All studies reviewed had small sample sizes and somewhat different protocols for stretching.
SECTION 2 – IMPLICATIONS FOR PRACTICE

1. Summary
This selected review included 6 studies that examined the relationship between passive stretching and joint range of motion in children (1 study of adults) with CP. Taken together, there is no clear evidence demonstrating the effectiveness of passive stretching on range of motion in children with spastic cerebral palsy. While the studies were small in scale and lacked power, they had good methodology and good attention to measurement error.

2. Trustworthiness of studies
The studies were all single subject designs and the few methodological weaknesses were disclosed. The results are reliable and valid. The Pin et al. review indicated research quality using the Pedro for 5 of the 6 studies.

3. Level of evidence
The AACPDM Methodology to Develop Systematic Reviews of Treatment Interventions (Revision 1.2), 2008 was used as a resource to evaluate levels of evidence. Specifically, Table 1b, Levels of Evidence for Single Subject Design, was used for this analysis. (www.aacpdm.org/membership/members/committees/treatment_outcomes_methodology.pdf), page 18. The studies ranged from Level I (2), Level II (2), Level IV (1) and Level V (1).

Take Home Message
Therapists should re-evaluate the use of short duration passive stretching programs for children and youth with CP. More research is needed to determine the effects of prolonged stretching and positioning. Therapists should focus efforts where we have more research to support positive changes with physical and occupational therapy interventions. There is evidence to support intervention at the impairment level in the areas of strength, balance, physical fitness and weight bearing programs to reduce the risk of osteopenia. Therapeutic emphasis should be on these target areas with the goal to increase functional activities and meaningful participation across environments.