

## Guest Editorial

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# Pediatric Constraint Induced Movement Therapy: Harnessing Adaptive Neuroplasticity

Constraint induced movement therapy (CIMT) has emerged as a popular treatment for hemiparesis in children. Although clinical programs are of varying lengths and intensities and the method of constraint varies, in general, positive results are reported. Despite the difficulty inherent in studying the effects of any therapy in children, due to the variability and complexity of brain injury and the absence of a suitable “non-intervention” group, it appears that adaptive neuroplasticity is activated by CIMT resulting in measurable functional gains. The underlying processes that account for these changes and the optimal methodology to provide best practice remain major open questions.

In this issue of JPRM, a collection of articles is presented that span a wide range of topics from basic neurophysiology to clinical trials and critical analysis. They represent the work of a small sampling of a much larger group of dedicated scientists and clinicians that have been captivated by the potential of the brain for repair through the still poorly understood process of neuroplasticity.

The articles by Brauers, Charles, and colleagues focus on the neurologic underpinning of motor control. They illustrate the point that individual differences are present and may impact the results of CIMT. On the clinical side, potential collateral “spread” of the effects of CIMT to areas controlling speech production is described by Allison et al. This interesting clinical observation raises the question of whether therapy can influence brain remodeling in areas other than the primary target.

Accurate and reproducible measurement of fine motor function is addressed in the article by Coker-Bolt and colleagues, using accelerometry. Although there may be debate as to the application of this kind of device to measuring daily living skills, tools that quantify movements serve as another source of information

to complement and verify results obtained from scales based on clinical examination and family feedback.

DeLuca et al. further emphasize this point by calling for clinical trials that employ the best available evidence based practices. Agreement regarding these practices is still missing. The infant protocol presented in the article by Reidy and colleagues is a good example. Applying the principles of CIMT to a younger age group requires development of protocols based on solid evidence with discussion and collaboration amongst professional groups involved in recommending and providing therapy.

Finally, the article by Hoare and Greaves compares and contrasts unimanual and bimanual therapies. The conclusion that these approaches are complementary makes sense and is well supported in this review.

One area that was not discussed is the role of neuroimaging and other techniques such as transcranial magnetic stimulation in the understanding of the influence of CIMT on the brain. These investigations promise to shed additional light on the intricacies of adaptive neuroplasticity. The question no longer appears to be “can” CIMT change the brain but “how”.

*Guest Editor*

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