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## Organized physical activity programs: improving motor and non-motor symptoms in neurodevelopmental disorders

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Novel lifestyle interventions that occur outside of the realm of a traditional clinic have gained much traction in health care over the last decade. More broadly, modified physical activity programs have shown positive impacts on the cognitive functioning of ageing individuals.<sup>1</sup>

We are now witnessing the growth and expansion of these novel lifestyle programs for children with developmental disorders. These interventions, conducted in the natural landscape of childhood activities, hold promise from a psychosocial and economic standpoint. Organized physical activity (OPA) programs that involve structured leisure activities (with peers, coaches, and group leaders) may enhance development in children with disabilities. Examples of OPA currently being studied to assess impact on cognitive and physical outcomes for children with developmental disabilities include tennis, martial arts, swimming, football, and horse-riding.<sup>2</sup>

Mak et al.'s<sup>3</sup> investigation of the benefits of an increasingly popular OPA program for children called MiYoga reported improvements in attention for children with cerebral palsy (CP). Although CP is not considered a neurodevelopmental condition, it is associated with many neurodevelopmental comorbidities, such as attention-deficit–hyperactivity disorders and intellectual disability. Such early interventions that employ environmental enrichment techniques and enhance attentional capacity may have many positive developmental downstream effects, and even improve the neurodevelopmental sequelae of CP. This is a benchmark study, as it is one of few randomized clinical trials of an OPA program that includes rigorous neuropsychological assessments as outcome measures.

The calm, quiet, indoor setting of an OPA program such as MiYoga will likely have great appeal to children with a disability and their parents. At the other end of the continuum are OPA programs that involve ball sports, and more physical and social contact with larger groups of children. May et al.'s<sup>4</sup> pilot study of a community-based OPA modified football game found that despite the many barriers implicit in team sports that take place in often noisy open environments, parents of children with autism reported that once their child was engaged, the benefits outweighed the barriers. Additionally, the football OPA program provided caregivers with the confidence to seek out other physical activities and sports programs for their children. While this pilot study holds promise in establishing feasibility in

more developmentally challenging OPA settings, further large scale, randomized control trial evidence is still needed.

In some countries, a prescriptive approach to physical activities for adult health is now routinely being employed. While lifestyle-based interventions can hold much appeal and promise for children with disabilities, it is imperative that we conduct rigorous clinical trials to examine the effects of these programs on a broad range of neurodevelopmental outcomes.

Parents of children with neurodevelopmental disorders are particularly vulnerable to being solicited for intervention programs that may seem effective but lack a scientific evidence-base efficacy and may, in fact, cause unnecessary financial burden and false expectations of curative outcomes. The Dore program is a good example of a highly controversial OPA-styled program that was subsequently closed in the wake of controversy. This program offered a personalized menu of exercises, which were promoted as a treatment for a range of disabilities, from specific learning disorders to ADHD. This program was largely criticized for being excessive in costs to families, non-evidence based, and for claiming a ‘cure’ (Rinehart N, personal communication 2006).

Such controversial programs serve as an important cautionary tale.

We know the motor system integrates with other developmental domains such as cognition and adaptive function. Thus, interventions that target physical activity can have a broad range of effects in many developmental areas. To determine if lifestyle-based interventions that are feasible and enjoyable are truly effective in improving outcomes, we need large-scale pragmatic randomized control trials and the employment of criterion standard biopsychosocial pre-post measurement. These trials can change clinical practice, justifying these activities for children with neurodevelopmental disorders alongside clinic-based treatments. We will also need evidence for which types of these non-clinic-based interventions would suit the developmental profile, preferences, and needs of individual children who present with neurodevelopmental disorders. Research that moves interventions beyond the clinic to the natural landscape of childhood will have positive impacts for children and families and more broadly to our community.

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