**Proposal for Yoga Classes for Children with Physical and Developmental Disabilities**

**Introduction:**

Over 2.6 million children ages 5 to 15 in the United States are living with physical or cognitive disabilities. 1 Children with physically handicaps and developmental delays have functional limitation that make it hard to exercises including spasticity, joint limitation, and pain. A recent study showed that youth with physical disabilities had a 4.5 time higher rate of physical inactivity compared to youth without disabilities. Making sure that physical fitness is part of prevention and health promotion is part of the physical therapist’s guides to practice and part of the ICF model. Physical therapist who treat children with physical disabilities, have an even greater role in helping to develop physical fitness activities and programs that fit the abilities of these children. The CDC recommends that all children including children with physical disabilities get at least 30-60 minutes of exercise daily, and Jassen et al recommends at least 2-3 of those days be more intensive activity for muscle and bone strengthening. 2. Strengthening activities could include sit-ups, push-ups or lifting weights. 3 By increasing their opportunity for physical activity, it will begin to develop healthy lifestyles now and for their future. However, the World Health Organization states that approximately 500 hundred million people will die due to disabilities associated with health conditions. Having limited access to physical activities leads to other secondary problems such as obesity, diabetes and pressures sores. 4 These co-morbidities lead to further limitations like the ability to access resources and opportunities. The difficulty in achieving the optimal amount of physical activity is multifactorial in children with physical and developmental disabilities including limited accessibility, limited appropriate community options and social-economical factors.  5

There are many studies of complementary and alternative methods (CAM) to introduce physical activity to children with physically and developmental disabilities. 6 Yoga, in particular is one of them. Yoga is an ancient Indian practice that teaches the body through movements and breathing and trains the mind to achieve balance and well being. 7 “Yoga means union, which is used by Hindu culture to describe the natural flow of body movements with melding structure and energy.”  7 The goals of yoga are for each individual to be healthy, both physically and mentally, and able to reach his or her highest capabilities as a person. Important aspects of yoga include focus on breathing, body awareness, motor planning, communication, self regulation, social skills, and sleeping patterns to name a few. 7 Beginning a practice of yoga as a child can be helpful in many ways but it can also be an activity that is beneficial for a lifetime. Yoga is beneficial for individuals with disabilities or chronic health conditions through both the physical postures and pranayama or breathing exercises. 7 Children and youth with physical disabilities and developmental delays can benefit from regular yoga practice with trained professional. Yoga can impact both increased and decreased muscle tone problems, which are seen in children with motor dysfunction.  7 Using asana postures provides the muscles and tendons a slow stretch encouraging a release of tightness in muscles and joints. Asanas also can be used to strengthen muscles and improve core stability through positioning. All postures and positions in yoga therapy improve spinal and skeletal alignment and work on symmetry in the trunk and abdominal musculature. 7 Other benefits include building muscle tone and strength, flexibility training, improved posture and learning to relax through breathing activities. Yoga classes would offer children enjoyable, non-competitive, group experience. Yoga classes would be a life long activity that would provide overall body-mind connection. Physical therapists have the expertise in human development, anatomy, skeletal alignment and balance training, to name a few, which puts the PT in a very good position to be a yoga therapy teacher for this population.

**Statement of Need**:

There are many extracurricular activities in Greensboro, NC for children with physical and/or developmental disabilities including ballet, baseball, horsepower and aquatic therapy. Some of these activities include one on one classes and or group classes. There are some yoga instructors doing one on one individualized classes but no group yoga therapy programs for children with physical and/or developmental disabilities so this is the need for this proposal. This proposal is for a yoga therapy group setting for 4 to 5 children per class accompanied by families member, that would participate with the child. This yoga group would serve as a community developmental initiative and is designed to promote children’s participation by making it convenient for parents, siblings (buddies) and other family member to attend.  8 Participation in a few highly meaningful activities can be enough to provide well being and a sense of meaning in everyday life and yoga could be one of these activities. 8

**Review of Literature**:

Many studies have discussed the need for physical activities for children with physical disabilities and developmental disabilities and the effect on health promotion and wellness.  5 The WHO defines participation as “the nature and extent of a person’s involvement in life situations and categorizes participation in terms of personal maintenance; mobility; information exchange; social relationships; home life; education, work and employment; economic life; and community, social, and civic life”  4 In the study by Rimmer et al, the participation-based model discusses the importance of increasing physical activity in children with disabilities. 5 Community participation is a major goal in models of rehabilitation service delivery for children. This type of participation in community activities is one of the best way that children with disabilities to increase physical activity.  5 The environment, family and child factors can help or hinder participation of children with disabilities.  8 Participation improves emotional skills to form friendships, achieve mental and physical health, express creativity self-identity and meaning and purpose of life. The article by Palisano et al, discusses the participation-based model and how it encourages optimal participation between the family, child and environment and the physical, social and self-engagement.  9The health care professional serves an important role in being that liaison to bring together the particular needs of each child with the community activity in a supportive positive experience.

Yoga has been shown to be an effective means to increase physical activity in children. 10 Over the years there has been research in the benefits of yoga for children with autism, depression and stuttering. Studies have shown the benefit of yoga in children with Down syndrome to improve muscle tone and improve developmental milestones. 10 In addition to the physical aspect, the yoga program would bring together a group of children to do what typically developing peers and siblings are doing. It would provide social outlets to the children and families. Previous literature has linked participation in yoga to various health benefits and supports that yoga is an effective exercise option.  11 Many studies have shown that yoga techniques may improve physical and mental health through down-regulation of the hypothalamic-pituitary adrenal axis and the sympathetic nervous system. The research also support that the HPA axis and the sympathetic nervous system are triggered as response to a physical or psychologic demand leading to a cascade of physiologic, behavioral, and psychologic effects because of a release of cortisol and catecholamines (epinephrine and norepinephirine).  12This constant state of energy needed to combat stressors can lead to poor regulation of systems and ultimately to diseases such as diabetes, obesity and cardiovascular disease. These studies have been done mostly on adults and further research is needed in the effects of the HPA axis and SNS in children. In this particular review of 12 studies, yoga was shown to be an effective and feasible alternative to exercise in a variety of health-related outcomes.  12

**Hypothesis:**

Yoga therapy, will be used as an adjunct to traditional physical therapy intervention, and will be used to demonstrate improve participation in physical activity for children and improve physical and mental well-being while maintaining joint flexibility and strength as it relates to each individual child.

**Program Goals/Aims**

* **The participants will concur that yoga therapy provided a participation-based model activity for children and family members at 6 month follow up**
* **The children will maintained and/or improvement and muscle tone, strength and flexibility, gross motor skills through yoga therapy at the end of the 16 weeks**
* **The parents and children will document through the Modified Children’s Questionnaire improved levels of participation**
* **The adolescents in the program will use the PACES to document improved scores in enjoyment physical activities at end of program**

**Purpose**:

The purpose is to develop a group setting for yoga therapy for children with physical and/or developmental disabilities and a family member. The purpose is to prepare children through stages of yoga practice to become familiar with beneficial poses. These poses would be individualized to each child. The purpose is for the child to move forward in a safe, gentle yoga program and gain an independent level of practice within their abilities that they can carry forward into life long practice.

**Method:**

Referral would be obtained from parents, therapists, teachers and physicians. Initial assessments will be made through contact with families. The classes would be divided into ages 3-5, 6-10 and 10-13. Both developmental and chronological ages would need to be taken into account in class placement.

Each child will be assessed at a baseline (initially), at 4 weeks (following individual sessions) and at 12 weeks (conclusion of group) and 6 months follow up. The following test and measurements and history will be obtained:

* Parents will fill out a questionnaire concerning their goals, expectations, and satisfaction with other group activities their children have participated in previously.
* I will also request physician order with specific information on any necessary precautions due to seizures, cardiac problems, atlantoaxial instability, skeletal alignment concerns and medications and medical history.
* *GMFM-66 combined with the Pediatric Evaluation of Disability Inventory-Functional Skills Mobility Domain (PED). The GMFM* measures the child’s capacity and the PEDI measures the child’s capability. The GMFM is more objective and the PEDI is more subjective from parent point of view. 13
* *Gross Motor Functional Classification System* is a 5 level classification system by age in which distinctions between the levels of motor function area based on functional limitations, the need for assistive devices and to lesser extent, quality of movement. 14
* *Modified Questionnaire for children is a measure of* how much physical activity a child is involved with presently and is completed by the parent. For the purpose of this program, consideration was made in using the *Physical Activity Scale for Individuals with Physical Disabilities*. However this scale includes household activities not applicable to this population.
* *ROM* measurement will be taken of heelcords, hamstrings and hip motion, including hip adduction, hip abduction, hip internal and external rotation.
* *Sit and reach test (SRT) measures flexibility in hamstring and spine.*
* *Modified Tradieu Test for muscle tone assessment* 15*.*
* *Muscle strength* assessment of abdominal strength and hip extension strength through performing bridge pose for 5 seconds 2 inches or more off of floor.
* Physical Activity Enjoyment Scale (PACES) measures the enjoyment of physical activity in children, however this will be use only in the two older groups due to the need for the children to understand and respond appropriately to answer questions related to the enjoyment of physical activities. 16

**Intervention Phase One**: Initial screening and individual session

As preparation for the group setting, the children and families will participate in individual sessions in order to lay the foundation for their yoga practice. This would involve approximately 4 weeks of individual weekly sessions for 30-45 minutes with hands on instruction and yoga information and handouts. Introduction with hands on assistance as needed to initiate the poses as follows: namaste, breathe work, savasana, full body stretch, knee to chest, bridging, spinal twist, sitting and supine, child’s pose and standing mountain pose.  7 At the end of the 4 weeks outcome measures will be assessed.

**Intervention Phase Two:** 12 week session

Following this, the group session will run for 12 weeks, 2 times per week for 45 minutes. Practice will continue with the ten yoga poses introduced in individual sessions as a group classes. Following this intervention, outcome measurements will be assessed.

**Intervention Stage Three**:

This will include six month follow up either as a home visit or clinic visit with outcomes measurements performed

**Anticipated Outcome Measurements:**

1. 90% of children will have no negative change in score on the GMFM or PEDI at 16 weeks and six month follow up.
2. 100% of children will maintain initial level on the GMFCS at 16 weeks and 6 months follow up.
3. 80% of children will increase frequency of days by one level in question #1,2. Decrease 2 hours in #3 and add one activity to the list of activities #4 at the 6 month follow up on the Modified Children Questionnaire.
4. 80% of children will improve scores by at least +1/2 inch on the Sit and Reach test at the end of 16 total weeks of program.
5. 80% of children will show improved range of motion measurements in at least 2 joint with improvement in 5 degrees at 16 weeks.
6. 90% of children will show no change in Modified Tradieu test at end of 16 weeks.
7. 80% of children will increase strength in abdominals and hip extension by improved ability to maintain bridge pose for 5 seconds with full hip extension at end of 16 weeks.
8. 80% of the adolescent participating in the program will show improvement in PACES score by 10 points at end of 16 weeks and at 6 month follow up.
9. 100% of the family members and children will voice satisfaction in participation in a the group yoga therapy class at 16 weeks

**Location:**

Stage one intervention, will be performed in the home. The group class will be held at a PT private clinic, which is easily accessible with adequate parking. The 6 month follow up will be scheduled at the clinic unless it is necessary to go to the home.

**Funding:**

At the present time, consideration for funding will be applying for a grant or a private donor. Realizing that asking for private payment for the sessions may limit the population that could also benefit from this program.

**Potential Barriers**

Participant adherence is always a complicating factor when working with children due to their health issues, dependency on parental transportation and school schedules. Location may be an issue for some parents who may live farther away. Due to the short duration, limited changes in anticipated outcomes may be documented. Lastly, commitment to a program for 16 weeks may be difficult. Follow up at 6 months may also pose some logistically issue and retesting may need to be scheduled as a home visit. Also noted, as a potential barrier, is the limited number of participants in each group with the large age span. It may be difficult to complete the PACES due to communication limitations with some children in the 2 older age groups.

**Evaluation of program:**

An appropriate designed yoga therapy program could be a compliment to traditional physical therapy and benefit children with physical and developmental disabilities. A group setting is beneficial for the child and the family for the social component. Physical activities are important for all children but especially for the children with physical and developmental delays. Their choices for physical activities are more limiting due to their physical and/or cognitive delays. Sometimes the parents and children with physical disability feel they have limited choices with physical activity and fitness and this program is a good option for a participation-based program. Children with physical disabilities need to enjoy physical activity in their lives in order to promote life long habits. Improved scores on the SRT, muscle strength test, ROM and GMFM may demonstrate that a yoga therapy program would be a complement to traditional physical therapy. A program such as this could grow and reach a larger population and include more typically developing children as models and “buddies.”

Submitted by Marian Stein, PT

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