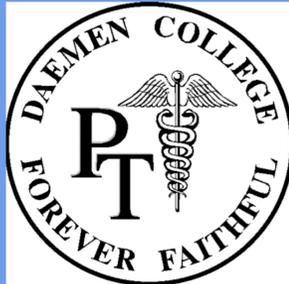




Effects of Classroom Based Yoga on Gross Motor Skills and Self-Regulation in Preschool Aged Children With Developmental Delays

Stacie Dailey, SPT, Raechel Rowley, SPT, Bethany Sivak, SPT, Abigail Stone, SPT
 Research Advisor: Jennifer Priore, PT, DPT, MS, PCS
 Physical Therapy Department

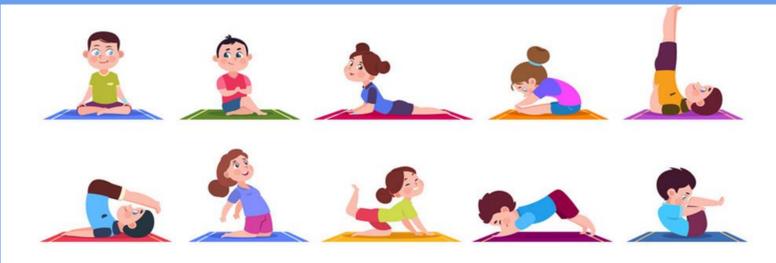


PURPOSE

The purpose of this research is to determine the effect of classroom based yoga on gross motor skills and self-regulation in preschool aged children with developmental disorders. Examination of alternative interventions, such as yoga, is necessary as approximately 12% of children used complementary or alternative medicine in 2007 and rates double (24%) for children with six or greater health conditions.⁷

Children and Developmental Disabilities

Mental, behavioral, or developmental disabilities are diagnosed in 15.4% of children ages 2-8 years and prevalence is expected to increase over the next several years.^{5,6} Children with developmental disabilities experience challenges and limitations across several domains, which impact their ability to fully participate in their daily activities across environments. Children with developmental disabilities often require many different types of therapy to address various needs throughout their lives. As a result, families will often seek alternative therapies to complement the traditional therapies that are typically received. Yoga is a popular complementary form of exercise that is easily accessible and a viable option for children. Although yoga has proposed benefits in pediatric populations, current evidence is lacking for children with developmental disabilities.



Yoga kids cartoon children doing yoga sporting vector image. VectorStock. <https://www.vectorstock.com/royalty-free-vector/yoga-kids-cartoonchildren-doing-yoga-sporting-vector-22266276>. Published October 2, 2018.

Anger Control - BASC-2

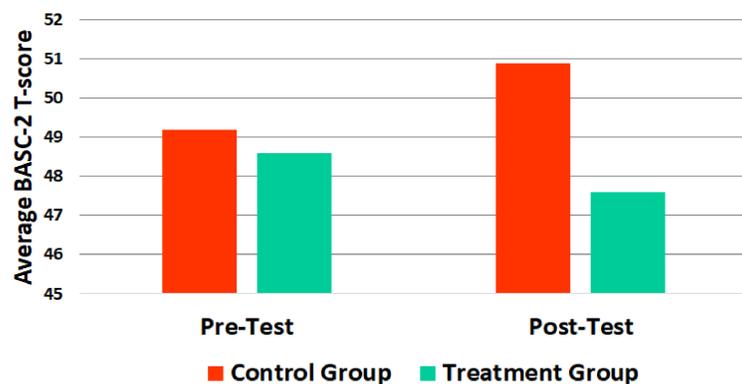


Figure 1: Relative changes in anger control. Mean scores are plotted for treatment (red bar) and control (green bar) groups at baseline and at the end of the program for the Anger Control subscale of the BASC-2 (p=0.03).¹

MATERIALS AND METHODS

Authors and Purpose	Subjects	Methods	Results
Khalsa S, Hickey-Schultz L, Cohen D, Steiner N, Cope S., 2011 ¹ The aim of this study is to investigate the potential mental health benefits of yoga, including coping strategies, anger control, and fatigue levels for adolescents who are in secondary school.	-121 subjects (51 female, 70 male) aged 15-19 years with a mean age of 16.8 years -74 subjects in the treatment group (34 female, 40 male) with a mean age of 16.8 years -47 subjects in the control group (17 female, 30 male) with a mean age of 16.9 years	-Treatment group: Subjects attended two to three yoga session per week for 11-weeks -Classes were 30-40 minutes long and included single yoga postures, breathing exercises, visualization, and games with an emphasis on fun and relaxation -Control group: General physical education class -The Self-Report of Personality (SRP) version of the Behavior Assessment Survey for Children Version 2 (BASC-2) for children aged 12 to 21 years provides insight into thoughts and feelings of the subjects -The Profile of Mood States short form (POMS-SF) provides a total mood disturbance score, as well as subscale scores for six mood states -The Resilience Scale (RS) measures the degree of individual resilience	-There was a significant difference between the treatment and control groups in resilience (via RS, p=0.01), anger control (via BASC-2, p=0.03, see figure 1), and fatigue/inertia (via POMS-SF, p=0.02) in favor of the treatment group -Subjects in the treatment group frequently reported improvements in relaxation, stress coping strategies, mood and positive affect, and sleep -Yoga instructors noted that many subjects made visible improvements in proper execution/alignment of the yoga postures and understanding of the yoga practices in general
Koenig KP, Buckley-Reen A, Garg S., 2012 ² The aim of this study is to investigate the impact of Get Ready to Learn (GRTL) yoga postures on functional and academic performance in elementary school-aged children with Autism Spectrum Disorder (ASD).	-46 subjects (37 male, 9 female) aged 5-12 years old with ASD in 6:1:1 classrooms -24 subjects (19 male, 5 female) in the treatment group -22 subjects (18 male, 4 female) in control group	-Treatment group: Subjects attended yoga sessions once a day, every school day for 16 weeks -Classes were 15-20 minutes long and followed the GRTL yoga program -Control group: Standard morning routine -Parents rated adaptive functioning measured by the Vineland Adaptive Behavioral Scales-II (VABS-II) -Parents and teachers rated challenging behavior assessed by the Aberrant Behavior Checklist (ABC)-Community. -Results assessed by a pre- and post-test design	-Parent rated VABS-II revealed no statistical difference between treatment and control groups -Parent rated ABC-Community demonstrated no significant difference between treatment and control groups from pre- to post-test -Teacher rated ABC-Community demonstrated a significant difference (p=0.029) between treatment and control groups for total scores with overall trends of decreased aberrant behavior in the treatment group and increased aberrant behavior among the control group
Rosenblatt L, Gorantla S, Torres J et al, 2011 ³ The aim of this study is to develop and objectively assess the therapeutic effect of a movement-based, modified relaxation response program, involving yoga and dance on behavior for children with Autism Spectrum Disorder (ASD).	-24 subjects (22 males and 2 females) with ASD ages 3.6 to 16.5 years with a mean age 8.9 years -16 subjects were 5-12 years -6 subjects were 13-16 years -2 subjects were 3 years old -No control group	-Treatment group: eight treatment sessions once a week for eight weeks -Classes were 45 minutes long with a final summary and post-testing session and the cessation of the study -Each session consisted of breathing techniques of relaxation response, yoga postures, music and dance, and typical yoga relaxation -Irritability, lethargy, hyperactivity, stereotypy, and inappropriate speech were measured using the Aberrant Behavior Checklist (ABC) -Atypicality, depression, the externalizing scale, internalizing scale, and the behavior symptom index (BSI) were assessed using The Behavioral Assessment System for Children, Second Edition (BASC-2)	-Among the 16 subjects ages 5-12, all three BASC-2 composite scales, as well as two subscales were found to have improved -BSI (p=0.013), externalization (p=0.04), internalization (p=0.02), atypicality (p=0.003), depression (p=0.02) -For the subjects ages 5-12, there was a trend toward improvement on the irritability scale of the ABC -For all ages, BSI (p=0.04) and atypicality (p=0.02) had significant improvements -No scales on the ABC changed for any of the cohort
Folletto JC, Pereira K, Valentini N, 2016 ⁴ The aim of this study is to investigate the effects of a yoga program in physical education classes on motor abilities, social behaviors, and development of 6 to 8-year-old children with typical development in a first grade classroom of a public elementary school.	-16 subjects ages 6-8 years (8 males and 8 females) -One subject had a diagnosis of Autism Spectrum Disorder (ASD) -The rest of the subjects were not diagnosed with any disabilities -No control group	-Treatment group: Yoga was performed during physical education classes for 12 weeks, twice a week in 45 minute lessons -Yoga movement curriculum based on initial level of performance, encouraging subjects to do modeled movements -Balance, running speed, agility, and strength subsets of Bruininks-Oseretsky Test of Motor Proficiency Second Edition (BOT-2) were used to assess motor ability -Sit and reach from Eurofit Test was used to assess flexibility -Subject and classroom teacher interviews were used to assess attitudes towards yoga -Parent questionnaires were used to assess impact on home environment	-BOT-2: Statistically significant changes in the balance subset for tasks B2 (p=0.047), B5 (p=0.001), B6 (p=0.009), and B8 (p=0.026), the agility subset for task RSA2 (p=0.050), the strength subset S5 (p=0.050), and flexibility (p=0.010) (see figure 2) -Subjects frequently reported learning postures, activities, breathing, and calmness and all subjects expressed wanting to continue practicing yoga at school -The instructor reported the subjects were calm and concentrated more often following treatment -Most parents reported that the subjects were more relaxed and calm, and practiced the postures learned at home

RESULTS

The general consensus in review of the evidence is that yoga for children with developmental disorders demonstrated a positive impact on mood and self-regulation, as well as interpersonal interactions. Khalsa et al¹ found that children who participated in yoga sessions demonstrated improved maintenance of anger, resilience, and fatigue/inertia, indicative of successful coping strategies. Koenig et al² reported that children who participated in yoga demonstrated a reduction in maladaptive behaviors in the classroom as compared to age-matched peers. Rosenblatt et al³ found that children in the yoga program demonstrated improvements in behavior and sensory dysfunctions. Folletto et al⁴ reported changes in balance, strength, and flexibility in typically developing children.

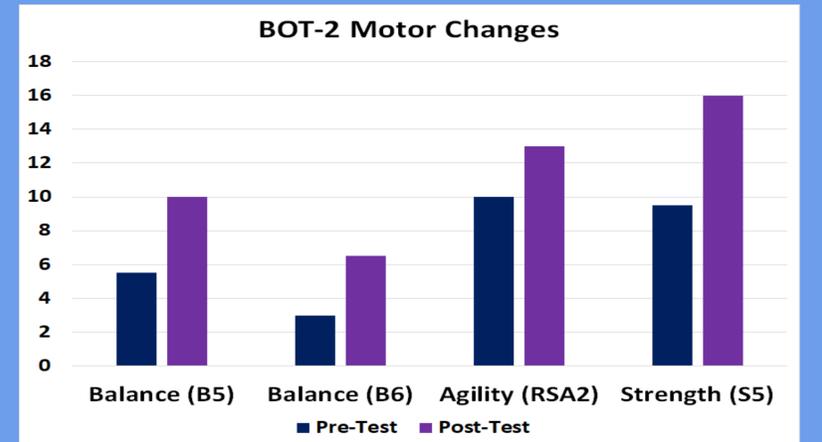


Figure 2: Statistically significant changes in the balance subset for tasks B5, B6, the agility subset for task RSA2, the strength subset S5, and flexibility.⁴

CONCLUSIONS

Although research is limited in this area, evidence suggests that yoga is an effective complementary treatment to traditional physical therapy for children with developmental delays, to improve behavioral regulation and gross motor skills. Yoga uses psychological and physiological processes that are aimed at improving physiologic aspects through breathing techniques, postures, relaxation, and meditation, as well as poses that improve balance and coordination. Children with developmental disabilities may benefit from yoga practice to improve behavioral regulation and gross motor skills, however future research is needed to fully examine the impact of yoga for this population.

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