



Therapeutic Effects of Yoga for Children

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ABSTRACT

The effect of yoga on quality of life and physical outcome measures in the pediatric population has been examined. The study explored various databases and included case-control and pilot studies, cohort and randomized controlled trials that examined yoga as an exercise intervention for children. Using the Sackett levels of evidence, this article reviews the literature on yoga as a complementary mind-body movement therapy. The research addresses through three practice patterns according to the Guide to Physical Therapist Practice and provides considerations for the inclusion of yoga into clinical practice. The evidence shows physiological benefits of yoga for the pediatric population that may benefit children through the rehabilitation process, but larger clinical trials, including specific measures of quality of life are necessary to provide definitive evidence.

Keywords : Adolescent; child; complementary therapy; exercise movement techniques; human movement system; yoga

INTRODUCTION

Today's "typical child" is described as stressed out, under nourished, and sedentary. The complexity posed by these profiles demands treatment that taps into both the physical and the psychosocial domain. A study by Parshad¹ found the state of the mind and that of the body to be intimately related. If the mind is relaxed, the muscles in the body will also be relaxed. Stress produces a state of physical and mental tension. Yoga, developed thousands of years ago, is recognized as a form of mind-body medicine. There are many forms of yoga with emphasis on various aspects of body mechanics, fitness, and spirituality. Parshad's study demonstrates that yoga's physical postures and breathing exercises improve muscle strength, flexibility, blood circulation and oxygen uptake, and hormone function. In addition, Parshad found that relaxation induced by meditation helps to stabilize the autonomic nervous system with a tendency toward parasympathetic dominance. Physiological benefits that follow help individuals who practice yoga to become more resilient to stressful conditions and reduce a variety of important risk factors for various diseases, for example, cardiorespiratory diseases.

METHODOLOGY

Yoga was defined as a form of leisure-time physical activity that was performed on a repeated basis during an extended period of time, with the intention of improving fitness, performance or health. The breadth of yoga styles, some of which were used in the reviewed studies. Studies with an additional treatment arm or combined intervention (e.g. yoga with traditional exercise) were included only if the effects of exercise could be isolated. Trials were included only if they involved normally developing children and children with various impairments of the muscular, cardiopulmonary, or neuromuscular systems. Studies were required to have as a primary outcome quality of life (QOL), cardiorespiratory fitness or physical functioning. Secondary outcomes of interest included cognition and attention. We also extracted data on adverse events resulting from the yoga intervention.

NEUROMUSCULAR EFFECTS OF YOGA

Yoga seems to have a positive impact on motor performance in children and most studies have been conducted on children

developing typically. Four studies analyzed the effects of yoga on reaction time, planning, execution time and motor speed. Reaction time has been used to quantify level of motor function, and thus speaks to the overall functioning of the central nervous system (CNS) Pilot data by Bhavanani et al² found that mukh bhastrika yoga (bellows type breathing) produced decreased visual reaction time and auditory reaction time in 22 healthy schoolboys. This indicates potentially improved sensory-motor performance and enhanced processing ability of the central nervous system. He also showed trends of improved planning and execution times in the yoga group in the Tower of London test for both simple and complex tasks. The Tower of London test is standardized and addresses executive functions. The study revealed no change in the physical training group.

Motor speed, like reaction time, is also a quantification of CNS processing. The effects of yoga training on a finger tapping task is done to assess motor speed in children and adults. Significant increases in tapping speed values after 10 days of yoga training in the children's group and 30 days of yoga training in the adult group. Although not verified by diagnostic imaging, this and other studies point to the potential plasticity of the brain and CNS in response to yoga. Yoga supports improved motor performance in children after yoga training. The yoga group showed a significant decrease in errors, while the control group showed no change. Although an improvement in the quality of research design, further investigation is needed for application in children with disabilities.

Yoga increases working efficiency, and overall ability to concentrate and focus. Yoga fosters relaxation and breathing in a very active way, enabling children to channel their energy into goal-driven tasks. These findings have implications for learning and classroom behavior. Three studies specifically examined the use of yoga and meditation as a treatment for attention deficit hyperactivity disorder (ADHD) and would be considered pilot in nature. One study by Yoga may have merit as a complementary treatment for ADHD already stabilized on medication. Yoga remains an investigational treatment, but this study supports further research into its possible uses to address behavioral challenges for this population. These

findings need to be replicated on larger groups with a more intensive supervised practice program. Application of yoga for children with mental retardation also shows promise. Uma et al⁴ demonstrated significant improvements in IQ and social parameters compared with a control group through an intervention for 1 academic year. Changes occurring at the neuromuscular level enabled the more global effects of behavioral and cognitive enhancements. Such benefits may be applied along the spectrum of children with neurological impairments but further RCT are needed to determine definitive use of yoga.

CARDIOPULMONARY EFFECTS OF YOGA

A primary emphasis in the practice of yoga is controlled-breathing techniques. This idea leads to new research on children with cardiopulmonary impairments. Our search yielded four studies that demonstrate yoga's mechanism of action on subjects with healthy cardiac function. The effects of pranayama training (voluntary regulation of breathing) on cardiac function in normal young volunteers. Twenty-four school children were divided into a pranayama group and a control group. The pranayama group practiced breathing techniques for 20 minutes daily for 3 months. A control group maintained normal breathing. Researchers found that pranayama training effectively modulated ventricular performance by decreasing sympathetic output and thereby increasing parasympathetic output. This study provided baseline evidence for the efficacy of yoga on cardiorespiratory parameters in normal volunteers, and allowed for expanded research into populations with pathology.

MUSCULOSKELETAL EFFECTS OF YOGA

Yoga may be used with children developing typically, or children who are not meeting national norms for fitness and body composition, or children with elevated stress levels to improve musculoskeletal parameters. Orthopedic injuries in children are often caused by lack of strength and flexibility,⁷ which are addressed in the musculoskeletal practice pattern. The four studies reviewed showed significant effects of yoga and its breathing techniques on the musculoskeletal system in children. Although these studies were not very recent, they lay down the foundational work in this body of evidence, and provide a starting point upon which to build future studies. The results and conclusions of these studies suggest that yoga can be introduced during school to improve physiological function, overall health, and performance of students. Yoga has many more implications for total body strengthening.

Obesity, another growing concern in our pediatric population, may also be reduced through the implementation of yoga programs. A pilot study by Slawta et al⁸ entitled "Be a Fit Kid" included a 12-week program of yoga designed to improve physical fitness and nutritional habits in children. The program also included a physical activity component (running, jumping, and strengthening) along with a nutrition program. After the intervention, significant improvements were found in body composition and fitness in those who participated 75% of the time. Because the "Be a Fit Kid" program used a holistic approach,

the specific effects of the yoga component are difficult to determine. However, we felt that the study was important to include, given that it portrays yoga as an important contributor to an overall healthy lifestyle. Considering the recent trend of child participation in yoga classes, it is likely that more studies investigating children who are obese should be conducted with more rigorous methodology. This pilot study established the framework for replication in a larger, randomized sample.

CONCLUSION

Yoga is one mind-body therapy that has emerged as an educational-based intervention and to improve various medical conditions for children. Parents often have higher expectations of CAM therapies than do their children. Additionally, enhanced expectations often resulted in better outcomes. Thus, the use of alternative modalities must take into consideration these influential factors. Therefore, it is important that PTs are increasingly aware of the potential complementary and beneficial effects of various CAM modalities in children's rehabilitation.

The use of yoga for rehabilitation may have diverse applications. Yoga practice may benefit children with mental challenges by improving their mental ability, along with motor coordination and social skills. Children with physical disabilities may also experience restoration of some degree of functional ability after practicing yoga. Children who are VI can decrease their abnormal anxiety levels, and children in a group home can improve their sleep, appetite, and general well being, as well as a decrease in physiological arousal. Evidence from the previous studies of yoga as a CAM intervention have implications for PTs in the neuromuscular areas of learning, motor control, and coordination. PTs might apply these findings to their patients with asthma or simply as a form of biofeedback in stress management. Further, outcomes may be enhanced by applying findings from these studies to young athletes or children who are overweight. Regardless of the goal, yoga seems to be a multitasking modality that simultaneously treats physical impairments and psychosocial issues such as stress, anxiety, or hyperactivity. Many of these studies set out to measure purely physical parameters, but encompass psychosocial issues. Moreover, many of the studies in this review overlap or address multiple practice patterns, making it difficult to distinguish the effects of yoga on one specific impairment.

Yoga guides us in determining issues that will be important in the design of larger pediatric rehabilitation clinical trials. Future studies should examine the effect of yoga, as well as the magnitude and the variability of the response throughout childhood and adolescence. Compelling evidence exists that demonstrates the effect within the neuromuscular, cardiopulmonary, and musculoskeletal practice patterns. The breadth of these studies has implications in all areas of PT practice, particularly in complementing existing wellness programs and clinical interventions for children.

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