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## Responding to Exercise Deficit Disorder in Youth: Integrating Wellness Care into Pediatric Physical Therapy

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### Abstract

**The Problem**—The decline and disinterest in regular physical activity among contemporary youth has created an immediate need to identify and treat these youngsters before they become resistant to our interventions.

**Key Points**—Exercise deficit disorder is a term used to describe a condition characterized by reduced levels of physical activity that are inconsistent with current public health recommendations. Pediatric physical therapists are in an enviable position to identify and treat exercise deficit disorder in youth regardless of body size or physical ability.

**Recommendation**—If pediatric physical therapists want to become advocates for children's health and wellness, there is a need to address limitations in the physical therapist professional curriculum, educate families on the benefits of wellness programming, and initiate preventive strategies that identify youth who are inactive, promote daily physical activity and encourage healthy lifestyle choices.

### Keywords

adolescence; child; health promotion; physical activity; physical therapy; prevention; professional role; sedentary lifestyle

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The belief that exercise is good for health and well-being predates the historical writings of ancient Greek philosophy. While some early observers suggested that disease was a result of mystical forces, physicians including Hippocrates (460–370 B.C.) and Galen (A.D. 129–210) believed that disease was influenced by environmental factors, specifically healthful living habits. Hippocrates spoke of the health-related benefits of exercise and is credited with the quote “If we could give every individual the right amount of nourishment and

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exercise, not too little and not too much, we would have found the safest way to health.” However, recent epidemiological reports indicate that youth are not as active as they should be and over the past quarter century the prevalence of overweight and obesity among children and adolescents has become a major public health concern.<sup>1-4</sup> The incontrovertible effect of physical inactivity during the growing years on lifelong pathological processes has created a need to adapt treatment plans and health care policies. The aim of this commentary is to present a contemporary approach for informing therapeutic practice and improving wellness care so we are better prepared to identify and treat youth who are inactive before they become resistant to our interventions.

Currently, a growing number of school districts view physical education as an expendable part of the school curriculum and only 18% of the United States require elementary schools to provide daily recess.<sup>5</sup> Nationwide only 29% of high school students are physically active for at least 60 minutes every day, yet 32% of students watch television 3 or more hours on an average school day.<sup>6</sup> Among US children and adolescents aged 2 to 19 years, more than 5 million girls and approximately 7 million boys are obese.<sup>4</sup> Fewer students who are black and Hispanic meet physical activity recommendations when compared with students who are white, and the prevalence of obesity is highest among students who are black and Hispanic.<sup>6</sup> From a global health perspective, physical inactivity is now recognized as the fourth leading risk factor for mortality for non-communicable diseases.<sup>7</sup> The economic costs associated with escalating medical expenses are mounting and the deleterious effects of hypoactivity on disease, illness and suffering are incalculable.

The decline and disinterest in physical activity which seems to be a modern-day corollary of low fundamental motor skill proficiency appears to decline steadily after age six years.<sup>3,8,9</sup> In a longitudinal study that examined the determinants of physical activity in youth, motor proficiency was a significant predictor of physical activity in children 6 to 10 years of age.<sup>8</sup> That is, children with high levels of motor coordination at age 6 years showed negligible changes in levels of physical activity over the next 3 years compared with children with low and moderate levels of motor coordination who significantly reduced their physical activity over the same period. These findings support the work of Seefeldt<sup>10</sup> who observed that youth who do not develop the prerequisite skills to engage in a variety of physical activities early in life may not be able to break through a hypothetical “proficiency barrier” later in life that would allow them to participate regularly in recreational activities and sports with energy and vigor.

Research has also demonstrated that body composition trajectories are inversely associated with fundamental motor skill levels during childhood and into adolescence.<sup>11,12</sup> Thus, youth that are not exposed to an environment with opportunities to learn and practice fundamental motor skill are less likely to develop the motor skill repertoire and perceived confidence to meet or exceed national recommendations for physical activity and more likely to have unhealthy habits and associated disease risk factors. In support of these observations, accelerometry-measured moderate to vigorous physical activity (MVPA) at age 5 years was a predictor of adjusted fat mass at age 8 and 11 years in boys and girls.<sup>13</sup> Clearly, the effect of a sedentary lifestyle during the growing years on lifelong pathological processes has created an immediate need to identify and treat youth who are inactive with focused interventions. This conviction is supported by long-term epidemiological studies in youth and the alarming diagnosis of type 2 “adult onset” diabetes mellitus in children and adolescents who are most commonly obese.<sup>14-16</sup>

## Exercise Deficit Disorder in Youth

Both positive and negative behaviors established during childhood tend to carry over into adolescence. Therefore, we need to systematically identify youth who are physically inactive early in life in order to prevent the inevitable cascade of adverse health consequences later in life.<sup>15-17</sup> Exercise deficit disorder or EDD is a term used to describe a condition characterized by reduced levels of MVPA<sup>18,19</sup> that are inconsistent with current recommendations. Although the optimal dose of exercise depends on age and pre-existing medical conditions, public health guidelines state that children and adolescents should participate in at least 60 minutes or more of MVPA each day (i.e., 420 minutes/week).<sup>7</sup> As such, a child's physical activity status should be assessed against this standard and youth who are not receiving this daily dose of exercise should be identified and efforts should be made to activate their lifestyle with age-appropriate exercises and games that spark a lifelong interest in fitness activities and sport.

Of note, unlike other pediatric diseases and disorders, no established laboratory tests or clinical markers are used to diagnose EDD, nor are medications used to treat deficiencies in movement skill or physical fitness. Therefore, youth should be asked about the amount of time per day they engage in structured (e.g., sports and physical education) and unstructured (e.g., bicycling and free play) activities as well as their mode of transportation to and from school. Asking follow-up questions about the amount of time they engage in activities that make them "breathe hard" may shed some light on the intensity of their physical exertion. The amount of time a child spends in front of the television or computer screen may provide additional insights into their lifestyle habits. As part of a routine episode of care, pediatric physical therapists could obtain a "play history" on every patient by asking about their weekly physical activity habits during the initial evaluation. Youth who are not meeting daily recommendations for MVPA or those who show a decrease in physical activity could be identified and treated with the same energy and resolve as a child with attention deficit disorder or pervasive developmental delay. In our view, a physically inactive 7-year-old boy with EDD, despite having achieved appropriate developmental milestones should not be considered "healthy."

Although many pediatric physical therapists traditionally work with patients who have developmental or neurological delays, some have the opportunity to provide guided exercise prescriptions to children and adolescents with congenital disorders as well as youth recovering from musculoskeletal injuries. Physical therapists are uniquely trained to identify neuromuscular and musculoskeletal limitations that preclude youth from achieving desired levels of pain free physical activity. Whereas youth who are sedentary may not show signs of injury that are typically observed in routine practice of patients with musculoskeletal pathology, pediatric physical therapists can certainly recognize limitations in fundamental movement skills and muscle strength in children and adolescents and in youth that are developing skills typically but with EDD.<sup>9,20</sup> For this reason, pediatric physical therapists are in an inimitable position to identify and treat youth who are not meeting current recommendations for daily MVPA.

Youth identified with EDD should be provided with a management plan that includes treatment, community-based recommendations for physical activity, and follow-up. Improved communication between physical therapists and pediatric fitness specialists, including physical education teachers, will facilitate the identification and treatment of youth with EDD. Youth who are sedentary need to engage regularly in developmentally-appropriate and enjoyable exercises that are purposely designed to target movement deficiencies and physical weaknesses. Focusing our efforts only on youth or children who are obese or those with disabilities will likely foster symptom-oriented treatment strategies

that may be ineffective in the long term. Since no child is immune from EDD, physical therapists have an opportunity to identify this condition in patients and initiate preventative strategies that promote healthy lifestyle choices in all youth regardless of body size or physical ability.

Physical therapists could also introduce children to pediatric fitness specialists in their community who could help children and their families develop a weekly action plan that is consistent with individual needs, interests and abilities. Community-sponsored wellness programs can provide a unique opportunity for families to learn about the benefits of physical activity and healthy lifestyle choices. In this regard, the concept that fundamental movement skills such as jumping, kicking, throwing, and balancing must be learned, practiced and reinforced regularly should be emphasized. Since neuromuscular performance (i.e. muscular strength and motor fitness) appears to be declining in school-age youth,<sup>21,22</sup> the development of muscle strength and motor skills is an important goal for sparking a continued interest in fitness activities and sport. Instead of prolonged periods of endurance exercise on high-tech aerobic machines, the first step in encouraging youth who are sedentary to “move” should be to increase their physical strength and perceived confidence to perform a variety of low-tech fundamental movement skills. The word exercise in EDD does not suggest that free play is inconsequential, but rather emphasizes the premise that a variety of strength-building and skill-enhancing activities need to be prescribed by professionals and practiced regularly. As such, participation in structured and unstructured activities can be prescribed to “treat” EDD which is a modifiable risk factor for chronic disease.

## The Next Step

The American Physical Therapy Association’s Section on Pediatrics supports global health recommendations for physical activity and highlights the need for physical therapists to educate children, parents, teachers and community leaders about the importance of physical activity on lifelong health and well-being.<sup>23</sup> Reversing current trends in physical inactivity among youth will require a comprehensive and coordinated approach which focuses on primary prevention. Health care providers, school administrators, government officials, and insurance companies will need to create an environment that supports and promotes healthy lifestyles for all youth. While changing social mores about physical inactivity may help to redefine what is or is not a condition worthy of treatment and reimbursement, we know that regular participation in developmentally-appropriate physical activity starting early in life is vital for long-term health and well-being. If this window of opportunity is missed, children will be less likely to exercise later in life and more likely to have cardiovascular disease risk factors and suffer from profoundly negative health outcomes.<sup>15,16</sup>

The American Physical Therapy Association recognizes the role of physical therapists in primary prevention and emphasizes the importance of promoting health, wellness and fitness.<sup>24</sup> Nevertheless, a study of 257 pediatric physical therapists found that only 1 in 3 respondents considered incorporating wellness promotion into their practice and only 54% actually started wellness programs.<sup>25</sup> In this report, the most common barriers to incorporating wellness promotion into practice were resources, time and lack of interest by the family.<sup>25</sup> Although health promotion is certainly within the scope of practice of pediatric physical therapists, it is also noteworthy that a majority of parents and teachers seem to be unaware of therapists involvement in health promotion, obesity prevention, and physical activity.<sup>26</sup> Based on these observations, it appears that pediatric physical therapists may well be an under-recognized and underutilized resource to identify youth who are sedentary and implement health promotion programs that spark a lifelong interest in physical activity.

If pediatric physical therapists wish to become advocates for children's health and wellness, they need to be familiar with the fundamental principles of pediatric exercise science and have practical experience designing and implementing community-based interventions. These issues are critically important for optimizing training adaptations, creating an enjoyable experience for the young participant, and reducing future health risks later in life. Yet only 50% of accredited physical therapy education programs in the United States that list prerequisites and their curriculum online require exercise science as a prerequisite or a course within their curriculum.<sup>23</sup> Furthermore, since only 7% of professional physical therapy education programs in the United States require a pediatric clinical education placement, many physical therapy students matriculate to licensure without any experience working with younger populations.<sup>27</sup> Since it is often suboptimal to apply adult physical therapy skills to the pediatric population, we need to create opportunities for students to practice newly learned skills with children under the direction of pediatric faculty.

In some cases, it may be advantageous for pediatric physical therapists to partner with pediatric fitness specialists to develop comprehensive wellness programs that can continue to support the integration of meaningful and enjoyable physical activities into the lives of children with EDD. Youth who have successfully restored function from neuromuscular deficits or attained sufficient competence in motor skill performance may be ideal candidates for this type of programming. Pediatric physical therapy centers that include wellness programs can help support goals achieved during rehabilitation that positively influence a child's motor development and physical fitness during adolescence and adulthood.

Seasoned professionals who work with youth in school- and community-based programs are well-aware of the challenges associated with implementing exercise programs for younger populations. In addition to unsafe parks and inadequate resources, most parents of youth who are inactive wrongly believe their children meet or exceed physical activity recommendations<sup>28</sup> and a majority of parents of overweight and obese children underestimate their child's weight status.<sup>29</sup> Parents need a truthful assessment of their child's health status and specific recommendations for achieving physical activity goals and making healthy lifestyle choices. Along with setting limits on media use (i.e., computers, television, and gaming), parents should be active role models and need to encourage participation in "family fitness" activities that are safe, fun and rewarding.

By identifying children who do not participate in the recommended amount of daily physical activity, pediatric physical therapists can raise public awareness about this important health concern and offer their expertise to schools, community centers, and child care facilities. Pediatric physical therapists can champion community efforts to provide fitness opportunities to children in need while raising public awareness about the exercise-health link and associated health-care costs. Given proper training, community partners can work with pediatric physical therapists and fitness professionals to assess physical activity habits and assist in implementing cost-effective interventions. By establishing links with local universities, pediatric physical therapists can develop creative service learning opportunities for physical therapy students to gain invaluable experience working with youth who are inactive who are ill-prepared for competitive sports programs. Pediatric physical therapists can also be advocates for daily physical education, regular recess breaks, and well-designed before- and after-school activity programs.

Physical therapists are expected to educate children, parents, teachers, and community leaders about the benefits of regular physical activity and provide resources to make healthy lifestyle choices that are sustainable. Additionally, pediatric physical therapists are in a unique position to identify youth who are inactive and help them overcome barriers to

fitness and sport. A change in current attitudes and common practice is urgently needed before the eventual decline and disinterest in movement and play begins to take shape. We should adhere to the wisdom of those notable Greek physicians and make every attempt to promote the modern day concept that exercise really is medicine. Clearly, the stakes of EDD are substantial and the debate will continue as the emergence, recognition, and long-term effect of EDD is not just a pathophysiological process, but rather a phenomenon that will be influenced by social, economic and political processes.

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