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Sports: An underutilized tool for patients with disabilities

Sport activities promote health and well-being in this population, which is disproportionately affected by obesity, sedentary lifestyle, and social isolation.

PRACTICE RECOMMENDATIONS

› *Recommend physical activity as an adjunct to traditional medical management to maximize physical and psychosocial benefits in patients with intellectual/developmental disabilities.* (B)

Strength of recommendation (SOR)

(A) Good-quality patient-oriented evidence

(B) Inconsistent or limited-quality patient-oriented evidence

(C) Consensus, usual practice, opinion, disease-oriented evidence, case series

Approximately 6.5 million people in the United States have an intellectual disability, the most common type of developmental disability.[1] People with disabilities are 3 times more likely to have heart disease, stroke, or diabetes than adults without disabilities.[2]

Sports as a treatment modality are not used to full advantage to combat these conditions in people with intellectual/developmental disabilities (IDDs). Participation in sport activities can lead to weight loss, reduce risk for cardiovascular disease, and optimize physical health. Sports also can help enhance social and communication skills and improve quality of life for this patient population (**TABLE**).[3-6]

However, a 2014 report found that while inactive adults with disabilities (hearing, vision, cognition, mobility) were 50% more likely to report 1 or more chronic diseases than those who were physically active, only 44% of adults with disabilities who visited a health professional in the previous 12 months received a physical activity recommendation.[7] In addition, more than 50% of adults with disabilities are not meeting US recommended exercise guidelines.[7-9]

Family physicians may not feel they have adequate training to counsel patients with IDDs. Additional limiting factors include dependence on caregivers for exercise participation, expense, transportation difficulties, a lack of choice in sporting activities, and the patient's level of motivation.[10]

The guidance reviewed here details how to modify the pre-participation sports physical exam specifically for patients with IDDs. It also provides sport and exercise recommendations for patients with 3 disabilities: Down syndrome, cerebral palsy, and autism spectrum disorder.

Worth noting: As is true for adults without disabilities, those with IDDs should participate in at least 150 minutes of moderate-intensity, or 75 minutes of vigorous intensity, aerobic physical activity each week.[9] Recommend muscle-strengthening activities be performed at least 2 days each week.[9]

TABLE

Physical and social benefits of exercise

	Physical	Social
Autism	Improves locomotor, gross, and fine motor skills[3,4]	Reduces stereotypic behaviors, hyperactivity, aggression, and self-injury[3]
Cerebral palsy	Improves spasticity and gross motor skills[5]	Provides peer-interaction opportunities
Down syndrome	Reduces body fat and oxidative stress; improves blood flow and balance; affords easier completion of activities of daily living[6]	Provides opportunities to develop skills and increase social interactions

Exercise recommendations for patients with Down syndrome

One in every 700 babies receives a diagnosis of Down syndrome.[11] Among its many possible manifestations—which include intellectual disability, heart disease, and diabetes—Down syndrome is associated with an increased risk for obesity, which makes exercise an extremely important lifestyle modification for these patients. Obesity can lead to obstructive sleep apnea causing cor pulmonale and even premature death. Continuous positive airway pressure intervention can be difficult in terms of patient compliance. However, weight loss through exercise and sports is an effective intervention to mitigate these obesity-related health comorbidities.

Pre-participation exam. A focused history and physical exam are often conducted before a patient engages in organized competitive or recreational sports. The pre-participation sports physical exam typically focuses on cardiac, neurologic, hereditary, and musculoskeletal disorders. While we recommend including these baseline elements as part of the exam for patients with disabilities, we also recommend modifying the exam to include disability-specific screening for associated comorbidities.

For patients with Down syndrome, a complete pre-participation sports physical exam is warranted. Inquire specifically about neck pain or dislocations, heart murmur, cardiac surgery, seizures, sleep issues, history of congenital abdominal defect, hematologic malignancy, and bone pain as part of the focused physical exam.

Look for evidence of patellofemoral instability, pes planus, scoliosis, hallux deformities, decreased muscle tone, and muscular weakness. Check for cataracts and perform a thorough cardiovascular exam to assess for murmur or signs of chronic hypoxia, such as cyanosis. If a heart murmur is detected, refer the patient to a cardiologist.

Patients with Down syndrome are also at increased risk for atlantoaxial instability. A thorough neurologic evaluation to screen for this condition is indicated; however, routine radiologic screening is not needed.[12]

An annual complete blood cell count and thyroid-stimulating hormone test are recommended for all children with Down syndrome.[13] For patients with Down syndrome who are 13 to 21 years of age, an echocardiogram also is recommended for concerning symptoms.[13] Ferritin levels also should be assessed annually for patients who are younger than 13 years of age to check for iron-deficiency anemia.[13] Consider high-risk screening strategies for patients with diabetes and metabolic syndrome.

Special considerations. Patients with Down syndrome were found to be injured more frequently than individuals with other disabilities during the Special Olympics.[14] These patients may be hypersensitive to pain with prolonged pain responses, or unable to verbally communicate their pain or injury.[15]

The complexity of pain assessment in patients with Down syndrome may increase the difficulty of accurately diagnosing an injury, leading to underdiagnosis or overdiagnosis. To increase accuracy of pain assessment in this setting, we recommend using the Wong-Baker FACES Pain Rating Scale or a numeric pain rating scale in verbal patients.[15] In nonverbal patients, facial expressions are reliable indicators of pain.

Which exercise? Healthy patients with Down syndrome can participate in any sport.

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Aerobic exercise can help lower body fat, reduce oxidative stress, and improve blood flow.[6] Muscle-strengthening exercises can lead to improved daily functioning and balance. Strength training and aerobic exercise benefit aging patients with Down syndrome who are struggling with obesity. Such exercise also helps increase bone mineral density and improve cardiovascular fitness, especially when initiated at a young age. Consistent exercise promotes positive health outcomes throughout the lifespan.[16]

Exercise recommendations for patients with cerebral palsy

Cerebral palsy, the most common motor disability in children, is associated with intellectual disability, seizures, respiratory insufficiency, scoliosis, osteoporosis, mood disorders, dysphagia, and speech and hearing impairment.[17] The increasing survival of premature babies born with cerebral palsy and the growing prevalence of adults with the condition point to the importance of expanding one's knowledge of how best to care for this population.[18]

Pre-participation exam. In addition to a complete sport physical exam, it's important to further evaluate patients with cerebral palsy for epilepsy, joint contractures, muscle weakness, spinal deformities, and respiratory insufficiency. The Gross Motor Function Classification system, commonly used for patients with cerebral palsy, scores functional ability in 5 levels.[18] Patients at Level I are the most mobile; patients at Level V need wheelchair transport in all settings.

Further evaluation of spinal deformities can be initiated with x-ray screening. Consider ordering dual x-ray absorptiometry scans to evaluate bone mass.[17]

Special considerations. Patients with cerebral palsy have a heightened risk for depression and anxiety.[19] Mental health can be assessed via the General Anxiety Disorder-7, the Patient Health Questionnaire-9, and the Ask Suicide-Screening Questions tools, among others. Mental health screening may need to be adjusted depending on the patient's level of cognition and ability to communicate. The patient's caregiver also can provide supplemental information.

Consider screening vitamin D levels in patients with cerebral palsy. Approximately 50% of adults with cerebral palsy are vitamin D–deficient secondary to sedentary behavior and lack of sun exposure.[20-22]

Optimal medical management has been shown to decrease muscle spasticity and may be beneficial before initiating an exercise program. For patients with moderate-to-severe symptoms, referral for physical therapy to further improve gross motor function and spasticity may be required before initiating an exercise program.

Which exercise? Individuals with cerebral palsy spend 76% to 99% of their waking hours being sedentary.[5] Consequently, they typically have decreased cardiorespiratory endurance and decreased muscle strength. Strength training may improve muscle spasticity, gross motor function, joint health, and respiratory insufficiency.[5] Even in those who function at Level IV-V of the Gross Motor Function Classification system, exercise reduces vertebral fractures and improves time spent standing.[23] By improving endurance, spasticity, and strength with exercise, deconditioning can be mitigated.

Involvement in sports promotes peer interactions, personal interests, and positive self-identity. It can give a newfound passion for life. Additionally, families of children with disabilities who engage in leisure activities together have less caregiver burden.[24,25] Sporting activities offer a way to optimize psychosocial well-being for the patient and the entire family.

Dance promotes functionality and psychosocial adjustment.[26] Hippotherapy, defined as therapy and rehabilitation during which the patient interacts with horses, can diminish muscle spasticity.[27] Aquatic therapy also may increase muscle strength.[28]

Sports for patients with autism spectrum disorder

Autism spectrum disorder is defined as persistent deficits in social communication and social interaction that are usually evident in the first 3 years of life.[29] Autism can manifest with or without intellectual or language impairment. Patients with autism commonly

Consider sports and exercise a vital therapeutic modality—something beyond a form of recreation.

have difficulty processing sensory stimuli and can experience "sensory overload." More than half have a coexisting mental health disorder, such as attention-deficit/hyperactivity disorder, anxiety, depression, schizophrenia, or bipolar disorder.[30]

Aversions to foods and food selectivity, as well as adverse effects from medical treatment of autism-related agitation, result in a higher incidence of obesity in patients with autism.[31,32]

Pre-participation exam. In addition to a comprehensive pre-participation exam, the Autism Spectrum Syndrome Questionnaire (ASSQ) and Modified Checklist for Autism in Toddlers are tools to screen school-age children with normal cognition to mild intellectual disability.[33] These questionnaires have limitations, however. For example, ASSQ has limited ability to identify the female autistic phenotype.[34] As such, these are solely screening tools. Final diagnosis is based on clinical judgment.

Special considerations. Include screening for constipation or diarrhea, fiber intake, food aversions, and common mental health comorbidities using *Diagnostic and Statistical Manual of Mental Disorders-Fifth Edition* criteria.[29] Psychiatric referral may be necessary if certain previously undiagnosed condition(s) become apparent. The patient's caregiver can provide supplemental information

During the physical exam, limit sensory stimuli as much as possible, including lights and sounds. Verbalize components of the exam before touching a patient with autism who is sensitive to physical touch.

Which exercise? Participation in sports is an effective therapy for autism and can help patients develop communication skills and promote socialization. Vigorous exercise is associated with a reduction in stereotypic behaviors, hyperactivity, aggression, and self-injury.[3] Sports also can offer an alternative channel for social interaction. Children with autism may have impaired or delayed motor skills, and exercise can improve motor skill proficiency.[4]

The prevalence of feeding problems in children with autism spectrum disorder is estimated to be as high as 90%, and close to 70% are selective eaters.[31,35,36] For those with gastrointestinal disorders, exercise can exert positive effects on the microbiome-gut-brain axis.[37] Additionally, patients with autism are much more likely to be overweight or obese.[32] Physical activity offers those with autism health benefits similar to those for the general population.[32]

Children with autism spectrum disorder have similar odds of injury, including serious injury, relative to population controls.[38] Karate and swimming are among the most researched sports therapy options for patients with autism.[38-40] Both are shown to improve motor ability and reduce communication deficits.

Summing up

The literature, although limited, demonstrates that exercise and sports improve the health and well-being of people with IDDs throughout the lifespan, especially if childhood exercise/sports involvement is maintained.

Encourage your patients to participate in sports, but be aware of factors that can limit (or facilitate) participation.[41] Exercise participation increases based on, among other things, the individual's desire to be fit and active, skills practice, peer involvement, family support, accessible facilities, and skilled staff.[10]

Additional resources that can help people with IDDs access sports and recreational activities include the Special Olympics; Paralympics; YMCA; after-school programs; The American College of Sports Medicine; The National Center on Health, Physical Activity, and Disability; and disability-certified inclusive fitness trainers. JFP

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Vigorous exercise is associated with a reduction in stereotypic behaviors, hyperactivity, aggression, and self-injury in patients with autism spectrum disorder.

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