



Clinical Considerations and Resources for Youth Athletes with Intellectual Disability: a Review with a Focus on Special Olympics International

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Abstract

Purpose of Review This review provides an overview of sports participation by youth athletes with intellectual disability (ID), focusing on activities offered by Special Olympics International (SOI). The review also describes SOI's health initiatives, as awareness of the sports and health activities of SOI is critical for clinicians who serve youth with ID. SOI is the largest global public health organization for people with ID.

Recent Findings 2018 is the 50th Anniversary of SOI. For 50 years, SOI has been using the power of sport to break down barriers both on and off the field. From 2016 to 2020, SOI is focusing on Inclusive Health: the inclusion of people with ID in mainstream health policies and laws, programming, services, training programs, research, and funding streams (Special Olympics International 2018). This article summarizes recent SOI efforts in both sports competition and health initiatives. Data collected from SOI's Healthy Athletes Initiative revealed obesity in 31.5% of youth with ID. Data also demonstrated concerns with flexibility in 71.3% of athletes and concerns with muscle strength in 56.5% of athletes. Results from medical coverage of the 2009 Special Olympics Great Britain Summer Games revealed musculoskeletal and skin concerns as the primary reasons for on-site sports coverage medical consultation.

Summary Clinicians caring for youth with ID should be aware of the sport opportunities for this population and the health initiatives of SOI. Future research is needed on applying sports' medicine principles to youth athletes with ID. By including this article alongside an article on youth adaptive sports, the field of Pediatric Rehabilitation Medicine is demonstrating its commitment to all youth athletes.

Keywords Youth sport · Intellectual disability · Pediatric sports medicine · Pediatric rehabilitation medicine · Special Olympics · Youth athlete with intellectual disability

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Introduction

The mission of Special Olympics International (SOI) is “To provide year-round sports training and athletic competition in a variety of Olympic-type sports for children and adults with intellectual disability (ID)—see Table 1 for definitions [2–5], giving them continuing opportunities to develop physical fitness, demonstrate courage, experience joy, and participate in a sharing of gifts, skills, and friendship with their families, other Special Olympics athletes, and the community” [6]. For many people, the cause of intellectual disability is unknown. Some of the most common causes of intellectual disability include fragile X syndrome, Down syndrome, fetal alcohol syndrome, genetic conditions, birth defects, serious head injury, stroke, or certain infections [7]. Intellectual disability is a relatively common diagnosis, with an estimated prevalence of 1.04% [8].

Table 1 This table presents the definitions of terms utilized in this article [3–6]. Of note, one individual may have more than one neurodevelopmental disorder/developmental disability, as is the case for a child with both cerebral palsy and intellectual disability

Term	Definition
Intellectual disability	As defined by American Association on Intellectual and Developmental Disabilities (AAIDD), refers to a disability that originates before age 18 and is characterized by significant limitations in both <i>intellectual functioning</i> and in <i>adaptive behaviors</i> . Of note, the Diagnostic and Statistical Manual of Mental Disorders, 5th Edition (DSM-5) defines intellectual disability in a similar way but does not define a specific age of onset; instead of specifying before age 18, the DSM-5 refers to onset “during the developmental period.”
Intellectual functioning	Refers to general mental capacity and may be measured by an Intelligence Quotient (IQ) test. An IQ test score of 70–75 indicates a limitation in intellectual functioning.
Adaptive behaviors	Skills that are needed to live, work, and play in the community and include communication, self-care, and social skills. Put another way, adaptive behaviors are the conceptual, social, and practical skills that people learn and perform in their everyday lives.
Neurodevelopmental disorders	Umbrella term for intellectual disabilities, communication disorders, autism spectrum disorder, attention-deficit/hyperactivity disorder, specific learning disorder, and motor disorders. This term is utilized in the DSM-5.
Developmental disabilities	A group of conditions due to an impairment in physical, learning, language, or behavior areas. This term is utilized by the Centers for Disease Control and Prevention.

SOI is the world’s largest sports organization for children and adults with ID. SOI was started in 1968 by Eunice Kennedy Shriver, who was inspired by her sister Rosemary Kennedy, who had ID. The official SOI athlete oath is: “Let me win. But if I cannot win, let me be brave in the attempt,” highlighting the nod to healthy competition with a larger focus on inclusion in sport [6].

The benefits of Special Olympics sports participation extend beyond physical activity and beyond the athletes themselves. Ninety-four percent of Special Olympics athletes report improved sports skills as a result of participation [9]. Additionally, Special Olympics athletes have been shown to have increased levels of self-esteem, self-worth, and social inclusion compared to non-participants [9, 10]. Participation in Special Olympics is also beneficial for families, as evaluation in the USA has shown that 70% of parents report that Special Olympics has a positive effect on time spent as a family, either increasing time spent together or types of activities shared [9, 11]. Additionally, 65% of parents feel that participation in Special Olympics raised their expectations of their children [9, 11]. Other evaluation of siblings has shown that 82% report that participation in Special Olympics positively affected their family, 44% report that participation gives them the opportunity to have an activity that the whole family shares, and 39% report that participation gives them a normative experience that could be shared between siblings with and without ID [9, 11].

Objective

This review provides an overview of sports participation by youth athletes with ID, focusing on activities offered by Special Olympics International (SOI). While not all athletes with ID participate in Special Olympics sports, we focus on Special Olympics athletes in this article, as general literature on youth athletes with ID is limited. We aim to summarize the literature in the context of Special Olympics athletes while recognizing that this population does not generalize to the population of all youth with ID. Nevertheless, it is important for clinicians that serve children and youth with ID to be familiar with the sports and health opportunities provided by SOI. This article is timely, as 2018 marks the 50th Anniversary of Special Olympics and the middle of a 5-year (2016–2020) Inclusive Health campaign, which aims to reach beyond only Special Olympics athletes, to improve access to quality health care for people with ID around the world.

This article discusses SOI sports competition, SOI health initiatives, and some considerations for clinicians when serving patients with ID. Additionally, a comparison of Special Olympics and Paralympics is presented, to help physiatrists better understand the similarities and differences between the two movements. This article serves as a helpful initial primer for physiatrists who may be unfamiliar with the patient population of youth with ID.

Table 2 Sports of Special Olympics International. Details of the sports offered by Special Olympics International [12]

Official sports	Recognized sports	Locally popular sports
SOI-approved Coaching Guide available		
At least 24 accredited programs conduct this sport at program-level games*	At least 12 accredited programs conduct this sport at program-level games*	
At least 3 Special Olympics Regions are represented	At least 2 Special Olympics Regions are represented	
An SOI Sport Resource Team is in place	An SOI Sport Resource Team is in place	Program Board has approved the sport
An International Federation is in place	An International Federation is in place	A National Governing Body is in place
Athletics	Cricket	Flag football
Badminton	Kayaking	Netball
Basketball		Triathlon
Bocce		
Bowling		
Cycling		
Equestrian		
Football		
Golf		
Handball		
Judo		
Gymnastics-artistic		
Gymnastics-rhythmic		
Open water swimming		
Powerlifting		
Roller skating		
Sailing		
Softball		
Swimming		
Table tennis		
Tennis		
Volleyball		
Alpine skiing		
Cross-country skiing		
Figure skating		
Floorball		
Floor hockey		
Short track speed skating		
Snowboarding		
Snowshoeing		

SOI Sports Competition

There are three classifications of Special Olympics sports: official sports, recognized sports, and locally popular sports. Table 2 further details these classifications and lists the 30 official sports, two recognized sports, and three locally popular sports [12]. For each official sport, an SOI-approved Coaching Guide is available, which describes details specific to each sport. An SOI-approved Athlete-Centered Coaching Guide is also available, which applies to all sports and serves as a general introduction to coaching children and adults with ID [13]. The guide includes information on co-occurring conditions commonly associated with ID (sensory processing disorder, atlantoaxial instability, orthopedic impairments, and attention deficit hyperactivity disorder), psychological considerations related to learning and recommended teaching strategies, developmental appropriateness, behavior modification, and communication considerations [13].

The minimum age for SOI participation is 8 years old [6]. In addition to the age requirement, SOI athletes must be identified by an agency or professional as having one of the following conditions: ID, cognitive delay as measured by formal assessment, or significant learning or vocational problems due to cognitive delay that require or have required specially designed instruction. In Special Olympics sports competitions, athletes are grouped by age, gender, and ability [12, 14]. All athletes are given the chance to participate and perform to the best of their ability.

SOI oversees 223 programs in each of the 50 states, District of Columbia, and 172 countries around the world, averaging 298 sports competitions each day around the world [6, 9]. Special Olympics Programs are independent, accredited 501(c)(3) organizations, such as Special Olympics Kentucky or Special Olympics Virginia, which operate under the General Rules of Special Olympics International in exchange for the right to carry the Special Olympics name.

SOI World Games occur every 2 years and alternate between Summer Games and Winter Games [6]. There are also competitions at the local, state/province, country, and region levels every year. In total, there are more than 70,000 Special Olympics competitions held every year [6]. Recently, the 2018 USA Games held in Seattle, Washington, featured 14 sports and more than 4000 athletes and coaches representing 50 state programs and the District of Columbia [15].

In addition to general SOI sports competition, SOI offers Young Athletes and Unified Sports programs. SOI Young Athletes is a sport and play program for young children with and without ID not quite old enough for the SOI Sports Competition Program [16]. It is offered for children ages 2 through 7 that focuses on activities in the areas of developmental/foundational skills including walking and running, balance and jumping, trapping and catching, throwing, striking, kicking, and advanced sports skills [17]. The program can be conducted in a home, school, or community

setting using the Young Athletes Activity Guide and basic equipment [16]. The guide is available online [17].

Unified Sports teams consist of athletes with and without ID, who compete together on a team made up of people of similar age and ability [18, 19]. Special Olympics also has a comprehensive model for schools, Unified Champion Schools, which aims to create school and community climates of acceptance and inclusion [20]. Unified Sports are now in more than 4500 elementary, middle, and high schools in the USA [18]. Several professional sports organizations, including the National Basketball Association (NBA), Major League Soccer (MLS), and Union of European Football Associations (UEFA), have highlighted the Unified Sports program as a demonstration the power of inclusive sports [18]. Additionally, the Entertainment and Sports Programming Network (ESPN) has served as the Global Presenting Sponsor of Special Olympics Unified Sports since 2013, featuring Unified Sports competition at the ESPN X Games Aspen and providing media coverage of the recent 2018 USA Games [18]. Participation in Unified Sports not only benefits athletes with ID through improved social competence, improved social inclusion, and decreased problem behaviors [21, 22] but also benefits athletes without ID, as evaluation has shown that 79% of Unified teammates without ID reported increased understanding of people with ID [23].

While Special Olympics International is the sports organization dedicated to serving athletes with ID, it is important for clinicians to understand that athletes with intellectual impairment may compete in the Paralympic Games. The International Paralympic Committee (IPC) is a separate organization that hosts elite Paralympic Summer and Winter Games in parallel to the Olympic Games [24]. Athletes with intellectual impairment competed for the first time in the 1996 Paralympic Games in Atlanta, Georgia [25]. However, due to an issue in confirming the diagnosis of intellectual impairment of athletes in the 2000 Paralympic Games, these athletes were banned from competition in 2004 and 2008 until a new system was approved in 2009 [25]. Three intellectual impairment sport classes (swimming, track and field, and table tennis) were reinstated for the 2012 Paralympic Games [25, 26•].

While both Special Olympics Games and Paralympic Games are recognized by the International Olympic Committee, focus on sport for athletes with disability, and are run by international non-profit organizations, they differ in three main areas: (1) the disability categories of the athletes they work with, (2) the criteria and philosophy under which the athletes participate, and (3) the structure of their respective organizations [27]. Table 3 presents a comparison of Special Olympics Games and Paralympic Games [2, 24, 26•, 27].

Table 3 Special Olympics and Paralympics. A review of the similarities and differences between Special Olympics and Paralympic Games [3, 12, 24, 26•, 27]

	Special Olympics	Paralympics
Parent non-profit organization	Special Olympics International	International Paralympics Committee
Recognized by the International Olympic Committee?	Yes	Yes
Founded	1968	1989
Focus on sport for athletes with disability?	Yes	Yes
Number of official sports	30	22
Disability categories of athletes	<ul style="list-style-type: none"> • Must have one of the following conditions: intellectual disability, cognitive delay as measured by formal assessment, or significant learning or vocational problems due to cognitive delay that require or have required specially designed instruction • May also have a physical disability 	10 categories of eligible impairments <ul style="list-style-type: none"> • Intellectual impairment • Impaired muscle power • Impaired passive range of movement • Limb deficiency • Leg length difference • Short stature • Hypertonia • Ataxia • Athetosis • Visual impairment
Criteria for participation and sporting philosophy	<ul style="list-style-type: none"> • All ability levels may participate • Athletes are divisioned based on qualifying scores for fair competition against others of like ability 	<ul style="list-style-type: none"> • Stringent qualification process based on ability level • Elite performers compete at the games • Athletes wishing to compete in the intellectual impairment sport classes must fulfill three criteria: <ul style="list-style-type: none"> - Intellectual functioning (IQ) at or below 75; - Significant limitations in adaptive behavior; and - Disability onset before age 18

SOI Health Initiatives

In addition to offering sports competition, SOI is the largest global public health organization for people with ID. Special Olympics Health supports a wide variety of partners so that people with ID will have improved access to inclusive health care and trained medical professionals [28]. Special Olympics Health receives support for efforts in the United States from both the Centers for Disease Control and Prevention and the Golisano Foundation; international efforts are supported by the Golisano Foundation. SOI health initiatives strive to reach beyond Special Olympics athletes to improve access to quality health care for people with ID around the world [29]. To this end, in 2017, SOI and The Pan American Health Organization/World Health Organization (PAHO/WHO) signed a memorandum of understanding to formalize collaboration regarding training health providers, educating policymakers, disseminating information, and strengthening health systems to serve all people with ID [30]. This partnership will also support PAHO's Action Plan on Disabilities and Rehabilitation, which aims to improve access to health services for all people with disabilities [30]. Below, we highlight two Special Olympics Health initiatives of interest to physicians: Inclusive Health and Healthy Athletes.

Inclusive Health

From 2016 to 2020, SOI is focusing on Inclusive Health, the inclusion of people with ID in mainstream health policies and laws, programming, services, training programs, research, and funding streams [29]. Inclusive health means people with ID are able to take full advantage of the same health programs and services available to people who do not have ID [1]. Given the lack of physician training in the care of patients with ID throughout the lifespan, health care provider education about serving patients with ID is a priority [1, 29, 31]. The Center for Inclusive Health is an online hub for health care providers, fitness and wellness professionals, professional associations, and businesses to find resources to become more inclusive [31]. Resources for health care providers currently focus on inclusive medical education, which is the intentional inclusion of patients with ID in training health professions students. Additional resources for practicing physicians are under development. Resources for health care providers may be found online at <https://inclusivehealth.specialolympics.org/health-care-providers>.

Healthy Athletes

SOI's Healthy Athletes initiative began offering free health screenings and health education to athletes starting in 1997 [29]. The key objectives of Healthy Athletes are to improve access to care at event-based and other health screening

clinics, make appropriate referrals for follow-up to community health professionals, train health care professionals and students about the needs of people with ID, collect/analyze/disseminate data on the health needs of people with ID, and advocate for improved health policies and programs for people with ID [29]. To date, SOI has conducted over 2 million free screenings for people with ID and has trained more than 260,000 health professionals and students to treat people with ID [29]. Currently, there are eight Healthy Athletes disciplines that provide health screenings with different areas of focus: MedFest (sports physical exam), FUNfitness (physical therapy), Health Promotion (better health and well-being), Special Smiles (dentistry), Fit Feet (podiatry), Healthy Hearing (audiology), Opening Eyes (vision), and Strong Minds (emotional well-being) [29]. Table 4 provides additional details on the Healthy Athletes Programs mentioned above [32–37]. Of note for physiatrists, MedFest [32] provides free preparticipation physical exams (PPEs) and includes an assessment of height, weight, vitals (temperature, heart rate, oxygen saturation, blood pressure), and a vision screening. Many people with ID have difficulty obtaining a PPE. Thus, MedFest serves as a part of the healthcare infrastructure by providing a service that many people with ID have trouble accessing through the mainstream healthcare system and by providing referrals to community health providers. Additionally, MedFest gives physicians and medical students experience in caring for people with ID.

In addition to providing health screening services, Healthy Athletes also allows for research on the health needs of people with ID. In fact, data collected during Healthy Athletes screenings is the world's largest data set on the health status of people with ID [9]. Analyzing Healthy Athletes data of youth (ages 8 to 19 years old) in North America through July 1, 2018, revealed that 31.5% were obese [38], as compared to a prevalence of obesity of 18.5% for youth in the general population (ages 2 to 19 years old) [39]. While not specific to youth athletes, results from Healthy Athletes screenings in North America through July 1, 2018, indicate that 71.3% of athletes have identified flexibility problems, 75.7% have identified balance problems, 56.6% have identified strength problems, 54.3% have gait abnormalities, 21.9% have bone deformation, 47.6% need a new glasses prescription, 41.5% have a blocked or partially blocked ear canal, and 35.8% have exposure to second-hand smoke [38].

Most clinicians receive little training in the health care of patients with ID across the lifespan. In fact, surveys commissioned by Special Olympics International found that only 25% of medical schools include content regarding people with intellectual/developmental disabilities in their curricula [40], and 52% of medical school deans report that their students are "not competent" to treat people with ID [9]. As a result,

Table 4 Description of Special Olympics International's Healthy Athletes programs [32–37]

Healthy Athletes program	Discipline	Description
Fit feet	Podiatry	Provides podiatric screenings to evaluate ankles, feet, and lower extremity biomechanics, along with proper footwear, including shoes and socks
FUNFitness	Physical therapy	Provides screenings and education related to flexibility, functional strength, aerobic fitness, and balance
Health promotion	Health and well-being	Provides health screenings and health education related to blood pressure, bone mineral density, healthy weight, healthy eating, hydration, handwashing, physical activity, tobacco cessation and prevention, and sun safety
Healthy hearing	Audiology	Provides comprehensive hearing examinations to detect possible ear and hearing problems as well as medical services including ear wax removal, swim molds, hearing aid maintenance, and education about the importance of regular ear and hearing screening
MedFest	Medicine	Provides pre-participation sports physical examinations for athletes
Opening eyes	Ophthalmology/Optometry	Provides a vision and eye health assessment, prescription eyewear, sunglasses, and sports goggles in partnership with the Lions Clubs International Foundation
Special smiles	Dentistry	Provides dental screenings, instruction on correct brushing and flossing techniques, and dental hygiene supplies for prevention of dental disease
Strong minds	Emotional wellness	Provides education on emotional wellness and developing adaptive coping skills, such as thinking positive thoughts, releasing stress, and connecting with others

patients with ID are often not included in mainstream health care delivery organizations and practices. Thus, educating clinicians and health professions students is an important aspect of Healthy Athletes. Training includes education on health disparities experienced by patients with ID, how to manage common abnormalities that may be found on PPE, and communication. After being trained at Healthy Athletes, health care professionals reported improvements in competency and confidence in serving patients with ID [9, 41]. Specifically, after being trained at Healthy Athletes, 72.7% of healthcare professional volunteers said that they would seek out more patients with ID, 93% agreed or strongly agreed that the training improved their ability to communicate with people with ID, and 89% found the training useful for their daily work [9, 41]. Overall, 84% of health care providers felt better prepared to treat people with ID as a result of volunteering with Healthy Athletes [9, 41]. Additionally, after volunteering with Healthy Athletes, health care professionals reported improved perceptions of people with ID's ability to "describe their health to doctor" and "act appropriately toward strangers" [41]. Thus, volunteering with Healthy Athletes is an opportunity for psychiatrists to improve their skillset in caring for patients with ID.

Considerations for Medical Providers

Given that clinicians receive little education specific to the care of individuals with intellectual disability, this section aims to provide an overview of clinical considerations when caring for youth with ID.

Communication

During the PPE and all clinical visits, it is important to communicate effectively with the youth athlete and his/her parent(s)/guardian(s). It is helpful for the provider to ask the patient and the caregiver(s) about best ways to communicate. As a general rule, when talking to any youth patient, it is important to talk directly to the patient and, when necessary, clarify any information with the parent/guardian. Questions should be asked one at a time and should be simple and easy to understand. Adequate time should be provided for answering each question. Some individuals may use alternative ways of receptive or expressive communication, such as use of sign language, assistive/adaptive communication devices, or pictures/visual aids. Interpreters, including sign language interpreters, should be provided when necessary. As with most

youth, a quiet clinic area is best for patient care as it minimizes distractions that may be intimidating or stressful [42]. This is particularly true for individuals with a sensory processing disorder. It is helpful to explain examination components prior to and during their execution. At times, pictures or gestures can be used to describe next steps in the visit or to ask questions (such as the use of a visual analog scale for assessment of pain). Patient handouts should use simple language and should include visual components. For youth with significant distress regarding the clinic visit, the PPE may need to be divided over more than one visit to not overwhelm the patient [42]. The most important thing to consider is that every child and adolescent will be different and while some individuals with ID may have additional communication, behavioral, or stress-reducing considerations during their visit, incorporating these considerations into routine clinic visits helps make visits more comfortable for *all* patients.

Preparticipation Physical Examination

The preparticipation physical examination (PPE) is a history and physical screen that is completed prior to sports participation. Its purpose is to evaluate an individual's safety for sport, while screening for possible life-threatening conditions [43, 44]. The SOI Athlete Medical Form is the PPE requirement for participation in SOI events. It is available online at https://media.specialolympics.org/resources/leading-a-program/registration-forms/SOI_Medical%20Form_US%20Programs_July2017.pdf?_ga=2.192627299.878392060.1545846958-620836755.1504033664. PPE for youth with ID should include a thorough review of medications, as polypharmacy is common in this population and side effects may impact sport performance and safety. At the conclusion of the screen, the individual is cleared for sport, not cleared for sport with or without recommendation for further evaluation, or conditionally cleared for sport [45••].

One important medical consideration in this population, particularly in individuals with Down syndrome, is screening for atlantoaxial instability. Atlantoaxial instability is an orthopedic condition in which there is increased mobility at the atlantoaxial joint, which is comprised of the atlas (first cervical vertebra) and the axis (second cervical vertebra) [46••]. Atlantoaxial instability is seen in 7–28% of individuals with Down syndrome [46••]. The increased movement at the atlantoaxial joint seen in atlantoaxial instability can cause spinal cord compression. This is often termed symptomatic atlantoaxial instability and can result in mild to complete spinal cord injury. Symptomatic atlantoaxial instability is seen in less than 2% of individuals with Down syndrome who have known atlantoaxial instability [46••].

While historically, plain imaging has been used to diagnose asymptomatic atlantoaxial instability, studies have shown a lack of difference in outcomes at 1 year in individuals with

and without asymptomatic atlantoaxial instability on imaging, discrepancies in criteria for diagnosis of atlantoaxial instability on imaging, difficulty with the technically challenging radiologic assessment, and small rates of symptomatic atlantoaxial instability [46••]. These factors have brought the use of plain imaging for atlantoaxial instability screening out of favor [47]. SOI's current policy on atlantoaxial instability screens for symptoms concerning for spinal cord compression, not on imaging. The provider completing the PPE indicates the presence/absence of neurological symptoms or physical findings associated with spinal cord compression. If symptoms are present, the athlete must undergo additional neurological evaluation by a specialist outside of the MedFest event to determine clearance, and the athlete/guardian must sign the "Special Release Concerning Spinal Cord Compression and/or Symptomatic Atlantoaxial Instability" acknowledging they have been informed of the findings and recommendations of the physician [12]. Official SOI policy regarding participation of individuals who might have spinal cord compression or atlantoaxial instability may be found in the SOI documents: "Article 1: Sports Rules, Addendum E" [12] and "Medical Form Instructions" [45••].

While many clinicians are aware of the risk of atlantoaxial instability in individuals with Down syndrome, it is important for the clinician to realize that just like any other youth patient with or without medical complexity, there are risks for conditions in other organ systems, such as the cardiac or pulmonary systems. This highlights the importance of a thorough PPE screen for all youth.

General Considerations During Youth Sport

All youth athletes should be encouraged to hydrate. Current guidelines recommend that youth athletes hydrate with water before and during their sporting activities. Overhydrating comes with a risk of hyponatremia; therefore, youth athletes should hydrate according to thirst. If an individual sweats excessively or has back to back competitions with little time for appropriate hydration, carbohydrate-electrolyte sports drinks may be helpful, but, in most other youth athlete situations, water is most appropriate [48•, 49]. Proper nutrition is also important to provide adequate energy for sport. Sunscreen should be worn during outdoor events to prevent sunburn and the risk of skin cancer. Individuals should dress according to the weather to minimize the risk of heat or cold illness. Youth athletes should have sufficient break time to allow cool down for prevention of heat illness. Cool cloths and shaded rest areas can also be helpful [50]. Youth athletes should be encouraged to participate in a diversity of sports, as sports specialization at a young age is thought to increase a youth athlete's risk of serious overuse injuries and psychological burnout [51•, 52•].

Sports Injuries

While the Special Olympics movement has existed for the past 50 years, there is still little published research on sports injuries in athletes with ID. In 2012, Wheeler et al. [53] published a report of injuries at the Special Olympics Great Britain 2009 Summer Games. Of the 2500 athletes, 1200 coaches, 6000 family members, and 1500 volunteers involved in the 8-day long games, there were 581 medical consultations. Ninety-five percent of these were for athletes. Overall, 97.8% of consultations were non-emergent cases, and 2.2% were emergent cases. Of the 13 emergent cases, 5/13 were cases of individuals with reduced levels of consciousness, which was most commonly due to hypoglycemia or seizures. There were no individuals who were unconscious or requiring cardiopulmonary resuscitation. Fifty-seven percent of medical consultations for athletes were for musculoskeletal injuries and 19.5% were for skin wounds. 1.6% of athlete consultations were for head injuries. At least 87% of athletes were fit to continue participation in sport after their medical consultation [53]. As expected, this suggests that similar injury patterns are seen in athletes with and without ID. Further research on patterns of musculoskeletal injuries specific to youth athletes with ID would be valuable to best provide evidenced-based inclusive care for this population.

Conclusions

Clinicians caring for youth with ID should be aware of the sport opportunities for this population, including those through SOI. Additionally, clinicians should be aware of the impact that sport participation for youth with ID has, not just on athletes, but also on family members, people without ID, and clinicians themselves. A brief review of clinical care of youth athletes with ID was provided in this manuscript; however, future research is needed to help provide better guide physicians in an evidenced-based practice of sports medicine with this population. For example, there remains a lack of data on the incidence of sports injuries in athletes with ID. More epidemiologic knowledge on sports injuries in this population would allow for additional research on prevention and treatment considerations specific to this population.

Compliance with Ethical Standards

Conflict of Interest Dr. Chandan reports grants from American Academy of Developmental Medicine and Dentistry (AADMD), grants from Special Olympics, and grant from WITH Foundation, outside the submitted work. Dr. Dubon reports spouse's employment at and stock in Medstrat, and stock in Amazon outside the submitted work.

Human and Animal Rights and Informed Consent All reported studies/experiments with human or animal subjects performed by the authors have been previously published and complied with all applicable ethical standards (including the Helsinki declaration and its amendments,

institutional/national research committee standards, and international/national/institutional guidelines).

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