

## MEDICAL CONDITIONS AND SPORTS PARTICIPATION

Condition	May Participate
Atlantoaxial instability (instability of the joint between cervical vertebrae 1 and 2) Explanation: Athlete (particularly if he or she has Down syndrome or juvenile rheumatoid arthritis with cervical involvement) needs evaluation to assess the risk of spinal cord injury during sports participation, especially when using a trampoline. <sup>4-7</sup>	Qualified yes
Bleeding disorder Explanation: Athlete needs evaluation. <sup>8,9</sup>	Qualified yes
Cardiovascular disease	
Carditis (inflammation of the heart) Explanation: Carditis may result in sudden death with exertion.	No
Hypertension (high blood pressure) Explanation: Those with hypertension >5 mm Hg above the 99th percentile for age, gender, and height should avoid heavy weightlifting and power lifting, bodybuilding, and high-static component sports (Fig 1). Those with sustained hypertension (>95th percentile for age, gender, and height) need evaluation. <sup>10-12</sup> The National High Blood Pressure Education Program Working Group report defined prehypertension and stage 1 and stage 2 hypertension in children and adolescents younger than 18 years of age. <sup>10</sup>	Qualified yes
Congenital heart disease (structural heart defects present at birth) Explanation: Consultation with a cardiologist is recommended. Those who have mild forms may participate fully in most cases; those who have moderate or severe forms or who have undergone surgery need evaluation. The 36th Bethesda Conference <sup>12</sup> defined mild, moderate, and severe disease for common cardiac lesions.	Qualified yes
Dysrhythmia (irregular heart rhythm) Long-QT syndrome Malignant ventricular arrhythmias Symptomatic Wolff-Parkinson-White syndrome Advanced heart block Family history of sudden death or previous sudden cardiac event Implantation of a cardioverter-defibrillator Explanation: Consultation with a cardiologist is advised. Those with symptoms (chest pain, syncope, near-syncope, dizziness, shortness of breath, or other symptoms of possible dysrhythmia) or evidence of mitral regurgitation on physical examination need evaluation. All others may participate fully. <sup>13-15</sup>	Qualified yes
Heart murmur Explanation: If the murmur is innocent (does not indicate heart disease), full participation is permitted. Otherwise, athlete needs evaluation (see structural heart disease, especially hypertrophic cardiomyopathy and mitral valve prolapse).	Qualified yes
Structural/acquired heart disease	
Hypertrophic cardiomyopathy	Qualified no
Coronary artery anomalies	Qualified no
Arrhythmogenic right ventricular cardiomyopathy	Qualified no
Acute rheumatic fever with carditis	Qualified no
Ehlers-Danlos syndrome, vascular form	Qualified no
Marfan syndrome	Qualified yes
Mitral valve prolapse	Qualified yes
Anthracycline use Explanation: Consultation with a cardiologist is recommended. The 36th Bethesda Conference provided detailed recommendations. <sup>12,13,15-18</sup> Most of these conditions carry a significant risk of sudden cardiac death associated with intense physical exercise. Hypertrophic cardiomyopathy requires thorough and repeated evaluations, because disease may change manifestations during later adolescence. <sup>12,13,17</sup> Marfan syndrome with an aortic aneurysm also can cause sudden death during intense physical exercise. <sup>18</sup> Athlete who has ever received chemotherapy with anthracyclines may be at increased risk of cardiac problems because of the cardiotoxic effects of the medications, and resistance training in this population should be approached with caution; strength training that avoids isometric contractions may be permitted. <sup>19,20</sup> Athlete needs evaluation.	Qualified yes
Vasculitis/vascular disease	Qualified yes
Kawasaki disease (coronary artery vasculitis)	
Pulmonary hypertension Explanation: Consultation with a cardiologist is recommended. Athlete needs individual evaluation to assess risk on the basis of disease activity, pathologic changes, and medical regimen. <sup>21</sup>	
Cerebral palsy Explanation: Athlete needs evaluation to assess functional capacity to perform sports-specific activity.	Qualified yes
Diabetes mellitus Explanation: All sports can be played with proper attention and appropriate adjustments to diet (particularly carbohydrate intake), blood glucose concentrations, hydration, and insulin therapy. Blood glucose concentrations should be monitored before exercise, every 30 min during continuous exercise, 15 min after completion of exercise, and at bedtime.	Yes
Diarrhea, infectious Explanation: Unless symptoms are mild and athlete is fully hydrated, no participation is permitted, because diarrhea may increase risk of dehydration and heat illness (see fever).	Qualified no
Eating disorders Explanation: Athlete with an eating disorder needs medical and psychiatric assessment before participation.	Qualified yes
Eyes	Qualified yes
Functionally 1-eyed athlete	
Loss of an eye	
Detached retina or family history of retinal detachment at young age	
High myopia	
Connective tissue disorder, such as Marfan or Stickler syndrome	
Previous intraocular eye surgery or serious eye injury	

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Explanation: A functionally 1-eyed athlete is defined as having best-corrected visual acuity worse than 20/40 in the poorer-seeing eye. Such an athlete would suffer significant disability if the better eye were seriously injured, as would an athlete with loss of an eye. Specifically, boxing and full-contact martial arts are not recommended for functionally 1-eyed athletes, because eye protection is impractical and/or not permitted. Some athletes who previously underwent intraocular eye surgery or had a serious eye injury may have increased risk of injury because of weakened eye tissue. Availability of eye guards approved by the American Society for Testing and Materials and other protective equipment may allow participation in most sports, but this must be judged on an individual basis. <sup>22,23</sup>	
Conjunctivitis, infectious Explanation: Athlete with active infectious conjunctivitis should be excluded from swimming.	Qualified no
Fever Explanation: Elevated core temperature may be indicative of a pathologic medical condition (infection or disease) that is often manifest by increased resting metabolism and heart rate. Accordingly, during athlete's usual exercise regimen, the presence of fever can result in greater heat storage, decreased heat tolerance, increased risk of heat illness, increased cardiopulmonary effort, reduced maximal exercise capacity, and increased risk of hypotension because of altered vascular tone and dehydration. On rare occasions, fever may accompany myocarditis or other conditions that may make usual exercise dangerous.	No
Gastrointestinal Malabsorption syndromes (celiac disease or cystic fibrosis) Explanation: Athlete needs individual assessment for general malnutrition or specific deficits resulting in coagulation or other defects; with appropriate treatment, these deficits can be treated adequately to permit normal activities. Short-bowel syndrome or other disorders requiring specialized nutritional support, including parenteral or enteral nutrition Explanation: Athlete needs individual assessment for collision, contact, or limited-contact sports. Presence of central or peripheral, indwelling, venous catheter may require special considerations for activities and emergency preparedness for unexpected trauma to the device(s).	Qualified yes
Heat illness, history of Explanation: Because of the likelihood of recurrence, athlete needs individual assessment to determine the presence of predisposing conditions and behaviors and to develop a prevention strategy that includes sufficient acclimatization (to the environment and to exercise intensity and duration), conditioning, hydration, and salt intake, as well as other effective measures to improve heat tolerance and to reduce heat injury risk (such as protective equipment and uniform configurations). <sup>24,25</sup>	Qualified yes
Hepatitis, infectious (primarily hepatitis C) Explanation: All athletes should receive hepatitis B vaccination before participation. Because of the apparent minimal risk to others, all sports may be played as athlete's state of health allows. For all athletes, skin lesions should be covered properly, and athletic personnel should use universal precautions when handling blood or body fluids with visible blood. <sup>26</sup>	Yes
HIV infection Explanation: Because of the apparent minimal risk to others, all sports may be played as athlete's state of health allows (especially if viral load is undetectable or very low). For all athletes, skin lesions should be covered properly, and athletic personnel should use universal precautions when handling blood or body fluids with visible blood. <sup>26</sup> However, certain sports (such as wrestling and boxing) may create a situation that favors viral transmission (likely bleeding plus skin breaks). If viral load is detectable, then athletes should be advised to avoid such high-contact sports.	Yes
Kidney, absence of one Explanation: Athlete needs individual assessment for contact, collision, and limited-contact sports. Protective equipment may reduce risk of injury to the remaining kidney sufficiently to allow participation in most sports, providing such equipment remains in place during activity. <sup>22</sup>	Qualified yes
Liver, enlarged Explanation: If the liver is acutely enlarged, then participation should be avoided because of risk of rupture. If the liver is chronically enlarged, then individual assessment is needed before collision, contact, or limited-contact sports are played. Patients with chronic liver disease may have changes in liver function that affect stamina, mental status, coagulation, or nutritional status.	Qualified yes
Malignant neoplasm Explanation: Athlete needs individual assessment. <sup>27</sup>	Qualified yes
Musculoskeletal disorders Explanation: Athlete needs individual assessment.	Qualified yes
Neurologic disorders History of serious head or spine trauma or abnormality, including craniotomy, epidural bleeding, subdural hematoma, intracerebral hemorrhage, second-impact syndrome, vascular malformation, and neck fracture. <sup>4,5,28–30</sup> Explanation: Athlete needs individual assessment for collision, contact, or limited-contact sports.	Qualified yes
History of simple concussion (mild traumatic brain injury), multiple simple concussions, and/or complex concussion Explanation: Athlete needs individual assessment. Research supports a conservative approach to concussion management, including no athletic participation while symptomatic or when deficits in judgment or cognition are detected, followed by graduated return to full activity. <sup>28–32</sup>	Qualified yes
Myopathies Explanation: Athlete needs individual assessment.	Qualified yes
Recurrent headaches Explanation: Athlete needs individual assessment. <sup>33</sup>	Yes
Recurrent plexopathy (burner or stinger) and cervical cord neuropraxia with persistent defects Explanation: Athlete needs individual assessment for collision, contact, or limited-contact sports; regaining normal strength is important benchmark for return to play. <sup>34,35</sup>	Qualified yes
Seizure disorder, well controlled Explanation: Risk of seizure during participation is minimal. <sup>36</sup>	Yes
Seizure disorder, poorly controlled Explanation: Athlete needs individual assessment for collision, contact, or limited-contact sports. The following noncontact sports should be avoided: archery, riflery, swimming, weightlifting, power lifting, strength training, and sports involving heights. In these sports, occurrence of a seizure during activity may pose a risk to self or others. <sup>36</sup>	Qualified yes

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Obesity Explanation: Because of the increased risk of heat illness and cardiovascular strain, obese athlete particularly needs careful acclimatization (to the environment and to exercise intensity and duration), sufficient hydration, and potential activity and recovery modifications during competition and training. <sup>37</sup>	Yes
Organ transplant recipient (and those taking immunosuppressive medications) Explanation: Athlete needs individual assessment for contact, collision, and limited-contact sports. In addition to potential risk of infections, some medications (eg, prednisone) may increase tendency for bruising.	Qualified yes
Ovary, absence of one Explanation: Risk of severe injury to remaining ovary is minimal.	Yes
Pregnancy/postpartum Explanation: Athlete needs individual assessment. As pregnancy progresses, modifications to usual exercise routines will become necessary. Activities with high risk of falling or abdominal trauma should be avoided. Scuba diving and activities posing risk of altitude sickness should also be avoided during pregnancy. After the birth, physiological and morphologic changes of pregnancy take 4 to 6 weeks to return to baseline. <sup>38,39</sup>	Qualified yes
Respiratory conditions Pulmonary compromise, including cystic fibrosis Explanation: Athlete needs individual assessment but, generally, all sports may be played if oxygenation remains satisfactory during graded exercise test. Athletes with cystic fibrosis need acclimatization and good hydration to reduce risk of heat illness.	Qualified yes
Asthma Explanation: With proper medication and education, only athletes with severe asthma need to modify their participation. For those using inhalers, recommend having a written action plan and using a peak flowmeter daily. <sup>40–43</sup> Athletes with asthma may encounter risks when scuba diving.	Yes
Acute upper respiratory infection Explanation: Upper respiratory obstruction may affect pulmonary function. Athlete needs individual assessment for all except mild disease (see fever).	Qualified yes
Rheumatologic diseases Juvenile rheumatoid arthritis Explanation: Athletes with systemic or polyarticular juvenile rheumatoid arthritis and history of cervical spine involvement need radiographs of vertebrae C1 and C2 to assess risk of spinal cord injury. Athletes with systemic or HLA-B27-associated arthritis require cardiovascular assessment for possible cardiac complications during exercise. For those with micrognathia (open bite and exposed teeth), mouth guards are helpful. If uveitis is present, risk of eye damage from trauma is increased; ophthalmologic assessment is recommended. If visually impaired, guidelines for functionally 1-eyed athletes should be followed. <sup>44</sup> Juvenile dermatomyositis, idiopathic myositis Systemic lupus erythematosus Raynaud phenomenon Explanation: Athlete with juvenile dermatomyositis or systemic lupus erythematosus with cardiac involvement requires cardiology assessment before participation. Athletes receiving systemic corticosteroid therapy are at higher risk of osteoporotic fractures and avascular necrosis, which should be assessed before clearance; those receiving immunosuppressive medications are at higher risk of serious infection. Sports activities should be avoided when myositis is active. Rhabdomyolysis during intensive exercise may cause renal injury in athletes with idiopathic myositis and other myopathies. Because of photosensitivity with juvenile dermatomyositis and systemic lupus erythematosus, sun protection is necessary during outdoor activities. With Raynaud phenomenon, exposure to the cold presents risk to hands and feet. <sup>45–48</sup>	Qualified yes
Sickle cell disease Explanation: Athlete needs individual assessment. In general, if illness status permits, all sports may be played; however, any sport or activity that entails overexertion, overheating, dehydration, or chilling should be avoided. Participation at high altitude, especially when not acclimatized, also poses risk of sickle cell crisis.	Qualified yes
Sickle cell trait Explanation: Athletes with sickle cell trait generally do not have increased risk of sudden death or other medical problems during athletic participation under normal environmental conditions. However, when high exertional activity is performed under extreme conditions of heat and humidity or increased altitude, such catastrophic complications have occurred rarely. <sup>8,49–52</sup> Athletes with sickle cell trait, like all athletes, should be progressively acclimatized to the environment and to the intensity and duration of activities and should be sufficiently hydrated to reduce the risk of exertional heat illness and/or rhabdomyolysis. <sup>25</sup> According to National Institutes of Health management guidelines, sickle cell trait is not a contraindication to participation in competitive athletics, and there is no requirement for screening before participation. <sup>53</sup> More research is needed to assess fully potential risks and benefits of screening athletes for sickle cell trait.	Yes
Skin infections, including herpes simplex, molluscum contagiosum, verrucae (warts), staphylococcal and streptococcal infections (furuncles [boils], carbuncles, impetigo, methicillin-resistant <i>Staphylococcus aureus</i> [cellulitis and/or abscesses]), scabies, and tinea Explanation: During contagious periods, participation in gymnastics or cheerleading with mats, martial arts, wrestling, or other collision, contact, or limited-contact sports is not allowed. <sup>54–57</sup>	Qualified yes
Spleen, enlarged Explanation: If the spleen is acutely enlarged, then participation should be avoided because of risk of rupture. If the spleen is chronically enlarged, then individual assessment is needed before collision, contact, or limited-contact sports are played.	Qualified yes
Testicle, undescended or absence of one Explanation: Certain sports may require a protective cup. <sup>22</sup>	Yes

This table is designed for use by medical and nonmedical personnel. "Needs evaluation" means that a physician with appropriate knowledge and experience should assess the safety of a given sport for an athlete with the listed medical condition. Unless otherwise noted, this need for special consideration is because of variability in the severity of the disease, the risk of injury for the specific sports listed in Table 1, or both.