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Committee on Sports Medicine and Fitness

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ABSTRACT. Children and adolescents who have systemic hypertension may be at risk for complications when exercise causes their blood pressures to rise even higher. The purpose of this statement is to make recommendations concerning the athletic participation of individuals with hypertension using the 26th Bethesda Conference on heart disease and athletic participation and of the Second Task Force on Blood Pressure Control in Children as a basis.

Hypertension is the most common cardiovascular condition seen in people who engage in competitive athletics.¹ Recently, the National Institutes of Health convened the 26th Bethesda Conference to make recommendations concerning the participation of athletes who have heart disease. One of the panels considered hypertension.¹ In 1987, the Second Task Force on Blood Pressure Control in Children also briefly addressed exercise for hypertensive youth.² This policy statement summarizes the recommendations of these two groups of experts and makes these guidelines more available to pediatricians.

Table 1 presents the classification of hypertension of the Second Task Force² and includes some values from the 26th Bethesda Conference.¹ All values given in the table apply to patients who are not taking antihypertensive drugs and who are not acutely ill. When the systolic and diastolic blood pressures fall into different categories, the higher category should be selected to classify the patient's blood pressure status.

Care must be taken to obtain reliable blood pressure recordings.^{1,2} Some athletes have exceedingly large biceps or triceps, and others have long extremities. The width of the blood pressure bladder must be adequate to cover at least 66%¹ or 75%² of the individual's upper arm measured between the top of the shoulder and the olecranon and should be of adequate length to encircle the arm completely,² which may require the use of a thigh cuff. The athlete should be seated, at rest, and the arm should be supported at heart level.² Only after several elevated readings are obtained on separate occasions should the diagnosis of systemic hypertension be made. Further details concerning the measurement of blood pressure are available.^{1,2}

Once the diagnosis of systemic hypertension is

confirmed, an evaluation including a history, thorough physical examination, and appropriate laboratory testing should be performed, as outlined in the report of the Second Task Force on Blood Pressure Control in Children.²

Reports of cerebrovascular accidents during maximal exercise have raised concerns that the rise in blood pressure accompanying strenuous activity may cause harm.¹ The following guidelines recommend temporary restriction for those athletes who have severe hypertension, but the available data do not indicate that strenuous dynamic exercise places these athletes at risk of acute complications of hypertension during exercise or of worsening of their baseline blood pressure values.¹ In dynamic exercise, intramuscular force is not greatly increased as muscles lengthen and contract and joints move through their range of motion. There is a sizable increase in systolic blood pressure, a moderate increase in mean arterial pressure, and a fall in diastolic pressure and total peripheral resistance. In static exercise, relatively large intramuscular forces develop without much change in muscle length or joint motion. Systolic, mean arterial, and diastolic blood pressures rise significantly, and total peripheral resistance remains essentially unchanged. It is the acute increase in diastolic pressure that particularly concerns the experts, as well as the possible increases in muscle mass that may elevate resting blood pressure. Although the limited evidence shows no greater risk with highly static exercise¹ (Table 2), experts are more cautious about allowing athletes with severe hypertension to participate in this type of activity.

Most physical activities and sports have both static and dynamic components. Guidelines for restricting participation should be based on the cardiovascular demands of the activity and the demands of the practice, training, and/or preparation for that activity.

The experts from the 26th Bethesda Conference¹ and those from the Second Task Force on Blood Pressure Control in Children² agree on temporary restriction of athletes who have severe hypertension. However, the definition of severe hypertension of the 26th Bethesda Conference is more liberal for youth greater than 12 years old than is that of the Second Task Force (Table 1, last column). We recommend the use of the values of the Second Task Force because this group of experts was more pediatric oriented. Since the Second Task Force did not define severe hypertension in youth older than 18 years,

The recommendations in this statement do not indicate an exclusive course of treatment or serve as a standard of medical care. Variations, taking into account individual circumstances, may be appropriate.

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TABLE 1. Classification of Hypertension²

Age, y	High Normal, mm Hg*	Significant Hypertension, mm Hg†	Severe Hypertension, mm Hg‡
6–9			
Systolic	111–121	122–129	>129 (129)§
Diastolic	70–77	70–85	>85 (84)
10–12			
Systolic	117–125	126–133	>133 (134)
Diastolic	75–81	82–89	>89 (89)
13–15			
Systolic	124–135	136–143	>143 (149)
Diastolic	77–85	86–91	>91 (94)
16–18			
Systolic	127–141	142–149	>149 (159)
Diastolic	80–91	92–97	>97 (99)
>18			
Systolic	Not given	[140–179]	> (179)
Diastolic		[90–109]	> (109)

* 90th to 94th percentile for age, boys and girls combined.²

† 95th to 98th percentile for age, boys and girls combined.²

‡ 99th percentile for age, boys and girls combined.²

§ The values in parentheses are those used for the classification of severe hypertension by the 26th Bethesda Conference on cardiovascular disease and athletic participation.¹ See text for explanation.

|| Because the Second Task Force did not discuss youth older than 18 years, the values in brackets are those for mild and moderate hypertension given by the 26th Bethesda Conference.¹

only the values of the 26th Bethesda Conference are given for this age group (Table 1).

RECOMMENDATIONS

The American Academy of Pediatrics recommends:

1. The presence of significant (Table 1) hypertension in the absence of target organ damage or concomitant heart disease should not limit a person's eligibility for competitive athletics. Athletes with significant hypertension should have their blood pressure measured regularly (every 2 months at the physician's office) to monitor the impact of exercise on blood pressure.
2. Youth who have severe (Table 1) hypertension need to be restricted from competitive sports and highly static (isometric) activities (Table 2) until their hypertension is under adequate control and they have no evidence of target organ damage. Since cardiovascular conditioning may be less strenuous than competitive athletics, complete restriction of exercise may not be necessary for those with severe hypertension.
3. When hypertension and other cardiovascular diseases coexist, eligibility for participation in competitive athletics is usually based on the type and severity of the other cardiovascular disease.¹
4. The young athlete with hypertension, regardless of the degree of severity, should be strongly encouraged to adopt healthy lifestyle behaviors, including the avoidance of exogenous androgens, growth hormone, drugs of abuse (especially cocaine), alcohol, use of tobacco (by all routes), and high sodium intake.¹ In addition, the athlete

TABLE 2. Sports That Have a High Static Component*

Low Dynamic	Moderate Dynamic	High Dynamic
Bobsledding	Body building	Boxing†
Field events (throwing)	Downhill skiing	Canoeing/kayaking
Gymnastics	Wrestling	Cycling
Karate/judo		Decathlon
Luge		Rowing
Sailing		Speeding skating
Rock climbing		
Waterskiing		
Weight lifting		
Windsurfing		

* Adapted from Mitchell et al³ with permission.

† The American Academy of Pediatrics recommends that youth not participate in boxing.

should be advised that the use of diuretic drugs and β blockers has been prohibited by some athletic governing bodies. In these instances, other types of medication may need to be considered.

ADDENDUM

An update to the 1987 Task Force report on high blood pressure² has recently appeared (*Pediatrics*. 1996;98:649–658). It provides new data on the 90th and 95th percentile values for blood pressure categorized by age, sex, and height and mentions new information on the diagnosis, treatment, and prevention of hypertension in youth. It does not address sports participation for hypertensive patients other than to say that hypertension is “usually not” a contraindication. Members of the working group that developed the update indicate that the 1987 report's recommendations concerning severe hypertension still stand (Stephen R. Daniels, Jennifer M. H. Logie, personal communication).

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