Even though each year millions of high school and college athletes participate in sporting events without incident, it is the rare occurrence of sudden cardiac death that draws attention and sorrow from all walks of life, both inside the athletic community and from the general population. Who among us doesn’t remember the strength and power of Flo Hyman or the seemingly unbounded potential of Hank Gathers? Their deaths have changed how sports medicine physicians view participation physicals. They have not, however, necessarily increased the coverage of sporting events or practices by physicians. Providing frequent contact with a health care provider remains the role of athletic trainers and therapists, who typically interact on a daily basis with athletes. The purpose of the article is to help athletic trainers and therapists recognize cardiac risk factors through the use of a thorough history and physical exam.

**History**

The preparticipation physical exam has been under scrutiny for its usefulness in identifying clinically relevant preexisting cardiovascular problems. To help clarify this, the American Heart Association issued a consensus statement in 1996, with a revised section for the collegiate athlete in 1998 (Maron et al.). The sidebar illustrates the key points of a comprehensive cardiovascular history and physical.

Obtaining a complete history from young athletes is often difficult. They are commonly unaware of family history and unfamiliar with complex medical terminology. Optimally, the student athlete and a parent should complete the history form together before the preparticipation physical exam.

A thorough cardiac history should include any family history of sudden cardiac death before age 50. Many causes are inherited, such as Marfan’s syndrome, hypertrophic cardiomyopathy, and premature coronary artery disease. Any prior cardiac history such as murmurs, heart surgery, or exclusion from play for cardiac reasons is important to note. Current symptoms such as dizziness, light-headedness, or syncope during or after exercise might indicate underlying cardiac pathology. Chest pain during or after exercise could be the manifestation of advanced cardiovascular disease or coronary artery abnormalities. Palpitations (fluttering or pounding heart) might signal arrhythmias.

Reviewing questions about other organ systems can be of benefit, as well. Dyspnea (shortness of breath) out of proportion to activity or to that of peers might represent lung...
disease. This can also be seen secondary to structural cardiac anomalies such as septal defects or valvular problems. Drug use (alcohol, cocaine, amphetamines, tobacco), nutritional supplements, and ergogenic aids can cause a multitude of cardiac symptoms and even sudden death. Exploring use patterns is essential to avoid often-missed causes.

**Physical Exam**

The athletic trainer or therapist should be proficient in assessing the athlete’s vital signs. Heart rate and pulse should be assessed for both rate and rhythm. Pulses should be obtained from radial, carotid, femoral, and dorsalis pedis locations for consistency. The irregularity of a pulse indicates the need for further investigation. A normal resting pulse ranges from 60 to 100 beats per minute. A lower pulse in elite athletes and a higher pulse in children are often found and presumed normal. Checking simultaneous pulses over the femoral and radial arteries is a useful test for coarctation of the aorta, because a weakening or delay in femoral pulse is often characteristic of that condition.

An accurate blood pressure (BP) should be taken for evaluation of hyper- or hypotension. Proper technique is critical in order to ensure accurate readings. For example, either elevating the arm over the level of the heart or using a cuff size too large for the athlete can artificially lower BP. An arm position lower than the heart, athlete actively contracting muscles, or too small a cuff size can artificially raise the pressure reading. If the age-adjusted BP is elevated, a repeated test after a 10- to 15-min rest period is warranted. Keep in mind that anxiety, pain, caffeine, nicotine, and even over-the-counter cold medicines can raise blood pressure.

Inspection and observation of the athlete provide the first signs that he or she is developing cardiac distress. A bluish, or cyanotic, appearance can indicate decreased oxygenation in peripheral tissues. This might be a manifestation of a septal defect or “failing” hypertrophic heart. An athlete with Marfan’s syndrome typically has a distinctive appearance: a tall frame, arachnodactyly (elongated digits), and an arm span greater than the athlete’s standing height. Oftentimes these athletes are severely nearsighted (although this can be corrected with contact lenses or surgery) and demonstrate thoracic deformities such as kyphoscoliosis, pectus excavatum, or pectus carinatum.

Precordial auscultation is a difficult yet often precise way to elicit arrhythmias, murmurs, and precursors to a number of congenital abnormalities. Proper use of a stethoscope can help discern murmurs, rubs, gallops, and clicks. The American Board of Family Physicians offers an on-line tutorial called HeartLab™. This free auscultation simulator reviews positioning of the