



## PREVENTING SUDDEN CARDIAC ARREST IN ATHLETES

**PURPOSE:** The following policy is intended to assist the Sports Medicine Staff and Physicians in establishing the steps necessary to prepare and respond to a potentially unexpected sudden cardiac arrest (SCA) episode. The policy is based on the recommendations found in the consensus statement established by the Inter Association Task Force on Emergency Preparedness and Management of Sudden Cardiac Arrest in High School and College Athletic Programs, Kory Stringer Institute, and National Athletic Trainer's Association (NATA).

### **Prevalence of SCA:**

Sudden Cardiac Arrest is a leading cause of death in the United States, claiming an estimated 325,000 lives each year. According to the NATA, the incidence rate of Sudden Cardiac Death (SCD) in high school athletes is estimated to be 1:100,000 to 1:200,000, with commotio cordis accounting for approximately 20% of SCD. Commotio cordis is a condition caused by a blunt force to the chest which induces ventricular arrhythmia, an abnormal heartbeat causing the heart to beat too fast and prevents oxygen-rich blood from circulating to the brain, possibly resulting in SCA. Other factors that may contribute to SCD are: myocarditis (inflammation of the heart muscle), arrhythmogenic right ventricular dysplasia (disease of the heart muscle), Marfan syndrome, valvular heart disease, dilated cardiomyopathy (weak and enlarged heart muscle), atherosclerotic coronary heart disease (plaque buildup in arteries supplying blood to the heart).

### **Definition of SCA:**

During a sudden cardiac arrest, heart function ceases abruptly and without warning. When this occurs, the heart is no longer able to pump blood to the rest of the body, and in 95% of victims, death occurs.

According to the Kory Stringer Institute:

*“Sudden cardiac death (SCD) is the number one cause of exercise related death in young athletes and is due to a cardiovascular disorder. Age is a very significant factor in regards to SCD in athletes. For adults (individuals older than 35) coronary artery disease is the major cause of exercise related sudden cardiac death. For youth congenital cardiac conditions are the majority of causes for exercise related SCD. In the United States SCD is seen in all sports but mostly in basketball and football due to higher participation levels. Males are more likely to suffer from this condition as well as athletes of the African-American ethnicity.”*

While Sudden Cardiac Arrest (SCA) is a significant public health crisis, it is often misunderstood. SCA is not a heart attack. A heart attack occurs when a blood vessel becomes blocked and interrupts blood flow to the heart, causing heart muscle to die. Sudden cardiac arrest occurs when the heart's electrical system malfunctions and the heart stops beating. Most of these deaths occur with little or no warning, from a syndrome called sudden cardiac arrest. The most common cause of sudden cardiac arrest is a disturbance in the heart rhythm called ventricular fibrillation.

**Recognition of SCA:**

Prompt recognition and identification of SCA is critical in the management of this life-threatening emergency. Any collapsed athlete who is unresponsive requires an immediate assessment for SCA. On-site responders must maintain a high level of suspicion for SCA, as unrecognized SCA in a collapsed athlete causes critical delays in the initiation of CPR and defibrillation. Resuscitation is often delayed because the victim is reported to have signs of life. Sudden cardiac arrest can be misdiagnosed as a seizure in the form of involuntary myoclonic jerks; seizure-like activity is present in approximately 20% of patients with cardiogenic collapse. To avoid life-threatening delays in resuscitation, brief seizure-like activity should be assumed to be due to SCA and initial management steps for SCA taken immediately until a noncardiac cause of the collapse is clearly determined.

Other obstacles to recognizing SCA in athletes include inaccurate rescuer assessment of pulse or respirations. Occasional or agonal gasping can occur in the first minutes after SCA and is often misinterpreted as normal breathing. Occasional gasping does not represent adequate breathing and, if present, should not prevent rescuers from initiating CPR. Health care providers should take no longer than 10 seconds to check for a pulse and should proceed with chest compressions if a pulse is not definitively detected.

Sports medicine staff members, physicians, and other potential first responders to an SCA in a student-athlete must understand these potential obstacles to recognizing SCA, as inaccurate assessment of SCA results in critical delays or even failure to activate the EMS system, emergency action plan, initiate CPR, and provide early defibrillation.

**Common Signs and Symptoms of SCA:**

- Chest pain (angina pectoris)
- Difficulty breathing (dyspnea)
- Rapid/racing heart rate (tachycardia)
- Nausea/Vomiting
- Dizziness/Feeling faint (syncope)
- Sometimes SCA can occur with no prior symptoms

**Management of SCA:**

- Early activation of EMS, emergency action plan, early CPR, early defibrillation, and rapid transition to advanced cardiac life support (ACLS).
- Sudden cardiac arrest should be suspected in any collapsed athlete.
- An AED should be applied as soon as possible on any collapsed and unresponsive athlete for rhythm analysis and defibrillation if indicated.
- CPR should be provided while waiting for the AED/ and while being applied.
- Interruptions in chest compressions should be minimized and CPR stopped only for rhythm analysis and shock.
- CPR should be resumed immediately after the first shock, beginning with chest compressions, with repeat rhythm analysis after every 2 minutes or 5 cycles of CPR, and continued until advanced life support providers take over or the victim starts to move (i.e. victim has return of circulation, consciousness)

- Sudden cardiac arrest in athletes can be mistaken for other causes of collapse, and rescuers should be trained to recognize SCA in athletes with special focus on potential barriers to recognizing SCA, including inaccurate rescuer assessment of pulse or respirations, occasional or agonal gasping, and myoclonic jerking or seizure-like activity.
- Young athletes who collapse after shortly being struck in the chest by a firm projectile or by player contact should be suspected of having SCA from commotio cordis, also called a cardiac contusion.
- Rapid access to the SCA victim should be facilitated for EMS personnel.

**Remember:** The rate of survival from sudden cardiac arrest falls 7-10% for each minute without CPR. That would mean that if CPR was delayed even 3 minutes, the injured person now has a 70% chance of survival.

### **Chain of Survival:**

The American Heart Association (AHA) recommends a five-part chain of survival for effective emergency cardiac care:

- Immediate recognition and activation of EMS
- Early CPR
- Rapid defibrillation with an AED, when indicated
- Effective advanced life support (including airway management and ventilation support)
- Integrated post-cardiac arrest care

Within these steps, implementation of rapid defibrillation requires consideration of the following key points for AED policies at your venue:

- AEDs are to be used under the advice, guidance and consent of a physician OR by individuals with proper training and certification. They have the potential to be dangerous if used improperly or by untrained individuals.
- Athletic trainers, coaches, administrators, school nurses, and physical education teachers should have access to an AED on school property and at all school athletic events/activities. These individuals should be provided annual training and certification in CPR and AED use.
- AED is to be stored in a safe (protected from snow, rain, sun, etc.) and easily accessible place. Institutions that are sponsoring athletic events, should have an AED on site or access to one at each athletic venue to practices and games.
- The location of the AED should be well marked, publicized, and known among athletic staff. It is critical that the location is close enough to the venue that it takes no longer than 5 minutes from the time of collapse to the first administered shock. Ensure the device is visible to the public and easily recognizable in an emergency.
  - **It is strongly recommended to have a response time of less than 3-5 minutes.**
- AED is to be used ***after*** activating EMS. Another athletic trainer, coach, athlete or bystander may perform this action. EMS can be called by anyone on-site; they do not need to be trained in CPR/AED administration. AED use is a supplemental treatment until further medical care is on-site.

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