

PERFORMANCE POINT

CARDIAC SCREENING IN ATHLETES

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Cardiac (heart) abnormalities in athletes are rare but can be devastating. A cardiac abnormality or disease can have a significant impact on performance, and very rarely, can cause sudden cardiac death (SCD). SCD in the young athlete is estimated to be between 1:45,000 to 1:200,000. Some examples of concerning cardiac abnormalities/diseases include:

Hypertrophic Cardiomyopathy (the most common cause of sudden cardiac death in the athlete under 35); Arrhythmogenic Right Ventricular Dysplasia, 2nd and 3rd degree Heart Block, Atrial Fibrillation, Myocarditis, Brugada Syndrome, Long QT syndrome, Aortic Stenosis and Commotio Cordis (blunt trauma to the chest causing an arrhythmia)

Most cardiac abnormalities in athletes under 35 yrs of age are due to the above causes. Most cardiac abnormalities in those over 35 are due to atherosclerotic heart disease from a build up of plaques in the arteries of the heart muscle.

SCREENING FOR CARDIAC ABNORMALITIES

What are red flag symptoms that may indicate an underlying cardiac abnormality? If an athlete experiences any of these symptoms, they should be evaluated by a physician.

- Chest pain on exertion
- Palpitations (sensation of an irregular heart rate), especially if occurring with exertion
- Shortness of breath, (more than expected), especially with exertion
- Light headedness or fainting, especially during exertion

What increases the risk for cardiac abnormalities?

- Medical conditions that may affect the heart (high blood pressure, high cholesterol, diabetes, untreated thyroid conditions, Marfans Syndrome, Ehlers Danlos syndrome)
- Exercising with a fever. Some viruses can irritate the conduction of the heart, causing arrhythmias
- Exercising with known inflammation of the heart (myocarditis or pericarditis)

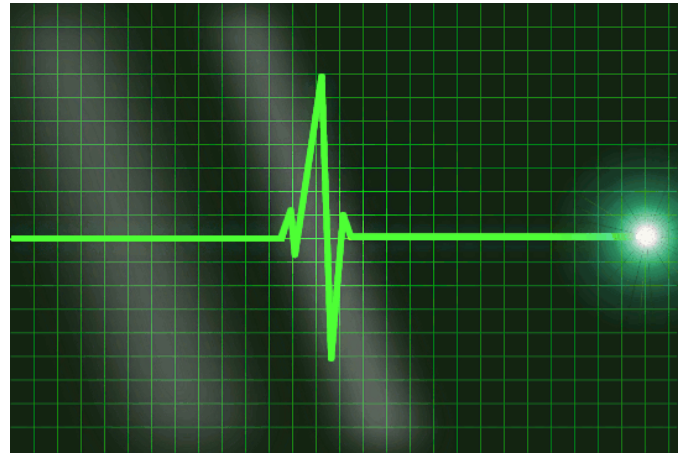
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- Drugs that affect the heart (including some illicit & banned drugs)
- Family history of sudden cardiac death, under 60 years of age
- Family history of any of the above mentioned cardiac abnormalities

How can an athlete screen for cardiac abnormalities?

- Pre-participation Physical Exam (PPE) – done yearly, involving:
 1. Screening questionnaire
 2. Physical exam, including a cardiac exam
 3. +/- Screening Electrocardiogram (ECG) *



*An electrocardiogram is a non invasive test with electrodes attached to limbs and the chest wall to evaluate electrical conduction of the heart. The use of the screening ECG as part of the PPE is widely used in the European community. In North America the ECG is not recommended for all athletes but is becoming strongly recommended as a screening tool in elite athletes involved in aerobic and strength focused sports. By adding the ECG to the PPE, the sensitivity of identifying true cardiac abnormalities increases from approx 6% to 70%.

We see a normal physiological cardiac adaptation to aerobic and strength training in elite athletes often causing changes on the electrocardiogram (ECG). Other changes on an ECG could suggest a true cardiac abnormality usually warranting further investigation. There are guidelines to interpret an ECG in the elite athlete helping to differentiate between a normal physiologic response to exercise and a true abnormality.¹ By improving the specificity of cardiac abnormalities with use of the guidelines, one can reduce anxiety to the athlete and the need for further unnecessary investigations.

BOTTOM LINE FOR THE ATHLETE

- Have a yearly screening medical (PPE)
- See your physician if you develop any red flag symptoms
- Don't exercise if you have a fever



References

1. Recommendations for interpretation of 12-lead electrocardiogram in the athlete, European Heart Journal (2010) 31, 243-259