

AHA/ACC SCIENTIFIC STATEMENT

# Eligibility and Disqualification Recommendations for Competitive Athletes With Cardiovascular Abnormalities: Task Force 8: Coronary Artery Disease



A Scientific Statement from the American Heart Association and American College of Cardiology

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Atherosclerotic coronary artery disease (ASCAD) is the leading cause of sudden cardiac death (SCD) and acute myocardial infarction (AMI) in adult athletes, variably defined as people older than age 30, 35, or 40 years (1). ASCAD can occur in younger athletes who have inherited hyperlipidemia. For many adults, SCD or AMI is the first manifestation of ASCAD, because most of these acute events are caused by coronary plaque disruption and acute coronary thrombosis in plaques that were previously not sufficiently narrowed to have caused ischemia, even during intense

exercise (1). There is universal agreement that vigorous exercise, such as athletic competition, acutely, albeit transiently, increases the risk of SCD and AMI in previously healthy people (1). Vigorous exercise also transiently increases the risk for SCD and AMI in people with diagnosed ASCAD. These events may be caused by plaque disruption, but SCD in these patients may also be produced by malignant arrhythmias caused by demand ischemia or originating in areas of myocardial scar (1). In addition to ASCAD, other coronary conditions such as coronary

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vasospasm, myocardial bridging, and coronary dissection, as well as infection such as Kawasaki disease, vasculitis, and cardiac transplant vasculopathy, may also cause acute cardiac events during exercise. The present section makes recommendations on how to evaluate patients with disease of the coronary arteries and make appropriate recommendations for athletic competition. Anomalous coronary arteries are considered in the Task Force 4 report (2).

We searched PubMed for English language articles reporting exercise-related issues related to coronary diseases. This search produced no clinical trials examining how competitive athletes with coronary artery diseases should be advised regarding vigorous exercise in general or athletic competition in particular. Consequently, the following recommendations are based on case series, case reports, and consensus among the committee members.

## **ATHEROSCLEROTIC CORONARY ARTERY DISEASE**

Patients with ASCAD can be divided into clinically manifest or symptomatic and clinically concealed or asymptomatic subgroups. The former have either experienced an acute cardiac event or have symptoms consistent with inducible myocardial ischemia, or they have findings of ischemia identified by a diagnostic testing modality such as exercise testing with or without adjunctive nuclear or echocardiographic imaging. This group includes those with “silent ischemia” who have no symptoms but have ischemia documented by provocative testing. Patients with clinically concealed ASCAD are presently and previously asymptomatic and are diagnosed as having ASCAD by the presence of coronary artery calcification on computerized tomography or by the presence of non-calcified plaque by coronary computed tomography angiography but do not have evidence of ischemia on provocative testing.

Evaluation and recommendations for patients with ASCAD are based on the following assumptions: 1) The risk of an acute exertion-related cardiac event is greater in those who have had a previous acute cardiac syndrome and lower in those whose ASCAD is clinically silent and was diagnosed by such techniques as coronary artery calcification scanning or computed tomography angiography. 2) The risk of an acute exertion-related cardiac event increases with increasing extent of coronary artery disease, reduced left ventricular systolic function, the presence and extent of ischemia, and increased electrical instability. Unstable or “vulnerable” plaques are often lipid rich (3), so it is also likely that the risk of an exertion-related plaque disruption can be reduced by aggressive lipid-lowering treatment, which has been shown to

reduce the lipid content of atherosclerotic plaques (4). 3) Patients with clinically manifest ASCAD should strongly consider deferring their possible return to athletic competition to permit lesion regression and regression of lipid from the plaque. The length of this delay is not defined, but some have suggested 2 years, because substantial lesion regression has been documented to occur within 2 years of aggressive lipid management (5).

### **Recommendations**

- 1. Athletes with ASCAD should undergo maximal exercise testing to evaluate exercise tolerance, the presence of inducible ischemia, and the presence of exercise-induced electrical instability. Testing should be performed on the subject’s standard medical regimen, including  $\beta$ -adrenergic blocking medications (Class I; Level of Evidence C).**
- 2. Athletes with ASCAD should undergo an evaluation of left ventricular function (Class I; Level of Evidence C).**
- 3. Once informed of the results of the evaluations contained in recommendations 1 and 2, adult patients with ASCAD should participate in the decision as to whether the health and psychological benefits of exercise for them outweigh the risk (Class I; Level of Evidence C).**
- 4. Athletes with ASCAD should undergo aggressive risk factor reduction with high-intensity statin therapy to reduce the chance of plaque disruption (6) (Class I; Level of Evidence A).**
- 5. It is reasonable for athletes with clinically concealed ASCAD to participate in all competitive activities if their resting left ventricular ejection fraction is >50% and they have no inducible ischemia or electrical instability (Class IIb; Level of Evidence C).**
- 6. It is reasonable for patients with clinically manifest ASCAD to participate in all competitive activities if their resting left ventricular ejection fraction is >50%, they are asymptomatic, and they have no inducible ischemia or electrical instability (Class IIb; Level of Evidence C).**
- 7. It is reasonable to restrict patients with clinically manifest ASCAD that does not fulfill the criteria in recommendation 6 to sports with low dynamic and low to moderate static demands (Class IIb; Level of Evidence C).**
- 8. It is reasonable to prohibit patients with clinically manifest ASCAD from competitive sport participation:**
  - a. For at least 3 months after an AMI or coronary revascularization procedure (Class IIb; Level of Evidence C);**
  - b. If they have increasing frequency or worsening symptoms of myocardial ischemia (Class IIb; Level of Evidence C).**

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