

# SPORTS AND CORONARY ARTERY DISEASE

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# EXERCISE RECOMMENDATIONS FOR PRIMARY PREVENTION

To promote and maintain health, all healthy adults aged 18–65 yr need moderate-intensity aerobic physical activity for a minimum of **30 min on five days each week** or vigorous-intensity aerobic activity for a minimum of 20 min on three days each week. [I (A)]

Combinations of moderate- and vigorous intensity activity can be performed to meet this recommendation. [IIa (B)]

To promote and maintain good health and physical independence, adults will benefit from performing activities that maintain or increase muscular strength and endurance for a minimum of two days each week. [IIa (A)]

It is recommended that 8–10 exercises be performed on two or more nonconsecutive days each week using the major muscle groups. To maximize strength development, a resistance (weight) should be used that allows 8–12 repetitions of each exercise resulting in volitional fatigue. Muscle-strengthening activities include a progressive weight-training program, weight bearing calisthenics, stair climbing, and similar resistance exercises that use the major muscle groups

*Haskell W.L., Lee I.M., Pate R.R., et al. (2007) Physical activity and public health: updated recommendation for adults from the American College of Sports Medicine and the American Heart Association. Circulation 116:1081–1093.*

<b>Light &lt; 3mets/min</b>	<b>Moderate 3-6 mets/min</b>	<b>Vigorous &gt; 6 mets/min</b>
<b>Walking</b> - Slowly	Moderate or brisk pace	Very brisk walking, jogging , running
<b>Household&amp; occupation</b> - Sitting - Making beds, washing dishes	- Cleaning - Laundry - Mowing the lawn - Carpentry	- Carrying heavy objects - Farming - Digging
<b>Leisure time &amp; sports</b> - Musical instruments - Fishing while sitting - Darts - -etc	-Badminton -Table tennis - Slow dancing - Cycling slowly - Shooting basketball - Leisure swimming	- Basket ball gam - Soccer - Cross country - Swimming - Tennis singles - etc

Adapted from Haskell W.L., Lee I.M., Pate R.R., et al. (2007) Physical activity and public health: updated recommendation for adults from the American College of Sports Medicine and the American Heart Association. *Circulation* 116:1081–1093.

## EXERCISE RECOMMENDATIONS FOR SECONDARY PREVENTION

For all patients, the clinician should encourage **30 to 60 minutes of moderate-intensity aerobic activity, such as brisk walking, at least 5 days and preferably 7 days per week**, supplemented by an increase in daily lifestyle activities (e.g., walking breaks at work, gardening, household work) to improve cardiorespiratory fitness and move patients out of the least-fit, least-active, high-risk cohort (bottom 20%) . (Level of Evidence: B)

2012 ACCF/AHA/ACP/AATS/PCNA/SCAI/STS Guideline for the diagnosis and management of patients with stable ischemic heart disease: a report of the American College of Cardiology Foundation/American Heart Association Task Force on Practice Guidelines, and the American College of Physicians, American Association for Thoracic Surgery, Preventive Cardiovascular Nurses Association, Society for Cardiovascular Angiography and Interventions, and Society of Thoracic Surgeons. JACC 2012

# ESC GUIDELINES ON PHYSICAL ACTIVITY FOR PRIMARY PREVENTION

2016 European Guidelines on  
cardiovascular disease prevention  
in clinical practice: The Sixth Joint  
Task Force of the European  
Society of Cardiology and Other  
Societies on Cardiovascular  
Disease Prevention in Clinical  
Practice

EHJ 2016

Recommendations	Class <sup>a</sup>	Level <sup>b</sup>
It is recommended for healthy adults of all ages to perform at least 150 minutes a week of moderate intensity or 75 minutes a week of vigorous intensity aerobic PA or an equivalent combination thereof.	I	A
For additional benefits in healthy adults, a gradual increase in aerobic PA to 300 minutes a week of moderate intensity, or 150 minutes a week of vigorous intensity aerobic PA, or an equivalent combination thereof is recommended.	I	A
Regular assessment and counselling on PA is recommended to promote the engagement and, if necessary, to support an increase in PA volume over time. <sup>d</sup>	I	B
PA is recommended in low-risk individuals without further assessment.	I	C
Multiple sessions of PA should be considered, each lasting $\geq 10$ minutes and evenly spread throughout the week, i.e. on 4–5 days a week and preferably every day of the week.	IIa	B
Clinical evaluation, including exercise testing, should be considered for sedentary people with CV risk factors who intend to engage in vigorous PAs or sports.	IIa	C

# LEISURE/COMPETITIVE SPORTS IN PATIENTS WITH CAD INTRODUCTION

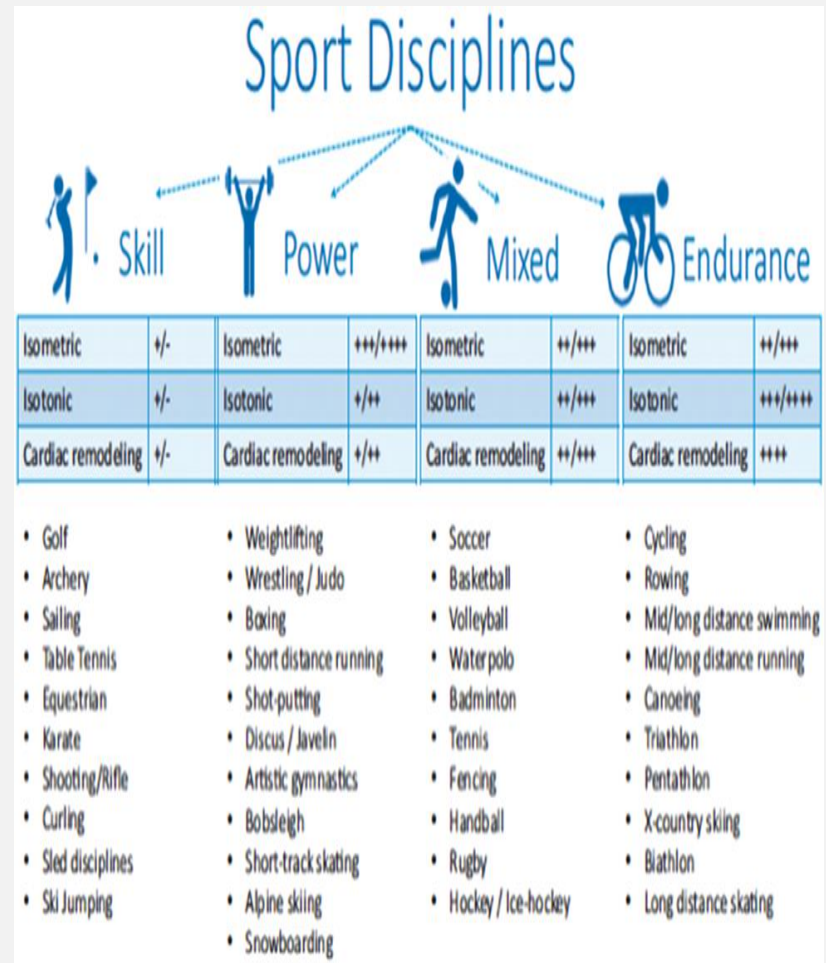
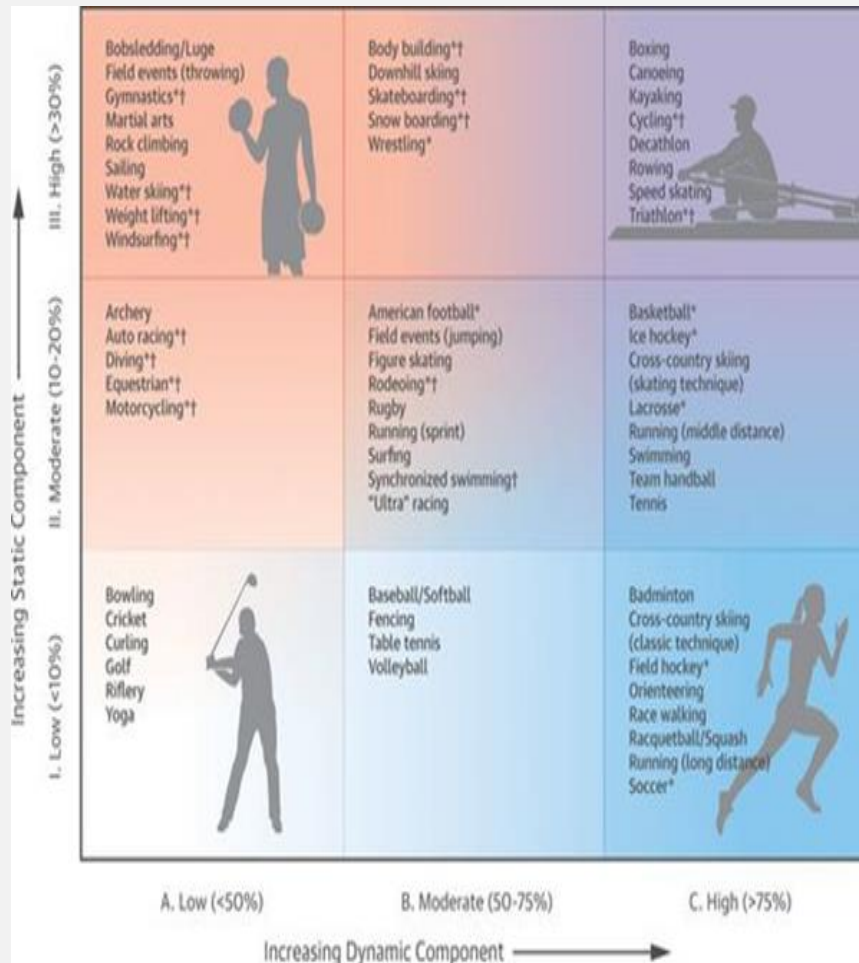
- In athletes > 35 yrs , CAD is the commonest cause of sudden cardiac death/arrest (SCD/SCA)\*
  - Regular exercise ↓ incidence of CAD, SCD/SCA during exercise.\*\*
  - Intensive exercise training (> 7 x / week or 18 h of strenuous exercise/wk ), ↑ the mortality risk in patients with CAD. Risk is still very small .\*\*\*
- \*Adabag A, Peterson G, Apple F, Titus J, King R, Luepker R. Etiology of sudden death in the community: results of anatomical, metabolic and genetic evaluation. Am Heart J 2010;159:33–39.
  - \*\*Mittleman MA, Maclure M, Tofler GH, Sherwood JB, Goldberg RJ, Muller JE. Triggering of acute myocardial infarction by heavy physical exertion. Protection against triggering by regular exercise. N Engl J Med 1993;329:1677–1683.
  - \*\*\*Mons U, Hahmann H, Brenner H. A reverse J-shaped association of leisure-time physical activity prognosis in patients with stable coronary heart disease: evidence from a large cohort with repeated measurements. Heart 2014;100:1043–1049.

## MAJOR GUIDELINES ON SPORTS ACTIVITY AND CAD

- Borjesson M et al. **Recommendations for participation in leisure time or competitive sports in athletes-patients with coronary artery disease: a position statement from the Sports Cardiology Section of the European Association of Preventive Cardiology (EAPC)**, European Heart Journal. Jan 2019
- Thompson PD, Myerburg RJ, Levine BD, Udelson JE, Kovacs RJ. **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.** JACC 2015.

# ACC/AHA

# ESC/EAPC





## HOW TO APPROACH CAD PATIENTS/ATHLETES?

Two main categories:

- Symptomatic:
  - h/o ACS, exertional angina, ischemia on functional testing
- Asymptomatic:
  - evidence of asymptomatic disease on CT or angio.

## APPROACH TO PATIENT/ATHLETE WITH ASYMPTOMATIC CAD

### ESC guidelines:

Exercise stress test is recommended.

- If borderline EST results or pre-existing LBBB → stress echo/CMR/PET/SPECT
- If abnormal EST, ESC guidelines recommend CTCA first .

## ESC GUIDELINE RECOMMENDATION FOR ASYMPTOMATIC CAD

- Given the net benefits of exercise, we recommend that patient-athletes with **asymptomatic coronary disease** defined as CAD with **no evidence** of inducible ischemia on functional tests, may be advised for participation in **all** types of exercise programmes including competitive sports, based on an individual careful evaluation.
- Effective risk factor management according to guidelines is mandatory.
- The athlete-patient should periodically be reassessed regarding risk profile and progression/regression of CAD—Level of recommendation: Class IIa, level of evidence C.

## ASYMPTOMATIC CAD AND SPORTS US GUIDELINES

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).



Athletes with ASCAD should undergo an evaluation of left ventricular function (Class I; Level of Evidence C).

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).

Athletes with ASCAD should undergo aggressive risk factor reduction with **high-intensity statin therapy** to reduce the chance of plaque disruption<sup>6</sup> (Class I; Level of Evidence A).

## APPROACH TO SYMPTOMATIC CAD ESC/EAPC GUIDELINES

- For athletes-patients with proven CAD, as documented by an earlier clinical event, CT scan or coronary angiography, advice relative to sport participation should be based on individual assessment
- Recommendations on eligibility for competitive sports should primarily be based on:
  - Presence of exercise-induced myocardial ischaemia
  - Exercise induced arrhythmia
  - Evidence of myocardial dysfunction
  - Type and level of sport competition
  - Fitness level of the individual patient-athlete
  - Profile of cardiovascular risk factors

Low probability	High probability
Absence of critical CAD ( 70% stenosis / 50% in LMS)	Critical stenosis present
EF $\geq$ 50%	EF < 50%
Normal, age-adjusted exercise capacity	Dyspnea at low workload. Dizziness or syncope during exertion
Absence of inducible ischemia on maximal exercise testing	Exercise-induced ischemia, $>0.1$ mV ST  (horizontal or downsloping at J 80 ) in 2 chest leads or ST  $>0.1$ mV or new LBBB at low exercise intensity or immediately post-exercise
Absence of major ventricular tachyarrhythmias (i.e. NSVT, polymorphic or very frequent PVCs at rest and during maximal stress testing)	Relevant ventricular tachyarrhythmias (i.e. NSVT, polymorphic or very frequent PVCs, at any time)
	Extensive scarring on CMR

## ESC/EAPC GUIDELINES FOR SYMPTOMATIC CAD

- Athletes-patients with clinically proven CAD and considered to be at low-risk for cardiac events may be selectively advised to participate in competitive sports .
- However, as a measure of caution due to the high hemodynamic load and possible electrolyte imbalance, restrictions may apply on an individual basis for certain sports with the highest CV demand (such as extreme power and endurance disciplines).
- Moreover, older athletes-patients with CAD and even low risk profiles deserve special attention, and a more cautious advice, as recent studies have shown that the risk of SCD during endurance events may be considerably higher in men >60-year-old
- Level of recommendation: Class IIa, level of evidence C

## ESC/EAPC GUIDELINES ON SYMPTOMATIC CAD (CONTD)

- Patient-athletes with clinically proven CAD, defined as high risk, should be temporarily restricted from competitive sport and receive appropriate management .
- As in all patients, also in patient-athletes with CAD and significant ischemia during exercise, anti-ischemic therapy needs to be optimized.
- In case of continued ischemia, revascularization ought to be performed.

Class IIa, level of evidence C



## US GUIDELINES ON CLINICALLY MANIFEST CAD

- 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).
- It is reasonable to restrict patients with clinically manifest ASCAD that does not fulfill the criteria in above recommendation to sports with low dynamic and low to moderate static demands (Class IIb; Level of Evidence C).

## PRIOR REVASCULARIZATION

- Cardiac rehab is advised as per cardiac rehab guidelines (gradual/ low intensity/ limited duration)
- ESC/US guidelines both advise a 3 mo period before engaging sports activities (Class IIb; Level of Evidence C);

## TAKE HOME MESSAGES

- Exercise is beneficial for primary and secondary prevention of CAD ( 150 min/wk of moderate intensity exercise)
- In athletes > 35 yrs, CAD is the commonest cause of SCA/SCD ( though very rare)
- In asymptomatic/subclinical CAD , a low risk EST ( +/- normal EF) →no exercise/sports restriction as a general rule + intensive risk factor control
- Symptomatic/Clinical CAD
  - Identify high risk features ( low intensity sport)
  - Low risk : allow competitive sport ( individualize )