

Sudden Cardiac Death During Sports Activities in the General Population



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KEYWORDS

• Sports • Athlete • Prevention • General population • Sudden cardiac arrest

KEY POINTS

- Although sports-related sudden cardiac death (SCD) is often a devastating event in a young individual, exercise is beneficial and has a role in the prevention and therapy of cardiac disease.
- The goal for health care providers should be not to discourage sports participation.
- However there should be concerted efforts to enhance prevention and management of sports-related SCD, which seems to be a particularly suitable model for specific therapies.
- Targeted prevention through tailored and individualized preparticipation screening as well as education of participants and other stakeholders in sporting events could be of particular benefit.

Participating athletes in competitive sport events as well as sports participants in general are usually healthy and are perceived to be fit. It is also accepted that regular sports activity is beneficial in reducing long-term overall as well as cardiovascular mortality, including sudden cardiac death (SCD).^{1–7} However, the occasional instance of SCD during a sporting event in full public glare serves as a grim reminder of the small but definite arrhythmic risk of extreme exercise. This paradox of exercise has been described for more than 30 years,^{2–4} wherein, although regular physical activity has proven benefits for cardiovascular health, vigorous exercise could increase the short-term risk of dying suddenly (during or shortly after exercise).

Therefore, fairly extensive attention has focused on physical exertion as a potential trigger for SCD. To add to the complexity, the risk of sports-related SCD decreases with regular exercise training.^{7,8} Notwithstanding these facts, the occurrence of such unexpected and tragic events among athletes, who epitomize health and well-being, invariably begs the question as to whether they cannot be prevented or better managed. The ability to screen athletes to prevent such events has been the subject of considerable scientific attention and controversy.^{9–11} The devastating and traumatic consequences of sports-related SCD, therefore, mandate a thorough understanding of this phenomenon across the general population.^{12,13}

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In this review, we summarize the current knowledge in this field, to provide an overview of the connection between sports and SCD, and to place into perspective the current thoughts on screening and other measures to improve outcomes.

SPORTS ACTIVITY: CONCLUSIVELY BENEFICIAL FOR LONG-TERM SUDDEN CARDIAC DEATH RISK

The cardiovascular advantages of physical activity are well-established, and the excessive attention often focused on sports-related SCD should not overshadow the broad issue that regular exercise has irrefutable benefits.¹⁴ Several studies have demonstrated a strong and consistent reduction of risk through regular physical activity with regard to cardiovascular mortality,⁵ atrial fibrillation,¹⁵ and coronary artery disease,¹⁶ with the last mentioned being described more than 35 years ago.¹⁷ Considering that coronary artery disease is one of the major underlying causes of SCD (especially during sports activity in subjects over 30 years of age^{18,19}), regular physical activity could, through reduction of coronary artery

disease, lead to a decreased SCD risk. Concordant with this, studies have clearly established that regular physical activity is associated with a lower long-term risk of SCD.^{7,20–24} Therefore, there is scientific consensus that a certain amount of physical activity is strongly recommended to reduce overall mortality,²⁵ including SCD.

In contrast, for sports-related SCD, an analogy of “drug overdose”²⁶ has been used, considering that sports (exercise) is in fact an effective “drug” for SCD risk reduction. This analogy suggests that the association between sports and mortality may follow a U-curve²⁷; moderate sports would confer a lower overall mortality, whereas strenuous sports activity would be associated with a similar mortality as a nonexercising population owing to a counterbalancing effect of short-term SCD risk (Fig. 1). However, this concept remains controversial: for instance, recent data from healthy elite athletes (French participants in the Tour de France) reported a significantly lower mortality when compared with the general population.²⁸ Such results need careful interpretation, considering the potential selection bias in a population of elite athletes.²⁹

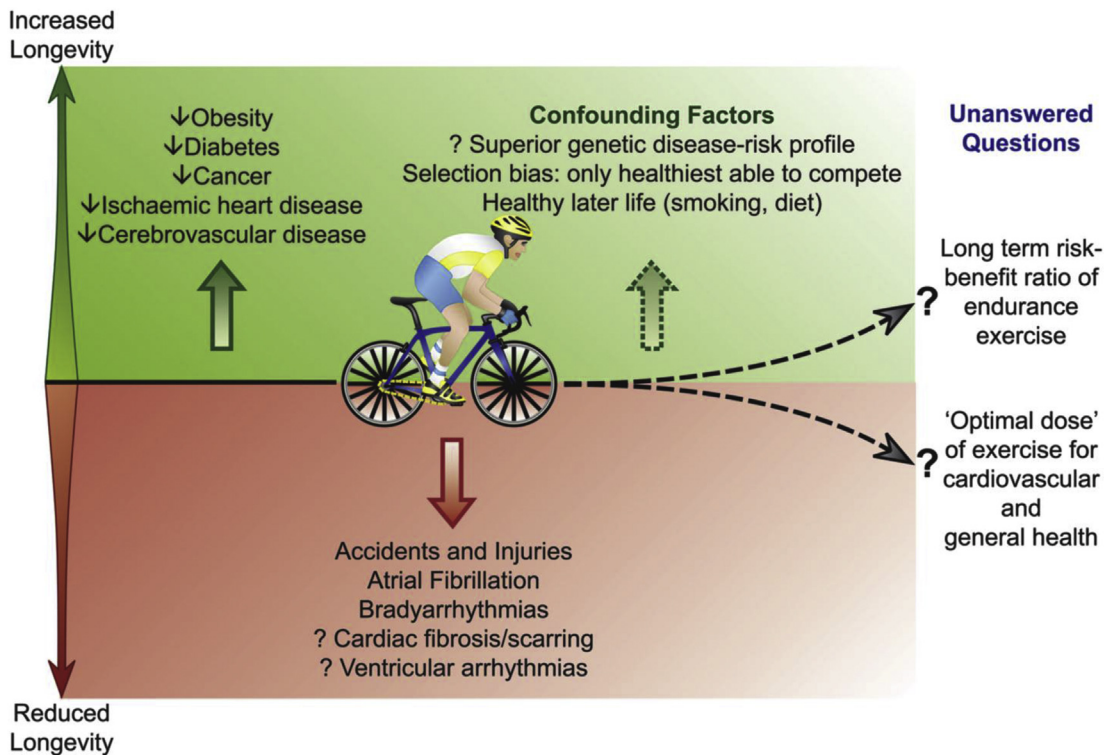


Fig. 1. Potential effects of endurance sport on longevity. (From Zaidi A, Sharma S. Reduced mortality in former Tour de France participants: the benefits from intensive exercise or a select genetic tour de force? *Eur Heart J* 2013;34(40):3106–8.)

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