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Physical Activity in the Prevention of Atherosclerosis

Zhi-Ping Liu*

Department of Internal Medicine, Cardiology Division, UT Southwestern Medical Center, Texas, USA

***Corresponding author:** Zhi-Ping Liu, Department of Internal Medicine, Cardiology Division, UT Southwestern Medical Center, Texas, USA; E-mail: ZhiPing.Liu@UTSouthwestern.edu

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Abstract

The link between physical activity and CHD was first established in the early 1950s and since this time population studies have consistently found high levels of physical activity to be associated with reduced risk of CHD morbidity and mortality. Reports evaluating the results of several populations studies have concluded that inactive individuals are about twice as likely to develop CHD as their active counterparts.

Keywords: CHD; Population; Heart; Physical activity

Introduction

The sedentary lifestyle prevalence is rising rapidly. The level of risk associated with sedentary lifestyle is comparable to that conferred by hypertension, smoking or high serum cholesterol concentrations and on the basis of this evidence the American Heart Association has highlighted physical inactivity as an independent risk factor for cardiovascular disease [1]. Some studies have shown that lifestyle modification and physical activity intervention are as effective as a structured exercise program in improving physical activity, cardiorespiratory fitness, and blood pressure.

Description

An inverse association between physical fitness and CHD morbidity and mortality has similarly been reported. Increases in level of physical activity or fitness are associated with reduction in CHD, suggesting that unfit or sedentary individuals can improve their risk profile by starting an exercise program [2]. In both men and women, there is an inverse relation between the level of physical activity and the incidence of cardiovascular disease, and this relationship persists after control for other risk factors. Moderately vigorous exercise resulted in a substantial reduction in mortality from all causes by 23% and from CHD by 41% compared with sedentary classmates. Maintaining or increasing physical activity level in late middle age was associated with a reduction in mortality rates, and light activities appeared to be sufficient to produce this benefit in older men.

Among patients with established cardiovascular disease, mortality is lower among those who participate in an exercise program than among those who do not. Lemaitre et al. have shown that postmenopausal women in such a program had reduced the risk of myocardial infarction by 50% with modest leisure-time energy expenditures, equivalent to 30 to 45 minutes of walking for exercise three times a week [3]. Furthermore, the British Regional Heart Study concluded that light or moderate activity in men with established CHD is associated with lower risk of all-cause mortality. Participating in regular physical activity more than three days per week resulted in fewer coronary risk factors; even those who engaged in physical activity once a week had fewer risk factors than sedentary individuals.

It has been shown that the beneficial effects of exercise (i.e., higher concentrations of HDL cholesterol and lower adiposity, triglyceride concentrations, ratio of total cholesterol to HDL cholesterol, and estimated 10-year risk of coronary heart disease) appear to increase with distances run of up to at least 80 km per week. Recognising the potential importance of regular physical activity in the prevention of CHD, the American college of sports medicine and the centres for disease control and prevention recommended 30 minutes or more of moderate-intensity physical activity on most days of the week and these recommendations were emphasized [4].

The mechanisms by which physical activity/physical fitness attenuate CHD risk have not been fully elucidated, but are likely to involve changes in lipid and lipoprotein metabolism. Individuals who regularly exercise possess lipoprotein profiles consistent with a low risk of CHD, and typically having HDL cholesterol concentrations that are 20-30% higher than untrained individuals as well as lower TG concentrations in the fasting state. In particular, there appears to be a dose-response relationship between the amount of exercise performed and HDL cholesterol concentration [5].

Promoting moderate physical activity and avoiding sedentary behaviour needs to remain a public health priority given the numerous health benefits including its association with subclinical atherosclerosis. Thus, interventions focused on cardiovascular health can better help people achieve the associated health benefits by promoting a more focused message of 150 min of moderate aerobic activity per week and avoiding TV sitting for more than 3 h/day or total sitting for more than 8.5 h/day. Future research should continue to examine how the physical activity profile (both activity levels and sitting time) can impact other health outcomes such as coronary heart disease events and how genetics may play a role in these relationships.

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