REVIEW

The impact of regular exercise in physiological regulation: mini review

Onur Oral[1], Pınar Tatlibal[2], I. Banu Ayca [3], Cemil Tatlibal [4]

[1] Ege University, Faculty of Sports Sciences, Izmir, Turkey, [2] Dokuz Eylul University Necat Hepkon Faculty of Sports Sciences, Izmir, Turkey, [3] Marmara University, Faculty of Sport Sciences, Department of Sports Health Sciences, Istanbul, Turkey, and [4] Celal Bayar University, Faculty of Sports Sciences, Manisa, Turkey

ABSTRACT

With a better understanding of the importance and necessity of physical activity for health all over the world, a more active lifestyle and regular exercise have been adopted by large masses of people. And thus the habit of regular exercise has been one of the important reasons for reducing the incidence of chronic diseases such as obesity, cardiovascular diseases, hypertension, diabetes, depression, and osteoporosis.

It is everyone's dream to be healthy and fit throughout life. In line with this goal, many factors can be mentioned in life to maintain health and be healthier, but among all these factors, adequate and balanced nutrition and regular physical activity habits are of great importance for a healthy life.

Along with adequate and balanced nutrition, exercise is critical to the proper functioning of the body and the prevention and treatment of obesity. Exercise is important for the development of muscle mass and the healthy functioning of the cardiovascular (heart and vascular) system. However, being physically active and maintaining regular exercise habits as a way of life is also important for the protection and development of health.

Keywords: exercise, physiological regulation, active lifestyle, wellness

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INTRODUCTION

Physical activity refers to any bodily movement produced by the contraction of skeletal muscle that increases energy expenditure above a basal level. In the Guidelines, physical activity generally refers to the subset of physical activity that enhances health. An exercise is a form of physical activity that is planned, structured, repetitive, and performed intending to improve health or fitness. Although all exercise is physical activity, not all physical activity is exercise [1]. Virtually everyone can benefit from becoming more physically active. Numerous systematic reviews of the literature have supported the importance of routine physical activity and/or

exercise participation for the primary and secondary prevention of diseases of the cardiovascular system (in particular) and many other chronic medical conditions [2]. Individuals engaged in PA present lower incidence rates of coronary heart disease, type 2, diabetes mellitus, hypertension, some cancers, and osteoporosis [3,4]. Regular physical activity and/or exercise participation are thought to be of benefit for more than 25 chronic medical conditions [5-8].

A recent systematic review and meta-analysis of 14 studies (from six prospective cohorts) revealed that running participation was associated with a 27, 30, and 23%, respectively, reduced risk of all-cause-, cardiovascular-, and cancer-related mortality. Importantly, very small doses of running (i.e., ≤1 time a week, <50min a week, <6 mph, <500 MET-min/week) resulted in significant all-cause mortality benefits, with no evidence of further mortality benefits with increasing amounts of running [9]. The benefits of physical activity and exercise provide positive health effects for people of all age groups when applied in the required amount and time. Also, there is a general belief that physical activity and exercise have positive effects on mood and anxiety and a great number of studies describe an association between physical activity and general well-being, mood, and anxiety [10]. The aim of this study is to the physiological positive effects of physical activity and exercise.

DISCUSSION

Regular physical activity is one of the most important things people can do to improve their health. Moving more and sitting less have tremendous benefits for everyone, regardless of age, sex, race, ethnicity, or current fitness level. Physical activity plays in many health outcomes: All-cause mortality; Diseases such as coronary heart disease, stroke, cancer at multiple sites, type 2 diabetes, obesity, hypertension, and osteoporosis; Risk factors for disease, such as overweight or obesity, hypertension, and high blood cholesterol; Physical fitness, such as aerobic capacity and muscle strength and endurance; Functional capacity, or the ability to engage in activities needed for daily living; Brain health and conditions that affect cognition, such as depression and anxiety, and Alzheimer's disease; and Falls or injuries from falls [1].

Regular physical exercise is part of a healthy lifestyle, with multiple cross-sectional studies consolidating reduced overall risk of cardiovascular diseases and cardiac events associated with habitual or leisurely physical exercises [11,12]. Wilson et al. recently reviewed the basic science behind the cardiovascular benefit of exercise, suggesting functional, structural, cellular, and molecular adaptations in the heart in response to exercise. Considering how much and how intense exercise should be, the authors concluded that there is no lower exercise threshold for cardiovascular benefits to be seen, signifying that 'some exercise is better than none [13]. Hu et al. [14] and the more recent work from Cooper Center for Longitudinal Study [15,16] in 2017 demonstrated the

protective association of physical activity against heart failure (HF) risk across all body mass index ranges and independent of the presence of cardiac and non-cardiac co-morbidities.

Although most national guidelines recommend that cancer survivors meet the public health guidelines for physical activity, exercise prescription is nuanced and requires consideration of many factors to positively and safely impact individuals with a cancer diagnosis [17,18]. In general, findings demonstrate an overall positive benefit of exercise interventions among a variety of cancer types using various forms of movement-based exercise. A general trend toward improved outcomes was noted when exercise was conducted in a supervised setting [19-23].

The prevalence of type 2 diabetes increases with decreasing physical activity and increasing obesity [24]. The molecular mechanisms of glucose uptake during exercise are independent of insulin. Therefore, the decrease in serum insulin level does not affect the glucose uptake of the muscles from the circulation [25]. The improvement in the effect of insulin at the beginning of the exercise is due to an adaptation mechanism as a result of exercise, independent of weight loss. Both adaptations and weight loss are thought to be effective in long-term recovery [26]. Some studies have found a 35% increase in insulin sensitivity and improvement in glucose tolerance in obese and impaired glucose tolerance populations after exercise over 50 minutes for 7 consecutive days, with a maximum heart rate reserve (MHRR) of 70-75% [27,28].

Hypertension is a major risk factor for cardiovascular disease (CVD) and mortality [11,12] with a prevalence of ~40% worldwide [29]. A network meta-analysis reported that the blood pressure (BP)-lowering effect of aerobic exercise is similar to antihypertensive medications [30]. Lin et al. showed that physical activity counseling (PAC) programs associated with dietary interventions can reduce 2 mmHg of systolic and 1.4 mmHg of diastolic BP in adults with CVD risk factors [31]. Farinatti et al. found that 8 months of a home-based PAC decreased 4 mmHg of systolic BP in middle-aged women with hypertension [32]. Bravata et al. showed that a pedometer-measured increase in physical activity of ~2000 steps per day was associated with a 3.8 mmHg decrease in systolic BP [33]. Moreau et al. found a strong correlation ($r = 0.75$) between the reduction in systolic BP following 24 weeks of a walking-based intervention and the baseline BP levels of the pre-hypertensive and hypertensive postmenopausal women [34].

Motl et al. (2004) reported that naturally occurring changes in physical activity are inversely related to depressive symptoms during early adolescence [35]. In a sample of 2,548 adolescents and young adults, we recently described that subjects with regular physical activity had a substantially lower overall incidence of any and comorbid mental disorders after 4 years and a lower incidence of somatoform-, dysthymic- and some anxiety disorders [36].

The beneficial effects of physical activity go beyond skeletal muscle and involve adaptations in other organs. Exercise causes changes in the brain at the anatomic, cellular, and molecular levels by inducing a cascade of cellular and molecular processes that promote different physiologic phenomena, including angiogenesis, neurogenesis, synaptogenesis, and stimulation of neurotrophic factors that enhance learning, memory, and brain plasticity [37,38,39,40]. A meta-analysis that included 16 studies with more than 160,000 participants found a 45% reduction in the risk of developing Alzheimer's disease due to the regular practice of physical activity (hazard ratio = 0.55, 95% confidence interval: 0.36, 0.84, p = 0.006) [41]. Exercise has important modulatory effects on immune function [42]. Systemically, physical exercise has been shown to have a positive effect on markers of inflammation, and recently those effects have been extended to the central nervous system [43]. Physical inactivity contributes to about 5 million deaths in the world each year from noncommunicable diseases [44]. The inverse relationship between a physically active life and the risk of suffering cognitive decline is widely documented [45] and aerobic exercise training has been the most extensively used option for the study of the effect of physical activity in alleviating the negative impact of aging in cognitive function [45,46].

For substantial health benefits, adults should do at least 150 minutes (2 hours and 30 minutes) to 300 minutes (5 hours) a week of moderate intensity, or 75 minutes (1 hour and 15 minutes) to 150 minutes (2 hours and 30 minutes) a week of vigorous-intensity aerobic physical activity, or an equivalent combination of moderate- and vigorous-intensity aerobic activity. Preferably, aerobic activity should be spread throughout the week. Additional health benefits are gained by engaging in physical activity beyond the equivalent of 300 minutes (5 hours) of moderate-intensity physical activity a week. Adults should also do muscle-strengthening activities of moderate or greater intensity that involve all major muscle groups on 2 or more days a week, as these activities provide additional health benefits [1]. The scientific evidence continues to build—physical activity is linked with even more positive health outcomes than we previously thought. And, even better, benefits can start accumulating with small amounts of, and immediately after doing, physical activity. Today, about half of all American adults—117 million people—have one or more preventable chronic diseases. Seven of the ten most common chronic diseases are favorably influenced by regular physical activity [1].

CONCLUSION

It has been observed that weight problems have become a global epidemic disease due to changing dietary habits and insufficient physical activity all over the world in recent years. All individuals, both developed and developing countries, are facing a rapidly increasing obesity crisis.

Obesity and overweight are known to prepare the ground for serious health risks and various metabolic problems. Risk of cardiovascular (heart and vascular system)

disease, type 2 diabetes (diabetes), metabolic syndrome, musculoskeletal disorders such as osteoarthritis and some cancers (endometrial, breast, and colon), and depression, obesity, and overweight problem that can often occur. known as health problems.

In addition to having a healthy life, regular exercise stands out as an activity that contributes to a healthy life to prevent the occurrence of some metabolic problems that individuals may experience over the years or by providing treatment. Among the metabolic problems that threaten health, cardiovascular diseases are among the most common problems.

The incidence of heart diseases in the general population tends to increase more than in the past, due to a sedentary, sedentary life and associated excess weight and obesity. To cope with this problem, in recent years, it is a very good choice to acquire regular exercise habits to spare more time for physical activity and to reduce the increased blood cholesterol levels, which are the main risk factors for heart disease.

Starting from the fact that exercise is an indispensable factor to be healthy at any age, incorporating physical activity into daily habits will be a very positive step toward a healthy life.

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Corresponding author: **Onur Oral,** E-mail: onur.oral@ege.edu.tr