



Review

Physical activity and autoimmune diseases: Get moving and manage the disease



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ABSTRACT

Physical activity, by definition, is any skeletal muscle body movement that results in energy expenditure. In the last few decades, a plethora of scientific evidences have accumulated and confirmed the beneficial role of physical activity as a modifiable risk factor for a wide variety of chronic diseases including cardiovascular diseases (CVDs), diabetes mellitus and cancer, among others. Autoimmune diseases are a heterogeneous group of chronic diseases, which occur secondary to loss of self-antigen tolerance. With the advent of biological therapies, better outcomes have recently been noted in the management of autoimmune diseases. Nonetheless, recent research highlights the salient role of modifiable behaviors such as physical inactivity on various aspects of the immune system and autoimmune diseases. Physical activity leads to a significant elevation in T-regulatory cells, decreased immunoglobulin secretion and produces a shift in the Th1/Th2 balance to a decreased Th1 cell production. Moreover, physical activity has been proven to promote the release of IL-6 from muscles. IL-6 released from muscles functions as a myokine and has been shown to induce an anti-inflammatory response through IL-10 secretion and IL-1 β inhibition. Physical activity has been shown to be safe in most of autoimmune diseases including systemic lupus erythematosus (SLE), rheumatoid arthritis (RA), multiple sclerosis (MS), inflammatory bowel diseases (IBD), as well as others. Additionally, the incidence of RA, MS, IBD and psoriasis has been found to be higher in patients less engaged in physical activity. As a general trend, patients with autoimmune diseases tend to be less physically active as compared to the general population. Physically active RA patients were found to have a milder disease course, better cardiovascular disease (CVD) profile, and improved joint mobility. Physical activity decreases fatigue, enhances mood, cognitive abilities and mobility in patients with MS. In SLE patients, enhanced quality of life and better CVD profile were documented in more physically active patients. Physically active patients with type 1 diabetes mellitus have a decreased risk of autonomic neuropathy and CVD. Both fibromyalgia and systemic sclerosis patients report decreased disease severity, pain, as well as better quality of life with more physical activity. Further, SSc patients improve their grip strength, finger stretching and mouth opening with increased level of exercise. The purpose of this paper is to review the clinical evidence regarding the safety, barriers to engagement, and impact of physical activity on autoimmune diseases.

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1. Introduction

Physical activity is defined as any body movement that is produced by skeletal muscular action that leads to energy consumption. “Physical activity” is often a term used interchangeably with the term “exercise”, yet there are important differences. Exercise can be defined as a planned, structured, and repetitive physical activity [1]. Physical inactivity is one of the most prevalent modifiable risk factors for acquiring disease worldwide [2]. It is the fourth leading risk factor for global mortality and is responsible for an estimated 13.4 million disability-adjusted life-years worldwide [2]. Physical activity levels have been shown to correlate with many chronic diseases including type 2 diabetes mellitus, cardiovascular disease, and metabolic syndrome [3].

An autoimmune disease develops when the immune system fails to recognize self from non-self and mounts an immunologic response damaging its own tissues [4,5]. The etiopathogenesis of autoimmune

diseases is not completely understood, but complex interactions between genetic and environmental factors including lifestyle behaviors have been postulated to play a role in disease etiology [6–9]. Pharmacological therapies have been shown to be valuable in enhancing outcome and prognosis [10]. Research suggests that modifiable behaviors such as physical inactivity may be targeted to reduce the incidence as well as improve the outcome of these diseases [11,12].

Despite the widely known favorable effects of physical activity on our health, we still lack a thorough understanding of the immunologic effects and influence on autoimmune diseases. The goal of this review is (a) to summarize the impact of physical activity on the immune system, (b) to investigate the role of physical activity in reducing the incidence of autoimmune diseases (Table 1) (c) to discuss the perceived barriers against engagement in physical activity (d) to examine the impact of physical activity on the many manifestations of autoimmune diseases (Table 2).

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