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The Role of Sports Medicine in Managing and Preventing Chronic Diseases

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Abstract: Sports medicine, traditionally focused on injury prevention and athletic performance, has evolved to play a significant role in managing and preventing chronic diseases. With lifestyle-related chronic conditions on the rise globally, the intersection of sports medicine and preventive healthcare offers promising avenues for promoting long-term health. Physical inactivity is now the fourth leading independent risk factor for death caused by non-communicable chronic disease. Although there have been efforts directed towards research, education and legislation, preventive efforts have been meager relative to the magnitude of the problem. The disparity between our scientific knowledge about chronic disease and practical implementation of preventive approaches now is one of the most urgent concerns in healthcare worldwide and threatens the collapse of our health systems unless extraordinary change takes place. The authors believe that there are several key factors contributing to the disparity. Reductionism has become the default approach for healthcare delivery, resulting in fragmentation rather than integration of services. This, in turn, has fostered a disease-based rather than a health-based model of care and has produced medical school curricula that no longer accurately reflect the actual burden of disease. Trying to 'fit' prevention into a disease-based approach has been largely unsuccessful because the fundamental tenets of preventive medicine are diametrically opposed to those of disease-based healthcare. A clinical discipline within medicine is needed to adopt disease prevention as its own reason for existence. Sport and exercise medicine is well positioned to champion the cause of prevention by promoting physical activity. This article puts forward a strong case for the immediate, increased involvement of clinical sport and exercise medicine in the prevention and treatment of chronic disease and offers specific recommendations for how this may begin.

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Introduction

Chronic diseases, such as cardiovascular disease, diabetes, obesity, and certain cancers, are among the leading causes of morbidity and mortality worldwide. According to the World Health Organization (WHO), non-communicable diseases (NCDs) account for nearly 71% of global deaths, largely due to modifiable risk factors such as physical inactivity, poor nutrition, and smoking. As a field that emphasizes physical fitness and preventative care, sports medicine has significant potential in addressing these modifiable risk factors and promoting overall health (Malek, 2024; Babiker et al., 2024). This article explores how sports medicine interventions can assist in both the prevention and management of chronic diseases. Regular physical activity is one of the most effective ways to prevent chronic diseases. Physical inactivity is associated with a wide range of health risks, including hypertension, elevated cholesterol levels, insulin resistance, and obesity. Sports medicine practitioners, including sports physicians, physical therapists, and exercise physiologists, are uniquely positioned to prescribe tailored exercise programs that reduce the risk of developing these conditions. A study by Warburton et al. (2006) highlights that moderate-to-vigorous exercise can reduce the risk of cardiovascular disease by up to 50% and lower the risk of developing diabetes by as much as 40%. Through individualized exercise prescriptions, sports medicine professionals are able to account for an individual's current health status, physical capabilities, and risk factors, making it possible to safely introduce physical activity to those with varying levels of fitness. Cardiovascular disease (CVD) is one of the most prevalent chronic diseases globally. For individuals with CVD, structured exercise and lifestyle interventions offered through sports medicine can be life-changing. Cardiac rehabilitation programs, often led by sports medicine professionals, include supervised exercise, nutritional counseling, and lifestyle coaching that help patients manage their cardiovascular health. The benefits of cardiac

rehabilitation extend beyond physical health, providing patients with psychological support to improve adherence and reduce anxiety related to their condition. Research by Anderson et al. (2016) demonstrated that cardiac rehabilitation reduces cardiovascular mortality by 26% and decreases hospital readmissions by 18% among individuals with CVD. Sports medicine's role in CVD management emphasizes supervised exercise programs that are carefully designed to optimize cardiovascular health without overloading the patient's system, thereby improving long-term outcomes.

Type 2 diabetes, a condition closely linked with sedentary behavior and obesity, is one of the fastest-growing chronic diseases worldwide. The American Diabetes Association (ADA) recommends regular exercise as a cornerstone of diabetes prevention and management. Physical activity enhances insulin sensitivity, improves blood glucose control, and reduces the risk of cardiovascular complications associated with diabetes. Sports medicine professionals are equipped to design safe and effective exercise programs for individuals with diabetes, taking into account factors such as glycemic control, medication, and comorbidities. According to Sigal et al. (2006), regular exercise can reduce HbA1c levels (a marker of blood glucose control) by an average of 0.66% in individuals with type 2 diabetes. These benefits extend to pre-diabetic populations, where regular physical activity has been shown to prevent the progression to diabetes by 58% in high-risk individuals (Knowler et al., 2002). The combination of exercise, dietary modifications, and patient education offered by sports medicine practices provides a comprehensive approach to diabetes management. Obesity is a major risk factor for many chronic diseases, including heart disease, diabetes, and certain cancers. Exercise prescription and lifestyle counseling provided by sports medicine professionals can play a critical role in both preventing and managing obesity. Sports medicine offers a structured approach to physical activity that helps individuals achieve and maintain a healthy weight, ultimately reducing the risk of obesity-related chronic conditions. In a randomized controlled trial by Ross et al. (2000), participants who engaged in a structured exercise program demonstrated significant reductions in abdominal fat, a major contributor to metabolic syndrome and cardiovascular disease. Sports medicine practitioners work with dietitians and other healthcare providers to provide holistic weight management strategies that emphasize sustainable lifestyle changes rather than temporary solutions. Sports medicine has also contributed to the prevention of certain cancers, such as breast and colon cancer, by promoting physical activity as a preventive measure. Physical activity is associated with a 20-40% reduction in the risk of breast cancer and a similar reduction for colon cancer, according to the American Cancer Society (ACS). For cancer survivors, exercise interventions facilitated by sports medicine professionals help mitigate the side effects of treatment, such as fatigue, loss of muscle mass, and depression, enhancing quality of life.

A study by Courneya et al. (2003) found that breast cancer survivors who engaged in regular exercise experienced reduced cancer recurrence and mortality rates. Sports medicine interventions for cancer patients and survivors focus on gradual, supervised exercises that help rebuild strength, improve mood, and enhance overall well-being. The role of sports medicine in chronic disease prevention is enhanced through collaboration with primary care and preventive medicine providers. Primary care physicians may refer patients to sports medicine professionals to develop individualized exercise and lifestyle plans that prevent chronic disease or aid in its management. This interdisciplinary approach ensures that patients receive a continuum of care that prioritizes prevention, early intervention, and lifestyle modification. The American College of Sports Medicine (ACSM) promotes the "Exercise is Medicine" initiative, which encourages healthcare providers to integrate physical activity as a standard part of chronic disease prevention and management. This initiative exemplifies the collaborative potential of sports medicine and primary care in creating a healthier society.

Materials and Methods

In order to "investigate the associations of sports participation with physical fitness, PA, cognition, cardiovascular health, and quality of life in youth with CDPD," we employed a cross-sectional prospective design. This article explores the links between physical activity (PA) and health-related fitness in young people with chronic disease-related physical dysfunction (CDPD).

People with CDPD and a diagnosis of cardiovascular, pulmonary, musculoskeletal, metabolic, or neuromuscular illness were eligible to participate in this study if they were ambulatory and aged 8–19 years. Table 1 displays the patients' characteristics, including age, sex, medical diagnosis, and identification of sports participation and nonsport. Every participant, including minors whose parents were compelled to do so by Dutch law, gave their written informed consent.

Results and Discussions

Young individuals engaged in sports had higher activity levels compared to their non-participating counterparts on both school days and weekends. The

average total minutes of bicycling and running were considerably greater for the SG compared to the NSG (Table 1). The total activity time (walking, bicycling, and running) was considerably greater in the SG than in the NSG. The duration of sedentary behavior (sleeping and sitting) did not exhibit significant differences between the groups on both weekends and school days (Table 1).

Table 1. Physical activity among groups

Daily physical activity (minutes)	Non sport group	Sport group
Lying	5.1 + 4.9	3.5 + 1.9
Sitting	613.3 + 67.9	557 + 55.3
Standing	111.3 + 33.3	123 + 21.1
Active time (walking–cycling–running)	145.4 + 40.0	171 + 59.3
Walking	109.0 + 31.1	132 + 41.3
Cycling	13.5 + 19.3	19.3 + 11.9
Running	5.3+ 2.3	7.9 + 3.2

There is an urgent necessity for clinical sport and exercise medicine to broaden its engagement and enhance its proficiency in chronic disease prevention and management. Sports and exercise medicine has four decades of expertise in exercise medicine, rehabilitation, and human performance. Significant attention has been devoted to the management of athletes and those with musculoskeletal disorders (Khan, 2011). There is a growing recognition of the necessity for implementation and dissemination research pertaining to public health and health promotion (Finch, 2011) The knowledge, skills, and innovative leadership are transferable from the performance-oriented population to the prevention of chronic diseases and the preservation of good health. Sports and exercise medicine prioritizes functional capacity rather than disease diagnosis. In the field of sports and exercise medicine, critical inquiries have been: 'When may I resume athletic activities?' and 'How may I expedite my return to fitness and improvement?' These inquiries pertain to function. These inquiries necessitate transcending diagnosis and concentrating on functional capacity evaluation to comprehend the effects of the diagnosis on the patient's physical and daily activities. Numerous advancements in sports and exercise medicine have emerged from efforts to address these inquiries (Blatter and Dvorak, 2010).

Sports participation increased active time (Table 2). Age negatively correlated with active time. Students with poor gait patterns spent less time exercising. The cycling and jogging were positively connected with sports participation. Bicycling negatively correlated with motoric gait function, while running negatively correlated with sex and age.

Table 2. Associations of physical activity in young perople with chronic diseases

Mean physical activity in minutes per day	**Regression coefficient (SD)**	**P-Value**	**R^2**
Cycling			
Constant	40. 1± 63.907	0.03*	
Sports involvement	21.65 ±33.15	0.001*	
Motoric	23.57 ±43.33	0.07*	0.073
Running			
Constant	13.11 ±11.733	0.003*	
Sports involvement	3.155 ±50.343	0.009*	
Sex	19.65 ±30.93	0.04*	
Age	15.711 ± 41.79	0.00*	0.113

Sports participation was positively correlated with bicycling, while age was negatively correlated. The culture of sport and exercise medicine is multidisciplinary, integrated, and holistic, making it perfectly equipped to address preventative and rehabilitative medicine through a comprehensive approach (Hellénius and Sundberg, 2011). For forty years, sport and exercise medicine practitioners have been mandated to address the 'whole patient', necessitating collaboration with medical specialties and other professions, including athletic training, physical therapy, nutrition, and sport science, as well as coaches, administrators, sport agents, the media, and legal entities.

Sports and exercise medicine is advantageous because to its strong association with organized sports, which significantly impact various parts of society. Utilizing this influence is a distinctive advantage that clinical sport and exercise medicine contributes to chronic illness prevention and management. FIFA founded the F-MARC (FIFA Medical Assessment and Research Centre) in 1994 to advocate for football as a health-promoting endeavor. F-MARC's innovative campaign 'Football for Health' – '11 for Health' effectively integrates the popularity of soccer with curricular reforms aimed at enhancing health in public schools across its 208 member nations, many of which are developing countries. One hundred thirty-seven The effective statewide implementation of for Health in all schools in Mauritius exemplifies the reciprocal relationship between sports and medicine. Exercise is Medicine, coordinated by the American College of Sports Medicine, exemplifies a comprehensive preventative campaign addressing many entrance points, from education to advocacy (Blatter and Dvorak, 2010) The Swedish textbook on exercise prescription for various chronic conditions has recently been translated into English (Fuller et al. 2010; Jonas and Phillips, 2009).

Ultimately, sports and exercise medicine are at the forefront. The recent trend of renaming 'sports medicine' to 'sport and exercise medicine' is evident in organizations such as the American College of Sports Medicine and its Exercise is Medicine program, as well as the British, Canadian, Australian, and German sports medicine societies, which have incorporated the terms 'exercise' or 'prevention' into their names.

Conclusion

Sports medicine plays a vital role in managing and preventing chronic diseases through evidence-based exercise prescriptions, rehabilitation, and lifestyle interventions. By targeting modifiable risk factors such as physical inactivity and obesity, sports medicine contributes to long-term health outcomes and reduces the burden of chronic diseases. Future research should focus on optimizing exercise protocols for chronic disease patients, exploring the physiological mechanisms behind exercise's preventive effects, and promoting interdisciplinary collaboration to further integrate sports medicine into preventive healthcare.

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