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Physical Inactivity: A Behavioral Disorder in the Physical Therapist's Scope of Practice

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In health, the gold standard is a state of complete physical, mental, and social well-being.[1] This state is weakened by physical inactivity, which involves a higher risk of cardiovascular disease,[2] hypertension,[3] diabetes,[2,4] cancer,[5] depression,[6] and obesity.[7] Moreover, 6% to 10% of all deaths from non-communicable diseases worldwide can be attributed to physical inactivity.[8] These adverse effects of physical activity provide evidence that physically active individuals are closer to the gold standard of health than inactive individuals. Therefore, physical activity – not inactivity – should be the standard reference behavior. In this framework, physical inactivity is a clinically significant disturbance in an individual's behavior, which is the definition of a behavioral disorder.[9] Therefore, physical inactivity should be treated as such.

[H1] Epidemiology

A recent study involving 1.9 million participants who represented 96% of the world's population showed that more than a quarter of all adults are physically inactive, which represents more than 1.4 billion adults.[10] The prevalence of physical inactivity is highest in Latin America, the Caribbean, high-income Western countries, and high-income Asia Pacific. These data also confirmed previous findings[11] demonstrating higher levels of physical inactivity in women than in men, with some of the biggest differences in south and central Asia, the Middle East, and north Africa. While multiple articles mention a pandemic of physical inactivity,[11,12] the global prevalence of physical inactivity was stable between 2001 and 2016 with an average change across the 65 countries of less than 0.01%.[10] Yet, wide variations in physical inactivity were observed across countries. Levels of physical inactivity were increasing in 37 countries, whereas they were decreasing in 28 countries. The largest increases (>15%) occurred in high-income countries such as Germany and Singapore, while the largest decreases (>15%) occurred in east and southeast Asia.

[H1] Physical Inactivity Disorder

During the past two decades, society has encouraged people to be more physically active.[8,13] As a result, most individuals are now cognizant of the positive effects of regular physical activity and have the intention to be active.[14] Yet, this intention is not sufficient alone, as engagement in physical activity is often not executed.[15] The World Health Organization (WHO) defines impulse control disorders, a specific type of behavioral disorder, as "the repeated failure to resist an impulse, drive, or urge to perform an act that is rewarding to the person, at least in the short-term, despite consequences such as longer-term harm to the individual."[9] Recent studies have shown that individuals with stronger impulses toward physical inactivity fail to implement their intention to be physically active because of a weaker ability to control these impulses.[16,17] Therefore, physical inactivity can be characterized as the repeated failure to resist an impulse, drive, or urge to minimize energy expenditure,[18] which matches the WHO definition of an impulse control disorder. Two meta-analyses examining the effectiveness of exercise-related interventions based on motivation theories showed small effect sizes and high levels of unexplained variance regarding intervention outcomes.[19,20] Therefore, the development of new interventions targeting the automatic evaluation of exercise-related stimuli to influence decision-making and behavior regarding physical activity may be a better approach. Indeed, the effect of such interventions has already shown its potential in other behavioral disorders such as alcohol use disorders.[21]

[H1] Diagnosis

From a health perspective, physical inactivity, also named insufficient physical activity,[10] is defined as the failure to meet the recommendations on physical activity for health. The latest recommendations from the WHO[22] and the US Department of Health and Human Services[23]

address multiple population groups. Preschool-aged children aged 3 to 5 years should be physically active throughout the day. Children and adolescents aged 6 to 17 should perform 60 min or more of moderate-to-vigorous physical activity daily. Throughout the week, adults aged 18 to 64 and older adults age 65 years and above should perform at least 150 min of moderate-intensity, or 75 min of vigorous-intensity aerobic physical activity, or an equivalent combination of moderate- and vigorous-intensity aerobic activity. They should also perform muscle-strengthening activities on 2 or more days a week. Pregnant and postpartum women should engage in at least 150 min of moderate-intensity aerobic activity a week. Adults with chronic conditions or disabilities, who are able, should follow the key guidelines for adults and perform both aerobic and muscle-strengthening activities. The inability to reach these recommendations, i.e., physical inactivity, can be diagnosed indirectly using self-report questionnaires and diaries, which could be used as screening tools, and directly using commercially available devices such as accelerometers, pedometers, and armbands.[24] Yet, a gold standard assessment of the physical inactivity disorder is still missing, which may partly explain the current absence of reimbursement for treating physical inactivity in the United States.

[H1] Etiology

Physical inactivity has shown to be related to multiple factors including genetics,[25] older age,[26] lower education,[26,27] lower cognitive resources,[27,28] poor neighborhood conditions,[26-28] ethnicity,[26] disadvantaged socioeconomic circumstances,[29] and weak impulse control.[16-18]

[H1] Pathophysiology

Physical inactivity disorder is associated with a loss of lean body mass, which is the result of a chronic imbalance between muscle protein synthesis and breakdown.[30] This imbalance can be exacerbated during the progression of aging (Figure) and lead to sarcopenia,[31] which is

characterized by progressive and generalized loss of skeletal muscle mass and strength. Sarcopenia is a major contributor to the risk of physical frailty, functional impairment, poor health-related quality of life, and premature death.[32] Physical inactivity disorder is associated with a reduced bone density,[33] which increases bone fragility and constitutes a risk factor for osteoporosis.[34] Physical inactivity disorder is associated with higher fat mass[35] and being overweight or obese.[7] Physical inactivity disorder is also a risk factor for cardiovascular disease[2], hypertension,[3] diabetes,[2,4] cancer,[5] and depression.[6]

[H1] Prognosis

Based on data from the National Institutes of Health–American Association of Retired Persons, adults who were consistently inactive throughout adulthood were at higher risks for all-cause, cardiovascular disease-related, and cancer-related mortality than physically active individuals.[36] Yet, increasing physical activity later in adulthood (40–61 years) was associated with a lower mortality risk that was similar to those associated with being physically active across the adult lifespan (15–61 years). These results suggest that midlife is not too late to begin engaging in physical activity for health.

[H1] Education and Rehabilitation

Physical therapists are experts in physical activity, defined as any bodily movement produced by skeletal muscles that requires energy expenditure – including activities undertaken while working, playing, carrying out household chores, travelling, and engaging in recreational pursuits.[37] This expertise should be used to help people reach the recommendations of physical activity to optimize their health and extend their life, no matter their age. Physical therapists should serve as primary educators regarding the idea that physical inactivity is a behavioral disorder resulting from multidimensional factors. Being cognizant of these factors, such as our

automatic attraction to energetic cost minimization,[17,18] is the first step towards a more active lifestyle. For instance, greater awareness regarding physical inactivity can lead to the development of cognitive or environmental strategies to counteract this automatic attraction. Physical therapists should also inform the public that being physically active[22,23] does not necessarily require specific exercise – a subset of physical activity that is planned, structured, and repetitive[37] – or doing sport – which involves competition. Walking in the street is also a physical activity. Individuals performing the least physical activity benefit most by even modest increases in moderate-to-vigorous physical activity.[23] Physical therapists should emphasize that clients cannot afford to miss out on this inexpensive path to a healthier life. Recommendations emphasize that moving more and sitting less will benefit nearly everyone.[23] Another central point to the rehabilitation of physical inactivity is to monitor the pleasure associated with different intensities of physical activity.[38] This pleasure is likely to foster longer engagement in the activity, especially when it is experienced at the end of the activity.[39] Additional research is required to build and implement more efficient rehabilitation programs to ensure patients receive comprehensive care aiming to cure a physical inactivity disorder. Physical therapists feel confident, more than physicians,[40] in giving general advice to patients on a physically active lifestyle and suggesting specific physical activity programs.[41] Yet, they also perceive some barriers to this comprehensive care including the lack of time, counselling skills, and reimbursement.[41]

[H1] Conclusion

Physical inactivity accurately matches the definition of a behavioral disorder, which emphasizes the necessity to provide care for physically inactive people. As movement specialists and primary care practitioners, physical therapists are key health professionals in preventing,

diagnosing, and rehabilitating this disorder. As such, they should define the gold standard for the assessment of the physical inactivity disorder. This gold standard will determine whether a physical inactivity disorder is severe enough to be qualified for reimbursement. Such reimbursement can result in the emergence of certified clinical specialists able to develop a greater depth of knowledge and skills related to physical inactivity.

Author Contributions:

Concept / idea / research design: M.P. Boisgontier, M.D. Iversen

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Disclosures

The authors completed the ICMJE Form for Disclosure of Potential Conflicts of Interest and reported no conflicts of interest.

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Figure caption

Typical quadriceps and hamstrings Magnetic Resonance Image of a 40-year-old triathlete (left panel), a 74-year-old sedentary man (middle panel), and a 70-year-old triathlete (right panel). Reprinted by permission of Taylor & Francis Ltd (http://www.tandfonline.com) from Wroblewski AP, Amati F, Smiley MA, Goodpaster B, Wright V. Chronic exercise preserves lean muscle mass in masters athletes. *The Physician and Sportsmedicine.* 2011;39:172-178.