

Is Exercise a Solution for Every Individual Living with Chronic Conditions?



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Opinion

The simple answer is probably ‘it depends!’ The outcomes experienced as a result of exercise varies depending on the expected outcome, the chronic condition, and how exercise is defined. In past decades, the public health messages have shouted from every rooftop that exercise is a corner stone to manage chronic conditions. We would argue that while this argument is correct from a general health perspective, however for some individuals their odds of achieving their health goals through engagement in exercise may not be as glorious as expected. In other words, a patient might experience some of the reported benefits of engagement in exercise, such as a reduction in blood pressure and improvement in glycemic control, but experience a lack of improvement in other areas, such as not returning to their desired weight.

Most agencies that provide recommendations for Type2 diabetes (T2D) prevention and treatment highlight regular exercise as one of the most important behavioral changes individuals with T2D can make to improve their condition. Typically, it is promoted that such improvements include enhanced glycemic control and protection against the onset of diabetes-related complications [1]. One such agency includes Diabetes Canada, who commends 150 minutes of moderate-to-vigorous aerobic activity in addition to two sessions of resistance exercise per week [2]. Similarly, the American College of Sports Medicine (ACSM) calls for obese individuals to perform a minimum of 150 minutes of moderate-to-vigorous intensity to expect modest weight loss [3]. While some health benefits associated with exercise are undeniable for the majority of the population, predicting the specific outcomes experienced has proven difficult [4]. Typically, improvements in cardiorespiratory fitness (CRF) will be the primary trigger for metabolic and functional improvements. However, despite seeming ubiquitous reports of the benefits associated with exercise, numerous findings exist indicating that some individuals do

not improve their CRF following an intervention [4-6]. These individuals have previously been termed ‘non-responders’. That said, our group investigated youth at risk of T2D and found a significant variability in metabolic response across changes in CRF. In other words, youth who change their CRF over 6-month intervention are the one who increase their health [7]. Recently alternative studies have attempted to eradicate the presence of exercise non-response through the modification of exercise parameters. For example, Ross et al. [8]. Investigated the effect of various combinations of walking-based activity volume and intensity with 121 obese participants over 24 weeks. The authors found that increasing exercise volume and intensity eliminated all non-responders based on CRF metrics, whereas lower volumes and intensities could not. Additionally, Montero & Lund [9] randomized participants into one of five exercise programs, each differing in the volume of exercise completed per week. The authors reported that those completing the highest volume of exercise had no trace of non-response. Meanwhile, groups completing lower volumes of exercise displayed a multitude of non-responders. The non-responders then progressed through a second training period with an increased volume, and found that doing so disposed of all non-response. The findings from these authors provide evidence that non-response to exercise may not truly exist, and that some individuals require higher exercise volumes or intensities to achieve desired health outcomes. Similar to the currently prevailing mindset, studies completed by Sénéchal et al. [10] and Church et al. [11]. Reported large heterogeneity in their participant abilities to enhance glycemic control in response to exercise programs. The rate of non-response in terms of the ability of exercise to benefit those with T2D has been estimated to be about 20% [12].

Moreover, are view completed by Bouchard et al. [13]. Found that some experience adverse metabolic effects to engagement in exercise, including are ported 8.3% of participants who

increased their fasting insulin concentrations, suggesting a decrease in insulin sensitivity or glucose metabolism efficiency. As evidence continues to mount showing that adaptations to current exercise programs, potentially through increases in the intensity and duration recommended by current exercise guidelines provided through agencies such as Diabetes Canada and ACSM, it may be time to reexamine the way in which exercise is prescribed to individuals. Alternatively, research should start investigating alternative strategies and combinations of exercise and lifestyle modifications to assist those who are currently described as non-responders.

One such strategy worth investigating may be the expansion of the current recommendation of 'exercise' for a set time each week, to observing how incorporating physical activity throughout a full day, every day can contribute to the treatment of chronic conditions. Focusing efforts exclusively on moderate-to-vigorous aerobic exercise that accounts for less than 5% of a full day [14] limits our understanding of how exercise and physical activity are potentially associated with metabolic and functional health benefits. Perhaps a comprehensive approach including all activities performed in a day, despite their mode or intensity, should be evaluated to truly understand the role of physical activity on metabolic and functional health. Chaput et al. suggested that the combined effects of different intensities and modes of activities extend beyond the individual contributions of each on health [14]. This was supported by other subsequent evaluations [15,16]. In addition, a large body of literature suggests that sedentary time must be considered to evaluate the importance of physical activities for health [17-21]. Recent epidemiological studies have shown that despite adherence to the physical activity guidelines, the risk of mortality and onset of cardiovascular disease increases with more than six hours of sitting per day [22,23]. However, a meta-analysis of one million participants completed by Ekelund et al. found that a high level of moderate intensity physical activity (>60 minutes per day) seems to eliminate the increased mortality risk associated with high volumes of sitting [24]. The importance of using a comprehensive approach to evaluate the association between total daily physical activity and health has been proposed in the past decade and has proved to be quite useful, especially in children [14,25,26]. Different modes and intensities of physical activity needs to be studied to understand the ideal combination that should be targeted to maximize metabolic and functional health benefits in adults.

Based on the literature presented above, it may be possible that adapting the approach to exercise and physical activity may lead to an increased volume of patients responding favorably, thus enhancing the number of those who identifying as 'responders'. The benefits of modifying the treatment in terms of intensity, mode, volume, or by adopting a more comprehensive, physical activity lifestyle approach has shown great promise thus far, but additional research remains necessary. While previous examination indicates that alterations to an unsuccessful

exercise training program may convert previous non-responders to responders, these studies focused mostly on fitness-based outcomes. Understanding the ability of enhanced training programs for those labeled as non-responders and understanding mechanism by which chronic diseases improvement is observed could re-establish exercise as a treatment option for those living with conditions such as T2D or obesity, thereby positively impacting the quality of life of additional patients. Based on the current literature, there is a need to identify these non-responding patients, and work with them to determine the most effective alterations to currently offered programs to help them respond. This could include a more individualized increase in intensity, duration, mode of activities, a combination of these variables, or a broader approach inclusive of all daily physical activity outcomes.

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