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Short Communication

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The short of breath and sweaty principle: Risk reduction therapies available to everyone

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Motivating others to incorporate exercise into lifestyle is both imperative and onerous. Despite the challenge of uptake, the compelling health benefits from exercise are not novel or bewildering. On angina pectoris, even in 1772, British physician William Heberden detailed how one of his patients took up sawing wood for half an hour every day and was "nearly cured" of his obesity (or corpulence) induced health problems [1]. In 1816, William Wadd who noted "the value of exercise consists… particularly…in cutaneous perspiration," accounted numerous exercise triumphs in reversing corpulence-induced health problems, including one sickly, obese man who reversed his disease by rowing a heavy boat across a lake daily, and another who improved his health mightily by running up a hill near his home every two hours [2]. In delivering evidence-based lifestyle medicine, what achievable, effective exercise modalities could be made available to nearly everyone? How can clinicians describe simple, measurable fitness aims for patients with type 2 diabetes mellitus (T2D), thus reducing both excuses and barriers?

A search of the medical literature from January 2020 to February 2021 elicited 3153 articles that addressed exercise duration and diabetes. Further limiting to randomized controlled trials or systematic reviews focused on A1c of HbA1c brought forth 10 studies that revealed exercise methods that anyone with even limited spare time, equipment, and exercise literacy could access.

A systematic review of randomized, controlled studies on long-term effects of exercise on glycemic control in people with T2D supported combined endurance + resistance training over one single exercise for HbA1c reduction (-1.5%) [3]. Training intensity trumped duration in metabolic improvement [3].

262 sedentary adults with T2D were randomized into nonexercised, resistance training, aerobic, and combined aerobic + resistance training groups. Aerobic + resistance training at 50 to 80% of maximum oxygen consumption improved HbA1c [-0.34%] to levels unachievable by aerobic or resistance training alone [4].

With higher-intensity resistance exercise, no unique equipment was needed to improve metabolic health in a randomized, double-blind controlled trial of 103 older adults with T2D randomized to receive either high-intensity, progressive resistance training on pneumatic resistance equipment (leg press, chest press, hip extension, etc) or sham (low-intensity, non-progressive) exercise 3 days weekly over 12 months [5]. Significant improvements (reductions in HbA1C [-0.38%] and insulin resistance) occurred only with high-intensity work, done on the same equipment used by the lower-intensity group [5].

Retrospective data from a 2,707-participant study found in adults at risk for T2D, short moderate-to-vigorous intensity exercises were more likely to lower HbA1c than low-intensity activities [6]. Higher-intensity episodes may contribute to adipose mRNA changes favoring long-term glucose control, and reductions in T2D complexity over time [6].

On the issue of prolonged sitting, moderate to vigorous exercise was associated with significant decreases in HbA1C (-0.11%) in a 3-year study on 489 participants looking at sedentary time, moderate to vigorous physical activity time, body weight and HbA1c [7]. Moderate to vigorous activity had a protective effect independent of sedentary time, suggesting those with sitting jobs may not be resigned to a grim destiny, but can benefit from making short fitness installments a habit [7].

Brief, 10-second intervals were manageable for patients with T2D, yielded better commitment, and improved HbA1c without adverse events in a 2020 randomized controlled trial on 44 men with T2D, studying the effects of modalities on HbA1c over ten weeks [8]. One group performed 10-20-30 training (repeated 10-second sprints followed by 30 and 20 seconds of low and moderate-intensity exercise, respectively) and one did

moderate-intensity continuous training. 10-20-30 training was superior at lowering HbA1c (-0.5%), decreasing visceral fat, and improving cardiovascular performance despite 42% less time commitment [8]. Also yielding lower time commitment, a 2019 systematic review and meta-analysis of 24 exercise trials, involving 962 patients with T2D, found that in patients with T2D, insulin levels and HbA1c were significantly decreased only with higher intensity exercise [9].

Exercise generating labored breathing and perspiration seemed to relate to better cardiovascular fitness, long-term exercise engagement, better HbA1c, less visceral fat, and had no adverse outcomes. Any exercise two or three times a day may improve post-meal glucose levels and lipid profiles [10,11]. Clinicians should simplify these findings and encourage patients to find any imaginable activity that would result in getting short of breath and sweaty. Skip rope, climb stairs, try a new gadget like a slam ball or body blade, go for a brisk walk, toss a medicine ball/tire/bag of dirt, use resistance bands or a rowing machine…find something.

For providers hesitant to recommend vigorous exercise, consider studying vigorous social networks (i.e. pickleball teams, table tennis in break rooms, swimming groups), noting which behaviors improve emotional, intellectual, social, and spiritual well-being; sleep and mood; interest in sex; stress relief; energy and stamina; and mental alertness [12]. Clinicians should not discourage vigorous intensity exercise without a sound clinical reason.

Benefits obtained from intense exercise cannot be replicated elsewhere yet the value of exercise with longer duration and less intensity should not be discounted. Cautiously disallow perfection from being the enemy of progress. For patients hesitant to get out of breath and sweaty in pursuit of health, who may otherwise forego exercise due to lack of perceived value, assure them that longer duration, lower intensity exercise is still a massive boon to health and should be pursued. In ancient times, Herodicus, the father of sports medicine, ordered a patient to walk from Athens to Megara (roughly twenty miles) with a strong injunction to walk back again as soon as he had touched the walls [2]. Longer duration exercise has immediate benefits, though may not be as sustainable as short bursts. As a note of caution, do not embark on this journey without living it out yourself. Any patient whose excuses have contributed to disease and misery can sniff out a fraud before the clinician opens the chart. In our practice, we often do something brief with the patient in the exam room to show that no matter the barriers, we can do it!

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