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Assisting the Novice in Lifestyle Change

Abstract: *The beginning of a lifestyle intervention is a sensitive time, as doing “too much too quickly” may stress the immune system, resulting in an increase in upper respiratory symptoms and, consequently, attrition. However, “too little too slowly” may not align with patients’ motivation to change and may also result in attrition. There is also evidence that early weight loss is predictive of long-term maintenance of goal weight. Health care providers are frequently presented with contradictory information on the best model to promote enduring lifestyle change. Best practice dictates that health care provider acknowledge their patients’ motivation to change and incorporate each individual’s goals in designing the lifestyle change intervention. Additional support and advice may be warranted at the beginning of an intervention to promote the patient’s health and avoid attrition.*

Keywords: immune function; obesity; weight loss; attrition

Exercise and Immune Function

The beneficial effects of participating in regular exercise training are multidimensional, with improvements in cardiovascular health, reductions in metabolic diseases and certain cancers, and the maintenance of mental health

The J-curve hypothesis describes the relationship between infection risk (especially from upper respiratory tract infections [URTIs]) and exercise. It suggests that compared to being sedentary, moderate exercise may decrease risk of URTI, while heavy exercise can increase infection risk.⁷ Hence, while exercise training programs

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and independence during aging.¹⁻⁵ As presented in the review by Davidson et al in this issue, there is also evidence that regular physical activity can enhance the immune system, resulting in improvements in inflammation-associated disorders, autoimmune disease, and decreasing the risk of infectious disease.⁶ Thus, improving immune function can be offered as an additional incentive for engaging in physical activity.

largely have a net positive impact on the immune system, individual exercise sessions may transiently suppress immune function, particularly when the exercise is arduous. When multiple exercise sessions are performed without sufficient recovery in between, this immunosuppression may accumulate and lead to an “open window” of increased infection risk.⁸ The open window theory has been offered as an explanation for the increased complaints of upper respiratory symptoms

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among athletes during periods of intense training and competition.^{9,10} However, as discussed by Davison et al, this concept may also have relevance for previously sedentary individuals first embarking on an exercise training program.⁶ Besides the inconvenience and discomfort associated with upper respiratory symptoms, illness could discourage the new exerciser from continuing an exercise program and lead to attrition.

Starting an Exercise Regimen

New exercisers may require additional rest between training sessions to allow the immune system to fully recover before a new exercise session (ie, potential immune suppressor) is begun. Typically, alterations in immune function are short-lived, as most components of the immune system return to resting levels within 2 hours of exercise cessation.¹¹ However, particularly stressful bouts (ie, exercise of long duration and/or high intensity) have been shown to have a much longer lasting impact on immune function, and recovery periods of up to 3 days may be required to allow all immune parameters to return to resting levels.^{11,12} For the new exerciser, the novelty of the exercise itself may stress the immune system beyond what might be expected from a particular exercise load. Consequently, training programs should include rest days between training sessions early in a program in order to prevent an increase in infection risk for the new exerciser.

The new exerciser should also be cautioned to pay particular attention to their nutrition. Research has shown that certain nutritional strategies can counter immune decrements arising from exercise.^{12,13} For example, many studies have demonstrated that ingesting carbohydrates before or during prolonged exercise attenuates changes in some immune parameters, including white blood cell counts, inflammatory mediators, immune cell function, and stress hormones.¹⁴⁻¹⁶ Vitamin C has also shown some potential to lessen the fall in white blood cell numbers after exercise and to

prevent URTI.¹³ Many other supplements and strategies are marketed to maintain immune health, but most lack evidence that they perform better than placebo.^{12,13} New exercisers, especially those motivated by weight loss, might not practice proper nutritional strategies during exercise with the intention of achieving more rapid weight loss. However, this may place additional stress on the immune system. Rather, adequate amounts of food and fluids should be consumed before, during, and after exercise to aid recovery and maintain immune health.¹⁷

Motivation to Change

Evidence that doing too much too quickly may be problematic for someone initially engaging in a lifestyle change is often translated to advice given to patients as part of good practice. Health care providers (HCPs) may remind patients that as their deconditioning occurred over a period of time, so too will meeting weight loss and fitness goals. The National Institutes of Health advocates weight loss of 1 to 2 pounds per week, which most conventional weight loss programs have adopted.¹⁸ This is consistent with a “small changes” approach, which posits that the most effective mode of creating enduring behavior change is making small incremental modifications to diet and physical activity.¹⁹ Despite this advice, many individuals engage in a time of “overexercise” with “undernutrition” in pursuit of ambitious weight loss goals. Target weight is often positively related to body mass index, in which individuals who weigh more tend to choose higher weight loss goals.²⁰ In overweight patients, intended weight loss at the beginning of an intervention has been reported to be as much as 24% to 38% of initial body weight,²⁰ even though more conservative weight loss of 5% to 10% (with actual weight losses as little as 3%) is known to yield clinically significant improvements in health.²¹ Thus, the weight loss goals of patients entering lifestyle interventions may not agree with established recommendations.

It is vital that HCPs acknowledge and incorporate the goals of their patients

into lifestyle change plans. One of the hallmarks of good clinical practice is listening to and considering each patient's motivation to change. Although theoretically sound, the small changes approach may not align with all patients' goals. In fact, an emerging body of evidence has indicated that rapid weight loss is associated with better weight and behavior change maintenance.^{22,23} A sensitive period in weight loss has been identified, in which significant weight change at the beginning of treatment is predictive of maintenance 1 to 6 years postintervention.^{24,25} Rapid weight loss protocols have also been shown to improve certain markers of the metabolic syndrome.^{26,27} It may be that early results provide patients with energy to overcome the barriers associated with lifestyle change. Without recognizing that the individual's motivation to change may require rapid weight loss, the HCP could inadvertently increase the likelihood that the patient abandons the lifestyle intervention.

HCPs are frequently confronted with information that appears to be contradictory. In this case, it is clear that too much exercise too quickly can have a negative impact on immunity in the short term, for example, increasing the chance of developing upper respiratory symptoms. On the other hand, immune function overall is improved as fitness improves. Furthermore, early rapid weight loss is associated with long-term goal weight maintenance and is consistent with many patients' desires. Patients who do not see the results they expect in terms of weight loss are also more likely to discontinue their attempts at lifestyle change. These potentially conflicting findings may leave an HCP unsure of how to best translate this information into the clinic. Too much too quickly and too little too slowly are both problematic. In either case, the most likely outcome is attrition.

Conclusion

One of the most important issues that needs to be addressed for a novice in lifestyle change is attrition.²⁸ Patients stop treatment for a multitude of reasons,

including (but not limited to) discomfort associated with change and not meeting self-imposed goals or maintenance expectations.²⁹ Ultimately, the patient decides what he or she will do in terms of change, and the HCP supports positive momentum. One of the most important tasks of the HCP is ensuring patients return for a second session. To achieve this, a balance must be found between maintaining immune health and recognizing the desire for rapid weight loss. The HCP can support patients who choose to pursue rapid weight loss by making them aware of the potential risks of “too much too quickly.” They can suggest some simple countermeasures to potential immune suppression, such as frequent handwashing and recommend additional sleep. HCPs should focus on encouraging patients to establish realistic short-term goals while not losing sight of long-term goals, and promote cognitive restructuring that instills hope instead of all-or-nothing thinking.³⁰ The overall message to the patient needs to be that exercise and proper nutrition are an essential part of healthy living that can benefit all aspects of well-being.

Authors' Note

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References

- Bigley AB, Spielmann G, LaVoy EC, Simpson RJ. Can exercise-related improvements in immunity influence cancer prevention and prognosis in the elderly? *Maturitas*. 2013;76:51-56.
- Kokkinos P, Myers J. Exercise and physical activity: clinical outcomes and applications. *Circulation*. 2010;122:1637-1648.
- Carroll S, Dudfield M. What is the relationship between exercise and metabolic abnormalities? A review of the metabolic syndrome. *Sports Med*. 2004;34:371-418.
- Pedersen BK, Saltin B. Exercise as medicine—evidence for prescribing exercise as therapy in 26 different chronic diseases. *Scand J Med Sci Sports*. 2015;25(suppl 3):1-72.
- Hupin D, Roche F, Gremeaux V, et al. Even a low-dose of moderate-to-vigorous physical activity reduces mortality by 22% in adults aged ≥ 60 years: a systematic review and meta-analysis. *Br J Sports Med*. 2015;49:1262-1267.
- Davidson et al. *Am J Lifestyle Med*. In press.
- Nieman DC. Exercise, infection, and immunity. *Int J Sports Med*. 1994;15(suppl 3):S131-S141.
- Pedersen BK, Bruunsgaard H. How physical exercise influences the establishment of infections. *Sports Med*. 1995;19:393-400.
- Gleeson M, Pyne DB. Special feature for the Olympics: effects of exercise on the immune system: exercise effects on mucosal immunity. *Immunol Cell Biol*. 2000;78:536-544.
- Nieman DC. Special feature for the Olympics: effects of exercise on the immune system: exercise effects on systemic immunity. *Immunol Cell Biol*. 2000;78:496-501.
- Walsh NP, Gleeson M, Shephard RJ, et al. Position statement. Part one: immune function and exercise. *Exerc Immunol Rev*. 2011;17:6-63.
- Walsh NP, Gleeson M, Pyne DB, et al. Position statement. Part two: maintaining immune health. *Exerc Immunol Rev*. 2011;17:64-103.
- Moreira A, Kekkonen RA, Delgado L, Fonseca J, Korpela R, Haahtela T. Nutritional modulation of exercise-induced immunodepression in athletes: a systematic review and meta-analysis. *Eur J Clin Nutr*. 2007;61:443-460.
- Bacurau RF, Bassit RA, Sawada L, Navarro F, Martins E Jr, Costa Rosa LF. Carbohydrate supplementation during intense exercise and the immune response of cyclists. *Clin Nutr*. 2002;21:423-429.
- Nieman DC, Fagoaga OR, Butterworth DE, et al. Carbohydrate supplementation affects blood granulocyte and monocyte trafficking but not function after 2.5 h of running. *Am J Clin Nutr*. 1997;66:153-159.
- Nehlsen-Cannarella SL, Fagoaga OR, Nieman DC, et al. Carbohydrate and the cytokine response to 2.5 h of running. *J Appl Physiol* (1985). 1997;82:1662-1667.
- American Dietetic Association; Dietitians of Canada; American College of Sports Medicine; Rodriguez NR, Di Marco NM, Langley S. American College of Sports Medicine position stand. Nutrition and athletic performance. *Med Sci Sports Exerc*. 2009;41:709-731.
- National Heart, Lung, & Blood Institute. Clinical practice guidelines. <https://www.nhlbi.nih.gov/research/resources/obesity/education/clinical-guidelines.htm>. Updated March 2011. Accessed January 6, 2016.
- Hills AP, Byrne NM, Lindstrom R, Hill JO. “Small changes” to diet and physical activity behaviors for weight management. *Obes Facts*. 2013;6:228-238.
- Foster GD, Wadden TA, Vogt RA, Brewer G. What is a reasonable weight loss? Patients' expectations and evaluations of obesity treatment outcomes. *J Consult Clin Psychol*. 1997;65:79-85.
- Blackburn G. Effect of degree of weight loss on health benefits. *Obes Res*. 1995;3(suppl 2):211s-216s.
- Casazza K, Brown A, Astrup A, et al. Weighing the evidence of common beliefs in obesity research. *Crit Rev Food Sci Nutr*. 2015;55:2014-2053.
- Nackers LM, Ross KM, Perri MG. The association between rate of initial weight loss and long-term success in obesity treatment: does slow and steady win the race? *Int J Behav Med*. 2010;17:161-167.
- Unick JL, Neiberg RH, Hogan PE, et al. Weight change in the first 2 months of a lifestyle intervention predicts weight changes 8 years later. *Obesity (Silver Spring)*. 2015;23:1353-1356.
- Wadden TA, Foster GD, Wang J, et al. Clinical correlates of short- and long-term weight loss. *Am J Clin Nutr*. 1992;56(1 suppl):271s-274s.
- Pi-Sunyer FX. Short-term medical benefits and adverse effects of weight loss. *Ann Intern Med*. 1993;119(7 Pt 2):722-726.
- Xydakis AM, Case CC, Jones PH, et al. Adiponectin, inflammation, and the expression of the metabolic syndrome in obese individuals: the impact of rapid weight loss through caloric restriction. *J Clin Endocrinol Metab*. 2004;89:2697-2703.
- Goode RW, Ye L, Sereika SM, et al. Socio-demographic, anthropometric, and psychosocial predictors of attrition across behavioral weight-loss trials. *Eat Behav*. 2016;20:27-33.
- Moroshko I, Brennan L, O'Brien P. Predictors of dropout in weight loss interventions: a systematic review of the literature. *Obes Rev*. 2011;12:912-934.
- Dalle Grave R, Calugi S, Centis E, El Ghoch M, Marchesini G. Cognitive-behavioral strategies to increase the adherence to exercise in the management of obesity. *J Obes*. 2011;2011:348293.