



THE IMMUNE SYSTEM

## Exercise and Immunomodulation

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The global outbreak of the novel coronavirus disease 2019 (COVID-19), has heightened awareness of prevention; "What can be done to stop /prevent *the virus?*" seems to be the never-ending question. Pharmaceuticals, hygiene, isolation, masks, etc., are the agents that jump into the conversation, but exercise as a component of a chiropractic lifestyle can and should be included in the discussion.

### Key Immunomodulatory Benefits

The immunomodulatory benefits of exercise are well-referenced. It reduces non-communicable age-related degenerative diseases (type 2 diabetes, hypertension, obesity, cancer), which have all been shown to lead to a worse prognosis for the COVID-19 patient. In addition, regular physical activity reduces the risk for contracting communicable diseases including viral and bacterial infections by improving immune competency and regulation.



Obesity is a major non-communicable disease that has been linked as a risk factor for hospitalization and death in viral infections including the Spanish (1918), Asian (1957-60), Hong Kong (1968) and H1N1 (2009) influenzas. The obese patient has increased pro-inflammatory cytokines, (TNF-alpha, IL-6), and higher leptin (a pro-inflammatory adipokine) and lower adiponectin (an anti-inflammatory adipokine) levels.

*The message to your patients should be clear: To reduce your risk for any viral infection, avoid obesity and engage in physical activity on a regular basis to maintain or achieve regular bodyweight.*

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Clinical Tip: Frequency of physical activity has a greater impact on reducing pro-inflammatory cytokines (CRP, IL-6, TNF-alpha) than weekly volume alone. A minimum of 30 minutes per day 5-7 days a week is superior to an equivalent volume of activity over fewer days.

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#### Emphasize Intensity and Recovery

High intensity, long-duration exercise (> 2 hours and over 80% V02 max) has been shown to increase intestinal permeability. This supports the hypothesis that high-intensity exercise would upregulate pro-inflammatory cytokines and downregulate the immune response, leaving the patient more vulnerable to infections and chronic degenerative diseases.

Even though studies involving subjective measurement of illness and secretory IgA measurement after prolonged, high-intensity exercise demonstrate a negative effect on the immune system, Campbell contends this evidence is " limited and does not support the claim that exercise suppresses immune competency, and heightens the risk of opportunistic infections."

Perhaps a more important question would be, "Has your patient fully recovered from their last workout?" Overtraining and lack of recovery not only set the stage for injury, but also reduce the immune response. Remember, the most important workouts of the training cycle (or week) are the recovery days: fitness is maintained while the body rebuilds.

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Clinical Tip: Overtraining can lead to immunosuppression due to a lack of rest and recovery. If a patient's resting morning heart rate becomes elevated by 10 percent over normal for three consecutive days, this indicates overtraining: have them to reduce the volume and intensity ( even take a few days off) until their heart rate returns to normal.

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### Flexibility & Resistance Training Can Also Make a Difference

Beyond cardiovascular exercise, activities that promote flexibility (yoga, *tai chi*, *qigong*) and resistance exercise are also beneficial for immunomodulation. Flexibility training enhances sleep quality and mood, whereas resistance exercise has been shown to reduce TNF-alpha and IL-6, and enhance macrophage phagocytosis.

While the standard recommendation for exercise to stimulate immunity would be moderate duration (45-60 minutes) and moderate-intensity (50-70% VO2 max) exercise at a frequency of at least three times per week, a multimodal program is optimum.

Consistent exercise consisting of a combination of flexibility, cardio and strength variables has a positive effect on longevity, quality of life, non-communicable chronic disease, and immunomodulation. In fact, the Cleveland Clinic recommends one hour of multimodal exercise daily for seniors to reduce age-related mental decline.

Since cardiovascular disease continues to be the leading cause of death in the U.S., it would be prudent to make cardio activities the cornerstone of any multimodal exercise program. However, the individual needs of the patient need to be considered, as some patients require more strength, others flexibility, others weight loss or even blood sugar management.

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Clinical Tip: For the deconditioned patient, start slowly: 5-10 minutes once, then twice, then three times/day. Use the multimodal approach and when the patient can do 10 minutes 3x/day, you can then progress to 15 minutes 2x/day, then 20 minutes per session, and build from there.

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### Chiropractic: In the Right Place at the Right Time

The COVID-19 global pandemic has led to increased sedentariness, elevated stress, social isolation and for many, poor eating habits. Each of these variables is positively impacted by exercise. Furthermore, consider the impact of low-to-moderate exercise-induced immunomodulation as a component in the wholistic chiropractic paradigm of diet, rest, CMT, positive mental outlook and exercise for prevention of illness.

Chiropractic is in the right place at the right time to answer the recurring question, "How can we stop/prevent *the virus*?" According to the current literature, hygiene and lifestyle modification are where the chiropractic model outpaces the allopathic model. The challenge is for us to inform our patients and educate the public.

*Editor's Note:* See "How to Help Your Patients Avoid COVID Hospitalization" in this issue for new

research supporting the value of exercise in reducing infection complications / severity.

### *Resources*

- Campbell JP, Turner JE. Debunking the myth of exercise induced immune suppression: redefining the impact of exercise on immunological health across the lifespan. *Front Immunol*, 2018 Apr 16;9:648.
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- Loprinzi PD, Frequency of moderate-to-vigorous physical activity (MVPA) is a greater predictor of systemic inflammation than total weekly volume of MVPA: implications for physical activity promotion *Physiol Behav*, 2015 Mar 15;141:46-50.
- Mach N, Fuster-Botellaa D. Endurance exercise and gut microbiota: a review. *J Sport Health Sci*, 2017 Jun;6(2):179-197.

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