



EFFECTS OF EXERCISE ON IMMUNE FUNCTION

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Abstract: The immune system is a complex, dynamic, and beautifully orchestrated mechanism with enormous responsibility. It defends against foreign invasion by microorganisms, screens out cancer cells, adapts as we grow, and modifies how we interact with our environment. Exercise as it relates to immunity is a mixed message. Regular, moderate-intensity physical activity has been shown to help protect people against some diseases, particularly those that involve the upper respiratory track (like colds). Your immune system is no different. Doctors have found that exercise can boost your immune system by providing a boost to the cells in your body that are assigned to attack bacteria. These cells appear to work more slowly in people who don't exercise than in those that do. As a result, if you exercise, your immune system is better equipped to handle bacteria that could cause you to become sick. The people following lower key exercise regimens have enhanced immune reactions to infection.

Keywords: Immune System, Exercise, Infection

Introduction:

During the last century, the population of developed and developing countries has become less physically active, either by the alteration in the kind of work, or by adoption of new habits attributable in part to changes in the demands of work and the adoption of new habits that are increasingly sedentary. This alteration has led to remarkable increases in the incidence of chronic diseases, such as cardiovascular diseases and type 2 diabetes, highlighted words obesity, musculoskeletal disorders, pulmonary diseases, certain types of cancer and neurological disorders. Regardless of the health status, sedentarism has also been affecting both the quality and life expectancy of these populations.

When you exercise regularly, there are a number of things that benefit your body. Your heart gets stronger and is able to pump more blood throughout your body when you exercise. Your lungs get better equipped at handling oxygen and dishing it out to the rest of your body. Your muscles also get stronger as you use them more often. Your immune system is no different. Doctors have found that exercise can boost your immune system by providing a boost to the cells in your body that are assigned to attack bacteria. These cells appear to work more slowly in people who don't exercise

than in those that do. As a result, if you exercise, your immune system is better equipped to handle bacteria that could cause you to become sick. Though this boost only lasts for a few hours after you exercise, it's often enough to help keep you healthier than you would be if you didn't exercise.

The responses promoted by exercise, both acutely and chronically, affect many components of the immune system. Exercise of moderate intensity may stimulate parameters related to cellular immunity and hence decrease the risk of infection, while high-intensity exercise may promote a decrease of these same parameters, increasing the risk of infectious diseases .

Exercise causes changes in antibodies and white blood cells (WBC). WBCs are the body's immune system cells that fight disease. These antibodies or WBCs circulate more rapidly, so they could detect illnesses earlier than they might have before. However, no one knows whether these changes help prevent infections. Exercise has been shown to increase the production of macrophages, which are cells that attack the kinds of bacteria that can trigger upper respiratory diseases. More recent studies show that there are actually physiological changes in the immune system that happen when a person

exercises. Cells that promote immunity circulate through the system more rapidly, and they're capable of killing both viruses and bacteria. After exercising, the body returns to normal within a few hours, but a regular exercise routine appears to extend periods of immunity.

Exercise slows down the release of stress hormones. Some stress increases the chance of illness. Lower stress hormones may protect against illness.

The most exciting finding in the field of exercise immunology is that positive immune changes take place during moderate exercise. People who exercise at a moderate level experience fewer days of sickness from the common cold and other Upper Respiratory Tract Infections (URTI).

The brief rise in body temperature during and right after exercise may prevent bacteria from growing. This temperature rise may help the body fight infection better. (This is similar to what happens when you have a fever.) Several studies reported that recreational exercisers and athletes had a lower incidence of colds when they were engaged in a running program.

Basic considerations for the immune response

Immunological response can be understood in two forms: innate response and adaptive response. The innate response includes physical barriers (e.g. skin), chemical barriers (e.g. tears, complement system) and the participation of cells such as macrophages, neutrophils, dendritic cells, natural killer cells (NK) and microbicide molecules such as the nitric oxide (NO) and the superoxide anion (O_2^-). The adaptive immune response mainly involves T lymphocytes T (CD4+ and CD8+), B lymphocytes and their products, cytokines and antibodies, respectively. It can be divided into a humoral immune response (mediated by antibodies) and a cellular immune response (cell mediated, such as T lymphocytes and macrophages).

Benefits of Exercise at Moderate Levels

How does exercising at a moderate level improve our immune system?

Light or moderate exercise boosts our body's natural immune system by circulating protective cells through the body

faster, to attack and eliminate bacteria, viruses and fungi. Infection fighters, such as Natural Killer Cells, macrophages, immunoglobins, white blood cells, and other antibodies, are produced in the bone marrow, lungs, and spleen, and have a clean up effect on foreign invaders.

Another theory holds that the increase in body temperature when we exercise may inhibit the growth of bacteria, thus reducing its foothold in the body. Some exercise scientists believe that regular exercise helps rid the lungs of airborne bacteria and viruses that cause URTI, while others believe exercise causes the loss of carcinogens through increased sweat and urine loss.

Interestingly, active people also experience lower rates of colon cancer and breast cancer. Researchers believe that moderate exercise boosts the body's immune system, attacking malignancies that have viral origin. In addition, the faster passage of food through people who exercise reduces the time carcinogens are in the digestive tract. And fit people are less likely to be overweight and have lower body fat, which can cause cancers.

How does Over exercising can suppress normal immune system?

However exercise is a two-edged sword. Over exercising can suppress normal immune function, so getting the right balance of frequency, intensity and duration of fitness workouts is critical. You can go from being vibrantly healthy and energetic to toppling over the abyss by picking up any virus and infections going around, if you overdo things.

Overtrained athletes at all levels have been shown to experience impaired immune systems, to the extent that they suffer from a higher number of upper respiratory tract infections (URTI) than untrained people.

During Olympic Games, athletes experience URTI at abnormally high levels, according to clinicians. In the 1960 Tokyo Olympics, no less than 40% of the athletes were stricken with a nasty flu virus that swept through the games village like the plague—robbing many of medal performances. In the more recent 2000 Sydney Olympics, 33% of the New Zealand

team's visits to medical personnel were attributed to URTI.

Scientists notice that the plasma levels of stress hormones such as cortisol and epinephrine go sky high after heavy exertion, as do anti-inflammatory cytokines. Natural Killer Cell activity, T lymphocyte levels, neutrophil function, and macrophage antigens all experience significant reductions after strenuous activity. The result of these myriad reactions is a cascade effect that can lead to depressed immune function in the exerciser or athlete who has been overreaching for extended periods of time.

However, if you train hard but within your limits, your URTI risk is typically unaltered. Thus there is a relationship between how much and how hard you exercise and your chances of getting infection.

Improving Your Immune System by Exercising

The truth is that you don't have to be a super athlete to boost your immune system through exercise. All you need to do is walk for a half hour every day or find time to hit the gym a few times every week. By speeding up the cells in your immune system that fight off bacteria, you can get healthier in no time. Studies have also shown that people who work out often take half as many sick days per year as those that don't work out. Try to incorporate more exercise into your day to help strengthen your immune system over time.

How Exercise Boosts The Immune System

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