International Journal of
Clinical Images and Medical Reviews

Mini Review

Importance of maintaining and improving immune function by diet, nutrition and exercise before specific vaccinations and therapeutic drugs for COVID-19

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Mini Review

In March 2021, vaccination against COVID-19 had just started in Japan. At that time, there were no sufficient therapeutic agents other than conventional anti-inflammatory steroids. However, only half a year later, the vaccination rate of the Japanese people against COVID-19 exceeded 70% and specific medicines using specific antibodies came into use, resulting in a drastic decrease in the number of infected people in Japan. This experience made us realize once again how amazing the immune system is. Before relying on vaccinations and therapeutic drugs, it is very important to enhance the immune system in our daily life, and for this purpose, the role of nutrition and exercise is very important and cannot be neglected. Maintaining and improving immune function is important not only for the frail elderly and diseased people, but also for the healthy general population. In the case of the COVID-19 pandemic, not only countermeasures against the pathogen, but also various measures to enhance immune function were taken. The author has also been involved in logistical support activities with the cooperation of researchers and medical backup both inside and outside Japan and describe some of the experience/findings here.

First, researchers in Iran and the UK, where the damage caused by COVID-19 was serious in the early 2020, proposed measures focusing on exercise and nutrition, and international guidelines were published online in August 2020 [1], so I introduced its contents as a corresponding author. As people refrained from going out, there were fewer opportunities for exercise, physical activity and training, and there were concerns about the decline in physical fitness and immune function. In order to prevent infection, it is essential to wear masks, wash hands and ventilate rooms in daily life, but it was also necessary to take care not to weaken the immune system. Psychological stress due to restrictions on going out, overeating, unbalanced diet, and a lack of physical activity are all risks for lowering immune function. Therefore, avoiding stress, promoting proper sleep, moderate exercise, and intake of fruits and vegetables were recommended [1]. Supplements such as vitamins C and D, omega-3 fatty acids, and zinc were also thought to be useful in maintaining immune function when fresh foods were not available. Lifestyle-related diseases such as obesity and diabetes lower the immune system [2]. In addition to aerobic exercise, resistance exercise is also effective in preventing these diseases, and exercise using an online program was recommended during the COVID-19 pandemic. In particular, a simple method of respiratory muscle training was introduced in order to prevent respiratory failure in COVID-19 [1].

On the other hand, mild dietary restriction is known to increase life expectancy, improve insulin sensitivity, reduce oxidative stress and inflammation, and decrease mortality from cancer and cardiovascular diseases [3]. As for immune function, previous studies have reported that it can be improved by fasting for three days. However, exercise and training under fasting conditions may not only cause exhaustion and dehydration, but may also lead to oxidative stress, inflammation, muscle damage, fatigue and an immunocompromised state. For these reasons, the following points of caution for training during the month-long fasting period (Ramadan), which is a religious event for Muslims, were presented: intensity, duration and frequency of exercise, recommended timing of food intake and nutrient requirements [3]. In the same way, the importance of hydration was also pointed out to prevent dehydration and related disorders [3-6]. In order to maintain the immune system, it is important for the organism to exercise without excessive stress, and to consume nutrition, water, and rest accordingly [3-5].

Furthermore, the importance of exercise and nutrition has begun to be verified in COVID-19 patients. First of all, a case report was pre-

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Received: Nov 11, 2021 Accepted: Dec 31, 2021 Published: Jan 05, 2022.

Citation: Katsuhiko SUZUKI. Importance of maintaining and improving immune function by diet, nutrition and exercise before specific vaccinations and therapeutic drugs for COVID-19. Int Clin Img and Med Rev. 2022; 1(1): 1013.

sented in which isometric exercise was prescribed to an overweight young female patient, which improved her respiratory function and vital signs and may hasten her discharge from the hospital [7]. Then, the importance of bioactive substances secreted from skeletal muscles by exercise was discussed in view of the importance of rehabilitation [8]. In addition, a randomized controlled trial reported that patients with high blood levels of vitamin D and zinc are less likely to become seriously ill after being infected with COVID-19, and pointed out the need to consume food components that enhance immune function on a regular basis [9].

In COVID-19, preventive measures against infection are essential. For this purpose, it is important to enhance individual immune function, that is, resistance to infection, by improving lifestyle habits such as diet, nutrition [10-12] and moderate exercise [13-17]. The spread of infection may continue to occur due to the emergence of new variant strains or drug resistance. Each time this occurs, the development and improvement of vaccines and therapeutic agents are expected to progress, but before that, it is fundamentally important to maintain and improve immune function. The author has also been cooperating with COVID-19 countermeasures through support activities such as vaccination, healthcare visits to elderly facilities, and health checkups, and reaffirmed the need for medical research activities that are useful for early detection and early treatment for those in the front-line positions.

Acknowledgments

I thank the editorial staff , Dr. Llion Roberts and Aya Miki for editing of this manuscript.

Conflict of Interest

The author declares no conflict of interest.

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