

Returning to fitness after COVID-19 Virus

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Abstract COVID-19 poses major challenges for the sports community. A variety of clinical features have been seen in athletes with confirmation of being COVID-19 infected who develop severe to mild symptoms needing hospitalization and intensive care. Lack of exercise may have a negative effect on the immunity system and lead to having a greater susceptibility to infections and comorbidities. Returning to physical activity safely after COVID-19 pandemic was an obstacle for sports medicine professionals. It's extremely important to gradually make a comeback to sport under the supervision of a specialized medical team in order to restore the level of fitness before infection. Individual training programs should begin at a low intensity that can be slowly increased based on an appropriate metabolic equivalent. Therefore, there is a apparent requirement for clinical suggestions before athletes are able to come back to training after contracting COVID-19.

Keywords: COVID-19; Coronavirus; Exercise; Athletes; Return to Sports.

Introduction

In December of 2019, the World Health Organization (WHO) was notified of the pneumonia cases in the Wuhan city of China. In the January 2020's first week, Chinese authorities officially announced the presence of a new virus known as COVID-19. On or about March 10, 2020, It was declared by WHO that outbreak of COVID-19 is a global pandemic.¹ Under a year, the COVID-19 virus has become a global health concern with more than 40 million cases were recorded and 1.1 million mortality happening globally.² As the battle on the virus rages on, the sports world encountered the largest health war that has been waged in recent history. Despite the athletes who meet the following conditions:

- (i) Intention to train,
- (ii) Participating in sporting events, and
- (iii) Membership in a sporting association,

Aren't in high risk of contracting COVID-19, they might still be in danger of contracting COVID-19 -19.^{3,4} As theorized, a large amount of athletes contracted COVID-19 virus or were in proximity of someone who was discovered to be COVID-19 positive.^{5,6} Players should adhere to recommended infection prevention strategy for general population, which includes self-isolating during symptomatic periods, to limit the spreading of corona virus and protecting you, your relatives and community.⁶

Public health advice are of paramount importance, for example the widespread suspension of gyms, stadiums and health clubs, and the requirement for quarantining or athletes practicing self-isolating (for two weeks) after being tested positive.^{6,7} These suggestions are intended to limit the growth of the virus and protecting people along with their community. Although, they have also resulted in impairments for various activities of daily living, this includes general physical activity and particularly in

sport. These rapid changes is living style results from physical inactivity and self-isolation have risen the danger of acute, negative and potentially long-term health problems for athletes.^{7,8} There was issues that the lacking in fitness routines and participation in sporting activities has grave implications for the Immunity system and on the athletes' mental and physical health, which also has led to the aggravation of existing pathologies or the new pathologies being developed.⁷

The Problem

Physical inactivity, can be explained as insufficient daily physical activity and disrupting your exercise regimen, can increase your susceptibility to infection, whether you are an sportsperson or not, due to impairment or dysfunction of your immunity system components, and increases your overall danger, over time to develop additional comorbidities.⁷ In addition, the limitation of physical activity can affect the physical performance for a athlete negatively because of the loss in skeletal muscle mass and associated decrease in strength of muscle.^{9,10} The adverse physical inactivity effects on metabolic pathways were described previously.^{7,9} For example, low walking activity for two weeks (reduced steps per day from 10,000 to 1,000) might trigger or assist in metabolic changes, which includes decreased peripheral sensitivity to insulin, altered of lipid profile, and greater fat deposition.^{8,11} Decreased physical activity has been documented. Athlete contracted COVID-19 during self-isolation. Every athlete reacts and recovers differently and may have difficulty returning to documented activities. Every athlete reacts and recovers differently and may have difficulty resuming daily activities and exercise.⁷ It's therefore extremely important to safely instruct an athlete back to training who has been diagnosed with COVID-19.

General Recommendations for Athletes with Covid-19

As a result, an international panel of classified professional sportsmen with COVID-19 virus diagnosis into five distinct groups which are as follows:

- (i) Asymptomatic;
- (ii) People who were mildly affected;
- (iii) People who were moderately affected;
- (iv) People who were severely affected without mechanical ventilation; and
- (v) Highly symptomatic individuals who require mechanical ventilation and/or suffer from myocardial injury.^{5,6,8}

They additionally supplied recommendations specific to group for a safe return to exercise.^{5,6,8} While most athletes infected by COVID-19 remain asymptomatic or if you were mildly affected by COVID 19, a full medical evaluation is suggested prior to resume exercising. Particularly, asymptomatic sportsmen who have confirmed to be COVID positive were offered two weeks of self-isolation after workout along with rest, followed by a steady comeback to physical activity while following the directions of a medical team.

Athletes who showed mild symptoms but don't need hospitalization are suggested an additional two weeks of practicing social distance, after which an assessment of their condition with blood tests (brain natriuretic peptide, troponin and C-reactive protein) and a 12-lead Echocardiography along with electrocardiogram if medically recommended. This group was also recommended to steadily come back to physical activity while following the medical team directions.

A further complicated testing protocol is suggested for sportsmen who show moderate to severe symptom requiring hospitalization. Individuals hospitalized with myocardial damage and respiratory issues were recommended to go through a, multidisciplinary evaluation that's comprehensive prior to resuming exercising.

preferably, a team consisting of a sports cardiologist, a sports medicine physician, a professional athletic trainer, and a pulmonologist should perform the individual assessment.^{5,6} it was recommended by Barker-Davies *et al.* That an extended duration of three-six months abstinence of exercise in athletes who were myocarditis confirmed along with the rest period adjustment should use on duration and clinical severity of the underlying illness as a basis.¹³ Verwoert *et al.* a wide-ranging plan for rehabilitation, which includes a comprehensive cardiovascular assessment prior to making a comeback in fitness and sport along with cardiac complications being monitored intensively.⁶ Careful observation of hospitalized patients with COVID-19-related respiratory symptoms is generally warranted. It's furthermore suggested that people with critical levels of respiratory

problems are observed by an pulmonologist despite then steadily making a comeback to exercising as they recover.⁸

Exercise and Viral Infections

Nearly most of the viral infections lead to the employment and activation of inflammatory cells being for example neutrophils and macrophages, which releases a variety of molecules (metalloproteinase, cytokines, and oxygen burst apparatus) that are related to tissue dysfunction or damage.¹⁴ A great balance between inflammatory response and the protective immunity facilitates both virus elimination as well as infection resolution. Exercise serves as the immune system modulator, increasing cell-mediated immunity and decreasing the danger of systemic inflammatory processes being developed.¹⁵ Several researches have suggest that exercising is in direct relation to reducing death toll which can be a result of influenza and pneumonia and improving the impacts on metabolic profile and cardiorespiratory function, that includes cholesterol, faster blood pressure, triglycerides, blood glucose, along with the circumference of waist.^{7,9-11,16} Other possible advantages of physical activity, particularly low-to-moderate intensity exercise, include a decreased recovery rate after viral infection.¹⁶

In addition to its beneficial effects on overall cardiovascular and metabolic function, exercise has also been displayed reduction in a variety of mental health problems, as it decreases depression and anxiety by improving cognition and self-esteem.¹⁶ Previous research has also displayed that exercising is responsible for reducing symptoms such as lower self-esteem along with reducing the self-isolation's harmful effects while under quarantine.^{15,16}

Endogenous opioids for example endorphins serves an important part in integrating metabolic and hormonal responses to exercise while also being in association with euphoria, which displayed significant increase after exercise/running.⁷ Improved overall health in COVID-19 patients (mental state and physiological) can help them in carrying out the required daily activities and enabling them to make a comeback at work.¹⁶

As sportsmen of every skill levels make a comeback to training after the viral pandemic, exceptional attention must be paid to the volume along with the intensity of training. For people who were recuperating from the COVID-19 virus, getting back into exercising could be challenging. In this regard, returning to exercising should be based on the clinical diagnosed symptoms and patients displaying symptoms must be motivated to pursue an exercise program of low-intensity while under self-isolation for 72 hours after symptoms have resolved. This program could be tailored to available equipment such as an ergo meter and/or treadmill, and may also involve exercises for resistance.^{8,17} They should avoid High-intensity exercises due to it being in association with a higher threat of infection in upper respiratory tract and

further issues, even sudden cardiac arrest.^{7,10,18} Past research have shown that low- to moderate-intensity exercises strengthens immunity system, while high-intensity exercises weakens the immunity system along with increasing the vulnerability to getting infected.^{7,10}

It should be noted that a combined mix of high- and low-intensity exercise is a significant ingredient in enabling the advance athletes for improving their aerobic ability and achieving best possible performance in exercise.¹⁹ It is important for athletes to determine the perfect time before you can start training again along with/or exercise of high-intensity after being infected. Coming back to vigorous exercising while the individual is still suffering from a systemic infection associated with persistent coughing and high fever along with shortness of breath is significantly related to a serious danger of critical complications for example myocarditis.²⁰

COVID-19 diagnosed sportsmen should opt for gradually returning to physical activity once symptoms resolve to return to their fitness levels prior to the infection.^{7,8} Although information on returning to physical activity after COVID-19 is limited, a week of low-intensity exercise is performed before engaging in more intense and/or more demanding exercise. Because of prolonged periods of being physically inactive (at minimum two weeks of resting without exercise), individuals making a recovery from the symptoms might be at higher threat of being injured.⁸ To prevent these injuries, Three metabolic equivalents (METs) were recommended by Barker-Davies et al. over the duration of two-three weeks.¹³ there were 3 classification for Physical activity which were as follows low-intensity (<3 METs), moderate-intensity (3-6 METs) and high-intensity (>6 METs).^{21,22} Training on a treadmill (walking speed 3.2 km/h) with the ergometer (andlt; 50 W) along with/instead training resistance utilizing light weights corresponds to three METs and are therefore potential choices for starting the training program 22 The training program must start at low intensity, which can be steadily increased.^{21,22}

In addition, a healthy COVID-19 infected athlete who has the self-restrictive virus after seven days of being symptom-free can resume training at half the standard volume and intensity.⁸ It's important to note that current recommendations for many athletes report symptoms related to COVID-19 after the disease has cured, particularly throughout high-intensity exercises.^{7,20} These may include runners who experience persistent fatigue and swimmers who report persistent symptoms If symptoms for example cough, shortness of breath, fever, extreme tiredness and tachycardia occur.⁸the intake have to be discontinued along with consulting a sports doctor, as these can be related to a reactivation or recurrence. The COVID-19 infections.²³ It is also important to note that beginning training at a normal volume and intensity prior to full recovery could further the danger of severe injury along with/otherwise illness.⁷ The danger exists during moments of great intensity This is in primarily a problem for non-professional and sporting athletes.¹⁹

Most should make a full recovery after a progressive, individualized exercise program.^{6,7}

Conclusion

COVID-19 virus is a worldwide pandemic affecting everyone to different degrees and ranges from mild symptoms lasting an only some days because of myocardial damage, respiratory failure and fatality; Even athletes weren't excused from the risk of getting infected. Healthcare workers face unprecedented challenges related to COVID-19 virus and its difficulties. Therefore, it is of paramount importance to follow and assess the swiftly changing scientific landscape of who are returning to sport unharmed after being infected with COVID-19. It makes sense to develop basic recommendations for the secure comeback of sportsmen to training.

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