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SARS-CoV-2 and the implications of high intensity training

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Abstract

The rapid spread of the virus that causes COVID-19 (SARS-CoV-2) has sparked alarm worldwide. The way the virus spreads is still unclear; however, it's known that similar viruses are spread in cough & sneeze droplets. At the time of writing this editorial over 300,000 people worldwide have been infected with over 13,000 deaths (WHO, 2020). The principle measure introduced to stop the spread of infection among the general population is by encouraging the public to undertake specific behaviours related to hygiene, that is useful in stopping the spread amongst family members or close associates for previous outbreaks of virus from the same family. A second measure used widely across the world is social distancing for non-infected members of the public or social isolation for infected families or high-risk individuals. Many sporting events and athletic games have been postponed causing large scale disruption to the global sport industry with millions of dollars lost. Most teams and induvial athletes will continue to train to maintain fitness and be ready for the return to active competition when the pandemic is under control.

Keywords: Coid-19, URTI, Exericise, Intesity training.

INTRODUCTION

The rapid spread of the virus that causes COVID-19 (SARS-CoV-2) has sparked alarm worldwide. The way the virus spreads is still unclear; however, it's known that similar viruses are spread in cough & sneeze droplets. At the time of writing this editorial over 300,000 people worldwide have been infected with over 13,000 deaths (WHO, 2020). The principle measure introduced to stop the spread of infection among the general population is by encouraging the public to undertake specific behaviours related to hygiene, that is useful in stopping the spread amongst family members or close associates for previous outbreaks of virus from the same family. A second measure used widely across the world is social distancing for non-infected members of the public or social isolation for infected families or high-risk individuals. Many sporting events and athletic games have been postponed causing large scale disruption to the global sport industry with millions of dollars lost. Most teams and induvial athletes will continue to train to maintain fitness and be ready for the return to active competition when the pandemic is under control.

The main question is whether training is an appropriate action for athlete's during this pandemic, particularly as Covid-19 is a viral respiratory tract disease. Should stringent measures be applied to athletic training during this pandemic?

The immune system plays an important role in the prevention of illness and injuries among the athletic population. It has been reported that moderate exercise reduces the risk of chronic metabolic and cardiorespiratory diseases [1]. An agreement between scientists exists in that moderate exercise enhances the athlete's immunity, but high-intensity prolonged exercise impairs, temporarily, immune competence. In addition, a relationship between immune-depression and risk of upper respiratory tract infection (URTI) has been established following heavy exercise [2]. Therefore, a perception exists that some athletes, especially those engaging in prolonged intensive exercise and competition, such as running, cycling and swimming, may show an increased rate of URTI during intense training periods and competition [2]. It has been reported that a high percentage of illness occur among elite athletes when training above lactate threshold levels [3]. In Davis *et al* [5] in the animal model identified that one or two periods of exhaustive exercise leads to infections and to a higher fatality rate in animals. In addition, the rates of infection and illness peak mostly at winter time when environmental temperatures are lowest [5]. Hence, the combination of exposure to cold environment and intensity exericse lead to damage of the physical barriers to pathogens, increase mucus viscosity, and decrease the action of cilia in the upper respiratory system [6]. Therefore, this decrease in mucosal immune function in athletes during the winter period might explain the increases in URTI via a decrease in the effect of the protective mucosal surfaces' antibodies. All athletes and coaches need to be aware of the increased vulnerability of athletes to infection exercising at intensity.

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For the majority of coaches training plans are set at least a weekly training session above threshold level. Thus, physical exertion experienced from intense and prolonged exercise from these above threshold level sessions can cause significant stress on the respiratory system. This increased stress may be caused by hyperventilation and increased airway exposure to contaminants within inhaled air [7]. Furthermore, the prevalence of airway inflammation is greater among elite athletes than in the general population and is higher among certain groups of athletes, such as distance runners and cyclists [8]. Furthermore, the risk of Covid-19 virus contamination could be elevated in athletes during periods of heavy training and in the period of one to two weeks following participation in competitions. In addition to the URTI potentially developed by athlete's immune system suppression can also occur providing an "open window" period in which the immune system is weakened for 3 to 72 hours after prolonged strenuous exercise [9]. Thus, care should be taken to ensure that heavy training is avoided during the time of this pandemic of COVID-19. Parker et al, [10] found evidence that athletes who continued to exercise while showing symptoms of flu developed a form of chronic fatigue syndrome that could last for several years in some cases.

In animal models moderate exericse significantly decreased mortality after influenza infection, whereas, prolonged exercise led to increased morbidity and tended to decrease survival [11]. Furthermore, back in the 1940s during the polio epidemic, athletes who played high intensity football game were coming down with the more severe form of polio.

CONCLUSION

To conclude, training among professional athletes should remain at the individual level avoiding social interactions. Moderate levels of training should be undertaken, avoiding high intensity training and allowing an adequate length of time to pass for recovery between training sessions. These steps as discussed above should reduce the risk of infection to athletes by preventing a suppression of the immune system as observed with intensity training. Therefore, increasing athlete's resilience to fighting infections.

We highly support postponing of competitions to reduce the risk to athlete's not just from their increased exposure to the SARS-CoV-2 virus through travelling but also a potential increased vulnerability associated with high-level intensity training and exercise and the associated suppression of the immune system as highlighted above.

Conflicts of interest: None

REFERENCES

1. Gleeson M, Bishop N, Oliveira M, Tauler P. Influence of training load on upper respiratory tract infection incidence and antigen-stimulated cytokine production. Scandinavian journal of medicine & science in sports. 2013;23(4):451-7.
2. Nieman DC, Henson DA, Austin MD, Sha W. Upper respiratory tract infection is reduced in physically fit and active adults. British Journal of Sports Medicine. 2011;45(12):987-92.
3. Foster CA. Monitoring training in athletes with reference to overtraining syndrome. Medicine & Science in Sports & Exercise. 1998;30(7):1164-8.
4. Davis MS, Williams CC, Meinkoth JH, Malayer JR, Royer CM, Williamson KK, McKenzie EC. Influx of neutrophils and persistence of cytokine expression in airways of horses after performing exercise while breathing cold air. American journal of veterinary research. 2007;68(2):185-9.
5. Whitham M, Laing SJ, Dorrington M, Walters R, Dunklin S, Bland D, Bilzon JL, Walsh NP. The influence of an arduous military training program on immune function and upper respiratory tract infection incidence. Military medicine. 2006;171(8):703-9.
6. Beachey W. Respiratory Care Anatomy and Physiology-E-Book: Foundations for Clinical Practice. Elsevier Health Sciences; 2017.
7. Martin SA, Pence BD, Woods JA. Exercise and respiratory tract viral infections. Exercise and sport sciences reviews. 2009;37(4):157.
8. Bougault V, Turmel J, St-Laurent J, Bertrand M, Boulet LP. Asthma, airway inflammation and epithelial damage in swimmers and cold-air athletes. European respiratory journal. 2009;33(4):740-6.
9. Kakanis M, Peake J, Hooper S, Gray B, Marshall-Gradisnik S. The open window of susceptibility to infection after acute exercise in healthy young male elite athletes. Journal of Science and Medicine in Sport. 2010;13:e85-6.
10. Parker S, Brukner P, Rosier M. Chronic fatigue syndrome and the athlete. Research in Sports Medicine: An International Journal. 1996;6(4):269-78.
11. Lowder T, Padgett DA, Woods JA. Moderate exercise protects mice from death due to influenza virus. Brain, behavior, and immunity. 2005;19(5):377-80.