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Respiratory health in athletes: facing the COVID-19 challenge



There are unique cohorts of individuals facing specific challenges during the current global coronavirus disease 2019 (COVID-19) crisis. When faced with a rapidly evolving pandemic associated with high morbidity and mortality in older people (>60 years), the respiratory health of a (predominantly) young and very physically fit population might, on the face of it, seem trivial or almost irrelevant. Yet, for athletes, para-athletes, and clinicians concerned with their health, it is important that targeted guidance is available to ensure the wellbeing of this population is considered.

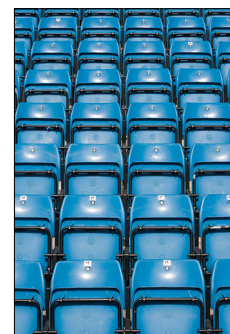
Several specific issues are pertinent here, including questions regarding decisions to continue training, potential transmission of disease within teams, the potential effect of vigorous exercise on infection susceptibility, and the need for guidance regarding return to play, following COVID-19 infection. Additionally, there are considerable implications associated with the now almost complete and immediate curtailing of all employment activity for professional athletes. Indeed, virtually all major international sporting events, including the Olympic Games, have now been either cancelled or postponed. It is also recognised that there are cohorts of athletes and para-athletes with heightened susceptibility to viral respiratory tract infection and cohorts with known chronic medical conditions, such as airways disease (seen in approximately 20% of all endurance athletes).

Participation in some form of physical activity or sport is clearly a core component of maintaining a healthy lifestyle and is undoubtedly an important public health message for those residing in geographical areas enforcing isolation. There is general consensus that regular exercise training at what might be termed a moderate volume (30–60 min, 3–5 days per week) and intensity (60–80% of maximum capacity) is associated with a general decrease in the risk of respiratory tract infection, whereas low levels of regular physical activity appear to be associated with an increased risk of respiratory tract infection (ie, showing a so-called J-shape association). For competitive athletes, however, it is necessary to undertake vigorous or high-intensity sessions, to facilitate the higher forms of physical conditioning required. Very high intensity training workloads, with or without sudden increases in training load, have been associated with transient immune perturbations, inflammation, oxidative stress, and muscle damage. A potential increased risk of illness in periods of high-intensity training is a concern, but mainly in non-competitive recreational athletes. Evidence suggests that elite athletes can continue with high-intensity training without a similar increased risk of illness, providing there is no sudden increase in training load (ie, the J shape relationship appears to plateau, or becomes more S shaped in elite athletes). Increased risk of COVID-19 transmission during training is more likely in certain athletic settings

where athletes train in groups, engage in contact sports, do not adhere to universal guidelines for social distancing, make use of shared equipment, do not practice universal guidelines to maintain personal hygiene, and use common facilities such as changing rooms. There is, however, currently no specific data available regarding the prevalence, nature, and behaviour of COVID-19-related illness in athletic individuals.

A key concern in athletic individuals surrounds the timing or ability to return to full physical exertion (a return to play strategy), following an infection. Many young individuals with COVID-19 infection appear to develop relatively mild disease and recover almost completely over 5–7 days. However, an apparent heightened risk of further deterioration has been suggested to occur between days 7 and 9, with individuals developing more fulminant lower respiratory tract manifestations and thus requiring more intense medical care. In athletes, return to play decisions, in the context of respiratory illness, usually default to the so-called neck check, which dates back to the early 1990s and is still implemented today—ie, athletes continue to exercise if their symptoms and clinical signs are confined to the upper airway (eg, only coryzal symptoms). The scientific basis for this recommendation is weak, and there is long-standing concern of the potential risk of athletes with respiratory tract infection developing other complications from return to vigorous exercise. Of these risks, the most important is the risk of myocarditis or myocardial damage, which could be highly relevant in the current outbreak; published data from COVID-19 infection cohorts indicate a definite prevalence of myocardial damage, with troponin elevation, and an increasing number of cases with myocarditis. On this basis, and taking into account evidence of a risk of late deterioration, we recommend that the neck check rule for return to play is not used as an assessment strategy and that a more prolonged rest period and conservative return to play strategy are employed (eg, ≥ 10 days from onset of symptoms plus 7 days from symptom resolution). This strategy will not be of immediate relevance to athletes who are isolated or indeed have no planned competition targets; nevertheless, as the pandemic evolves, there will likely be more scenarios in which COVID-19 should be considered as a differential diagnosis and thus the more conservative approach, as outlined above, regarding return to play should be adopted.

Finally, ensuring the mental health and wellbeing of this group of individuals is key. Continuing with training is an important component to protect the mental health of the athlete, particularly to reduce the risk of anxiety and depression. Many elite athletes have been engaged in a protracted period of careful preparation for international competitions (such as the Tokyo Olympic Games), including partaking in specific training camps,



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For more on **respiratory conditions in athletes** see **Comment Lancet Respir Med** 2018; **6**: 8–10

For more on **physical activity and immunology** see *J Sport Health Sci* 2019; **8**: 201–17

For more on the **effect of exercise on immune response** see *Front Immunol* 2018; **9**: 648

For more on **risk of illness in sport** see *Br J Sports Med* 2016; **50**: 1043–52

For more on **features, evaluation, and treatment of COVID-19** see <https://www.ncbi.nlm.nih.gov/books/NBK554776/>

For more on the **neck check** see *Phys Sportsmed* 1993; **21**: 125–35

For more on **cardiac injury in COVID-19** see *JAMA Cardiol* 2020; published online March 25. DOI:10.1001/jamacardio.2020.0950

For more on **anxiety in athletes** see *Depress Anxiety* 2019; **36**: 846–58

For more on **depression in athletes** see *Transl Behav Med* 2019; **9**: 703–10

For more on the **mental health of athletes** see *Br J Sports Med* 2020; **54**: 216–20

For more on **support for athletes during the COVID-19 pandemic** see <https://blogs.bmj.com/bjism/2020/03/25/athlete-mental-health-and-mental-illness-in-the-era-of-covid-19-shifting-focus-a-new-reality/>

acclimatisation strategies, and participation for dedicated selection events. For some, this opportunity to compete will be gone and will never arise again; thus, the sudden cancellation or postponement of these events and competition, while immediately necessary and clearly logical from an international health perspective, is likely to have immediate and important ramifications for some athlete's mental health. Moreover, the support structures that typically surround highly competitive athletes are likely to be physically disbanded and some athletes now face a considerable period of isolation, potentially located away from their home (ie, in a training location where they are under mandatory isolation), along with excessive unoccupied time and no training or clear work target. Fortunately, in the past 5 years, recognition of the high levels of anxiety, depression, and suicide in competitive athletes has improved, hopefully leading to a more holistic approach to maintaining health in this population. These multidisciplinary support structures need to be used now, to help maintain overall athlete health.

As we move forward during the pandemic, whenever possible, it is crucial that guidance and strategies are developed using the best available evidence. More robust data needs to be collected on how COVID-19 (and indeed other infections) affects athletic populations, which will undoubtedly complement work being done

to understand the effect of general physical fitness on COVID-19 susceptibility, disease behaviour, and prognosis. Respiratory illness is a key issue for athlete medical services; acute respiratory tract infection is the leading cause of non-injury related medical consultation and is associated with a significant loss in training and competition time in elite athlete cohorts. It is, therefore, encouraging that the International Olympic Committee has already convened an expert panel to address the broader issues pertaining to athlete respiratory health, which aims to publish evidence-based guidance in the near future.

The COVID-19 pandemic is a challenging time for all, but some populations, such as athletes, have very specific needs. In this maelstrom of changes, it is important to identify some of the unique challenges this population currently faces to ensure these needs are addressed, and the health and wellbeing of this population is protected.

We declare no competing interests.

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