COVID-19 VACCINATION IN ATHLETES

In the current COVID-19 pandemic, vaccine administration has been one of the key public health messages advocated for protecting people. Although the majority of athletes and the general population have opted/consented (figure 1) to receive their COVID-19 vaccines, there is a significant minority with vaccine hesitancy. For the athletic population, a key concern is the effect of the vaccine on athletic performance, despite the fact that a 2021 report indicated that around one in four athletes had not returned fully to sport a month after the onset of COVID-19 infection.

SIDE EFFECT PROFILE OF COVID-19 VACCINATION IN ELITE ATHLETES

To evaluate concerns over the side effect profile of COVID-19 vaccines, Hull et al8 established a prospective monitoring system in the elite athletic population to characterise SARS-CoV-2 vaccine side effects and their effects on sporting participation in preparation for the Tokyo Olympic and Paralympic Games. These elite UK athletes completed a daily electronic questionnaire for 10 days following SARS-CoV-2 vaccination via a mobile phone application.

Complete data were available for 127 athletes (57 (45%) female, 70 (55%) male; mean age 27.5 years, SD 4.9) who received two doses of the Pfizer-BioNTech vaccine, administered between 12 May and 2 September 2021, in line with licensed recommendations. Of these 127 participants, 97 (76%) were Olympic sport athletes and 30 (24%) were Paralympic sport athletes, with 67 subsequently competing at the Tokyo Olympic Games and 22 competing at the Tokyo Paralympic Games.

The most prevalent side effect was arm pain around the injection site (in 94% of participants, lasting a median of 2 days (IQR 1–2)) and 37% after 3 days; IQR 1–2). Systemic side effects were reported in 70% of participants, with generalised fatigue in 28% after the first vaccination (median 1 day, IQR 1–2) and 37% after the second vaccination (1 day, IQR 1–3). Several side effects were more commonly reported (p<0.01) after the second vaccination compared with the first: fever or chills (2% after first vaccination vs 18% after second vaccination), muscle aches (7% vs 33%) and headache (16% vs 34%). Most athletes (93, 73%) reported zero or only minor effect on their ability to train, and only eight (6%) athletes felt completely unable to train, of whom seven returned to training after 1 day. There was no difference in vaccine side effect profiles between Paralympic and non-Paralympic athletes, nor between male and female athletes. Moreover the incidence of myocarditis postvaccination is reported to be 1 in 20000 compared with 1 in 200 following infection with the virus.6

These findings were in keeping with those reported in a UK community-based study following up patients after the COVID-19 vaccine and show that COVID-19 vaccines are safe, with only minor side effects reported.7 The findings also indicate that continuation of sport after SARS-CoV-2 vaccination is appropriate, with the paper by Batatinha et al8 reassuringly illustrating that healthy exercising adults can return to the same level of exercise post-COVID-19 vaccination. Indeed Batatinha et al performed exercise testing in 12 healthy volunteers between the ages of 24 and 43 years, 1–3 weeks after receiving their final COVID-19 vaccine (9 receiving the Pfizer-BioNTech mRNA vaccine and 3 the Johnson & Johnson viral vector-based vaccine) with no pre–post vaccine differences in most physiological outcomes, although the heart rate response was slightly elevated (+5 beats per minute) during exercise at 70% VO2max, which requires further investigation. Additionally, Presby and Capodilupo9 reviewed postvaccination (vaccines received were AstraZeneca, Janssen-Johnson & Johnson, Moderna or Pfizer-BioNTech vaccine) physiological variables captured on the WHOOP from 69619 participants. They show that...
resting heart rate, heart rate variability, respiratory rate and sleep architecture return to prevaccine levels within 4 days of receiving the vaccine. Thus, athlete vaccine recipients can be reassured that any physiological side effects are temporary and that training and/or competition will only need to be modified for the first few days following the vaccine.

**ADDRESSING COVID-19 VACCINE HESITANCY IN THE ATHLETIC POPULATION**

In conclusion, in elite athletes, vaccination against SARS-CoV-2 appears to be well tolerated and associated with few significant side effects. When side effects occurred, they were short-lived and did not affect sporting participation, although it would appear sensible for athletes to reduce their training requirements for the first few days following vaccine administration. Additionally, athletes are able to return to the physiological requirements of their sport post vaccine and their resting physiological measures return to prevaccine levels within 4 days of vaccine administration. This analysis should help to inform health practitioner–athlete discussions regarding the risks and benefits of SARS-CoV-2 vaccination in the context of sport and athletes, helping to address concerns around COVID-19 vaccine hesitancy.