Monkeypox: recognition and prevention in sports

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INTRODUCTION

Monkeypox is a zoonotic infection caused by the orthopox DNA monkeypox virus. Early in 2022, a sharp increase in monkeypox cases was observed. The exact reason for this epidemiological change is not well understood. In fact, some phylogenetic analyses of the current circulating strain suggest it may have been circulating at low levels since 2017–2019.[1] Other potential reasons for the increase in cases include waning smallpox immunity and/or behavioural changes and increased travel post-COVID-19 restrictions.

As of 17 October, more than 73 000 cases of monkeypox have been diagnosed worldwide during 2022, including in 102 countries in which monkeypox does not routinely occur.[2] While still a rare disease, the WHO declared the rapidly spreading monkeypox outbreak a global public health emergency on 23 July 2022.[3] This editorial summarises information on recognition and prevention of monkeypox relevant to sport, athletes, and clinicians. Treatment and diagnostic testing for monkeypox are beyond the scope of this editorial.[4]

WHAT ARE MONKEYPOX SYMPTOMS?

The most common symptoms of monkeypox are fever and rash. Thornhill *et al* summarised findings from 528 cases in 16 countries in the current outbreak.[5] Rash was present in 95% of cases, and fever was present in 62%. The rash can be widely disseminated but may not be readily evident in some cases; 39% of patients in the cohort had fewer than five lesions, and 10% had a single lesion. The rash is typically characterised as well- circumscribed, raised, deep-seated and often umbilicated (figure 1).

Additional features of monkeypox rash:

- Lesions tend to develop simultaneously and are relatively the same size on a single site of the body.
- Lesions tend to be centrifugal (concentrated on the face and distal extremities); however, in several recent cases, lesions started in the genital area.
- Lesions are often described as painful initially, becoming pruritic as they crust.
- Typical lesion progression evolves from papules → vesicles → pustules (may have central umbilication) → scabs (figure 2).

Symptoms of monkeypox typically begin within 2 weeks of exposure. The illness usually begins with a febrile prodrome associated with lymphadenopathy, malaise, headache and muscle aches. The rash typically begins within 5 days of the viral prodrome onset.

HOW IS MONKEYPOX SPREAD?

Monkeypox can spread several ways. The most common transmission route is via direct contact with monkeypox lesions or scabs. Other mechanisms include exposure to respiratory secretions and touching contaminated items.

In the current outbreak, transmission has been associated with intimate physical contact and sex, and, to date, the majority of cases have occurred in men who have sex with men. However, cases have occurred in women, pregnant women, heterosexual men and even secondary cases of infection in children. In other words, anyone could potentially contract monkeypox with skin-to-skin contact or prolonged (typically >3 hours) close contact to an infected individual's respiratory secretions.

Infected individuals are considered infectious from the onset of illness until all lesions have crusted over and a fresh layer of healthy skin has formed under the crust. This sequence typically occurs over 2–4 weeks.

CAN MONKEYPOX BE TRANSMITTED DURING SPORTS?

To our knowledge, transmission of monkeypox during athletic activities has not been described. However, the WHO identifies 'playing sports' as a reason to consider someone a 'contact' when performing contact tracing of an infected individual.[6] Transmission via athletic activity seems at least theoretically possible, particularly in sports with high levels of contact. For example, one component of the Centers for Disease Control and Prevention current definition for a 'high-risk' exposure is contact between an

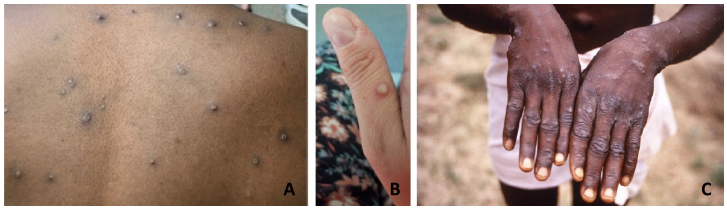

Figure 1 Monkeypox lesions. Source for (A, B): UK Health Security Agency (HSA) and the NHS England High Consequence Infectious Diseases Network; Source for (C)—Source: US Centers for Disease Control and Prevention (CDC) (Open source from CDC https://www.cdc.gov/ncezid/stories-features/global-stories/testing-tools-to-fight-mokeypox-drc.html). NHS, National Health Service.

Figure 2 Different stages of monkeypox lesions: (1) early vesicle, (2) pustule, (3) umbilicated pustule, (4) ulcerated skin lesion with developing scab, (5) crusted, mature lesions and (6) removed scab. Source: UK NHS Health Security Agency. https://www.gov.uk/guidance/monkeypox, https://www.gov.uk/guidance/monkeypox#clinical-features). NHS, National Health Service.

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Table 1 Prevention of secondary transmission of monkeypox infection in an athletic facility

Always practice standard precautions	These precautions include routine hand hygiene and use of appropriate personal protective equipment (PPE) when potentially exposed to infectious materials or bodily fluids.
Isolation	If an athlete presents with signs or symptoms concerning for monkeypox, put the athlete in a private room and close the door. Ideally, place a HEPA-filter in the room as well. When the athlete is ready to depart the room after evaluation, ensure the athlete is wearing a facemask and that any skin lesions are completely covered.
Perform a risk exposure assessment	Tools derived from the COVID-19 pandemic in the sports environment can be modified to identify if additional athletes are at risk of transmission from the index athlete.[9]
Personal protective equipment	When evaluating the athlete with potential or known monkeypox, use PPE consistent with 'airborne isolation' (gown, gloves, N95, and face shield).
Disinfection	Monkeypox virus is hardy and can persist on environmental surfaces, but it is easy to kill with disinfectants. Disinfect environmental surfaces contacted by the individual and any equipment recently used by the individual with an effective disinfectant.[10] Ideally, avoid unnecessary sharing of equipment and clothing.
Educate athletes to practice safe sex with barrier protection	While transmission through sports is theoretically possible, the primary source of transmission remains through sex.

exposed individual's broken skin or mucous membranes with skin lesions or bodily fluids from a person with monkeypox.[7] As athletes are at high risk for 'broken' skin, particularly with contact sports, it stands to reason that an athlete could be exposed during athletic activity or training. That said, if transmission through athletic activities were to occur, we believe transmission would be more likely within a team due to shared materials and longer durations of exposure than from one team to the other following brief player to player contact.

A major disruption from monkeypox for athletes would be the prolonged isolation. An athlete diagnosed with monkeypox should not participate in athletic activities, even if the lesions can be covered. An athlete with a confirmed case of monkeypox would miss 2–4 weeks of team activities.

WHAT PREVENTS THE TRANSMISSION OF MONKEYPOX?

While vaccination of at risk individuals is a critical intervention to prevent primary infection,[8] vaccine availability remains limited and most athletes are not vaccinated against monkeypox or smallpox. However, several infection prevention interventions can prevent secondary transmission in an athletic facility if a case is identified in an athlete (table 1).

CONCLUSIONS

The incidence of monkeypox is increasing throughout the world. While still a rare disease, a case of monkeypox in a sports team would lead to significant disruption. At minimum, the infected individual would miss multiple weeks of activity and could potentially transmit the virus to others on the team. At worst, the infected individual could have significant disease requiring hospitalisation and an outbreak may result in cancellation of sporting events. To prevent these complications, we recommend the following:

- Educate players and staff—emphasise that monkeypox can occur in anyone. If we have learnt anything from centuries of human behaviour, infections that spread through sexual or close contact can potentially impact any person.
- Have high suspicion for monkeypox in anyone with a rash+fever. Most clinicians have not seen real 'pox' infections like smallpox or monkeypox, so remain aware and vigilant.
- If a case of monkeypox is diagnosed on the team or in the facility, contact your local public health authorities for guidance on contact tracing. As monkeypox is not easily spread, we suspect one case will not require closing facilities or cancellations, particularly if the guidance recommended above is routinely followed. However, if one case is identified in a facility, all team members must be quickly educated about the importance of reporting any new skin lesions or rashes for the following 3 weeks.

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