Human Monkey Pox- Dental Implications and Public Health Emergency

Abstract

A viral disease that is mostly limited to African area is monkeypox (MPX). However, it has re-emergence recently in a number of places outside of nations where disease is prevalent. Humans may acquire the virus by coming into contact with infected individual, contaminated materials or diseased animals. Fever, headache, and enlarged lymph nodes are among the symptoms, which are followed by the development of excruciating skin sores. Typically, monkeypox is a self-limiting illness that goes away on its own without medical intervention. It can, however, occasionally be dangerous, especially for those with compromised immune systems. An interprofessional team comprising physicians, nurses, virologists, dentists, veterinarians, and public health specialists that can quickly detect MPX infection in people and animals, put preventative measures in place, and start public health reporting builds a strong defense against a catastrophic outbreak. An improved patient outcome will be facilitated by the interprofessional paradigm. Infection management in dentistry may face new difficulties as a result of the monkeypox virus's re-emerging global outbreak. Given the recent spread of MPXV in non-endemic areas where dentists are not accustomed to include this illness in the differential diagnosis, it is currently expected of all dental healthcare providers to be knowledgeable about the oral signs of MPX in order to perform an adequate oral screening and implement the necessary preventive measures for infection control in the dental practice. As the dental setup is more prone for aerosol cross infection strict infection control measures have to be followed in dental practice. In this article we have focussed the dental implications of MPX disease.

Keywords: Monkeypox; Dental Practice; Infection control; Public Health Emergency; Non endemic outbreak

Context

The World Health Organization has described the spread of the human monkeypox virus (MPXV) as "emerging threat of moderate health concern"(1). The high incidence of transmission makes it a serious issue for the healthcare authorities. Due to the possibility of cross-infection or occupational contact, dental practitioners may be affected by an outbreak of the viral infectious disease monkeypox. From the lessons we learnt from COVID-19 pandemic, the health care professionals need to be very cautious. As a result, we cannot overlook the re-emergence of monkey pox. Because they work closely with patients, dentists have the responsibility to lookout for early symptoms in order to control the disease spread. Aerosols are commonly produced during dental procedures and so infections are more prone to spread. The Centre for Disease Control and Prevention promote stringent airborne infection control protocols and the risk of airborne transmission. It is also potentially important in dental settings to be aware that monkeypox can spread through close contact with an infected individual, contaminated objects and surfaces, droplets and possibly aerosols. The importance of awareness about monkeypox infection among dental practitioners is addressed in this article,

along with how it might affect infection prevention and control procedures and dental service delivery.

Evidence acquisition

The double-stranded DNA virus MPXV, which is a member of the Poxviridae family and the genus Ortho pox virus is the cause of this zoonotic viral disease. This genus also includes the smallpox-causing Variola virus. This infection belongs to Hazard Group 3 and should only be treated in specialized facilities (2). MPXV is assumed to have its natural reservoirs in small rodents and other species that are native to Central Africa (3). The nasopharynx, oropharynx, and damaged skin are the main entrance and inoculation sites. The majority of the way that the virus spreads is by direct touch or secretions with infected patients, contaminated objects, animals and respiratory droplets. The 1958 report of the first pox-like illness in confined monkeys served as the basis for the virus name (4). Historically, MPXV has been divided into two clades, genotypically separate groups, that are called after the region in where it was initially discovered (5).

Modes of Spread

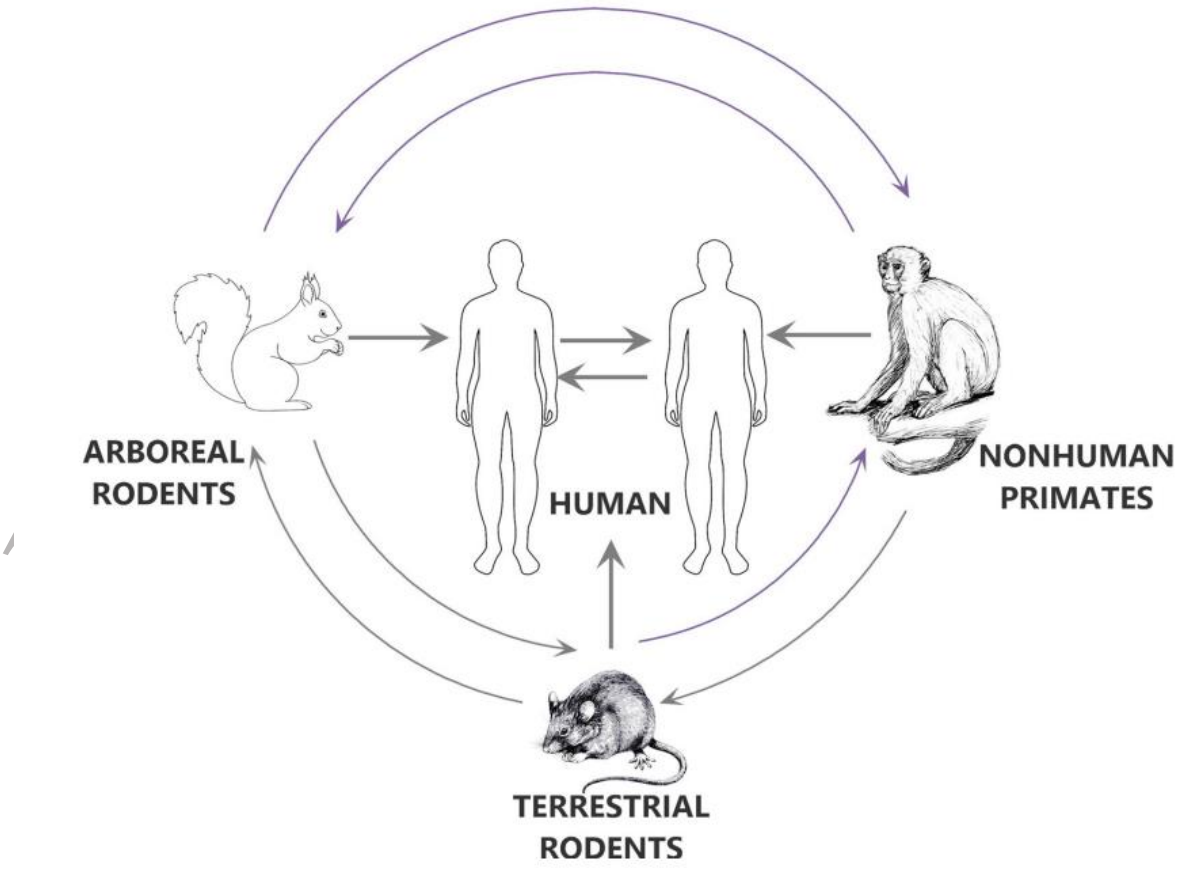

Figure 1 Modes of spread of monkeypox virus (6-8)

The different modes of spread are shown in figure 1. In the past, cases with limited human-to-human transmission both inside and outside of these regions were documented after

interaction with infected animals in Central and West Africa. However, the rapid emergence of MPX among people who are not necessarily connected or who have not travelled to Africa in several cities outside of the virus's endemic region, coupled with recent evidence suggesting person-to-person transmission, has been a major concern for many health authorities (9).

It is a self-limiting illness with a fatality incidence of 3–6% with symptoms that last for two to four weeks (10). This infectious condition affects the skin and soft tissues, including the oral cavity and is characterized by a rash. An ulcerative rash on the tongue or other oral mucosal surfaces is frequently the first sign of it and is shown in figure 2. It has been shown to induce intraoral lesions on the tongue, cheeks, palate, gums, and even the neck. These lesions can have a wide range of characteristics just like their external counterparts. In addition, only the prodromal or acute phase is thought to be infectious for MPX-positive individuals. While there is currently no vaccine for MPX, there is a smallpox vaccine that seems to work well. Therefore, an awareness must be created among dental health care providers and are expected to have knowledge about this relatively new danger.

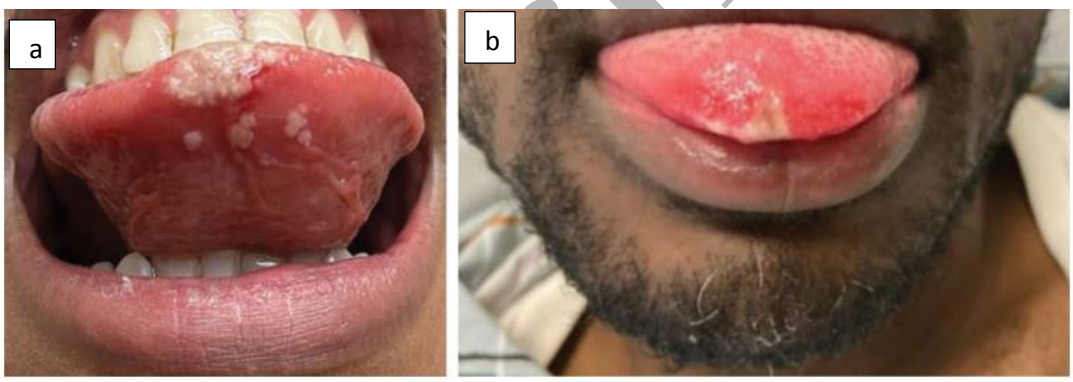

Figure 2 Oral lesions of monkeypox (11)

a) Ventral surface and tip of the tongue affected by confluent vesicular and ulcerated lesions;
b) Ulcerated lesion affecting the tip of the tongue with surrounding erythema

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As a result, the dental care provider community have to be informed about the re-emergence details on MPX symptoms. By asking patients about mouth sores and physically examining the tongue, oral cavity, and cheeks for rashes and lesions, dentists can assist in the diagnosis of monkeypox. The fact that the initial lesions begin in the oropharynx before appearing on the skin is noteworthy in the perspective of dentistry. Periodically, oral ulcers can make it difficult for a patient to eat or drink, which can lead to malnutrition and dehydration (12). The current outbreak was first reported to have perioral papules that blistered and ulcerated (13).

Oral ulcers were found to be present in nearly one-quarter (23.5%) of MPX patients in one study (14,15). Therefore, dental professionals may be the first to notice MPX's early warning signs in areas where the disease is endemic. As a result, dental professionals should exercise extreme caution when treating patients who have lymphadenopathy, especially if they operate in a region where the condition is common or endemic. Early-stage oral lesions were described in almost 70% of cases with monkeypox, necessitating a differential diagnosis from other oral lesions. Ulcerated lesions are frequently observed on the tonsils, buccal mucosa, and tongue in the oral mucosa (16). The latter could be confused for tonsillitis or other illnesses with ease. Oral mucosal lesions may not proceed in the same way as cutaneous monkeypox lesions, which complicates the differential diagnosis even further. Although the itchy maculopapular lesions of chickenpox are unlikely to be umbilicated as lesions from monkeypox frequently are, and herpes zoster typically presents with a dermatomal distribution of numerous vesicles that coalesce and crust, lesions caused by the varicella-zoster virus, including chickenpox and herpes zoster (shingles), may be included in a differential diagnosis.

Similar symptoms can be seen in molluscum contagiosum, a disorder brought on by the molluscum contagiosum virus, another member of the Poxviridae family. This virus causes elevated, pink lesions with a central dimple. When oral ulceration is the first symptom to appear, there are a few other possible causes to take into account, including traumatic ulceration (11). It is imperative that all patients have a comprehensive evaluation of their oral mucosa for macular, papular lesions.

The UK Health Security Agency has recommended taking the following precautions to avoid contracting MPXV infection.

- Strict attention to standard, contact, and droplet infection control precautions in dentistry is necessary. These precautions include the use of FFP3 respirators, N95 masks, eye protection, and clothing that is fluid-resistant (17).

- Those who are pregnant or very immunocompromised should not receive dental care in addition to being suspected of having an MPX infection.

- Postponing necessary dental care until the patient is no longer contagious in cases with probable or confirmed MPX.

- Procedures for acute patients requiring emergency dental treatment will be performed in a private room as opposed to a shared treatment area.

- Adherence to proper hand hygiene procedures is required, such as cleansing with alcohol-containing hand sanitizer or hand washing with soap and water.

- Care should be used when handling towels, hospital gowns, and linens.

- Refrain from touching anything that has come into contact with an MPX patient. Equipment used in patient care needs to be adequately sterilised.

Conclusion

The COVID-19 epidemic's after effects are already being felt by the healthcare systems, which are already under unnecessary strain due to rising medical costs. In order to manage the hazards associated with newly and re-emerging viral infectious illnesses in dental settings, more study is necessary. It is vitally important that dentistry, wider healthcare and research

funding bodies continue to prioritise research into IPC to ensure that services remain resilient in future emerging and re-emerging infectious disease outbreaks**.** We urge professionals take note of the existing guidelines and recommendations. Moreover, it could be necessary to update the current IPC recommendations in order to maintain their resilience in the event of future viral illness outbreaks. The monkeypox outbreak has brought attention to the critical need for reliable evidence to support IPC precautions against both established and newly emergent infectious diseases. Research must go on in order to make sure we are ready for whatever challenges lie ahead.

Acknowledgment

Not Applicable.

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Critical revision of the manuscript: Q.A.A., R.A.V.

Funding:

Nonfunded **-** The authors did not receive funds from any organization for the submitted work.

Conflict of Interest:

All the authors contributed equally in drafting the manuscript and the authors report there are no competing interests to declare.

Ethical Statement:

We hereby declare that all ethical standards have been respected in preparation of the submitted article.

References

1. CDC. Monkeypox. 2022. Available from: https://www.cdc.gov/poxvirus/monkeypox/clinicians/clinical-recognition.html. Accessed 11 June 2022.

2. UK Government. The Approved List of biological agents. 2021. Available at https://www.hse.gov.uk/pubns/ misc208.pdf (accessed September 2022)

3. Doty J B, Malekani J M, Kalemba L N et al. Assessing Monkeypox Virus Prevalence in Small Mammals at the Human-Animal Interface in the Democratic Republic of the Congo. Viruses 2017; 9: 283.

4. Von Magnus P, Andersen E, Petersen K, BirchAndersen A. A pox-like disease in cynomolgus monkeys. Acta Patholog Microbiol Scand 1959; 46:156–176.

5. Likos A M, Sammons S A, Olson V A et al. A tale of two clades: monkeypox viruses. J Gen Virol 2005; 86:2661–2672.

6. Petersen E, Kantele A, Koopmans M, et al. Human monkeypox: epidemiologic and clinical characteristics, diagnosis, and prevention. Infect Dis Clin North Am 2019;33(4):1027–43.

7. Fuller T, Thomassen HA, Mulembakani PM, et al. Using remote sensing to map the risk of human monkeypox virus in the Congo Basin. Ecohealth 2011;8(1):14–25.

8.Guagliardo SAJ, Doshi RH, Reynolds MG, et al. Do monkeypox exposures vary by ethnicity? Comparison of Aka and Bantu suspected monkeypox cases. Am J Trop Med Hyg 2020;102(1):202–5.

9. Saxena, Shailendra K., Saniya Ansari, Vimal K. Maurya, Swatantra Kumar, Amita Jain, Janusz T. Paweska, Anil K. Tripathi, and Ahmed S. Abdel-Moneim. "Reemerging human monkeypox: a major public-health debacle." J. Med. Virol. (In press).

10.Lakshman Samaranayake, Sukumaran Anil, The monkeypox outbreak and implications for dental practice, Int. Dent. J. 72 (2022) 589–596.

11. Peters S M, Hill N B, Halepas S. Oral Manifestations of Monkeypox: A Report of 2 Cases. J Oral Maxillofac Surg 2022; DOI: 10.1016/j.joms.2022.07.147.

12. World Health Organization. Clinical management and infection prevention and control for monkeypox: interim rapid response guidance, 10 June 2022. 2022. Available from: https://www.who.int/publications/i/item/WHO-MPX-Clinicaland-IPC-2022.1. Accessed 30 July 2022

13.Heskin J, Belfield A, Milne C, et al. Transmission of monkeypox virus through sexual contact - a novel route of infection. J Infect 2022. doi: 10.1016/j.jinf.2022.05.028

14. Huhn GD, Bauer AM, Yorita K, et al. Clinical characteristics of human monkeypox, and risk factors for severe disease. Clin Infect Dis 2005;41(12):1742–51.

15. Sookaromdee P, Wiwanitkit V. Mouth sores and monkeypox: a consideration. J Stomatol Oral Maxillofac Surg 2022. Epub ahead of print. doi: 10.1016/j.jormas.2022.06.020.

16. Thornhill J P, Barkati S, Walmsley S et al. Monkeypox Virus Infection in Humans across 16 Countries – April-June 2022. N Engl J Med 2022; 387: 679–691.

17. Agency UHS. Principles for monkeypox control in the UK: 4 nations consensus statement. 2022. Available from: https:// www.gov.uk/government/publications/principles-for-monkeypox-control-in-the-uk-4-nations-consensus-statement/ principles-for-monkeypox-control-in-the-uk-4-nations-consensus-statement. Accessed 11 June 2022.