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Short Communication

The Monkeypox Virus Outbreak and Dental Practice: Editorial

Arpit Sikri[1]* and Jyotsana Sikri[2]

[1]Associate Professor and Post Graduate Teacher, Department of Prosthodontics, Crown and Bridge and Oral Implantology, Bhojia Dental College and Hospital, Budh (Baddi), Himachal Pradesh, India

[2]Associate Professor and Post Graduate Teacher, Department of Conservative Dentistry and Endodontics, Bhojia Dental College and Hospital, Budh (Baddi), Himachal Pradesh, India

***Corresponding Author:** Arpit Sikri, Associate Professor and Post Graduate Teacher, Department of Prosthodontics, Crown and Bridge and Oral Implantology, Bhojia Dental College and Hospital, Budh (Baddi), Himachal Pradesh, India.

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Monkeypox, a zoonotic orthopoxvirus, unintentionally produces smallpox-like sickness in people, though with a far lower death rate. This virus is clinically noteworthy because it is native to western and central Africa and that outbreaks in the Western Hemisphere have been connected to the exotic pet trade and international travel. The monkeypox virus (MPV) was first isolated and identified in 1958 when sick monkeys were sent from Singapore to a research facility in Denmark. However, the first known human case of the virus was discovered in a toddler in the Democratic Republic of the Congo in 1970 who was believed to have smallpox. Vaccination against vaccinia coincidentally protected against the monkeypox virus before the eradication of smallpox and the subsequent absence of immunization attempts; nonetheless, monkeypox gained therapeutic relevance [1].

While recent travel to endemic locations, interaction with wild animals imported from endemic regions, and care for an infected animal or human can all serve as historical markers of monkeypox infection, clinical symptoms are critical in making a differential diagnosis.

The early symptoms of monkeypox differ from those of smallpox and include fever, headache, myalgia, fatigue, and lymphadenopathy. Skin lesions on the face, extremities, especially the palms and soles, and mucosal lesions in the mouth start to manifest after one to two days. Centrifugally, these lesions are concentrated. A few to thousands of lesions may be present overall, and the rash may or may not spread to other parts of the body.

The subsequent 2 to 4 weeks saw the lesions go through macular, papular, vesicular, and pustular phases at 1- to 2-day intervals. Lesions are hard, 2 to 10 mm in size, and go through synchronous change. Lesions stay in the pustular phase for 5–7 days before developing crusts. The condition often goes away on its own 3 to 4 weeks after symptoms first appear, with crusts growing and desquamating during the next 7 to 14 days. Once all of the crusts have disappeared, the patient is no longer thought to be contagious [2].

Poxviridae, chordopoxvirinae, and orthopoxvirus family are the names of the orthopoxvirus genus and species for the monkeypox virus. When viewed using an electron microscope, the monkeypox virus is quite large (200-250 nanometers). A lipoprotein sheath surrounds the brick-shaped double-stranded DNA genome of a xenovirus. Poxviruses rely on host ribosomes for mRNA translation in addition to having the necessary replication, transcription, assembly, and egress proteins in their genome [3].

Monkeypox, a zoonotic illness that is indigenous to central and western Africa, is most prevalent in the Democratic Republic of the Congo. Even though the disease was first identified in captive

monkeys, research indicates that African rodents are the natural reservoir (thus the name). Infections have been acquired by squirrels, rats, mice, primates, prairie dogs, and humans. Currently, there are only two clades that can be distinguished genetically from one another. The Congo Basin (Central African) clade is reported more frequently than the West African clade and has recorded occurrences of human-to-human transmission.

Outside of Africa, occasional clusters and cases of human monkeypox have been documented. In 2003, Gambian giant rats that were being trafficked from Ghana infected adjacent prairie dogs who were being sold as house pets in the Midwest of the United States. 53 persons developed monkeypox as a result. In October 2018, one instance involving a man from Nigeria who had traveled to Israel took place. One instance was a man who, in May 2019, took a flight from Nigeria to Singapore. In May 2021, three family members who had been to Nigeria returned to the United Kingdom after getting the monkeypox virus there. It's possible that transfer from one individual to another was the reason for the ordered development of symptoms in each case within the family (day 0, day 19, and day 33). One instance included a man who, in July 2021, took a flight from Nigeria to Texas. One incidence involved a man who arrived in Maryland from Nigeria in November 2021. On May 20, 2022, investigators are looking into a single instance of human monkeypox in a person who returned from Canada to Massachusetts and clusters of human monkeypox in the United Kingdom.

Precise prevalence and incidence figures are difficult to establish due to purported shortcomings in disease reporting and confirmation. Both measures, however, have increased after the routine smallpox vaccination was discontinued. There are several known risk factors for monkeypox infection, including living in rural and heavily forested areas of central and western Africa, handling and cooking bushmeat, caring for someone who has the monkeypox virus, and not having gotten a smallpox vaccination. The male gender has also been related to an increased risk of infection. However, this may be complicated by the social norm that men often engage in hunting and other forms of wild animal contact.

Transmission can happen through direct or indirect contact with the body fluids, skin lesions, or respiratory droplets of infected animals. Although historically limited, mathematical modeling in the context of falling herd immunity to orthopoxviruses suggests an increased threat of disease transfer between humans. The Centers for Disease Control and Prevention (CDC) suggest isolation in a negative pressure chamber, standard, contact, and droplet precautions, and if possible, escalation to airborne measures when dealing with patients in hospitals [4].

After viral entrance by any route (oropharynx, nasopharynx, or intradermal), the monkeypox virus multiplies at the injection site and then spreads to adjacent lymph nodes. Viral spread and organ seeding are then triggered by an initial viremia. This is the incubation period, which typically lasts between seven and fourteen days but can last up to 21.

There are 1-2 days of prodromal symptoms before the appearance of lesions, including lymphadenopathy and fever brought on by secondary viremia. Patients who are ill right now may be contagious. Oropharyngeal lesions can rise to skin lesions. By the time lesions start to form, serum antibodies are frequently detected [5].

The CDC developed case definition guidelines during the 2003 human monkeypox outbreak in the United States. However, endemic areas might not benefit as much from the same criteria. The epidemiological criterion's specificity decreases as more persons in the population could potentially come into contact with infectious creatures or people. Additionally, because varicella-zoster vaccination is not routinely administered in Africa, the specificity of the clinical criteria decreases as the prevalence of illnesses similar to the disease in question rises, as is the case with chickenpox. Although test evidence is still necessary to demonstrate human monkeypox infection, clinical and epidemiologic criteria are currently under investigation and may vary depending on the situation and the place.

Given the resemblance between smallpox and human monkeypox infection, it may be possible to choose patients for additional testing using the "Acute, Generalized Vesicular or Pustular Rash Illness Protocol" created by the CDC, which includes lymphadenopathy in addition to the essential primary criteria.

To confirm monkeypox infection, either viral culture isolation or PCR testing for monkeypox DNA from patient material can be

utilized. Alternatively, if a patient has not previously been exposed to another orthopoxvirus of the same genus, tests showing the presence of orthopoxvirus in a patient specimen may be sufficient for diagnosis. These tests include orthopoxvirus IgM and IgG serum testing, immunohistochemistry staining for orthopoxvirus antigens, and electron microscopy visualization (indicating prior exposure or vaccination) [6].

Clinically, monkeypox infection can be identified by the presence of rash conditions such as syphilis, measles, chickenpox, bacterial skin infections, scabies, and medication-related allergies. The emergence of lymphadenopathy during the prodromal stage of sickness distinguishes monkeypox infection from chickenpox or smallpox infection. To confirm the diagnosis, the polymerase chain reaction (PCR), the typical laboratory test for skin lesion samples, can be done to look for the monkeypox virus. PCR blood tests are often inconclusive because the virus cannot survive in the blood for an extended period. The patient's age, the day the fever first started, the stage at which the rash is currently, and the day the samples were taken must all be known to interpret test results. According to Indian standards, the incidents are classified as suspected, likely, and verified. Any individual regardless of age, who has visited one of the affected nations during the preceding 21 days and displays an unexplained rash in addition to one or more of the crucial signs and symptoms is deemed to be a suspected case (fever, headache, body ache, swollen lymph nodes, and weakness). The phrase "potential case", which designates a suspected case with a clinically compatible illness, refers to a suspected case with an epidemiological relationship, such as direct contact with skin or skin lesions, sexual intercourse, or contact with contaminated clothing, utensils, or bedding. The use of PCR or sequencing has been used to identify a confirmed case of monkeypox. Indian guidelines state that even one case of monkeypox will be considered to be an outbreak. These recommendations also involve certain surveillance techniques to swiftly spot and eradicate occurrences and clusters of illness. Among the core surveillance techniques are hospital-based and targeted surveillance, contact tracing, and testing of all symptomatic cases after the discovery of probable or confirmed cases [7].

Monkeypox infection has no recognized effective treatments at this time. Viral infections are treated with supportive symptom control. To prevent an outbreak, various precautions can be taken.

The infected person should remain in isolation, wear a surgical mask, and keep lesions covered as much as is practicable until all lesion crusts have naturally gone off and a new skin layer has developed. In extreme circumstances, compounds with proven efficacy against orthopoxviruses in animal studies and severe vaccinia vaccine sequelae may be studied. The intravenous vaccinia immune globulin, the oral DNA polymerase inhibitor brincidofovir, and the intracellular viral release inhibitor tecovirimat are not effective against the monkeypox virus.

Those who have been exposed to the virus should have their temperature and symptoms examined twice daily for 21 days, which is the accepted top limit of the incubation period for monkeypox. Because infectiousness occurs at the same time as the onset of symptoms, close contacts do not need to isolate while asymptomatic. A modified vaccinia, Ankara vaccine (live, non-replicating smallpox and monkeypox vaccine), is sometimes recommended as a post-exposure immunization. Contact between wounded skin or mucous membranes with an infected patient's body fluids, respiratory droplets, or scabs is a "high risk" exposure that demands post-exposure immunization as soon as feasible. According to the CDC, vaccination within four days of exposure may prevent the disease from developing, and vaccination within 14 days may lower the disease's severity.

The altered vaccine has issues with replication. The Ankara vaccine is given in a two-shot series separated by four weeks and has a higher safety profile than first- and second-generation smallpox vaccinations. In contrast, to live vaccinia virus preparations, Ankara does not result in a skin lesion or raise the risk of local or widespread transmission. Atopy and impaired immune systems are known to be contraindicated for the injection of live vaccinia, but clinical investigations have shown that modified vaccinia Ankara is safe and increases the production of antibodies in people with these disorders.

The potential benefits and drawbacks of prophylactic monkeypox vaccination in endemic locations require more thorough data collection and feasibility studies. Lack of access to healthcare, diagnostic equipment, and infrastructure makes it difficult to make well-informed decisions about how to best handle this neglected tropical disease [8].

There are two distinct clades of the monkeypox virus. The West African lineage has a better prognosis when the case fatality rate is less than 1%. On the other side, the Central Basin clade (Central African clade) is more lethal, with a case fatality rate of up to 11% in young, uninfected people. Within four weeks following the onset of symptoms, patients often recover completely, with the possible exception of scars and skin discoloration [9].

For differential diagnosis, clinicians must be on the lookout for rashes mimicking MPX and distinguish MPX from herpetic and similar vesicular-bullous lesions. The most common means of transmission are direct contact with MPX lesions or items belonging to the patient that have come into touch with lesions.

Therefore, while treating patients with MPX symptoms in dental care settings, transmission can be stopped by following conventional, contact, and droplet infection control precautions.

Additionally, due to the possibility of MPXV transmission through the air, airborne precautions should be performed following the risk assessment, and all participating dental staff members should wear N95 masks. The patient should be treated in isolation, and measures should be made to limit exposure to nearby people, like placing a surgical mask on the patient's nose and mouth and covering any exposed skin lesions. Dental surgeons and dental teams should take steps now to prevent the spread of the virus even though there is a low risk of transmission in dental offices by Being aware of the potential for monkeypox transmission by respiratory droplets at close range and through face-to-face contact. Maintaining knowledge of instances in their community, particularly through the local public health agency; doing essential screenings of patients and workers; and wearing the required PPE [10].

Indicating that MPX has become an important travel-related disease, at least for the time being, and that all healthcare professionals, including dentistry professionals, should be attentive to avoiding its spread, MPX has made several appearances outside of disease-endemic countries. It's somewhat surprising how MPXV appeared at the same time in so many different nations. The virus is currently being sequenced thoroughly to determine both its origin and the potential for high transmissibility. Longer-term indications point to it being another transient sporadic viral infection with little to no significant impact on health workers in underdeveloped countries, while dental staff in areas of Africa where the disease is endemic should be watchful.

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