OPEN ACCESS

Short Communication

# Monkeypox: Oral manifestation as diagnostic indicator

## Affenpocken: orale Manifestation als diagnostischer Indikator

## Abstract

Lesions of monkeypox affect the oral mucosa in approximately 70% of infected patients and reported as the first clinical sign of the disease, manifesting as macules, papules, vesicles, or blisters, which are highly contagious and are followed by the appearance of lesions on the face and extremities of the body. These lesions have clinical aspects like recurrent herpes simplex, herpes zoster, and secondary syphilis and should be part of differential diagnoses.
The clinical course after initial oral manifestation is shown to support the clinical diagnosis.

**Keywords:** monkeypox, oral manifestation, diagnostic indicator

## Zusammenfassung

Läsionen an der Mundschleimhaut werden bei etwa 70% der infizierten Patienten beobachtet und als erstes klinisches Anzeichen der Krankheit angegeben. Sie äußern sich auch als Makula, Papeln, Bläschen oder Blasen, die hochgradig ansteckend sind und auf die Läsionen im Gesicht und an den Extremitäten folgen. Diese Läsionen weisen klinische Aspekte auf, die denen von rezidivierendem Herpes simplex, Herpes zoster und sekundärer Syphilis ähneln, weshalb Affenpocken zu den Differentialdiagnosen gehören sollten.
Als Hilfestellung für die klinische Diagnose wird der klinische Verlauf nach oraler Erstmanifestation dargestellt.

**Schlüsselwörter:** Affenpocken, orale Manifestation, diagnostischer Indikator

**Raquel D'Aquino Garcia Caminha**[1]
**Gabriel de Toledo Telles-Araujo**[2]
**Gabriel Araujo-Silva**[3]
**Liliane Lins-Kusterer**[2]
**Paulo Sérgio da Silva Santos**[1]

1 Department of Surgery, Stomatology, Pathology and Radiology, Bauru Dental School, University of São Paulo, Bauru, Brazil

2 School of Medicine, Federal University of Bahia, Salvador, Brazil

3 Piracicaba Dental School, University of Campinas, Piracicaba, Brazil

## Introduction

Monkeypox (MP) is a disease caused by the Monkeypox DNA virus (genus: Orthopoxvirus, family: Poxviridae), a zoonotic pathogen, which is spreading rapidly worldwide [1], [2]. Transmission of MP occurs through direct contact with saliva and respiratory secretions or from virus-infected lesions, through contact on contaminated surfaces, clothing, and objects, and through sexual intercourse [3], [4], [5], [6]. The presence of the virus is documented in semen [7], [8], [9], saliva [7], [9], nasopharyngeal swabs [7], [9], [10], urine [9], blood [7], [8], [9], [10], urine [7], [9], faeces [7], [9], rectal swab [9], skin lesions [8], [9] as well as in oral, pharyngeal and rectal lesions [9].
To date, the most affected population is homosexual patients, mainly males [11], aged between 21 and 40 years [2] and who have not been vaccinated against smallpox [1], [12], [13]. Penetration of the virus may occur via the oropharynx, nasopharynx, and/or skin and then a period of inoculation will occur with subsequent spread of the virus to the lymph nodes and an incubation period of approximately ranging from 7 to 21 days [14].

Clinically, the first signs and symptoms of the disease may appear from the 1st to the 5th day after contamination and manifest themselves through lymphadenopathies (prevalent characteristic), fever, fatigue, headache, and myalgias [15]. After the disappearance of fever, already in the second phase, the patient evolves with numerous rashes on the skin and mucous membranes such as the buccal, genital, cornea, and conjunctiva, with specific sequential stages of macules, papules, vesicles, pustules, crusts, in a typically centripetal manner and that after a few days or weeks heal, leaving the skin and mucosa integral [16], [17], [18], [19], [20]. The literature reports that some cases may also evolve with anal lesions, rectal pain, and penile edema [21], [22].

## Oral manifestation of monkeypox

Lesions affecting the oral mucosa have been observed in approximately 70% of infected patients [23] and are reported as the first clinical sign of the disease, also manifesting as macules, papules, vesicles, or blisters, which are highly contagious and are followed by the ap-


**Figure 1: Clinical course of oral manifestation of monkeypox**
(A) Initial oral manifestation with the presence of a papule, (B) After 7 days a larger lesion with scaling and crusting, (C) After 12 days with an ulcer affecting the lip and lower lip mucosa, (D) After 15 days an ulcer on the lower lip with regression in size and the healing process.

pearance of lesions on the face and extremities of the body. These lesions have clinical aspects similar to recurrent herpes, herpes zoster, and secondary syphilis and for this reason, MP should be part of the differential diagnoses [24]. In Figure 1 a typical clinical course is shown. The oral lesions of MP present painful symptoms and interfere with feeding, generating a picture of dysphagia/odynophagia, dehydration, and malnutrition, worsening the systemic picture and quality of life [24]. It is noteworthy that oral lesions, regardless of the stage, are contaminated by the virus which consequently enables its spread [21].

## Discussion

The oral cavity may be one of the initial sites of the MP lesions, making it essential for health professionals to be informed about these signs and symptoms, which will allow early diagnosis, favoring the prognosis of the patient, besides minimizing infection to other people and the professional himself during clinical care [23]. The secretion from oral lesions can be collected with a swab to identify the DNA of the virus [25] and analyzed through the Polymerase Chain Reaction test for the diagnosis of MP, which is considered the gold standard for this diagnosis [23].

The clinical management of oral lesions of MP may include chemical control through mouthrinses with antimicrobials that will decrease the viral load in the oral cavity, such as 0.12% chlorhexidine without alcohol [26] and mechanical control through patient instruction on the best technique to perform oral hygiene, application of topical or systemic (acyclovir, fanciclovir, penciclovir, cidofovir) antivirals to the lesions [27]. In addition, it is also possible to associate the topical use of benzydamine hydrochloride, which will promote pain control through its anti-inflammatory, analgesic, and anesthetic action, providing greater comfort for the patient to eat properly [28], [29]. The use of low-power lasers presents great results to accelerate injury repair, analgesia, and anti-inflammatory effect, which may also be associated with photodynamic therapy to help reduce the viral load [30]. Laser therapy can also be applied in the management of MP, if its application is feasible, given the limited access to these patients due to the risk of spreading the disease. There are no studies in the literature that use these treatment modalities specifically for cases of MP, but there is scientific evidence of effective results in similar clinical situations, in the treatment of viral lesions, as mentioned above.

The biosafety measures widely discussed during the Covid-19 pandemic [31], should be applied in suspected and/or confirmed cases of MP, such as a thorough anamnesis, use of N-95 or PFF-2 mask, face shield, disposable apron, goggles, abundant hand washing before and aftercare, in addition to all the recommended care with the care environment (including chair covered with disposable sheets) and contaminated materials [32], [33], [34], [35]. In outpatient care, it is recommended to guide the patient to come to the consultation wearing a mask, with the skin lesions covered, without a companion (who may be contaminated), and not bringing personal objects are also considered preventive measures [32].

During care, the patient should be instructed not to move around too much to minimize the chances of rupture of the skin lesions, which would increase the risk of spreading the virus present in these lesions [32].

## Conclusions

Oral lesions can be initial foci of MP, are symptomatic, and can be part of the early diagnosis of MP and its consequent treatment, improving the prognosis and quality of life of the affected patient.

# Notes

## Competing interests

The authors declare that they have no competing interests.

## Authors' ORCID


- Raquel D'Aquino Garcia Caminha: https://orcid.org/0000-0002-8361-3894
- Gabriel de Toledo Telles-Araujo: https://orcid.org/0000-0002-9577-2008
- Gabriel Araujo-Silva: https://orcid.org/0000-0003-2235-9519
- Liliane Lins-Kusterer: https://orcid.org/0000-0003-3736-0002
- Paulo Sérgio da Silva Santos: https://orcid.org/0000-0002-0674-3759


# References


1. Kraemer MUG, Tegally H, Pigott DM, Dasgupta A, Sheldon J, Wilkinson E, Schultheiss M, Han A, Oglia M, Marks S, Kanner J, O'Brien K, Dandamudi S, Rader B, Sewalk K, Bento AI, Scarpino SV, de Oliveira T, Bogoch II, Katz R, Brownstein JS. Tracking the 2022 monkeypox outbreak with epidemiological data in real-time. Lancet Infect Dis. 2022 Jul;22(7):941-2. DOI: 10.1016/S1473-3099(22)00359-0
2. Pan American Health Organization; World Health Organization. Monkeypox Situation Report. Washington, D.C.: PAHO/WHO; 2022 Aug 11. Available from: https://www.paho.org/en/documents/weekly-situation-report-monkeypox-multi-country-outbreak-response-region-americas-12
3. Centers for disease control and prevention. Monkeypox. 2022 [Accessed 2022 Aug 25]. Available from: From:https://www.cdc.gov/poxvirus/monkeypox/clinicians/clinical-recognition.html (link nicht mejr gültig)
4. Nolen LD, Osadebe L, Katomba J, Likofata J, Mukadi D, Monroe B, Doty J, Kalemba L, Malekani J, Kabamba J, Bomponda PL, Lokota JI, Balilo MP, Likafi T, Lushima RS, Tamfum JJ, Okitolonda EW, McCollum AM, Reynolds MG. Introduction of Monkeypox into a Community and Household: Risk Factors and Zoonotic Reservoirs in the Democratic Republic of the Congo. Am J Trop Med Hyg. 2015 Aug;93(2):410-5. DOI: 10.4269/ajtmh.15-0168
5. Nolen LD, Osadebe L, Katomba J, Likofata J, Mukadi D, Monroe B, Doty J, Hughes CM, Kabamba J, Malekani J, Bomponda PL, Lokota JI, Balilo MP, Likafi T, Lushima RS, Ilunga BK, Nkawa F, Pukuta E, Karhemere S, Tamfum JJ, Nguete B, Wemakoy EO, McCollum AM, Reynolds MG. Extended Human-to-Human Transmission during a Monkeypox Outbreak in the Democratic Republic of the Congo. Emerg Infect Dis. 2016 Jun;22(6):1014-21. DOI: 10.3201/eid2206.150579
6. McCollum AM, Damon IK. Human monkeypox. Clin Infect Dis. 2014 Jan;58(2):260-7. DOI: 10.1093/cid/cit703
7. Antinori A, Mazzotta V, Vita S, Carletti F, Tacconi D, Lapini LE, D'Abramo A, Cicalini S, Lapa D, Pittalis S, Puro V, Rivano Capparuccia M, Giombini E, Gruber CEM, Garbuglia AR, Marani A, Vairo F, Girardi E, Vaia F, Nicastri E; INMI Monkeypox Group. Epidemiological, clinical and virological characteristics of four cases of monkeypox support transmission through sexual contact, Italy, May 2022. Euro Surveill. 2022 Jun;27(22):2200421. DOI: 10.2807/1560-7917.ES.2022.27.22.2200421
8. Noe S, Zange S, Seilmaier M, Antwerpen MH, Fenzl T, Schneider J, Spinner CD, Bugert JJ, Wendtner CM, Wölfel R. Clinical and virological features of first human monkeypox cases in Germany. Infection. 2023 Feb;51(1):265-70. DOI: 10.1007/s15010-022-01874-z
9. Peiró-Mestres A, Fuertes I, Camprubí-Ferrer D, Marcos MÁ, Vilella A, Navarro M, Rodriguez-Elena L, Riera J, Català A, Martínez MJ, Blanco JL; Hospital Clinic de Barcelona Monkeypox Study Group. Frequent detection of monkeypox virus DNA in saliva, semen, and other clinical samples from 12 patients, Barcelona, Spain, May to June 2022. Euro Surveill. 2022 Jul;27(28):. DOI: 10.2807/1560-7917.ES.2022.27.28.2200503
10. Adler H, Gould S, Hine P, Snell LB, Wong W, Houlihan CF, Osborne JC, Rampling T, Beadsworth MB, Duncan CJ, Dunning J, Fletcher TE, Hunter ER, Jacobs M, Khoo SH, Newsholme W, Porter D, Porter RJ, Ratcliffe L, Schmid ML, Semple MG, Tunbridge AJ, Wingfield T, Price NM; NHS England High Consequence Infectious Diseases (Airborne) Network. Clinical features and management of human monkeypox: a retrospective observational study in the UK. Lancet Infect Dis. 2022 Aug;22(8):1153-62. DOI: 10.1016/S1473-3099(22)00228-6
11. Mahase E. Seven monkeypox cases are confirmed in England. BMJ. 2022 May;377:o1239. DOI: 10.1136/bmj.o1239
12. Otu A, Ebenso B, Walley J, Barceló JM, Ochu CL. Global human monkeypox outbreak: atypical presentation demanding urgent public health action. Lancet Microbe. 2022 Aug;3(8):e554-e555. DOI: 10.1016/S2666-5247(22)00153-7
13. Kozlov M. Monkeypox outbreaks: 4 key questions researchers have. Nature. 2022 Jun;606(7913):238-9. DOI: 10.1038/d41586-022-01493-6
14. Hahon N, McGavran MH. Air-borne infectivity of the variola-vaccinia group of poxviruses for the cynomolgus monkey, Macaca irus. J Infect Dis. 1961;109:294-8. DOI: 10.1093/infdis/109.3.294
15. Patel A, Bilinska J, Tam JCH, Da Silva Fontoura D, Mason CY, Daunt A, Snell LB, Murphy J, Potter J, Tuudah C, Sundramoorthi R, Abeywickrema M, Pley C, Naidu V, Nebbia G, Aarons E, Botgros A, Douthwaite ST, van Nispen Tot Pannerden C, Winslow H, Brown A, Chilton D, Nori A. Clinical features and novel presentations of human monkeypox in a central London centre during the 2022 outbreak: descriptive case series. BMJ. 2022 Jul 28;378:e072410. DOI: 10.1136/bmj-2022-072410
16. Adler H, Gould S, Hine P, Snell LB, Wong W, Houlihan CF, Osborne JC, Rampling T, Beadsworth MB, Duncan CJ, Dunning J, Fletcher TE, Hunter ER, Jacobs M, Khoo SH, Newsholme W, Porter D, Porter RJ, Ratcliffe L, Schmid ML, Semple MG, Tunbridge AJ, Wingfield T, Price NM; NHS England High Consequence Infectious Diseases (Airborne) Network. Clinical features and management of human monkeypox: a retrospective observational study in the UK. Lancet Infect Dis. 2022 Aug;22(8):1153-62. DOI: 10.1016/S1473-3099(22)00228-6
17. Minhaj FS, Ogale YP, Whitehill F, Schultz J, Foote M, Davidson W, Hughes CM, Wilkins K, Bachmann L, Chatelain R, Donnelly MAP, Mendoza R, Downes BL, Roskosky M, Barnes M, Gallagher GR, Basgoz N, Ruiz V, Kyaw NTT, Feldpausch A, Valderrama A, Alvarado-Ramy F, Dowell CH, Chow CC, Li Y, Quilter L, Brooks J, Daskalakis DC, McClung RP, Petersen BW, Damon I, Hutson C, McQuiston J, Rao AK, Belay E, McCollum AM; Monkeypox Response Team 2022. Monkeypox Outbreak - Nine States, May 2022. MMWR Morb Mortal Wkly Rep. 2022 Jun;71(23):764-9. DOI: 10.15585/mmwr.mm7123e1
18. Ogoina D, Iroezindu M, James HI, Oladokun R, Yinka-Ogunleye A, Wakama P, Otike-Odibi B, Usman LM, Obazee E, Aruna O, Ihekweazu C. Clinical Course and Outcome of Human Monkeypox in Nigeria. Clin Infect Dis. 2020 Nov;71(8):e210-e214. DOI: 10.1093/cid/ciaa143

19. Mahase E. Monkeypox: What do we know about the outbreaks in Europe and North America? BMJ. 2022 May;377:o1274. DOI: 10.1136/bmj.o1274

20. Brown K, Leggat PA. Human Monkeypox: Current State of Knowledge and Implications for the Future. Trop Med Infect Dis. 2016 Dec;1(1):. DOI: 10.3390/tropicalmed1010008

21. Patel A, Bilinska J, Tam JCH, Da Silva Fontoura D, Mason CY, Daunt A, Snell LB, Murphy J, Potter J, Tuudah C, Sundramoorthi R, Abeywickrema M, Pley C, Naidu V, Nebbia G, Aarons E, Botgros A, Douthwaite ST, van Nispen Tot Pannerden C, Winslow H, Brown A, Chilton D, Nori A. Clinical features and novel presentations of human monkeypox in a central London centre during the 2022 outbreak: descriptive case series. BMJ. 2022 Jul;378:e072410. DOI: 10.1136/bmj-2022-072410

22. Thornhill JP, Barkati S, Walmsley S, Rockstroh J, Antinori A, Harrison LB, Palich R, Nori A, Reeves I, Habibi MS, Apea V, Boesecke C, Vandekerckhove L, Yakubovsky M, Sendagorta E, Blanco JL, Florence E, Moschese D, Maltez FM, Goorhuis A, Pourcher V, Migaud P, Noe S, Pintado C, Maggi F, Hansen AE, Hoffmann C, Lezama JI, Mussini C, Cattelan A, Makofane K, Tan D, Nozza S, Nemeth J, Klein MB, Orkin CM; SHARE-net Clinical Group. Monkeypox Virus Infection in Humans across 16 Countries - April-June 2022. N Engl J Med. 2022 Aug;387(8):679-91. DOI: 10.1056/NEJMoa2207323

23. Samaranayake L, Anil S. The Monkeypox Outbreak and Implications for Dental Practice. Int Dent J. 2022 Oct;72(5):589-96. DOI: 10.1016/j.identj.2022.07.006

24. World Health Organization. Clinical management and infection prevention and control for monkeypox: interim rapid response guidance, 10 June 2022. Geneva: World Health Organization; 2022. p. 56. Available from: https://www.who.int/publications/i/item/WHO-MPX-Clinical-and-IPC-2022.1

25. Li Y, Olson VA, Laue T, Laker MT, Damon IK. Detection of monkeypox virus with real-time PCR assays. J Clin Virol. 2006 Jul;36(3):194-203. DOI: 10.1016/j.jcv.2006.03.012

26. Santos DSF, Peralta-Mamani M, Brandão FS, Andrade FB, Cruvinel T, Santos PSDS. Could polyhexanide and chlorine dioxide be used as an alternative to chlorhexidine? A systematic review. Sao Paulo Med J. 2022;140(1):42-55. DOI: 10.1590/1516-3180.2020.0776.R1.18052021

27. Hirata CH. Oral manifestations in AIDS. Braz J Otorhinolaryngol. 2015;81(2):120-3. DOI: 10.1016/j.bjorl.2014.12.001

28. Epstein JB, Silverman S Jr, Paggiarino DA, Crockett S, Schubert MM, Senzer NN, Lockhart PB, Gallagher MJ, Peterson DE, Leveque FG. Benzydamine HCl for prophylaxis of radiation-induced oral mucositis: results from a multicenter, randomized, double-blind, placebo-controlled clinical trial. Cancer. 2001 Aug;92(4):875-85. DOI: 10.1002/1097-0142(20010815)92:4<875::aid-cncr1396>3.0.co;2-1

29. Chitapanarux I, Tungkasamit T, Petsuksiri J, Kannarunimit D, Katanyoo K, Chakkabat C, Setakornnukul J, Wongsrita S, Jirawatwarakul N, Lertbusayanukul C, Sripan P, Traisathit P. Randomized control trial of benzydamine HCl versus sodium bicarbonate for prophylaxis of concurrent chemoradiation-induced oral mucositis. Support Care Cancer. 2018 Mar;26(3):879-86. DOI: 10.1007/s00520-017-3904-4

30. Ajmal M. Effectiveness of photodynamic therapy as an adjunct to topical antiviral therapy in the treatment of herpes labialis: A randomized controlled clinical trial. Photodiagnosis Photodyn Ther. 2021 Jun;34:102302. DOI: 10.1016/j.pdpdt.2021.102302

31. de Toledo Telles-Araujo G, Caminha RDG, Kallás MS, Sipahi AM, da Silva Santos PS. Potential mouth rinses and nasal sprays that reduce SARS-CoV-2 viral load: What we know so far? Clinics (Sao Paulo). 2020 Nov;75:e2328. DOI: 10.6061/clinics/2020/e2328

32. UK Health Security Agency (UKHSA); Public Health Scotland; Public Health Wales; Public Health Agency Northern Ireland. Guidance – Principles for control of non-HCID mpox in the UK: 4 nations consensus statement. 2022 [Accessed 2022 Aug 24]. Available from https://www.go33263622v.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

33. Samaranayake L. Essential microbiology for dentistry. 5th ed. Edinburgh, UK: Elsevier Health Sciences; 2018. p. 1-400.

34. Tsagkaris C, Eleftheriades A, Laubscher L, Vladyckuk V, Papadakis M. Viruses monkeying around with surgical safety: Monkeypox preparedness in surgical settings. J Med Virol. 2023 Jan;95(1):e27915. DOI: 10.1002/jmv.27915

35. Cunha BE. Monkeypox in the United States: an occupational health look at the first cases. AAOHN J. 2004 Apr;52(4):164-8.

36. 24. Ministério da Saúde. [Accessed 2022 Aug 25]. Available from: file:///C:/Users/raque/Downloads/Boletim_monkeypox_6%20-%20SE%2027_09_07_2022.pdf [Link funktioniert nicht]



**Corresponding author:**
Paulo Sérgio da Silva Santos, PhD, MSc, DDS
Department of Surgery, Stomatology, Pathology and Radiology, Bauru Dental School, University of São Paulo, Alameda Octávio Pinheiro Brisola, 9-75, 17012-901, Bauru, São Paulo, Brazil; phone: +55 (14) 3226-6113; paulosss@fob.usp.br



***Please cite as***
*D'Aquino Garcia Caminha R, de Toledo Telles-Araujo G, Araujo-Silva G, Lins-Kusterer L, da Silva Santos PS. Monkeypox: Oral manifestation as diagnostic indicator. GMS Hyg Infect Control. 2024;19:Doc74. DOI: 10.3205/dgkh000529, URN: urn:nbn:de:0183-dgkh0005295*

***This article is freely available from***
*https://doi.org/10.3205/dgkh000529*

***Published:*** *2024-12-16*