CASE REPORT

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Assessment of submandibular sialolithiasis with panoramic and occlusal radiographs: diagnostic relevance in a clinical case

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ABSTRACT

Objectives: This case report aims to describe the radiographic appearance of sialolithiasis on occlusal and panoramic radiographs.

Case Report: A 27-year-old female patient came to RSGMP UNHAS with complaints of a lump under her right tongue. Before the lump appeared, the patient complained of pain under his right tongue. The swelling began approximately one week ago, initially about the size of a green bean. It has progressively increased in size until the present time. On occlusal radiography imaging, an irregular round radiopaque focus was found, and on panoramic radiography of the right mandibular zone, a well-defined radiopaque image in the form of an elongated oval/cylindrical shape was found. Case management: After clinical examination and panoramic and occlusal radiographs, a sialolithectomy was performed under general anesthesia in the right sublingual area

Conclusion: This case report is to describe radiographically the appearance of sialolithiasis on panoramic radiographs and occlusal radiographs, which is clearly visible in this case.

Keywords: *Radiography, panoramic; salivary glands; sialolithiasis; submandibular gland*
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INTRODUCTION

Sialolithiasis is one of the most common disorders of the salivary glands, and the submandibular gland is the most commonly affected gland.[1] Although the exact cause of sialolithiasis is unknown, sustained changes in the flow and amount of saliva are believed to trigger the deposition of amorphous tricalcium phosphate, which then crystallizes and transforms into hydroxyapatite. This process also leads to the deposition of calcified substances that contribute to the formation of a sialolith.[2,3] Compared to other salivary glands, a more alkaline pH in the submandibular gland is associated with a higher calcium concentration. This causes the saliva produced to be thicker because the anatomy of the salivary ducts in these glands is long and tortuous. In addition, the higher position of the salivary ducts causes gravity-defying drainage.[4]

The clinical features of sialolithiasis are often recognizable, typically presenting as intermittent painful swelling in the region of the affected salivary gland, particularly during meals, along with local tenderness. The presence of these symptoms frequently facilitates clinical diagnosis.[5,6,7] The prognosis varies depending on the cause. However, if surgical treatment is required to resolve sialolith stones, the prognosis is generally good.[8]

The following therapies are recommended for the management of sialolithiasis: Drug treatment: A combination of antispasmodics to enlarge the diameter of the ostium and antibiotics, especially in cases of infection or invasive treatment such as amoxicillin or macrolides. Surgical treatment: Includes intra- or extra-oral approaches, such as excision of the calculus or the gland itself. Extracorporeal lithotripsy: A method of breaking up the calculus with ultrasonic waves or laser. Sialendoscopy: Localization and ablation of stones using a camera and sonde. In addition, palliative therapies that combine conservative therapies, such as duct milking, can be effective for treating small and easily accessible stones. However, if the stones are large and inaccessible, surgical therapy should be considered if conservative approaches are unsuccessful.[9] The importance of proper treatment early on is emphasized as sialolithiasis can cause irreversible damage to the gland, which in turn can lead to chronic infection and atrophy.[10] This is particularly important considering the vital role of saliva in maintaining digestive health, lubricating the oral cavity, and protecting the teeth against decay.[11,12]

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CASE REPORT

A 27-year-old female presented to RSGMP Hasanuddin University with a progressively enlarging lump under the right side of the tongue, which appeared approximately one week prior and was preceded by localized pain. Initial self-medication with ibuprofen was ineffective, and she was later prescribed dexamethasone, ibuprofen, and metronidazole at a local clinic before referral. She reported no swallowing difficulty, systemic illness, or relevant family history, but had a known allergy to ciprofloxacin. Extraoral examination revealed symmetrical facial features with normal mouth opening and no palpable lymphadenopathy. Intraorally, a reddish, tender, mobile, spongy mass measuring 2.8 × 1 × 0.5 cm was found in the right sublingual region. Oral hygiene was moderate, with dental calculus present. Tooth 18 was partially erupted, while teeth 28, 38, and 48 were unerupted, all without signs of inflammation. Occlusal radiography revealed an irregular, round radiopaque mass at the right mandibular base (100.02 × 88.85 mm) with surrounding bone within normal limits (Figure 3). A panoramic radiograph showed a well-defined, oval-to-cylindrical radiopaque structure extending across teeth 43–45, with no pathological changes in adjacent structures (Figure 4).

Figure 1. Extraoral clinical examination showing a symmetrical face without swelling and normal mouth opening

Figure 2. Intra-oral examination, there is a lump a.r sublingual dextra

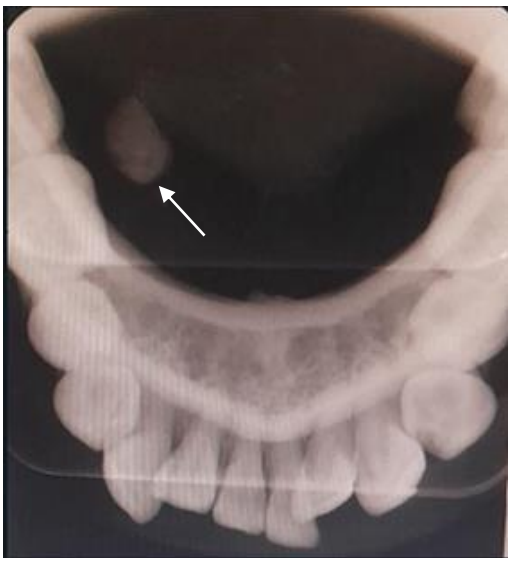

Figure 3. Occlusal radiograph showing a radiopaque image at the base of the right mandible (white arrow)

Figure 4. Panoramic imaging showed a linear radiopaque lesion superimposed over the apical area of teeth 43 to 45 (white arrow)

DISCUSSION

In dental radiography, mandibular intraoral occlusal and panoramic images are the conventional methods often used to detect sialolithiasis.[7] Although generally useful, conventional radiography has limitations in sensitively detecting stones. Although about 80-90% of stones can be seen on such images, about 20% of stones still remain undetected, mainly due to poor calcification.[13] In patients with stones that appear radiopaque and radiolucent, it is a very rare occurrence. Therefore, if one radiopaque stone can be detected, this is sufficient to reduce the chance of additional radiolucent stones. However, there are other calcifications in the area that may confuse the diagnosis, such as: i) Phleboliths or calcified intravascular thrombi occurring either in the hemangioma or in the veins of the tongue. ii) Calcified cervical lymphadenopathy, which may appear in response to tuberculosis infection. iii). Calcifications that occur in the tongue arteries due to atherosclerosis, which show calcifications along the floor of the mouth.[14] In the case of sialolithiasis, preoperative history, clinical examination, and radiographic evaluation play a crucial role in establishing a definitive diagnosis and formulating an effective treatment plan.[15,16] Salivary gland imaging is crucial in determining the location, type and extent of the lesion, as well as assisting in evaluating the duct morphology and determining the appropriate biopsy site. In addition, imaging also helps to formulate an optimal treatment strategy. Panoramic imaging has proven to be a very useful method in diagnosing sialolithiasis and helps in directing treatment.[7] Although the panoramic view provides a good representation of the parotid gland, its anatomical structure may overlap with oval or elongated lesions. Sialolith stones can be seen on panoramic as lesions that are round, oval, cylindrical, or irregular in shape.[13,17] The size of sialolith stones generally ranges from 5 to 10 mm, and stones larger than 10 mm are rare.[18] As shown in Figure 5, the panoramic radiograph provides a comprehensive view of the dentomaxillofacial structures; however, the drawback lies in the potential overlap of mandibular anatomical structures, which may obscure critical radiopaque or radiolucent findings and complicate accurate interpretation. (Figure 5) Here are several types of calcifications that can be confused with stones or lesions located within the bone. Stones located in the submandibular gland are usually detected on panoramic images if they are at the back of the excretory duct (Figure 6).[13]

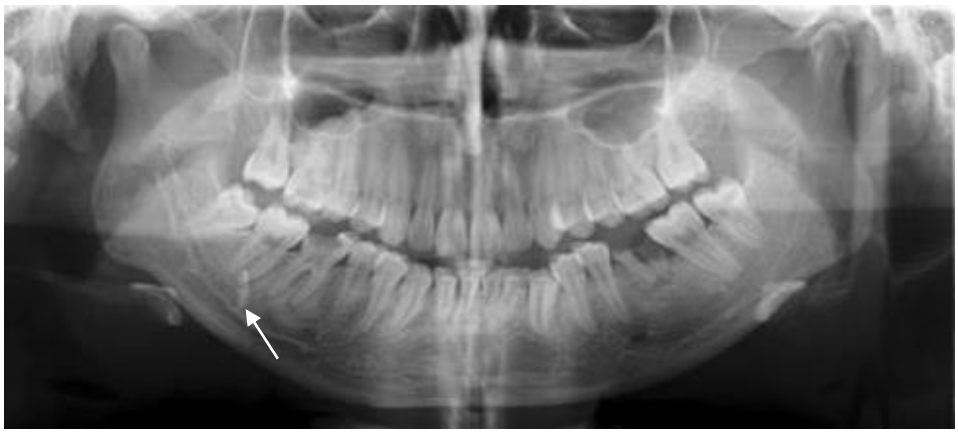

Figure 5. Panoramic radiograph demonstrates a unilateral radiopaque lesion in the posterior right mandibular body, superimposed over the inferior border of the mandible (white arrow)

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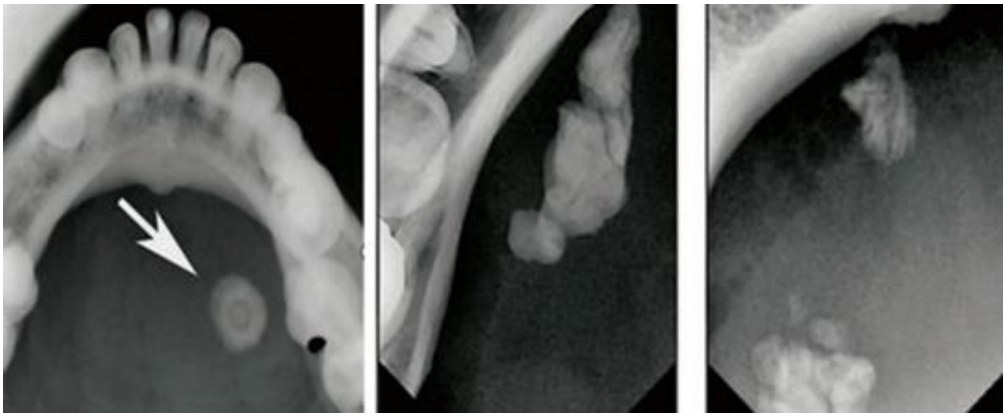

Figure 6. Intraoral occlusal radiograph shows a single, well-defined radiopaque mass in the right posterior floor of the mouth, indicating a possible submandibular sialolith

Radiological imaging plays a pivotal role in identifying the location of stones within the parotid gland. In addition to panoramic and occlusal radiographs, other modalities such as sialography, ultrasonography, computed tomography (CT), and cone beam computed tomography (CBCT) are commonly employed for diagnostic evaluation.[17] Clinical manifestations of salivary flow obstruction are typically evident, including localized swelling and pain that intensifies before and during meals, followed by gradual pain relief post-prandially. Chronic, recurrent ductal obstruction may lead to secondary inflammation and infection.[16] Ultrasonography, a noninvasive and readily available modality, demonstrates high diagnostic performance in detecting sialoliths, with reported specificity, sensitivity, and overall accuracy of approximately 95%.[18] Sialography remains valuable in assessing ductal integrity and identifying non-radiopaque sialoliths that may be missed on conventional radiographic imaging.[19]

On the use of standard radiographs, such as occlusal, it is usually sufficient to find stones in the submandibular and lingual salivary glands. However, not all calcifications can be detected with conventional radiographic methods, requiring further examinations such as computerized tomography, sialography, ultrasonography, scintigraphy or magnetic resonance.[1] Although conventional radiography is still useful for initial screening of salivary duct stones, modern imaging techniques using ultrasonography or CT scan can provide a more accurate diagnosis and pinpoint the position of the sialolith.[20]

CONCLUSION

Panoramic and occlusal radiographs are commonly used to detect submandibular sialoliths, though overlapping structures may limit visibility. While useful for initial screening, advanced imaging such as CT, sialography, ultrasound, or MRI provides a more accurate diagnosis and localization.

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FOOTNOTES

All authors declare that there is no conflict of interest related to this case report.

REFERENCES

1. Kim JH, Aoki EM, Gonzalez Cortes AR, Abdala-Júnior R, Asaumi J, Arita ES. Comparison of the diagnostic performance of panoramic and occlusal radiographs in detecting submandibular sialoliths. Imaging Sci Dent. 2016;46(2):87–92. doi:10.5624/isd.2016.46.2.87
2. Santos JO, Da Silva Firmino B, Carvalho MS, De Pinho Mendes J, Teixeira LN, De Castro Lopes SLP, et al. 3D reconstruction and prediction of sialolith surgery. Case Rep Dent. 2018;2018:1–5. doi:10.1155/2018/3951956
3. Kraaij S, Karagozoglu K, Forouzanfar T, Veerman EC, Brand HS. Salivary stones: symptoms, aetiology, biochemical composition and treatment. Br Dent J. 2014;217:23. doi:10.1038/sj.bdj.2014.1054
4. Ferneini EM. Managing sialolithiasis. J Oral Maxillofac Surg. 2021;79(7):1581–2. doi:10.1016/j.joms.2021.04.021
5. Pauly G, Kashyap RR, Kini R, Rao PK, Bhandarkar P, HCM. Sialolithiasis: the stones within the oral cavity – two case reports and review of literature. ARC J Radiol Med Imaging. 2019;4(1):6–9. doi:10.20431/2456-057X.0401002
6. White SC, Pharoah MJ. Oral Radiology: Principles and Interpretation. 7th ed. St. Louis: Elsevier Health Sciences; 2014. p. 542
7. Pousya VS, Shetty U, Shetty P. Sialolith with sialadenitis: a case study and a proposal of a diagnostic algorithm. J Health Allied Sci NU. 2024;14(2):281–9. doi:10.1055/s-0043-1768590
8. Adhikari R, Soni A. Submandibular sialadenitis and sialadenosis. In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing; 2022. P.8. [cited 2025 Jul 25]. Available from: https://www.ncbi.nlm.nih.gov/books/NBK560524/
9. Sonar PR, Panchbhai A, Dhole P. Sialolithiasis in the left submandibular gland: a case. Cureus. 2023;15(11):e48999. doi:10.7759/cureus.48999
10. Manjula AA. Intermittent pain and swelling in the floor of the mouth: sialolithiasis. In: Clinicopathological Correlation of Oral Diseases. Cham: Springer; 2023. p. 685–93. doi:10.1007/978-3-031-24408-7_61
11. Aiyekomogbon J, Babatunde L, Salam A. Submandibular sialolithiasis: the roles of radiology in its diagnosis and treatment. Ann Afr Med. 2018;17(4):221–4. doi:10.4103/aam.aam_57_18
12. Anicin A, Urbancic J. Sialendoscopy and CT navigation assistance in the surgery of sialolithiasis. Radiol Oncol. 2021;55(3):284–91. doi:10.2478/raon-2021-0037
13. Ivanović A, Mihalec D. Diagnostic imaging of sialolithiasis. Radiol Vjesn. 2023;47(1):33–40. doi:10.55378/rv.47.1.4
14. Pachisia S, Mandal G, Sahu S, Ghosh S. Submandibular sialolithiasis: a series of three case reports with review of literature. Clin Pract. 2019;9(1):1119. doi:10.4081/cp.2019.1119
15. Razmara F, Mahmoudi X. Noninvasive treatment for chronic sialadenitis: case report. Clin Case Rep. 2019;7(10):1870–3. doi:10.1002/ccr3.2379

16. Duong LT, Kakiche T, Ferré F, Nawrocki L, Bouattour A. Management of anterior submandibular sialolithiasis. J Oral Med Oral Surg. 2019;25(2):16. doi:10.1051/mbcb/2018039
17. Shah JS, Rathod M, Dubey J. An angulated parotid duct sialolith: radioimaging in diagnosis. J Oral Maxillofac Radiol. 2021;9(2):52–5. doi:10.4103/jomr.jomr_21_21
18. Koch M, Mantsopoulos K, Müller S, Sievert M, Iro H. Treatment of sialolithiasis: what has changed? An update of the treatment algorithms and a review of the literature. J Clin Med. 2022;11(1):231. doi:10.3390/jcm11010231
19. Kandula S, Nagi R, Nagaraju R. Sialography: a pictorial review. Oral Radiol. 2023;39(2):225–34. doi:10.1007/s11282-022-00668-1
20. Hammett JT, Walker C. Sialolithiasis. In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing; 2022. P. 3. [cited 2025 Jul 25]. Available from: https://www.ncbi.nlm.nih.gov/books/NBK549845/.