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Sialolithiasis' diagnosis and treatment plan: A case series

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SUMMARY

Introduction. Sialolithiasis is a relatively uncommon alteration of the salivary gland characterized by the presence of calcified structures within the glandular parenchyma or its ductal system, causing swelling and pain.

Aim. Present a series of six cases of sialolithiasis in the submandibular and parotid glands, the diagnostic process, and the adopted treatment approach.

Case series. Five reported cases occurred in the submandibular gland, and only one in the parotid gland. Three patients presented with painful symptoms, increased volume, and purulent secretions, while the other three cases were asymptomatic. All sialoliths were diagnosed through radiographic exams. The treatment consisted of sialolith removal via surgical approach and/or salivary flow stimulation via local massage.

Conclusion. Sialolithiasis is diagnosed through clinical and imaging evaluation, and conservative treatment approaches preserve the integrity and function of the gland.

Keywords: sialolithiasis, salivary gland calculi, submandibular gland, parotid gland, radiography.

INTRODUCTION

Sialolithiasis is a benign alteration of relatively uncommon occurrence in the salivary glands. It is characterized by calcified structures, called sialoliths, in the glandular parenchyma or its ductal system (1). Sialoliths can cause partial or complete obstruction of salivary gland ducts, leading to infection and painful symptoms. It occurs mainly in the submandibular glands, which represent about 80 to 90% of reported cases (1-3), but it can also occur in the parotid glands and, less often, in the sublingual glands. This alteration affects a wide age range, being more common in young and middle-aged adults (1-3).

Sialolithiasis is diagnosed based on clinical features, the consistency of the affected area upon palpation, and symptoms reported by the patient (1-3). Radiographs usually assist in identifying sialoliths, especially occlusal ones, when sialolithiasis occurs in the submandibular and sublingual glands (1, 4). Generally, treatment involves surgical removal and conservative approaches such as gland massages, improving hydration, and sialogogues, which can be recommended depending on the location and size of the sialolith (5). This paper aims to report a case series of sialolithiasis in the major salivary glands, describe the diagnostic process, and outline the adopted treatment approach.

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CASE REPORTS

Case 1

A 48-year-old male patient attended to emergency care with severe pain and facial swelling. According to the patient, he had mild pain symptoms in the area for two years, but in the last two weeks, the pain became intense. The patient's medical history was non-contributory. Physical examination revealed an increase in volume on the right side of the submandibular region, extending to the floor of the mouth near teeth 44 and 45. The intraoral area was edematous, showed red color, was soft and sensitive to touch, and purulent discharge from the salivary gland duct was observed. An occlusal radiograph was requested, revealing a radiopaque mass on the floor of the mouth measuring approximately 15 mm, confirming the clinical suspicion of sialolithiasis (Figure 1A). The initial treatment was a prescription of azithromycin 500 mg/day for

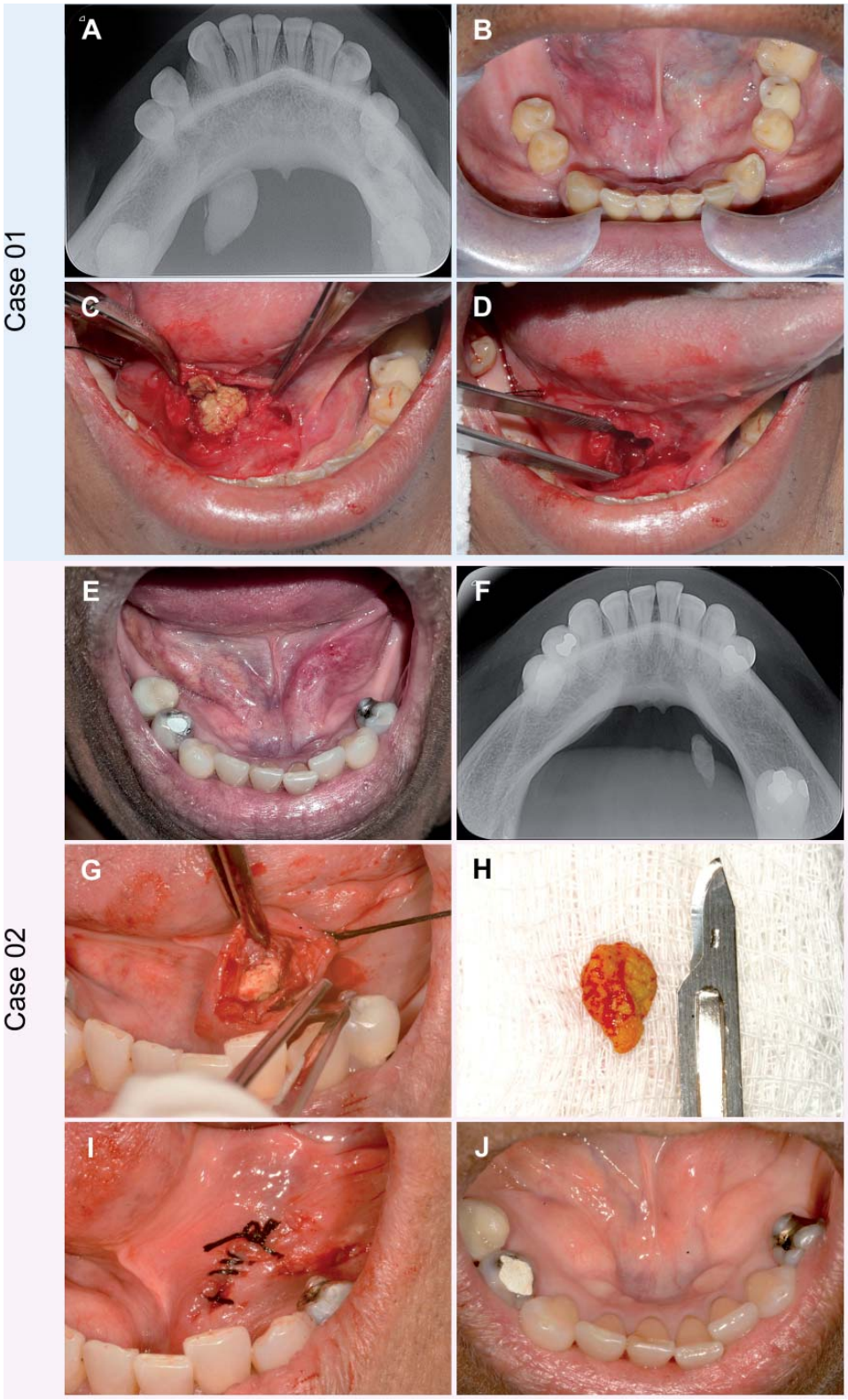

Fig. 1. Clinical, radiographic, and surgical features of Cases 1 and 2. Case 01 (Blue) – (A) Occlusal radiography revealing radiopaque image on the right side of the floor of the mouth close to teeth 44 and 45. (B) Clinical aspect before the surgical procedure. A red swelling on the right side of the floor of the mouth was observed. (C) Excision of the soft tissues and exposure of the sialolith. (D) Clinical aspect after sialolith surgical removal. Case 02 (Pink) – (E) Erythematous swelling on the left side of the floor of the mouth. (F) Occlusal radiography reveals a radiopaque image on the floor of the mouth close to tooth 35. (G) The surgical incision under the duct and divulsion of the soft tissue for the sialolith exposure. (H) The gross aspect of the sialolith, which presented approximately 10 mm. (I) Continuous suture to prevent closure and future obliteration of the duct. (J) Clinical follow-up seven days after the surgery. The patient presented complete healing of the region.

three days. Following the acute infection, the patient underwent surgical removal of the sialolith (Figure 1B-D). He returned after one week, showing good healing. No evidence of recurrence was observed during the clinical 30-day post-surgery follow-up.

Case 2

A dentist referred a 59-year-old female patient to an Oral Diagnostic Service for evaluation of an oral infection. The patient had been taking amoxicillin 500 mg daily for one week. No significant systemic conditions were noted in her medical history, and she reported experiencing pain and purulent discharge in the duct of the submandibular gland over the past 30 days. The extraoral clinical appearance was normal, and the intraoral physical examination revealed an erythematous swelling on the left side of the floor of the mouth, which was firm on palpation (Figure 1E). The patient also had a clinically evident mandibular exostosis. An occlusal radiograph showed a radiopaque area on the floor of the mouth consistent with the clinical diagnosis of sialolithiasis (Figure 1F). An excisional biopsy was performed by dissecting the tissues and exposing the sialolith, which measured approximately 10 mm (Figures 1G-H). The surgery was finished using a continuous suture, carefully avoiding the salivary duct to prevent obliteration and ensure saliva flow (Figure 1I). Postoperative instructions were provided, and the suture was removed after

seven days. Thirty days post-biopsy, the patient returned with good healing and no signs of lesion recurrence (Figure 1J).

Case 3

A 42-year-old female patient was referred by her dentist for evaluation of a symptomatic lesion on the anterior floor of the mouth, lasting 10 years. The patient's medical history was unremarkable. During intraoral physical examination, a normochromic swelling on the right side of the mouth was observed, measuring approximately 25 mm, and had a hard consistency on palpation. No signs of infection were observed (Figure 2A). Based on the clinical hypothesis of sialolithiasis, an occlusal radiograph was performed, and a radiopaque image on the right side of the floor of the mouth was observed. Thus, the clinical hypothesis was confirmed (Figure 2B). Treatment involved prescribing an anti-inflammatory (nimesulide 100 mg, every 12 hours for three days) to relieve symptoms. The sialolith was then surgically removed (Figure 2C). The patient healed well and showed no signs of recurrence during follow-up.

Case 4

A 62-year-old male patient, a smoker with systemic arterial hypertension, attended a dental appointment complaining of a "little ball in the mouth close to the prosthesis" lasting 30 days. A normochromic nodular lesion in the left buccal mucosa was observed during the intraoral physical examination, which presented approximately 10

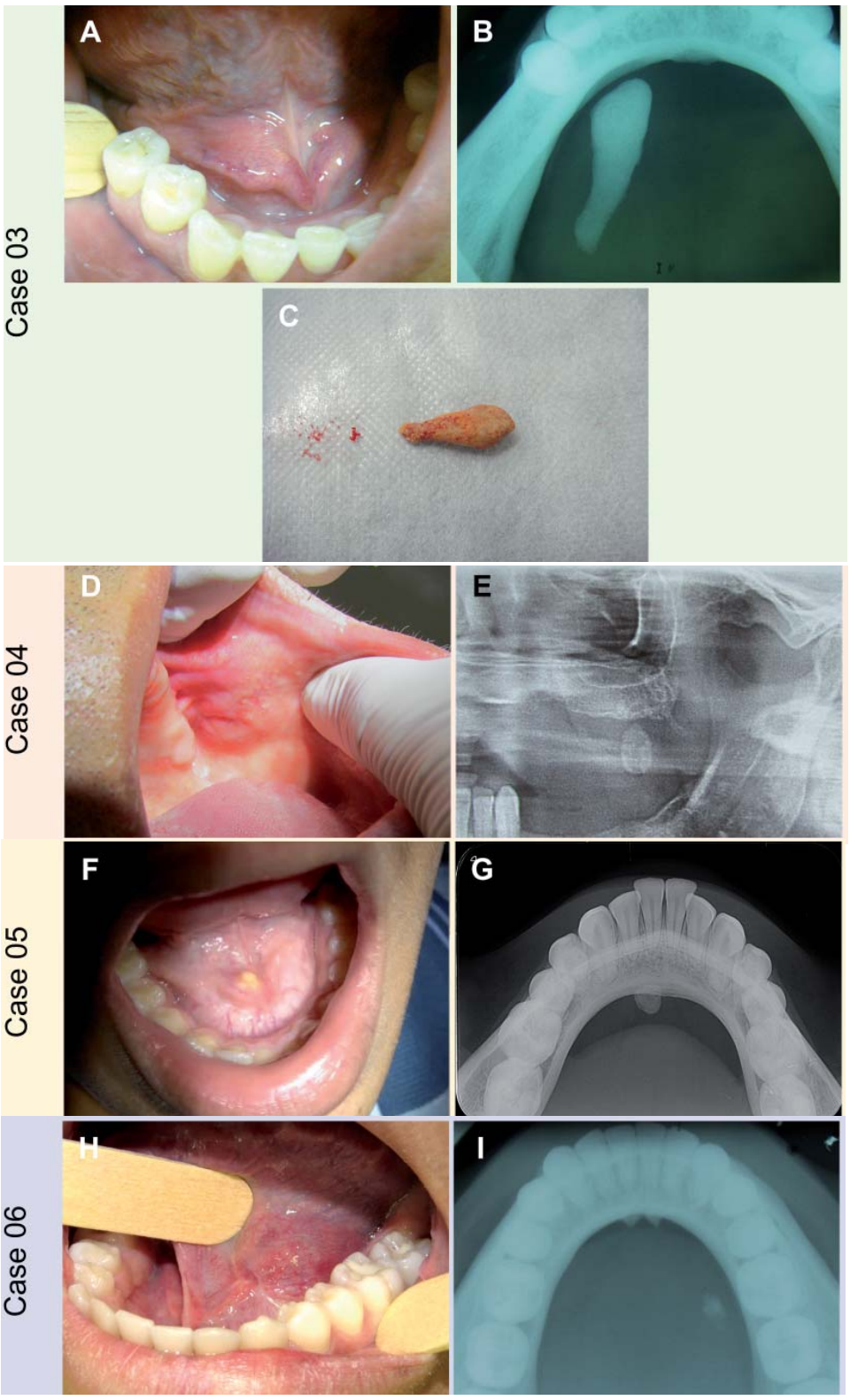

Fig. 2. Clinical and radiographic characteristics of Cases 3, 4, 5 and 6. Case 03 (Green) - (A) Erythematous swelling on the right side of the floor of the mouth. (B) Occlusal radiography revealed a radiopaque image measuring 25 mm in size, located close to teeth 34 and 35. (C) The gross aspect of the sialolith revealed an elongated yellow calcified mass measuring 25 mm. Case 04 (Orange) - (D) Erythematous swelling on the right buccal mucosa. (E) Panoramic radiograph revealing a 10 mm radiopaque image in the region corresponding to the right buccal mucosa. Case 05 (Yellow) - (F) Swelling on the floor of the mouth with the presence of a yellow mass in the center. (G) Occlusal radiograph revealing a radiopaque, round-shaped image close to the mandibular symphysis. Case 06 (Purple) - (H) Swelling on the left side of the floor of the mouth. (I) Occlusal radiograph showing a 5 mm radiopaque image close to tooth 36.

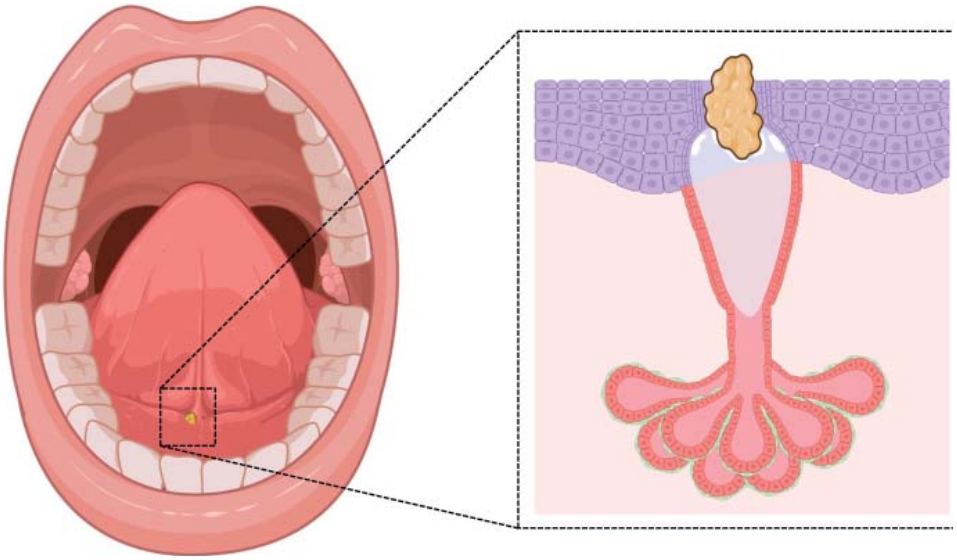

Fig. 3. Representation of a sialolith in the submandibular salivary gland. From a microscopic point of view, the sialolith obliterates the terminal portion of the excretory segment of the salivary duct, resulting in saliva accumulation

mm in diameter with a firm consistency on palpation. It was noted that the lesion did not show mobility (Figure 2D). In the panoramic radiograph brought by the patient, a radiopaque image was observed in the area, indicating calcification in the parotid region. The clinical diagnosis of sialolithiasis was established (Figure 2E). The clinical management involved sialolith removal without surgery, achieved by stimulating the parotid gland with massages and increasing fluid intake. After fifteen days, the patient returned for a follow-up and showed no signs of lesion recurrence.

Case 5

An 11-year-old male patient was referred to an oral diagnostic service to evaluate an asymptomatic swelling in the floor of the mouth that had been present for eight months. No significant systemic conditions were noted in his medical history. During the intraoral clinical examination, a yellow, nodular lesion measuring 5 mm in diameter was observed on the floor of the mouth and was firm to palpation (Figure 2F). The occlusal radiograph revealed a 5 mm rounded radiopaque image near teeth 41 and 42, confirming the clinical diagnosis of sialolith (Figure 2G). The sialolith was surgically removed, and the patient exhibited good healing with no signs of recurrence during follow-up.

Case 6

A 20-year-old male patient was referred to an oral diagnostic service with a swelling under the tongue that developed 15 days ago. The patient's medical history was unremarkable. During the intraoral clinical examination, a 5 mm nodular lesion was observed on the left side of the floor of the mouth (Figure 2H). The occlusal radiography revealed a rounded radiopaque image near to tooth 36 (Figure 2I). Based on these findings, the diagnosis of sialolithiasis was made, and the sialolith was surgically removed. After seven days, the patient returned for a follow-up appointment and exhibited complete healing of the area.

DISCUSSION

Sialoliths are calcified structures consisting mainly of phosphate and calcium in the form of hydroxyapatite, associated with small amounts of magnesium carbonate and ammonium (1,6,7). Its occurrence is uncommon and frequently affects adult men between 30 and 60 years old (6,8). Most of the cases reported here also showed the same profile of occurrence found in the literature, except for case 05, which affected an 11-year-old child. This observation confirms the uncommon occurrence of sialolithiasis in childhood, corroborating the study performed by Avishai et al. (8), who evaluated 100 cases of sialolithiasis and found only 3% of cases in pediatric patients. It is believed that this finding may be associated with a lower concentration of phosphate and calcium in the saliva of children and a more intense salivary flow in this age group, which may hinder the formation of calcified structures (4,7). Regarding the anatomical site, the submandibular glands are the most affected and represent more than 80% of cases of sialolithiasis (1, 4, 6, 9).

In analyzing 158 cases of sialolithiasis, Huoh and Eisele (10) reported that 82% involved the submandibular glands and 18% the parotid glands. Our reports were similar, as five cases involved the submandibular glands and only one involved the parotid gland. It is believed that the anatomical position of Warthon's duct from the submandibular gland that goes up towards the oral cavity and its mucinous/viscous saliva results in a slow flow and stasis of saliva compared to the parotid gland's salivary flow. Another essential characteristic is that the saliva produced by the submandibular gland is more alkaline, which predisposes to the precipitation of inorganic salts and, consequently, to the formation of salivary calculi (8,10). The occurrence of sialoliths in sublingual glands is very uncommon, accounting for about 2% of cases. Although the reason for this low occurrence is unknown, it is believed that these

cases may be underreported since the submandibular and sublingual ducts are located on the floor of the mouth, which can make it difficult to distinguish these salivary glands (4, 11).

Sialolithiasis presents with varying symptomatology, ranging from asymptomatic to pain and swelling associated with infection (1, 2, 12). The size of the sialolith can cause the presence of symptoms. Cases with sialoliths greater than 10 mm are more likely to present with painful symptoms, as they cause a more significant obliteration of the salivary ducts, leading to edema from saliva accumulation (Figure 3). It favors inflammatory and infectious processes, the latter originating from bacteria in the oral environment (1, 12). Cases 1, 2, and 3, as reported here, presented larger sialoliths and exhibited painful symptoms. In contrast, this was not observed in case 4, in which the symptoms were absent despite a similar-sized sialolith. We believe that it may be related to the location of the calculus since it was in the terminal portion of the excretory segment of the salivary duct, close to the oral cavity, and a possible lower accumulation of saliva. Cases 5 and 6, which presented smaller sialoliths, did not complain of pain, probably due to the small size of the sialolith.

The literature shows that the sialoliths are usually small, measuring less than 10 mm in diameter, and may not cause significant obstruction in salivary flow or be associated with painful symptoms (12). Many of these cases are probably not diagnosed since patients do not present symptomatology and do not seek specialized care. Besides, lesions in multiple glands are rare but can also be found (9, 12).

Sialolithiasis is often diagnosed based on clinical findings, such as swelling and pain at the affected site, in combination with imaging exams (9). Occlusal radiographs help identify the size of the sialolith present in the submandibular region. In some cases, cone beam tomography, ultrasonography, sialography, or sialendoscopy may be indicated, especially in patients with larger, multiple calculi or those located in the parotid gland (13, 14). All the cases reported here did not present diagnostic difficulties, and the two-dimensional imaging exams were sufficient to aid in the clinical diagnosis and planning for surgical removal of the lesion.

Regarding treatment, a conservative approach should be initially pursued, especially for small sialoliths, as in case 4 reported here. In cases like this, stimulating and increasing salivary flow through massage of the gland, application of local heat, use of sialogogues, and increased intake of liquids and acidic foods may favor sialolith expulsion without the need for surgical intervention (4, 7).

When a conservative approach is ineffective or in cases involving larger sialoliths, sialolith surgical removal is indicated to preserve salivary gland function (4, 10). We emphasize that surgical intervention may entail risks, including the development of ranulas or fibrosis of the salivary duct (4, 14). Other techniques have been developed, such as sialendoscopy and lithotripsy, that aim to fragment and reduce the size of the salivary calculus (4, 9, 14).

Sialolithiasis of the salivary glands is considered uncommon and may be associated with pain and infection, especially when the sialolith is larger than 10 mm. Its diagnosis is based on clinical and imaging findings, and conservative treatments have shown good results because they preserve the gland's integrity and function.

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Authors' contributions: MRSM, IBL, CAAD and CCSB contributed to data acquisition, data interpretation, and manuscript writing and drafting. ÉJDS, ARG, and PTO provided clinical information, radiographic imaging, and follow-up information on the cases, contributed to data interpretation, and drafted and revised the manuscript for intellectual content.

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