

Septic arthritis of the temporomandibular joint secondary to disseminated odontogenic infection with severe systemic involvement

CASE REPORT

Artritis séptica de la articulación temporomandibular consecutiva a infección odontogénica diseminada con compromiso sistémico grave

Artrite séptica da articulação temporomandibular secundária a infecção odontogênica diseminada com comprometimento sistêmico grave

Abstract

Septic arthritis (SA) of the temporomandibular joint (TMJ) is a rare but clinically significant manifestation of odontogenic infections. It is characterized by an acute or chronic infection of the joint space, caused by bacterial or fungal microorganisms. Its diagnosis is often challenging due to its variable and nonspecific clinical presentation. We report the case of a 78-year-old female patient who presented to the emergency department with right hemifacial swelling, trismus, dysphagia, progressive pain, asthenia, and adynamia, three days after undergoing an unspecified dental procedure. The clinical presentation warranted hospitalization for life support and management through intravenous antibiotic therapy and aggressive surgical intervention. A follow-up computed tomography (CT) scan revealed inflammatory changes in the joint and condylar resorption, consistent with SA of the TMJ. Consequently, an intra-articular lavage via arthroscopy was performed. This case highlights the importance of considering SA of the TMJ as a potential complication of septic conditions involving adjacent anatomical spaces. Timely diagnosis requires appropriate correlation among patient history, clinical findings, imaging studies, and laboratory tests.

Keywords: Odontogenic infection, facial cellulitis, head and neck infections, septic arthritis, temporomandibular joint.

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Resumen

La artritis séptica (AS) de la articulación temporomandibular (ATM) constituye una manifestación infrecuente, aunque clínicamente significativa, de las infecciones de origen odontogénico. Se caracteriza por una infección aguda o crónica del espacio articular, causada por microorganismos bacterianos o fúngicos, y su diagnóstico suele ser complejo debido a que sus manifestaciones clínicas son variadas e inespecíficas. Se reporta el caso de una paciente de 78 años quien consultó en el servicio de urgencias con un cuadro de aumento de volumen hemifacial derecho, trismus, disfagia, dolor progresivo, astenia y adinamia, tres días posterior a un procedimiento odontológico no especificado. El cuadro derivó en su hospitalización para soporte vital y manejo mediante terapia antibiótica endovenosa y quirúrgica agresiva. Una tomografía computarizada (TC) de control evidenció signos inflamatorios articulares y reabsorción condilar compatibles con AS de la ATM, indicándose artroscopia para aseo intraarticular. Este caso subraya la importancia de considerar la AS de la ATM como posible complicación de cuadros sépticos que afecten espacios anatómicos adyacentes. El diagnóstico oportuno requiere una adecuada correlación entre anamnesis, hallazgos clínicos, estudios imagenológicos y exámenes de laboratorio.

Palabras Clave: Infección odontogénica, celulitis facial, infecciones de cabeza y cuello, artritis séptica, articulación temporomandibular.

Resumo

A artrite séptica (AS) da articulação temporomandibular (ATM) é uma manifestação rara, porém clinicamente significativa, das infecções de origem odontogênica. Caracteriza-se por uma infecção aguda ou crônica do espaço articular, causada por microrganismos bacterianos ou fúngicos, sendo seu diagnóstico frequentemente desafiador devido à apresentação clínica variável e inespecífica. Relata-se o caso de uma paciente de 78 anos que procurou o serviço de emergência com aumento de volume hemifacial direito, trismo, disfagia, dor progressiva, astenia e adinamia, três dias após ter sido submetida a um procedimento odontológico não especificado. O quadro clínico levou à sua hospitalização para suporte vital e manejo com antibioticoterapia intravenosa e intervenção cirúrgica agressiva. A tomografia computadorizada (TC) de controle revelou alterações inflamatórias na articulação e reabsorção condilar compatíveis com AS da ATM, indicando-se lavagem intra-articular por artroscopia. Este caso ressalta a importância de considerar a AS da ATM como uma possível complicação de quadros sépticos que acometem espaços anatómicos adjacentes. O diagnóstico oportuno exige correlação adequada entre anamnese, achados clínicos, exames de imagem e testes laboratoriais.

Palavras-chave: Infecção odontogénica, celulite facial, infecções de cabeça e pescoço, artrite séptica, articulação temporomandibular.

Introduction

Septic arthritis (SA) of the temporomandibular joint (TMJ) is one of the least common yet clinically significant infectious manifestations of odontogenic origin. It is a complex clinical condition that is difficult to diagnose, characterized by an acute or chronic bacterial or fungal infection of the TMJ joint space. The main routes of spread described in the literature include hematogenous dissemination, direct inoculation, or contiguous local extension.⁽¹⁾ The clinical manifestations of this condition are varied and often nonspecific, including erythema, swelling, preauricular pain, and reduced range of motion of the affected joint. Diagnosis should be complemented by a comprehensive imaging workup, laboratory tests, and synovial fluid aspiration for analysis.^(1,2) Treatment involves antibiotic therapy, joint drainage, and immobilization for a defined period. Broad-spectrum beta-lactams are generally used for several weeks.⁽³⁾ Once the infectious process has resolved, it may be beneficial to initiate controlled mandibular dynamic exercises. The most common clinical sequelae include intracapsular adhesions, disc perforation, ankylosis, fibrosis, and bone and cartilage destruction.⁽²⁾

This article aims to describe the case of a 78-year-old woman who developed septic arthritis of the right temporomandibular joint secondary to a disseminated odontogenic infection, addressing its clinical presentation, diagnostic challenges, and medical-surgical management.

Case Report

A 78-year-old woman with a history of Parkinson's disease presented to the emergency department three days after undergoing an unspecified dental procedure. She presented with diffuse right-sided facial swelling, characterized by progressive pain, asthenia, adynamia, trismus, and dysphagia, requiring hospital admission for initial management. Physical examination revealed a soft swelling with crepitus associated with extensive cutaneous involvement of the right temporal, masseteric, buccal, and submandibular regions, as well as the submental region (**Figure 1a**).

Oral examination revealed partial edentulism, with a visible ulcer on the right buccal mucosa. In the right hemimaxillary and hemimandibular regions, the only remaining tooth was tooth 1.7, which was in poor periodontal condition. Initial laboratory tests showed C-reactive protein (CRP) levels of 270.1 mg/L and leukocytosis of 12.66×10^3 cells/mm³. The initial computed tomography (CT) scan showed extensive emphysema in the right temporal, infratemporal, masticatory, sublingual, submandibular, and cervical spaces, as well as the submental space (**Figure 1b, 1c**).



Figure 1. (a) Initial clinical image showing extensive right hemifacial swelling with skin involvement. (b and c) Coronal and axial CT slices showing extensive emphysema involving multiple head and neck anatomical spaces.

Empirical intravenous antibiotic therapy was initiated with ampicillin/sulbactam 3 g every 6 hours, along with appropriate analgesic therapy. Two days later, CRP decreased to 262.8 mg/L, but leukocytosis increased to 29.74×10^3 cells/mm³, along with a creatine kinase (CK) level of 6072 U/L. Following evaluation by the infectious disease team, a change in antibiotic therapy was indicated, consisting of piperacillin/tazobactam 4.5 g every 6 hours in combination with clindamycin

900 mg every 8 hours and vancomycin 750 mg every 12 hours, due to suspicion of necrotizing fasciitis. On the second day after initiating the indicated antibiotic therapy, a new CT scan was performed, revealing extensive fluid collections in the areas previously identified with emphysema (**Figure 2**).

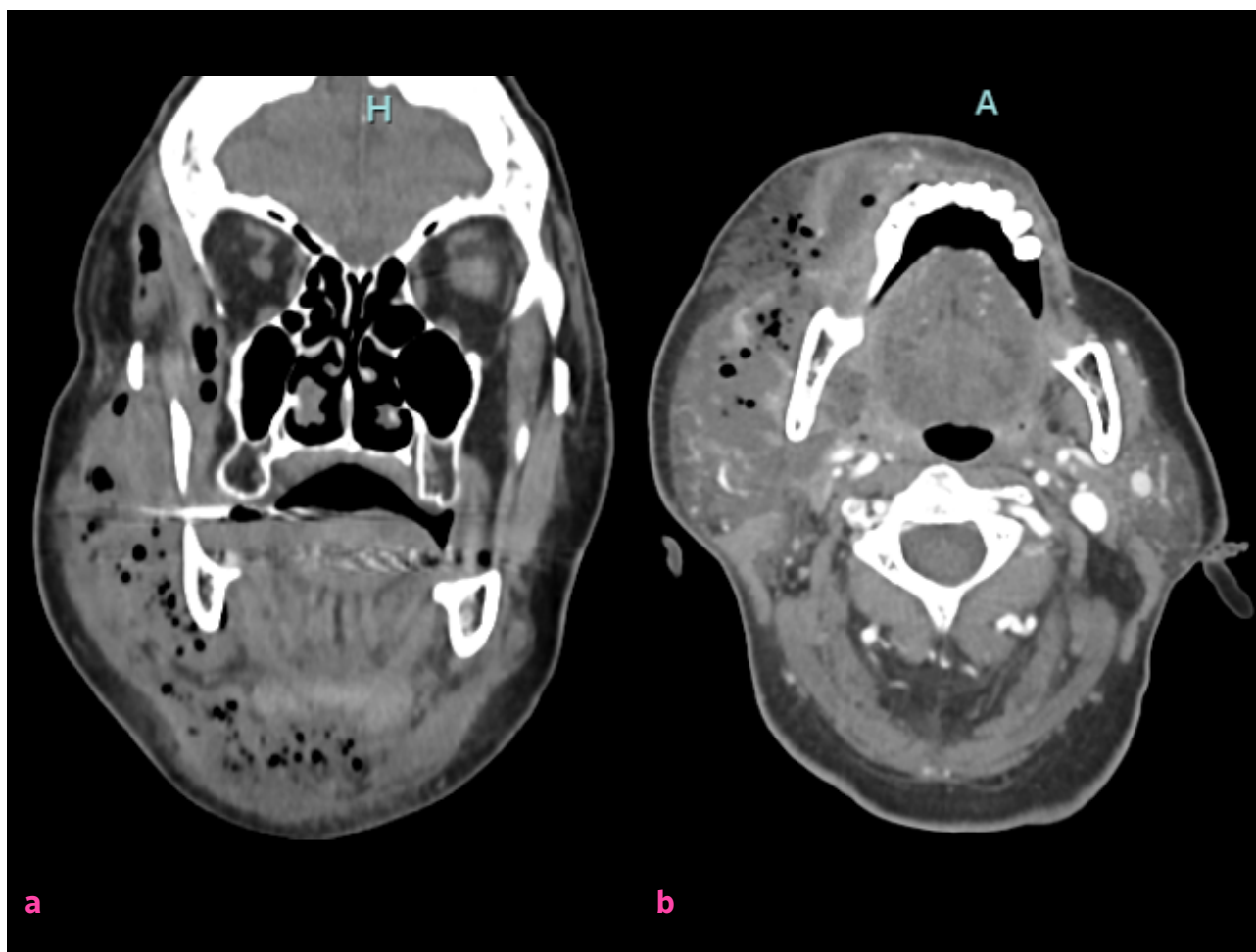


Figure 2. (a and b) Contrast-enhanced CT scans showing coronal and axial sections. Fluid collections are evident in the right temporal, infratemporal, masticatory, sublingual, submandibular, and cervical spaces, as well as in the submental space.

In view of the clinical features and the risk of involvement of deeper neck spaces, surgical debridement was performed, with access through the right temporal, submandibular, and ipsilateral pterygomandibular spaces. There was abundant sanguinopurulent drainage and necrotic tissue, and samples were obtained for culture. Finally, suction drains were placed, connecting the affected anatomical spaces (**Figures 3a** and **3b**).

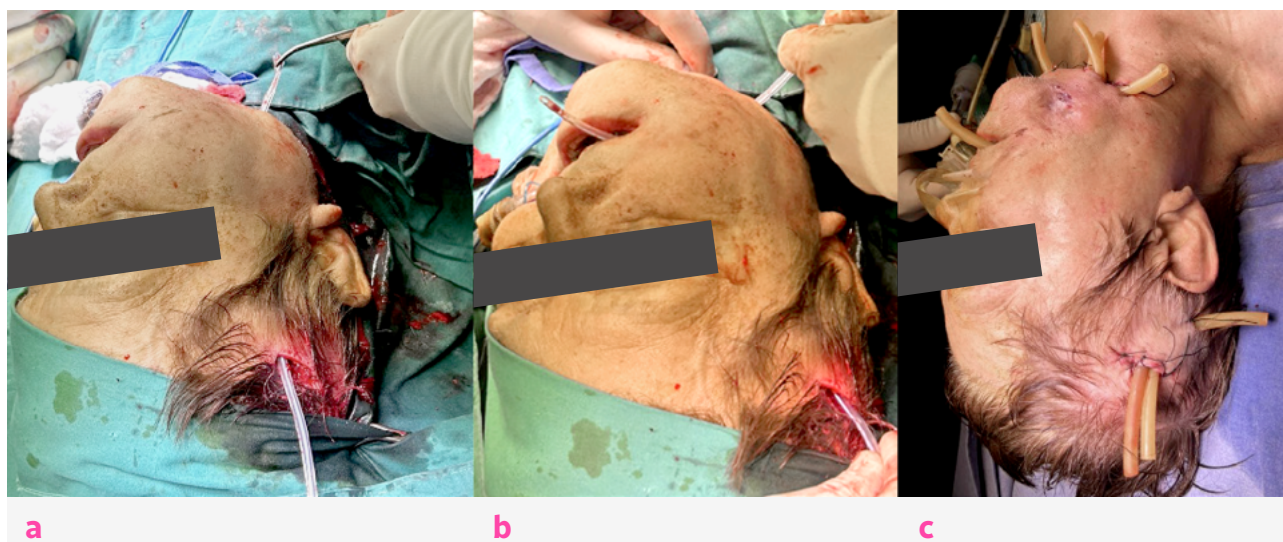


Figure 3. (a) First surgical debridement, showing communication between the right temporal and submandibular spaces via a tubular drain. (b) First surgical debridement, showing communication between the right pterygoid and submandibular spaces via a tubular drain. (c) Second surgical debridement, showing replacement of drains with larger-diameter drains.

Following the procedure, the patient was admitted to the Intensive Care Unit (ICU) for continuous monitoring, assisted mechanical ventilation, and antibiotic and analgesic therapy. Daily irrigation was performed through the drains using copious amounts of 0.9% saline solution. Decreasing CRP (125.5 mg/L) and CK (222 U/L) levels indicated a favorable response to treatment; however, leukocytosis increased to 31.64×10^3 cells/mm³. Cultures revealed the presence of *Streptococcus mitis* and *Streptococcus oralis*, and antibiotic therapy was changed back to ampicillin/sulbactam 3 g every 6 hours. A follow-up contrast-enhanced CT scan showed residual fluid collections in the right submandibular and masticatory spaces.

Given this clinical course, reoperation was performed, consisting of repeat surgical debridement and replacement of the drains with larger-diameter ones, accessing the residual abscess cavities (Figure 3c). Following this procedure, a favorable clinical course was observed. Laboratory tests showed a decrease in CRP to 88.7 mg/L, white blood cell count to 7.67×10^3 cells/mm³, and normalization of CK levels to 56 U/L.

Monitoring continued for 7 days, and a follow-up CT scan revealed inflammatory changes around the right mandibular ramus, increased joint space, and signs of condylar resorption consistent with SA of the right TMJ (Figure 4). In view of these findings, a third intervention was performed. This consisted of arthroscopic joint lavage with prior synovial fluid aspiration for culture (Figure 5), along with removal of the previously placed drains due to improvement of the primary condition. Synovial fluid culture analysis was negative for microorganisms.

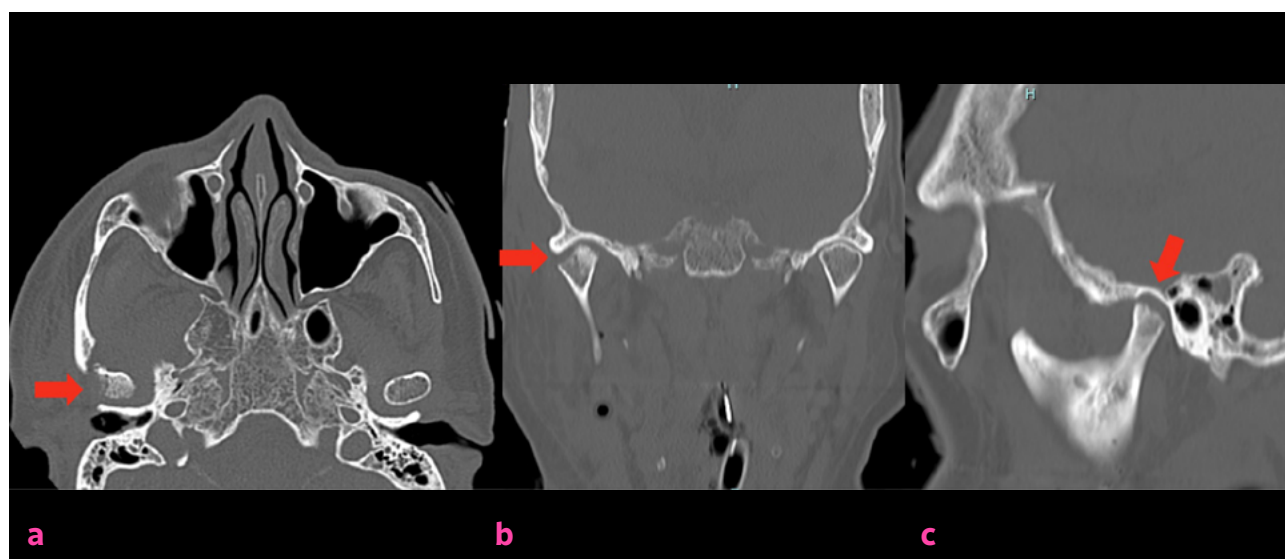


Figure 4. CT scans in axial (a), coronal (b), and sagittal (c) views. Loss of cortical bone and flattening of the lateral pole of the right mandibular condyle are evident.

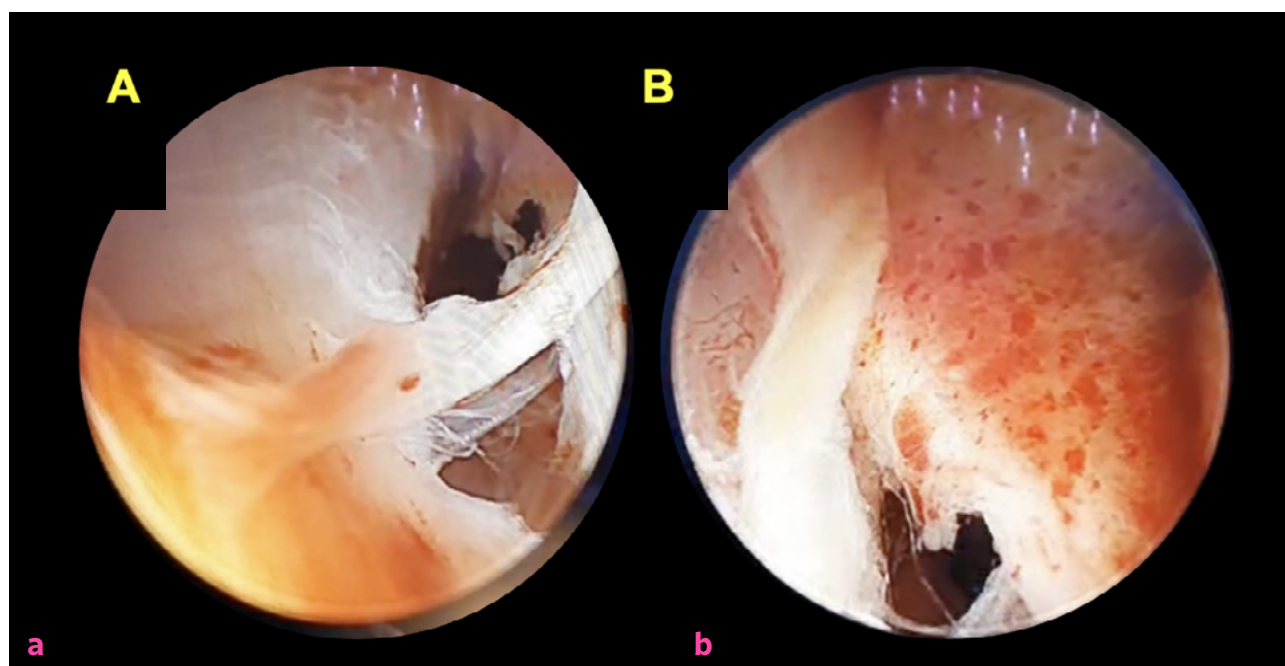


Figure 5. (a) Arthroscopic image showing intra-articular adhesions. (b) Arthroscopic image showing generalized synovitis, with extensive areas of hyperemia and loss of normal arthroscopic anatomy.

After three days in the ICU, clinical and laboratory improvement was observed, with CK at 33 U/L, white blood cells at 5.40×10^3 cells/mm³, and CRP at 101.2 mg/L (Figure 6). The increase in CRP was likely related to the recent surgical procedure. The patient was extubated and transferred to the hospital's intermediate care unit, where she was stabilized and continued on the established antibiotic and analgesic therapy. Finally, after 49 days of hospitalization, she was discharged in stable condition.

Changes in C-reactive protein (CRP) and white blood cell count during hospitalization

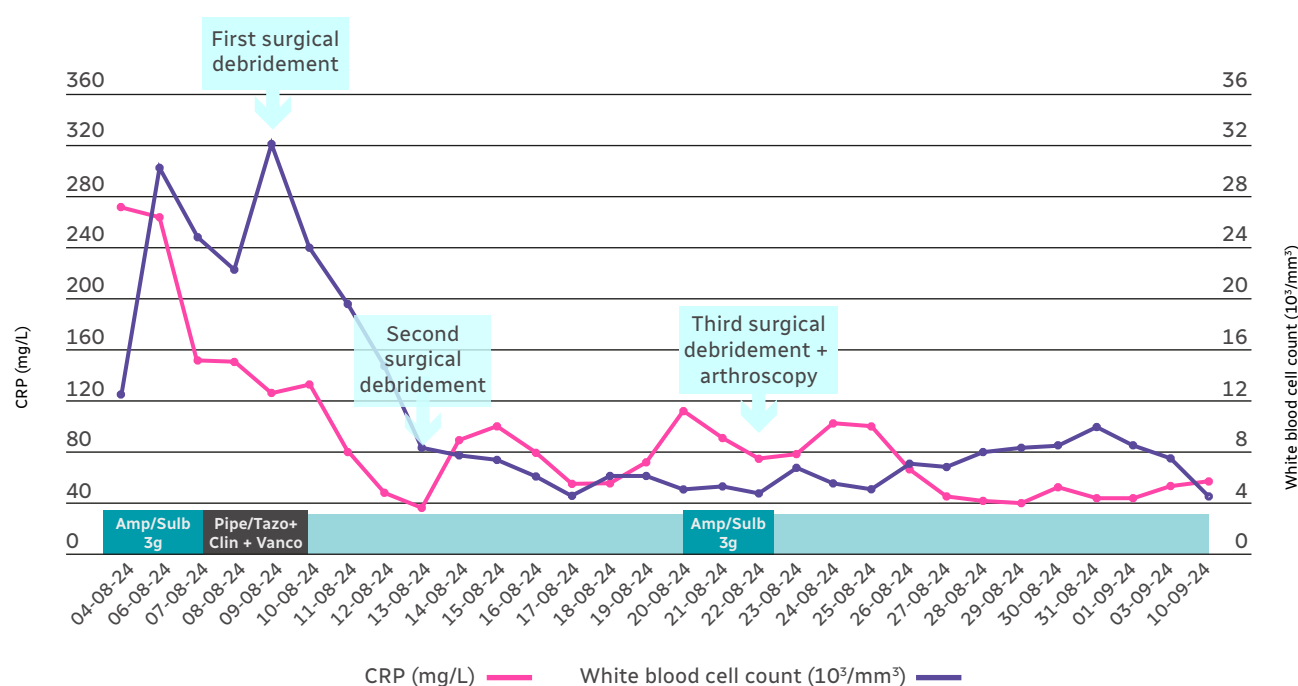


Figure 6. Changes in C-reactive protein (CRP) and white blood cell count during hospitalization. The timeline of surgical procedures and administered antibiotic therapy is highlighted.

Regular clinical and radiographic follow-up revealed a favorable course of the infection. However, reduced mouth opening was noted, accompanied by misalignment of the previously placed dental prosthesis. At nine months, a follow-up CT scan was performed (Figure 7), revealing a right temporomandibular joint with structural sequelae, without findings consistent with active septic arthritis. During the postoperative period, the patient continued multidisciplinary treatment involving physical therapy, speech-language pathology, occupational therapy, and physical medicine and rehabilitation to address functional sequelae secondary to prolonged hospitalization.



Figure 7. CT scans in axial (a), coronal (b), and sagittal (c) views, nine months post-arthroscopy. Residual condylar flattening, bone sclerosis, and reduced joint space are evident. No evidence of new osteolytic foci.

Discussion

According to the literature, SA of the TMJ is more frequent in adults and is usually unilateral.⁽¹⁾ Three possible routes of spread have been described for this condition: hematogenous dissemination, direct inoculation, and contiguous local extension. Among these, the hematogenous route is the most common; however, in most reported cases, the primary site of infection cannot be identified.^(1,4,5,6) This differs from our case, in which the infection originated by contiguous extension from a severe odontogenic infection. In this regard, the systematic review by Jovanović et al. (2022) reports that the most common adjacent foci are infections in the pterygomandibular or masseteric spaces, primarily related to untreated or inadequately treated teeth, as well as dental extractions, particularly of third molars.⁽³⁾

In most reported cases, SA of the TMJ initially presents with preauricular edema and trismus. It may also be associated with fever, ipsilateral hemifacial pain, and malocclusion with mandibular deviation toward the contralateral side.⁽¹⁾ In this case, due to the primary odontogenic infection involving the right temporal, masseteric, and buccal regions, these signs were initially masked, likely resulting in a delayed diagnosis. Subsequently, clinical evaluation became impossible due to orotracheal intubation.

Regarding the most commonly implicated pathogens, the systematic review by Barry et al. (2025) reports bacteria of the genus *Staphylococcus* in 43.6% of cases, including *S. aureus*, multidrug-resistant *S. aureus*, and *S. anginosus*, among others. Bacteria of the genus *Streptococcus* rank second, accounting for 18% of cases, including *S. constellatus*, *S. pyogenes*, and *S. oralis*.⁽¹⁾ These findings are consistent

with those of the systematic review by Jovanović et al. (2022), who reported *S. aureus* as the most frequently isolated microorganism.⁽³⁾ Although both reviews note that most cultures were negative, this may be due to the initiation of empirical antibiotic therapy prior to joint aspiration. In this case, the microorganisms isolated from the primary infection were *S. mitis* and *S. oralis*, both belonging to the genus *Streptococcus*. However, synovial fluid culture was negative, possibly for the same reasons cited in both systematic reviews.

Initial management of SA of the TMJ involves immediate empirical antibiotic therapy, with emphasis on the use of cephalosporins, metronidazole, and penicillins.^(1,2,5,6) Subsequently, treatment should be adjusted according to microbiological findings. However, as mentioned previously, this is not always possible, as positive cultures cannot be obtained in some cases.^(1,4)

In addition to antibiotic therapy, intra-articular lavage should be considered in more advanced and complex cases to remove infected synovial fluid, since antibiotics alone cannot completely eradicate microorganisms within the joint cavity.^(1,2,4) Therefore, in the context of SA, both antibiotic therapy and lavage of the infected synovial fluid are required to restore TMJ sterility. With appropriate treatment, a sterile joint can be achieved within 48 to 72 hours.^(1,2,4) This can be accomplished through various techniques, including TMJ aspiration, arthrocentesis, arthroscopy, and open TMJ surgery.^(1,6) TMJ arthroscopy is a minimally invasive tool that is useful both therapeutically, by enabling precise lavage and drainage, and diagnostically, by allowing assessment of the degree of joint destruction, synovitis, and fibrosis. This information is essential for guiding subsequent therapeutic strategies, such as potential joint replacement.^(1,3)

Conclusion

SA of the TMJ should be considered a potential complication of septic conditions affecting anatomical spaces adjacent to this joint. Appropriate anamnesis, clinical findings, and their correlation with imaging and laboratory studies are essential for diagnosis, enabling timely identification of this condition. Early diagnosis and treatment are crucial to minimize potential sequelae, with arthroscopy playing a key role in both diagnosis and management.

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Sebastián Alberto Galleguillos Conejeros	x		x			x						x		x
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