

# Temporomandibular Joint Septic Arthritis

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**Summary:** Infection of the temporomandibular joint (TMJ) is a rare pediatric condition resulting from the introduction of pathogens into the joint by hematogenous seeding, local extension, or trauma. Early recognition of the typical signs and symptoms including fever, trismus, preauricular swelling, and TMJ region tenderness are critical in order to initiate further evaluation and prevent feared complications of fibrosis, ankylosis, abnormal facial structure, or persistence of symptoms. Contrast-enhanced computed tomography with ancillary laboratory analysis including erythrocyte sedimentation rate, C-reactive protein, and white blood cell count are beneficial in confirming the suspected diagnosis and monitoring response to therapy. Initial intervention should include empiric parenteral antibiotics, early mandibular mobilization, and joint decompression to provide synovial fluid for analysis including cultures. This report describes a case of TMJ bacterial arthritis in a healthy 6-year-old male who was promptly treated nonsurgically with intravenous antibiotics and localized needle joint decompression with return to normal function after completion of oral antibiotics and physical therapy. (*Plast Reconstr Surg Glob Open* 2018;6:e1648; doi: 10.1097/GOX.0000000000001648; Published online 23 January 2018.)

## CASE REPORT

A 6-year-old healthy male with 3 days of fever, right-sided facial swelling, and trismus, presented as a transfer after outside hospital computed tomography (CT) demonstrated a 16×16×10 mm rim-enhancing collection consistent with an intraarticular right TMJ abscess and adjacent parotitis, temporalis myositis, and cellulitis (Fig. 1). Outside hospital records indicated the patient initially presented with a temperature of 102.4°F and neutrophilic leukocytosis (18,000/mm<sup>3</sup>). The patient had blood cultures drawn before transfer, which were serially followed and consistently negative until final culture confirmed no growth at 5 days. On initial consultation, physical examination was significant for right facial

swelling, tenderness to palpation of right preauricular and temporal regions, and decreased maximal incisal opening (MIO) of 15 mm restricted by pain. Laboratory values showed C-reactive protein (CRP) of 4.2 mg/L and erythrocyte sedimentation rate (ESR) of 1 mm/h. After initiation of empiric intravenous antibiotics (clindamycin 10 mg/kg 3 times daily), ultrasound-guided needle aspiration under general anesthesia returned 2 milliliters of purulent fluid. MIO improved to 22 mm following aspiration, and the patient immediately started range of motion (ROM) mandibular exercises. After aspirate culture grew *Streptococcus pyogenes*, antibiotics were changed to parenteral ampicillin (200 mg/kg/daily divided into 4 doses). Following a 4-day hospitalization, the patient was discharged with a 14-day course of oral amoxicillin (85 mg/kg/daily) and instructions to continue ROM exercises. At discharge, MIO was 30 mm. At 13-day follow-up, the patient reported tenderness at the right TMJ, with painless MIO of 32 mm. Mandibular radiographs showed symmetric, normal appearing condyles bilaterally. Due to persistent tenderness of the right TMJ and elevated ESR of 45 mm/h, amoxicillin was extended for another 14 days despite a decreased CRP of 0.7 mg/L. At 5-week follow-up, the patient had no abnormal physical examination findings and MIO increased to 39 mm. At 12-week follow-up, the patient reported no symptoms with MIO of 40 mm.

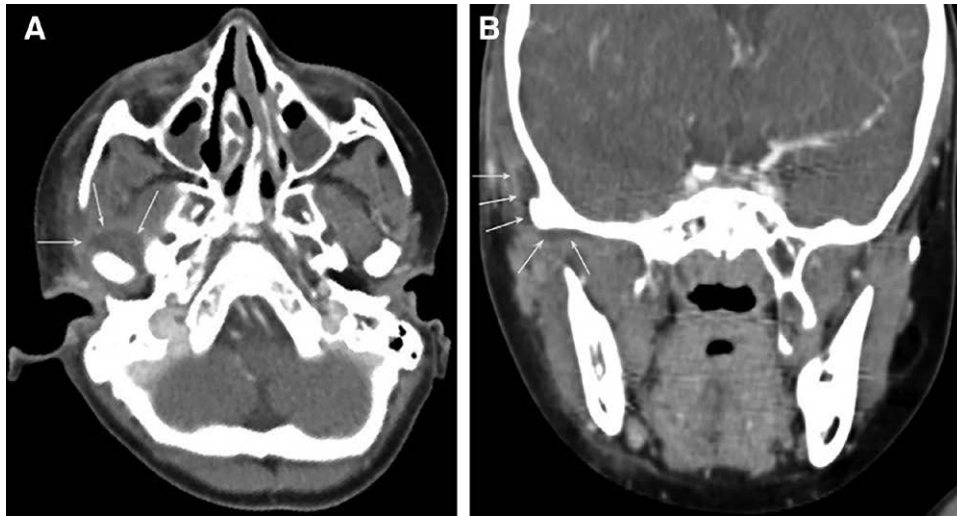
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The article was created in accordance without violation of ethical standards.

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**Fig. 1.** Axial (A) and coronal (B) CT images: arrows demonstrate low-density rim-enhancing collection arising from right TMJ extending anteriorly from the mandibular condyle into the masticator space along the deep surface of the temporalis.

## DISCUSSION

TMJ infectious arthritis is caused by hematogenous seeding or direct contiguous spread of pathogens into the joint.<sup>1,2</sup> Early diagnosis and treatment are critical to prevent complications including destruction of synovium, fibrotic adhesions, bony ankylosis, or osteomyelitis.<sup>3,4</sup> In pediatric patients, an additional feared complication includes injury to the growth plate located under the fibrocartilage covering the condylar head, which may result in deficient mandibular growth and potential permanent facial asymmetry.<sup>5-7</sup> Characteristic signs and symptoms of TMJ infectious arthritis include fever, trismus, preauricular swelling, and TMJ region tenderness, all present in this case.<sup>8</sup> The similarity in physical examination findings to other pediatric disorders involving the TMJ, such as juvenile rheumatoid arthritis, trauma-related injury, or dental malocclusion-related joint derangement, makes diagnosis challenging without laboratory and radiographic studies.<sup>9-11</sup>

Contrast-enhanced CT is the superior imaging method in the assessment of the TMJ.<sup>12,13</sup> Alternatively, cone-beam CT provides a similar evaluation while delivering less radiation.<sup>14</sup> CT allows visualization of inflamed soft tissues and increased intracapsular fluid while also permitting evaluation of adjacent structures to determine the presence of concomitant myositis or osteomyelitis.<sup>8,12</sup> If initial CT imaging is negative and clinical suspicion remains high, magnetic resonance imaging should be performed.<sup>15</sup>

Although typical laboratory values such as WBC, ESR, and CRP are helpful, they lack specificity and sensitivity to make a diagnosis without clinical signs and synovial fluid analysis.<sup>16</sup> CRP levels are helpful in determining the resolution of infection after aspiration and antibiotic therapy.<sup>17,18</sup> In this case, the CRP level was initially 4.2 mg/L, and diagnosis was made based on history, physical, and imaging.

There is insufficient evidence to support a definitive algorithm for the surgical management of pediatric TMJ

septic arthritis, initial interventions described have included aspiration only, aspiration with arthroscopic joint lavage, or arthrotomy.<sup>19,20</sup> In general, initial intervention for any infected joint should include antibiotics, joint decompression with fluid analysis, and early mobilization.<sup>18</sup> Antibiotics should be started urgently, then tailored based on synovial fluid cultures.<sup>16,18</sup> Causative organisms in TMJ septic arthritis include *Staphylococcus aureus*, *Streptococcus* species, *Pseudomonas aeruginosa*, *E. coli*, *Neisseria*, and *Haemophilus influenzae*.<sup>21-23</sup> Aspiration of intrasynovial fluid is essential for decompression, elimination of inflammatory contents, and to facilitate synovial fluid analysis to guide antibiotic therapy.<sup>24</sup> Additional options of arthroscopy and arthrotomy allow direct joint visualization and additional lavage, lysis of adhesions, or debridement.<sup>19,24</sup> A randomized, multicenter prospective trial including 130 children with culture-positive bacterial arthritis showed that a combination of antibiotics and a single aspiration are sufficient for treatment if physical examination improves and CRP normalizes; however, no case involved the TMJ.<sup>25</sup>

No specific data exists supporting the initiation, duration, or type of physiotherapy, but other reviews of TMJ septic arthritis advocate early mandibular ROM exercises.<sup>10,26</sup> Similar to closed treatment of pediatric condylar fractures, early initiation of mandibular ROM exercises are recommended to improve condyle excursion and prevent fibrotic adhesions.<sup>27</sup> In this case, active opening and bite exercises helped improve MIO to 40 mm (normal for age group) by 12-weeks follow-up.<sup>28</sup>

## CONCLUSIONS

TMJ septic arthritis is uncommon but potentially devastating in the pediatric population. Often presenting with generalized symptoms, it may be confused with other TMJ disorders. Infectious arthritis of the TMJ should be considered in a patient presenting with fever, preauricular swelling, and impaired TMJ function such as decreased

maximal incisal opening. Physical examination, contrast-enhanced CT, and laboratory analysis should determine the need for diagnostic and potentially therapeutic TMJ arthrocentesis and joint decompression. Although no gold standard exists for management, one can maximize patient outcomes by recognizing clinical and radiologic findings to initiate early joint decompression with synovial fluid analysis, antibiotic therapy, and joint mobilization with monitoring of maximal incisal opening.

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