

# Infection of the temporomandibular joint: a report of three cases

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**Abstract** (J Korean Assoc Oral Maxillofac Surg 2011;37:510-4)

An intracapsular and pericapsular infection of the temporomandibular joint (TMJ) is rare. The invasion of bacteria into the joint space can occur through several routes. Among them, hematogenous spread is most common. This report describes three cases of abscess formation in the TMJ (intracapsular and pericapsular infection). The patients were treated with supportive care and surgical intervention (incision and drainage) under hospitalization, and their symptoms had improved. Pain of the TMJ is a typical symptom of temporomandibular joint disorders (TMD). On the other hand, an infection of the TMJ can also cause pain on the affected side, and can be misdiagnosed as routine TMD. Therefore, the possibility of an infection of the TMJ cavity should be considered when treating TMD.

**Key words:** Infection, Temporomandibular joint, Temporomandibular joint disorders, Septic arthritis

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## I. Introduction

The oral and maxillofacial fascial spaces comprise primary and secondary fascial spaces and cervical spaces. Infection of the primary fascial space mostly results from odontogenesis and can be frequently found at the clinic. However, infection of the secondary fascial spaces around the temporomandibular joint (TMJ) including masseteric space, pterygomandibular space, and temporal space, or intracapsular infection of the TMJ are not that common. Patients who have these infections usually have systemic or local predisposing factors<sup>1</sup>. And this infection can be developed by local spread or haematogenous spread secondary to systemic processes.

Literatures about infections of TMJ regions use various terms according to the infection sites and characters such as infectious arthritis, masticator space infection, suppurative arthritis, septic arthritis and septic TMJ<sup>1-9</sup>. The cases in this report are including intracapsular and/or pericapsular infection of TMJ, so we call these kinds of infection as 'TMJ

infection' for convenience in this report.

TMJ infection is required to be carefully examined since its initial symptoms start from pain and limitation of jaw movement similar to common temporomandibular joint disorders (TMD). Failure to initially diagnose TMJ infection may results in aggravation of symptoms and development of complications.

This report describes three cases of TMJ infection which were successfully treated.

## II. Cases report

### 1. Case 1

A 46-year-old male visited the emergency room complaining of severe pain on left preauricular region and difficulty of jaw movement. The patient stated that he visited other hospital for the chief complaints of pain around the left TMJ before 5 days. He didn't get any examination there. He was diagnosed as common TMD and received some medications and instruction of mouth opening exercise. But the symptoms were aggravated with severe pain thereafter and visited our hospital. In physical examination, erythematous edema was observed at the left preauricular region, and the patient had a sense of induration

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and complained of continuous pain. With limitation of mouth opening, open bite was found at the posterior tooth of the affected side.(Fig. 1. A) In patient's past history, no remarkable medical history or family history was shown. His maximum open range without pain and active/passive range of motion were checked. All of them were under 15 mm.

Fever (38.6°C) and chills were noted. The inflammation into the left superior joint space and the remarkably broadened joint cavity compared to the right side were observed on the computed tomography (CT) scan with contrast.(Fig. 1. B) At needle aspiration, bloody exudates were detected and cultured.

Results of laboratory studies were as follows-count of white blood cell (WBC): 13.3 ( $\times 10^3/\mu\text{L}$ , normal range 3.9-9.7), C-reactive protein (CRP): 22.79 mg/dL (normal range 0.02-0.80), Erythrocyte sedimentation rate (ESR): 67 mm/hr (normal <20).

He was admitted to the hospital and administration of empirical antibiotics (Augmentin, Il Sung Pharm, Seoul, Korea) was initiated. Incision and drainage was done for decompression.(Fig. 1. C) Daily irrigation within his TMJ and antibiotic therapy was continued. After acute infectious symptoms had passed, the patient was instructed to do jaw opening exercise and application of warm pack.

Some gram positive alpha *streptococci* species were observed in the results of culture and gram stain studies.

After 1 week, his symptom improved well, showing the normal occlusion. He was able to open his mouth by 30 mm and he was discharged. The laboratory studies were obtained at the time of discharge - WBC: 9.9, CRP: 10.5, ESR: 38.

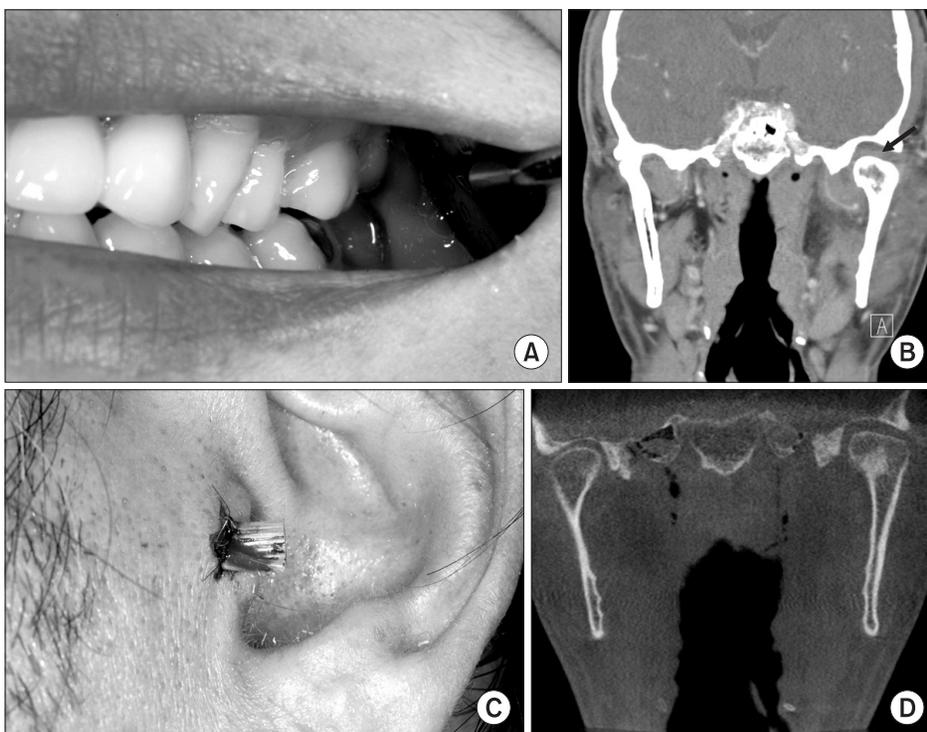
At one month follow-up, the patient's symptoms disappeared and maximum opening range was 40+mm. The normal cavity was observed in the CT scan.(Fig. 1. D) We didn't use contrast for the follow-up examination because he was asymptomatic and range of jaw movement was normal.

## 2. Case 2

A 16-year-old male visited our center, whose chief complaint was swelling and pain on right preauricular region. The patient stated that the symptoms started before 3 weeks and were aggravated. In his medical history, he had mild upper respiratory infection with fever (38.1°C) and chilling sensation.

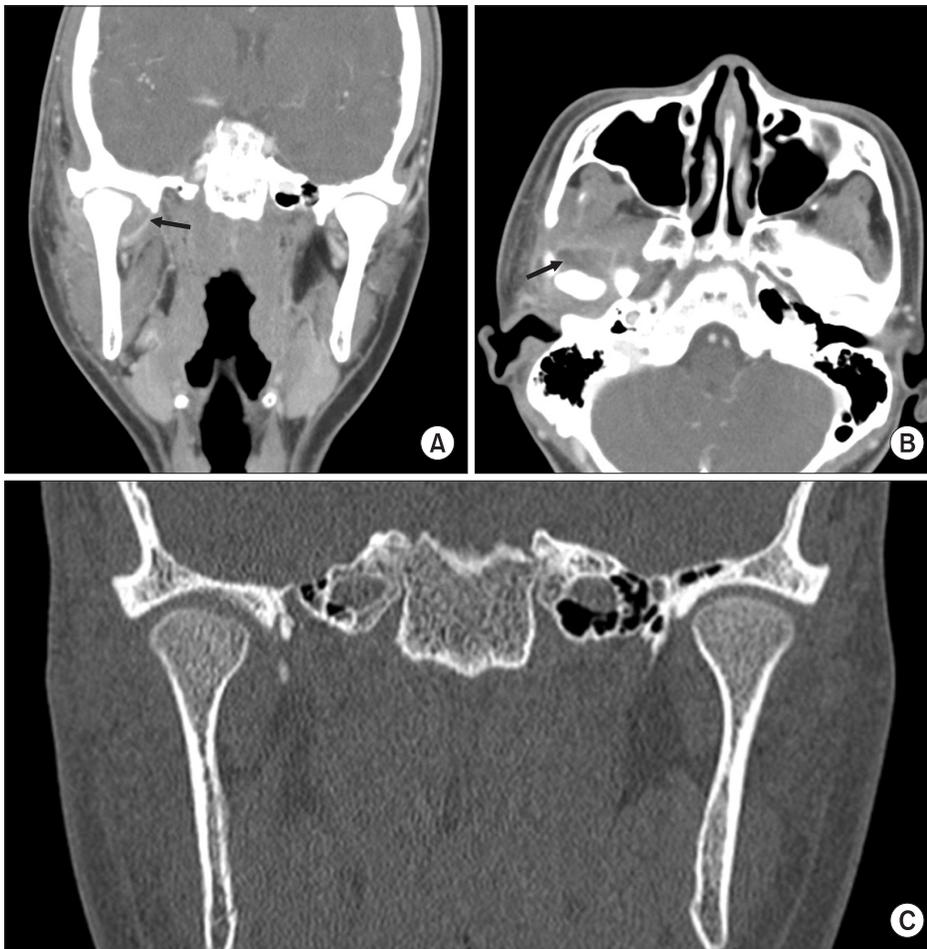
In physical examination, edema of the right preauricular site and a sense of induration were palpated, limited opening(<20 mm) and pain were noted.

In the CT scan with contrast, diffused inflammatory findings and multifocal small abscess cavities were shown on right pericapsular region.(Figs. 2. A, 2. B) It was presumed that inflammation from secondary fascial space (pterygoid space) spread to pericapsular region.



**Fig. 1.** A. Clinical findings in Case 1. Hypoocclusion with ipsilateral posterior open bite. B. Computed tomography (CT) findings in Case 1. Coronal CT-scan reveals intracapsular abscess formation in left temporomandibular joint with widened joint cavity (arrow). C. Treatment of Case 1. D. CT findings of postoperation in Case 1. One month follow-up CT-scan reveals a normal joint cavity.

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**Fig. 2.** A, B. Computed tomography (CT) findings of Case 2. Diffuse inflammation and multifocal small abscess cavity around right temporomandibular joint (arrows). C. CT findings of postoperation in Case 2. Normal joint cavity was seen (1 month later).

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Results of laboratory studies were as follows - WBC: 14.0, CRP: 7.72, ESR: 47.

A few alpha *streptococcus* species were shown in the result of culture.

Similar to Case 1, administration of antibiotics (Augmentin) empirically, incision, drainage and pus culture were performed under hospitalization. He was also instructed to do mouth opening exercise and massage with warm pack. After 5 days, at the time of discharge, his symptom was decreased significantly and laboratory results were also decreased near the normal range (WBC: 8.2, CRP: 3.6, ESR: 29). Range of maximum mouth opening was about 25 mm.

At one month postoperatively, the patient did not complain of any remarkable symptoms, and no inflammatory findings were shown on the CT scan.(Fig. 2. C) Maximum mouth opening range was more than 40 mm without any symptoms.

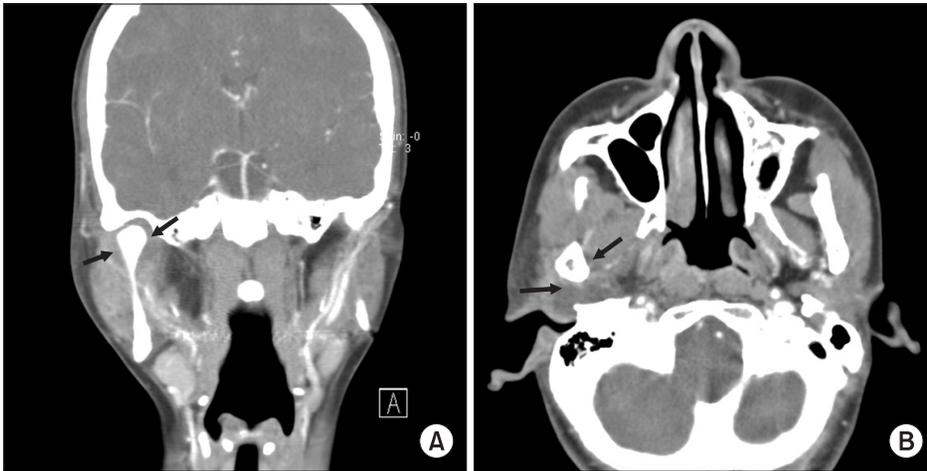
### 3. Case 3

A female patient aged 43 years visited our center, whose chief complaints were pain and edema on the right TMJ and

exudates from external auditory meatus. Her chin bumped against the foot of her young child while she played with him. She didn't have any underlying diseases. She has mild fever (37.8°C) without chilling sensation. Her maximum open range was around 20 mm. Passive range of motion was same.

At the initial examination, inflammation was shown to spread out around the right condyle (particularly, posterior region) on the CT scan with contrast.(Figs. 3. A, 3. B) It was deemed as exudate of the external auditory meatus. Like the above cases, incision and drainage were performed, administration of antibiotics (Augmentin) and jaw opening exercise were conducted under hospitalization. Ear drops (Cetraxal plus ear drop, Salvat, Barcelona, Spain) was applied into external auditory meatus. Similar to above two cases, some gram positive alpha streptococci species were observed in the results of culture and gram stain studies.

The patient's symptom was improved at 1 week and the patient was discharged our center. Follow-up CT scan was not taken for this patient. Laboratory studies at the discharge were decreased as follow - WBC counts: 8.7, CRP: 4.9, ESR: 46.



**Fig. 3.** A, B. Computed tomography (CT) findings in Case 3. CT-scan reveals a right masticator space abscess with a low density mass (arrows).

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Range of jaw motion increased to 30 mm without pain and symptoms.

After 1 month, she was asymptomatic and was able to open her mouth more than 40 mm. We couldn't get her CT scan at this time because she refused it.

### III. Discussion

TMJ infection (both intracapsular and pericapsular infections) is rare. Goldschmidt et al.<sup>2</sup> reported that there were only 31 case reports of TMJ infection published in the English literature between 1931 and 1999.

The predisposing factors contributing to TMJ infection can be divided into local and systemic factors. The local factors include blunt trauma, history of joint diseases and burn and the systemic factors include autoimmune diseases, medications (mostly the use of systemic steroids), and sexually transmitted diseases, which are related with compromised immune in most cases<sup>3,4</sup>.

The route of infection can be categorized into three: spread from the blood flow (hematogenous), spread from the adjacent infectious tissues (contiguous), and direct centesis into the joint cavity (direct inoculation)<sup>5</sup>. Among these, the most prevalent route is hematogenous spread originating from primary infectious site. The synovial membrane of TMJ is well vascularized and has no limiting basement and thus vulnerable to infections<sup>6,7</sup>. According to literatures, history of pharyngitis or upper respiratory infection, or dental prophylaxis was reported in patients without specific findings around the mouth<sup>8</sup>.

Contiguous spread of inflammations on adjacent structures to the TMJ is also a prevalent route<sup>9</sup>. Inflammations of the mastoid aircell or the parotid gland, or infratemporal space

can be spread to TMJ and develop TMJ infection.

Rarely, it may be affected by direct inoculation into the TMJ but it is not a common route. Arthrocentesis or direct inoculation into the joint cavity can be iatrogenic routes<sup>8</sup>.

Symptoms in the early stage of TMJ infection include pain of TMJ and limitation of jaw movement. If diagnosis is performed just with clinical symptoms without other examinations at this time, it may be misdiagnosed as a common TMD as seen from Case 1.

Generally, in case of mouth opening limitation by internal derangement, the passive range of motion (PROM) of jaw can be allowed up to 25 mm. But if PROM is limited under 20 mm with severe pain, clinician should consider the possibility of non-TMD including intracapsular infection, intramuscular abscess formation, acute myositis and fracture of condyle. In this case, all laboratory tests should be performed before treatment to check the infection. TMJ aspiration is also required if swelling is developed subsequently.

Patient may present with fever, malaise, erythema on the preauricular site, local lymphadenopathy, displacement of the mandible toward the opposite side, and posterior openbite of the affected side as the infection develops<sup>10</sup>.

The joint cavity has been regarded as aseptic structure, however, some recent studies reported that bacteria were detected in the TMJ<sup>11</sup>, and Kim et al.<sup>12</sup> reported that bacterial screening test in the synovial fluids of the asymptomatic knee joint was positive.

Therefore the existance of bacteria is not clinically significant but the type of bacteria is the important thing. The typical bacteria causing TMJ infection are *Staphylococcus aureus*, *Neisseria gonorrhoeae*, and *haemophilus influenzae*<sup>2,13</sup>.

Early diagnosis and treatment are essential in the management of joint infection<sup>7,14</sup>.

Nade<sup>14</sup> reported that if the treatment of TMJ infection is delayed seven days or more, the incidence of complications can be increased up to 77%. Some studies report that failure to initially diagnose TMJ infection may lead to mandibular ankylosis<sup>15</sup>.

Goldschmidt et al.<sup>2</sup> suggest a sequence of diagnostic plan as follows.

- History
- Physical examination
- Joint fluid aspiration
- Culture (aerobic, anaerobic)
- Gram stain
- Leukocyte count
- Blood cultures
- Culture other lesions/wounds
- Peripheral WBC counts
- ESR
- CRP
- Radiographs (plain film, CT)
- Bone scan
- Magnetic resonance imaging
- Response to treatment

Complications from delayed treatment include functional disorders of joints or fibrosis, ankylosis, and infection spread to adjacent structures, and in growing patients, mandibular growth disturbance can be developed<sup>8,16</sup>.

In most cases, immediate drainage for decompression and administration of antibiotics are recommended to manage the TMJ infection. And pus culture should be performed for gram stains and microbial sensitivity test<sup>5,16</sup>.

When the infection develops acutely, fibrinogen is accumulated within the joint. And it results in difficulty of jaw movement. So, mouth opening exercise should be started as soon as the acute symptoms of infection has gone down. Nutritional supplements also should be administered for poor diet<sup>2</sup>.

Diseases that are required to be distinguished from TMJ infection include common TMD, cellulitis of the soft tissues around the TMJ, malignant external otitis, gout, rheumatic diseases, and neoplasm (synovial chondromatosis), and fracture of condyle<sup>2,5,8</sup>.

In conclusion, the routes of TMJ infection (intracapsular and/or pericapsular) are hematogenous, contiguous, and iatrogenic spread by direct inoculation.

The authors treated three cases of TMJ infection, and the cause could not be clarified in Case 1. The patient's medical

history was unremarkable, inflammation of other site of body and history of invasive treatment of TMJ had not reported. It was assumed that inflammation at other site in his body could be the cause, moving along the blood stream, though the patient could not be aware of it. In Case 2, it was pericapsular infection which was spread from adjacent fascial space. It is assumed that it would be related to the patient's upper respiratory infection. In Case 3, it is deemed that trauma at her jaw acted as a predisposing factor. All the three cases showed satisfactory therapeutic effects by proper surgical interventions, administration of antibiotics, and physical therapy.

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