# Infratemporal Space Abscess Mimicking Temporomandibular Disorder Following Dental Procedures: A Case Report

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#### ABSTRACT

Often, abscesses in the orofacial region are of odontogenic origin. Odontogenic abscesses should be treated with caution, since they can have a severe or even fatal course. Because infratemporal space abscesses are located in the deep facial space and the clinical symptoms of this condition are similar to those of temporomandibular joint disorder (TMD), early differential diagnosis is difficult. Herein, we report a case of infratemporal space abscess that was misdiagnosed as TMD at the initial diagnosis and discuss relevant information in the literature on infratemporal space abscess.

Key words : Abscess, Facial pain, Temporomandibular joint disorders, Trismus

#### INTRODUCTION

Temporomandibular disorder (TMD) refers to a collection of clinical problems involving the masticatory muscles, temporomandibular joints (TMJs), and associated structures. The most common presenting symptoms are localized pain in the masticatory muscles, preauricular area, and/or TMJ; TMJ joint sounds; and limitation of mandibular range of motion<sup>1</sup>. There are many causes of limitation in opening the mouth, such as acute or chronic trauma; reactive diseases such as acute masticator space inflammation; and chronic diseases/conditions such as TMJ ankylosis, oral submucosal fibrosis, radiation-induced damage, and cancer invading the masticator system<sup>1,2</sup>.

Inflammatory changes in the masticator space are usually odontogenic in origin and mainly caused by periodonti-

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tis, pericoronitis, dental caries, suppurative pulpitis, or complications from dental procedures, such as post-tooth extraction infection<sup>2,3</sup>. The masticator space is a complex anatomic area, posterior and superior to the oral cavity and below the temporal bone, consisting of temporal, infratemporal, masseteric, and pterygomandibular spaces<sup>4</sup>. Isolated infection in the infratemporal space is rare and difficult to diagnose because the clinical symptoms of trismus and tenderness in the masticator muscles are likely to be diagnosed as TMD<sup>5</sup>. For accurate, early diagnosis of unusual infections in the infratemporal space, clinicians need to be aware of cases involving abscesses in the infratemporal space without obvious signs of odontogenic infection. To the best of our knowledge, very few cases of such a diagnostic dilemma have been reported in the literature. Therefore, in this case report, we describe a case of infection in the infratemporal space after periodontal treatment that was misdiagnosed as TMD.

#### CASE REPORT

A 65-year-old female patient visited the Department of

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*Figure 1.* Panoramic view at the first visit, showing generalized alveolar bone resorption.



*Figure 2.* TMJ tomography view at the first visit, showing both mandibular condyle translation restriction. (A), (D) TMJ tomography when the mouth is opened. (B), (C) TMJ tomography when the mouth is closed.

Oral Medicine, Pusan National University Hospital, with the chief complaint of limitation in opening the mouth and pain in the right pre-auricular area a few days after undergoing periodontal treatment for the right maxillary posterior periodontitis at another dental clinic. She previously visited the Department of Otorhinolaryngology with a chief complaint of pre-auricular pain and was recommended to undergo evaluation at a dental clinic. The dental clinician diagnosed her with TMD and prescribed medication and physical therapy. However, as the symptoms did not improve despite receiving treatment, she visited our hospital for evaluation. She had a history of thyroid tumor surgery in 2019, and was currently taking medications for it. However, she had no history of previous trauma or surgery of the right TMJ or the ear. On clinical examination, she showed mouth opening limitation, in which maximum comfortable opening (MCO) was 23 mm and passive range of motion was 33 mm with deflection mouth opening path. No significant joint sounds were present upon digital palpation. Tenderness was elicited in the right TMJ area when she clenched her teeth and while



Figure 3. Cone-beam computed tomography. (A) Coronal image and (B) sagittal image show the cortical erosive and sclerotic change in the right mandibular condyle.

opening and closing the mouth. Mandibular asymmetry, occlusion change, and swelling in the right pre-auricular region were absent. Panoramic radiography and tomography of the TMJ showed generalized alveolar bone resorption and restricted condylar translation (Figs 1, 2). She was tentative diagnosed with acute disc dislocation without reduction of right TMJ, and prescribed medications (non-steroidal anti-inflammatory drugs and muscle relaxants) along with supplemental physical and self-exercise therapy for symptom improvement. However, the next day, she returned to our hospital because of increased pain and decease in the ability to open her mouth. At her second visit, she was additionally diagnosed with osteoarthritis of right TMJ using cone-beam CT, which revealed cortical erosion and sclerotic change on the right mandibular condyle (Fig 3(A), (B)). Five days after her third visit, she presented with severe pain and trismus. At this time, her MCO had decreased to 18 mm with no swelling in the right TMJ area and no systemic fever (36.5°C). Contrast-enhanced facial CT, performed to identify the source of pain, revealed low-density fluid collection in the right infratemporal space (Fig 4). With a tentative diagnosis of abscess in the right infratemporal space, she was immediately referred to the Department of Oral and Maxillofacial Surgery and admitted to the hospital. At admission, the following laboratory results were obtained: erythrocyte sedimentation rate (ESR), 65 mm/h and C-reactive protein (CRP) level, 5.52 mg/dL. Intraoral incision and drainage were performed and antibiotics (metronidazole and



**Figure 4.** Preoperative image of contrast-enhanced facial computed tomography coronal view reveals abscess formation (arrows) with a low density fluid collection in the right side of infratemporal space.

cefradine) were administered. After these treatments, her symptoms subsided, and she was discharged on the 10th day from admission. At the final follow-up (2 months after discharge), she was assessed clinically. Her clinical symptoms had improved and MCO had recovered to 38 mm without right TMJ pain.

## DISCUSSION

The masticator space is a complex anatomic area, posterior and superior to the oral cavity and below the temporal bone<sup>6,7</sup>. This space contains the mastication muscles (medial and lateral ptervgoid muscles, masseter muscle, and temporalis muscle), ascending ramus of the mandible, pterygoid plates, and mandibular neurovascular bundles<sup>2</sup>. The temporal space along with the infratemporal, masseteric, and ptervgomandibular spaces are grouped as the masticator space<sup>4</sup> (Fig 5). Most abscesses in the masticator space originate from an odontogenic infection. Odontogenic infections are commonly caused by pericoronitis, dental caries, periodontitis, or complications from dental procedures; the second and third molars are often the causative teeth<sup>4,5,7-12</sup>. Our patient had a history of root planing under local anesthesia for periodontitis of the right maxillary posterior teeth 1 week before the symptoms appeared.

The clinical symptoms of masticator space abscess, which are similar to those of TMD, include limited mouth opening, pain in the masticator muscles, and arthralgia. In the case of an abscess in the deep masticator space, such as infratemporal space abscess, facial swelling and fever tend to be of low severity<sup>11</sup>. In our patient's case, the symptoms included limitation in opening the mouth without any joint sounds and pain in the right periauricular region without facial swelling or fever. These symptoms indeed mimic disc dislocation without reduction of TMJ. Therefore, TMD was suspected at the initial visit.

Careful dental history taking and clinical examination have a valuable but limited role in confirming the diagnosis, and the use of appropriate imaging modalities is essential for making an accurate diagnosis. CT and magnetic resonance imaging play a central role in the detection and characterization of abscesses in this location and in treatment planning. CT is the only way to detect characteristic signs of inflammation or infection such as radiolucency and gas bubbles<sup>2,11,13</sup>. The widespread availability and short examination time of pre-operative CT make it the preferred modality<sup>5,8</sup>. In the present case, CT was extremely useful in making the correct diagnosis and deciding the course of treatment (Fig 4).

Blood analysis is not always performed at the first visit in cases of trismus with pain in the TMJ or masticator muscles. If an abscess is suspected, blood tests can be performed for making a diagnosis. ESR, white blood cell (WBC) count,



*Figure 5.* Schematic representation of infratemporal space (black star). (Cited and modified from Narayana et al.<sup>4</sup>)

and CRP are often used as markers of inflammation and have been reported to be useful for detecting infections in the head and neck region<sup>14,15</sup>. CRP is affected faster than the ESR and WBC count during the course of acute infections because of its short half-life (5~7 hours). Rapid increase and decrease in CRP levels in the presence of acute inflammation makes it a sensitive indicator of infection<sup>16</sup>. Our patient had high a CRP level (5.52 mg/L) and ESR (65 mm/h) while the WBC count was within the reference range.

Antibiotic therapy combined with surgical incision and drainage of abscess is the appropriate therapeutic strategy. Additional intravenous antibiotic treatment is required in severe cases<sup>3,4,11</sup>. Our patient was hospitalized for 10 days and was managed with surgical drainage of the abscess, intravenous high-dose antibiotic therapy, and analgesic therapy. At the end of hospitalization, her CRP level and ESR had recovered to the reference range.

Delayed diagnosis and treatment of abscesses in the masticator space can increase the risk of infection and potentially life-threatening events. However, the typical symptoms of such abscesses, namely trismus and pain in the masticator muscles and TMJ, are similar to those of TMD. In the case of abscesses in the deep masticator space, it is difficult to make the correct diagnosis if fever or swelling is not noticeable. Therefore, even if the patient presents common symptoms and signs of TMD, clinicians should suspect masticator space abscess in the differential diagnosis of TMD when the patient shows ominous signs of spontaneous or worsening pain and refractory responses to repetitive conservative treatments. We believe that this case report provides useful information for the diagnosis of infratemporal space abscesses.

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