

# Infratemporal Fossa Abscess

## Complication of Dental Injection

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**T**he infratemporal fossa (ITF) is a rare anatomic site for abscess formation. Infections in this space have been found following maxillary sinusitis, maxillary sinus fracture, temporomandibular arthroscopy, dental infection, and tooth extraction.<sup>1-5</sup> The ITF is bounded superiorly by the sphenoid bone, medially by the lateral pterygoid plate, anteriorly by the maxilla, posteriorly by the deep parotid region, and laterally by the mandibular ramus. The ITF contains important neurovascular structures and communicates with the orbit and middle cranial fossa. Therefore, infection may spread to these areas leading to rapid clinical deterioration.

Prompt diagnosis and initiation of treatment is of the utmost importance in managing this condition. This case of an ITF abscess may have resulted from multiple needle sticks necessary to achieve anesthesia prior to a dental procedure. This is a potentially unusual cause of infection, but the presenting symptoms and subsequent imaging study led to the diagnosis. Incision and drainage was performed leading to clinical improvement.

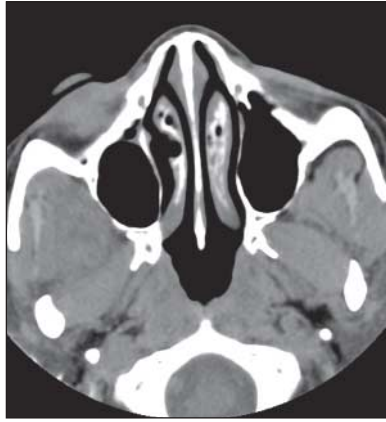
### REPORT OF A CASE

A 39-year-old, otherwise healthy woman with a history of a dental filling placed in the second maxillary molar 2 weeks prior was admitted to the hospital for a right buccal space infection. The patient stated that she required multiple needle sticks as well as maxillary nerve block anesthesia to achieve adequate anesthesia for the filling placement. The patient noted no dental complaints prior to the filling placement, but after the procedure she began experiencing severe pain in the right side of her mouth. She returned to the dentist and received clindamycin. The patient's dental pain became increasingly more severe and she began to develop right-sided facial swelling and trismus. At this point, she sought treatment from an oral and maxil-

lofacial surgeon, where she was diagnosed with a buccal space infection and was admitted to the hospital. The patient was afebrile, and her complete white blood cell count was 6500/ $\mu\text{L}$  (to convert to  $\times 10^9/\text{L}$ , multiply by 0.001). A computed tomographic scan of the head and sinus was performed and showed no evidence of abscess formation (**Figure 1**). The following morning, the patient underwent extraction of the right second maxillary molar and incision and drainage of the buccal space infection, which revealed no fluid collection. The patient was discharged the following day and continued taking clindamycin and levofloxacin.

The patient's symptoms worsened over the ensuing 6 days, prompting a visit to the emergency department. On examination, she was afebrile and showed no signs of respiratory distress. She had diffuse right-sided facial swelling over the temporal, maxillary, and submaxillary regions. She had right masseter muscle spasm with moderate submaxillary induration. There was no proptosis, extraocular movements were intact, and gross visual acuity appeared normal. There was marked trismus with an interincisal opening of about 5 mm, making intraoral examination difficult. The right Stenson duct appeared inflamed but without purulent discharge. The prior dental extraction socket appeared to be healing well; however, there was fullness in the surround-

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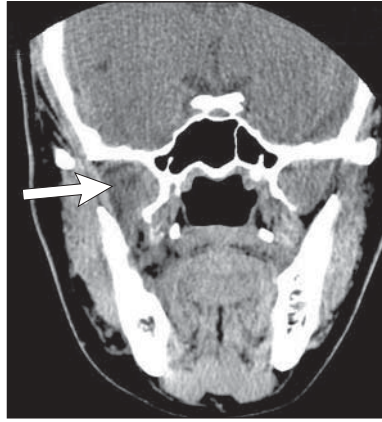
**Figure 1.** Initial computed tomographic scan, which was viewed as having no evidence of abscess.



**Figure 2.** Repeated computed tomographic scan (axial view) showing infratemporal fossa abscess (arrow).

ing buccal space. She exhibited hypesthesia in the right V<sub>3</sub> dermatome. Nasopharyngeal laryngoscopy revealed mild right pharyngeal fullness with a widely patent airway. The patient's complete white blood cell count on admission was 11 300/ $\mu$ L. A repeated computed tomographic scan revealed a 3.8-cm right ITF abscess, possibly extending down the right pterygoid muscle (**Figure 2** and **Figure 3**).

The following day the patient was taken to the operating room for incision and drainage of the right ITF abscess. The risks, benefits, and alternatives were explained to the patient, and informed consent was obtained for the procedure. Using a Keen approach, we bluntly dissected along the posterior buttress of the maxillary sinus. We cautiously dissected superolaterally and then posteriorly to enter the abscess space. The



**Figure 3.** Repeated computed tomographic scan (coronal view) showing infratemporal fossa abscess (arrow).

cavity was widely opened, and approximately 15 mL of pus was liberated and examined for cultures. The cavity was copiously irrigated with isotonic sodium chloride solution, and a 0.5-inch Penrose drain was then placed through the open intraoral wound into the abscess cavity.

Over the next few days, the patient clinically improved, and she was able to tolerate a soft dysphagia diet. The drain was left in place and she continued to have minimal intraoral purulent drainage. She remained afebrile, and her complete white blood cell count, which peaked at 16 100/ $\mu$ L, had subsequently declined to 5800/ $\mu$ L. The culture grew rare *Staphylococcus aureus*, rare *Staphylococcus* species (coagulase negative), rare *Streptococcus viridans*, and rare *Candida albicans*. The patient was discharged on postoperative day 4 with the drain in place and was prescribed a 10-day course of doxycycline.

At 1-week follow-up, she continued to show improvement and the drain was removed. She still had considerable trismus, but her interincisal opening had improved to 1.5 cm. The patient was instructed on range-of-motion exercises and was referred for physiotherapy. Close follow-up was also recommended.

#### COMMENT

Infratemporal fossa abscess is a rare condition that is scantily described in the literature. It has been cited as

an uncommon complication of dental infections and tooth extractions. Although rare, it is important to recognize the possibility of this clinical entity following any dental procedure.

This case exemplifies the difficulty in clinical diagnosis of an ITF abscess. Given the patient's history, the exact etiology of the abscess formation is unclear. Most cases of ITF abscesses occur following spread from an odontogenic infection or dental extraction. The possibility of a dental infection prior to placement of the dental filling may be considered in this case; however, our patient had no clinical signs of infection at presentation and had no medical conditions predisposing her to severe infections. Furthermore, her symptoms seemed to appear directly following the dental filling procedure. Schwimmer et al<sup>4</sup> described 3 patients with ITF abscesses following dental extractions. In each case, the patients' symptoms began shortly after removal of the tooth. Gallagher and Marley<sup>5</sup> also described a case of ITF infection that followed extraction of a clinically noninfected tooth. In this case, the patient's pain and facial swelling manifested prior to tooth extraction. In retrospect, the initial computed tomographic scan (Figure 1) taken shortly after our patient's dental filling procedure, which was viewed as normal, showed asymmetry between the infratemporal areas and a possible phlegmon. This suggests that the infectious process in the ITF had begun prior to the dental extraction.

One hypothesis as to the etiology of the abscess is from the multiple needle sticks and maxillary nerve block anesthesia that the patient received prior to her dental filling placement. In a maxillary nerve block, the needle enters the pterygopalatine fossa, which is directly connected to the ITF. The pterygoid plexus of veins is in close proximity to the area approached with this technique and, if entered, may lead to hematoma formation. Therefore, the patient may have developed a hematoma within the ITF that subsequently became infected. In addition, the insertion of the needle may have seeded organ-

isms into the pterygopalatine fossa and ultimately into the ITF.

## CONCLUSIONS

This case of an ITF abscess highlights the importance of prompt diagnosis because of the potential for spread into the orbit and skull base. Given the numerous avenues for the infection to disseminate, a patient's condition can rapidly deteriorate, leading to grave consequences. The presenting signs and symptoms, which are sensible from an anatomic basis, warrant inclusion of this condition into the differential diagnosis following any dental procedure. Imaging then may be used as confirmation, and treatment should be initiated without delay.

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