




Spontaneous healing of mandibular angle fracture following a submandibular and sub-masseteric abscess: a case report

Curación espontánea de una fractura del ángulo mandibular después de un absceso submandibular y submaseterino: reporte de un caso

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Abstract

Mandibular angle fractures can lead to complications like infection. We present a case of a 29-year-old male with an undiagnosed mandibular angle fracture after blunt trauma, resulting in submandibular and sub-masseteric abscesses. The third molar's location near the fracture contributed to the infection. A three-week delay in treatment, along with imaging showing no displacement, supported a non-surgical approach. Empirical antibiotic therapy with Ampicillin/Sulbactam and later Ceftriaxone/Clindamycin resolved the infection. This case emphasizes the importance of timely diagnosis and personalized management to prevent complications. It follows the CARE Guidelines.

Keywords: Mandibular Fractures; Submandibular Abscess; Sub-masseteric Abscess; Case Report; Spontaneous healing

Resumen

Las fracturas del ángulo mandibular pueden llevar a complicaciones como infecciones. Presentamos el caso de un hombre de 29 años con una fractura del ángulo mandibular no diagnosticada después de un trauma contundente, que resultó en abscesos submandibulares y submaseterinos. La ubicación del tercer molar cerca de la fractura contribuyó a la infección. Un retraso de tres semanas en el tratamiento, junto con imágenes que no mostraron desplazamiento, respaldó un enfoque no quirúrgico. La terapia antibiótica empírica con Ampicilina/Sulbactam y luego Ceftriaxona/Clindamicina resolvió la infección. Este caso subraya la importancia de un diagnóstico oportuno y un manejo personalizado para prevenir complicaciones. Sigue las Guías CARE.

Palabras Claves: Fracturas mandibulares; absceso submandibular; absceso submaseterino; reporte de caso; curación espontánea.

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Introduction

The jaw is the most solid and resistant bone within the facial skeleton. Its anatomy, position, and projection render it more susceptible to fractures compared to other facial bones (Giovacchini *et al.*, 2018; Beret *et al.*, 2022). Angle fractures have a reported prevalence ranging between 16% and 37% of all mandibular fractures (Rai, 2021). Lee and Kim (2019) have defined mandibular angle fractures as those situated posterior to the second molar, extending from any point along the curve formed by the junction of the body and ramus in the retromolar area to any point along the curve formed by the lower edge of the body and the posterior edge of the mandibular ramus. The etiology of these fractures is multifactorial, with traffic accidents being the primary cause, followed by cases involving physical violence (Munante-Cardenas *et al.*, 2015).

Mandibular fractures, especially in the dentate regions, are prone to infection. However, infections may also manifest prior to or independently of surgical intervention. Primary contributing factors include delays in seeking treatment and additional soft tissue damage from the injury mechanism (Oksa *et al.*, 2024). Complications associated with these fractures can occur in up to 32% of cases reported, with infection being one of the most prevalent (Zweig, 2009; Odom & Snyder-Warwick, 2016). Microorganisms from the oral cavity can spread from the fracture site to deep anatomical spaces, mainly due to movement between fracture fragments when not promptly stabilized (Odom & Snyder-Warwick, 2016), potentially spreading through facial planes, with the submandibular space being the most commonly affected (Zirk *et al.*, 2016).

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Treatment of mandibular fractures often involves surgical intervention, primarily through open reduction and internal fixation, with closed reduction techniques utilizing mandibular-maxillary fixation (MMF) being less common. Non-surgical management, or “conservative” treatment, is relatively infrequent and typically reserved for select cases due to factors such as fracture complexity, patient factors, and, occasionally, economic considerations (Arya et al., 2022).

The following describes a case of mandibular fracture that was not diagnosed or promptly stabilized, leading to the development of two abscesses: one submandibular and the other sub-masseteric. Following the resolution of this complication, the decision was made to maintain non-surgical treatment. This case report follows the CARE Guidelines (Gagnier et al., 2013).

Description of clinical case

A 29-year-old male patient presented with severe pain rated 10/10 on the Visual Analog Scale (VAS) in the left mandibular region and was admitted to the Emergency Department of Padre Hurtado Hospital. He was subsequently referred to the Maxillofacial team. The patient reported a three-week history of symptoms following blunt trauma to the mandibular area during an altercation. He stated that he had sought care at the emergency department on the day of the trauma but was discharged without treatment or further diagnostic assessment.

During the anamnesis, the patient reported pain on mastication, severe trismus, dysphagia, and odynophagia. On general examination, vital signs were obtained, revealing a fever of 38.3°C while remaining hemodynamically stable. Clinical examination revealed a painful countenance, facial asymmetry, and increased volume in the left mandibular angle area (Figure 1).



Figure 1: Patient on the day of admission to the Maxillofacial service. Increase volume in the masseter area and the left mandibular angle.

Palpation localized a tender, diffusely bordered, firm mass in the area, with a maximum mouth opening of 4 mm. Upon intraoral examination, ecchymosis was observed in the left retromolar mucosa. No occlusal alterations or associated hemorrhages were noted, and the floor of the mouth was unoccupied.

Additional complementary imaging and laboratory tests were conducted. Computed tomography (CT) revealed the presence of a collection in the left submandibular region with locations extending into the sub-masseteric space, measuring approximately 2.5 x 1.2 x 1 cm, associated with edema of the left submandibular gland and regional subcutaneous tissue. Additionally, another poorly defined deep cervical collection was identified beneath the medial pterygoid muscle, measuring approximately 2 x 1.4 x 1 cm, along with ipsilateral adenopathy of up to 1 cm (Figure 2).

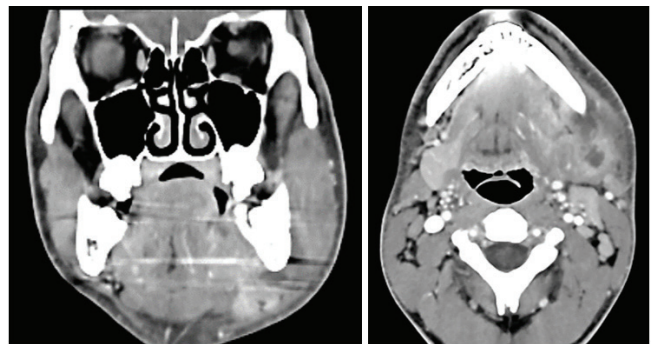


Figure 2: Coronal and Axial CT scan on admission. Collection in the left submandibular region with locations extending into the sub-masseteric space, edema of the left submandibular gland, and regional subcutaneous tissue.

Both infectious processes were associated with an oblique fracture line in the left mandibular angle, with no observed displacement or overlap of bone fragments. The fracture line extended from the mandibular angle cranially to the alveolar ridge of the second molar, passing through the left lower third molar (Figure 3)

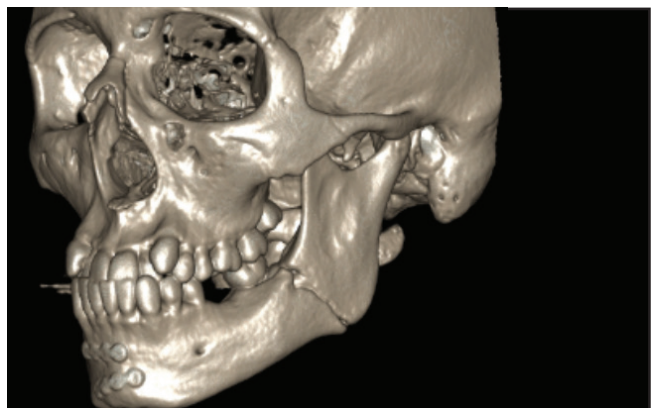


Figure 3: Reconstruction of the fracture. There is an oblique fracture line in the left mandibular angle, with no observed displacement or overlap of bone fragments.

Regarding the laboratory tests performed, the patient exhibited a slightly elevated white blood cell count and a c-reactive protein level of 51.9 mg/L. All other biochemical and hematological parameters were within normal limits.

Due to the painful symptoms, difficulty swallowing, and severe jaw muscle spasm, coupled with the progression of the infectious process towards the throat, an immediate decision was made to commence intravenous antibiotic therapy and admit the patient into hospitalization. An empirical approach was adopted, involving intravenous administration of ampicillin 1000mg + sulbactam 500mg (Unasyn) 3g every 8 hours. Pain relief was managed with ketorolac 60mg + 2g metamizole in 250cc normal saline (BIC). Local heat therapy was applied to the affected area, along with a soft diet and rinses, using 0.12% chlorhexidine twice daily. No closed reduction techniques were performed, given that three weeks have passed since the incident, and there were no signs of displacement, the presence of trismus, and the risk of a poor evolution with airway compromise.

During the hospital stay, pus spontaneously drained from inside the mouth in the absence of a maxillofacial surgeon, which is why cultures or antibiograms could not be performed. Due to limited hospital resources, after a week, the antibiotic treatment was changed to intravenous ceftriaxone 2g/day + clindamycin 600 mg every 8 hours and paracetamol 1g every 8 hours orally for pain relief. The patient responded positively to empirical antibiotic therapy.

Treatment was continued for two weeks, and following significant improvement in terms of infection and clinical examination (Figure 4), the patient was discharged with a follow-up appointment scheduled at the Maxillofacial surgery service in one week.



Figure 4: Patient on the seventh day of hospitalization. Clinical resolution of the inflammatory and infectious condition.

The patient was instructed to follow a soft diet, take pain medication, and use antiseptic mouth rinses. There was significant improvement in jaw inflammation and complete pain relief

at the follow-up appointment. The patient's mouth opening had increased to 25 mm, and the bite had no issues. No abnormalities in bone or swelling were detected upon examination, maintaining the decision not to operate.

Discussion

Mandibular fractures, especially angle fractures, are common injuries in the maxillofacial region that require careful and timely management to avoid serious complications such as postoperative infections of deep spaces of the head and neck (Giovacchini *et al.*, 2018). According to the literature, exposed mandibular fractures should be treated at most within 24 to 72 hours to avoid complications such as infections and non-unions (Zweig, 2009). The most common approaches involve open reduction and internal fixation through an intraoral or transcutaneous approach or external fixation (Munante-Cardenas *et al.*, 2015). External fixation is typically maintained for 4 to 6 weeks, but in cases where no displacement is observed, two weeks are suggested as sufficient (Jain *et al.*, 2023). Generally, closed reduction is avoided and only considered in specific cases where additional considerations related to the patient's clinical and socioeconomic context exist.

In our case, the undiagnosed and untreated mandibular fracture most likely contributed to the developing submandibular and sub-masseteric abscesses. The lack of fracture fixation, combined with a delay of several weeks in administering antibiotic therapy, is directly associated with the development of this acute infectious process. The literature emphasizes that mandibular fractures involving teeth have a higher propensity for infection, either as a postoperative complication or as a pre-surgical clinical condition (Oksa *et al.*, 2024). In our case, the infection was mainly attributed to the delay in treatment, exacerbated by the location of the third molar in the fracture region (Giovacchini *et al.*, 2018; Beret *et al.*, 2022).

Considering that the mandibular angle has the highest rate of post-fracture complications (19%) (Ahmad, 2021), the patient could have presented not only with infection but also with non-union, fibrous union, or malunion of the fracture, leading to aesthetic problems, malocclusion, and a much more complex surgical treatment. However, we found that at 6 weeks post-trauma, the patient showed signs of proper healing, both clinically and on imaging.

In his literature review, Ahmad reported finding only 32 cases of spontaneous healing of mandibular fractures in the English literature. He further indicated that the mechanisms by which this may occur are unclear but include preservation of the periosteum, patient age, absence of local infection, post-trauma immobilization, and function or mechanical stress near the fracture (Ahmad, 2021). In this case, the patient was a young man with no systemic con

ditions who presented a significant infectious process and severe trismus, which may have played a role in the involuntary immobilization of the fracture fragments. While the presence of infection is a detrimental factor for healing and antibiotic treatment was initiated late, the use of a combination of ampicillin/sulbactam and later ceftriaxone/clindamycin yielded satisfactory results in resolving the infection, as both combinations offer adequate coverage for microorganisms typically associated with odontogenic infections, supporting their efficacy in this clinical context. The rapid drainage of abscesses and subsequent elimination of the infection, combined with a favorable fracture line (Gagnier *et al.*, 2013) that extended obliquely from the mandibular angle to the alveolar ridge of the second molar and prevented fragment displacement due to masticatory muscle action, may have favored the spontaneous healing of the fracture. This leads us to believe that resolving the acute infectious condition, selecting antibiotic therapy, and inpatient care were crucial in this case.

It is relevant to remember that the management of mandibular fractures typically involves surgical intervention, with open reduction and internal fixation as the preferred modalities (Zweig, 2009). However, a conservative approach could be considered in this case, where no displacement of the bone fragments nor signs of malunion were observed. Initially, surgical reduction was contemplated, but after two cancellations of the operating room for administrative reasons and a new CT scan with the aforementioned signs, this was dismissed.

The epidemiology from two studies on surgically treated fractures in Chile was obtained regarding the country's situation. These studies indicate that the most affected gender is male, and the average age of affected patients is approximately 30.3 years, as reported by Zapata in a study conducted at the Traumatology Institute of Santiago between 2001 and 2010 (Zapata *et al.*, 2015). This aligns with what was reported in Valdivia during the same years (Raposo *et al.*, 2013).

As for evidence of reported cases of spontaneous healing of mandibular fractures, none were found in the national literature. However, a study conducted in La Serena provided information on cases of non-surgically treated fractures. It was recorded that, although closed reduction as a standalone treatment appears as an option for maxillofacial trauma, only a tiny percentage (9%) was performed as a sole treatment (Venegas *et al.*, 2013).

It is also worth mentioning that although the number of surgical treatments performed by the maxillofacial surgery service is significant in our country, the lack of human resources, infrastructure, and supplies in the national public health service limits the early diagnosis and resolution of various pathologies affecting

the maxillofacial region. In the long term, prolonging in-hospital processes increases costs for the state and the patient (Pérez Gutiérrez *et al.*, 2015).

This situation is reflected in Zapata's study, which showed that a low percentage of the total fractures diagnosed during the first years of the study were treated surgically. This was attributed to the fact that the available resources did not allow for the treatment of these fractures using open reduction and titanium plate osteosynthesis. Under those circumstances, priority was given to closed reduction of fractures and stabilization through intermaxillary fixation (Zapata *et al.*, 2015).

Finally, it is essential to remember the importance of accurate clinical and imaging diagnosis to avoid severe complications such as abscesses near structures that can compromise the patient's airway and, consequently, their life, ensuring the correct treatment of the conditions presented and reducing hospitalization times in this type of patient. In this case, a mandibular angle fracture complicated by two abscesses led to the patient's hospitalization but was resolved clinically, culminating in the spontaneous healing of the fracture, which rarely occurs and, under the presented conditions, was even less likely.

It is important to acknowledge the limitations of this study, such as the lack of bacterial cultures and susceptibility testing due to resource constraints, which limited the precise identification of the pathogens involved and the selection of antibiotic therapy. Additionally, although significant improvement was observed in the short-term follow-up, long-term follow-up is needed to assess mandibular stability and function fully.

Conclusions

In conclusion, our case underscores the importance of timely assessment and treatment of mandibular fractures to prevent serious complications. A comprehensive understanding of the underlying pathology and an individualized approach is required to achieve optimal outcomes in managing these injuries.

Recognitions

Authors contributions: **Javiera Cordero-Escalona:** Conceptualización, Investigación, Recursos, Visualización, Escritura – Borrador Original, Escritura – Revisión y Edición. **Valentina Veloso-Casado:** Conceptualización, Supervisión, Validación, Visualización, Escritura – Borrador Original, Escritura – Revisión y Edición. **Emilio Díaz-Bórquez:** Conceptualización, Investigación, Escritura – Borrador Original. **José Tomás Ramos-Rojas:** Conceptualización, Escritura – Borrador Original, Escritura – Revisión y Edición.

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