



## COMPLICATION OF MANDIBULAR ANGLE FRACTURE INVOLVING LOWER THIRD MOLAR IMPACTION: CASE REPORT

Savira Nurazky Yuniar<sup>1</sup>, Yayun Siti Rochmah<sup>2</sup>

1. Clinical Student, Faculty of Dentistry, Universitas Islam Sultan Agung, Indonesia

2. Oral and Maxillofacial Surgery Department, Faculty of Dentistry, Universitas Islam Sultan Agung, Indonesia

Correspondence: [yayun@unissula.ac.id](mailto:yayun@unissula.ac.id)

Received September 12<sup>th</sup>, 2024; 1<sup>st</sup> Revision February 18<sup>th</sup>, 2025; Accepted February 27<sup>th</sup>, 2025; Published online February 28<sup>th</sup>, 2025.

### Keywords:

Infection, Mandibular Angle Fracture, Third Molar Impaction

Indonesian Journal of Dentistry  
Volume 5 No 1 Issue 10 Year 2025 Pages 80-88  
URL <https://jurnal.unimus.ac.id/index.php/IJD>  
DOI <https://doi.org/10.26714/ijid.v5i1.16487>

### ABSTRACT

**Introduction:** Mandibular angle fractures frequently result from trauma and are often complicated by the presence of impacted third molars, which can increase the risk of infection. This case report aims to highlight the impact of third molar impaction on mandibular angle fractures and emphasize the importance of proper management in reducing postoperative complications.

**Case:** This report presents two cases of mandibular angle fractures involving the third molar. In the first case, the tooth was not extracted during the previous surgery, leading to an infection six months post-ORIF. Surgical debridement and third molar extraction were required to manage the infection. In the second case, ORIF was performed along with the extraction of the third molar followed by inter-maxillary fixation, resulting in satisfactory outcomes without complications. These cases illustrate the clinical significance of third molar extraction in fracture management.

**Conclusion:** The presence of third molars impacted in the fracture line increases the risk of postoperative infections. The decision to extract impacted third molars should be carefully considered based on clinical findings and radiographic evaluations to optimize healing outcomes and minimize complications.

### INTRODUCTION

A fracture is a bone discontinuity caused by trauma or pathological conditions. Mandibular fractures are among the most common maxillofacial injuries, with the angle region being a frequent fracture site. Trauma to the maxillofacial region remains the most common etiology of mandibular fractures, often resulting from motor vehicle accidents, falls, interpersonal violence, or sports-related injuries.<sup>1</sup> Mandibular fractures can vary in severity, ranging from simple, non-displaced fractures to more complex, displaced, or comminuted fractures. Mandibular fractures can have serious consequences if not managed properly.<sup>1,2</sup>

Based on the involved anatomy, mandibular fractures are classified into symphysis, parasymphysis, body, ramus, angle, coronoid process, and condyle.<sup>3</sup> The mechanism of damage and the direction of the force determine the location and pattern of fractures.<sup>4</sup> Among mandibular fractures,

the angle is one of the most commonly affected areas, with an incidence rate of 23–29.8%, second only to the condyle.<sup>5,6</sup> The mandibular angle is located more prominently, at the transitional area between the lower and posterior parts of the mandible, making it more vulnerable to impact or trauma.<sup>4</sup> Traffic accidents are the primary cause of fractures in this area because blunt force trauma to the face often affects this region. Additionally, the third molar, being the last tooth to erupt and located closest to the mandibular angle, increases susceptibility to fractures related to third molar impaction. Furthermore, a study by Soos et al. found that the prevalence of impaction in cases of mandibular angle fractures was 72.6%.<sup>7</sup>

Research by Ryant et al (2022) shows that the prevalence of mandibular angle fractures accompanied by third molar impaction in the lower jaw occurs more frequently in men (92.8%) than in women (7.2%). Fractures caused by traffic accidents were the most frequently found etiology (85.3%), followed by maxillofacial trauma due to inter-personal violation (14.7%). The classification of the third molar teeth in angle fractures is as follows: class IA (20%), class IB (6.7%), class IIA (20%), class IIB (20%), class IIC (13.3%), class IIIC (6.7%), and unerupted tooth buds (13.3%).<sup>8</sup> Impacted teeth lessen the thickness of the mandibular bone in the angulus region, increasing the likelihood of fractures during trauma. This evidence is supported by research conducted by Poernomo (2015), which reported a difference in mandibular angle thickness, where the group with impacted mandibular third molars exhibited a lower average thickness of the mandibular angle compared to respondents without impaction.<sup>9</sup> The difference in bone thickness, especially in the cortical area, causes the mandibular angle to be weaker and more susceptible to fractures.<sup>8</sup>

The diagnosis of mandibular angle fractures can be established through clinical findings supported by a radiological examination.<sup>10</sup> The recommended radiological imaging are panoramic X-rays or 3D CT scans, as these imaging techniques clearly show the involvement of the impacted third molar with the fracture line. Management of mandibular fractures involves precise techniques to ensure proper bone healing and restoration of function. Treatment goals include re-establishing the continuity of the mandible, ensuring correct occlusion, and minimizing complications.<sup>4</sup>

The management of mandibular fractures can be performed using either closed reduction or open reduction methods. Minor, non-displaced fractures are often treated with maxillomandibular fixation (MMF), where the jaws are wired or banded together to allow for healing. More severe fractures may require open reduction and internal fixation (ORIF), where plates and screws are used to stabilize the jaw. Proper fracture management typically results in successful healing.<sup>1</sup> Nevertheless, one of the most common complications in maxillofacial fracture treatment is infection, which can arise from poor oral hygiene or the presence of bacterial entry points that facilitate infection development.<sup>11</sup> This includes

the proximity of impacted teeth to the fracture line, which may compromise bone integrity and promote bacterial colonization, potentially increasing the risk of infection development.

This case report presents two cases of mandibular angle fractures involving impacted third molars. This comparison highlights how the timing of third molar extraction can influence patient outcomes. The extraction of the teeth involved in the fracture line requires consideration based on clinical and radiographic findings, thus minimizing the risk of postoperative infection. Notably, these cases underscore the significance of personalized treatment planning in mandibular fracture management, offering valuable contributions to existing literature.

### **CASE 1**

A 19-year-old female patient presented to RSIGM Sultan Agung with complaints of jaw pain that had persisted for one month. The patient had a history of a mandibular fracture due to a traffic accident and had undergone plate and screw fixation 6 months ago at another hospital. However, for the past month, the patient had been experiencing pus drainage and pain from the scar in the gum at the left lower back corner of her jaw.

Extraoral clinical examination revealed no abnormalities, while intraoral examination showed a scar on the buccal side of teeth 36, 37, and 38. The third molar (tooth 38) was impacted with grade 2 Miller tooth mobility, accompanied by pericoronal swelling and redness. Palpation revealed tenderness, the miniplate was palpated and found to be floating (Figure 1). The patient was diagnosed with a mandibular abscess post ORIF.



**Figure 1.** a) Extraoral examination b) impaction of tooth 38 accompanied by pain upon palpation.

Panoramic radiograph showed two miniplates in the right parasymphiseal region and a dislodged miniplate in the left mandibular angle (Figure 2).



**Figure 2.** Radiograph imaging of the patient, floating miniplates on the left mandibular angle (red arrow)

The patient underwent surgical management under general anesthesia, which included debridement, drainage, extraction of the third molar (tooth 38), and removal of the plate at the mandibular angle region. After injection of local anesthetic, a triangular flap incision was made along the distal side of tooth 38 to the mesial of tooth 36 (Figure 3a). The third molar, which was positioned within the fracture line and suspected to contribute to the infection, was then extracted to reduce the risk of persistent bacterial presence. Finally, the previously placed plate at the mandibular angle, which had become infected, was carefully removed to eliminate the foreign body that could hinder proper bone healing (Figure 3b). A thorough debridement of the infected tissue was performed by saline and povidone iodine irrigation to remove necrotic bone and any debris at the fracture site, ensuring a clean wound for healing. Following debridement, drainage was established to allow the evacuation of any residual infection or fluid accumulation. Postoperative care included monitoring for signs of infection, managing pain, and ensuring proper oral hygiene to facilitate recovery.



**Figure 3.** a) Triangular flap incision. b) Removal of tooth 38, miniplates, and 2 screws.

Following surgery, patients were given injections of ceftriaxone (2 x 1 gram), ketorolac (3 x 1 amp), and dexamethasone (3 x 1 amp). The patient was in good health and had no complaints following the surgery (Post-operative Day+0). The patient was discharged with oral medication consisting of cefixime 2 x 100 mg, mefenamic acid 3 x 500 mg, and a povidone iodine gargle for oral hygiene (Post-operative Day+1), then advised to return for a follow-up a week following the surgery. The patient is in good health and shows no symptoms of inflammation, discomfort, or complaints during the follow-up (Post-operative Day+7).

## CASE 2

A 22-year-old male patient came to RSIGM Sultan Agung with complaints of jaw pain after slipping and hitting the floor about three days ago. The patient reported difficulty opening his mouth since the incident. Extraoral examination revealed facial asymmetry. The results of the CT scan showed a segmental fracture in the left parasymphyseal region, incomplete, accompanied by a fracture in the mandibular angle involving tooth 38 (Figure 4). Intraoral examination showed limited mouth opening, avulsion of teeth 11, 12, 13, 21, 22, and tooth 38 involved in fracture line showed grade 2 Miller tooth mobility.



Figure 4. Pre-operative CT-Scan.

The patient then scheduled for an open reduction (ORIF) procedure as the management for the fracture. The procedure was performed under general anesthesia. First, an arch bar was installed on the patient's upper and lower jaws followed by extraction of tooth 38. Immediate third molar extraction was determined based on the tooth's mobility and its direct involvement in the fracture line, as leaving the tooth in place could increase the risk of infection. Graduals reposition was performed using ¼-sized rubber elastics attached to the right and left posterior sides and 2 pieces on the anterior, waited for 1-2 minutes until the patient achieved optimal occlusion. After the patient's normal occlusion was obtained, the rubber was removed and replaced with IMF using wire. Reduction of the fracture fragments was performed through an intraoral approach followed by fixation by installing a Ø 0.2mm



titanium plate and 8mm (mesial) and 10mm (distal) screws on the left external oblique of the mandible. The wire on the arch bar was then removed (Figure 5).



**Figure 5.** Post operative panoramic x-ray.

Injections of ceftriaxone (2 x 1 gram), ketorolac (3 x 1 amp), and dexamethasone (3 x 1 amp) were administered to the patient following surgery. Inter-maxillary Fixation (IMF) using wire was done one day post operative, then maintained for 2 weeks. The two-week and one-month follow-up showed satisfactory outcomes. The patient was in good condition with no complaints, and the post-operative wound healed completely.

## **DISCUSSION**

Complications linked with mandibular fracture therapy might occur in up to 15% of patients. Infection, osteomyelitis, hardware failure, malunion, nonunion, and wound dehiscence are the most frequent complications.<sup>10</sup> Infections following surgery are the most frequent complications of managing mandibular fractures. Preoperative, perioperative, and postoperative oral hygiene, infected or fractured teeth in the fracture line, alcoholism, metabolic disorders, tobacco use, the length of time between the injury and definitive treatment, poor patient compliance with treatment, the severity of the fracture, and inadequate reduction or fixation are all contributing factors to complications.<sup>12</sup>

Fractures that occur in the tooth-bearing area require special attention. The extent of damage caused to the tooth due to the fracture can complicate the fracture and the healing process, as well as the prognosis of the treatment. The decision to extract third molars in the fracture line remains a topic of debate. Some researchers advocate that the extraction of the third molar can help prevent postoperative infections because both are connected through the periodontium, making the tooth on the fracture line that is loose considered a potential source of infection. Meanwhile, others mention

that retaining the tooth on the fracture line might provide benefits for the patient, accompanied by the use of prophylactic antibiotics to prevent postoperative infections.<sup>13</sup> Fractures involving teeth can occur in various manifestations (Figure 6). The first pattern is a fracture that passes through the periodontium along the root unilaterally, the second pattern is a fracture that passes through only  $\frac{3}{4}$  of the root. The third pattern is a fracture line that only reaches the apex of the tooth, and the fourth pattern is a fracture that surrounds the tooth bilaterally and extends to the alveolar bone. The third fracture pattern has the best prognosis compared to the other groups, while the first pattern has the worst prognosis.<sup>13</sup>

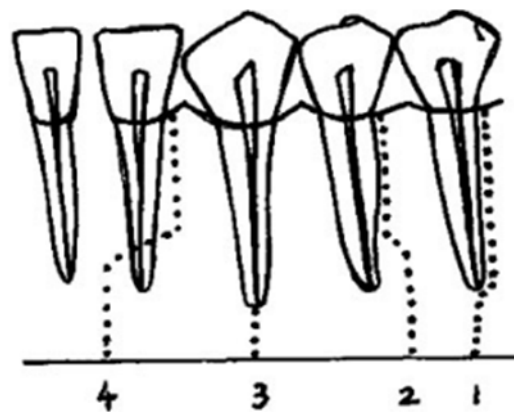


Figure 6. Fracture pattern in tooth bearing area according to Samson et al (2010).<sup>14</sup>

The study by Rai and Pradhan was conducted on 54 patients with mandibular angle fractures involving the third molar. The patients were divided into two groups: the first group consisted of 30 people whose third molars were retained, and the second group consisted of 24 people who underwent extraction of the third molars. The results of the study showed that there was a post-operative infection rate of 13.33% (4 out of 30) in group I, while in group II it was only 2.51%. Conversely, the first group had a lower occlusal discrepancy (13.33%) compared to group II (16.66%).<sup>15</sup>

The primary principles for bone fractures treatment must always be adhered properly when treating patients with maxillofacial injuries. These consist of reducing bone fragments to the appropriate anatomy, maintaining the occlusal plane, using proper fixation techniques, and preventing infection.<sup>13</sup> Previous studies have identified aspects that may impact doctors' decision-making while managing upon mandibular fractures with teeth close or in the fracture line and their outcome: (1) the clinical state and condition; (2) the location and position of the impacted teeth as well as teeth and alveolar bone condition; (3) the expected consequences following extraction or preservation and their risk; (4) the effect on the stability of the occlusion; and (5) the treatment plan and timing.<sup>16</sup> According to Spinatto (2009) and Gerbino (1997), the following criteria are used to determine the necessity of extractions of tooth involved in the fracture line (Table 1).<sup>13</sup> Research also suggests that when there is

an asymptomatic (non-urgent) third molar, it should ideally be removed once an adequate healing period has occurred, typically at a minimum of 3-4 weeks following reduction.<sup>13</sup>

**Table 1.** The guideline of tooth extraction involved in fracture line.

Absolute indications for extraction	Relative indication for extraction	Relative contraindications for extractions
1. Vertical root fracture of the teeth	1. Teeth with advanced periodontitis	1. Teeth that are essential for anatomical reduction
2. Highly mobile	2. Non-functional teeth (third molars)	2. Teeth that act as an occlusal stopper
3. Teeth with periapical diseases	3. Horizontal and/or oblique root fractures	
4. Unrestorable decay/fractures		
5. Presence of acute infection in the fracture line		
6. Pericoronitis		
7. Fracture near the cemento-enamel junction		

In this case, both third molars involved in the fracture line were extracted. Extracting the third molars involved in a mandibular fracture line is often necessary to prevent complications and support healing. Teeth within the fracture line, especially those with damage, root fractures, or infection, increase the risk of bone infection (osteomyelitis) and delayed healing.<sup>15</sup> In such cases, tooth extraction helps achieve better alignment and stability, as the impacted or damaged tooth can obstruct reduction and fixation. Additionally, a fractured or mobile tooth may cause pain during jaw movement, and retaining it could lead to eventual tooth loss.<sup>12</sup> Extracting such teeth promotes better bone healing, reduces infection risks, and enhances patient comfort.

Following mandibular fracture procedures, postoperative antibiotic protocols are essential for preventing infections.<sup>17</sup> The use of antibiotics postoperatively helps mitigate the risk of bacterial contamination at the surgical site, especially in fractures involving the tooth-bearing area.<sup>18,19</sup> Commonly prescribed antibiotics include amoxicillin-clavulanic acid 500 mg three times daily or cefixime 100 mg twice daily for 5–7 days, depending on patient tolerance and the presence of infections.<sup>19,20</sup> In penicillin-allergic patients, clindamycin 300 mg three times daily is recommended.<sup>19</sup> By limiting bacterial growth during the early stages of recovery, routine antibiotic therapy lowers the chance of infection.<sup>21</sup> Additionally, maintaining proper oral hygiene through chlorhexidine or povidone iodine mouthwash during the healing period further supports infection prevention.<sup>22</sup> Regular follow-up and patient education on postoperative care enhance treatment outcomes and minimize the likelihood of complications.<sup>22</sup>

## CONCLUSION

Managing fractures that involve impacted third molars is particularly challenging due to the heightened risk of infection. In this case, removing the impacted third molars helped avoid infection



and supported healing. Dentists must consider the clinical condition and supporting examination results for teeth involved in the fracture line as well as the risks that may arise before deciding to extract or preserve the tooth. Proper treatment requires a balanced approach, focusing on reducing infection risk, maintaining jaw alignment, and ensuring patient comfort.

## REFERENCES

1. Fonseca RJ, Walker R V., Barber D, Powers MP, Frost DE. Oral and Maxillofacial Trauma. 4th Editio. Elsevier; 2013.
2. Goodday RH. Management of Fractures of the Mandibular Body and Symphysis. *Oral Maxillofac Surg Clin North Am.* 2013;25(4):601–16.
3. Cornelius CP, Audigé L, Kunz C, Rudderman R, Buitrago-Téllez CH, Frodel J, et al. The comprehensive AOCMF classification system: Mandible fractures-level 3 tutorial. *Craniofacial Trauma Reconstr.* 2014;7(3): S31–43.
4. Debata A, Patro S, Pattnaik N, Panda M, Samal SK, Nayak SC. a Comprehensive Approach Towards Management of Mandibular Fractures. Innovative Publication Company. 2021.
5. Saluja JS, Bambawale A, Priyadharsana PS, Ganesh C, Karunajothi E, Shunmugavelu K. Prevalence and Pattern of Mandibular Fractures: A Retrospective Study in India. *J Pharm Bioallied Sci.* 2022 Jul;14(Suppl 1):S140–2.
6. Avery LL, Susarla SM, Novelline RA. Multidetector and three-dimensional CT evaluation of the patient with maxillofacial injury. *Radiol Clin North Am.* 2011 Jan;49(1):183–203.
7. Soós B, Janovics K, Tóth Á, Di Nardo MD, Szalma J. Association Between Third Molar Impaction Status and Angle or Condylar Fractures of the Mandible: A Retrospective Analysis. *J Oral Maxillofac Surg.* 2020;78(7): 1162.e1-1162.e8.
8. Ryant Ganda Santoso, Sjamsudin E, Adiantoro S. The Incidence of Mandibular Angle Fractures Accompanied by Impacted Third Molar at Oral Surgery Clinic of Hasan Sadikin Hospital, Bandung - West Java. *Dentika Dent J.* 2022;25(1):42–6.
9. Poernomo H. Pengaruh Gigi Impaksi Molar Ketiga terhadap Ketebalan Angulus Mandibula Berdasarkan Jenis Kelamin. *Maj Kedokt Gigi Indones.* 2015;1(1):47.
10. Panesar K, Susarla SM. Mandibular Fractures: Diagnosis and Management. *Semin Plast Surg.* 2021;35(4):238–49.
11. Bicsák Á, Abel D, Tack L, Smpionias V, Hassfeld S, Bonitz L. Complications after osteosynthesis of craniofacial fractures-an analysis. *Oral Maxillofac Surg.* 2021 Jun;25(2):199–206.
12. Hsieh TY, Funamura JL, Dedhia R, Durbin-Johnson B, Dunbar C, Tollefson TT. Risk Factors Associated with Complications After Treatment of Mandible Fractures. *JAMA Facial Plast Surg.* 2019 May;21(3):213–20.
13. Taysıl M, Ildirim SY. Should the teeth in the line of jaw fractures be extracted? 2015;49(1):61–5.
14. Samson J, John R, Jayakumar S. Teeth in the Line of Fracture: To Retain or Remove? 2010;1(212):177–84.
15. Rai S, Pradhan R. Tooth in the line of fracture: Its prognosis and its effects on healing. 2011;22(3).
16. Gao M, Li F, Wang Z. The Evaluation of Objective and Subjective Fate of Teeth in the Mandible Fracture Line and the Management - A Center's Experience. *J Craniofac Surg.* 2024;35(4):e316–21.
17. Suresh Jaiswal R, Pandey C, Speedie A, Jaiswal R, Lanjewar S, Dondulkar Y. Post-Operative Swelling Management in Dental Surgery [Internet]. Vol. 6, *International Journal of Oral Health and Medical Research.* 2020. Available from: <https://www.researchgate.net/publication/343904819>
18. Abdullah FM, Hatim QY, Oraibi AI, Alsafar TH, Alsandook TA, Lutfi W, et al. Antimicrobial management of dental infections: Updated review. *Med (United States).* 2024;103(27):e38630.
19. Camps-Font O, Sábado-Bundó H, Toledano-Serrabona J, Valmaseda-de-la-Rosa N, Figueiredo R, Valmaseda-Castellón E. Antibiotic prophylaxis in the prevention of dry socket and surgical site infection after lower third molar extraction: a network meta-analysis. *Int J Oral Maxillofac Surg [Internet].* 2024;53(1):57–67. Available from: <https://www.sciencedirect.com/science/article/pii/S0901502723001881>
20. Adamson OO, Adeyemi MO, Gbotolorun OM, Oduyebo OO, Odeniyi O, Adeyemo WL. Comparison of the sensitivity of bacteria isolated in odontogenic infections to ceftriaxone and amoxicillin-clavulanate. *Afr Health Sci.* 2019;19(3):2414–20.
21. Lodi G, Figini L, Sardella A, Carrassi A, Del Fabbro M, Furness S. Antibiotics to prevent complications following tooth extractions. *Cochrane Database Syst Rev [Internet].* 2012;(11). Available from: <https://doi.org/10.1002/14651858.CD003811.pub2>
22. Sakai H, Kurita H, Kondo E, Tanaka H, Shimane T, Hashidume M, et al. Dental and oral management in the perioperative period of surgery: A scoping review. *Jpn Dent Sci Rev.* 2024 Dec;60:148–53.