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Case Report

Open Reduction Internal Fixation Treatment of Unilateral Condyle Fracture of Mandible: a Case Report

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Abstract:

Introduction: Condyle fracture is a fracture of the mandible which is quite common. Treatment of mandibular fractures can be with open reduction or closed reduction. This situation can be obtained by opening the fracture fragments, obtaining a normal relationship and fixing on its position. The goal of surgical treatment of fractures is to return the fracture fragments to their anatomical position. Surgical treatment can be intraoral or extraoral approach. The aim of this case report is to discuss the management of a patient with an unilateral condylar fracture of mandible through open reduction and internal fixation (ORIF) with an extraoral approach using the risdon technique.

Case: We report a case with complaints of pain when opening the mouth and limited mouth opening. Two and a half months prior to admission the patient had an accident but he refused ORIF treatment. One and a half months prior to admission, he complained of pain when opening his mouth and limited mouth opening. He had no infection and was diagnosed with Neglected fracture of left condyle.

Case Management: We performed head CT Scan to establish the diagnose. One day before the surgery, an interdental wiring fixation was performed to prepare for ORIF treatment. We performed ORIF with an extraoral approach using risdon technique. During the surgery we performed refracture and fixation using plate and screws. We followed up this patient until five months after the surgery. The result was acceptable and his complaints was resolved.

Conclusion: ORIF is the treatment of choice for neglected condylar fractures.

Keyword: Unilateral subcondyle fracture, Neglected condylar fractures, Open Reduction and **Internal Fixation** (ORIF), Extra oral approach, Risdon technique

Introduction

Maxillofacial trauma is a common condition that often occurs. This trauma can be classified as facial bone fracture, dento-alveolar trauma, and soft tissue injury.[1] The highest incidence among maxillofacial trauma is mandibular fracture. Mandibular condyles fracture is the most common mandibular fracture with prevalence

between 18 – 57%, and 24 – 57% in children.[2] Mandibular condyles fracture may be due to trauma during exercise, physical abuse, and traffic accident. [3]

Mandibular condyles fracture may occur due to direct and indirect trauma and dislocation must be determined based on direction, degree, impact contact point, also tooth condition and occlusal location. Based on anatomical level of fracture, condyles fracture can be classified extracapsular (condylar or sub-condylar neck) or intracapsular (condyle head). It may also be grouped based on the level of displacement: immovable, deviation, or dislocation.[4]

Several complications may occur due to condylar fractures including pain, limitation of mandible opening, muscle spasm, mandibular deviation, malocclusion, pathological changes in the temporomandibular joint (TMJ), osteonecrosis, facial asymmetry, and ankylosis.[5]

Indications for the management of mandibular condyle fractures are still controversial, therefore, several considerations need to be evaluated before treatment was performed, such as fracture location, degree of fracture angulation, degree of luxation of the head condyle, type of fracture (simple or complex), status of teeth, the presence of other maxillofacial fractures, patient's condition, and foreign body invasion of the temporomandibular joint.[6] Two methods have been established to treat this fracture, namely open reduction and internal fixation (ORIF) and closed reduction with external fixation (CREF).[7]

This case report aims to discuss a patient with an unilateral sub-condyle fracture that was managed with ORIF. The patient has complaints of pain when opening the mouth and limited mouth opening. The treatment goal was to achieve occlusal stability, normal mouth opening, normal TMJ movement, prevention of temporomandibular joint disorders and joint pain, and prevention of growth disorders in mandibular fracture patients by choosing the right treatment method.[6]

Case

A 22-year-old male came to the Oral and Maxillofacial Surgery Department at Hasan Sadikin General Hospital with complaints of pain when opening his mouth and limited mouth opening. Two and a half months prior to admission, when he was riding a motorcycle in Purwakarta at medium speed, suddenly he slipped and lost his balance and then fell with 4 mechanism the chin hit the asphalt first. After the accident, he went to a Hospital in Purwakarta area and Skull AP Lateral X-Ray was performed (Figure 1). However, he refused to do ORIF treatment.

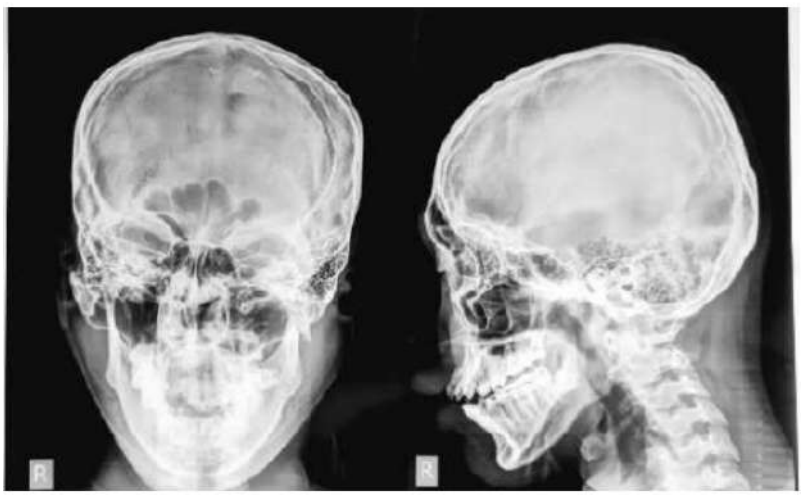


Figure 1: Skull AP Lateral X-Ray of the patient two and a half months before the surgery

One and a half months prior to admission, he returned to a Hospital in Purwakarta area due to pain when opening his mouth and limited mouth opening. A panoramic X-Ray (Figure 2) was taken, and he was referred to the Oral and Maxillofacial Surgery Department at Hasan Sadikin General Hospital for further treatment.

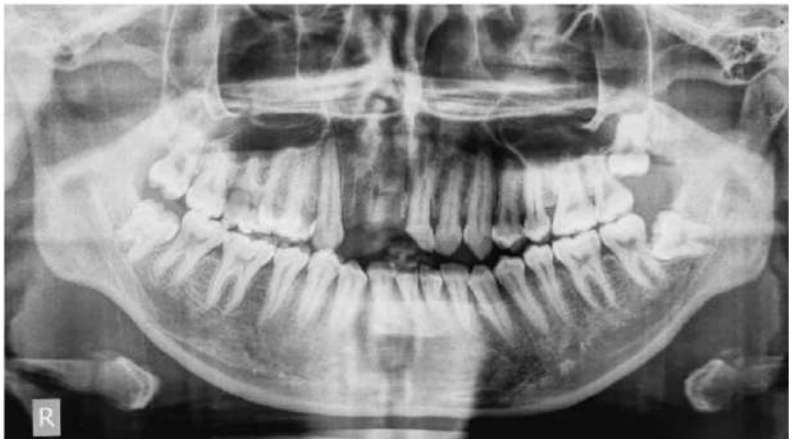


Figure 2: Panoramic X-Ray of the patient one and a half months before the surgery. The images shows a fracture in the left mandibular sub-condyle

The patient has limited mouth opening about 2 cm and open bite on the fracture side. Then we performed 3D head CT scan to establish the diagnose. 3D Head CT scan images (Figure 3) show a fracture in the left mandibular sub-condyle without signs of bleeding, ischemic lesions, neoplasms, or other abnormalities. This patient was diagnosed with a neglected fracture of the left condyle and he agreed that his case published.

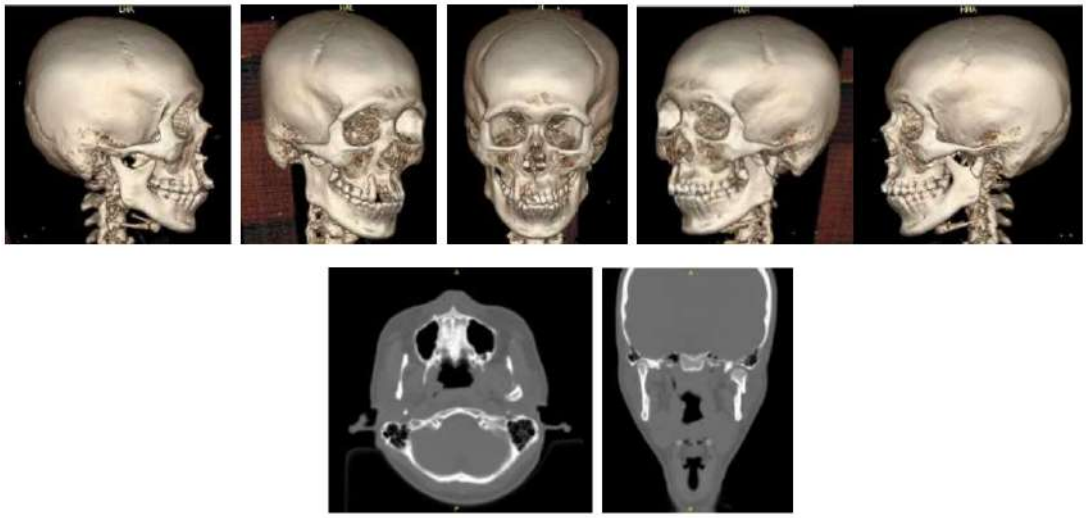


Figure 3: 3D Head CT scan images show a fracture in the left mandibular sub-condyle without signs of bleeding, ischemic lesions, neoplasms, or other abnormalities

Case Management

The first management performed on this patient is to establish the diagnosis using a 3D head CT-scan. The imaging result revealed a fracture in the left mandibular sub-condyle without signs of bleeding, ischemic lesions, neoplasms, or other abnormalities. Then he was diagnosed with a neglected fracture of the left condyle. The we performed a complete blood count and chest X-Ray to prepare for surgery and the result was in a normal limit. One day before

the surgery, a preoperatif interdental wiring fixation was performed to prepare for elective ORIF treatment (Figure 4). Installing the interdental wire is a postoperative preparation procedure to anticipate if intermaxillary fixation is needed using either rubber or wire.

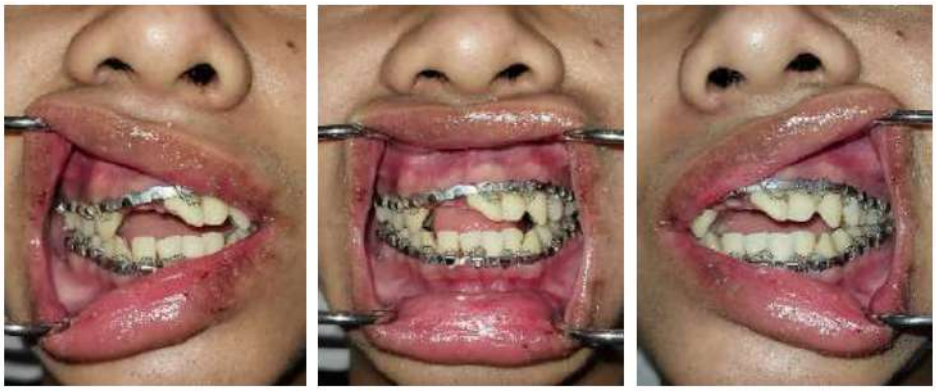


Figure 4: Pre Operative Intra Oral Condition : Interdental wiring can be seen on the maxilla and mandible

During the surgery we performed refracture because the fracture fragments have fused. Then we returned the fracture fragments to it's anatomical position and fixed the position using[6] plate and screws. We used a 4-hole straight plate with a diameter of 1.6 mm and 5 mm screws (1 piece) and 9 mm screws (3 pieces) for fixation (Figure 5).

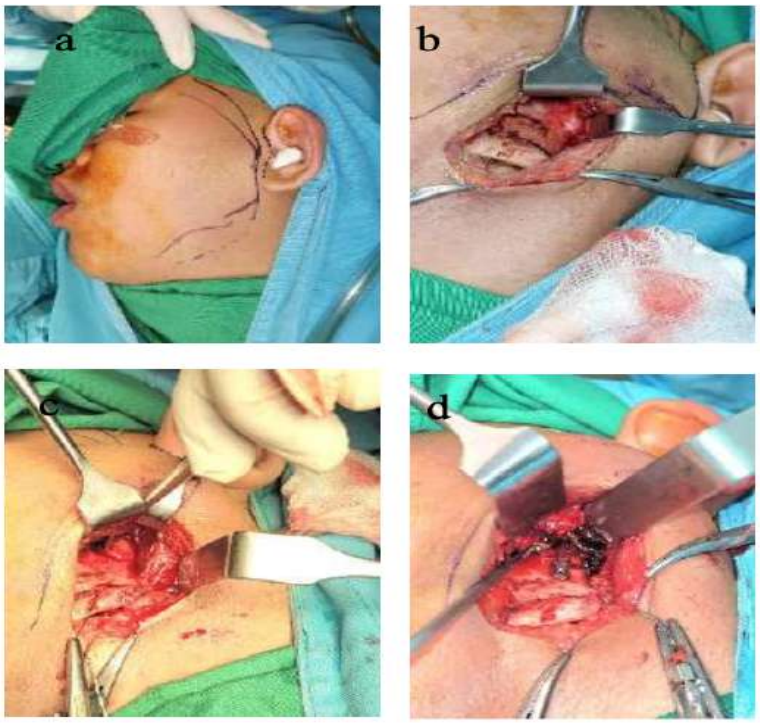
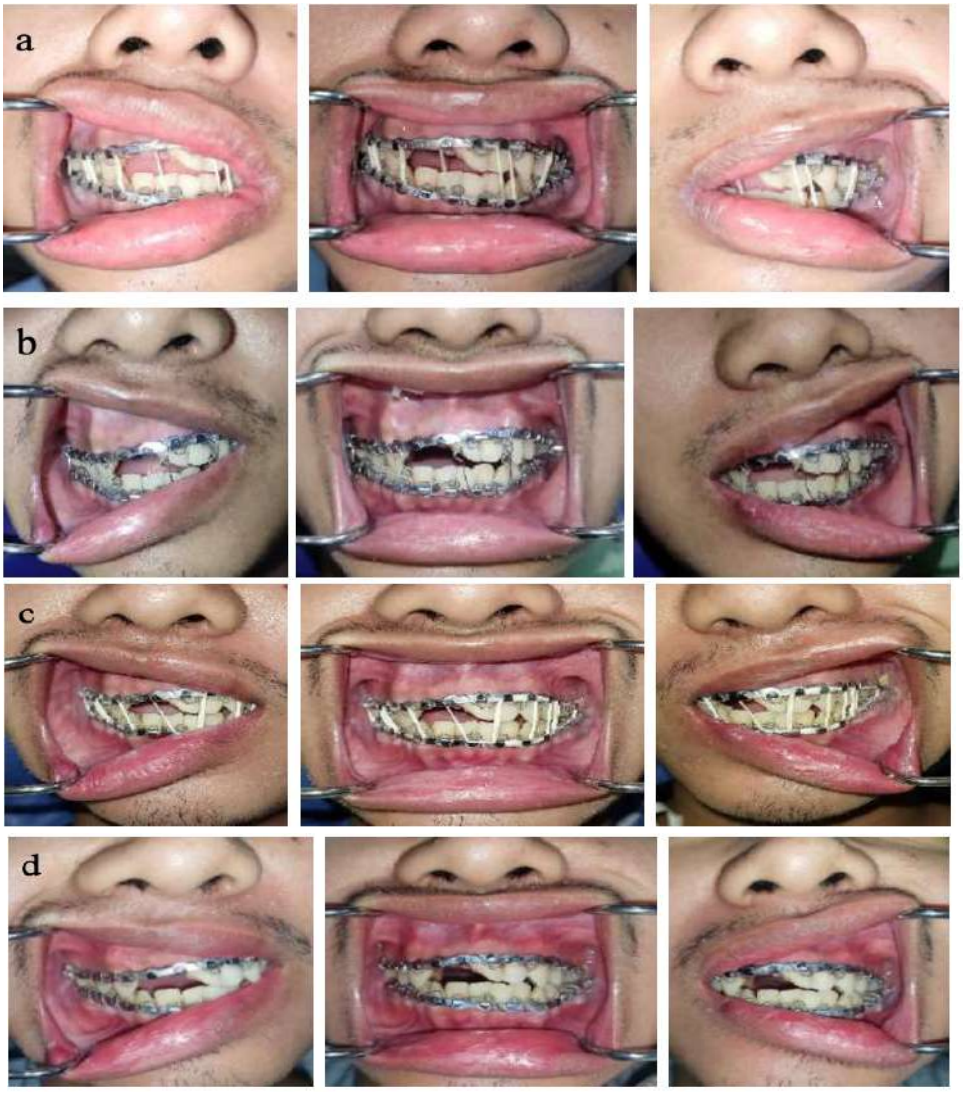


Figure 5: Intraoperative images (a) Extra oral approach design (b)The fracture fragments (c) After re fracture condition (d) After plating of plate an screws

Then we performed wound suturing. Muscle suture used vycril thread 6-0 and extra oral suture used nylon thread 6-0. We also installed the an extraoral drain (Figure 6) with the aim of flowing inflammatory fluid from inside of the surgical wound to the outside.

Figure 6: An extraoral drain was installed

On Post Operation Day (POD) I, we installed an intermaxyllary fixation using rubber (Figure 7.a) and replaced it with wire on POD II (Figure 7.b) which was maintained until POD VII. On POD VII we replace the wire with the rubber (Figure 7.c) until POD XXI (Figure 7.d). The goal of intermaxillary fixtation was7 to maintain the new occlusion.On the POD XXVIII we removed the interdental fixation (Figure 7.e).



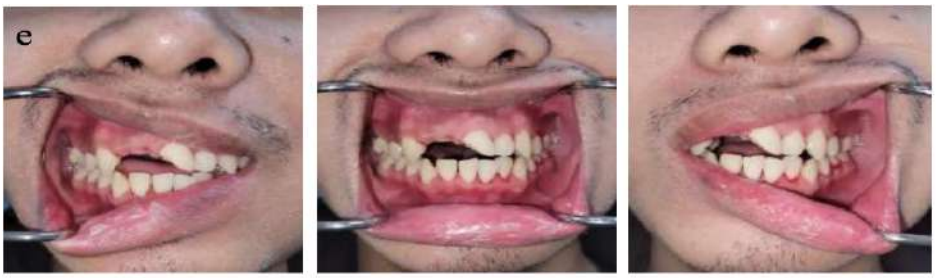


Figure 7. Intra Oral Condition. (a) Post Operation Day I, (b) Post Operation Day II, (c) Post Operation Day VII, (d) Post Operation Day XXI, (e) Post Operation Day XXVIII

We maintain the drain untill POD VII (Figure 8.a). We remove the extraoral suture on POD XIV (Figure . And we follow up the patient untill five months after the surgery.

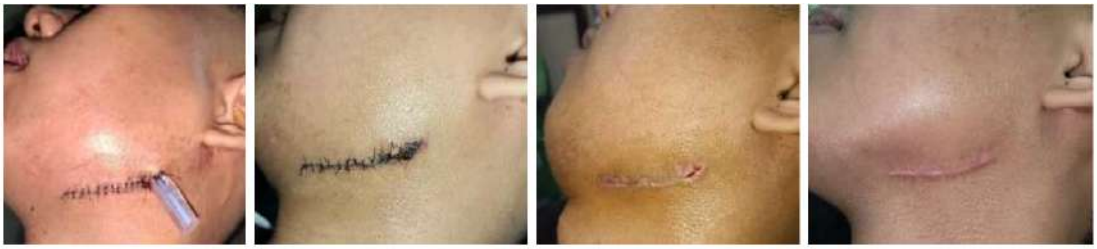


Figure 8: Extra oral condition after the surgery (a) Post Operation Day I, the drain was maintain untill POD IV, (b) Post Operation Day VII, the drain was removed (c) Post Operation Day VII, the extraoral suture was removed (d) Extra oral condition after five months of the surgery

We recalled the patient for evaluation after five months of surgery and performed panoramic X-Ray (Figure 9.a). The panoramic image shows the fracture segments are fused. We also evaluation of the patient's mouth opening. The patient has a normal mouth opening and no longer feels pain when opening his mouth (Figure 9.b).

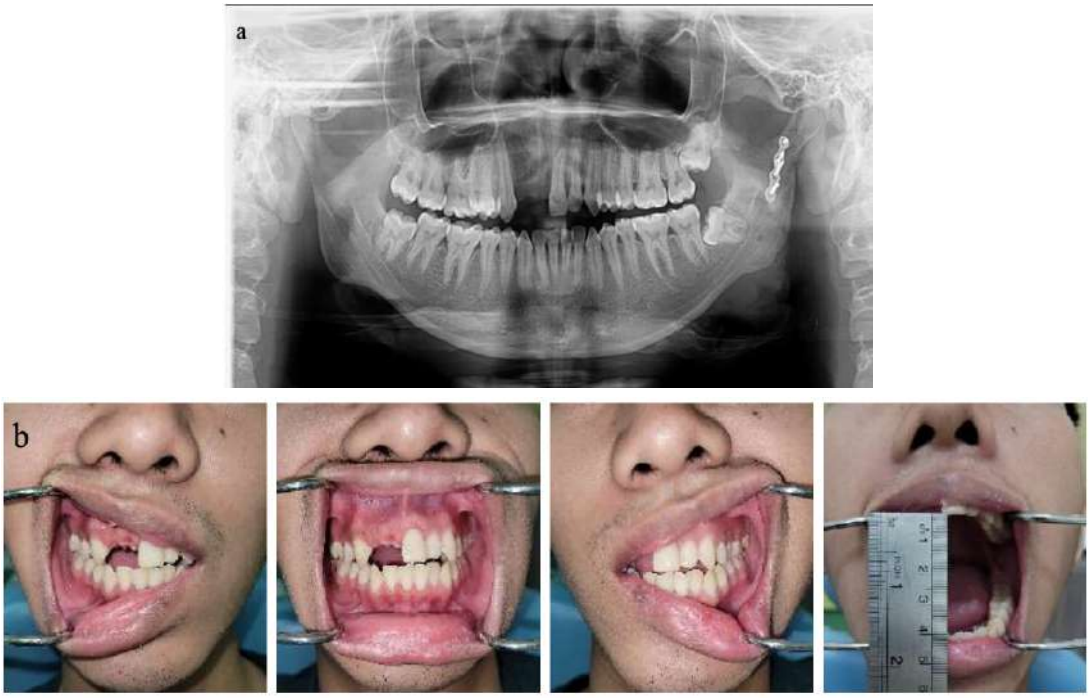


Figure 9: Patient's Evaluation after five months of surgery (a) Panoramic X-Ray (b) Intra oral condition

Discussion

Condyle fracture is one of the controversial cases in the maxillofacial area. This fracture occurs in 30 – 40% of the total mandibular fracture cases. This region is clinically significant because of the presence of the facial nerve and the temporomandibular joint which can be functionally compromised by either surgical treatment or the fracture itself.[8] Fractures of the mandibular condyle can limit full range of joint motion and prevent optimal mouth opening. Management is crucial in these types of cases to avoid severe functional disability, including limited mouth opening, malocclusion, impaired lateral excursion of the condyle, and deviation of the mouth opening. Therefore, a careful consideration is needed in selecting effective therapy to achieve adequate mouth opening and increasing patient satisfaction level.[7] The management of mandibular condyle fractures is still in controversy in the maxillofacial surgery.9 Surgical treatment of mandibular condyle fractures has a high risk and complicated because of the potential damage to the facial nerve, muscles, and other anatomical structures during surgery. Moreover, non-surgical reduction may lead to malocclusion, decreased mouth opening, deviation, or deflection of jaw opening.[3] However, in the last decade, open reduction and internal fixation (ORIF) has become the standard treatment. [8]

The treatment usually depends on the patient's age, the presence of other mandibular or maxillary fractures, uni or bilateral condyle fractures, the degree and displacement of the fractures, the status and occlusion of the teeth. Appropriate management is required to reconstruct form and achieve normal function. Due to this, timely and accurate diagnosis, appropriate reduction and fixation and prevention of complications are required.10 Clinical examination and radiographic imaging of the patient revealed a left sub-condylar fracture (Figure 2). This condition was also confirmed by 3D Head CT scan images (Figure 3). This fracture was caused by a traffic accident approximately two and a half months before surgery. The patient reported that two and a half months prior to admission, he slipped and lost his balance when riding a motorcycle. He fell with his chin hitting the asphalt first. This trauma mechanism usually causes a fracture of the condyle. [4]

Preoperative interdental wiring was also performed to prepare for ORIF surgery. Installing the interdental wire is a postoperative preparation procedure to anticipate if intermaxillary fixation is needed using either rubber or wire. [3]

ORIF allows direct anatomic repositioning and functional movement of the jaws.9 ORIF is indicated in adults with unilateral condylar fractures, moderate to severe unilateral displacement and dislocation of the condyle neck. Several studies reported that ORIF resulted in greater mobility, lower incidence of malocclusion, and earlier functional recovery.2 Several complications have been reported related with ORIF treatment of unilateral condylar fractures, including extra-oral scars, facial nerve lesions, and aseptic necrosis of secondary condyle segments due to loss of periosteal blood supply during dissection.5 In this case,we choose ORIF treatment because of the position of the fracture which is located in the sub-condyle; therefore, surgical access is needed to reposition, reduce and fixate the fracture segment. Other than that, we consider the need for refracturing the fracture line before returning to it's anatomical position. Final consideration is the method of fixation which is carried out using plate and screws.

There are several approaches that can be performed for ORIF mandibular fractures including the pre-auricular approach (high condylar) to enter the capsule area and condyle fractures, retromandibular approach (condylar neck fractures and sub-condyle fractures), submandibular approach or also called the risdon approach

for sub-condylar fractures. The retromandibular approach presented a higher risk of injuring the main nerve and branches of the facial nerve.6 Due to this, we choose the risdon approach in our case. Furthermore, in our patient, intermaxillary fixation was performed until 21st days after surgery aiming to stabilize the new post operative occlusion. The extraoral drain and sutures were removed after 7 and 14 days after surgery, respectively. We evaluated the patient after five months of the surgery where a panoramic x-ray was taken, and an evaluation of the patient's occlusion and mouth opening was performed and the complaints was resolved.

Conclusions

Maxillofacial fractures, such as unilateral mandibular condyle fractures, often occur because of facial trauma or accidents. Appropriate management remarkably determines treatment success. In this case, ORIF managed to restore the patient's mastication and speech functions, also to resolve the chief complaints. The patient revealed that there was no pain when opening the mouth and no limitation on mouth opening after the surgery. The interdental wiring followed by ORIF with the risdon approach can be considered as a treatment option for mandibular condyles fracture.

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