

## Case Report

# RE-TREATMENT OF MISMANAGED BILATERAL CONDYLAR FRACTURE AND POST-SURGICAL COMPLICATION

<sup>1</sup>Oyagi Shuka, <sup>1</sup>Nyoman Ayu Anggayanti, <sup>2</sup>Anak Agung Manik Swayoga, <sup>3</sup>Agus Dwi Sastrawan <sup>4</sup>Eka Marwansyah Oli'i

<sup>1</sup>Department of Oral and Maxillofacial Surgery, Faculty of Medicine, Universitas Udayana, Denpasar, Indonesia

<sup>2</sup>Department of Oral and Maxillofacial Surgery, Faculty of Dentistry, Universitas Mahasaraswati Denpasar, Denpasar, Indonesia

<sup>3</sup>Department of Oral and Maxillofacial Surgery, Wangaya Regional Hospital, Denpasar, Indonesia

<sup>4</sup>Department of Oral and Maxillofacial Surgery, Dr. Hasan Sadikin Central General Hospital, Bandung, Indonesia

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## KEYWORDS

Bilateral condylectomy, neglected condylar fracture, post-surgical neurological complication



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## ABSTRACT

**Introduction:** Improper management of condyle fractures can lead to changes in the structure of the temporomandibular joint, which can impact the patient's oral function. Corrective surgery is necessary to restore the patient's function and quality of life. This case report aims to discuss the procedure of bilateral condylectomy in neglected condylar fracture, as well as the risks and post-operative complication management.

**Case:** A 26-year-old female patient presented with mandibular hypomobility and occasional temporomandibular pain. The patient had history of a traffic accident around four months ago, and was managed in a public hospital but symptoms persisted.

**Case Treatment:** After thorough examinations, the patient was diagnosed with neglected complete bilateral condylar fracture with displacement and managed via bilateral condylectomy. Post-operative, the patient presented with anterior open-bite and facial paralysis on the right side, and was treated accordingly. During 4-month follow-up, complications and chief complaints had all subsided.

**Discussions:** Mismanagement of condylar fracture could result in malunion of fragments, which is difficult to reposition due to the changes that have already occurred in the temporomandibular structure. Condylectomy is often necessary to relieve symptoms, although bilateral condylectomy poses certain neurological risks. Prompt recognition and intervention of nerve injury is important to prevent permanent complication.

**Conclusion and Suggestions:** Condylectomy could properly treat neglected bilateral condylar fracture in adult patients. Operators must know the associated risk and management of post-operative complications.

## Corresponding Author:

Oyagi Shuka  
Department of Oral and Maxillofacial Surgery, Faculty of Medicine  
Universitas Udayana, Denpasar, Indonesia  
e-mail address: oyagishuka@gmail.com

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## INTRODUCTION

Condyle is a common site to be involved in mandibular fractures. Previous studies have shown a prevalence ranging from 19 to 52 percent.<sup>1,2</sup> Unilateral condylar fracture is frequently found, but bilateral condylar fracture is rarer and more difficult to manage. Swift, precise treatment is needed in necessary to avoid oral and masticatory dysfunction.<sup>1-3</sup>

Various factors influence the decision whether to treat surgically or non-surgically, including age, association with other injuries, dentition status, level of fracture, degree and direction of fracture displacement, and comorbidity (systemic).<sup>3-5</sup> In the past, non-surgical approach (closed reduction) is the preferred treatment of choice for condylar fracture due to limited resources and experience.<sup>3,6</sup> However, it must be noted that performing closed reduction in cases indicated for an open reduction would lead to complications such as chronic pain, malocclusion, and malunion of bony fragments, which would need a more complicated secondary surgery to rehabilitate the symptoms.<sup>7-10</sup>

When condylar fracture is mismanaged or chronically neglected, maladaptive fibro-osseous changes could occur, causing difficulties in reduction procedure.<sup>5,9,11</sup> Under such circumstances, open reduction is no longer an ideal procedure to restore functionality of the temporomandibular structure.<sup>5,12</sup> A more advanced surgery is needed to correct the complications that already settled. Several treatment options are available, including condylectomy.

Condylectomy in neglected bilateral condylar fracture has an overall good prognosis, although it still has complication risk. Possible post-operative complications include transient facial nerve paresis, post-operative infection, and iatrogenic jaw fracture.<sup>11,13</sup> Prompt recognition and intervention of said complications is important to avoid permanent disability. Operators should have adequate understanding on the surgical procedure, post-surgical complications, and management to ensure optimal care for patients. Regardless, reported cases on bilateral condylectomy procedure as the treatment for neglected bilateral condylar fracture is still scarce,

especially in South East Asian subjects. This report aims to discuss the procedure of bilateral condylectomy, associated risk and post-surgical management in a 26-years-old female Indonesian patient.

## CASE

A 26-year-old female patient came to Udayana Teaching Hospital, Bali, Indonesia with chief complaint of difficulty opening her mouth and occasional pain during mastication. The patient stated a history of traffic accident around four months ago, where the patient fell from a motorcycle, hit her chin and scrapped her limbs. The patient was brought to a public hospital for emergency assessment and initial treatment. She was referred to another center for oral inspection, and received closed reduction treatment via maxillomandibular fixation (MMF) for three months. Seven weeks later, she came to Udayana Teaching Hospital as mentioned above due to persistent symptom.

General condition and vital signs of patient were all within the normal range. Clinical examination showed limited mouth opening, approximately 22 mm (Figure 1). Intra-oral examination showed good occlusion with no signs of open bite. Radiographic and 3D CT imaging showed bilateral complete fracture of both condyles with inferomedial displacement (Figure 2). Based on the anamnesis, clinical, and supportive examination, the patient was diagnosed with bilateral condyle fracture. The patient had consented to receive bilateral condylectomy as the treatment of choice. The patient had also consented for her case to be documented and published for scientific purposes.



Figure 1. Pre-operative trismus (>22 mm).

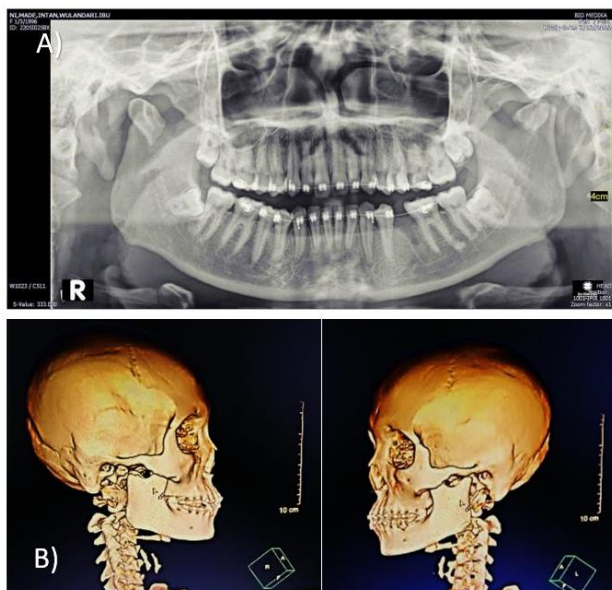


Figure 2. A) Radiographic imaging showing bilateral complete condylar fracture; B) CT imaging showing bilateral condylar fracture with inferomedial displacement.

## CASE MANAGEMENT

One day before the surgery (August 25<sup>th</sup> 2022), the patient was admitted to hospital for pre-operative observation. General condition and vital signs were normal. Patient was instructed to fast for eight hours before the surgery (August 26<sup>th</sup> 2022). Around 45 minutes before the surgery, the patient received intravenous (IV) ringer lactate solution 20 dpm, ceftriaxone 1 gram (IV), methylprednisolone 125 mg (IV), and intraoral iron supplement.

The surgery was performed under general anesthesia. Extra oral and intra oral asepsis were performed with 10% povidone iodine. The patient was draped with sterile cloth, exposing only the right operative site. The operative area and incision line were outlined with a surgical marker, followed by administration of two ampules of pehacain diluted in 0.9% NaCl 1:1 around the surgical site (Figure 3A). Pre-auricular incision was performed according to the outline, layer-by-layer until the condylar head is exposed using blade no. 15 and electrocautery sequentially (Figure 3B). The condyle fragment was identified, released from malunion with piezotome and oscillating micro surgical saw under extensive irrigation, then retrieved with a surgical forceps (Figure 3C). The surgical site was smoothed with a bone

file, irrigated, and inspected for any leftover fragments (Figure 3E), followed by occlusion reconstruction. The flap was sutured layer-by-layer, covered in antibacterial dressing and hypafix (Figure 3F). The same procedure was performed on the left side (Figure 4A-D).

Day-1 follow-up the patient presented with bilateral extra-oral edema and open bite. The patient was instructed to consume liquid diet for the day, followed by soft diet for the next day. The patient was also instructed to practice opening and closing her mouth. Day-3 follow-up, Gilmer's intermaxillary fixation (IMF) was performed to correct the open bite (Figure 5). The patient also presented with difficulties moving her right eyelid and eyebrow. The patient was consulted to the medical rehabilitation department and dismissed from hospital. Day-9 follow-up, the extraoral edema had completely subsided, the open bite had lessened, and the patient could move her right eyelid better, but still had difficulties raising her right eyebrow. The patient was instructed to continue physical rehabilitation and periodic follow-up to activate the IMF.

On December 15<sup>th</sup> 2022 (4-month follow-up), the incision wound had healed nicely with minimum scarring (Figure 6A). Ideal occlusion had been achieved and the IMF was removed (Figure 6B). The patient was able to open her mouth normally (approximately 44 mm) without any restriction or pain. The transient nerve palsy of the right eyelid and eyebrow had subsided. The patient was satisfied with the outcome of the surgery, and reported an increased quality of life.

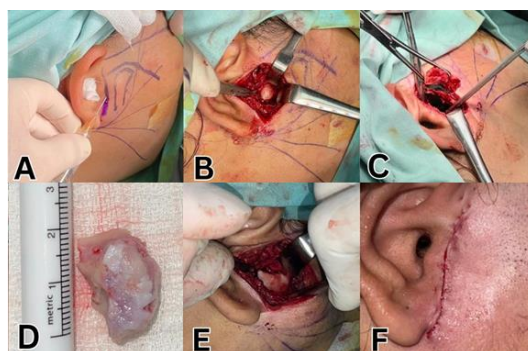


Figure 3. A) Surgical marking and injection of diluted local anesthetic on the right side; B) Pre-auricular incision exposing the right condylar head; C,D) Retrieval of the right condylar head fragment; E) Inspection of the rest of the right condylar process; F) Suturing the flap layer-by-layer.

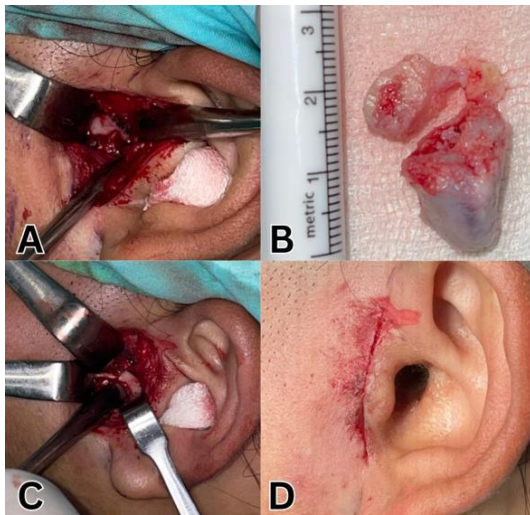


Figure 4. A) Pre-auricular incision exposing the left condylar head; B) The left condylar fragment retrieved; C) Inspection of the rest of the left condylar process; D) The flap is sutured layer-by-layer



Figure 5. Gilmer's intermaxillary fixation to correct the open bite



Figure 6. Wound closure at 4-month post-operative follow-up



Figure 7. A) Post-surgical open bite; B) Open bite had resolved at 4-month post-operative follow-up after treatment with Gilmer's IMF. Ideal occlusion had been achieved.

## DISCUSSION

Mismanagement of bilateral condylar fracture could result in malunion of the bony fragments, causing temporomandibular pain, facial asymmetry, dental malocclusion, and difficulties performing mastication or jaw movements.<sup>14,15</sup> Significant traumatic force leading to condylar fracture would also be exerted towards the intra-articular structure, prompting degenerative damage on the overall TMJ structure.<sup>5,9</sup> In this patient, both condylar fragments were displaced into the middle cranial fossae, most likely caused by the pull of the sphenomandibular ligament. Forceful, high-velocity, blow to a partially open mouth could also displace the fragment into the middle cranial structure, such as in a motorbike accident experienced by this patient.<sup>16,17</sup> In chronic neglected condylar fractures (more than three months), pseudo-joints made of fibrous tissue would develop in the mandibular fossa.<sup>7</sup> Once such changes occur, it would be greatly challenging to return the structure to its initial position.

In the past, especially before the advancement of internal rigid fixation and computed tomography (CT) technology, conservative approach used to be the common treatment of choice for condylar fractures. Difficulties in examining the fracture position and relevant surrounding anatomy without CT scan, and the tedious procedure in reduction via wire fixation resulted in frequent post-operative complications.<sup>4,18,19</sup> Hence, surgical treatment for condylar fracture was deemed suboptimal to non-surgical approach. Post-surgical neurological risk was also stated to be one of the main reasons surgeons in the past preferred non-surgical approach.<sup>20,21</sup> Other reasons include insufficient literature comparing the benefit and drawback of both courses of treatment, and lack of experience in the specific surgical procedure.<sup>12</sup> Nonetheless, with the

development of technology, researches, and instruments, surgical approach is becoming considerably more efficient with significantly less complication incidence.

The main objectives in condylar fracture management are reinstating patients' physiologic occlusion, achieving acceptable vertical facial height, and restoring both function and esthetic.<sup>11</sup> The course of treatment should be decided on a case-by-case basis depending on the type and level of fracture, degree of displacement, patient's age, surgeon's expertise, malocclusion, facial asymmetry, available resources, and timing of injury.<sup>19,21</sup> A study proposed a treatment algorithm for condylar fracture management to aid surgeons in deciding proper approach (Figure 7).<sup>4</sup> Generally, non-surgical approach (closed reduction) is

indicated for pediatric patients, unless a significant displacement or dislocation is present. Closed reduction supported by physiotherapy and functional stimulation give acceptable result when performed in appropriate cases. In adult patients with unilateral condylar fracture and minimum displacement, closed reduction via intermaxillary fixation (IMF) could be performed and yield a functional outcome with the aid of the healthy contralateral side. On the other hand, condylar fracture in adult patients with extensive displacement or dislocation, especially into the medial cranial fossae, is deemed an absolute indication for surgical treatment (open reduction).<sup>18,22</sup> Bilateral condylar fracture is a relative indication for open reduction.<sup>4,18,22</sup>

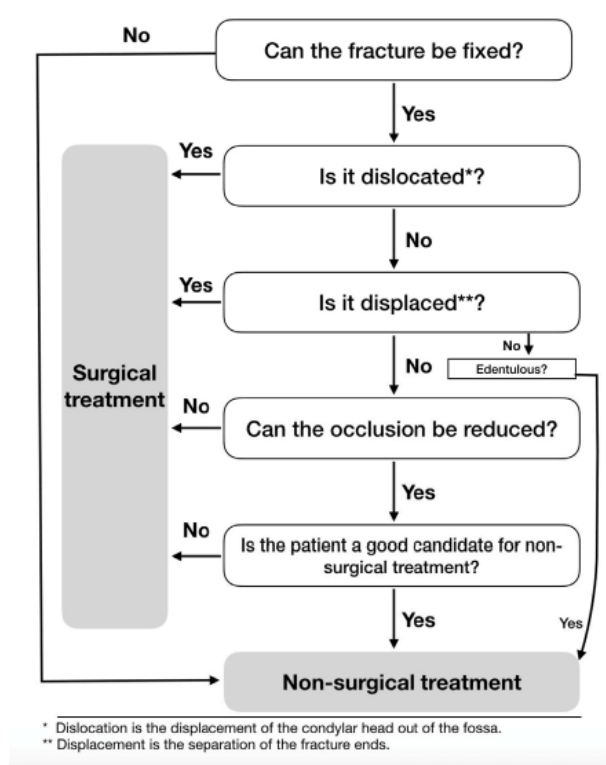


Figure 8. Algorithm for condylar fracture management (Source: Nilesh K, Vande A V. Post-traumatic deformity of mandibular condyle: Descriptive review and proposal of treatment algorithm.<sup>5</sup>

In this case report, the patient experienced bilateral condylar fracture with inferomedial displacement and should have been treated surgically. Although closed reduction completely reduces the risk of any post-operative complication risk related to open reduction such as bleeding, infection, nerve damage, and/or post-surgical

scarring, it is impossible to reposition the bony fragment properly via closed reduction in this case.<sup>19-21</sup> Hence, malunion occurred and the patient experienced mandibular hypomobility with occasional pain. In accordance to that, previous studies stated that some common complications related to closed reduction are incorrect healing position of

the condylar head (93%) and trismus (17%).<sup>5,12</sup> Furthermore, the patient was managed via IMF for twelve weeks, leaving the TMJ structure immobilized for a long period of time (more than three weeks) is stated to increase the risk of mandibular hypomobility due to lack of functional stimulation. Other studies have stated that up to 10% of bilateral condylar fracture treated via closed reduction would need a secondary orthognathic surgery in long-term follow-up.<sup>6</sup> Literatures suggest that performing closed reduction in bilateral condylar fracture could induce condylar deformity, abnormal fibro-osseus changes, and maladaptive remodeling of the articulation structure, even in patients with seemingly normal occlusion and jaw motions.<sup>6,7,10,22</sup>

The longer a condylar fracture is neglected, the more difficult it would be to manage due to the maladaptive changes of the bony fragments, neuromuscular function, as well as the development of pseudo-joint inside the articular fossae.<sup>7,10</sup> In this case, it is unfeasible to reposition the structure back into their original places due to the anatomical changes, thus condylectomy is performed. Condylectomy is a surgical procedure where the deformed condylar head is extracted.<sup>5,10,23</sup> This allows the rest of the structure to move more freely, eliminating restriction and pain during jaw movements. Condylectomy is performed as a last resort if previous less invasive treatments fail. It should be noted that bilateral condylectomy would result in an anterior open bite.<sup>23-25</sup> In this case, the patient presented with an anterior open bite and was corrected successfully with Gilmer's IMF.

A common complication of condylectomy is facial nerve damage, although in most cases the symptoms are temporary.<sup>9,11,23</sup> During the surgery, the nerve might get retracted or stretched, resulting in either neuropraxia or axonotmesis. Electrical radiation from electrocautery during bleeding control of nearby vessels could also impact the facial nerve.<sup>11</sup> Unless the nerve is completely severed, patients would usually recover in three to six months.<sup>9,11,23</sup> In this case the patient had also experienced transient nerve palsy on the right side involving her eyelid and eyebrow. Literature states that preauricular incision

during TMJ surgery has a risk of damaging the frontal or zygomatic branch of the facial nerve due to its position in relation to the surgical site.<sup>11</sup> Other incision techniques, such as the retromandibular or submandibular, does not significantly reduce the risk of nerve involvement. Preventive measures include mindful surgical planning, careful technique, and preparedness to immediately diagnose and manage the condition to damage control.<sup>11,23</sup> A nerve stimulator or locator could also be used during surgical planning. Prescription of corticosteroids to reduce edema and pressure near the nerve and vitamin B complex to support nerve regeneration accompanied by physical rehabilitation would usually resolve the issue.<sup>26-28</sup>

## CONCLUSION AND SUGGESTIONS

Condylectomy could be performed to treat neglected bilateral condylar fracture with displacement in adult patient. Nerve injury is a frequent post-surgical complication. Surgeons must practice mindful surgical planning, careful technique, and be prepared to immediately diagnose and manage the condition to damage control.

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