

Surgical Management of Bilateral Superolateral Displacement of Condylar Segment with Intracapsular Fracture in Complex Facial Trauma: A Case Report

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ABSTRACT

Facial fractures are a common result of trauma due to road traffic accidents, falls, assaults, sports injuries, and various pathological conditions. These fractures can involve several bones, making treatment more challenging in achieving both functional and aesthetic rehabilitation due to the complexity of the anatomical structures involved. The present case report describes the treatment of a 45-year-old female who suffered severe facial injuries after a bike accident, including fractures in her upper jaw (Le Fort fractures), lower jaw (mandibular symphysis), and both sides of the jaw joints (condylar fractures with Temporomandibular Joint (TMJ) dislocation). She presented to the department with swelling, pain, difficulty in opening her mouth (limited to only 15 mm), and malocclusion. Computed Tomography (CT) scans confirmed the fractures. The patient underwent surgery under general anaesthesia, during which the fractures were repaired using plates and screws, and the dislocated jaw joints were repositioned using a specific technique called the Ellis Maneuver. After surgery, her jaws were held in place with Intermaxillary Fixation (IMF) for three weeks, followed by physiotherapy. To allow her to eventually open her mouth to 32 mm and restored normal jaw movements. Postoperative scans confirmed proper healing and positioning of the fractured bones. Bilateral condylar fractures with TMJ dislocation are particularly challenging because they affect both how the jaw moves and how it bites. Research shows that open surgery generally leads to better outcomes than conservative approaches, especially for displaced fractures. The present case emphasises the importance of early surgery, personalised treatment, and teamwork in successfully treating severe facial injuries.

Keywords: Implants, Intermaxillary fixation, Le Fort fractures, Maxillofacial trauma

CASE REPORT

A 45-year-old female was brought to the emergency department following a fall from her bike, one hour prior to her arrival. The patient presented with complaints of swelling and multiple abrasions on her limbs, without any long bone injury. She also reported bleeding from the nose, ears, and mouth, along with avulsion of her anterior teeth. Initially, the patient was referred to another hospital, where primary care was administered, and she was subsequently transferred to this hospital for advanced care. Additionally, she reported a 4-year history of asthma, but there was no significant past medical or dental history.

On local examination, oedema over the bilateral malar region, ecchymosis, and tenderness over the face were noted [Table/Fig-1]. Imaging studies, including Computed Tomography (CT) scans, confirmed fractures in the maxilla (specifically, a mid-palatine split), symphysis in the mandible, zygoma, and condyles on both sides. There were no neurological deficits, but the patient experienced a self-resolving loss of consciousness lasting around half an hour, accompanied by anterograde amnesia and two episodes of haematemesis. The patient reported pain and difficulty in chewing. Intraoral examination revealed reduced mouth opening (15 mm) and restricted jaw movements. Occlusion was noted as crossbite with intersegmental mobility in the 41-42 region [Table/Fig-2].

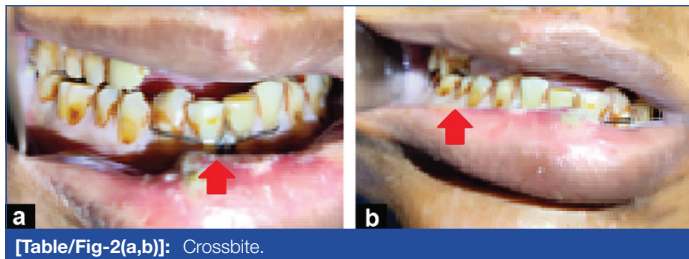
The CT of the face revealed a right high Le Fort I fracture, a left Le Fort II fracture, a displaced fracture of the mandibular symphysis, and bilateral sagittal condylar fractures, along with TMJ dislocation due to mandibular splaying [Table/Fig-3,4].

Seven days post-injury, after the oedema subsided, Open Reduction and Internal Fixation (ORIF) {as depicted in [Table/Fig-5,6]} was performed under general anaesthesia. The present procedure involved submental intubation, a technique commonly utilised in

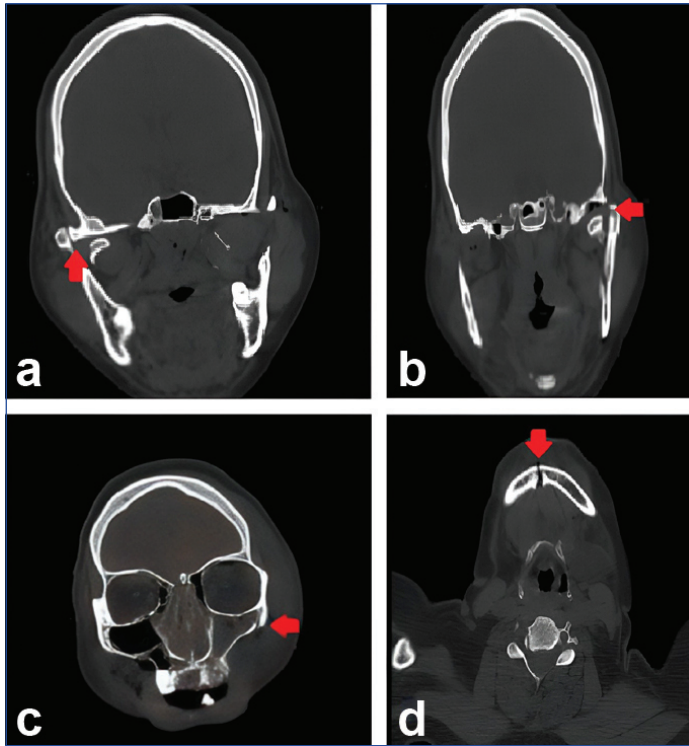


[Table/Fig-1]: Presence of oedema over the bilateral malar region, ecchymosis and tenderness.

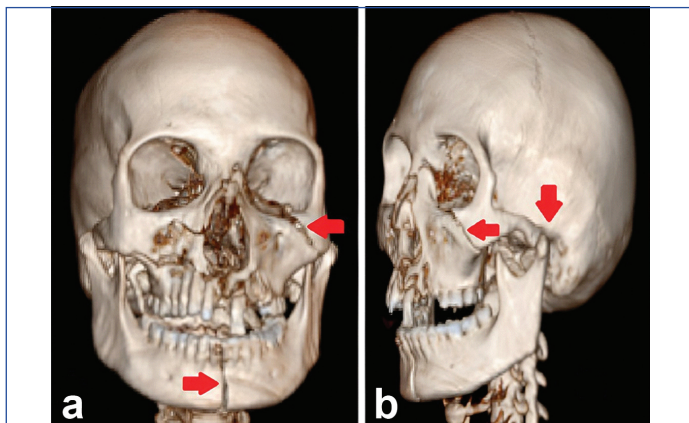
maxillofacial trauma cases to ensure an unobstructed surgical field while maintaining airway patency. Submental intubation was preferred in this instance to avoid interference with the oral and nasal cavities, which are typically involved in managing maxillofacial fractures. Strong titanium microbone plates were used to secure the symphysis in the lower border of the jaw. The Ellis maneuver was employed to reduce



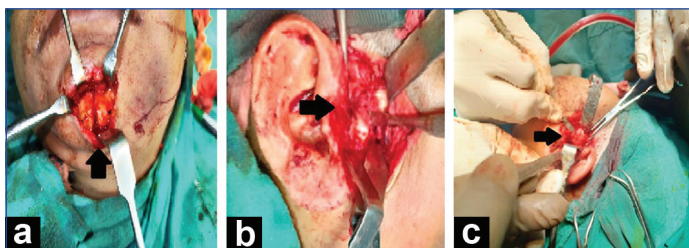
[Table/Fig-2(a,b)]: Crossbite.



[Table/Fig-3]: (a, b) Discontinuity seen in condylar neck region on right and left side in coronal section of CT scan with fracture segment displaced medially; (c) Fracture in left Zygomaticomaxillary Complex (ZMC); and (d) Right parasymphysis fracture.



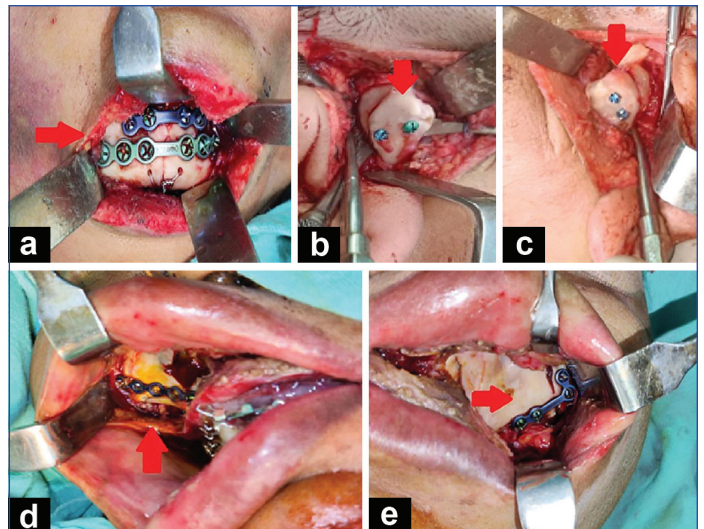
[Table/Fig-4]: a) Fracture in left ZMC, right parasymphysis; b) Left ZMC fracture, left condyle.



[Table/Fig-5 (a-c)]: Exposure of fracture site.

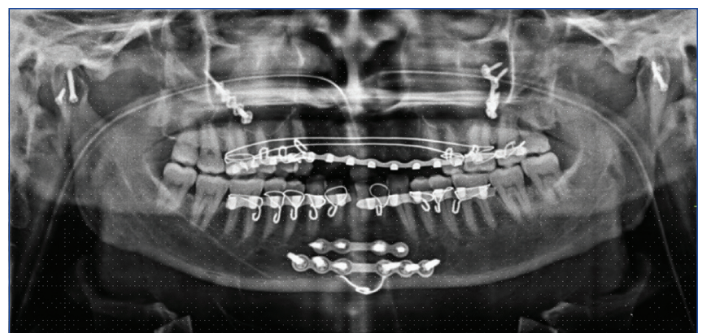
both condyles by pushing laterally downward over the condylar area and downward in the molar region [1].

On Postoperative Day (POD) 4, a standard radiographic scan was performed to ensure the fixation at the surgical site involving bones

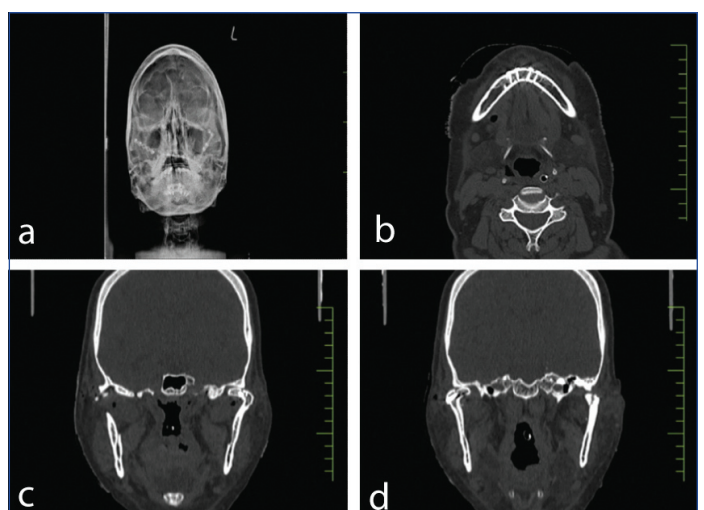


[Table/Fig-6 (a-e)]: Reduction and fixation of fracture.

or joints. The present imaging technique allows for the verification of the stability and correct placement of implants such as plates and screws. The primary purpose of this early postoperative scan is to confirm that the surgical fixation is stable and properly aligned while also assessing the initial stages of bone healing. Additionally, the CT scan helps in detecting any immediate complications, such as hardware failure, displacement, or infection. Postoperative Orthopantomogram (OPG) and CT provide clear images confirming good fixation of the fractured bones [Table/Fig-7,8].



[Table/Fig-7]: Presence of arch bar and titanium bone plates.



[Table/Fig-8 (a-d)]: Post-op CT scan.

The patient underwent intense physiotherapy, which included tongue mobility exercises and facial muscle activity to maintain muscle tone. Active and passive jaw exercises, including lateral and protrusion movements, were introduced to restore the range of motion. Sessions were conducted 2-3 times weekly, with each session lasting 20-30 minutes, over a period of five weeks following the three-week IMF release. An impressive 32 mm mouth opening and

normal mandibular motions were achieved as excellent outcomes. The decrease in mediolateral dislocation of both condyles within the glenoid fossa was verified by postoperative 3D-CT.

One month after follow-up, the clinical presentation of the patient showed no swelling or ecchymosis [Table/Fig-9].



[Table/Fig-9]: One month follow-up showing no swelling and ecchymosis.

DISCUSSION

Le Fort fractures represent a spectrum of injuries with varying degrees of complexity and associated complications. The management of Le Fort fractures requires a comprehensive approach, often involving a team of specialists [2]. The goals of treatment include restoring facial aesthetics, preserving sensory and motor functions, and preventing long-term sequelae such as malocclusion, enophthalmos, or visual impairment. Because there are fewer craniomandibular articulations in cases of bilateral involvement, managing bilateral condylar fractures is more difficult than managing unilateral fractures [3]. The masticatory muscle spasms resulting from bilateral condylar fractures cause the displaced or dislocated condyles to migrate longitudinally. Patients often present with an anterior open bite, reduced posterior facial height, and increased transverse mandibular breadth, all of which complicate treatment. There are two methods for treating condylar fractures: closed treatment and ORIF. Functional treatment, orthodontic appliances, and Maxillomandibular Fixation (MMF) are all part of closed reduction. Restoring normal occlusion, maintaining function, achieving an appropriate vertical face height, and maintaining an acceptable cosmesis are the main objectives of treatment. Contrary to popular belief, unilateral condylar fractures are easier to treat than bilateral condylar fractures; in fact, very few studies have specifically addressed bilateral condylar fractures [3]. According to reports, persistent discomfort, malocclusion, restricted mouth opening, facial asymmetry, and TMJ ankylosis might result from bilateral condylar fractures [4].

A study found that a Chen Type II bilateral condylar fracture, which is an asymmetric fracture involving both condyles along with an ipsilateral subcondylar and contralateral intracapsular fracture, had the worst functional outcomes when compared to Type I and Type III [3]. According to research that looked at 39 patients who had conservative care, closed therapy is an effective way to treat condylar fractures, although ORIF should still be used to treat bilateral condylar fractures and dislocations of the condylar head [4]. Ellis and Throckmorton state that treating displaced bilateral condylar fractures with closed reduction is a significant challenge, since it requires additional neuromuscular adaptations [5]. A total of 31 patients with bilateral condylar fractures who underwent ORIF therapy performed better functionally, particularly with regard to opening their mouths, according to Newman's study [6]. According

to Newman, in instances where there are two fractures, at least one of them should be treated using ORIF. This is because treating a fracture with anatomical reduction reduces the requirement for substantial remodelling and neuromuscular adaptation. When both condyles were repaired, research indicated good functional outcomes; the authors emphasised early rehabilitation for sufficient postoperative results [7].

An open bite, malocclusion, and facial asymmetry may result from closed reduction of bilateral condylar fractures, according to research [8]. A study conducted in 2008 suggested the fixation of condylar fractures by open reduction with a 10-45 degree deviation of the condyles along with a 2 mm shortening of the ascending ramus [9]. In the management of condylar fractures, ORIF yields better functional clinical results than closed treatment, according to a systematic review and meta-analysis of 23 trials [10]. Bilateral fractures increase the likelihood that closed treatment will fail and lead to post-traumatic condylar deformity. Numerous instances in the literature indicate that after MMF, the fractured condyle may adapt by remodelling to take on the morphology of the glenoid fossa.

Ten individuals with bilateral condylar fractures who received conservative treatment were the subjects of a separate study. The CT scans revealed displaced and dislocated condyles and an unhindered interaction with the glenoid fossa, despite the patients' normal jaw motions [11].

In patients with malunited bilateral condylar fractures, research recommends the use of bilateral sagittal split osteotomy [12]. The study comprised six individuals with bilateral condylar process fractures resulting in a post-traumatic anterior open bite. To close the open bite, five patients underwent Le Fort I osteotomy with posterior impaction and mandibular autorotation, while one patient had a bilateral inverted L ramus osteotomy [13]. Another study involved 12 individuals who either received no treatment at all or experienced treatment failure for condylar process fractures, resulting in malocclusion and facial asymmetry [14]. Similar outcomes were observed in another study by Punga R and Gaur S [1]. Treatment for subcondylar osteotomy was administered to eight patients who presented six months post-trauma, while sagittal split osteotomy was performed on four patients who sought treatment after six months [15].

CONCLUSION(S)

The present case report emphasises that successful outcomes in occlusion, mouth opening, and facial symmetry were achieved through ORIF and IMF. Bilateral condylar fractures pose unique challenges, requiring neuromuscular adaptations and carrying risks such as chronic pain, malocclusion, and TMJ ankylosis. Evidence favors ORIF for displaced fractures to improve function and reduce complications. Early, tailored intervention and rigorous postoperative physiotherapy are crucial for optimal recovery. A team-based, multidisciplinary approach ensures effective management and long-term success.

Take-Home Message: Timely, individualised treatment with ORIF and comprehensive care significantly improves outcomes in complex maxillofacial trauma.

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