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### Surgical management of medially displaced condylar neck fracture: A case report

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#### Abstract

The aim of the present case report is to evaluate the adequate fixation for the surgical treatment of condylar head fractures in the correct position and stable fixation of the fragment in its normal anatomical position. Open reduction and internal fixation using an extra-oral approach has few benefits over the nonsurgical treatment. Concerns, however remain about the risk of facial nerve injury, post operative facial nerve weakness and facial scarring when operating in this region. The objective of condyle fracture management is to achieve, pre-injury occlusion, adequate and pain-free mouth opening, functional and stable temporo-mandibular joint and good facial and jaw symmetry.

**Keywords:** Condylar fracture, trapezoidal plate, osteosynthesis, medial displaced

#### Introduction

Fractures of the condylar process are common fractures of the mandible, occurring in approximately 25–35% of cases [1-3] and their fracture patterns vary [4]. MacLennan [5] and Lindahl<sup>6</sup> described different fracture patterns, and these pattern differentiations are often used in practice to select the method of treatment. It is frequently unilateral and with medial deviation (Lindahl, 1977; Winstanley, 1984; Lindqvist *et al.*, 1986; Amaratunga, 1987). Treatment can broadly be divided into functional or closed treatment, or operative or open treatment, but there are no clear criteria to determine the choice between them. The restoration of the pre-trauma condylar head anatomy by ORIF is advocated especially if the fracture line runs within or lateral to the pole zone of the condylar head with the typical consequence of dislocation of the medial fragment and a loss of the vertical height of the ascending ramus (Chrcanovic, 2012; Kolk and Neff, 2015). Although treatment also depends on the morphological and functional characteristics of the temporomandibular joint (TMJ), the treatment strategy decision is affected by many factors, including the fracture site and pattern, as well as patient-related factors. Nevertheless, in recent years open treatment of adult condylar fractures has become more common as it has given more satisfactory results than closed treatment [7, 8-10].

Many oral and maxillofacial surgeons have reported complications after operative treatment of mandibular condylar fractures, including facial nerve palsy, auriculotemporal nerve dysfunction, Frey's syndrome, salivary fistulas, limitation of mouth opening, occlusion disorders, loosening of miniplates or screws, torsion or fracture of the miniplate, changing position of the condylar fragment, resorption and remodelling of the condylar process, osteoarthrosis, infection, and unsightly scars [10-13]. Although the goals of treatment are the restoration of form and function, closed treatment relies on patient adaptation to an altered anatomy, because anatomic repositioning of the proximal segment is not achieved. With advances in the understanding of osteo synthesis and an appreciation of surgical anatomy, open reduction and internal fixation of condylar fractures has become more prevalent. Zide and Kent [21] first outlined the indications for open reduction of mandibular condylar fractures in their classic article in 1983. Several surgical approaches have been described to access the condylar region, allowing anatomic reduction and trends toward earlier function of the condyle, reducing risks of ankylosis or reduced functional capabilities. However, there are some condylar fractures that continue to prompt debate among surgeons regarding the best course of treatment.

Regardless of the management, the starting point is a thorough understanding of the regional anatomy and the biomechanics of the fractured condyle. Numerous osteosynthesis devices are available for management of condylar fracture, in this case trapezoidal plate was used to fix the fracture and evaluated the clinical outcomes for internal fixation of mandibular condylar fractures in adults. The controversy prevails as how to best manage high condylar neck fractures however surgical management of these fractures has proven to yield a better outcome attributed to advancement in technology leading to the development of indigenous osteosynthesis devices and the enhancement of surgical techniques due to a better understanding of the surgical anatomy. To access the condylar region various approaches can be used, e.g., the transoral approach or different extraoral approaches such as the preauricular, submandibular, retromandibular, transparotid and retroauricular.

## 2. Materials and methods

### 2.1 Case report

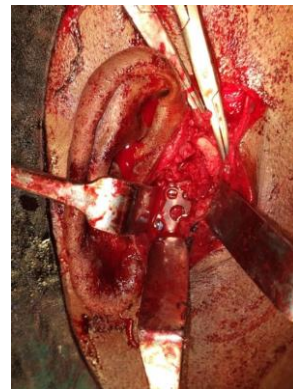
A male patient aged 37 years reported to our department of oral and maxillofacial surgery with the chief complain of limited mouth opening. Signs and symptoms included tenderness over the pre-auricular area and limited mouth opening. Deviation of the mandibular midline was noted, ipsilateral premature occlusion, with a contralateral open bite, owing to the loss of vertical height. Deviation to the affected side on opening is seen because of the interruption of the action of the lateral pterygoid muscle which suggested of Unilateral condylar fractures. A pre-operative orthopantomogram was taken to confirm the condylar neck fracture (fig 5). Under general anaesthesia, pre-auricular incision about 15 mm in length was made on the right side. Blunt dissection was performed through the masseter muscle just below the zygomatic arch, and the condylar process was exposed. Fracture was achieved by using a mosquito (Halstead) forceps, and the condylar fragment was deviated in the medial direction. Care was taken not to damage the articular surfaces. The left TMJ was used as a control. The medial condylar head fragments were typically dislocated in an antero-caudo-medial position along the vector pull of the lateral pterygoid muscle. Reduction of the medial condylar fragment was accomplished using elevators under maximal muscle relaxation. Because of limited space, it was difficult to adapt and fix 2 miniplates so the osteosynthesis plates such as the trapezoidal plates was used which serve as an alternative to the conventional miniplate technique which was developed specially for treatment of fractures associated with mandibular condyle (fig6). The time required for adaptation of the trapezoidal plates & ease of adaptation was significantly lower than that required for the two miniplates. The trapezoidal plates are better in terms of handling characteristics, such as ease of adaptation and time required for adaptation as only one plate and four screws are required. Postoperative clinical follow-up was done till 6 months. All kinds of complications such as wound infection, wound dehiscence, malocclusion, screw or plate loosening, plate fracture, saliva fistula, facial nerve weakness and palsy were recorded.



**Fig 1:** Marking of pre auricular incision



**Fig 2:** reflection done and fractured segment exposed.



**Fig 3:** Fixation done using trapezoidal plate



**Fig 4:** suturing done using 3-0 vicryl



**Fig 5:** Pre-operative OPG



**Fig 6:** Post-operative OPG

### 3. Results & Discussion

Different techniques of ORIF for the treatment of mandibular condylar head fractures have been reported such as microplates, miniplates, lagscrews, resorbable pins and small-fragment screws. Treatment methods for fractures of the condylar process can broadly be divided into open reduction or closed treatment. The first factor in determining the treatment strategy is the position of the fracture line. For low fractures of the condylar base or neck, the authors actively perform open reduction and fixation. However, intracapsular fractures are basically treated with closed treatment, because in case of open treatment, rigid fixation is difficult, postoperative scarring of the tissue occurs around the condyle, including the articular capsule, and joint movement may be impaired<sup>[9]</sup>. Closed treatment also offers the prospect of sufficient osseous healing<sup>[10]</sup>. Another important determining factor is the fracture type. For extracapsular fractures, open reduction and fixation should be considered for patients with deviation, displacement, and dislocation according to the MacLennan classification.<sup>5-7</sup> Patients with particularly large displacement with the fractured end of the ramus and those with deviation and dislocation or displacement and dislocation, should preferably undergo proactive reduction, because there is a risk of poor healing and postoperative functional impairment. Al-Kayat and Bramley studied the distance of the facial nerve from the anterior margin of the bony auditory meatus and found that it lies at an average distance of 20 mm anteriorly, but may vary from 8 to 35 mm. For this reason the preauricular approach to the TMJ involves placing the incision in a skin crease near the tragus, or in an endaural fashion. When dissection is carried down through the superficial temporal fascia in a posterior plane along the initial incision, the tissue can be safely retracted anteriorly along with the facial nerve, with the knowledge that the surgeon is now operating in a plane deep to it.

### 4. Conclusion

Ultimately, the patient and the type of the fracture determine the course of treatment. A thorough understanding of the anatomy of the condylar region is paramount for maxillofacial surgeons. Understanding this, along with the biomechanics of the injury, helps to guide the surgeons in therapy.

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