

Comparison of Preauricular Approach Versus Retromandibular Approach in Management of Condylar Fractures

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ABSTRACT

Objectives: Surgical treatment of patients with multiple mandibular fractures involving condylar segments may be a difficult proposition for a maxillofacial surgeon. These fractures can be double or triple fractures of the lower mandible and can also be associated with other fractures of the face. While many authors have suggested that the conventional approach to reducing and stabilizing a mandibular symphysis / para-symphysis fracture is appropriate before addressing a fractured condyle, there is another school of thought that suggests that the condylar segment should be reduced and repaired first. This article aims to review the results of operations where the reduction and fixation of a fractured condyle is performed prior to other associated mandible fractures, and to explore the effectiveness of various surgical methods including preauricular and retromandibular proposed in this case.

Place and Duration: In the Oral and Maxillofacial surgery department of Faryal Dental College, Lahore for two-years duration from Jan 2018 to Jan 2020.

Material and methods: The study included 60 surgically treated patients with multiple mandible fractures (double / triple), including the condyle component. For treatment of the fractured condylar segments, the preauricular and retromandibular (anterior parotid-transmasseteric) approach was used.

Results: Condyle fracture was the first segment to be managed during sequencing of surgical treatment, regardless of the method used. First, good reduction and stabilization have been achieved with limited complications in treating a condyle fracture.

Conclusion: While it is the surgeon's prerogative to sort multiple mandible fractures, addressing the condylar segment first provides the operator with a viable alternative to the conventional technique.

Key words: condylar fractures, multiple mandibular fractures, preauricular approach, retromandibular approach

INTRODUCTION

Mandibular condyle fractures range from 29% to 52% of all maxillary fractures. Previously, closed condylar fracture reduction was the most preferred technique in patients undergoing maxillo-mandibular fixation for varying periods¹⁻². Many surgeons prefer open fractured condyle surgery due to the possibility of a wide variety of complications that can result from closed reduction, such as facial asymmetry and stiffness³⁻⁴. A large number of reported condyle fractures are due to indirect trauma, where an external force applied to a specific position of the mandible will cause a fracture elsewhere. The kinetic energy of direct mandibular trauma can fracture the bones directly below the impact site as well as an indirect contralateral fracture in the area of weakness⁵⁻⁶. Condylar fractures are mainly caused by indirect forces transmitted to the condylar region in the event of an injury. Considering the numerous fractures of the lower mandible, the most common are symphysis with bilateral condyle fractures, as well as contralateral condylar fractures. Treatment of multiple fractures of the mandible associated with condyle segments includes perioperative care, surgical treatment, and post-operative rehabilitation, and can be a difficult

proposition for a maxillofacial surgeon⁷⁻⁸. These fractures can be double or triple fractures of the lower jaw and can also be associated with other fractures of the face. While most authors suggest the traditional approach of anatomical reduction followed by semi-rigid or rigid fixation of the mandibular symphysis fracture / para-symphysis before addressing the fractured condylar segment, there is another school of thought that suggests that the condylar segment should be reduced and viewed first⁹⁻¹⁰. This article aims to review the results of operations where the reduction and fixation of a fractured condyle is performed prior to other associated mandible fractures, and to explore the effectiveness of various surgical methods including preauricular and retromandibular proposed in this case. A fair effort has been made to provide an alternative surgical sequencing option to the conventional approach that can improve the surgical ease of surgery in the wider interest of patients.

MATERIALS AND METHODS

Systematic review of 60 patients with multiple (double / triple) mandibular fractures were included from the Oral and Maxillofacial surgery department of Faryal Dental College, Lahore for two-years duration from January 2018 to January 2020. The patients aged 18 to 60 were selected for review and their condylar component was managed

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surgically. This review does not address maxillofacial injuries, which are an associated neurosurgical component. The sequencing of the surgical treatment of multiple mandibular fractures was started with a fracture of a segment of the condyle. This method of sequencing was used in all cases. Various surgical approaches such as retromandibular and preauricular have been proposed to access the fractured condylar segments. For sub-condylar fractures [Fig. 1] was approached through the retromandibular approach, and for the superior condylar fractures from the preauricular approach. In the retromandibular approach [Fig. 2], in the treatment of sub-condylar fractures the transmasseteric anterior parotid access was used. Skin, subcutaneous tissue and platysma were dissected. The anterior edge of the parotid gland was identified and retracted, then an incision was made in the fibers of the masseter muscle. The condyles and the posterior edge of the ramus were exposed, and then the fractures were reduced and immobilized with at least two plates [Fig. 3] or a single set (3D) of three-dimensional trapezoidal plates [Fig. 4]. The condylar segment was reduced prior to a symphysis fracture and secured with two plates according to Champy's rules [Fig. 3].

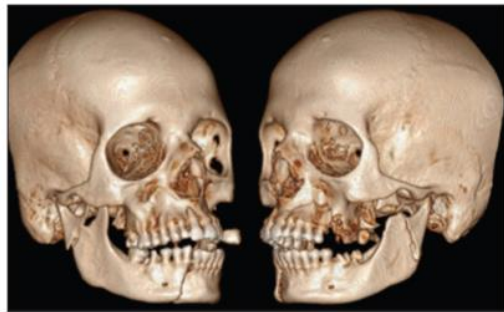


Figure 1: Three-dimensional computed tomography scan showing right parasymphysis fracture and bilateral subcondylar fracture.



Retromandibular approach Postoperative orthopantomogram showing a minimum to the fractured condyle, Figure 2 of 2-plate fixation of the condyle, Figure 3

For condylar head and neck fractures; preauricular approach was used. The incision was made in the skin and subcutaneous tissue to access the bright white temporalis fascia. An oblique incision was made parallel to the temporal branch of the facial nerve along the superficial layer of the temporal fascia above the zygomatic arch. The periosteum of the lateral zygomatic arch was removed and the capsule of the temporomandibular joint was exposed, incised and dissected to reach the articular spaces. The broken pieces were exposed, reduced in size and secured

in their respective anatomical positions with mini plates and screws.

Subsequently, the para-symphysis fracture was managed through the intraoral vestibular incision, and reduction and fixation were obtained. A combination of these two approaches has been proposed to reduce and consolidate inaccessible fractured condyles.

The two proposed approaches managed the fractured segment of the condyle first, followed by the reduction and fixation of other associated mandibular fractures. The condylar segment was stabilized with two plates, one along the posterior border and the other below the sigmoid notch or by a single 3-D trapezoidal plate.



Figure 4: Left condylar fracture fixed Preauricular approach, Figure 5 with three-dimensional trapezoidal plate through a retromandibular approach

RESULTS

Out of 60 patients who underwent open reduction and internal fixation under general anesthesia, 46 were male and 14 females [table. 1].

Table 1: Gender distribution

Gender	Frequency	(%)
Male	46	76.66%
Female	14	23.33%
Total	60	100.00%

Table 2: Distribution of patients according to the etiology of trauma

Etiology	Frequency	(%)
RTA	45	75%
Fall	11	18.33%
Others	4	6.66%
Total	60	100.00%

Table 3: Distribution of type of mandibular fractures associated with condylar fractures

Type of mandibular fractures associated with condylar fractures	Frequency	(%)
Symphysis	13	21.66%
Para-symphysis	25	41.66%
Angle	5	8.33%
Body	13	21.66%
Ramus	4	6.66%
Total	60	100.00%

Road accidents (ATR) were the most common cause of injuries in 45 patients, followed by a history of falls in 11 patients and other causes in 4 patients [Table 2].

Condylar fractures were associated with 13 symphysis fractures, 25 parasymphysis fractures, 5 mandibular angular fractures, 13 mandibular body fractures, and 4 mandibular ramus fractures [Table 3].

Bilateral fractures of the condyles concerned 7 patients, and only 2 of them underwent bilateral surgical

treatment. A total of 60 condylar fractures were treated by open reduction and internal fixation.

The retromandibular approach was used in 30 cases and the preauricular approach was applied in 30 cases [Tab. 4].

Table 4: Distribution of type of surgical approaches to the fractured condyle and associated complications

Surgical approach	Frequency	(%)	Temporary paresthesia	Sialocele formation	Occlusal discrepancy
Retromandibular	30	50%	2	2	2
Preauricular	30	50%	7	0	2
Total	60	100.00%	9	1	4

The frequency of transient postoperative paresthesia was found in 9 patients; The preauricular approach included 7 patients and two patients in the Retromandibular approach. In total, only four patients had occlusal discrepancy. Two cases have Sialocele formation.

DISCUSSION

Studies have shown that 22% to 52% of all mandible fractures are double / triple mandible fractures. The male to female ratio was approximately 3: 1, similar to other studies. RTA is the most common cause of trauma in developing countries, which can be attributed to the geographic location and economic status of participants¹¹⁻¹². Although fractures condyles can be accessed by a variety of methods, studies have shown that a preauricular incision can be a cumbersome option for treating subcondylar fractures¹³. In the case of preauricular incisions, the incidence of facial nerve injuries ranged from 3.2% to 42.9%, similar to ours. We use a preauricular incision only in the case of condylar head fractures. The retromandibular approach provides a satisfactory exposure for most condylar fractures. In traditional transparotid retromandibular approach, there is a high probability of injury to the branches of the facial nerve and retromandibular vein in the parotid gland. A possible salivary fistula developing after the operation is possible because the access passes through the parotid gland¹⁴⁻¹⁵. The anterior parotid transmasseteric technique, which involves retromandibular incision, eliminates complications related to this access. With this approach, there was no nerve damage and the postoperative sialocele was negligible. In this article, surgical sequencing of the treatment of multiple mandibular fractures involving the condyle was initiated by considering a condyle fracture in all cases. Some studies have found that if the condylar segment is repaired prior to the symphysis fracture, there is a possibility that the condylar segment is misaligned¹⁶. The study by Orabon et al. Concluded that treatment of fractures, especially in the area of teeth bearing, followed by treatment of the non-bearing area, resulted in fewer complications¹⁷. However, they felt that the fracture was much easier to reduce and repair when the non-tooth part was pretreated. Prior fixation of the condylar plate can lead to it being subjected to higher forces of stress during reduction of the lingual cortex in the symphyseal region. Some authors had different views on this matter. Cillo and Ellis highlighted the need for the cranio-mandibular joint in double mandibular fractures involving condylar fractures. After immobilization of the symphysis fracture, the lack of

cranio-mandibular articulation can lead to lateral enlargement of the gonial angle and misalignment of the posterior part of the ramus. It is best to start the reconstruction of pan-facial fractures associated with double fractures of the mandible with the use of the condylar component. This helps restore both the width of the lower mandible and the sagittal position of the lower mandible¹⁸⁻¹⁹. In addition, the posterior facial height is rebuilt when the condyle fracture reconstruction was done initially, which will be of great benefit in the surgical treatment of associated mandible and midfacial fractures. For a dislocated condyle fracture associated with a symphysis fracture, the first step is to correct the dislocation and then reduce the symphysis. The same principle of consolidating a condyle fracture prior to a symphysis / para-symphysis fracture has been applied to the cases described here²⁰. Photoelastic analysis by Meyer et al. This increased the view that the tensile stress is distributed below and parallel to the sigmoid and that compressive stresses occur along the posterior boundary of the ramus. Two mini plates are recommended along these lines of tension, one below the sigmoid notch and the other at the posterior edge of the mandible¹⁹⁻²⁰. As internal fixation errors are frequently reported when fixing the condyle to a single plate, a single 3D trapezoidal plate versus a single mini-plate is also highly recommended. In addition, when a single plate is used to repair a fractured condyle, the reduction of a mandibular symphysis fracture after condyle fixation may adversely affect the internal stabilization of the condyle²¹⁻²². In this review, the condylar fractures were immobilized with two mini plates along the stress line or with one 3D trapezoidal plate for good stabilization. Many authors have concluded that the retromandibular approach is a reliable technique in the treatment of condylar fractures. This approach can sometimes be associated with complications such as sialocele formation. This review article uses a slightly modified post-mandibular approach. A percutaneous prefrontal mandibular approach has been proposed as a surgeon-friendly approach that can be used by surgeons to varying degrees, and has been found to reduce complications such as sialocele formation and damage to the facial nerve²³. The recommended surgical approach is usually based on the experience and comfort of the surgeon. Prevention of lateral enlargement in the gonial angle, ensuring the right width of the mandible and sagittal position of the mandible, and restoring the correct posterior height of the face are the advantages of treating the condylar segment earlier than in other places of mandibular fractures²⁴.

CONCLUSION

Sorting multiple mandibular fractures involving the condyles is a unique challenge. Determining the posterior facial height and preventing lateral flattening of the gonial angle can best be accomplished by addressing the fracture of the condyle segment first. Sequencing multiple mandible fractures provides the operator with a viable alternative to traditional techniques, while the surgeon has the privilege of treating the condyle segment first.

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