International Journal of Pharmacological Research
ISSN: 2277-3312 (Online)
Journal DOI: https://doi.org/10.7439/ijpr **Review Article**

Mandibular condylar fracture - Recent advancements in treatment strategies

P. Pravahitha* and M. R. Mutushekar

Department of Oral and Maxillofacial Surgery, Saveetha Dental College, Saveetha University, Chennai, India

QR Code

***Correspondence Info:**
Dr. P. Pravahitha
Postgraduate Student,
Department of Oral and Maxillofacial Surgery,
Saveetha Dental College, Saveetha University,
162, Ponamallee high road, Chennai 600077, Tamil nadu, India

***Article History:**
Received: 08/03/2018
Revised: 09/07/2018
Accepted: 10/07/2018
DOI: https://doi.org/10.7439/ijpr.v8i8.4689

Abstract

Over recent decades, significant headway in craniomaxillary trauma care has been achieved. Although perhaps not to the same extent, advancements in the management of mandibular condyle injuries have nevertheless proved to be no exception .Essentially condyle fractures are treated by closed means either by functional methods and appliances or by maxillomandibular fixation for a lengthy period, almost without operative interventions. Subsequent, controversy has evolved with regard to treatment by closed reduction, in which anatomic alignment was not expected, versus open reduction .Several surgical techniques and innovative concepts are introduced in order to minimize preoperative challenges, which are often considered the cause of postoperative complications. In addition, an appreciation of the marked impact on facilitated functional recovery after proper anatomic reconstruction and functional stabilisation has gained widespread popularity. Thus, there is an increased tendency for surgeons to perform open reduction of the displaced condyle.

Keywords: Mandibular condyle fracture, Condylar neck fracture, Management, Open reduction.

1. Introduction

Clinicians generally agree about the treatment of fractures in most regions the mandible however considerable controversy continues regarding the management of condylar fracture because occlusion cannot be used to reestablish the alignment of the segments, which can only be accompanied through an open reduction [1-6]. Meanwhile concerns remain about the potential risk of injury to the facial nerve when operating in this region, despite various approaches. Therefore the crucial question is whether precise alignment of segments is necessary to provide the best functional results [7].

2. Conventional treatment

One needs to be reminded that some condylar fractures clearly call for an open reduction and others call for closed reduction .Sometimes the fragment maybe too small to plate and displacement can also be minimal for such cases it is agreed upon closed reduction .When there is a need to establish a solid mandible as a base for correcting associated midface fractures or when there is interference with occlusion everybody would agree to open reduction. There are cases when the choice is clear. [8] In many cases the choice is not clear and the clinician must weigh the benefits and risks of each approach. There is always conflicting literature when it comes to the management of fracture of condyle [9]

2.1 Management in the adult:

Four factors are to be taken into considerations

1) Unilateral or bilateral
2) Dentulous or edentulous
3) Isolated or in combination with others
4) Whether the fragments are in contact

3. Recent advancements:

Recently, there have been an increased number of enhanced study designs with randomised prospective reports, comparative clinical analysis, and novel techniques reporting not only clinically relevant interpretations to be applied in daily clinical practice but also broadened

management strategies[10]. Significant improvement in diagnostic modalities, adequate surgical access and operative concepts for complex and difficult fractures has been achieved. Accordingly operative indications have expanded to include some conditions previously thought to be inoperable condylar fractures in children are commonly managed by closed reduction: however technical improvements have enabled a change in managing such cases. Contrary to other joints of the body involvement of the capsular and diskoligamentous soft tissue of the TMJ restricted operative indications of condylar fractures in the past. Taken together, newer medical technologies and devices and enhanced operative expertise added to the fact that anatomic alignment is rarely achievable, have all encouraged surgeons to perform open, reconstructive, anatomic reduction and internal fixation [11]

3.1 Recent advancements in the management:

1) Enhanced imaging modalities/interpretations
a) Detection of soft tissue injuries
b) Detection of fracture line in relation to capsule
c) Assessment of precise location, angulation comminution
d) Assessment of hardware placement, alignment, and interferences
2) Surgical anatomic studies/revisited technique/innovation and modified surgical approaches
3) Intracapsular fracture
4) Soft tissue injury management
5) Early and effective post operative physiotherapy
6) Improved fixation techniques

3.2 Goals and functional importance

The main goals of managements are:

1) To restore premorbid occlusion
2) Painless normal range of movements
3) To correct and avoid functional, esthetic and developmental complications

3.3 Supportive and closed treatment options:

1) Dietary restrictions
2) Medication (pain)
3) Partial immobilization
4) Total immobilization (not exceeding 20 days)
5) Continuous passive motion
6) Orthodontic therapy
7) Physical therapy

3.4 Advances in open reduction:

The earlier the trauma the greater the potential of disturbance to development of facial growth if an improper treatment is delivered or if injury goes unnoticed without any form of treatment [12]. Relative operative indications in children:

1) Dislodgement of the condyle segment out of the fossa
2) Dislocation into - tympanic wall, external auditory meatus
3) Presence of foreign bodies
4) Bilateral fracture with occlusal disturbances
5) Open wounds

3.5 Operative approaches

1) Transcutaneous
   - Existing lacerations
   - Transmassetric
   - Anteparotid
   - Transparotid
   - Retromandibular
   - Extended temporal
   - Preauricular
   - Bicoronal
2) Transoral
   - Posterior vestibular
   - Endoscopic

3.6 Challenges in surgical approaches

1) Access and exposure
   - Diminutive cutaneous incision
   - Overly extended incision ‘distant from fracture site
   - Excessive retraction forces
   - Scar formation
   - Postoperative complications

❖ Facial nerve damage
❖ Auriculotemporal dysfunction
❖ Parotid fistula
❖ Excessive scar
❖ Infection

2) Reduction and fixation
   - Indirect open reduction
   - Invisibility of final condylar reduction
   - Complexity in checking fixation
   - Undesirable placement
   - Increased manipulation

4. Advances in internal fixation

Osteosynthesis materials and techniques have dramatically facilitated implementation of open reduction and internal fixation [13].

Titanium screws are considered the most reliable materials, Few materials are

❖ One plate mini plate
❖ Two plate mini plate
❖ Lag screws
❖ Delta plates
❖ Trapezoid plates
❖ Resorbable systems

Recently using 24 hole plates were proposed to be biomechanically stable dual plates can be executed at the condylar neck or lower base of condyle neck fractures can be used to overcome tension and compression trajectories and if warranted should be applied on the anterior and posterior borders of condyle neck.[14] If one plate is chosen

2 screws on each side must be placed. Resorbable plates with lesser manipulation were introduced to combat the disadvantages of titanium as well as those of resorbable that need tapping particularly in a location in which the area may require managements with strong retractions and difficult or restricted operative angulations [15].Ultrasonic welding and smelting of resorbable pins are used. The pin is inserted into the drilled holland melts laterally with the cancellous bone and therefore, anchorage is enhanced for improved fixation .These screws have fewer complications than metal screws.[16-19]

5. Conclusion

Management is related to patient discomfort and severity of limitation of mouth opening. The principal goal is to avoid limitation of mouth openings early as possible, especially if open reduction is not considered. Otherwise, progression into adhesions can occur between the coronoid process and surrounding soft tissue, which becomes harder and more troublesome to manage [20].

References

[1]. Noh K, Choi W, Pae A, *et al*. Prosthetic rehabilitation of a patient with unilateral dislocated condyle fracture after treatment with a mandibular repositioning splint: a clinical report. *J Prosthet Dent* 2013; 109:367e72.

[2]. Ellis E, Walker RV. Treatment of malocclusion and TMJ dysfunction secondary to condylar fractures. *Craniomaxillofac Trauma Reconstr* 2009; 2(1):1e18.

[3]. Janson G, Crepaldi MV, Freitas KM, *et al*. Stability of anterior open- bite treatment with occlusal adjustment. *Am J Orthod Dentofacial Orthop* 2010; 138(1):14.e1-e7.

[4]. Janson G, Crepaldi MV, Freitas KMS, *et al*. Evaluation of anterior open-bite treatment with occlusal adjustment. *Am J Orthod Den- tofacial Orthop* 2008; 134(1):10e1.

[5]. Al Yami EA, Kuijpers-Jagtman AM, van't Hof MA. Stability of or- thodontic treatment outcome: follow-up until 10 years post- retention. *Am J Orthod Dentofacial Orthop* 1999; 115: 300e4.

[6]. Cousley R, Gibbons AJ. Correction of the occlusal and functional sequelae of mandibular condyle fractures using orthodontic mini- implant molar intrusion. *J Orthod* 2014; 41(3): 245e53.

[7]. Yao CC, Lee JJ, Chen HY, *et al*. Maxillary molar intrusion with fixed appliances and mini-implant anchorage studied in three di- mensions. *Angle Orthod* 2005; 75(5): 754e60.

[8]. Yanagita T, Adachi R, Kamioka H, *et al*. Severe open bite due to traumatic condylar fractures treated nonsurgically with implanted miniscrew anchorage. *Am J Orthod Dentofacial Orthop* 2013; 143: S137e47.

[9]. Umemori M, Sugawara J, Mitani H, *et al*. Skeletal anchorage system for open-bite correction. *Am J Orthod Dentofacial Orthop* 1999; 115:166e74.

[10]. Long X, Goss AN. A sheep model of intracapsular condylar fracture. *J Oral Maxillofac Surg.* 2007; 65:1102–8.

[11]. Long X, Cheng Y, Li X, Li H, Hu S. Arteriovenous fistula after mandibular condylar fracture. *J Oral Maxillofac Surg*. 2004; 62:1557–8.

[12]. Choi J, Rotaru H, Kim IK. Treatment of post-traumatic open bite by radiofrequency. *British Journal of Oral and Maxillofacial Surgery*. 2007; 45:311–3.

[13]. Rutges JPHJ, Kruizinga EHW, Rosenberg A, Koole R. Functional results after treatment of fractures of the mandibular condyle. *British Journal of Oral and Maxillofacial Surgery.* 2007; 45:30–4.

[14]. Assael LA. Open versus closed reduction of adult mandibular condyle fractures: an alternative interpretation of the evidence. *J Oral Maxillofac Surg*. 2003; 61:1333–9.

[15]. Eckelt U, Schneider M, Erasmus F, Gerlach KL, Kuhlisch E, Loukota R, Rasse M, Schubert J, Terheyden H. Open versus closed treatment of fractures of the mandibular condylar process-a prospective randomized multi-centre study. *Journal of Cranio-Maxillofacial Surgery*. 2006; 34:306–14.

[16]. Terai H, Shimahara M. Closed treatment of condylar fractures by intermaxillary fixation with thermoforming plates. *British Journal of Oral and Maxillofacial Surgery.* 2004; 42:61–3.

[17]. Landes CA, Lipphardt R. Prospective evaluation of a pragmatic treatment rationale: open reduction and internal fixation of displaced and dislocated condyle and condylar head fractures and closed reduction of non-displaced, non-dislocated fractures. Part II: high condylar and condylar fractures. *Int J Oral and Maxillofacial Surgery*. 2006; 35:115–26.

[18]. Davis BR, Powell JE, Morrison AD. Free-grafting of mandibular condyle fractures: clinical outcomes in 10 consecutive patients. *Int J Oral and Maxillofacial Surgery.* 2005; 34:871–6.

[19]. Haug RH, Assael LA. Outcomes of open versus closed treatment of mandibular subcondylar fractures. *J Oral Maxillofac Surg.* 2001; 59:370–5.

[20]. Ellis III E, Throckmorton GS. Facial Symmetry after Closed and Open Treatment of Fractures of the Mandibular Condylar Process. *J Oral Maxillofac Surg.* 2000; 58:719–728.