DOI: 10.7860/JCDR/2014/10484.4914

Case Report

Dentistry Section

Extra Corporeal Fixation of Fractured Mandibular Condyle

KAMAL KANNADASAN[1], VANDANA SHENOY K[2], SRIVATSA KENGAGSUBBIAH[3], SATHYABHAMA V[4], VISHNU PRIYA[5]

ABSTRACT

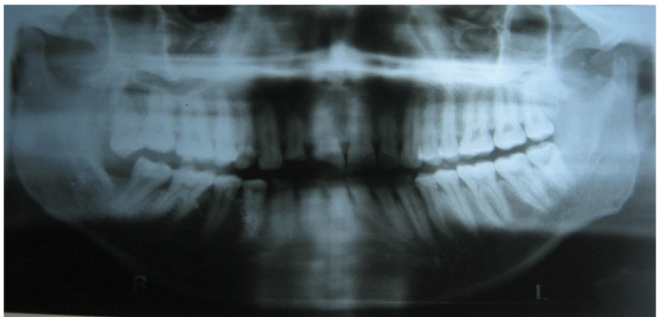
Condylar fracture is the second most common site in the mandibular fractures. Motor vehicle accident and fall are the major causes of such fractures. Because of the anatomical weakness of the condyle and the shape of the condylar head the antero-medial dislocation of the condyle is common. Open reduction and closed reduction is always debatable. The open reduction will bring back the normal function much earlier than closed reduction. Medially dislocated condylar fracture fragments are always managed with open method. In superior or high condylar fractures,exact reduction with conventional open reduction can be difficult due to the limited surgical and visual fields. In such cases extracorporeal fixation of condyle using vertical ramus osteotomy may be better choice to achieve perfect alignment and absolute maintaince of vertical height of the ramus and facial symmetry. We here present a case of extracorporeal fixation of unilateral left high condylar fracture.

Keywords: Dislocated condylar head, Extracorporeal fixation of condyle

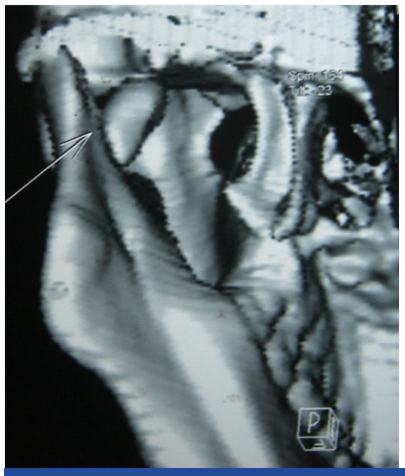
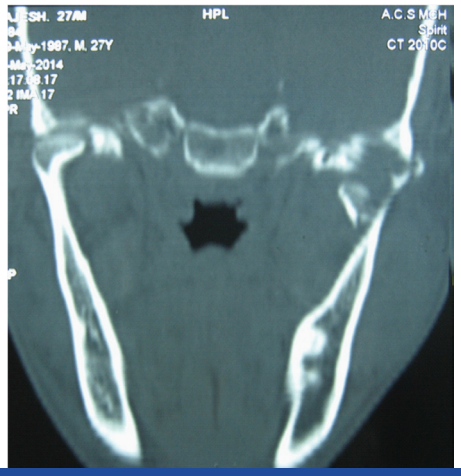
CASE REPORT

A 27-year-old male patient reported to our casualty with a history of fall from motor cycle about five days back and was seen by the medical officers in a hospital elsewhere. After the first-aid he reported to our hospital with a complaint of pain on the left side of jaw and deviation of jaw to the left side during mouth opening. On examination a young well-built and nourished male who was conscious, well oriented and was able to recall the incident clearly. Face was symmetrical and there was healed abrasions seen on the left temple area and left zygomatic area and sutured laceration on the right side of the chin area. A healed scar seen on the left side of the upper lip extending from the columella to the left ala. Intra-orally all teeth were present except right lower third molar. Right upper central incisor and lateral incisor were fractured with Elli's class II and class III respectively. Deranged occlusion seen on the right side [Table/Fig-1]. Mandible found to be deviated to the left with restricted mouth opening. On palpation the left side Temporomandibular joint (TMJ) area was soft and condyle could not be elicited. OPG shows left high condylar fracture [Table/Fig-2]. CT showed anteromedial dislocation of the fractured medial half of the head of the left condyle, found to be displaced to the level of sigmoid notch [Table/Fig-3-5].

As the fracture fragment was dislocated more antero medially, we decided to go for extracorporeal reduction and fixation, as the pre auricular or retro-mandibular will not give adequate exposure. Patient's routine blood investigations were normal. Neurosurgical clearance sought as the patient history showed loss of conscious for 10 min at the time of accident. After obtaining fitness patient was submitted to GA under Naso-Endotracheal intubation, First Inter-maxillary fixation (IMF) done to achieve normal occlusion for later placement of osteotomised segment in the proper anatomical location. Risdon Incision was placed through submandibular approach. After dividing the platysma the parotid and Masseter junction exposed. The area next to the anterior edge of the parotid gland is usually relatively free of branches of facial nerve, making this an ideal point to dissect down to the fracture. After carefully dissecting and retracting the parotid, masseter muscle divided at the angle. By sub periosteal dissection the sigmoid notch exposed and retractor placed. Four hole stainless steel mini plate without gap two in number were adapted over pre-planned osteotomy site on the lateral surface of the ramus. Plates and screws were removed and preserved. Osteotomy completed obliquely starting from the depth of the sigmoid notch and running around the anti-lingual prominence (the landmark for the mandibular canal medially) and completed at the angle 1cm from the posterior border. After dividing all the muscle and ligaments, the segment removed and preserved in blood gauze. By blind probing the soft tissues with curved mosquito forceps the condyle identified by its consistency and retrieved after releasing the lateral pterygoid. The smaller fragments retrieval was difficult due to sudden bleeding from maxillary vein and left behind. Hence the 'V' shaped deficiency found on the condylar head [Table/Fig-6&7] and the condylar segments held in the palm [Table/Fig-6] and with the help of 701 bur a vertical hole placed from anterior to posterior and turned back in the same manner so that broad area of contact is achieved. The fragments stabilized with 24 gauge wire [Table/Fig-7] and fixed to the same anatomical site in the pre-planned

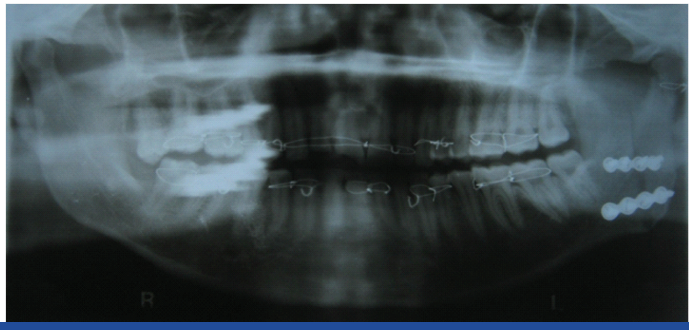


[Table/Fig-1]: Pre operative deranged occlusion on right side
[Table/Fig-2]: Pre operative OPG showing left high condylar fracture
[Table/Fig-3]: 3D CT showing left condylar head fractured


[Table/Fig-4]: 3D CT showing anteriomedial dislocation of left condylar head
[Table/Fig-5]: Coronal section CT showing sagittal split of the left condylar head
[Table/Fig-6]: Extra corporeal reduction of fracture fragments





[Table/Fig-7]: Extra corporeal fixation of fracture fragments with wire
[Table/Fig-8]: Fixation of vertical sub sigmoid osteotomy fragments with miniplates
[Table/Fig-9]: Immediate postoperative OPG showing fixation of fractured fragments

[Table/Fig-10]: Post-operative occlusion on right side after extra corporeal fixation of the left condyle

position with the same plate and screws [Table/Fig-8]. Wound closed in layers after water tight closure of parotid fascia to prevent fistula formation. The patient was not on IMF and advised soft diet for one week. Patient's post-operative recovery was uneventful. Postoperative OPG [Table/Fig-9] shows fixation of fractured fragments. Physiotherapy started after five days and advised to continue strictly for six weeks. Immediate postoperatively occlusion was normal [Table/Fig-10] and deviation in opening the mouth got corrected. The mouth opening improved over a period of 10days and case was followed up for three months without any change in the occlusion, mouth opening, and mandibular movements.

DISCUSSION

The prevalence of a mandibular condyle fracture is relatively high compared with other type of mandibular fracture. The mandibular condylar fractures are broadly classified as intra-capsular and extra –capsular and treatment modalities either by open or closed method [1]. Zide and Kent [1,2] formulated absolute indications for open reduction. Open reduction by standard surgical approaches like pre auricular and or endaural are difficult because of anatomic position and proximity of the facial nerve [3]. Localization of the displaced or dislocated fractured bony fragment also makes procedures more difficult by these approaches.

Many surgeons have selected closed method and treatment shown favorable results [3]. But some conservative treatments had complications such as malocclusion, facial asymmetry, TMJ pain, loss of vertical height of ramus [4]. In case of severely displaced condylar fractures open reduction may give better results [5]. In case of high or superiorly positioned fractures with antero-medial displacement standard approaches can be difficult in term of access, visualization, fixation and dangers of causing damages to adjacent structures such as parotid gland and facial nerve. Extra corporeal fixation utilizing vertical ramus osteotomy first performed [5,6], could be a method to resolve above problems. In our case bringing back the normal occlusion was difficult due to shortening of the ramus and pull of the mandible to the left side. The extracorporeal reduction and fixation [4-6] is planned due to high level head fracture into two fragments and severe antero-medial displacement of the fracture condylar head.

Approaches to the fractured condylar head is usually by pre-auricular or Endaural. We used submandibular approach via Risdon incision [6,7]. During the dissection we followed the trans masseteric antero parotid (TMAP) technique advocated by Wilson et al., [8], which offers swift access to the condylar neck while substantially reduces

the risk of injuring the facial nerve and eliminates the postoperative complication. In gross displacement of the fragment it is easy to locate by vertical sub sigmoid osteotomy [4,9] through sub-mandibular approach [4,9,10] since it is a quick, leaves a small less conspious scar, fractured fragments can be perfectly aligned, minimal risk to the facial nerve injury, access to the mandibular ramus is maximum [11] . The plates pre-fixing, planned osteotomy done exactly as practiced by many authors [5,8].

The localization of the dislocated head was not easy hence we probed for hard consistency in the soft tissue. As most of the surgeons used miniplates [11,12] while fixing the fractured segment we differed due to comminuted fracture of the head and also partial loss of segment. We have done wire osteosynthesis [11-13] to preserve more volume of bone and helps in good union. After fixing it in the precise plane, the patient's mouth opening was perfect. Most of the authors have practiced immobilization [6] for 1 or 2 wks we did not do any immobilization from the beginning. This is mainly due to patient developed immediate postoperative sinus tachycardia (heart rate above 160/min) which subsided after removing the Ryle's tube and Foleys catheter as it was psychologically disturbed him.

Extracorporeal fixation even though it is unique,compromising the vascularity [13] of the osteotomized segment is still possible. Fixing the fractured head to the free ramal graft without detaching the lateral pterigoid [4] will be difficult to reposition due to intervening soft tissues. Explanted fractured segment act as free graft [13-15] and shows condylar resorption [4,13]. In our case followup was only for three months and it is very early to comment on condylar resorption.

CONCLUSION

The decision for open or close reduction is by the surgeon keeping in mind bringing back normal function and esthetics of the patient. Severely displaced condylar fracture invariably warrant open reduction. To overcome demerits of closed method, proper anatomic alignment of the condyle, direct ramus visualization, retrieval of medially dislocated fractured fragment and fixation by extracorporeal method using vertical ramus osteotomy is valuable. Hence, extra corporeal reduction and fixation of condyle has remained to be a good choice of technique to achieve perfect alignment, absolute Maintenance of vertical ramus height, occlusion and facial symmetry in case of severely displaced, dislocated high condylar fractures. But the limitation with this technique is a broad exposure, damage to facial nerve and parotid gland and avascular necrosis of the free ramal graft segment.

REFERENCES

[1] Brandt MT, Haug RH. Open versus closed reduction of adult mandibular condyle fractures; a review of literature regarding the evolution of current thoughts on management. *J Oral Maxillofacial Surg*. 2003;61:1324-32.

[2] Zide MF, Kent JN. Indications for open reduction of mandibular condyle fractures. *J Oral Maxillofacial Surg*. 1983;41:89-98.

[3] Ellis E, McFadden D, Simon P, Throackmorton G. Surgical complications with open treatment of mandibular process fractures. *J Oral Maxillofac Surg*. 2000;58:950-58.

[4] Park JM, Kim SG, Rotaru H, Baciut G, Hurubeanu L. Comparative study of the prognosis of an extracorporeal reduction and a closed treatment in mandibular condylar head and or neck fractures. *J Oral Maxillofac Surg*. 2010;68:2986-93.

[5] Park SY, Im JH, Yoon SH, Lee DK, A Follow-up on extracorporeal fixation of condylar fracture using vertical ramus osteotomy. *J Korean Assoc Oral Maxillofac Surg*. 2014;40:76-82.

[6] Gupta MV, Shaoo NK. Extracorporeal fixation of displaced mandibular condylar fracture; viable option. *MJAFI.* 2009;65(3):229-31.

[7] Nam SN, Lee JH, Kim JH. The application of Risdon approach for mandibular condyle fractures. *BMC Surgery*. 2013;13(25):1-7.

[8] Wilson AW, Ethunandan M, Brennan PA. Transmasseteric antero-parotid approach for open reduction and internal fixation of condylar fractures. *British Journal of Oral and maxillofac surgery*.2005;43:57-60.

[9] Ellis E, Reynolds ST, Park HS. A method to rigidly fix high condylar fractures. *Oral Surg Oral Med Oral path.* 1989;68(4)part1:369-73.

[10] Ellis E, Throackmorton G, Palmieri C. Open treatment of condylar process fractures: Assessment of adequacy of repositioning and Maintenance of stability. *J Oral Maxillofac Surg.* 2000;58(1):27-34.

[11] Hwang K, Park JH, Lee HJ, Miniplate fixation of high condylar fracture and postoperative exercise regimen. *The Journal of craniomaxillofacial surgery.* 2005; 16(1):113-16.

[12] Meng FW, Liu YP, Hu KJ, Kong L. Use of a temporary screw for alignment and fixation of sagittal mandibular condylar fractures with lateral screws. *Int J Oral & Maxillofac Surg.* 2010;39:548-53.

[13] Narayanan V, Kannan R, Sreekumar K. Retromandibular approach for reduction and fixation of mandibular condylar fractures; a clinical experience. *Int J Oral & Maxillofac Surg.* 2009;38:835-39.

[14] Davis BR, Powell JE, Morrison AD. Free grafting of mandibular condyle fractures clinical out come in 10 consecutive patients. *Int J Oral & Maxillofac Surg.* 2005; 34(8):871-76.

[15] Boyne PJ. Free grafting of traumatically displaced or resected mandibular condyles. *J Oral Maxillofac Surg.* 1989;47(3):228-32.

PARTICULARS OF CONTRIBUTORS:

1. Professor and Head, Department of Oral and Maxillofacial Surgery, Thai Moogambigai Dental College and Hospital, Chennai, India.
2. Reader, Department of Oral and Maxillofacial Surgery, Thai Moogambigai Dental College and Hospita, Chennai,India.
3. Professor, Department of Oral and Maxillofacial Surgery, Thai Moogambigai Dental College and Hospital, Chennai, India.
4. Reader, Department of Oral and Maxillofacial Surgery, Thai Moogambigai Dental College and Hospita, Chennai, India.
5. Reader, Department of Orthodontics, Thai Moogambigai Dental College and Hospital, Chennai, India.

NAME, ADDRESS, E-MAIL ID OF THE CORRESPONDING AUTHOR:

Dr. Kamal Kannadasan,
Professor and Head, Department of Oral and Maxillofacial Surgery,
Thai Moogambigai Dental College and Hospital, Chennai-600 095, India.
E-mail : dr.ramachandra.prabhakar@gmail.com

FINANCIAL OR OTHER COMPETING INTERESTS: None.

Date of Submission: **Jul 03, 2014**
Date of Peer Review: **Jul 29, 2014**
Date of Acceptance: **Jul 31, 2014**
Date of Publishing: **Sep 20, 2014**