Superolateral Dislocation of Bilateral Intact Mandibular Condyles: A Rare Case Series

Satishkumar G. Patil¹ · Bindu S. Patil² · Udupikrishna Joshi¹ · B. M. Rudagi³ · Aafreen Aftab¹

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Abstract

Background and Purpose The dislocation of mandibular condyle is a clinical condition in which the head of condyle has been displaced out of the glenoid fossa. Complete dislocation of the mandibular condyle can occur in anterior, posterior, lateral and superior direction. Among these dislocations, bilateral superolateral dislocation of mandibular condyles is quite rare and often misdiagnosed. Because of its rare occurrence and unusual clinical course, the best treatment is debatable.

Patients and Method We present the first case series of true bilateral superolateral dislocation of intact mandibular condyles (Type 2B) without fracturing the Zygomatic arch, associated with symphysis fracture.

Conclusion This article intends to provide information regarding the possible biomechanics and management of bilateral superolateral dislocation of mandibular condyles associated with symphysis fracture.

Keywords Mandible fracture · Mandibular condyles · Bilateral superolateral dislocation

Introduction

Fractures of the mandibular condyle are unique among maxillofacial injuries as they affect mandibular function to a great extent. This is by far the most frequently involved in mandibular fractures, as the condylar neck forms the weakest portion and tends to get fractured when there is an impact on the chin. In few instances the impact can cause the condyle to be only displaced out of the glenoid fossa, but within the capsule either unilaterally or bilaterally, without fracturing it.

This dislocation of mandibular condyle can occur in anterior, posterior, lateral and superior direction. Among these, the anterior dislocation is most commonly encountered, owing to the lateral pterygoid muscle pull. On the contrary, the lateral and superior dislocations of condyle are less frequent as the condylar movement is restricted by the attachment of various structures such as temporomandibular joint ligament, capsule, articular disc and lateral pterygoid muscle.

In 1969, Allen and Young [1] classified the lateral dislocation of the mandibular condyle into 2 variants: Type 1 (lateral subluxation), where the condyle is laterally displaced from the glenoid fossa; and Type 2 (complete dislocation) wherein the condyle is displaced both laterally as well as superiorly and enters the temporal fossa. Satoh et al. [2] in 1994 further divided the Type 2 or complete dislocation into three subcategories as Type 2 A, Type 2 B and Type 2 C. In Type 2A, the condyle is displaced out of the glenoid fossa but does not move beyond the Zygomatic arch; in Type 2B, the condyle is hooked above the Zygomatic arch and in Type 2C, the condyle is lodged into the fractured Zygomatic arch. Either of these classifications did not mention about the presence or absence of associated mandibular fracture. Hence, a modification in the existing

✉ Satishkumar G. Patil
satpat71@gmail.com

¹ Department of Oral and Maxillofacial Surgery, HKE'S S. Nijalingappa Institute of Dental Sciences and Research, Sedam Road, Gulbarga, Karnataka 585105, India

² Department of Periodontics, HKE'S S. Nijalingappa Institute of Dental Sciences and Research, Gulbarga, India

³ Department of Oral and Maxillofacial Surgery, ACPM Dental College, Dhule, India

classification has been proposed by David et al. [3] in 2010, as an addition of a 3rd type of complete dislocation of mandibular condyle without fracture of anterior mandible along with the same subcategories as A, B and C as mentioned by Satoh et al.

Adequate information regarding unilateral superolateral dislocation of mandibular condyle is present in the literature, but very few isolated case reports of bilateral superolateral dislocation have been reported. Hence this article intends to present the first case series of true bilateral superolateral dislocation of mandibular condyle (Type 2B) without fracturing the zygomatic arch, associated with anterior mandible fracture, along with possible biomechanics and management.

Patients and Methods

This series of three cases had bilateral superolateral dislocation of mandibular condyle (Type 2B) associated with anterior mandible fracture and were managed by the same surgeon, utilizing the same treatment and follow up regimen (Fig. 1).

Case 1 (Fig. 2a–e)

A 25 year old male electrician reported to the maxillofacial surgery OPD with pain and inability to open mouth since 1 day secondary to a fall from height while working. Patient gives a history of 1 episode of vomiting and bleeding from both the ears. However, there was no history of loss of consciousness.

On examination, patient had a sutured laceration extraorally over the chin along with diffuse bony hard swelling and tenderness in the preauricular region. The condylar movement could not be elicited. Intraoral examination (Fig. 2a) revealed a mouth opening of approximately 5 mm, with an 8 mm symphyseal splay along with anterior openbite and posterior gagging of occlusion. 3D CT (Fig. 2b) confirmed the mandibular symphysis with Type 2B dislocation of bilateral condyles. Patient was operated on 2nd day with treatment protocol as mentioned in Fig. 1 and mouth opening of 27 mm (Fig. 2c–e) was achieved.

Case 2 (Fig. 3a–c)

A 14 year old girl reported with a complaint of pain and inability to open mouth along with loss of anterior teeth in upper jaw following a road traffic accident. On extraoral examination (Fig. 3a), a bony hard tender swelling in the preauricular region bilaterally with restricted temporomandibular joint movement was seen. Intraorally, avulsion

of upper central incisors was noted along with anterior openbite and posterior gagging of occlusion. A step deformity was observed between lower central incisors along with restricted mouth opening of approximately 4 mm. 3D CT scan (Fig. 3b) revealed Type 2B dislocation of bilateral condyles associated with fractured symphysis. Patient was operated on the 4th day according to the same treatment regimen. Postoperatively patient had 32 mm of mouth opening.

Case 3 (Fig. 4a–c)

A 32 year old man reported with a history of fall from motorcycle and complained of pain along with difficulty in opening of mouth since 2 days. Extraoral examination (Fig. 4a) revealed a cut lacerated wound along with a step deformity over the chin. Condylar movements were absent bilaterally. Intraorally, the occlusion was deranged with trismus. Flaring between right lateral incisor and canine was observed along with dentoalveolar fracture with respect to mandibular anteriors. 3D CT scan (Fig. 4b) revealed Type 2B dislocation of bilateral condyles with symphysis and left coronoid fracture. Patient was operated on 3rd day after injury and a mouth opening of 35 mm was achieved.

Discussion

The lateral dislocation of mandibular condyle is a condition in which the condyle is positioned lateral to the articular eminence or glenoid fossa and is unable to return to a closed position [4]. Literature presents a total of 12 cases of bilateral superolateral dislocation of mandibular condyles between the period from 1969 and 2015. We present the first case series of true bilateral superolateral dislocation of condyles to be reported over the years which will serve to add to the literature.

In the current study, patients who reported with the bilateral superolateral dislocation of condyles associated with anterior mandible fracture had a mean age of 25.5 years and a male predominance was observed. Out of three cases, two were caused by road traffic accidents and one was related to a fall from height. These findings are similar to the review done by Amarel et al. [5], who suggested that a high energy trauma could induce this type of dislocation of condyles along with fracture of anterior mandible.

This rare type of dislocation may be misdiagnosed or completely overlooked by amateur practitioners as the preauricular edema makes the lateral dislocated condyles difficult to palpate [6]. Yoshii et al. [7] advised that clinicians should consider an unusual condyle dislocation

Fig. 1 Treatment regimen

whenever the signs, symptoms and clinical course were atypical of common mandibular fracture. The diagnostic features of this type of dislocation have been described as malocclusion persisting after the jaw fracture was reduced, persistence of an open bite, persistent restriction of mandibular movements, an apparent loss of ramus height with elevation of the ramus fragment and facial asymmetry [8].

The factors such as the size and the direction of applied force, the position of the jaw during impact and the anatomic features of the joint like joint capsule or flabby pterygoid muscles play an important role in the dynamics

of dislocation of mandibular condyle, which can be unilateral or bilateral [9].

A few authors considered the fracture of mandible an essential prerequisite for lateral dislocation of condyles, [3, 10] whilst few others observed condylar dislocations without any traumatic fractures of the mandible [11, 12]. In this case series, the mechanism of dislocation might be due to the sudden high impact on the chin which was a common finding as seen by laceration over the chin causing the fracture of the anterior mandible. This allows the rotation and outward movement of the ramus which pushes the condyles laterally and superiorly over the zygomatic arch,

Fig. 2 Case 1. **a** Preoperative intraoral photograph showing symphysis fracture. **b** 3D reconstruction view showing bilateral superolateral dislocation of intact mandibular condyles along with symphysis

fracture. **c** 3D reconstruction view confirming the complete reduction of both the condyles into glenoid fossa and fixation of symphysis fracture. **d** Postoperative occlusion. **e** Postoperative mouth opening

thereby facilitating the bilateral superolateral dislocation of condyles as explained by Allen and Young.

Mandibular condyle may fracture in sagittal plane as the medial portion of the condylar head extends far beyond the condylar neck. This predisposes the medial portion to dislocate anteromedially or it may remain in the glenoid fossa. Rattan [6] in 2002 stated that the fractured medial

portion which is present in the glenoid fossa should be carefully sought, as it can cause hindrance to the free movement of the condyle and can also lead to serious complications like development of a bifid condyle or ankylosis within the joint [13]. Few cases have been reported in which the fractured medial portion of condyle will remain in the glenoid fossa while the lateral portion is

Fig. 3 Case 2. **a** Extraoral photograph showing swelling in the bilateral preauricular region. **b** Preoperative 3D reconstruction view. **c** Postoperative OPG

Fig. 4 Case 3. **a** Preoperative extraoral photograph showing swelling in the bilateral preauricular region. **b** Preoperative 3D reconstruction view. **c** Postoperative OPG

displaced laterally and superiorly over the root of the zygoma [6]. This unusual type of dislocation does not fall under any of the categories of the present classification. The existing classification also does not mention about the type of dislocation whether it is unilateral or bilateral. In addition to this, the condylar status whether it is fractured or intact will influence the mode of treatment, thereby determining the difficulty index of reduction and prognosis. Hence, there is a need for more comprehensive classification of lateral dislocation of mandibular condyles.

The treatment modalities include the closed and open reduction techniques with the duration of the dislocation playing a major role in choosing the treatment modality. Due to the traction effects of masticatory muscles, both closed and open reduction of bilateral superolaterally dislocated condyle becomes a challenging task [14]. Dislocations that have been diagnosed early can be reduced manually making closed reduction the first choice of management. The first description of the reduction of lateral dislocated mandibular condyles was given by Roberts in 1849, which consisted of a strong outward pressure on the ascending ramus with an inferior traction and medial pressure on the condylar head [15].

Open reduction is reserved for cases which are not amenable to closed reduction. Various techniques of reduction of bilateral superolaterally dislocated condyles have been described in literature such as Finck's technique in which traction wires are passed through the holes drilled in the mandibular angle region to facilitate the reduction of dislocated condyle into the glenoid fossa [10, 16]. The other method of reduction is the application of bone hook placed at the sigmoid notch through a stab incision at the same level, followed by applying a outward traction to facilitate the reduction of condyle into glenoid fossa [17]. More recently, Temiz et al. [14] introduced the Muselet technique as a useful intraoral method of reduction of laterally displaced condyle. It consists of a placement of 0.8 mm thick wire through the hole drilled in the rami and twisting the wire on itself while pulling it in inferior direction. This maneuver pulls bilateral rami inferiorly and medially providing the reduction of the joint, which can be accessed by palpation [14].

However the difficult or long standing cases may require direct exposure of dislocated condyles and its reduction into the glenoid fossa. It is reported by Amaral et al. [5] that 54.5 % cases of dislocated condyle were treated by open reduction whereas 41.0 % cases were managed by closed reduction. In our case series, all the three cases were successfully managed by manual (closed) reduction under deep sedation without any untoward complication as they were diagnosed at an early stage. Open reduction and internal fixation of the anterior mandible fracture was done with titanium miniplates under general anesthesia.

Intermaxillary fixation was done for 2 weeks followed by intensive physiotherapy. Assessment of occlusion and mouth opening was done at regular follow up appointments. No patient presented with signs and symptoms of temporomandibular joint disorder or any other complication at 1 year of recall visit.

It has been suggested by many authors that the intermaxillary fixation for minimum of 2 weeks is required postoperatively to facilitate the healing of damaged temporomandibular joint ligament, followed by vigorous physiotherapy [6, 9]. An early reduction is advisable, as a delay in this tends to induce fibrosis of the glenoid fossa, resulting in an imperfect or unsuccessful reduction, which might ultimately lead to fibrous ankylosis of temporomandibular joint, necessitating condylectomy with or without arthroplasty [1, 2, 12, 18]. When the dislocated joint has become adherent to the surrounding tissue, along with scarring of the pterygoid muscle, ankylosis developed. In such cases mandibular sagittal split ramus osteotomy along with articular reduction and fixation has been proved as a successful treatment modality with good results [19].

The force of impact causing the dislocation of condyles sometimes may lead to perforation of TMJ capsule, which often require open reduction and repair. Capsulorrhaphy and temporal fascia flap can be used to strengthen the lax capsule, thereby preventing further complication such as hypermobility of the joint, chronic subluxation and recurrent anterior dislocation [20].

The traumatic dislocation of condyles can also be associated with the facial palsy, as reported in few cases [21]. The extrapetrosal peripheral segment of facial nerve is in close proximity to the ramus of mandible and is susceptible for potential risk of damage which will usually resolve within 6–9 months. Long-term follow up is necessary to ensure the normal form and function of temporomandibular joint.

Conclusion

The treatment of any dislocated mandibular condyle should be focused on the restoration of the original physiological position of condyle into the glenoid fossa [22]. An early diagnosis and prompt treatment is necessary for accurate reduction of dislocated condyle, thus providing a favorable circumstance for a closed reduction. However, delay in management may lead to poor prognosis and compromised treatment outcome especially in the case of bilateral superolateral dislocation of condyles. Intensive physiotherapy postoperatively is a prime factor in determining the success rate of treatment and promotes a speedy return to normal function. From our finding we suggest that an anterior mandible fracture is an essential prerequisite for

the bilateral superolateral dislocation of mandibular condyles.

Compliance with Ethical Standards

Ethical Standards All procedures performed in our study were in accordance with the ethical standards of the organization.

Informed Consent Informed consent was obtained from all individual participants.

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