Superolateral Dislocation of the Mandibular Condyle: Report of a Case with Review of Literature and a Proposed Modification in the Classification

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ABSTRACT

Anteromedial fracture dislocation of the mandibular condyle is common but a superolateral dislocation of an intact condyle is quite rare. Only ~19 cases of such dislocation have been reported in the world English literature. This type of dislocation is often misdiagnosed or completely overlooked and hence inadequately addressed. A case of superolateral dislocation of the condyle associated with a symphyseal fracture is presented. We discuss the dynamics, diagnostic features and clinical management of such dislocations with the review of literature and propose a modification in the existing classification.

KEYWORDS: Superolateral dislocation, mandibular condyle, mid-symphyseal fracture

Fracture dislocation of the mandibular condyle is a common injury and an antero-medial dislocation is the most common one owing to the pull of the lateral pterygoid muscle. Occasionally, dislocation of the intact condyle occurs and its displacement is mostly anterior beyond the articular eminence.¹⁻³ On the contrary, posterior, superior, or lateral dislocations of an intact condyle are very rare.¹⁻⁷ The rarity of these dislocations can be attributed to the varying anatomy of the condyle, the direction of pull of muscles attached to the condyle and low incidence of skull base fractures from an indirect blow.

So far, a total 19 cases of lateral dislocation of an intact condyle have been reported in the world English literature (Table 1). The paucity of data probably has refrained clinicians from establishing a protocol for

managing such cases. This case report attempts to add our case to the preexisting numerical data along with the review of literature to understand the dynamics of etiology, pattern, and current methods of treatment of such dislocations.

CASE REPORT

A 25-year-old man moderately built but well nourished, reported to the maxillofacial surgery OPD with difficulty in mouth opening associated with pain for 3 days. A detailed history revealed that the patient had met with a road traffic accident 3 days prior to presentation. He was apparently travelling by an autorickshaw (a public transport vehicle in India) when it suddenly skidded and

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Table 1 Literature Review: Reported Cases of Lateral Displacement of Mandibular Condyle

Year	Author	Type	Unilateral/ Bilateral	Reduction Time (in days)	Reduction	Results
1969	Allen & Young ¹	I	U	8	Partial (C)	Fibro-osseous ankylosis
		II	U	15	Nil (C)	Gross malocclusion
		I	B	1	Complete (C)	25% reduction
		I	U	1	Complete (C)	Full range of jaw movements
		II	U	1	Complete (O)	Unknown
1978	Brusati & Paini ⁴	II	U	1	Complete (C)	With facial palsy, not described
		II	U	12	Complete (O)	With facial palsy, full jaw motion
1982	Worthington ⁵	Unusual	U	14	Partial (O)	Not described
1988	Devita et al ²	II	B	NA	Complete (O)	Not described
1989	Ferguson et al ²	II	U	1	Complete (O)	Condylectomy, arthroplasty by costal cartilage, mouth opening 30 mm
1989	ECWTO ³	II	U	14	Complete (O)	Bifid condyle, reduced mouth opening
1994	Satoh et al ³	II	B	13	Partial (O)	Condylectomy, arthroplasty by costal cartilage, mouth opening 30 mm
1996	Kapila & Lata ¹⁵	II	U	7	Complete (O)	3 mm mouth opening
1998	Hoard et al ¹²	II	B	NA	Complete (C)	Not described
2000	Yoshii et al ¹²	II	B	16	Complete (O)	2 mm mouth opening
2002	Rattan ⁹	II	U	14	Complete (O)	3 mm mouth opening
		II	B	NA	Not reduced	Interpositional gap arthroplasty
2007	Shou-Shan et al ⁸	II	U	5	Complete (C)	37 mm mouth opening
2007	Jui-Pin Lai et al ¹¹	II	B	1	Complete (C)	41 mm mouth opening
2009	Li et al ⁸	II	U	NA	Complete (C)	36 mm mouth opening

U, unilateral; B, bilateral; C, closed; O, open; NA, not available.

overtaken, and his lower jaw hit the metallic sidebar. Patient gave history of bleeding from both his ears and a brief episode of loss of consciousness with four episodes of vomiting immediately following the accident.

A detailed extraoral examination revealed a diffuse, bony-hard swelling in the left preauricular region and a sutured laceration over the chin (Fig. 1). Mild facial nerve weakness on the left side was also apparent. Intra-oral examination revealed a restricted mouth opening of ~1 cm with a 12-mm symphyseal splay between the mandibular central incisors (Fig. 2). Coleman's sign was positive with tenderness and step deformity elicited in the mid-symphysis region with an obvious cross bite on the left side.

Routine investigations included a hemogram and chest x-ray which were within normal limits. Special investigations included a 3D CT scan that showed superolateral dislocation of the left condyle over-riding the lateral surface of the left zygomatic arch associated with a 12-mm splay in the mid-symphyseal regions (Fig. 3). A neurosurgical consultation was sought to rule out any head injury. An ENT examination revealed small healing lacerations in the anterior walls of both the external auditory meati that required no active intervention.

In view of the difficulty in intubation, manual reduction of the dislocation was done under deep sedation and a mouth opening of 35 mm was achieved. A

naso-endotracheal intubation was then performed and definitive management of the fracture was done under general anesthesia. Postoperative recovery was uneventful and the patient was discharged on the fourth post-op

Figure 1 Restricted mouth opening and swelling in the left preauricular region.

Figure 2 Pre-op occlusion—obvious derangement in occlusion with symphyseal splay.

day. On discharge, the mouth opening was 32 mm, occlusion was satisfactory and stable with a slight deviation of the jaw to the right on mouth opening (Figs. 4 and 5). No decrease in mouth opening was observed on a monthly follow-up and remained the same at the last follow up of 8 months. A complete resolution of the left-sided facial nerve paresis was also noted.

DISCUSSION

Allen and Young¹ classified lateral dislocation of the mandibular condyle into type I (lateral subluxation) and type II (complete dislocation) in which the condyle is forced laterally and then superiorly. Satoh et al³ sub-classified type II dislocations into type IIA, in which the condyle is not hooked above the zygomatic arch; type IIB, in which the condyle is hooked above the zygomatic arch; type IIC, in which the condyle is lodged inside the zygomatic arch, which is fractured. According to these classifications our case falls under the type IIA category.

Figure 4 Postoperative occlusion.

Allen and young¹ suggested that an associated fracture of anterior mandible, near the symphysis, is a prerequisite for a type II dislocation but Li et al⁸ recently described a case of type IIB dislocation without any associated mandibular fracture. Based on their report, there arises a need to modify the existing classification of lateral dislocation of intact condyle.

We propose certain modifications in the existing classification:

Type I—Lateral subluxation

Type II—Complete dislocation with associated fracture of anterior mandible

Type IIA—Condyle not hooked above the zygomatic arch

Type IIB—Condyle hooked above the zygomatic arch

Type IIC—Condyle lodged within the zygomatic arch which is fractured

Type III—Complete dislocation without associated fracture of anterior mandible

Figure 3 Pre-op CT scan showing superolateral dislocation of the left condyle with associated mid-symphyseal fracture.

Figure 5 Postoperative OPT showing both the condyles in glenoid fossa.

Type IIIA—Condyle not hooked above the zygomatic arch

Type IIIB—Condyle hooked above the zygomatic arch

Type IIIC—Condyle lodged within the zygomatic arch which is fractured

Li et al⁸ explained the dynamics of dislocation by simulating the dislocation on a dried skull. They concluded that, the factors considered essential to such an injury occurring are the size and the direction of applied force, the position of the jaw during impact (the mouth may be in a wide open position), and the anatomic features of the joint (joint capsule and pterygoid muscles may be flabby). In most of the reported cases, the etiology was road traffic accidents (motor-bike accident).^{8–11} We suggest that more than one impact is necessary for such type of dislocations to occur with or without an associated fracture of the mandible. In our case in view of the nature of trauma there must have been another impact from a different direction to the already fractured mandibular symphysis (primary impact) to cause extreme lateral dislocation of the left condyle out of the glenoid fossa, overriding the zygomatic arch. In other words, the initial (primary) impact to the chin resulted in fracture of the symphysis and a subsequent (second) impact resulted in the dislocation. Even in the case of type IIB dislocation of condyle without any associated fracture of anterior mandible as described by Li et al, there was more than one impact and a tiny fracture piece detached from the top of the left condyle had reduced the bulk that would have facilitated the hooking of left condyle over the zygomatic arch.

Apart from the usual features of fractures of the anterior mandible, the patient presents with a bony hard bulge and pain in the affected preauricular region with extreme difficulty in performing any mandibular move-

ment, an apparent loss of ramus height on the affected side and sometimes facial palsy. Because of its rarity, this type of dislocation may be misdiagnosed or completely overlooked.^{9,10} A summary of the cases of lateral dislocation of mandibular condyle as reported in the English literature is shown in Table 1.

Worthington⁵ described the diagnostic features of such dislocations as follows: malocclusion persisting after jaw fracture was reduced, persistence of an open bite, persistent restriction of mandibular movements, an apparent loss of ramus fragment and facial asymmetry. Yoshii et al¹² advised that the clinician should consider an unusual condyle dislocation whenever the signs, symptoms, and clinical course were atypical to a common mandibular fracture. We suggest that in such unusual cases it is always better to advise CT scans and in particular 3D CT, to avoid delay in diagnosis and treatment, since it clearly demonstrates the type and extent of dislocations and any associated mandibular fractures, if present. In our case, the 3D CT revealed a dislocation of the left condyle and coronoid process laterally over the lateral surface of zygomatic arch along with the mid-symphysis fracture of mandible.

Early reduction is advisable for these types of dislocations. However, delay in reduction induces fibrosis of the glenoid fossa, resulting in imperfect or unsuccessful reduction. Unsuccessful or imperfect reduction induces fibro-osseous ankylosis of the TM joint; such conditions necessitate condylectomy with or without arthroplasty.^{1,3,10} Presence of fibrous tissue, in long standing cases, may make closed reduction impossible. The previous reports suggest that if diagnosis and treatment in this type of dislocation is delayed, the lateral dislocation has a high incidence of unsatisfactory results and imperfect reduction.^{1,3–5,9,10,12}

Manual reduction is the first choice for a condyle dislocation.¹⁰ Dislocation of a few days can be corrected by closed/ manual reduction which is the least traumatic, simplest, and safest method.^{13,14} We propose that reduction of dislocation of this nature should be performed under general anesthesia that gives us an opportunity to reduce and fix the associated fracture, if present, and also an option to perform open reduction if closed reduction fails as in long standing cases or type IIB dislocations. Extreme discomfort and pain would normally be felt by the patient if reduction is attempted under local anesthesia. This can, however, be avoided by subjecting the patient to GA, thereby facilitating easier reduction. Open reduction is to be reserved for those cases not amenable to closed reduction. Ferguson² and Kapila¹⁵ have described use of traction through wires placed in holes drilled in the exposed angle region. Direct exposure of dislocated condyle through a preauricular approach is useful for difficult cases and more so in long standing ones (fibro-osseous ankylosis) where condylectomy with or without arthroplasty would be necessary.²⁻⁴ Rigorous mouth-opening exercises are to be advocated as early as possible to prevent fibrosis from developing postoperatively.⁹

Injuries such as these will inevitably result in complete disruption of normal structure of the TM joint, and secondary reconstruction might be required in some cases. Routine postoperative MRI is recommended for symptomatic cases to reveal any disc deformity. If internal derangement of joint exists, arthroscopy seems to be a safe, minimally invasive, and effective tool for diagnosis and treatment. However, open arthrotomy is required if there is anterior disc displacement after reduction, extensive intra-articular fibrosis and failed arthroscopy. Long-term follow-up is necessary. Facial nerve damage^{1,4} might accompany lateral displacement of the intact ramus/condyle because the degree of displacement will usually result in traction on the facial nerve. Most of the time the neuropraxia resolves within 6 to 9 months.

CONCLUSION

The goal of treatment of any dislocation is the return of the condyle to its original physiologic position.¹⁶ If the condyle is hooked on the zygomatic arch, manual reduction might be difficult, thereby requiring open reduction or strong traction. It was suggested that lateral dislocation had a high incidence of unsatisfactory results and imperfect reduction.^{1,3-5,9,10,12}

Further, delayed reduction of laterally dislocated condyle is more difficult and less accurate due to establishment of fibrous adhesions and organization. In our case, satisfactory results may be attributed to early and accurate diagnosis and immediate management. Post-

operative long-term follow is, however, germane in the routine management of these cases, since TM joint problems inevitably follow, irrespective of type.

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