

Superolateral dislocation of an intact mandibular condyle into the temporal fossa: case report and literature review

CASE REPORT

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Abstract – Temporomandibular joint dislocation refers to the dislodgement of mandibular condyle from the glenoid fossa. Anterior and anteromedial dislocations of the mandibular condyle are frequently reported in the literature, but superolateral dislocation is a rare presentation. This report outlines a case of superolateral dislocation of an intact mandibular condyle that occurred in conjunction with an ipsilateral mandibular parasymphysis fracture. A review of the clinical features of superolateral dislocation of the mandibular condyle and the possible techniques of its reduction ranging from the most conservative means to extensive surgical interventions is presented.

Key words: superolateral dislocation; condyle; mandible fracture

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Dislocation of the temporomandibular joint (TMJ) is described as a non-self-limiting displacement of the condyle, outside its functional positions within the glenoid fossa and posterior slope of the articular eminence (1, 2). It is characterized by complete separation of the joint with fixation of the condyle in an abnormal position (3). Anterior and anteromedial are, by far, the most commonly presenting directions of condylar dislocation whilst lateral and superolateral dislocations are the rarest types (4–6). Because such dislocations are very rare in occurrence, they are often misdiagnosed and neglected. This report describes a rare case of superolateral dislocation of an intact mandibular condyle that occurred in conjunction with an ipsilateral parasymphysis fracture.

Case report

A 30-year-old, conscious and well-oriented male patient reported to the Department of Oral and Maxillofacial Surgery, Government College of Dentistry, Indore, India, 20 days after a road traffic accident that resulted in the injuries. The patient gave a history of left ear

bleed at the time of injury. On examination, extra-oral findings included a laceration over the chin measuring about 2 × 1 cm with marked retrusion of left side of the chin, which was tendered on palpation. Decreased mandibular height on the left side with deviation towards the left on mouth opening was evident. A bony hard, tender elevation of around 3 × 2 cm was palpable on the left preauricular region. (Fig. 1) He was not able to close his mouth, and all mandibular movements were extremely restricted and painful. Intra-oral examination revealed an anterior open bite and crossbite on the left side. There was a step defect between the left lower central incisor and lateral incisor. An orthopantomograph (OPG) revealed a left parasymphysis fracture, and the image of the intact left condyle was seen to be overlapping on the articular eminence suggesting its dislocation. The contralateral condyle was intact and in its normal position in the glenoid fossa (Fig. 2). Facial nerve testing of the patient did not reveal any injury. A computed tomographic scan (CT scan) was not performed because of the financial concerns of the patient. After correlating the clinical and the radiological findings, a diagnosis of



Fig. 1. Pre-operative lateral view of the patient revealing a bulge in the TMJ region.

superolateral dislocation of the left mandibular condyle associated with an ipsilateral parasymphysis fracture was reached.

Initially, closed manual reduction was attempted under local anaesthesia, but this was not productive owing to the time elapsed between injury and treatment. The second attempt for closed manual reduction was made under general anaesthesia, but it was also unsuccessful. A left submandibular incision was made to expose the angle region. Two traction wires were passed through it, and force was applied with the help of these wires to pull the entire fragment downwards. This manoeuvre also proved to be futile. Subsequently, an Alkayat–Bramely incision was made on the left side and the condyle was exposed. It was dislocated out of the glenoid fossa and was hooked over the zygomatic arch. The disc was found to be dislocated antero-medially. The condyle was unhooked from the arch and manipulated back into the fossa with the help of a Molt #9 periosteal elevator. The disc was repositioned over the condyle and sutured with the articular capsule in the mandibular fossa laterally. The fractured parasymphysis was then reduced and fixed with a single 2-mm miniplate intra-orally. An intra-operative mouth opening of 36 mm and satisfactory occlusion were achieved. The patient was subjected to intermaxillary



Fig. 3. Post-operative photograph of the patient after 72 h.

fixation (IMF) with elastics for 2 weeks, and postoperative healing was uneventful (Figs 3 and 4). At 6-month follow up, the mouth opening was satisfactory with a good range of mandibular movement.

Discussion

Allen and Young (7) subdivided such dislocations into: type I dislocations (lateral subluxation), in which the condyle has been laterally dislocated out of the fossa, and type II dislocations (complete dislocation), in which the condyle has passed laterally and then superiorly to enter the temporal fossa outside the zygomatic arch (7). Satoh et al. (8) further 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; and type IIc, in which the condyle is lodged inside the zygomatic arch, which is fractured. The present case was classified as a type IIB dislocation based on the intra-operative findings. The reported cases of type IIB dislocation are listed in Table 1.

Allen and young (7) suggested that an associated fracture of the anterior mandible, near the symphysis, is a prerequisite for a type II dislocation. A study by Rattan (12) also emphasized that for the cases with lateral dislocation of the mandibular condyle, there



Fig. 2. Orthopantomogram revealing an intact laterally dislocated left condyle and ipsilateral parasymphysis fracture.

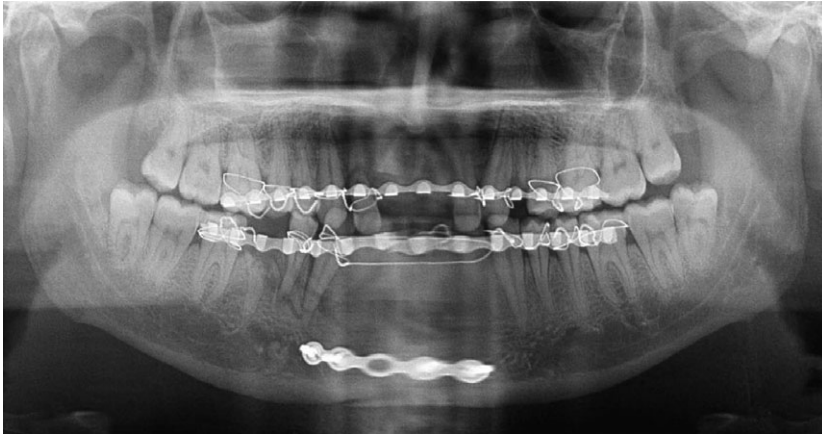


Fig. 4. Post-operative Orthopantomogram.

should always be a history of trauma to the side of the chin and an associated fracture in the symphyseal or body region (usually on the contralateral side) facilitating the rotation and movement of the ramus, which will contribute to the superolateral dislocation of the condyle.

Contrary to this, some reports suggest that superolateral dislocations can take place without any associated mandibular fracture (14, 15, 18, 19). According to Li et al. (14), for such dislocation to occur, the prerequisite factors are multiple multidirectional impacts of force, wide open mouth and flabby joint capsule and pterygoid muscles. Tauro et al. (20) separately categorized complete dislocations associated with fracture of anterior mandible under Type II and complete dislocation without associated fracture of anterior mandible under type III dislocations.

Apart from the usual clinical features of the anterior mandible fracture, if at all present, the patient with a superolateral dislocation of the condyle will present with a bony hard swelling and bulge in the affected temporal and preauricular region causing changes in the facial profile. Dislocation of the TMJ leads to the stretching of the ligaments around the joint and intra-articular effusion, causing painful mandibular movements. The muscle spasms and joint pain make speech and mastication difficult (3, 21).

An anterior open bite and a crossbite with loss of ramus height on the affected side are characteristic features. A slight retrusion of the anterior mandible is evident in cases of superolateral dislocation associated with a fracture in the mandible. The condylar head migrates laterally and superiorly in the temporal space and can often be palpated, but sometimes the palpation may become difficult because of the oedema associated with the injury.

Facial nerve damage may also occur during the lateral displacement of the intact ramus/condyle because the extrapetrosal peripheral segment of the facial nerve lies in close proximity to the ramus (14). Although not very frequently reported in the literature, it is wise to evaluate the condition of the facial nerve and document it before the treatment.

Anterior dislocation of the contralateral condyle occurring in conjunction with the lateral dislocation of

the condyle in question is also reported in some cases (5).

Worthington (22) has linked some diagnostic features to superolateral dislocation: malocclusion persisting after the reduction of jaw fracture, persistence of an open bite, persistent restriction of mandibular movement and an apparent loss of ramus height with elevation of the ramus fragment and facial asymmetry.

The crucial importance of an accurate and prompt diagnosis in the treatment planning of such cases necessitates that CT scans should ideally be performed in such cases to assess the type of dislocation (20).

For all types of acute dislocations, closed reduction with or without anaesthesia is the simplest, least traumatic and safest approach. It should be the preferred and the first attempted method of treatment (23–25). Intra-oral bimanual reduction is the preferred non-surgical method, others being slow elastic traction with splints or IMF, placing a mouth gag in between the occlusal surfaces of molars and opening it wide to open the patient's mouth and then rotating it to pull in the outlocated condyle.

A method involving application of heavy manual traction simultaneous to a downward traction applied with a wire twister engaging a loop of wire that was attached to the molars using an arch bar is described (18).

The repositioning of displaced intact mandibular condyles by application of a percutaneous traction force with a bone hook placed at sigmoid notch (26) and the use of traction with the help of wires placed in holes drilled in the exposed angle region are also reported in literature (10, 16, 27).

It is predicated that classical bimanual intra-oral manual reduction manoeuvre imparts unnecessary pressure to the unaffected side which may cause problems in the healthy TMJ (28) and the thumbs of the physician are at risk of being bitten by the patient which may cause traumatic damage or infection (29). To overcome these drawbacks, a method of placement of mouth props or approximately 3-cm-thick gauze pad in the affected molar region and applying an upward pressure on the chin extra-orally have been proposed (30).

Table 1. Reported cases of type IIB superolateral dislocation

Author and year of publication	Involved Side	Dislocation Condition	Associated mandibular fracture	Treatment performed	Treatment outcome
Brusati and Paini (9)	Left	External dislocation of left condyle that had been thrust up in front of the ear	Midline fracture of the mandible and fracture of left coronoid process	Closed reduction	With facial palsy, not described
Ferguson et al. (10)	Right	Upward and lateral dislocation of the right mandibular condyle	Fracture of the right mandibular body and left condyle	Open reduction	With facial palsy, full jaw motion
To (11)	Left	Lateral displacement of the condyle that was hooked above the zygomatic arch and left facial palsy	Right condyle+ symphysis fracture	After an unsuccessful attempt of manual reduction, left angle was exposed via extra-oral approach and traction force was applied through a hole drilled in angle region.	The facial nerve paralysis had fully resolved 4 months after injury.
Rattan (12)	Right	The right condyle dislocated superolaterally lying above the zygomatic arch in the temporal fossa.	Fracture of symphysis and fracture dislocation of left condyle.	Open reduction via preauricular incision. Post-operative OPG on 54th day revealed a bifid condyle.	Mouth opening 17 mm at 6 months
Hsieh et al. (13).	Right	Medial portion of the right condyle was fractured and lateral fragment was hooked on the zygomatic arch	Left symphyseal fracture of the mandible	Open reduction via preauricular approach. The fractured medial portion of condyle was removed from glenoid fossa. The laterally dislocated portion was levered into the glenoid fossa	At 18 months follow up, the patient's mouth opening was 30 mm and the occlusion was satisfactory
Li et al. (14)	Bilateral	Both the condyles were hooked above and fused to zygomatic arch. The patient reported with deteriorating mouth opening 18 months after interposition arthroplasty with silicone rubber block had been performed on the left TMJ at other centre.	Symphyseal fracture of the mandible	The right TMJ was exposed via an extended preauricular incision. Interposition arthroplasty and bilateral coronoidectomy was performed.	After 9 months of follow up, a 3.5-cm opening was maintained
Hegde et al. (15)	Right	The condylar heads were placed laterally away from glenoid fossa with the right condyle hooked above the zygomatic arch.	Symphyseal fracture	Manual reduction under GA	41 mm mouth opening and 8 mm lateral excursion were achieved with good occlusion
Singh et al. (16)	Left	Left condyle was hooked above the zygomatic arch with coronoid process penetrating into the temporal fossa	Without associated Mandible fracture	Closed reduction	3.6 cm mouth opening and normal mandibular movement
	Left	Left condyle was palpable above the zygomatic arch	Without associated Mandible fracture	After an unsuccessful attempt of manual reduction, Al Khayat-Bramley incision was made and open reduction was performed.	NA
	Bilateral	Both the intact condyles were dislocated laterally and superiorly, crossing the intact zygomatic arches	Left parasymphysis fracture	Right angle of mandible was exposed via small submandibular incision. Traction was applied through a wire held with a wire tightener passed through a hole drilled in angle region. Channel retractor was engaged in the sigmoid notch to pull the condyle downward in the fossa (Finck's technique). Once the right condyle was reduced, the left condyle was manually reduced with the help of a mouth gag	At 6-month follow up, the patient maintained a maximal incisal opening of 34 mm with adequate mandibular function and a satisfactory occlusion

Table 1. Continued

Author and year of publication	Involved Side	Dislocation Condition	Associated mandibular fracture	Treatment performed	Treatment outcome
Shen L et al. (17)	Left	IIB	Symphyseal fracture	Manual reduction of condylar dislocation.	34 mm mouth opening
	Bilateral	IIB	Symphyseal fracture	Mandibular sagittal split ramus osteotomy + manual reduction of condylar dislocation.	33 mm mouth opening
	Left	IIB	Symphyseal fracture + left condylar fracture	Mandibular sagittal split ramus osteotomy + manual reduction of condylar dislocation.	30 mm mouth opening
	Right	IIB	Symphyseal fracture	Manual reduction of condylar dislocation.	Mouth opening achieved was 34 mm
Rahman et al. (18)	Left	IIB	Symphyseal fracture + left condylar fracture	Mandibular sagittal split ramus osteotomy + manual reduction of condylar dislocation	Mouth opening achieved was 38 mm
	Bilateral	IIB	Symphyseal fracture	Mandibular sagittal split ramus osteotomy + manual reduction of condylar dislocation	Mouth opening achieved was 27 mm
	Left	Left condyle was sagittally fractured and the lateral fragment was hooked on the zygomatic arch.	No associated mandibular fracture	Manual reduction and application of downward traction force with a loop of wire attached to the molars using an arch bar with a wire twister.	Mouth opening of around 30 mm was achieved.
Mishra and Mishra (19)	Left	Superolateral dislocation of the intact condyle (type IIB) on the left side	Right condylar fracture and right parasymphysis fracture	Reduction of left condyle was performed under deep sedation by lateral and inferior movement of left ramus.	NA
	Right	Superolateral condylar dislocation of the intact condyle (type IIB) was seen on the right side.	No associated mandibular fractures	Open reduction of the right condyle was performed under GA by preauricular approach.	Occlusion and mouth opening were achieved post-operatively
	Bilateral	Bilateral superolateral dislocation of the mandibular condyles (type IIB) was evident.	Mid-symphyseal fracture	Closed manipulation of the mandible under GA	NA

Closed reduction methods are successful in cases in which early diagnosis of the injury has been made. Studies have shown good results with closed reduction of superolateral dislocation of mandibular condyle (18–20). Delay in the reduction may make closed reduction impossible because of the development of fibrosis within the joint cavities, myospasm, bony union or a combination of these (5, 21).

This case report supports the finding that the techniques of closed reduction may work for type I, IIA, IIIA and possibly IIC and IIIC dislocations; however, type IIB and IIIB may require an open reduction to 'unhook' the condyle from the zygomatic arch (5, 8, 10, 31). In cases with long-standing type II or type III dislocations, general anaesthesia should be preferred for reduction because if the closed reduction attempt fails, open reduction can be attempted simultaneously. In difficult and long-standing cases of superolateral dislocations, open reduction/radical surgery is advocated (3).

The open reduction techniques may vary from direct exposure of condyle and reduction; coronoidectomy performed through posterior vestibular incision followed by attempts to reduce the superolaterally dislocated condyle by placement of a Seldin elevator lateral to ramus and applying a downward and medial pressure (5), utilizing an intra-oral Keens vestibular incision to pass a zygomatic hook to engage the sigmoid notch and exerting a downward and lateral force to reduce the dislocation (17) or performing a mandibular sagittal split ramus osteotomy for condylar reduction through submandibular and preauricular incisions (17).

Condylectomy with or without arthroplasty is indicated in fibro-osseous ankylosis of the joint induced by unsuccessful or imperfect reduction (7). Superolateral dislocation usually occurs along with a midsymphyseal, contralateral parasymphyseal or body fracture of the mandible (9). The case reported here is unusual, because to the best of the authors' knowledge this is the only case when unilateral superolateral dislocation of the condyle occurred along with an ipsilateral parasymphysis fracture except for a case reported by Brusati and Paini (9) where a superolateral dislocation was seen with an ipsilateral body fracture.

Conclusion

Superolateral dislocations of the mandibular condyle are not frequently encountered in clinical practice and demand special attention in diagnosis and treatment planning. It is still debatable that whether an associated mandibular fracture is a prerequisite for such dislocations to occur or not. Early reduction is advisable for this rare condition of superolateral dislocation. The decision of the preferred treatment modality (either closed or open reduction) depends on the time elapsed since injury, the degree and type of dislocation, other associated mandibular fractures and the general condition of the patient. Open reduction should only be undertaken after the closed methods have been exhausted. Closed manual reduction can suffice in cases

with type I, type IIA, IIC, IIIA and type IIIC dislocations, but for type IIB and IIIB cases open reduction may often may be required.

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Conflict of interest

The authors confirm that they have no conflict of interest.

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References

- Nitzan D. Temporomandibular joint "open lock" versus condylar dislocation: signs and symptoms imaging, treatment, and pathogenesis. *J Oral Maxillofac Surg* 2002;60:506–11.
- Baur DA, Jannuzzi JR, Mercan U, Queresby FA. Treatment of long term anterior dislocation of the TMJ. *Int J Oral Maxillofac Surg* 2013;42:1030–3.
- Ugboko VI, Oginni FO, Ajike SO, Olasoji HO, Adebayo ET. A survey of temporomandibular joint dislocation: aetiology, demographics, risk factors and management in 96 Nigerian cases. *Int J Oral Maxillofac Surg* 2005;34:499–502.
- Liddell A, Perez DE. Temporomandibular Joint Dislocation. *Oral Maxillofacial Surg Clin N Am* 2015;27:125–36.
- Papadopoulos H, Edwards RS. Superolateral dislocation of the condyle: report of a rare case. *Int J Oral Maxillofac Surg* 2010;39:508–10.
- Bu SS, Jin SL, Yin L. Superolateral dislocation of the intact mandibular condyle into the temporal fossa: review of the literature and report of a case. *Oral Surg Oral Med Oral Pathol Oral Radiol Endod* 2007;103:185–9.
- Allen FJ, Young AH. Lateral displacement of the intact mandibular condyle: a report of five cases. *Br J Oral Surg* 1969;7:24–30.
- Satoh K, Suzuki H, Matsuzaki S. A type II lateral dislocation of bilateral intact condyle with a proposed new classification. *Plast Reconstr Surg* 1994;93:598–602.
- Brusati R, Paini P. Facial nerve injury secondary to lateral displacement of the mandibular ramus. *Plast Reconstr Surg* 1978;62:728–33.
- Ferguson JW, Stewart IA, Whitley BD. Lateral displacement of the intact mandibular condyle. Review of literature and report of case with associated facial nerve palsy. *J Craniomaxillofac Surg* 1989;17:125–7.
- To EWH. Supero-lateral dislocation of sagittally split bifid mandibular condyle. *Br J Oral Maxillofac Surg* 1989;27:107–13.
- Rattan V. Superolateral dislocation of the mandibular condyle: report of 2 cases and review of the literature. *J Oral Maxillofac Surg* 2002;60:1366–9.
- Hsieh CH, Chen CT, Tsai HH, Lai JP. Lateral dislocation of bilateral intact mandibular condyles with symphysis fracture: a case report. *J Trauma* 2007;62:1518–21.
- Li Z, Li ZB, Shang ZJ, Wu ZX. An unusual type of superolateral dislocation of mandibular condyle: discussion of the causative mechanisms and clinical characteristics. *J Oral Maxillofac Surg* 2009;67:431–5.
- Hegde S, Kamath VV, Deepa M, Priya A. Superolateral dislocation of the mandibular condyle not associated with fracture: a case report. *J Maxillofac Oral Surg* 2010;9:424–7.
- Singh V, Gupta P, Khatana S, Bhagol A. Superolateral dislocation of bilateral intact condyles- an unusual presentation:

- report of a case and review of literature. *Cranio-maxillofac Trauma Reconstr* 2013;6:205–10.
17. Shen L, Li P, Li J, Long J, Tian W, Tang W. Management of superolateral dislocation of the mandibular condyle: a retrospective study of 10 cases. *J Craniomaxillofac Surg* 2014;42:53–8.
 18. Rahman T, Hashmi GS, Ansari MK. Traumatic superolateral dislocation of the mandibular condyle: case report and review. *Br J Oral Maxillofac Surg* 2015. [Epub ahead of print].
 19. Mishra S, Mishra YC. Superolateral dislocation of the mandibular condyle: a series of seven cases. *J Maxillofac Oral Surg* 2015;14:943–8.
 20. Tauro D, Lakshmi S, Mishra M. Superolateral dislocation of the mandibular condyle: report of a case with review of literature and a proposed modification in the classification. *Cranio-maxillofac Trauma Reconstr* 2010;3:119–23.
 21. Chin RS, Gropp H, Beirne OR. Longstanding mandibular dislocation: report of a case. *J Oral Maxillofac Surg* 1988;46:693–6.
 22. Worthington P. Dislocation of the mandibular condyle into the temporal fossa. *J Maxillofac Surg*. 1982;10:24–7.
 23. Amaral MB, Bueno SC, Silva AA, Mesquita RA. Superolateral dislocation of the intact mandibular condyle associated with panfacial fracture: a case report and literature review. *Dent Traumatol* 2011;27:235–40.
 24. Li Z, Ongodia D, Wu ZX, Li ZB. Clinical characteristics and treatment of superolateral dislocation of the mandibular condyle. *Int J Oral Maxillofac Surg* 2013;42:1575–81.
 25. Adekeye EO, Shamia RI, Cove P. Inverted L-shaped ramus osteotomy for prolonged bilateral dislocation of the temporomandibular joint. *Oral Surg Oral Med Oral Pathol* 1976;41:568–77.
 26. Kim BC, Kang Samayoa SR, Kim HJ. Reduction of superior-lateral intact mandibular condyle dislocation with bone traction hook. *J Korean Assoc Oral Maxillofac Surg* 2013;39:238–41.
 27. Kapila BK, Lata J. Superolateral dislocation of an intact mandibular condyle into the temporal fossa: a case report. *J Trauma* 1996;41:351–2.
 28. Cascone P, Ungari C, Paparo F, Marianetti TM, Ramieri V, Fatone M. A new surgical approach for the treatment of chronic recurrent temporomandibular joint dislocation. *J Craniofac Surg* 2008;19:510–2.
 29. Kummoona R. Surgical managements of subluxation and dislocation of the temporomandibular joint: clinical and experimental studies. *J Craniofac Surg* 2010;21:1692–7.
 30. Yeşiloğlu N, Sarici M, Şirinoğlu H, Temiz G, Güvercin E, Filinte GT. The lever technique for the external reduction of temporomandibular joint dislocation. *J Plast Reconstr Aesthet Surg* 2015;68:123–5.
 31. Radhakrishna S, Ramesh B. Rare case of superolateral dislocation of the condyle. *Oral Maxillofac Surg* 2013;17:59–61.