



## Management of superolateral dislocation of the mandibular condyle: A retrospective study of 10 cases



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### ABSTRACT

**Introduction:** Superolateral dislocation of the mandibular condyle (SDMC) is rarely described. The best treatment for superolateral dislocation of the fractured mandibular condyle (SDMC) is debated. This study investigated selection of the timing and techniques used in treating these fractures.

**Patients and methods:** A retrospective clinical study was conducted on clinical data from 10 SDMC patients. Maximum mouth opening and occlusal relationships were compared following treatment using different techniques.

**Results:** The 10 patients were followed for 6–25 months. Patients who had dislocation for less than 1 week had condylar reduction and rigid internal fixation of the fractures.

Mandibular sagittal split ramus osteotomy and articular reduction and fixation were performed in seven cases. Postoperative mouth opening and occlusal relationships were satisfactory in all patients with the exception of one case with mouth opening of only 27 mm.

**Conclusions:** For all patients with superolateral dislocation, our first approach was to reduce the bone stump through surgery. When the dislocated joint had become adherent to the surrounding tissues and ankylosis developed, mandibular sagittal split ramus osteotomy was performed with good results.

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### 1. Introduction

Dislocation of the temporomandibular joint occurs when the temporomandibular joint is subject to large-amplitude movements, or suffers an injury, when the condyle leaves the glenoid fossa due to movement beyond the normal range of the joint (TMJ) (Baldwin, 1993). It accounts for 3% of all dislocations (Shorey and Campbell, 2000). TMJ dislocation is divided into anterior dislocation, posterior dislocation, superior dislocation and lateral dislocation. There have been few reports of lateral dislocation.

Allen and Young (1969) reported five cases of patients with anterolateral TMJ dislocation, which they divided into type I (subluxation, the condyle moves outward, partly leaving the glenoid fossa) and type II (complete dislocation). Satoh et al. (1994) divided type II (complete) dislocation into three subsets. In type IIA dislocation, the condyle is

dislocated superolaterally and leaves the glenoid fossa, but does not move beyond the zygomatic arch. In type IIB, the condylar dislocation overlaps the zygomatic arch. In type IIC, the dislocated condyle is displaced into the fractured end of the zygomatic arch.

In our retrospective analysis, 23 cases of superolateral dislocation of the mandibular condyle (SDMC) (Table 1) were collected from the literature from 1969 to 2011. The treatment methods were divided into closed reduction and open reduction techniques such as arthroplasty and arthrectomy. Although the data were incomplete, the incidence of ankylosis was (2/23, 8.7%), dysocclusion was (2/23, 8.7%) and facial nerve injury (2/23, 8.7%) which we considered high. The approach to treatment of SDMC based on the type and duration of dislocation has not been previously investigated. Our study reviewed 10 of our patients with SDMC who were seen in our hospital in the previous 5 years. We investigated the reasons for dislocation and the significance of the method and timing of treatment.

### 2. Methods

#### 2.1. Patients

From 2006 to June 2011, 10 patients with SDMC caused by condylar fracture received treatment in the Esthetic Surgery

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**Table 1**  
Reported cases of superolateral dislocation of intact mandibular condyle (from 1969 to 2011).

Years	Authors	Type	Unilateral or bilateral	Time to reduction (days)	Treatment method and reduction result	Result after treatment
1969	Allen and Young	I	U	8	Partial (C)	Fibro-osseous ankylosis
		II	U	15	Partial (C)	Malocclusion
		I	B	1	Complete (C)	Malocclusion
		I	U	1	Complete (C)	Full range of jaw movement
1978	Brusati and Paini	II	U	1	Complete (O)	Not available
		II	U	1	Complete (C)	With facial palsy, not detailed
		II	U	12	Complete (O)	With facial palsy and full jaw function
		Unusual	U	14	Partial (O)	Fibro-osseous ankylosis
1982	Worthington	II	B	NA	Complete (O)	Not available
		II	B	NA	Complete (O)	Not available
1988	Devita et al.	II	B	NA	Complete (O)	Not available
1989	Ferguson et al.	II	U	1	Complete (O)	Condylectomy, arthroplasty using costal cartilage, 30 mm mouth opening
1989	To	II	U	14	Complete (O)	Bifid condyle, reduced mouth opening
1994	Satoh et al.	II	B	13	Partial (O)	Condylectomy, 30 mm mouth opening
1996	Kapila and Lata	II	U	7	Complete (O)	30 mm mouth opening
1998	Hoard et al.	II	B	NA	Complete (C)	Not available
2000	Yoshii et al.	II	B	16	Complete (C)	20 mm mouth opening
2002	Rattan	II	U	14	Complete (O)	30 mm mouth opening
		II	B	NA	Not reduced	Interpositional gap arthroplasty
2007	Hsieh et al.	II	B	1	Complete (C)	41 mm mouth opening
2007	Bu et al.	II	U	5	Complete (C)	37 mm mouth opening
2010	Papadopoulos et al.	II	B	NA	Complete (O)	32 mm mouth opening
2010	Lloyd and Sivarajasingam	II	U	7	Complete (O)	30 mm mouth opening
2011	Prabhakar et al.	II	B	45	Complete (O)	33 mm mouth opening
2011	Amaral and Bueno	II	U	NA	Complete (O)	30 mm mouth opening

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

Department of Sichuan University. Their hospital data (including medical records and preoperative and postoperative imaging findings) were complete. Patients with a superolateral dislocation not caused by fracture were excluded from the study, as were patients who were followed-up for less than 6 months. Basic preoperative information is shown in Table 2. No patients had had previous surgery. All procedures were performed or supervised by consultants.

The patients were 10 males, with a mean age of 34.2 years (range, 16–58 years). Four cases (40%) were IIA dislocation and six cases (60%) were IIB dislocation. Six patients had unilateral dislocation (60%) and four had bilateral dislocation (40%). Six cases (60%) were accompanied by mandibular symphysis fracture, three cases (30%) had condyle dislocation and fracture and one (10%) had a mandibular angle fracture. The most common cause of SDMC was motor vehicle accidents (nine cases, 90%), followed by a fall (one case, 10%).

Clinical examinations included maximum mouth opening (MMO) and occlusal relationships. Imaging included panoramic radiography, cone beam computed tomography (CBCT), and three-dimensional CT. The above examinations were used to evaluate the effectiveness of surgery.

We obtained written informed consent from all patients and approval for all protocols from the Ethics Committee of Sichuan University. The study was approved by our institutional review and ethics board.

**Table 2**  
Preoperative patient information.

Patient	Gender, age (years)	Location	Etiology	MMO (mm)	Type	Mandible condition
1	M, 40	Left	Traffic accident	10	IIB	Symphyseal fracture
2	M, 20	Bilateral	Traffic accident	5	IIB	Symphyseal fracture
3	M, 44	Left	Traffic accident	13	IIB	Symphyseal fracture and left condyle fracture
4	M, 32	Right	Traffic accident	19	IIA	Symphyseal fracture
5	M, 20	Right	Traffic accident	16	IIA	Right mandibular angle fractures
6	M, 16	Bilateral	Traffic accident	13	IIA	Symphyseal fracture and condyle fractures
7	M, 58	Right	Falls	3	IIB	Symphyseal fracture
8	M, 27	Left	Traffic accident	7	IIA	Symphyseal fracture
9	M, 46	Left	Traffic accident	17	IIB	Symphyseal fracture and left condyle fracture
10*	M, 39	Bilateral	Traffic accident	7	IIB	Symphyseal fracture

MMO, maximum mouth opening.

## 2.2. Treatment methods

Two surgical methods were used in these patients. Seven underwent mandibular sagittal split ramus osteotomy and condylar reduction. The mandibular ramus and TMJ area were exposed through submandibular and preauricular incisions, and scar tissues adhering to the joint area and condyle were released. The mandibular ramus was then split with a reciprocating saw from the inferior margin of the mandible to the mandibular notch, and the dislocated condyle was reduced to the glenoid fossa. In addition, the displaced articular disc was reduced and fixed, and a mini-titanium plate was used to fix the split mandibular ramus. In the remaining patients, the condylar dislocation was reduced manually. In those with mandibular symphysis or mandibular angle fracture, reduction and internal fixation were performed, and a 2.4 reconstruction plate combined with a 2.0 mini-plate (Martin, Germany) was used to fix the broken segment (Biglioli and Colletti, 2008).

## 3. Results

The minimum follow-up period was 6 months, with a mean of 15.8 months (range, 6–25 months). Postoperative basic information is shown in Table 3. Three patients (30%) underwent surgical reduction less than 7 days after dislocation. In the other seven cases (70%), surgery was performed more than 7 days after the injury; the

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