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Case Series

Dentistry Section

# Facial Nerve Weakness following Retromandibular Transparotid Approach for Subcondylar Fractures of Mandible- A Series of Five Cases

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## ABSTRACT

Mandibular condyle fractures are the most commonly reported mandible fractures. The incidence of condylar fractures is 25-30% among all mandibular fractures and there are ongoing controversies about their management. The retromandibular transparotid technique is the most frequently employed technique to manage fracture of mandibular condyle. The benefits of this method have been reported to include a shorter working distance between the incision and the fracture site, less morbidity to the facial nerve as it can be identified and retracted under direct vision, cosmetically pleasing outcomes and ease of reduction/fixation of fractures. Nevertheless, surgical treatment of mandibular condyle fractures, can pose danger to facial nerve branches. With respect to condylar fracture surgical treatment, the prevalence of Facial Nerve (FN) injury has been reported to be around 12-48%. This case series reports the surgical and postoperative journey of five patients with subcondylar fracture. The retromandibular transparotid technique was applied in all patients for Open Reduction Internal Fixation (ORIF). Using the House-Brackman facial grading system, FN weakness was assessed. Postoperatively, FN weakness was evident after 24 hours of surgery in two patients. With a mean recovery period of two months, all patients maintained FN function at three months. None presented with persistent paralysis of the facial nerve. Parotid fistulation was not observed in any patient. Inconspicuous scar after six months was observed in four patients. The retromandibular transparotid approach is a safe and effective technique that gives less morbidity to the facial nerve, excellent access, good cosmetic results and patient satisfaction.


**Keywords:** Condyle fracture, Fracture fixation, Injury, Mandibular condyle, Parotid fistula

## INTRODUCTION

Condylar fractures are associated with 25-30% of all mandibular fractures, but their treatment remains controversial [1]. The key point of contention is between conservative and surgical care choices. Treating condylar fractures requires consideration of various factors because of the anatomical and functional complexity of the mandibular region [2]. Conservative management with maxillo-mandibular fixation may involve decreased mouth opening, pain, mandibular asymmetry, malocclusion, ankylosis and restricted masticatory function [3]. Surgical management challenges the risk of infection, unsightly scar, haemorrhage and possible damage to the FN branches. An ideal surgical approach to open reduction and fixation should include minor complications. Various surgical techniques have been reported for the open reduction of condylar fractures i.e, intraoral and extraoral. Retromandibular, preauricular, rhytidectomy and submandibular are amongst them [4,5].

The present case series included five patients with subcondylar fractures who reported to the Department of Oral and Maxillofacial Surgery, Government Dental College and Hospital, Chennai, Tamil Nadu, India. They were prospectively evaluated from February 2016 to October 2016 to primarily analyse weakness following retromandibular transparotid technique after ORIF.

Detailed case history, clinical examination, blood biochemistry, and preoperative and postoperative Orthopantomagram (OPG), radiographic (at six months) were included in the study protocol. All were treated by using retromandibular transparotid approach. Parameters like occlusal discrepancy, mouth opening, parotid fistulation, accessibility to the fracture site, wound infection and aesthetic outcome of the surgical site were also assayed.

## CASE SERIES

### Case 1

A 24-year-old male, reported with history of restricted mouth opening after a fall. On clinical examination, FN function was intact, mild deranged occlusion, deviation of mouth opening towards left side and a mouth opening of 24 mm was noted. Orthopantomogram showed left subcondylar fracture. No other clinical or radiographic evidence of fracture was noted.

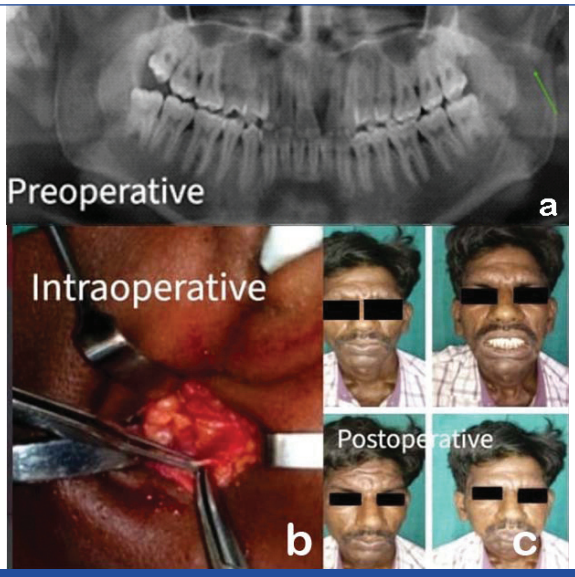
The case was surgically treated under general anaesthesia with endotracheal intubation. Adrenaline and saline injection were administered at the prepared surgical site to establish local haemostasis and plane of dissection. The parotid capsule was exposed following a 3-3.5 cm skin incision in the retromandibular area upto the platysma muscle using a Bard-Parker blade (number 15). Blunt dissection was performed inside the parotid gland material parallel to the FN branches.

After dissecting through the parotid gland, the pterygomasseteric sling was incised, exposing the fracture site. The fracture was anatomically reduced and fixed using 2×8 mm screws and a single 2×4 hole titanium miniplate.

The wound was closed in layers using 3-0 vicryl and 3-0 ethilon, with caution exercised to avoid parotid fistulation. Patient was reversed from general anaesthesia and extubated. Postoperatively the patients were managed with analgesics and antibiotics. Follow-up was carried out at 24 hours postoperative and at one week, one month, three months and six months.

Postoperatively the patient's mouth opening improved to 30 mm after one week. The patient developed weakness in the buccal branch of the FN immediately after the surgery which reverted to normal in

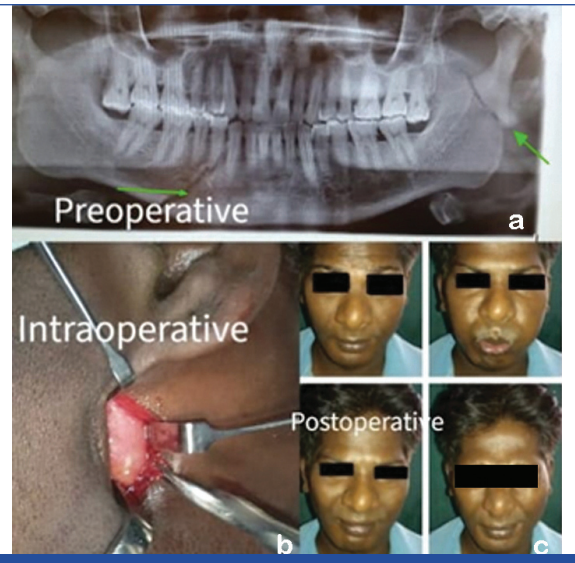
one month. [Table/Fig-1] shows the preoperative OPG, intraoperative and postoperative images for FN examination of the patient.




**[Table/Fig-1]:** Case 1: a) Preoperative Orthopantomogram showing left subcondylar fracture; b) Intraoperative: Buccal branch of FN identified during dissection; c) Clinical examination of the facial nerve.

## Case 2

A 33-year-old male reported to the Department of Oral and Maxillofacial Surgery following a road traffic accident. A mouth opening of 30 mm, moderately deranged occlusion, deviation of the mouth towards left side during mouth opening and an intact FN function were observed. Clinicoradiographic diagnosis of left subcondylar fracture and fracture right body of mandible was arrived at. Internal fixation was done using single 2×4 hole titanium miniplate and 2×8 mm screws. Postoperatively the mouth opening improved to 41 mm in a week's duration. Also, at one week postoperatively, the patient had mild occlusal discrepancy which was corrected by using intermaxillary elastics. No preoperative or postoperative FN dysfunction was noted. [Table/Fig-2] shows the preoperative OPG, intraoperative surgical image, and postoperative images for FN examination of the patient.




**[Table/Fig-2]:** Case 2: a) Preoperative OPG showing left subcondylar fracture and fracture right body of mandible; b) Intraoperative :Exposure of Parotid capsule; c) Clinical examination of the facial nerve.

## Case 3

A 21-year-old male who was an assault victim reported with a history of limited mouth opening. On clinical examination a moderately deranged occlusion with left side mouth deviation and a mouth opening of 29 mm was noted. There was no preoperative FN dysfunction. Pantomography revealed a fractured left subcondyle and left mandibular parasymphysis. Internal fixation was done using single 2×4 hole titanium miniplate and 2×8 mm screws. At 1 week postoperatively an improved mouth opening of 42 mm was noted. Postoperative FN function was intact. [Table/Fig-3] shows the preoperative OPG, intraoperative surgical image, and postoperative images for FN examination of the patient.


**[Table/Fig-3]:** Case 3: a) Preoperative panoramic image showing left subcondylar and parasymphsis fracture; b) Intraoperative: Fracture exposed; c) Clinical examination of the facial nerve.

## Case 4

A 20-year-old male reported for oral and maxillofacial evaluation after an incident of fall. Deviation of the mouth to left side on mouth opening, with moderate occlusal derangement, mouth opening of 36 mm and normal preoperative FN function was observed during clinical examination. On basis of clinical and radiological examination a diagnosis of fracture of left subcondyle of mandible was arrived. Internal fixation was done using single 2×4 hole titanium miniplate and 2×8 mm screws. An increased mouth opening of 44 mm was noted one week after surgery. No postoperative dysfunction of facial nerve. [Table/Fig-4] shows the preoperative OPG, intraoperative surgical image, and postoperative images for FN examination of the patient.


**[Table/Fig-4]:** Case 4: a) Preoperative panoramic image showing fracture of left subcondyle of mandible; b) Intraoperative: Retromandibular incision for condylar fracture; c) Clinical examination of the facial nerve.

## Case 5

A 32-year-old male patient was diagnosed with bilateral subcondyle and mandibular symphysis fracture due to road traffic accident. The

clinical examination had revealed severe occlusal discrepancy with anterior open bite and posterior gagging, an normally functioning FN and restricted mouth opening of 23 mm. Internal fixation was done using single 2×4 hole titanium miniplate and 2×8 mm screws. The mouth opening was 36 mm one week after the surgery. The patient also experienced slight occlusal discrepancy one week after surgery, which was addressed with intermaxillary elastics. The patient developed weakness in both buccal and marginal mandibular branch of the FN immediately after the surgery. The neurological recovery was noted in the third month after surgery. [Table/Fig-5] shows the preoperative OPG, intraoperative surgical image, and postoperative images for FN examination of the patient.


**[Table/Fig-5]:** Case 5: a) Preoperative panoramic image showing bilateral subcondyle and mandibular symphysis fracture; b) Intraoperative: Branches of FN in the substance of parotid gland; c) Clinical examination of the facial nerve.

### Branches of FN in the Substance of Parotid Gland

All the patients in this study were male in the age range with 20-35 years (mean age was 26.6 years). The time span between the trauma and surgery was, on average, seven days (5-14 days). The FN was retracted along with the gland and preserved if encountered. During surgery, in only two patients, FN was encountered.

**Facial nerve weakness:** House-Brackman facial grading system was employed to clinically analyse postoperative FN weakness [6]. In two of the patients, FN weakness was observed straightaway. FN recovered at one month in one patient. By the third month follow-up, no permanent FN weakness was observed in any of the patients and complete neural functionality was witnessed. The patient who had marginal mandibular nerve weakness recovered late. Patient with buccal branch weakness recovered early. This may be due to less anastomosis. The time taken for reduction and fixation of severe medially displaced fracture is more. The more retraction of soft tissue is also needed for these patients. The probable cause of FN weakness may be due to above mentioned reason. The mean period of recovery of FN function was two months. There was no statistically significant difference in FN function before and after surgery (p-value=0.195) [Table/Fig-6].

**Mouth opening:** Mouth opening showed a gradual increase from a preoperative average of 26.20 mm to 25-40 mm in two patients and more than 40 mm in three patients during the first week follow-up. An average of 45.20 mm of mouth opening was observed during one month follow-up. The increase in mouth opening after surgical treatment of subcondylar fracture is statistically significant with p-value of 0.006 [Table/Fig-6].

**Occlusal discrepancy:** Normal occlusion was achieved in all patients during the one month follow-up. With a p-value of 0.009, there is a statistically significant difference between preoperative and postoperative occlusion [Table/Fig-6].

**Parotid fistulation:** Throughout the research, there was no parotid fistulation in any of the patients.

**Scar assessment:** All the patients exhibited a conspicuous surgical scar at the one week postoperative period, which became inconspicuous in two patients during the first month follow-up and four patients at the six months follow-up. None of the patients presented with a hypertrophic scar. Over a six months period, the scar's visibility decreased, which was statistically significant (p-value=0.032) [Table/Fig-6].

## DISCUSSION

Commonly, condylar fractures account for one-third of all mandibular fractures. Most of them result from blunt trauma to the mandible, resulting from road traffic accident, sports injury, or physical assault [7]. Recent research has demonstrated that open reduction and internal fixation of condylar fractures give superior results to closed treatment methods [8,9]. The main disadvantage of open surgical reduction is FN damage. The incidence of FNP by open reduction method is 12-48%, according to studies [10,11]. In the present case series, transient Facial Nerve Paralysis (FNP) was observed in 40% of the cases at 24 hours postoperatively. The reason for FNP is that the access to the fracture site is between the seventh nerve branches in the parotid gland, and retraction of the seventh nerve can result in transient neuropraxia and palsy. No permanent FN damage has been documented so far in previous studies by retromandibular approach and neither in the present case series.

An incidence rate in men was 66%, with that of women was 34% reported by Marker P et al., [12]. Previous research has found that the highest incidence of condylar fractures were between the age group 20 and 30 years. Marker P et al., in his study of 348 patients, stated that the main cause of condylar fractures is road traffic accidents (45.1%), falls (24.7%) and physical violence (21.8%) [12].

Achieving temporomandibular joint stability, mandibular continuity, pain free movement, mouth opening beyond 40 mm and normal (physiologic) function of the Temporomandibular Joint (TMJ), including undisturbed masticatory function are the main treatment goals condylar fractures [13]. These goals were achieved by the retromandibular transparotid approach as confirmed by this study and in the literature. The area of dissection in the transparotid approach is the window between the marginal mandibular and

| | Occlusal status (discrepancy) | | | | Mouth opening (mm) | | | Facial nerve | | Scar | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Time period | Severe | Moderate | Mild | Nil | > 25 | 25-40 | >40 | Normal function | Mild dysfunction | Inconspicuous | Conspicuous |
| Preoperatively | 20% | 60% | 20% | 0 | 40% | 60% | 0 | 100% | 0 | NA | NA |
| 1 week | 0 | 0 | 40% | 60% | 0 | 40% | 60% | 60% | 40% | 0 | 100% |
| 1 month | 0 | 0 | 0 | 100% | 0 | 0% | 100% | 80% | 20% | 40% | 60% |
| 3 month | 0 | 0 | 0 | 100% | 0 | 0% | 100% | 100% | 0 | 80% | 20% |
| 6 month | 0 | 0 | 0 | 100% | 0 | 0% | 100% | 100% | 0 | 80% | 20% |
| p-value | 0.009* | | | | 0.006* | | | 0.195 | | 0.032* | |

**[Table/Fig-6]:** Assessment of occlusal status, mouth opening, facial nerve and scar.
Pearson Chi-square test *p-value <0.05 statistically significant

buccal branches. This procedure observed less morbidity to the facial nerve, which can be seen and retracted under direct vision [14]. The other benefits are the short working distance from the incision to the fracture site, an excellent posterior border of the ramus, and exposure to the subcondylar region.

In two patients (40%), FN was observed in the present case series, which is comparable with the results of Manisali M et al., who observed 30% of cases with facial nerve [15]. In addition, 22% of FN palsy was reported by Vesnaver A et al., in 2005 and Yang L and Patil PM, reported 18% of FN palsy in 2012 in their studies [4,16]. Furthermore, transient FN paralysis (40%) was shown by two patients in the present case series, which is comparable to the study result of Bhutia O et al., who observed a 12-48% transient FN paralysis in his study [14].

The buccal branch was most commonly affected in the current case series, comparable with Downie JJ et al., study results [17]. The buccal and zygomatic branches of the FN have much more frequent interconnections (70%) than between the marginal mandibular and the other facial branches (15%) [18]. This increases the greater risk of developing temporary or permanent palsy at the marginal mandibular nerve branch. An excellent approach to the fracture site, with the acceptable occurrence of transient FN paralysis, can be achieved with the retromandibular transparotid approach and provides good cosmetic results. Furthermore, the risk factors for facial nerves are more soft tissue retraction and medially displaced fracture. Therefore, the incidence of FN injury can be further reduced by gentle manipulation of soft tissue and gentle retraction of soft tissue.

## CONCLUSION(S)

The retromandibular transparotid technique is a safe and effective technique for the open reduction of subcondylar fractures. This approach has minimal complications, less morbidity to the facial nerve, excellent access, provides good cosmetic results and patient satisfaction. So, retromandibular transparotid approach can be recommended for ORIF of subcondylar fractures.

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