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Retromandibular and trans-parotid trans-masseteric surgical approaches to extracapsular mandibular condylar neck and subcondylar fractures: a retrospective descriptive case series

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Abstract

Background

Extracapsular fractures of the mandibular condylar neck and subcondylar region are frequent maxillofacial injuries. Their management remains debated because closed treatment avoids extraoral surgical morbidity, whereas open reduction and internal fixation may improve anatomical reduction and occlusal stability in selected displaced fractures.

Methods

This retrospective descriptive case series included surgically treated extracapsular mandibular condylar process fractures managed at a single maxillofacial unit. Eligible fractures were condylar neck or subcondylar fractures treated with retromandibular, trans-parotid trans-masseteric, or combined surgical access. Preoperative assessment included clinical examination, cone-beam computed tomography or computed tomography, and three-dimensional reconstruction. Postoperative assessment included clinical monitoring and postoperative imaging. Only descriptive statistics were used; no comparative or inferential analysis was performed.

Results

This series comprised 73 mandibular condylar process fractures, including 25 condylar neck fractures and 48 subcondylar fractures. The mean age was reported as 35 years. A retromandibular approach was used for condylar neck fractures. Reported adverse events included 3 temporary lower facial nerve branch weaknesses, 2 rhomboid plate fractures approximately 1 month after surgery, and 1 screw fixation failure after 40 days. No persistent facial expression deficit or occlusal sequelae were reported in the available text.

Conclusion

This retrospective descriptive case series documents the authors' operative experience with retromandibular and related approaches to extracapsular condylar fractures.

Keywords: mandibular condylar fracture; subcondylar fracture; condylar neck fracture; retromandibular approach; open reduction internal fixation; case series.

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Introduction

Fractures of the mandibular condyle and subcondylar region represent a substantial proportion of mandibular fractures and are a recurrent source of debate in maxillofacial traumatology [1,2]. Inadequate reduction or inappropriate functional management may result in malocclusion, impaired mouth opening, limitation of lateral mandibular movements, and facial asymmetry [1,3-5].

The treatment strategy depends on fracture location, degree and direction of displacement, occlusal stability, functional limitation, patient age, dentition, associated mandibular or midface fractures, and surgeon experience [1,3-5]. Conservative treatment, generally based on short-term intermaxillary fixation followed by physiotherapy, may provide satisfactory outcomes in selected nondisplaced or nondislocated fractures, whereas open reduction and internal fixation has been advocated for displaced extracapsular fractures when anatomical reduction and stable occlusion cannot be predictably achieved by closed treatment alone [3-5].

Several surgical approaches have been described for extracapsular condylar neck and subcondylar fractures [3,4,6-10]. Intraoral access avoids visible scarring and reduces the risk of direct facial nerve injury, but exposure and plate positioning may be technically demanding, particularly for high subcondylar and condylar neck fractures [8,9]. Extraoral approaches, including preauricular, retromandibular, submandibular, and trans-parotid trans-masseteric routes, provide more direct exposure but may be associated with facial nerve traction injury, salivary complications, and visible scarring [3,4,6,7,10].

The original version of this manuscript was mainly narrative. In response to peer review, the present version is structured as a retrospective descriptive case series. The aim is to describe the authors' surgical experience with retromandibular and trans-parotid trans-masseteric access for extracapsular mandibular condylar neck and subcondylar fractures, report the available perioperative and postoperative findings, and present representative clinical and radiographic documentation.

Materials and Methods

Study design and reporting framework

This is a retrospective descriptive surgical case series. It is not a single case report and not a comparative clinical study. The manuscript is structured according to the logic of surgical case-series reporting, including the PROCESS reporting recommendations [11].

Setting and participants

The series includes surgically treated extracapsular mandibular condylar process fractures managed at the U.O.C. Otorinolaringoiatria e Chirurgia Maxillo Facciale, Ospedale "Franz Tappeiner", Merano - Azienda Ospedaliera dell'Alto Adige. The available dataset reports 73 mandibular condylar process fractures, comprising 25 condylar neck fractures and 48 subcondylar fractures. Because the source material uses fracture-level terminology, the denominator is reported as fractures rather than patients.

The case series is therefore limited to the surgically treated extracapsular condylar neck and subcondylar fractures documented in the available material. Intracapsular fractures and conservatively treated fractures are not presented as part of the surgical series.

Preoperative assessment

All patients underwent clinical assessment of occlusion, mandibular mobility, and facial nerve function, followed by imaging. The diagnostic protocol included preoperative cone-beam computed tomography or computed tomography of the head and neck, three-dimensional reconstruction, and postoperative cone-beam computed tomography or computed tomography to assess reduction and fixation. This diagnostic and postoperative imaging strategy is consistent with published descriptions of surgically managed condylar and subcondylar fractures [3,4,8,9].

Surgical indications

According to the authors' stated clinical criteria, surgical treatment was preferred for extracapsular condylar neck and subcondylar fractures when the fractured stumps were misaligned and when stable occlusion could not be achieved or maintained with conservative treatment alone. The aim of surgery was anatomical reduction, restoration of occlusion, and early functional recovery. These indications are consistent with reports advocating open reduction and internal fixation for displaced or functionally unstable extracapsular condylar fractures [3-5,9].

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Surgical technique

Retromandibular approach

The retromandibular approach was used for condylar neck fractures and was considered the shortest route to the condylar neck, in line with previous descriptions of retromandibular and mini-retromandibular access [3,4,6,10]. After review of preoperative imaging and clinical localization of the fracture, the fracture site was marked on the skin. The skin incision was placed approximately one finger's breadth behind the posterior border of the mandible. A skin flap was elevated, followed by blunt dissection toward the condylar neck and fracture line.

Depending on local anatomy, access to the fracture was obtained by gently mobilizing the tail of the parotid gland and retracting the masseter muscle. Care was taken to identify, protect, and avoid traction injury to the lower branches of the facial nerve. Once the fracture was exposed, the periosteum was incised and elevated sufficiently to allow identification, reduction, and fixation of the fracture.

Trans-parotid trans-masseteric approach

For subcondylar fractures, the operative section reports use of a trans-parotid trans-masseteric route in 39 fractures. After marking the fracture site, the skin incision was performed and dissection proceeded carefully and bluntly toward the fracture. The parotid fascia was identified as a fibrous layer and incised or opened by blunt dissection. Because branches of the facial nerve may cross the operative field, meticulous dissection and gentle retraction were used during exposure and plate insertion. Similar extraoral approaches have been described for subcondylar and condylar process fractures [4,6,7,10].

Reduction and fixation

Reduction may be difficult when the fracture is older than 2 weeks, because muscle shortening, early fibrosis, and bleeding may limit manipulation and visualization. The authors caution against forceful levering within the fracture line. Mandibular manipulation using a molar-region retractor may facilitate reduction when posterior teeth are present. In difficult cases, release of the temporalis tendon from the coronoid process or downward traction on the mandibular fragment may assist reduction; this rationale is consistent with the combined intraoral and retromandibular approach previously described for subcondylar mandibular fractures [9].

Rigid internal fixation was performed using rhomboid plates or 2 single plates depending on fracture configuration and anatomical feasibility, as described in published open-reduction techniques for condylar and subcondylar fractures [3,4,9]. Custom-made plates were considered ideal in selected situations, but their routine use may be limited by cost and production time. The procedure was completed with layered closure and drain placement.

Postoperative assessment and outcomes

Postoperative monitoring focused on occlusion, facial nerve function, wound or salivary complications, plate or screw failure, and postoperative radiographic reduction. Postoperative orthopantomography and/or three-dimensional cone-beam computed tomography were used to assess reduction and plate position. The source material does not report a standardized follow-up schedule or final follow-up duration.

Statistical analysis

Because the manuscript reports an uncontrolled case series, analysis was descriptive. Categorical variables are presented as counts and percentages when the denominator is available. No hypothesis testing, comparative analysis, or regression model was performed.

Results

Case-series characteristics

The case series comprised 73 mandibular condylar process fractures. Twenty-five fractures were described as condylar neck fractures (34.2%) and 48 as subcondylar fractures (65.8%). The reported mean age was 35 years. Sex distribution was reported as 48 men and 25 women; the male-to-female ratio calculated from these counts is 1.92:1 (Table 1). The alternative notation "M/F = 33/15 = 2.2" present in the original text was not used because it conflicts with the stated denominator.

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Table 1. Available demographic and fracture data from the source manuscript.

Variable	Available data	Reporting status in the present rewrite
Study design	Retrospective descriptive case series	Presented as a descriptive surgical case series, not as a case report or comparative clinical study.
Total denominator	73 mandibular condylar process fractures	Reported as fractures because the original manuscript uses fracture-level terminology.
Age	Mean age: 35 years	Age range and dispersion measures were not reported in the source material.
Sex	48 men and 25 women	Male-to-female ratio calculated from these counts: 1.92:1.
Fracture location	25 condylar neck fractures; 48 subcondylar fractures	Surgical access is explicitly described for 25 condylar neck fractures and 39 subcondylar fractures in the operative text.
Preoperative imaging	CBCT/CT with three-dimensional reconstruction	Reported as part of the diagnostic protocol.
Postoperative imaging	CBCT/CT and/or orthopantomography	Used to evaluate reduction and fixation position.
Follow-up	Not reported in the source material	Reported as a study limitation.

Surgical approaches and fixation

The retromandibular approach was used for condylar neck fractures. The trans-parotid trans-masseteric approach was used for subcondylar fractures according to the available text. In selected difficult reductions, the authors report the use of a combined intraoral and retromandibular strategy to release muscular traction and improve exposure and reduction (Table 2).

Table 2. Surgical approach and fixation details available from the source manuscript.

Surgical item	Reported data	Interpretation in the present rewrite
Retromandibular approach	25 condylar neck fractures	Consistent with the reported number of condylar neck fractures.
Trans-parotid trans-masseteric approach	39 subcondylar fractures reported in operative section	The complete sample includes 48 subcondylar fractures; the available text explicitly documents this approach for 39 of them.
Combined intraoral + retromandibular approach	Used in selected difficult reductions	Presented qualitatively because the source material does not report the number of combined-approach cases.
Fixation	Rhomboid plate or 2 single plates	Plate choice depended on fracture configuration and anatomical feasibility.
Drain	Placed at closure	No drain-related complication was reported in the source material.
Physiotherapy / intermaxillary fixation	Not systematically reported	Reported as a limitation of the available postoperative protocol description.

Complications and postoperative outcomes

Postoperative information was available descriptively. Using the total reported denominator of 73 fractures, temporary lower facial nerve branch weakness occurred in 3/73 fractures (4.1%), rhomboid plate breakage in 2/73 fractures (2.7%), and screw fixation failure in 1/73 fracture (1.4%). One of the 2 broken plates was removed. No persistent facial expression or occlusal sequelae were reported in the source material (Table 3).

Table 3. Reported postoperative events and outcomes.

Outcome/event	Reported n	Descriptive percentage*	Notes
Temporary weakness of lower facial nerve branch / orbicularis oris branch	3	4.1%	Reported as temporary; duration to recovery was not provided.
Rhomboid plate breakage approximately 1 month after surgery	2	2.7%	One plate was removed.
Failure of osteointegration/fixation of a screw on condylar head fragment after 40 days	1	1.4%	Reported hardware-related event.
Persistent facial expression sequelae	0 reported	0.0%	No persistent facial-expression sequelae were reported.

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Outcome/event	Reported n	Descriptive percentage*	Notes
Persistent occlusal sequelae	0 reported	0.0%	No persistent occlusal sequelae were reported.
Salivary fistula	Not reported as an observed event	Not calculable	The source text notes that this complication was not a common problem.
Infection, hematoma, Frey syndrome, scar dissatisfaction	Not reported	Not calculable	These outcomes were not described in the source material.
Percentages are calculated using the total reported denominator of 73 fractures.			

Representative clinical case documented in the source material

The available figures document one representative patient with a right condylar fracture with medial dislocation. Preoperative CBCT and three-dimensional reconstructions demonstrate the displaced condylar fracture (Figs. 1-2). The patient underwent open reduction and internal fixation through the described surgical approach. Postoperative orthopantomography and three-dimensional CBCT show reduction of the fracture and positioning of the fixation plate (Figs. 3-4). Postoperative facial mimicry images document eye closure, smiling, and perioral movement (Fig. 5); no persistent facial palsy was reported in the original manuscript.

This representative case converts the previous narrative description into a documented clinical example. The source file contains imaging and clinical photographs for 1 complete representative case; no additional illustrated cases were available in the material supplied for this rewrite (Table 4).

Table 4. Representative cases to be included in the revised case-series format.

Case	Clinical/radiographic description	Images available in current file	Available clinical information
Case 1	Right condylar fracture with medial dislocation; postoperative imaging shows reduction and fixation; postoperative facial mimicry documented.	Preoperative CBCT, preoperative 3D CBCT, postoperative OPG, postoperative 3D CBCT, facial mimicry photographs.	Age, sex, trauma mechanism, exact fracture classification, fixation type, follow-up duration, and objective mouth-opening/occlusion measurements were not reported in the supplied material.

Figures

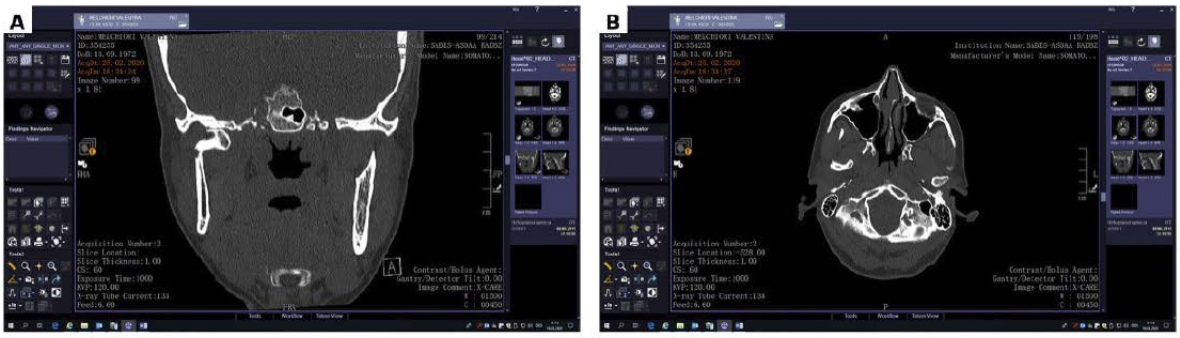

Figure 1. Preoperative cone-beam computed tomography (CBCT) of the right condylar fracture with medial dislocation. A, coronal view. B, axial view.

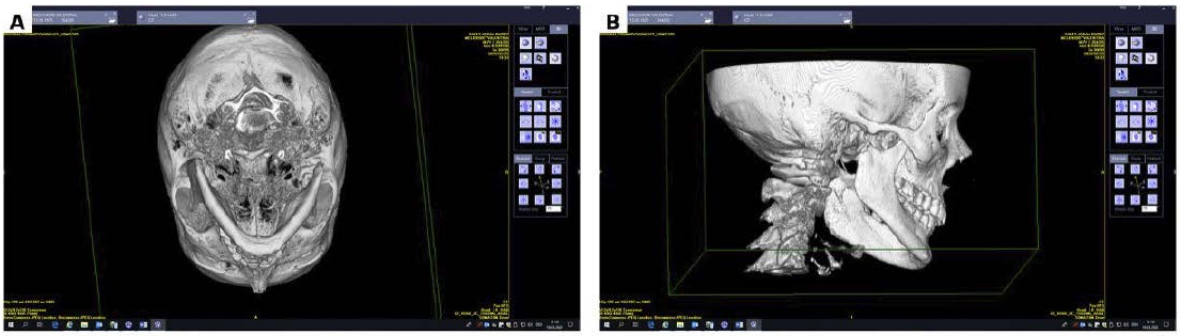

Figure 2. Preoperative three-dimensional CBCT reconstructions of the right condylar fracture with medial dislocation. A, inferior/axial view. B, lateral view.

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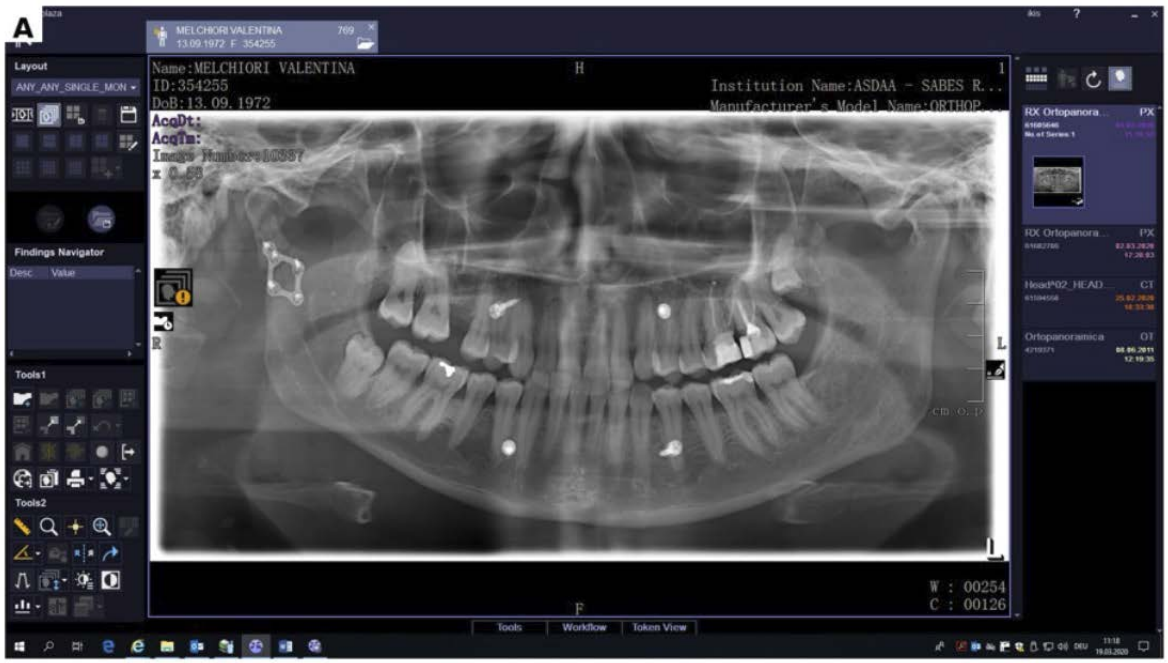

Figure 3. Postoperative orthopantomography showing internal fixation of the right condylar fracture.

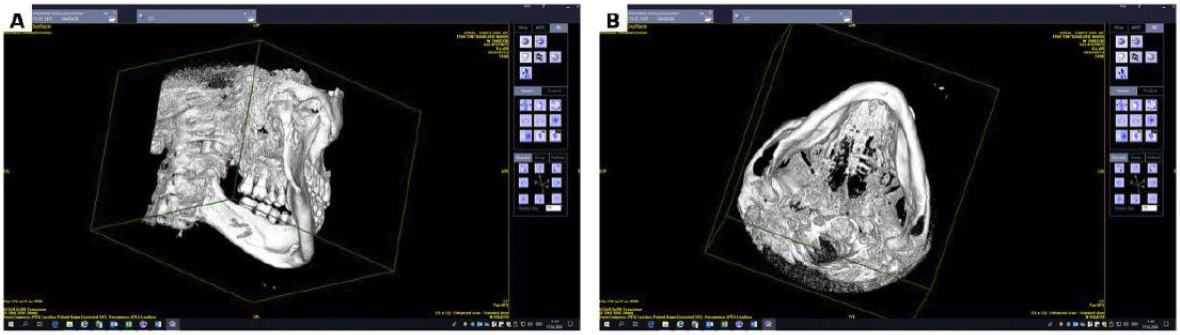

Figure 4. Postoperative three-dimensional CBCT reconstructions documenting fracture reduction and plate positioning. A, lateral view. B, inferior/axial view.

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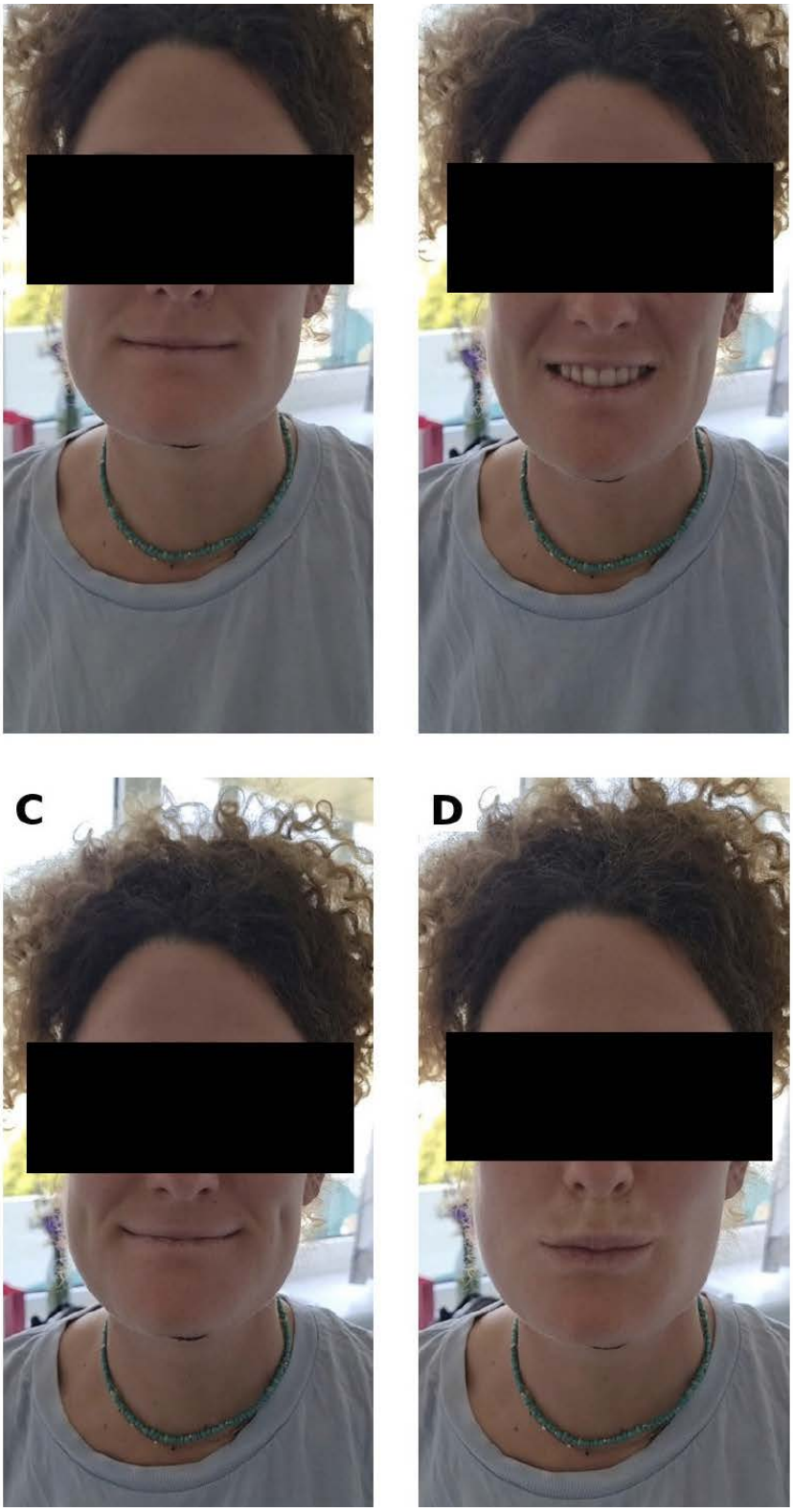

Figure 5. Postoperative facial mimicry photographs. A, eye closure. B, smiling. C-D, perioral movements. No persistent facial palsy was observed.

Discussion

This article should be interpreted as a descriptive surgical case series. The available material documents the authors' experience with extraoral surgical access to extracapsular mandibular condylar neck and subcondylar fractures, but it does not contain the patient-level dataset required for a full observational clinical study. Presenting the article as a case series is therefore methodologically more appropriate and aligns the manuscript with surgical case-series reporting guidance [11].

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The main practical message of the series is technical. The retromandibular route provides short access to the condylar neck and allows direct exposure for reduction and fixation, as previously described by Biglioli and Colletti and by other authors using retromandibular access [3,4,6,10]. In the authors' experience, careful broad dissection, gentle tissue mobilization, and avoidance of forceful retraction are central to limiting facial nerve traction injury. These principles are consistent with the known anatomical risks of extraoral approaches to the mandibular condyle [3,4,6,7,10].

The reported complications are compatible with the known morbidity profile of extraoral approaches: transient facial nerve weakness and hardware-related complications [3,4,6,7,10]. The available source manuscript reports 3 temporary facial nerve branch weaknesses, 2 plate breakages, and 1 screw fixation failure. No persistent functional sequelae of facial expression or occlusion were reported in the source material.

The representative radiographic case demonstrates the editorial change requested by the reviewers: the revised manuscript no longer relies only on generic narrative description, but links surgical discussion to preoperative imaging, postoperative imaging, and postoperative clinical photographs. However, because only 1 complete illustrated case was available in the source file, the figure set should be interpreted as representative documentation rather than comprehensive imaging for the entire series. This approach is compatible with case-series reporting, provided that the limitations of image availability are stated transparently [11].

Limitations

The principal limitation is that the available source material is incomplete for a fully transparent case series. The analysis is fracture-level rather than patient-level because the dataset is reported as 73 fractures. The study period, detailed inclusion and exclusion criteria, follow-up duration, objective functional outcomes, and patient-level data are not reported.

A second limitation is the absence of a control group. The results cannot be used to compare surgical treatment with conservative management, nor to compare retromandibular access with preauricular, submandibular, intraoral, or endoscopic approaches [3-10].

A third limitation concerns image documentation. The source file contains a complete image set for only 1 representative case; therefore, the manuscript illustrates the available case and does not infer additional cases.

Conclusion

The manuscript is best classified and submitted as a retrospective descriptive case series. Rewriting it in this format addresses the reviewers' central objection: the article is not a single case report, but it also lacks the complete dataset, tables, and statistical framework required for a clinical research article.

The revised manuscript can defensibly present the authors' experience with retromandibular and trans-parotid trans-masseteric access for extracapsular mandibular condylar neck and subcondylar fractures, describe surgical technique, provide descriptive complication rates, and illustrate representative cases. Before submission, the authors should verify the denominators, complete patient-level descriptive data, add additional illustrated cases, and insert ethics, consent, and follow-up information.

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