ORIGINAL RESEARCH

Comparision Of Preauricular Approach With Retromandibular Approach In Management Of Sub- Condylar Fracture: A Retrospective Study

[1]Tauseef Ahmed Khan, [2]Geeta Mishra Tripathi, [3]Saleha Tabassum

[1]Senior Resident, [2]Professor, Department of Dentistry, Shyam Shah Medical College, Rewa, M.P, India
[3]Senior Resident, Department of Anaesthesiology, Shyam Shah Medical College, Rewa, M.P, India

Corresponding Author
Tauseef Ahmed Khan
Senior Resident, Department of Dentistry, Shyam Shah Medical College, Rewa, M.P, India
Email: Tsfkhan0901@gmail.com

Received: 18 February, 2024 Accepted: 22 March, 2024

ABSTRACT
Background: The management of mandibular condylar process is a subject of ongoing debate among clinicians. There is a controversy surrounding the choice between surgical and conservative treatments. For accurate anatomical reduction of the fracture the preferred method is open reduction and internal fixation (ORIF) for fractured mandibular condyles. **Aim:** The aim of the study is to compare the two extraoral approaches to the TMJ namely preauricular and retromandibular approach in management of subcondylar fractures of mandible. **Materials and Methods:** This was a retrospective study included 62 surgically treated patients with mandible subcondylar fractures. For treatment of the fractured condylar segments, the preauricular and retromandibular (anterior parotid-transmasseteric) approach was used. **Results:** In our study, both approaches allowed excellent access and visibility to the subcondylar fractures, but each had its own limitations. We encountered minimal complications during and after surgery with both methods. Dental occlusion was restored in all the cases, and good anatomical reduction was achieved. **Conclusion:** Both approaches effectively manage subcondylar fractures. The retromandibular approach is generally preferred for its ease of access and fixation, except in cases requiring the preauricular approach, such as antero-medial or complete medial dislocations of condylar segment.
Key words: Condylar fractures, retromandibular approach, preauricular approach, subcondylar fracture

INTRODUCTION

The condyle fractures of the mandible are the most commonly seen type of mandibular fractures and account for more than a third of all fractures of the mandible.1 The complications of condylar fracture include pain, restricted mandibular movement, muscle spasm and deviation of the mandible, malocclusion, and pathological changes in the TMJ, osteonecrosis, facial asymmetry, and ankylosis, irrespective of whether treatment was performed or not.2

Treatment of mandibular condyle fractures is still controversial, with surgical treatment slowly becoming the preferred option. However, fractures of the condylar head are still treated conservatively at many institutions. Fractures of the condylar head are usually treated conservatively because of the difficulty in the exposure and fixation and the risk of facial nerve damage. Differently from conservative treatment, open surgery can give early recovery of occlusion and movement of the jaw.3

There are various surgical approaches to access the condyle, each with its own benefits and drawbacks. The intraoral approach minimizes the risk of facial nerve damage and visible scars, but it's technically challenging and necessitates specialized training and instruments. On the other hand, external access allows for easier fracture reduction, yet it does carry the risk of facial nerve injury and visible scarring.

To establish visualization, different extraoral approaches to the mandibular condyle are used. The two most commonly used approaches are preauricular and retromandibular. No recent articles have focussed on preauricular vs retromandibular approach for open reduction and internal fixation of condylar fractures. The objective of this study was to evaluate the comparative effectiveness and safety of surgical treatment for condylar fracture using preauricular and

retromandibular approach and to share our clinical insights and experiences.

MATERIALS AND METHODS

This was a retrospective study conducted in the Department of Dentistry, Shyam Shah Medical College Rewa M.P,India where 62 patients with mandibular subcondylar fracture ranging between 18-55 years reporting to the department between June2015 to May2023 were selected and treated accordingly with open reduction internal fixation.

62 patients with 77 fractured condyles were included in the study group and treated by the preauricular and retromandibular approaches. 47 of these patients had unilateral subcondylar fractures and 15 had bilateral subcondylar fractures.

Routine blood investigation was done for all patients and all were within normal parameters in all. Radiographic investigations included OPG (orthopantomograms) and 3D CT Scan face (Computed Tomography Scan) . Informed consent was taken from every patient after explaining the merits and demerits of extraoral approaches and comparison of open methods of treating the condyle fracture.

The following are the inclusion criteria for open reduction:

1. Unilateral and bilateral subcondylar fractures with occlusion derangement where it is not possible to achieve occlusion by closed reduction.
2. Associated fractures : unilateral, bilateral, and midface, ZMC #
3. Patient who not willing for closed reduction.(patient wants early rehabilitation)
4. Patient contraindicated for closed reduction. e.g., seizure disorders and alcoholism etc.

The study excluded edentulous patients, patients below the age of 18 years, patients with comminuted angle fractures, patients with systemic issues, patients with osteoporosis and osteopetrosis, and patients receiving chemotherapy or radiotherapy.

Arch bar fixation was done pre-operatively in dentulous patients. All the patients were treated under general anaesthesia with nasoendotracheal intubation. Post-operative recovery was uneventful in most of the patients.

The pre auricular approach

In preauricular approach for fixation of subcondylar fractures. The incision was meticulously executed through the skin and subcutaneous layers to attain access to the distinctively white temporalis fascia. An oblique incision was precisely made parallel to the temporal branch of the facial nerve, traversing the superficial layer of the temporal fascia above the zygomatic arch. Subsequently, the periosteum covering the lateral zygomatic arch was delicately excised, revealing the capsule encasing the temporomandibular joint, which was then carefully incised and methodically dissected to expose the articular spaces. The fractured segments were methodically exposed, meticulously reduced in size, and securely reinstated to their respective anatomical positions utilizing mini plates and screws.

Retromandibular approach

In the retromandibular approach employed to address subcondylar fractures, access was facilitated through the transmasseteric anterior parotid route. Following meticulous dissection involving the skin, subcutaneous tissue, and platysma, identification and retraction of the anterior edge of the parotid gland ensued. Subsequently, an incision within the fibers of the masseter muscle was made. This procedural sequence led to the exposure of the condyles and the posterior margin of the ramus, enabling the reduction and subsequent immobilization of the fractures using a miniplate and screws.

RESULTS

Out of 62 patients who underwent open reduction and internal fixation under general anaesthesia, 48 were male and 14 females [Table. 1]. The most affected age group was 21-30 years.[Table.2].

Table 1: Distribution of patients according to Gender

Gender	Number of patients (n)	Percentage(%)
Male	48	77.41
Female	14	22.58
Total	62	100

Table 2: Distribution of patients according to the Age

Age groups(Years)	Number of patients (n)	Percentage(%)
<20	6	9.67
21-30	25	40.32
31-40	16	25.80
41-50	12	19.35
>51	3	4.8
Total	62	100

Road traffic accidents (RTA) were the most common cause of injuries in 40 patients, followed by a history of falls in 15 patients, 5 patients by assault and 2 patients by animal bite **[Table 3].**

Table 3: Distribution of patients according to the cause of trauma

Cause of trauma	Number of patients (n)	Percentage(%)
RTA	40	64.51
Fall	15	24.19
Assault	5	8.06
Animal bite	2	3.2
Total	62	100

Association of subcondylar fractures with 7 symphysis fractures, 30 parasymphysis fractures, 7 mandibular angular fractures, 13 mandibular body fractures, and 5 mandibular ramus fractures**. [Table 4].**

Table 4: Distribution of patients based on associated fractures with mandibular condylar fractures.

Associated fracture	Number of patients (n)	Percentage(%)
Parasymphysis	30	48.38
Symphysis	7	11.29
Angle	7	11.29
Body	13	20.96
Ramus	5	8.06
Total	62	100

A total of 62 subcondylar fractures were treated by open reduction and internal fixation.The preauricular approach was used in 31 cases and the retromandibular approach was applied in 31 cases **[Tab. 5].**

Table 5: Distribution of patients based on type of approach used

Approach used	Number of patients (n)	Percentage(%)
Preauricular	31	50
Retromandibular	31	50
Total	62	100

Table 6: Distribution based on intraoperative time for approach used.

Type of approach	Time (mean)
Preauricular	90 minute
Retromandibular	70 minute

Facial nerve functions were assessed in terms of forehead wrinkling, eye closure, facial symmetry while smiling, and mouth blowing. Loss of forehead wrinkling in preauricular approach and retromandibular approach was seen in 4 and 2 cases which got recovered after 6 month and 3 months respectively.

2 cases with sialocele formation in preauricular approach and 4 cases with sialocele formation in retromandibular approach was seen. Surgical scar present in 1 case in preauricular approach and in 3 case of retromandibular approach. occlusal discrepancy seen in 1 and 3 cases of preauricular approach and retromandibular approach respectively while secondary infection was found only in 1 case of preauricular approach after 1 month of surgery.**[Table.6]**

Table 6: Distribution based on post operative complications for each approach used.

Approach	Facial nerve weakness	Sialocele formation	Surgical Scar	Occlusal discrepancy	Secondary infections
Preauricular	4	2	1	1	1
Retromandibular	2	4	3	2	0
Total	6	6	4	3	1

DISCUSSION

The commonest jaw fracture is a mandibular fracture. The more frequent mandibular traumas are mandibular condylar fractures, which occur in 18% to 57 % of adults and 24 % to 72 % of infants.4. The present study consisted of 48 male (77.41%) and 14 female patients, showing a male dominance. Similar findings were reported in a study by Erol B et al.5 This shows that the males are more prone to situations in which there is high risk of trauma. The present study showed that road traffic accidents were the main cause of mandibular condylar fracture in 40 cases (64.51%). Similar findings were observed by Singh V et al.6 in their study. In the present study, the age group commonly affected was 21-30 years (40.32%) followed by 31-40 years (25.80%). Zachariades N et

al.7 also observed that adults below 35yrs of age are more prone to mandibular fractures.

In the past, condylar fractures have been treated solely by closed reduction for various reasons like; surgical procedures in the TMJ area were associated with complications involving the facial nerve, technical problems in manipulating the fracture fragments into good anatomical reduction and scar on the face and reasonably good results have been achieved with conservative treatment.8. Nowadays with the advancement of pre, intra and post-operative management, positive and less complicated functional results were obtained by open reduction and internal fixation of condylar fractures.

Moreover, a study conducted by Karan A et al.2 in 2019 suggested that surgical intervention for condylar fractures led to favorable outcomes, encompassing pain alleviation, adequate mouth opening, limited deviation, restoration of ramal height, and enhanced lateral movements, when compared to non-surgical approaches. As such, this study lends support to the present investigation's recommendation of surgical treatment modalities.9.

Over many years, various surgical procedures were developed to access TMJ hence allowing the reduction and fixation of the condylar fracture. These approaches to TMJ include Preauricular, submandibular Risdon approach, intraoral, retromandibular, endaural, rhytidectomy, endoscopic approach, and retro auricular approach. Each of these approaches has its associated benefits, complications, and disadvantages. One approach over another is chosen based on the ease of accessibility, visibility, and soft tissue manipulation.10

In the results of the present study, the postoperative complications were assessed. It was shown that facial nerve weakness was seen in 4 and 2 cases, sialocele formation in 2 and 4 cases and occlusal discrepancy in 1 and 2 cases treated by preauricular and retromandibular approach respectively. These findings were consistent with the findings by Ashfaq ur rahim et al IN 2021 where temporary paresthesia was seen in 7 and 2 cases, sialocele formation in 0 and 2 cases and occlusal discrepancy in 2 and 2 cases treated by preauricular and retromandibular approach respectively.11

In our study surgical scar was seen in 1 and 3 cases treated by preauricular and retromandibular approach respectively. similar to study by Kumaran S in 2012 where scar is seen in 10 and 17 cases treated by preauricular and retromandibular approach respectively.12

The preauricular approach was initially given by Risdon (1934) and after that various modifications were proposed. The present modification widely followed is the modification made by Rowe (1972) and Al-Kayat and Bramley. In preauricular approach, the layers and structures encountered are skin, superficial fascia, deep fascia, parotid gland, facial nerve trunk and branches, superficial temporal vessels, auricular temporal nerve, transverse facial artery, periosteum, and condylar head and neck. The advantages includes visualization and alignment of high condylar and anteromedially displaced fractures whereas the disadvantages are scar formation, loss of sensation, Frey's syndrome, etc.13.

Retromandibular approach was preferred because of the following advantages: This approach exposes the entire ramus from behind the posterior border. The distance from skin incision to the area of interest is reduced. 14.

It is found to be minimally invasive, provided good access and allowed direct visual alignment of the fracture fragments. Facial scar produced is in less conspicuous location. There is no need to use transcutaneous trocar because the tissues can be retracted superiorly and anteriorly to the level of the sigmoid notch with this approach. The disadvantages being reduced accessibility to medially displaced condyles, and damage to retromandibular vessels.[8,15]

CONCLUSION

Hence, it can be deduced that both methodologies exhibit favourable outcomes in the management of condylar fractures, with the retromandibular approach offering notable advantages in terms of accessibility and fixation simplicity. Consequently, preference may generally be afforded to the retromandibular approach over the preauricular method. However, exceptions arise, such as in instances of anteromedial or complete medial dislocation of the condylar segment, where the preauricular approach becomes the sole viable option. Moreover, circumstances involving patients presenting late for surgery, resulting in tissue scarring, necessitate the exclusive employment of the preauricular approach.

REFERENCES

1. Cem ozer,Yusuf Tamer, Burak Bayram, and Zafer ozgur Pektas,The Journal of Craniofacial Surgery Volume 33, Number 7, October 2022)
2. Renato VALIATI, Danilo IBRAHIM , Marcelo Emir Requia ABREU, Claiton HEITZ, Rogério Belle de OLIVEIRA, Rogério Miranda PAGNONCELLI, Daniela Nascimento SILVA; The treatment of condylar fractures: to open or not to open? A critical review of this controversy;Int. J. Med. Sci. 2008, 5)
3. Paolo Boffano,Rodolfo Benech,Cesare Gallesio,Francesco Arcuri, Arnaldo Benech,Current Opinions on Surgical Treatment of Fractures of the Condylar Head ;Craniomaxillofacial Trauma Reconstruction 2014;7:92–100)
4. [Lavina a, Tahera Ayub b, Bharti Kumari c, Raj Kumar a, Babar Abro d, Syed Ghazanfar Hassan e and Salman Shams f*; Comparison of Preauricular Versus Retromandibular Approach in the Management of Mandibular Condyle Fractures; 34(2A): 28-35, 2022; Article no.JPRI.80884 ISSN: 2456-9119
5. Erol B, Tanrikulu R, Gorgun B. Maxillofacial fractures. Analysis of demographic distribution treatment in 2901 patients (25 year experience). J Craniomaxillofac Surg 2004:32:308-12.

6. Singh V, Bhagol A, Dhingra R. A comparative clinical evaluation of the outcome of patients treated for bilateral fracture of the mandibular condyles. J Craniomaxillofac Surg 2012;40(5):464-6
7. Zachariades N, Mezitis M, Mourouzis C, Papadakis D, Spanou A. Fractures of the mandibular condyle: a review of 466 cases. Literature review, reflections on treatment and proposals. J Craniomaxillofac Surg. 2006;34(7):421–432.
8. P. Mohan,K. A. Jeevan Kumar, V. Venkatesh, B. Pavan Kumar, Kapil Patil; Comparison of Preauricular Approach Versus Retromandibular Approach in Management of Condylar Fractures; J. Maxillofac. Oral Surg. (Oct-Dec 2012) 11(4):435–441; DOI 10.1007/s12663-012-0350-1
9. Karan A, Kedarnath NS, Reddy GS, Harish Kumar TVS, Neelima C, Bhavani M et al. Condylar Fractures: Surgical versus conservative management. Ann Maxillofac Surg. 2019;9:15-22.
10. Al-Moraissi, EA, Louvrier, A, Colletti, G, et al. Does the surgical approach for treating mandibular condylar fractures affect the rate of seventh cranial nerve injuries? A systematic review and meta-analysis based on a new classification for surgical approaches. J Craniomaxillofac Surg. 2018;46:398–412.
11. Ashfaq Ur Rahim, Sadiq Ali, Muhammad Nauman, Tannaza Qayyum, Abdullah Khan, Mohammad Abdullah Khan, Zahid Iqbal; Comparison of Preauricular Approach Versus Retromandibular Approach in Management of Condylar Fractures; P J M H S Vol. 15, NO.8, AUG 2021 ;DOI:doi.org/10.53350/pjmhs211582137
12. Kumaran S, Thambiah LJ; Analysis of two different surgical approaches for fractures of the mandibular condyle; Indian Journal of Dental Research, 23(4), 2012
13. Difficulties encountered in preauricular approach over retromandibular approach in condylar fracture;Perumal Jayavelu, R. Riaz, A. R. Tariq Salam, B. Saravanan, and R. Karthick; J Pharm Bioallied Sci. 2016 Oct; 8(Suppl 1): S175–S178.doi: 10.4103/0975-7406.191953
14. Wu CY, Shi XJ, Li Y (2004) Retromandibular incision and miniplate rigid fixation for condylar and subcondylar fractures. Shanghai Kou Qiang Yi Xue 13(1):20–22
15. Ellis Edward III, Throckmorton GaylordS, Palmieri Celso (2000) Open treatment of condylar process fractures: assessment of adequacy of repositioning and maintenance of stability. J Oral Maxillofac Surg 58:27–34.