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Compare The Efficacy of Transmasseteric Anteroparotid Approach with Conventional Retromandibular Transparotid

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ABSTRACT

Background: The RM-A has been found to be superior to other methods due to its short access route, excellent visualization and access for reduction and fixation, quickness, and ability to achieve satisfactory aesthetic outcomes.

Aim: To compare & assess the efficacy of T-AP for surgical MSCF-AP.

Material & method: In our study we have performed T-AP–A using MSCF among 20-60 years patient in 2 differnt groups i.e. A & B.

Result: We found that , group A showed significant difference for all the parameters from week 1 to 6 months as the p value was (0.00) for FN function & inter-incial and soalocele as the p value was 0.009. While for group B, showed not significant difference as the p value <0.05.

Conclusion: The method is an effective for surgically treating fractures in the subcondylar area.

Keywords: MSCF, subcondyle, T-AP-A,FNF, 1-1MO,asethetic outcome, reduction, fixation, RM-A, soalocele, parameter.

INTRODUCTION

The condylar region(CR) is one of the most prevalent locations for mandibular fracture(MF), accounting for 9%-50% of all maxillofacial fractures[1]. The management of CF is determined by conducting a thorough physical examination and analyzing radiological evidence of the fracture [2]. Finding a balance between achieving accurate fracture reduction and stabilization and limiting any detrimental effects on the patient's health has long been a part of the therapy of facial injuries [3]. In the past, closed reduction, or Maxillomandibular fixation (MMF) was considered the preferred method for treating subcondylar fractures. There was a belief that closed reduction would result in fewer complications and yield comparable esthetic and functional results to open elimination and internal fixation (ORIF). Consequently, closed reduction has become a widely performed procedure. Due to the procedure's non-invasive nature, there will be minimal to no risk of face nerve injury or scarring. Despite the abundance of information and thorough discussions, writers could not come to an agreement on a particular treatment approach for the management of SCF[4].

AIM

To evaluate & compare the efficacy of T-AP for surgical MMSF-AP.

INCLUSION CRITERIA

1. Age group between 20-60 year .
2. Clinically diagnosed & radiographically confirmed MSCF

EXCLUSION CRITERIA

1. Patient younger than 20 years & older than 60 years.
2. Fracture of condylar head & billateral condylar fracture.
3. Previously operated cases in retromolar region.
4. Those with pre-operative injury to FN or parotid gland.
5. Patient on medication
6. Bleeding disorder
7. Those not willing to participate

MATERIAL & METHOD

Material

a. 2% lignocaine with 1:80,000 adrenaline
b. Titanium miniplate
c. Vicryl 3-0
d. Ethilon 4-0
e. Calibrated Ruler

Method

Pre-operative parameter

All patients who had a clinical suspicion of having MSCF had further evaluation using OPG screening radiography. The severity of the fractures and the degree of condyle displacement were next assessed using a confirmatory 3D CT FACE scan. Prior to the surgery, an assessment of the FN was performed using the House and Brackmann FN grading system. The measurement is acquired by assessing the superior displacement of the midpoint of the top of the eyebrow and the lateral displacement of the angle of the mouth. Preoperative measurement of maximum Interincisal mouth opening (in mm) was done from incisal edge of 11 to the incisal edge of 41 using a calibrated ruler as shown in figure 1.

FIGURE 1: SHOWING THE INTERINCISAL MOUTH OPENING

Occlusion was assessed as satisfactory or unsatisfactory & was categorized as open bite (anterior /posterior) & cross bite as shown in figure 2.

FIGURE 2: SHOWING UNSATISFACTORY OCCLUSION

Surgical procedure for group A (RM-T-AP-A)

Under all aseptic conditions & precautions, scrubbing and painting with betadine solution, standard draping was done. 2% lignocaine with 1:80,000 adrenaline was locally infiltrated along incision marking. Incision line markings were placed just posterior to the border of mandile,0.5 cm below the earlobe extending 3-3.5 cm downwards parallel to the posterior border of mandible as shown in figure 3.

FIGURE 3: INCISION MARKING FOR TRANSPAROTID APPROACH

Using no.15 blade incision was placed according to predetermined incision making involving skin, platysma, SMAS & parotid capsule. Blunt dissection was carried out to expose the parotid gland overlying the ramus & then continued parallel t expected direction of facial nerve through the substance of parotid gland as shown in figure 4.

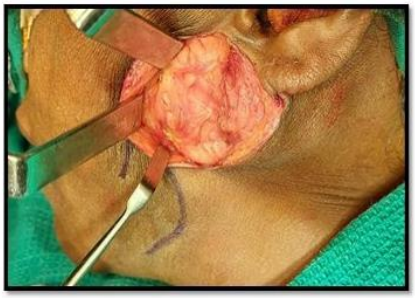

FIGURE 4: SHOWING THE PAROTID GLAND TISSUE AFTER DISSECTION

Superior & inferior division of facial nerve were identified & it was relieved to achieve sufficient mobilization during osteosynthesis. Pterygomasseteric sling was sharply divided superiorly & posteriorly on ramus, subperiosteally periosteal elevator was inserted & ramus & fractured condylar area was exposed. Occlusion was achieved & maxillo-mandibular fixation was done as shown in figure 5.

FIGURE 5: SHOWING MAXILLOMANDIBULAR FIXATION

Surgical procedure for group B (RM-T-AP-A)

Under all aseptic conditions & precautions after scrubbing and painting with betadine solution, standard draping was done. For group B, incision markings were placed slightly below compared to group A,1cm below earlobe till gonial angle parallel to the posterior border of mandible and then curved approximately 2 cm anterior below the inferior border of mandible as shown in figure 6.

FIGURE 6: INCISION MARKING FOR TRANSMASSETERIC ANTEROPAROTID APPROACH

A solution containing 2% lignocaine and 1:80,000 adrenaline was carefully applied along the incision marking. Employing a designated incision marking that covers the skin, platysma, superficial musculoaponeurotic system (SMAS), and parotid capsule, a precise incision was made using a number 15 blade. The parotid capsule was exposed through dissection. Extensive undermining was performed parallel to the facial nerve to ensure optimal exposure of the parotid gland. One way to locate the masseter muscle is by identifying and gently pulling back the tail of the parotid gland. Similar to a medical writer, the Masseter muscle was carefully dissected using a hemostat in a vertical orientation to expose the ramus and subcondylar fracture line. A procedure called maxillomandibular fixation was performed to achieve obstruction as shown in figure 7.

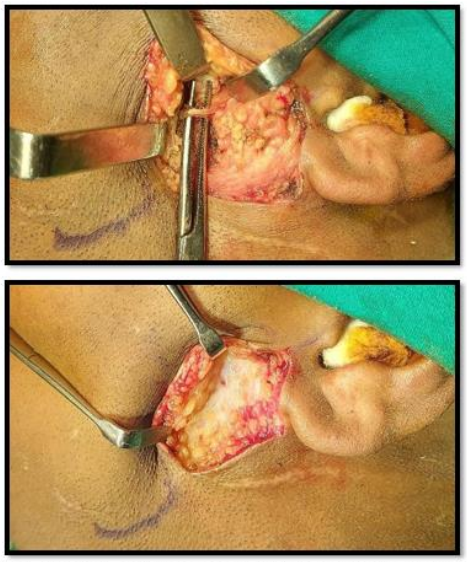

FIGURE 7: DISSECTION AND EXPOSURE OF MASSETER MUSCLE

After the frature line was reduced appropriately in both group A & B . Titanium delta plates (2mm with 2 x 8 mm screw) were used to fix the fractured segments as shown in figure 8.

FIGURE 8: FIXATION USING A 2MM DELTA PLATE & 2 X 8 MM SCREWS

Patients were discharged from the hospital after five days following their surgery and were instructed to follow a soft or liquid diet. All patients were instructed to promptly notify the department if they experienced any negative side effects.

After one week, all the patients were asked to return for a follow-up visit. During this visit, their parameters were carefully evaluated and recorded using the same device and settings. This process was repeated at the 1, 3, and 6-month follow-up visits.

STATISTICAL ANALYSIS

An intergroup comparison was conducted using the Unpaired t-test/Independent samples t-test to assess significant differences between the two groups for various parameters. Statistical tests were performed at a 95% confidence level, where a p-value of less than 0.05 was deemed statistically significant.

RESULT

INTER-INCISAL MOUTH OPENING

Inter-incisal opening (Group A)	N	Minimum	Maximum	Mean	Std. Deviation
Pre op	8	20.00	35.00	25.37	5.04
1 week	8	25.00	35.00	28.75	4.43
1 month	8	30.00	45.00	36.25	5.17
3 months	8	30.00	45.00	38.12	5.30
6 months	8	35.00	45.00	39.50	3.81

TABLE 1: GROUP A

Table 1 showed that , the minimum mouth opening at 1 week follow up was 25 mm, while maximum was 35 mm with mean of 28.75 (± 5.04). The minimum mouth opening at 1 month follow up was 30 mm, while maximum was 45 mm with mean of 36.25 (± 5.17). The minimum mouth opening at 3 months follow up was 30 mm, while maximum was 45 mm with mean of 38.12 (± 5.30). The minimum mouth opening at 6 months follow up was 35 mm, while maximum was 45 mm with mean of 39.50 (± 3.81).

Inter-incisal opening (Group B)	N	Minimum	Maximum	Mean	Std. Deviation
Pre op	8	20.00	40.00	28.87	6.33
1 week	8	25.00	40.00	29.50	5.52
1 month	8	30.00	45.00	34.50	4.98
3 months	8	35.00	46.00	40.04	5.22
6 months	8	35.00	46.00	40.04	5.22

TABLE 2: GROUP B

Table 2 showed that , the minimum mouth opening at 1 week follow up was 25 mm, while maximum was 40 mm with mean of 29.50 (± 5.52). The minimum mouth opening at 1 month follow up was 30 mm, while maximum was 45 mm with mean of 34.50 (± 4.98). The minimum mouth opening at 3 months follow up was 35 mm, while maximum was 46 mm with mean of 40.04 (± 5.22). The minimum mouth opening at 6 months follow up was 35 mm, while maximum was 46 mm with mean of 40.04 (± 5.22).

FACIAL NERVE

Facial nerve function (Group A)	N	Minimum	Maximum	Mean	Std. Deviation
Pre op	8	3.00	3.00	3.00	.00
1 week	8	3.00	6.00	4.75	1.16
1 month	8	3.00	6.00	4.25	1.16
3 months	8	3.00	4.00	3.25	.46
6 months	8	3.00	3.00	3.00	.00

TABLE 3: MEAN (SD) – Group A

Table 3 showed that , mild FN palsy(P) was observed in group A; 6 out of 8 were FNP postoperatively, which subsided on its own in a 3-month time period, and FN function was normal at the end of 6 months.

Facial nerve function (Group B)	N	Minimum	Maximum	Mean	Std. Deviation
Pre op	8	3.00	3.00	3.0	.00
1 week	8	3.00	4.00	3.37	.51
1 month	8	3.00	4.00	3.25	.46
3 months	8	3.00	4.00	3.12	.35
6 months	8	3.00	3.00	3.00	.00

TABLE 4: MEAN (SD) – Group B

Table 4 showed that, at 1 week post-operative followup, maximum score was 4 with a mean of 3.37 (±0.51). At 1 month post-operative followup, maximum score was 4 with a mean of 3.25(±0.46). At 3 months post-operative followup, maximum score was 4 with a mean of 3.12 (±0.35). At 6 months post-operative followup, maximum score was 3.

SIALOCELE

Sialocele (Group A)	Pre-op		1 week		1 month		3 months		6 months	
	Frequency (n)	Percent (%)	Frequency (n)	Percent (%)	Frequency (n)	Percent (%)	Frequency (n)	Percent (%)	Frequency (n)	Percent (%)
Absent	8	100.0	4	50.0	6	75.0	8	100.0	8	100.0
Present	-	-	4	50.0	2	25.0	-	-	-	-
Total	8	100.0	8	100.0	8	100.0	8	100.0	8	100.0

TABLE 5: SIALOCELE – Group A

Table 5 showed that , in group A, after one week, sialocele was observed in 50% of the cases (4 out of 8). After one month, the number of instances dropped to two, indicating a 25% decrease. At the end of the third month, the sialocele had fully healed.

Sialocele (Group B)	Pre-op		1 week		1 month		3 months		6 months	
	Frequency (n)	Percent (%)	Frequency (n)	Percent (%)	Frequency (n)	Frequency (n)	Percent (%)	Frequency (n)	Percent (%)	Frequency (n)
Absent	8	100.0	6	75.0	8	100.0	8	100.0	8	100.0
Present	-	-	2	25.0	-	-	-	-	-	-
Total	8	100.0	8	100.0	8	100.0	8	100.0	8	100.0

TABLE 6: SIALOCELE – Group B

Table 6 showed thta, after one week, salocele was seen in two out of eight instances (or 25% of the total) in group B. After one, three, or six months, sialocele did not appear in any of the cases.

OCCLUSAL STABILITY

Occlusal stability (Group A)	Pre-op		1 week		1 month		3 months		6 months	
	Frequency (n)	Percent (%)	Frequency (n)	Percent (%)	Frequency (n)	Frequency (n)	Percent (%)	Frequency (n)	Percent (%)	Frequency (n)
Unsatisfactory	8	100.0	-	-	-	-	-	-	-	-
Satisfactory	-	-	8	100.0	8	100.0	8	100.0	8	100.0

TABLE 7: GROUP A

Occlusal stability (Group B)	Pre-op		1 week		1 month		3 months		6 months	
	Frequency (n)	Percent (%)	Frequency (n)	Percent (%)	Frequency (n)	Frequency (n)	Percent (%)	Frequency (n)	Percent (%)	Frequency (n)
Unsatisfactory	8	100.0	-	-	-	-	-	-	-	-
Satisfactory	-	-	8	100.0	8	100.0	8	100.0	8	100.0

TABLE 8: GROUP B

Table 7 & 8 showed that satisfactory occlusal stability was observed in both the groups postoperatively from 1 week to 6 months.

Comparison	Parameter	Sum of Squares	df	Mean Square	F	p value
Pre-op vs 1 week vs 1 month vs 3 months vs 6months	Inter-incisal opening(I-IO)	1227.850	4	306.963	13.400	.000*
	Facial nerve function(FNF)	20.600	4	5.150	8.793	.000*
	Sialocele	1.600	4	.400	4.000	.009*
	Occlusalstability (OS)	6.400	4	1.600	.	.

TABLE 9: GROUP A

In table 9 we found that , statistically significant difference was seen for all the parameters from week 1 to 6 months. For I-IO & FNF the p value was (0.00) and soalocele as the p value was 0.009.

Comparison	Parameter	Sum of Squares	df	Mean Square	F	p value
Pre-op vs 1 week vs 1 month vs 3 months vs 6months	Inter-incisal opening	958.750	4	239.688	7.985	.000*
	Facialnerve function	.850	4	.213	1.750	.161
	Sialocele	.400	4	.100	2.333	.032*
	Occlusalstability	6.400	4	1.600	.	.

TABLE 10: GROUP B

Table 10 showed that , the comparison of FNF from one week to six months was not statistically significant, with the exception of I-IO, which exhibited a statistically significant difference (p value <0.05) from one week to six months, with a p value of 0.000. In addition, the comparison of sialocele demonstrated a statistically significant difference, with a p value of 0.032.

DISCUSSION

The anatomical degree of the condylar fracture and its displacement, the fixation method being used, the presence or absence of other associated fractures, the fracture method available, and concerns regarding aesthetics all influence the selection of any surgical approaches [5]. Using the endoscopic approach can help minimize damage to the FN, although it may require more time for reduction and fixation compared to alternative approaches[6]. Transoral approaches, while providing improved cosmetic outcomes, often require the addition of transbuccal screw placement and the utilization of an endoscope. When using trans-facial trocars for plate fixation, there is a potential risk to the facial nerve, particularly with intraoral approaches. The temporal and zygomatic branches of the facial nerve are frequently at risk during the rhytidectomy procedure. There are several complications that can arise from the rhytidectomy procedure, including skin loss, haematoma, sensory deficit, and hypertrophic scars [7].

In the Transparotid technique, a small incision is made just below the ear lobe, measuring 2mm in depth. The incision is carefully placed parallel to and slightly behind the posterior border of the ramus. The dissection has progressed in the subdermal adipose plane. Upon dissecting through the layers of skin, fat, and fascia, the parotid capsule becomes visible as a thin, translucent layer. Within the area devoid of nerves, a careful dissection of about 1 cm is carried out in the superior, anterior, and inferior directions before making an incision on the parotid capsule. A precise incision is made on the parotid capsule using a scalpel. To access the posterior border of the mandible, one can carefully navigate through the parotid gland with the help of delicate, curved mosquito forceps. The dissection should then proceed in an anteromedial direction, following the path of the FN. When coming across any branches of the facial nerve, it is important to gently move them aside. The pterygomandibular ligament is carefully cut and then dissected beneath the periosteum until it reaches the sigmoid groove on the upper side and the angle of the mandible on the lower side [5,8].

Complications such as postoperative sialocele and salivary fistulas are commonly observed following the surgical treatment of a condylar fracture. In the review by Rozeboom et al. [9] in 2018, analyzing 70 studies and a total of 2783 patients who underwent surgery for condylar fractures using extraoral approaches, a sialocele was observed in 2.33% of all surgical procedures. Interestingly, all of these sialoceles occurred after a transparotid approach.

In a retrospective study conducted by Koirala et al. [7], it was shown that out of 35 sub-condylar fracture surgeries done using a retromandibular transparotid approach, there were 2 cases of sialoceles and 1 case of salivary fistula. Additionally, sialoceles were detected in four out of the eight patients in Group A who had surgery using the retromandibular transparotid approach (RM-TP-A) during the one-week postoperative evaluation. The collection was removed by performing a transcutaneous puncture or making an incision at the suture site. Afterward, a pressure dressing was placed for around two weeks. After one month, two patients developed sialocele. By the third month of the postoperative follow-up, all instances of sialocele had been cured, and there were no signs of recurrence. The patients exhibited regular salivary secretion inside the mouth via the opening of the parotid duct. All of the cases in the current study occurred in the subcondylar area, which includes the temporofacial branches of the FN and their subbranches on the skin. These techniques were painstakingly followed in the present study, and none of the 16 participants showed signs of irreparable FN injury.

CONCLUSION

There were no statistically significant variations seen between the interincisal mouth opening, occlusion, and sialocele in both groups. There was a significant change in FNF during the 1-week (p value 0.009) and 1-month (p value 0.041) postoperative follow-up periods.

Hence the study showed that RM-T-AP-A has been shown to be very beneficial for the management of MSCF. This approach offers improved access and is linked to fewer problems and morbidity when compared to the RM-T-AP-A. Therefore, it can be concluded that this method is an effective for surgically treating fractures in the subcondylar area.

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