Does a Modified Endaural Incision Reduce Facial Nerve Injury and Improve Cosmesis When Compared to the Modified Pre-Auricular Incision for Management of Temporomandibular Joint Ankylosis?

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Background: Facial nerve injury (FNI) and unesthetic scar are distressing complications of temporomandibular joint (TMJ) surgery. Insufficient evidence on whether a modified endaural incision can reduce FNI and serve as an aesthetic alternative is a concern.

Purpose: The purpose of this study was to compare the postoperative FNI and surgical scar cosmesis using modified endaural incision (Inviscision approach [IA]) and modified preauricular incision (Alkayat-Bramley approach [ABA]) in TMJ ankylosis.

Study design, Setting, Sample: The authors implemented a single-centre, retrospective, cohort study. Subjects presenting to the Division of Craniomaxillofacial surgery at All India Institute of Medical Sciences, Rishikesh with TMJ ankylosis who underwent ankylosis release between January 2021 and December 2023 were identified through electronic medical record review. Inclusion criteria were the presence of unilateral or bilateral, Sawhney's type III or IV ankylosis. Exclusion criteria were pre-existing FNI, reankylosis cases.

Predictor/Exposure/Independent Variable: The primary predictor variable was surgical approach (IA vs ABA).

Main Outcome Variables: The primary outcome variables were FNI at 1 month and 6 months, measured using House-Brackmann scale, and scar cosmesis at 6 months using the Patient and Observer Scar Assessment Scale. Secondary outcome variables were dissection time for surgical exposure (minutes), intraoperative blood loss (milliliters), and other complications of infection, dehiscence, and hypertrophic scar.

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Covariates: Covariates included demographics (age, sex), preoperative (side, location and Sawhney's type of ankylosis).

Analyses: The data were analyzed using descriptive statistics, student t-test, Mann-Whitney U test and regression analysis, with the level of statistical significance at $P < .05$.

Results: The study included 30 patients (40 joints: 20 in each group) with mean age of 22.45 ± 7.09 years in IA and 19.25 ± 7.06 years in ABA ($P = .99$). IA included 8 men (53.33%), 7 women (46.6%) and ABA had 5 men (33.3%), 10 women (66.6%) ($P = .87$). Postoperative FNI at 1 month accounted 45% in IA (n = 9) and 95% in ABA (n = 19), which was statistically significant ($P = .001$). At 6 months, FNI was 15% in IA (n = 3) and 70% in ABA (n = 14) that showed statistical difference ($P = .003$). For scar assessment at 6 months, the mean Patient and Observer Scar Assessment Scale score was 40.7 ± 17.2 for IA and 61.75 ± 17 for ABA, which was statistically significant ($P = .001$). IA had statistically significant shorter dissection time (IA = 25.45 ± 2.48 mins, ABA = 35.45 ± 3.97 mins; $P = .0001$) and lower amount of blood loss (IA = 52.15 ± 9.12 mL, ABA = 80.05 ± 8.91 mL; $P = .0001$). No statistically significant complications were observed.

Conclusion and Relevance: To conclude, IA shows better outcomes like shorter dissection time, reduced FNI, better scar cosmesis and can be proposed as a suitable alternative to traditional ABA in TMJ ankylosis surgery.

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The management of temporomandibular joint (TMJ) ankylosis involves not only restoring jaw function but also preserving the integrity of facial nerve.[1,2] The choice of surgical approach plays a crucial role in minimizing the risk of facial nerve injury (FNI). Given the facial nerve's complex path and its proximity to the TMJ, its vulnerability is a primary concern during surgery.[3,4] Achieving optimal surgical visibility of the joint requires a delicate balance, often challenged by the need to safeguard the facial nerve while navigating the anatomical intricacies of ankylosis. This complexity, along with the pursuit of better cosmetic outcome, has led to the development of myriad of surgical approaches, including preauricular, postauricular, endaural, modified preauricular (Alkayat-Bramley incision), and rhytidectomy incisions.[5-9] Surgical interventions aim to achieve optimal postoperative outcomes while minimizing neurosensory deficits and the risk of intraoperative bleeding due to complex vascular anatomy.[10] To comprehensively address these challenges, a meticulous and well-considered surgical approach is necessary.

The inviscision approach (IA)—a modified endaural incision, acknowledged for its minimally invasive nature—offers nearly invisible scar, reduced surgical trauma and, consequently, lower risk of complications.[11] IA is designed to follow a plane of dissection close to the tragal cartilage, minimizing manipulation of the perichondrium and cartilage, thereby reducing the risk of FNI and aural deformation.[12] Extending the incision into the crus helix disrupts the straight-line closure, leveraging the advantages of Z-plasty to minimize scar contracture and, as a result gives esthetically acceptable scar. Moreover, there is no temporal extension in IA, unlike the Alkayat-Bramley incision. The Alkayat-Bramley approach (ABA), a more traditional method, necessitates extensive exposure of the surgical field, which increases the risk of nerve injury and often results in an unsightly scar and alopecia along the temporal extension.[13,14] Addressing these challenges and restoring both aesthetics and function are essential for TMJ surgeons for improving surgical practices and optimizing patient care. While the literature offers insights into the advantages and drawbacks of each approach, a paucity of direct comparative studies necessitates a dedicated investigation.[14] Furthermore, the existing data on the correlation between surgical approaches and the incidence of FNI remain inadequate.[13-18]

To the best of our knowledge, no study comparing traditional ABA with IA in surgical management of TMJ ankylosis has been reported. Therefore, to contribute to the existing literature, investigators hypothesize that IA can reduce incidence of FNI and offer acceptable scar when compared to the ABA for management of TMJ ankylosis. The purpose of this study was to compare the postoperative FNI and surgical scar cosmesis using modified endaural incision (IA) and modified preauricular incision (ABA) in TMJ ankylosis. The aim of this study was to measure the frequency of FNI at 1 and 6 months. In addition, we measured surgical scar cosmesis at 6 months postoperatively.

Material and Methods

STUDY DESIGN/SAMPLE

To address the research purpose, the investigators designed and implemented a retrospective, cohort study in accordance with Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) guidelines.[19] The study sample was composed of all patients presenting to the Division of Craniomaxillofacial Surgery, All India Institute of Medical Sciences, Rishikesh for evaluation and management of TMJ ankylosis between January 2021 and December 2023.

To be included in the study sample, subjects had to fulfil the following inclusion criteria: an established diagnosis of unilateral/bilateral, Sawhney's Type III/IV TMJ ankylosis as proven by clinical and radiological diagnosis. Patients were excluded as study subjects if they were ASA III/IV compromised patients, had previous or current neurological disease that may adversely affect facial nerve function, operated recurrent cases and patients who did not provide written informed consent. Patients were identified by electronic medical records review. A written informed consent was obtained from each patient included in the study. The study was exempted from institutional ethical committee clearance on the grounds of retrospective observational nature of study and nondisclosure of patient's identity.

VARIABLES

Predictor Variable

In this study, the predictor variable was the surgical approach used for TMJ ankylosis release and coronoidectomy, ie, IA and ABA. The study group included IA and comparator group included ABA. Patients operated using IA and ABA between January 2021 and December 2023 were identified from the cohort by electronic medical records review and included based on the inclusion criteria.

Primary Outcome Variables

The primary outcome variables were postoperative FNI assessed at 1 month and 6 months postoperatively using House-Brackmann's (HB's) facial nerve grading system[20] and surgical scar assessment at 6 months using the Patient and Observer Scar Assessment Scale (POSAS).[21] The HB grading system included a six-point scale, ranging from grade I to VI (I- normal facial function, II- mild dysfunction, III- moderate dysfunction, IV- moderately severe dysfunction, V- severe dysfunction, VI total paralysis).[20] In the POSAS, the patient component included 6 items and the observer component 5 items, each scored numerically from 0 to 10 (0-normal skin, 10-worst imaginable scar). Patients scored the characteristics of scar color, pliability, thickness, relief, itching, and pain, whereas the observer scored scar vascularization, pigmentation, pliability, thickness, and relief. The sum of patient (range, 6 to 60) and observer (range, 5 to 50) scores, ie; the lowest score of 11 reflected a normal skin and 110 corresponded to the worst possible scar appearance.[21]

Secondary Outcome Variables

The study's secondary outcome variables were dissection time for surgical exposure and blood loss measured intraoperatively, and other complications of infection, dehiscence and hypertrophic scar assessed at 1 month and 6 months. Dissection time (in minutes) was measured from the time taken from the start of the first skin incision until the exposure of the TMJ and coronoid. The intraoperative blood loss was measured during this dissection and was calculated (in milliliters) by the sum of the volume of fluid collected in suction container minus irrigation fluid and weight of the blood-soaked gauze.

COVARIATES

The analyzed covariates were demographics (age, sex) and preoperative (the affected side, location and type of ankylosis). Age was calculated at the time of operation, sex included male or female, side denoted right or left side of involvement of TMJ and location denoted the presence of unilateral or bilateral ankylosis. The type of ankylosis was diagnosed according to the clinical and radiographic assessment as per Sawhney's classification.

DATA COLLECTION METHODS

Digital medical records and operative case-sheets were reviewed for data collection of orthopantomograms (OPGs), computed tomogramy (CT) scans, facial nerve assessment in accordance with HB facial nerve grading system, and scar based on POSAS. The minimum follow-up period included was 6 months. All operations were performed by a single, experienced surgeon with the standard operating team at the institute. All the observations were made by a single observer. The standard surgical techniques of ABA and IA were followed. All patients in both the groups underwent interpositional arthroplasty which involved the ankylosis release and coronoidectomy followed by abdominal dermis-fat interpositional graft. TMJ arthroplasty of 10 to 15 mm and ipsilateral coronoidectomy was performed in all cases using piezosurgical unit under copious irrigation. An average mouth opening between 35 and 40 mm was achieved on table. The surgical procedures were performed followed by layer wise closure using absorbable sutures and skin with nonabsorbable sutures. Pressure dressing was maintained for 48 hours postoperatively. Topical

antiseptic cream was applied over sutures until suture removal. Postoperative aggressive jaw opening exercise was instructed to all patients to reduce the risk of reankylosis. No surgery or medication was used to treat the FNI or surgical scar.

DATA ANALYSIS

The data was analyzed by a blinded statistician. Statistical analysis was done using Student unpaired t-test, Mann-Whitney U test and regression analysis. Software used was Statistical Package for Social Sciences 24.0 version and Graph-Pad Prism 7.0 version. Statistical significance was considered at $P < .05$.

Results

The sample consisted of 30 patients (40 joints) of TMJ ankylosis equally divided in both groups of IA and ABA. The mean age of the study sample was 22.45 ± 7.09 years in IA group and 19.25 ± 7.06 years in ABA group ($P = .99$). The study included 13 men and 17 women, where IA included 8 men (53.33%), 7 women (46.6%) and ABA had 5 men (33.3%), 10 women (66.6%) ($P = .87$). No patients were lost to follow-up. Fall from height was recorded for 40.9%, followed by road-traffic-accident (37.3%) and infective etiology (21.8%) as cause for ankylosis. Sawhney's Type III cases accounted for 19 joints and Type IV for 21 joints. The right (n = 22) and left (n = 18) side TMJ showed a comparable frequency of ankylosis distribution in both the groups ($P = .99$). The demographic data of patients enrolled in the study is represented in Table 1. There was no statistical difference between the groups in relation to age, sex, involved side, type and location of ankylosis. This shows that there was no statistically significant association between the covariates and the predictor variable. There was a statistically significant association between intraoperative blood loss during dissection with respect to sex ($P = .04$). Otherwise, there was no statistically significant correlation of primary/secondary outcome variables with the covariates (Table 2).

The comparison of difference in FNI at 1 month and 6 months was found statistically significant in favor of IA ($P < .05$) (Table 3). In the ABA group, 55% (n = 11) had grade II dysfunction and 20% had grade III (n = 4), grade IV (n = 4) dysfunction each at 1 month. Whereas in the IA group, grade II dysfunction was noted in 35% (n = 7) and grade III in 10% (n = 2) at 1 month. None of the patients reported severe facial nerve dysfunction. Facial nerve function recovery was observed at 6 months in the cases of ABA with grade IV (n = 1, 5%), grade III (n = 3, 15%), and grade II (n = 10, 50%) cases. Six facial halves returned to grade I normal function (30%) at 6 months in ABA. However, with IA group, 17 halves reported grade I normal function (85%) at 6 months. Mild dysfunction was noted only in (n = 3, 15%) in IA. For scar assessment at 6 months, the mean POSAS score was 40.7 ± 17.2 for IA and 61.75 ± 17 for ABA, which was statistically significant ($P = .001$). The mean patient score in IA and ABA was 21.7 ± 8.65 and 32 ± 8.43, respectively ($P = .019$). And, the mean observer score was 18.95 ± 8.56 in IA and 29.75 ± 8.58 in ABA ($P = .002$) (Table 3).

Time taken for joint exposure in IA was 25.45 ± 2.48 mins and ABA was 35.45 ± 3.97 mins, demonstrating statistically significant difference ($P = .0001$). The mean intraoperative blood loss during this dissection was 52.15 ± 9.12 ml in IA and 80.05 ± 8.91 ml in ABA demonstrating statistically significant difference ($P = .0001$) (Table 4). No intraoperative complications were encountered in any of the cases. Both the approaches provided sufficient exposure of the ankylosed joint and for coronoidectomy. No statistically significant postoperative complications were associated in any of the cases. None of the cases reported reankylosis.

Table 1. BIVARIATE ANALYSIS OF COVARIATES VERSUS PREDICTOR VARIABLE

Covariates	Inviscision Approach (IA)	Alkayat-Bramley Approach (ABA)	*P* Value
Age (yr)	22.45 ± 7.09	19.25 ± 7.06	.99
Sex	Male – 8 (53.33)	Male – 5 (33.3)	.87
	Female – 7 (46.6)	Female – 10 (66.6)	
Type of ankylosis	Type III – 10 (50)	Type III – 9 (45)	.99
	Type IV – 10 (50)	Type IV – 11(55)	
Location of ankylosis	Unilateral – 10 patients (50)	Unilateral – 10 patients (50)	.99
	Bilateral – 5 patients (10 joints) (50)	Bilateral – 5 patients (10 joints) (50)	
Side of ankylosis	Left – 8 (40), Right – 12 (60)	Left – 10 (50), Right – 10 (50)	.99

Note: Data presented as mean ± standard deviation or n (%). *P* value statistically significant at $P < .05$.

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Table 2. BIVARIATE ANALYSES OF COVARIATES VERSUS OUTCOME VARIABLES

	Primary Outcome Variables		Secondary Outcome Variables	
Covariates	FNI Mean (SD)	POSAS Mean (SD)	Dissection Time Mean (SD)	Intraoperative Blood Loss Mean (SD)
Sex				
Male	1.01 (0.00)	50.15 (9.63)	27.40 (1.95)	57.19 (5.83)
Female	1.09 (0.00)	56.30 (7.50)	29.31 (2.10)	70.98 (4.17)
P value	.67	.07	.30	.04*
Type of ankylosis				
Type III	1.00 (0.00)	55.82 (7.20)	27.88 (1.00)	64.20 (7.10)
Type IV	1.04 (0.19)	53.20 (6.55)	29.50 (2.42)	68.33 (7.14)
P value	.22	.91	.47	.46
Location of ankylosis				
Unilateral	1.00 (0.00)	49.25 (6.80)	26.42 (0.80)	61.23 (2.17)
Bilateral	1.07 (0.02)	53.40 (7.00)	29.10 (0.88)	65.49 (4.33)
P value	.55	.17	.97	.78
Side of ankylosis				
Right	1.12 (0.27)	55.0 (8.20)	27.0 (1.20)	67.43 (4.15)
Left	1.00 (0.00)	54.75 (6.90)	27.96 (0.78)	62.22 (3.89)
P value	.40	.19	.50	.27

Abbreviations: FNI, facial nerve injury; POSAS, patient and observer scar assessment scale; SD, standard deviation.
* *P* value statistically significant at $P < .05$.

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REGRESSION ANALYSIS

The regression analysis of the primary predictor variable versus outcome variables is shown in Table 5. It shows that the surgical approach was associated with postoperative FNI ($P = .001$), surgical scar ($P = .001$), dissection time ($P = .000$), and intraoperative blood loss ($P = .000$) after adjusting for potential confounders.

Discussion

The primary objective of this study was to compare the postoperative FNI and surgical scar cosmesis using IA and the ABA in TMJ ankylosis. We hypothesized that IA would reduce the incidence of FNI and offer acceptable scar postoperatively in TMJ ankylosis management. To the best of our knowledge, no study comparing the surgical approaches of modified

Table 3. BIVARIATE ANALYSIS OF PREDICTOR VARIABLE VERSUS PRIMARY OUTCOME VARIABLES

	Primary Outcome Variables				
	FNI		POSAS at 6 Months		
Predictor Variable	1 Month	6 Months	Patient Score	Observer Score	Total Score
IA	G I – 11 (55%)				
	G II – 7 (35%)	G I – 17 (85%)	21.7 ± 8.65	18.95 ± 8.56	40.7 ± 17.2
	G III – 2 (10%)	G II – 3 (15%)			
ABA	G I – 1 (5%)	G I – 6 (30%)			
	G II – 11 (55%)	G II – 10 (50%)	32 ± 8.43	29.75 ± 8.58	61.75 ± 17
	G III – 4 (20%)	G III – 3 (15%)			
	G IV – 4 (20%)	G IV – 1 (5%)			
P value	.001*	.003*	.019*	.002*	.001*

Abbreviations: ABA, Alkayat-Bramley approach; FNI, Facial nerve injury; G I, G II, G III, G IV, facial nerve grading using House-Brackmann scale; IA, inviscision approach; POSAS, Patient and observer scar assessment scale.
* Value statistically significant at $P < .05$. *P* value derived from Student t-test and Mann-Whitney U test. Data presented as mean ± standard deviation or n (%).

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Table 4. BIVARIATE ANALYSIS OF PREDICTOR VARIABLE VERSUS SECONDARY OUTCOME VARIABLES

	Secondary Outcome Variables	
Predictor Variable	Dissection Time (in minutes)	Intraoperative Blood Loss (in mL)
IA	25.45 ± 2.48	52.15 ± 9.12
ABA	35.45 ± 3.97	80.05 ± 8.91
t-value	7.55, P = .0001*	6.32, P = .0001*

Abbreviations: ABA, Alkayat-Bramley approach; IA, inviscision approach.

* Value statistically significant at $P < .05$. The t-value is derived from Student unpaired t-test. Data presented as mean ± standard deviation.

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endaural (IA) and modified preauricular (ABA) in TMJ ankylosis surgery has been reported.

The choice of surgical approach significantly affects the successful exposure of the joint and preservation of the neurosensory structures. Traditionally, the preauricular incision modified by Alkayat-Bramley gained acceptance for TMJ and arch exposure, which also facilitated the favorable interposition of temporalis myofascial flap in ankylosis surgery.[22-24] However, recent modifications in dissection techniques aim to better safeguard the facial nerve during TMJ exposure.[8,13,16] Nevertheless, no statistically significant differences were observed in long-term outcomes with these modifications.[16,25] The endaural incision has been modified over the years for TMJ exposure, with inviscision being one of these modifications, acknowledged for its direct access and cosmetically acceptable scar.[11,12,26-28] Inviscision represents a refinement of the endaural incision, providing favorable results as the incision closely adheres to the natural aural anatomy and positions the scar line in a less visible location[11] (Fig 1).

The results of the present study confirm that IA yields superior outcomes compared to ABA in terms of FNI and surgical scar perception. IA offered adequate access to the TMJ and coronoid process with minimally invasive approach (Figs 2 and 3). Regarding FNI at 1 month and 6 months, IA had a better outcome than ABA. In addition, it was observed that the most frequently injured branch was the temporal branch, followed by the zygomatic branch of the facial nerve. There was 20% incidence of zygomatic branch weakness in ABA (n = 4) and none in IA observed at 1 month. However, zygomatic branch function was fully recovered at 6 months in both the

Table 5. SUMMARY OF REGRESSION MODEL FOR SURGICAL APPROACH VERSUS OUTCOME VARIABLES AFTER ADJUSTING FOR COVARIABLES

Outcome Variables	Predictor Variable	B	95% CI	P Value
FNI	Approach	0.756	0.322 to 1.190	.001*
	Age	−0.019	−0.054 to 0.016	.272
	Sex	0.045	−0.443 to 0.533	.853
	Side of ankylosis	0.195	−0.226 to 0.616	.352
	Diagnosis	−0.369	−0.846 to 0.108	.126
POSAS	Approach	22.447	10.486 to 34.407	.001*
	Age	0.262	−0.703 to 1.228	.584
	Sex	2.926	−10.51 to 16.369	.661
	Side of ankylosis	−2.982	−14.57 to 8.608	.604
	Diagnosis	4.548	−8.599 to 17.695	.487
Dissection time	Approach	9.956	7.668 to 12.244	.000*
	Age	−0.004	−0.188 to 0.181	.969
	Sex	−0.439	−3.010 to 2.133	.731
	Side of ankylosis	0.550	−1.667 to 2.768	.617
	Diagnosis	−1.662	−4.177 to 0.853	.188
Intraoperative blood loss	Approach	28.707	22.335 to 35.080	.000*
	Age	0.023	−0.492 to 0.537	.929
	Sex	2.569	−4.593 to 9.731	.471
	Side of ankylosis	−0.898	−7.073 to 5.277	.769
	Diagnosis	−3.523	−10.52 to 3.481	.314

Abbreviations: B, unstandardized beta coefficient of regression model; CI, confidence interval; FNI, facial nerve injury; POSAS, Patient and observer scar assessment scale.

* P value statistically significant at $P < .05$.

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FIGURE 1. Image showing the modified endaural 'inviscision' with incision running over the tragus, the crus helix and cavum concha.

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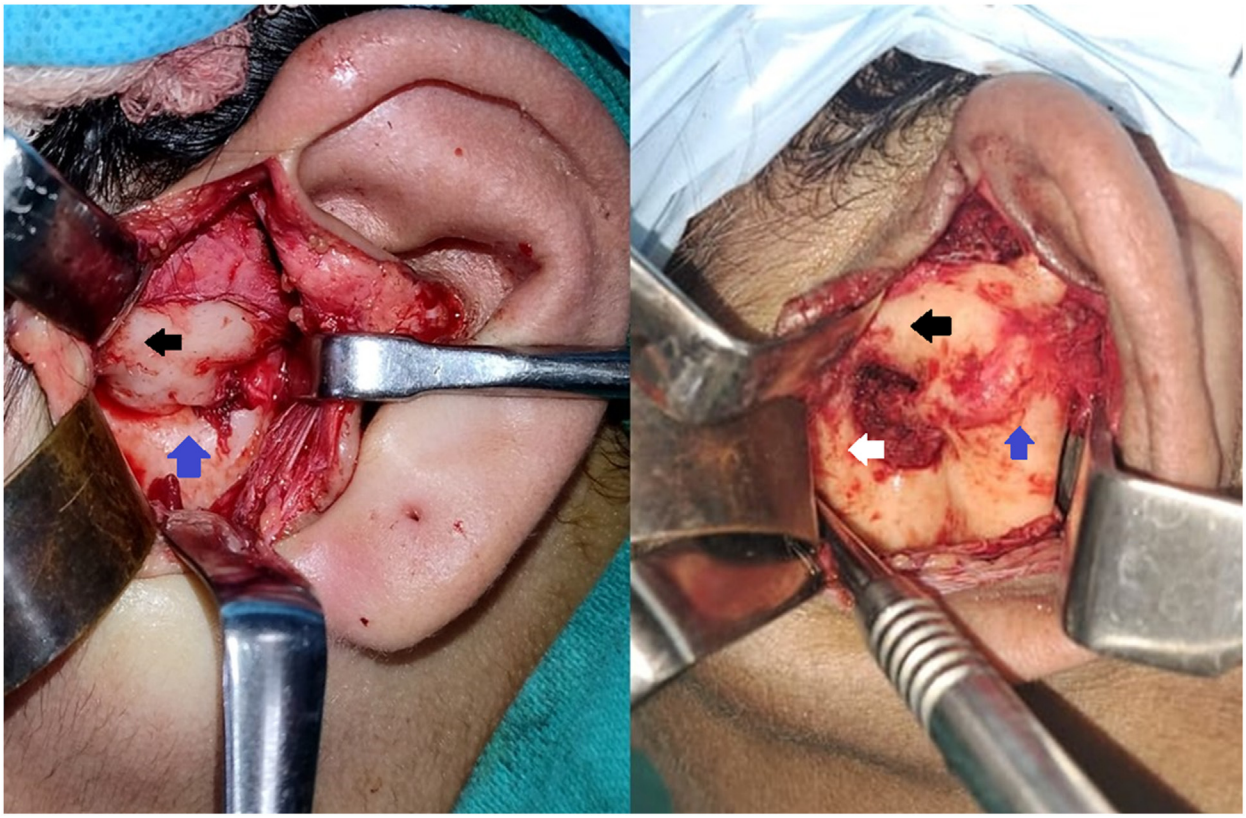

FIGURE 2. Image showing access to the ankylosed joint (*blue arrow*), coronoid process (*white arrow*) and zygomatic arch (*black arrow*) via the inviscision.

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FIGURE 3. Image showing postoperative closure of the inviscision.

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FIGURE 4. Image showing the marking for the Alkayat-Bramley approach.

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groups. Furthermore, at 6 months, all surgical sites in the IA retained normal function except for 3 sites (15%) that exhibited mild dysfunction of temporal branch. In contrast, temporal branch weakness in ABA accounted for Grade IV (n = 1, 5%), Grade III (n = 3, 15%), Grade II (n = 10, 50%) at 6 months. This can be attributed to subfascial dissection in ABA extending to malar arch to reach the joint capsule and coronoid process, resulting in a higher incidence of injury to temporal branch due to stretching of the retracted tissues.[12] (Figs 4-6) However in inviscision, the lateral aspect of the TMJ is the initial site of exposure.[11] The avascular plane of dissection above perichondrium provides direct access to posterior and lateral aspects of TMJ with neurovascular bundle safely protected in reflected flap. Extensive exposure of coronoid process was achieved by meticulous dissection in sigmoid notch region (Fig 2). The dissection plane is also easily identified and reproducible, making the method simple for a surgeon with a basic understanding of anatomy.[11,26]

Furthermore, at 6 months, IA showed better cosmesis of surgical site and left an acceptable scar in comparison to ABA (Fig. 7). In addition, removal of temporal hair is avoided in IA, with better patient acceptance. However, there was a sense of discomfort amongst patients, especially females, regarding shaving of hair on the operating side for the purpose of incision, which took months for ABA scar to be hidden in the hairline (Fig 8). This caused patients to feel self-conscious and socially uncomfortable after surgery, a concern that is mitigated in IA. It was noted that patients were more concerned about scar color, stiffness, irregularity and itchiness which influenced their overall opinion, despite the scar not being directly visible. In the observer component of POSAS, the vascularity, pigmentation and pliability received high scores. POSAS offered a comprehensive scar evaluation, taking into consideration both the patient's perceptions and the observer's opinions. The results of the intraoperative parameters namely dissection time and the amount of blood loss during dissection yielded statistically significant results in favor of IA.

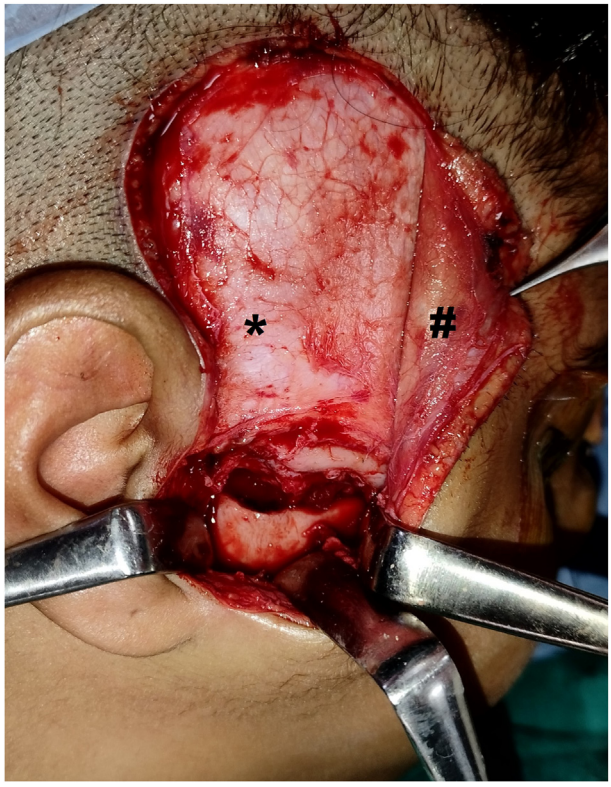

FIGURE 5. Image showing the surgical exposure of the joint using the Alkayat-Bramley approach (* denotes deep layer of deep temporal fascia, # denotes superficial layer of deep temporal fascia).

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FIGURE 6. Image showing postoperative closure of the Alkayat-Bramley incision.

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These results can probably be attributed to pericartilaginous dissection anterior to tragus in IA. A few other complications were noted, which were comparable between both the approaches. Infection and perichondritis were observed in one case of IA due to poor wound healing and patient's poor glycemic control, which resolved after the administration of oral hypoglycemics and antibiotics. Hypertrophic scar were treated with topical silicone gel after 6 months. In addition, a closed suction drain is superfluous in IA, which likely reduces the risk of infection.

From the decades of evidence available in the literature, none of the studies have compared the 2 incisions used for TMJ ankylosis surgery.[3,13,18] Electromyography studies have demonstrated faster facial nerve recovery with modified endaural approach.[29] Studies have reported temporary FNI between 40 and 60% incidence, the temporal branch being most commonly affected, followed by zygomatic branch at 1 month postoperatively.[12,15] The majority of evidence is based on cohorts with TMJ internal derangement, degenerative joint disease, condylar fractures that required discectomy, eminectomy, lysis of disc adhesions, condylectomy or fixation; there is a smaller cohort focused on ankylosis that necessitates coronoidectomy.[10,12,15] A study assessing FNI in relation to TMJ pathology and surgical procedures reported a 33.3% higher prevalence of injury in ankylosis compared to all other pathologies, which was statistically significant.[10] This correlates to findings of our study, where the high incidence of transient FNI is possibly attributed to retraction neuropraxia and edema due to surgical trauma, which requires extensive exposure in ankylosis and ultimately increases the operative duration. Therefore, these factors can be justified as possible causes for FNI in ankylosis, although it remains nonquantifiable and indistinguishable whether the nerve injury was solely due to surgical dissection or heavy retraction. Recent literature suggests the use of dermis fat graft for interposition, which has the least recurrence rate and eliminates the need to harvest temporalis myofascial flap from ABA.[23,30,31] Postoperative scars were acceptable in nearly all cases of IA, which is consistent with findings from Davies et al.[11] Perichondritis and dehiscence, although rare, can be anticipated in ankylosis surgery with IA due to prolonged heavy retraction needed for coronoidectomy. This can be minimized by meticulous dissection over perichondrium and adhering to proper layer-wise suturing techniques, leading to successful scar healing.

FIGURE 7. Image showing the healed inviscision.

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FIGURE 8. Image showing the healed scar of Alkayat-Bramley incision.

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The present study design reflects a deliberate effort to collect robust clinical evidence with adequate follow-up, which is a key strength despite its retrospective nature. The study's limitations include the lack of prospective randomization, a small sample size, absence of electromyography assessment of facial nerve function, and quality-of-life measures. While the HB scale was used for facial nerve assessment, it is limited in that it reduces function to a single grade and does not distinguish subtle differences in dysfunction among the branches of the facial nerve. For example, the inability to lift the eyebrow with barely perceptible motion (grade V) may coexist with complete eye closure requiring minimal effort (grade II). Despite these limitations, the HB grading scale remains the most widely accepted method, offering clinical ease of use and efficiency. The single-observer assessment of outcomes is another limitation that can introduce evaluation bias; however, the retrospective design allows for validation of the current findings. FNI during TMJ surgery is multifactorial, with key determinants including the type of incision, prior surgeries, the type and duration of surgery. Moreover, there is a recognized need to standardize the reporting of facial nerve recovery.

The authors recommend undertaking randomized controlled trials on inviscision with a larger cohort and long follow-up for better evaluation of clinical outcomes. The encouraging results positions inviscision favorably over traditional incisions, demonstrating shorter dissection times, reduced blood loss and esthetically acceptable scars. The authors propose that ABA should not be entirely dismissed and recommend its consideration for recurrent cases. In addition, it is crucial to acknowledge that inviscision has demonstrated superior facial nerve recovery within a comparable time-frame to the ABA. Based on our results, inviscision is a potentially transformative addition to the armamentarium of clinicians. In conclusion, this study contributes valuable evidence that can inform refinements in the technique and guide prospective studies comparing inviscision with other surgical approaches for the TMJ pathologies, ultimately strengthening the evidence on this topic.

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