

Al- Kayat Bramley Incision in Temporomandibular Joint Ankylosis: A Study

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ABSTRACT

Background: Temporomandibular joint (TMJ) ankylosis is defined as bony or fibrous adhesion of the anatomic joint components accompanied by a limitation in mouth opening, causing difficulties with mastication, speech and oral hygiene as well as inadvertently influencing mandibular growth. Al-Kayat Bramley incision provides adequate access to ankylotic TMJ for creation of sufficient gap and with the same incision one can interposition the temporalis fascia as well. Coronoidectomy, if required, as per Kaban's Protocol can be done through the same approach to achieve the desired mouth opening reducing the recurrence rate. The obtained wide exposure with suitable dissection prevents facial nerve injury and reduces chances of undesirable bleeding. Less alopecia and hidden scar provide the additional aesthetic advantage.

Keywords: Temporomandibular joint, Ankylosis, Al-Kayat Bramley, Incision.

INTRODUCTION

Temporomandibular joint (TMJ) ankylosis is defined as bony or fibrous adhesion of the anatomic joint components accompanied by a limitation in opening the mouth, causing difficulties with mastication, speech and oral hygiene as well as inadvertently influencing mandibular growth.¹ Etiological factors are trauma, local and systemic inflammatory conditions, tumours, degenerative diseases, forceps delivery and TMJ infection. The most common cause is usually trauma and infection.²

Younger patients have a greater tendency towards post-traumatic ankylosis, mostly before 10 years of age.³ The basic surgical management requires osteoarthrectomy and interpositional arthroplasty. The aim of treatment is not only to re-establish the movement at the joint but also prevent relapse. The restoration of occlusion and minimizing the secondary facial disharmony and occlusal abnormalities in children are equally important considerations, which can be achieved by

interceptive surgery in an attempt to restore normal facial growth. In adults, however, due to the resulting facial and occlusal disharmony, corrective surgery to realign the chin leaves a large lateral open bite on the affected side. Camouflaging procedures such as genioplasty are required to produce an acceptable result. Al-Kayat Bramley approach provides adequate access to TMJ ankylotic chunk for creation of sufficient gap and with the same incision one can interposition the temporalis fascia as well.

Coronoidectomy, if required, as per Kaban's Protocol can be done through the same approach to achieve the desired mouth opening.⁴ It is one of the most versatile and safe incision used in Oral and Maxillofacial Surgery. The approach involves the use of safe and well-hidden incision which permits widespread exposure with minimum complications. The aim of present study was to evaluate the use of Al-kayat Bramley incision in the management of TMJ ankylosis.

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MATERIALS AND METHODS

Ten clinically and radiographically diagnosed cases of TMJ ankylosis from August 2017 to June 2019, irrespective of gender, socioeconomic status, etiology and side affected were included in the study. Informed written consent was taken from all the subjects. Patients having any other TMJ disorder or who didn't turn up for surgery were excluded.

Surgical Technique:

TMJ area was approached through the standard Al-Kayat and Bramley's incision (Photograph 1). The incision line was first mapped out using marking ink. It started just within the hairline, about a pinna's length above the ear, and curved backwards and downwards well behind the main branches of the temporal vessels to the uppermost skin attachment of the pinna, following this anteriorly to the tragus and then moving end aurally and finally out again to the skin crease in front of the lobe of the ear and no further. Local anesthetic containing 1:200000 adrenaline was injected beneath the line of incision to reduce the bleeding during surgery.

Using number 15 blade the incision was started at the temporal end and taken down to the temporalis fascia. The flap was raised including superficial fascia and pre-auricular fascia as part of the skin flap. At about 2 cm above the malar arch, the flap development stopped and the pocket between the lateral and medial layers of temporalis fascia identified as fat globules could be seen shining through lateral layer. Starting at the root of malar arch, an incision running at 45° upwards and forwards was made through superficial layer of temporalis fascia with entry into the pocket. The periosteum of the malar arch on its deeper surface was safely incised and raised as one flap with the outer layer of temporal fascia and superficial fascia containing the nerves. The zygomatic branch of the superficial temporal artery was ligated. The careful division and reflection of outer layer of temporal fascia and then at malar arch working at a sub-periosteal level, virtually guarantees the integrity of temporal and zygomatic branches of facial nerve. The wide exposure with this incision also prevents excessive traction on the flap further negating facial nerve injury. The incision of the periosteum was extended to the post glenoid tubercle and reflected to expose the ankylosed mass (Photograph 2).



Fig 1: Al- Kayat and Bramley incision

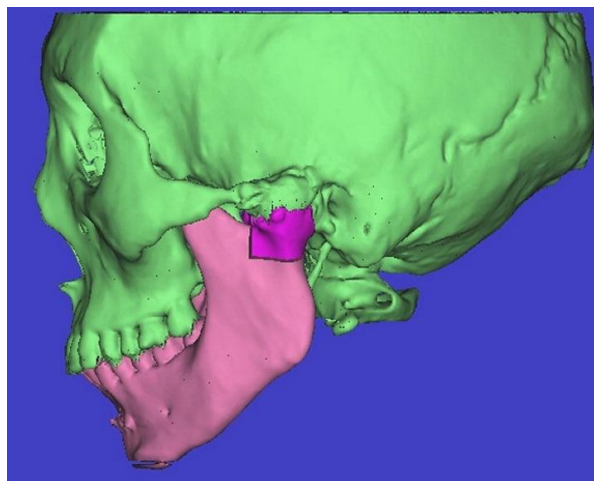


Fig 1: TMJ ankylosis.

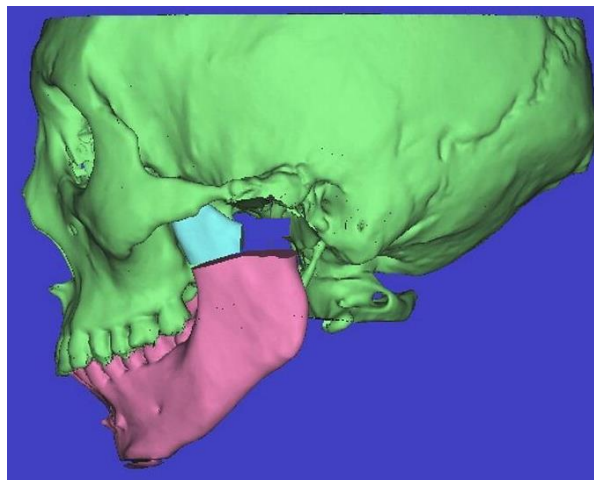


Fig 2: Gap arthroplasty.



Fig 4: Adequate exposure and gap arthroplasty with Al- Kayat Bramley Incision.

Table 1: Age wise distribution of patients.

Age group (in years)	Total Number of patients	Percentage (%)	Mean age	Standard deviation	Range
15-25	3	30	27.40 year	6.39 year	16-19 year
26-35	7	70			
Total	10	100			

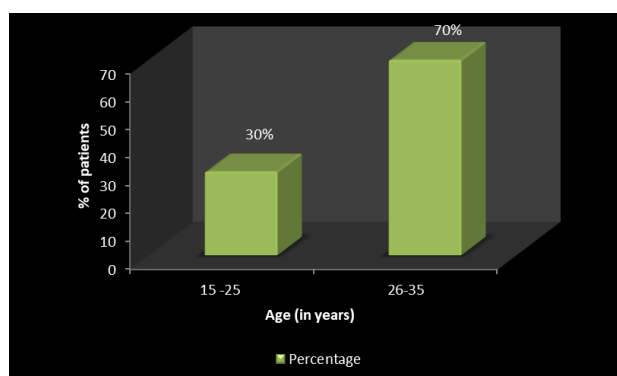


Fig 1: Age wise distribution of patients.

Table 2: Alopecia

Days	Alopecia			
	Absent		Present	
	No	%	No	%
1 st day	10	100.0	0	00.0
5 th day	10	100.0	0	000.0
7 th day	10	100.0	0	00.0
4 th week	10	100.0	0	00.0
6 th week	10	100.0	0	00.0
12 th week	00	00.0	10	100.0

After exposure of the site of bony block, the ankylosed bone was removed by using a round bur until a thin cortical bone was left in the depth. Then a chisel was used gently to split two segments, avoiding injury to internal maxillary artery. Any bony tissue deep in the surgical field and the irregular edges of the segments were shaved by bur. A space at least 1.5-2 cm between zygomatic arch and the upper surface of the ramus was created (Photograph 3 and 4). Pedicled temporal fascia was used as interposition material. After achieving hemostasis, wound was closed in layers and surgical vacuum drain placed. Pressure pad and bandage was given for 24 hours.

Assessment Criteria:

The approach was assessed based on the criteria below. Assessment was done after 24 hours, on day five, seven and after fourth, sixth and twelfth week.

- (a) Accessibility to anatomic structures- Adequate/Inadequate
- (b) Mean time required for exposure and reflection of flap (in minutes)
- (c) Post-operative haematoma- Present/Absent
- (d) Post-operative infection at incision line- Present/Absent
- (e) Post-operative alopecia- Present/Absent
- (f) Pain - Visual Analog Scale 1-10

A copy was given to patients to record pain in the post-operative days.

- (g) Post-operative swelling at operated side-

Score given as-

- 0 – No swelling
- 1 – Mild swelling
- 2 – Moderate swelling
- 3 – Severe swelling

- (h) Paresthesia- Present/Absent

- (i) Facial nerve involvement- Present/Absent

- (j) Maximum mouth opening (in centimetres)

The statistical analysis was done using SPSS (Statistical Package for Social Sciences), Version 15.0 Software. Statistical tools employed were Mean, Standard deviation, Student 't' test, Paired 't' test and Chi-square test. Probabilities of less than 0.05 were accepted as significant.

RESULTS

From our observation it was found that 26 to 35 years was the most common involved age group (70%) followed by 15 – 25 year (30%), and the mean age of the patient was 27.40 years (Table 1 & Bar diagram 1). Out of ten, two had bilateral TMJ ankylosis. In our series of cases, none of our patients developed hematoma at the postoperative site. This was attributed to proper attainment of haemostasis at the operated site prior to closure and also due to the use of vacuum drain, that were removed after 48-72 hour. In our series of ten patients, none developed postoperative infection at the operated site. This was attributed primarily to the strict adherence to the sterilization protocol. From our observation, transient alopecia of 2mm around the scar were observed in all cases which persisted for 1-1.5 months. But at the 12th week follow-up, increase in hair density in the focal areas were seen in all patients (Table 2). In this study we observed that severe degree of swelling which was maximum at immediate postoperative period decreased significantly on the fifth day but again increased on the 7th day which may be due to physiotherapy. The swelling, however, was a normal postoperative sequela and reduced to nil. On the immediate postoperative day, facial nerve deficit was evident in 20% of our patients, which gradually started to decrease significantly from the seventh day onwards and was completely absent on 3 months follow up. Paraesthesia or sensory deficit was not appreciable in any case. In all the cases, temporalis fascia was interposition through the same incision. Coronoidectomy too was done through the same Al-Kayat Bramley incision and no additional intraoral approach was required. The time taken to reflect the flap averaged to be 15-20 minutes. Intraoperative mouth opening of 35 to 40 mm was achieved. No inadvertent injury to internal maxillary artery was seen.

DISCUSSION

In this study, Al- Kayat Bramley approach provided adequate exposure to the surgical site. The exposure provided was considered adequate with the benefits of accessibility and visibility far outweighing the time consumed for reflection of flap. We found majority of the patients (90%) were males between 20 to 40 years which was similar to

descriptive analytical study conducted by Chossegras et al.⁵

Temporary motor nerve deficits were reported in the literature with recovery periods varying from 2 months to 1 year. In our study, transient motor nerve (facial) deficits in the form of muscle weakness were evident in 20% of our patients but had complete recovery by the end of 3 months. This observation was similar to the retrospective study of Elgazzar et al.⁶ who in a series of 27 patients reported that in most of the cases nerve deficit had resolved within 12 weeks. Neither Al kayat et al.^{7,8} nor Kaban⁹ and Clarkson et al.¹⁰ reported any long term motor nerve deficits, whilst Mitchell et al.¹¹ (1973) with hemicoronal approach in zygomatic fractures had 2 patients (4%) in a series of 50 patients with deficits that persisted for longer than 6 months. The careful division and reflection of outer layer of temporal fascia and then at malar arch working at a sub-periosteal level, virtually guarantees the integrity of temporal and zygomatic branches of facial nerve. The wide exposure with this incision also prevents excessive traction on the flap further negating facial nerve injury. The bifurcation of facial nerve is not nearer than 2.5 cm in an infero-posterior direction from post-glenoid tubercle and deep dissection should not be extended below inferior limit of bony external auditory meatus. Auriculotemporal nerve damage was minimized by keeping the incision in close apposition to cartilaginous portion of external auditory meatus. Swelling reached maximum (50 %) in the first 24 hours postoperatively. It resolved significantly from the 7th postoperative day which was in accordance with the studies by Topazian¹² and Popescu et al.¹³. Mouth opening achieved was adequate in all the cases which was in congruence with the study by Skouteris et al.¹⁴ Hematoma and alopecia was absent which coincided with the findings of El-Sayed.¹⁵ The incision made parallel to hair shafts at an angle of 45 degree results in less incidence of alopecia.

CONCLUSION

Al-Kayat and Bramley incision is the best and safest approach for osteoarthrectomy with interpositional arthroplasty in TMJ ankylosis with least chances of recurrence. It results in adequate mouth opening and at the same time prevents nearby nerve & vascular injuries. Moreover, coronoidectomy if

required can be done through the same incision preventing the need of an additional approach. Less alopecia and hidden scar provide the additional aesthetic advantage.

CONFLICTS OF INTEREST

The authors declare they have no potential conflict of interests regarding this article.

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