



REVIEW

Management Of Temporomandibular Joint Ankylosis Gap Vs Interpositional Arthroplasty

Madhu K¹, Deepika S², Monica S³, Venugopalan V⁴, Sathyanarayanan R⁵

ABSTRACT: In the management of temporomandibular Joint ankylosis, Gap arthroplasty and Interpositionalarthroplasty techniques are most commonly and widely used, in which preventing recurrence is a major concern. We selected ten cases of which five underwent gap arthroplasty and remaining five underwent interpositionalarthroplasty. In our cases, interpositionalarthroplasty technique was done using temporalis fascia. It is used because of its rich blood supply and its proximity to the reconstruction site. This retrospective review of 10 cases which concludes that both Gap and Interpositionalarthroplasty have a satisfactory functional outcome in preventing recurrence as well as in achieving maximal interincisal mouth opening.

Key words :Temporomandibularankylosis , Interpositionalarthroplasty, temporalis fascia

INTRODUCTION:

Temporomandibular joint ankylosis (TMJ) is a bony fusion between the condyle and the temporal bone, which partially or completely obliterates the articular space and it leads to joint deformity⁽¹⁾. This bony fusion between fragments or a large bone mass usually involves the condyle of the mandible, the temporal bone, and the zygomatic process. Thus it can be easily diagnosed from CT(computed tomography) and panaromic radiograph⁽²⁾.

TMJ ankylosis earlier in 1938 was classified into two types by Kazanjian as intra-articular and extra-articular ankylosis⁽³⁾. In 2002, El-Hakim and Metwalli reported a new classification of bony ankylosis including surrounding vital structures. Its complication includes difficulty in mastication, digestion, speech, appearance, and oral hygiene⁽⁴⁾. In growing patients, it results in facial deformities involving mandible and maxilla, which causes malocclusion. It is a debilitating condition usually effecting children and young adults⁽²⁾. Here we have discussed about 10 patients with TMJ ankylosis, in which gap arthroplaty was performed for five patients and the other five were treated with interpositionalarthroplasty.

PATIENTS AND METHODS:

10 patients with TMJ ankylosis, in which gap arthroplaty was performed for five patients and the other five were treated with interpositionalarthroplasty. Limited mouth opening was the chief complaints for all the patients. Of the 10 patients, four were diagnosed to have unilateral ankylosis and six patients had bilateral ankylosis.

Patient history shows various causes such as trauma in six patients, previous history of surgery for one patient and unknown cause in other three patients. The average preoperative mouth opening was about 8mm .The radiographic examination includes panaromic radiograph and CT scans in which the lateral and medial extention of the ankylotic mass was clearly noted.

All patients were operated under general anaesthesia with nasotracheal intubation. The incision site was infiltrated with 10ml of lignocaine with 1: 2,00,000 adrenaline. Access to the TMJ was through Alkaytbramhley incision or preauricular incision. Facial nerve was protected, ankylotic mass was exposed and osteotomy cuts given and ankylotic mass was excised. Trail mouth opening was attempted and measured. According to Kaban's protocol if a minimum requirement of 30 to 35 mm is not achieved ipsilateralcoronoidectomy was

performed, and mouth opening was rechecked. A pedicled temporalis fascia was placed and stabilized in the gap created. Layer by layer closure done. Mouth opening exercise was began as early as first postoperative day with gradual increase in its intensity. Aggressive physiotherapy was followed for patients who had recurrent TMJ ankylosis. Figure 1 describes interpositional arthroplasty with temporalis myofascial flap procedure and figure 2 describes gap arthroplasty procedure.

DISCUSSION:

The causes for TMJ ankylosis can be due trauma in early childhood or any infections ⁽⁵⁾. In our 10 cases, which are included for the comparison between those who underwent, Gap arthroplasty and Interpositional arthroplasty, posttraumatic TMJ ankylosis was mostly commonly encountered factor. According to Roy choudhury et al 1999 its incidence was reported as 86% in India ⁽⁶⁾. The problems mainly faced by TMJ ankylosis are facial asymmetry, occlusal rearrangement and psychosocial problems ⁽⁷⁾. The challenge in the management of TMJ ankylosis depends on restoration of mandibular function, to achieve adequate mouth opening, to avoid recurrence and to help in mandibular growth in paediatric patients⁽⁴⁾, for which a combination of surgery and early physiotherapy is said to be the choice of treatment⁽⁸⁾.

There are many surgical procedures have been used to achieve these goals. They are ⁽⁹⁾

1) Gap arthroplasty: This is the traditional surgical method which includes resection of the bone and division using no interpositional tissue or material (Gundlach, 2010) ⁽¹⁰⁾.

2) Interpositional arthroplasty with autogenous grafts: This involves gap arthroplasty and interposition of autogenous tissues like costochondral grafts, temporalis muscle flaps, dermal grafts, auricular cartilage and fascia (Topazian, 1966).

3) Interpositional arthroplasty with alloplastic materials: This involves the use of lyodura or any alloplastic materials like vitalium, acrylic, teflon-

proplast and silicone (Sawhney, 1986; Sayan et al., 2007).

4) Placement of the hemi joint or total prosthesis (Guven, 2008):

The choice of surgery depends upon various factors including age, medical status, growth potential, recurrences. (Danda et al 2009) ⁽¹¹⁾

Gap arthroplasty is the oldest technique in treating the temporomandibular joint ankylosis. It is done by reconturing the glenoid fossa by creating a gap between the fossa and ramal stump by 1.5 cm, and the ankylotic mass is excised. Injury to the vital structures are prevented by using channel retractor on the medial aspect ⁽¹²⁾. It is said to be advantageous because it is very simple and has less operating time⁽¹³⁾. Leonard et al described the disadvantages of gap arthroplasty like pseudoarticulation, short ramus, risk of reankylosis and has certain complications such as premature occlusion and open bite on the affected and contralateral side respectively, Open bite in cases of bilateral TMJ ankylosis⁽⁵⁾.

Chossegros et al., 1997 ⁽⁸⁾ described that surgical treatment only with gap arthroplasty without interpositional material requires a large amount of bone resection which leads to more jaw deviation. Therefore, he suggested interpositional arthroplasty, which reduces the recurrence rate due to osteoblastic growth.

Pogrel and Kaban et al 1990 ⁽¹⁴⁾ described advantages of temporalis fascia - muscle flap that may include (A) only fascia or both fascia and muscle, and is rotated inferiorly over the zygomatic arch and into the joint space. (B) Flap can be taken through same incision. (C) The dissection plane is directly over deep temporal fascia which prevents facial nerve injury (D) donor site morbidity is less.

He also included the disadvantages of interpositional arthroplasty, which include donor site morbidity if autogenous materials are used, foreign body reaction in case of alloplastic materials, failure to remove all bony pathology.

Brusati et al ⁽¹⁵⁾ used the temporalis muscle flap to treat the severely damaged TMJ structural



Fig 1 :Interpositional Arthroplasty with temporalis myofascial flap

- 1a. Alkayt bramhley incision
- 1b. Osteotomy
- 1c. Temporalis fascia in situ
- 1d. Mouth opening
- 1e. Closure

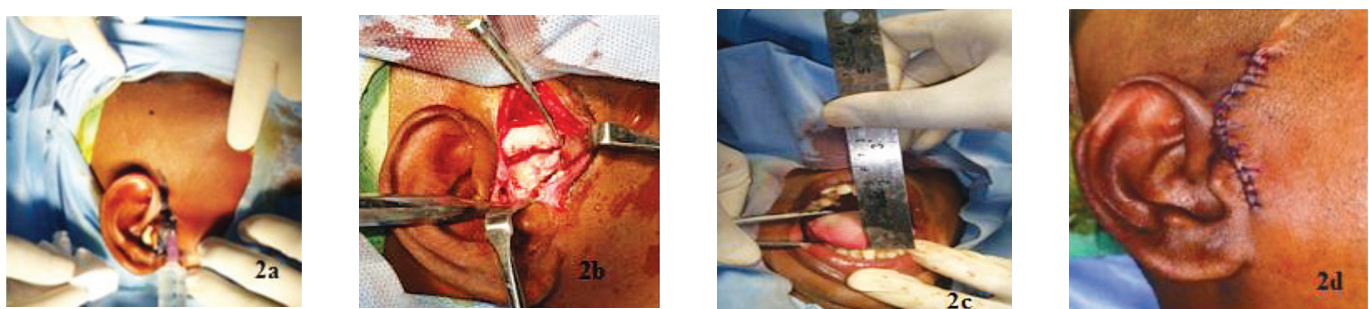


Fig 2 :Gap Arthroplasty

- 2a. Preauricular incision
- 2b. Osteotomy
- 2c. Mouth opening
- 2d. Closure

components. He treated 12 patients with 13 TMJ ankylosis using this surgical procedure and they showed positive functional results without any complication.

Clauser et al ⁽¹⁶⁾ carried out reconstruction with the temporalis myofascial flap in 182 cases specifically for reconstructive cranio-maxillofacial surgery - trauma, deformities, tumours, TMJ ankylosis, facial paralysis. No major complications were observed. The use of this flap constitutes a quick, reproducible method of reconstruction associated with minimal morbidity ⁽¹⁷⁾.

Karthigeyan et al 2012 ⁽¹⁸⁾ done eight cases with gap arthroplasty and nine cases with interpositional arthroplasty and observed that post operative Maximal interincisal Mouth Opening was greater in patients treated with interpositional arthroplasty.

Roychoudhury et al 1999 ⁽⁶⁾ done gap arthroplasty in TMJ ankylosis in 50 cases and concluded the recurrence rate was 2%.

Recurrence is a major concern in management of TMJ ankylosis. According to Krushna et al 2014, who operated 262 patients with TMJ ankylosis in which 207 patients gap arthroplasty (group I) was performed and in 55 patients temporalis myofascial interposition arthroplasty (group II) performed and he observed the recurrence rate is about 14.6% in group I and 4.8% in group II the differences were statistically insignificant (p value 0.08) ⁽¹³⁾.

In our present study, 10 patients with follow up of two years were done. The mouth opening measured is more than 30 mm in all cases with no recurrence. It is important to include that the success in achieving adequate mouth opening was achieved because of early postoperative mouth opening exercise and physiotherapy with strict follow up.

In conclusion the treatments using of temporalis fascia as interpositional material and gap arthroplasty with active mouth opening exercise gives a satisfactory functional outcome and also in preventing the recurrence.

REFERENCES

1. Kaban LB, Perrott DH, Fisher K. Joint Ankylosis. *J Oral Maxillofac Surg.* 1990;48:1145–51.
2. Menon S, Sinha R. Gap Arthroplasty for Mandibular Condyle Dislocation and Impaction Into the Middle Cranial Fossa. *J Oral Maxillofac Surg.* 2008;66(11):2390–3.
3. Song J, Kim S, Choi H, Kim HJ. Severe bony ankylosis of the temporomandibular joint on one side and contralateral adhesion : A case report. 2015;103–8.
4. Huang I-Y, Lai S-T, Shen Y-H, Worthington P. Interpositional arthroplasty using autogenous costal cartilage graft for temporomandibular joint ankylosis in adults. *Int J Oral Maxillofac Surg* [Internet]. 2007;36(10):909–15. Available from: <http://www.ncbi.nlm.nih.gov/pubmed/17644342>
5. Kaban LB, Perrott DH, Fisher K. A protocol for management of temporomandibular joint ankylosis. *J Oral Maxillofac Surg.* 1990;48(11):1145–51; discussion 1152.
6. Roychoudhury A, Parkash H, Trikha A. Functional restoration by gap arthroplasty in temporomandibular joint ankylosis. *Oral Surgery, Oral Med Oral Pathol Oral Radiol Endodontology* [Internet]. 1999;87(2):166–9. Available from: <http://www.sciencedirect.com/science/article/pii/S1079210499702672>
7. Zhi K, Ren W, Zhou H, Gao L, Zhao L, Hou C, et al. Management of temporomandibular joint ankylosis: 11 years' clinical experience. *Oral Surg Oral Med Oral Pathol Oral Radiol Endod* [Internet]. Elsevier Inc.; 2009;108(5):687–92. Available from: <http://dx.doi.org/10.1016/j.tripleo.2009.06.041>
8. Chossegros C, Guyot L, Cheynet F, Blanc JL, Cannoni P. Full-thickness skin graft interposition after temporomandibular joint ankylosis surgery. *Int J Oral Maxillofac Surg.* 1999;28(5):330–4.
9. Karamese M, Duymaz A, Seyhan N, Keskin M, Tosun Z. Management of temporomandibular joint ankylosis with temporalis fascia flap and fat graft. *J Cranio-Maxillofacial Surg* [Internet]. Elsevier Ltd;

- 2013;41(8):789–93. Available from: <http://dx.doi.org/10.1016/j.jcms.2013.01.027>
10. Gundlach KKH. Ankylosis of the temporomandibular joint. J Cranio-Maxillofac Surg [Internet]. European Association for Cranio-Maxillofacial Surgery; 2007;38(2):122–30. Available from: <http://dx.doi.org/10.1016/j.jcms.2009.04.006>
 11. Danda AK, S R, Chinnaswami R. Comparison of gap arthroplasty with and without a temporalis muscle flap for the treatment of ankylosis. J Oral Maxillofac Surg [Internet]. American Association of Oral and Maxillofacial Surgeons; 2009;67(7):1425–31. Available from: <http://dx.doi.org/10.1016/j.joms.2008.12.049>
 12. Babu L, Jain MK, Ramesh C, Vinayaka N. Is aggressive gap arthroplasty essential in the management of temporomandibular joint ankylosis?-a prospective clinical study of 15 cases. Br J Oral Maxillofac Surg [Internet]. British Association of Oral and Maxillofacial Surgeons; 2013;51(6):473–8. Available from: <http://dx.doi.org/10.1016/j.bjoms.2012.11.004>
 13. Bhatt K, Roychoudhury A, Bhutia O, Pandey RM. Functional Outcomes of Gap and Interposition Arthroplasty in the Treatment of Temporomandibular Joint Ankylosis. J Oral Maxillofac Surg [Internet]. American Association of Oral and Maxillofacial Surgeons; 2014;72(12):1–6. Available from: <http://dx.doi.org/10.1016/j.joms.2014.08.012>
 14. M, POGREL, L K. The Role of a Temporalis Fascia and Muscle Flap in Temporomandibular Joint surgery. J Oral Maxillofac Surg. 1988;I(48):14–9.
 15. Su-Gwan K. Treatment of temporomandibular joint ankylosis with temporalis muscle and fascia flap. Int J Oral Maxillofac Surg. 2001;30(3):189–93.
 16. Davis BR, Powell JE, Morrison a. D. Free-grafting of mandibular condyle fractures: Clinical outcomes in 10 consecutive patients. Int J Oral Maxillofac Surg. 2005;34:871–6
 17. Clauser L, Curioni C, Spanio S. The use of the temporalis muscle flap in facial and craniofacial reconstructive surgery. A review of 182 cases. J Cranio-Maxillo-Facial Surg. 1995;23(4):203–14.
 18. Karthigeyan R, Sathyanarayanan R, Balatandayoudam A. Management of TMJ ankylosis Gap arthroplasty vs interpositional arthroplasty. JIADS. 2012; 3(1):57–61.

Address of Correspondence

Dr. Monica Subramaniyan
23, Akila Nagar, 3rd st
Mambalasalai, T.V Kovil (P.O)
Trichy- 620005
Tel : +91 9486723047
E-mail: s_monicaa@yahoo.co.in

Authors:

¹Postgraduate student, Dept. of Oral & Maxillofacial Surgery, Indira Gandhi Institute Of Dental Sciences, Pondicherry.

²Postgraduate student, Dept. of Oral & Maxillofacial Surgery, Indira Gandhi Institute Of Dental Sciences, Pondicherry.

³Postgraduate student, Dept. of Oral & Maxillofacial Surgery, Indira Gandhi Institute Of Dental Sciences, Pondicherry.

⁴Postgraduate student, Dept. of Oral & Maxillofacial Surgery, Indira Gandhi Institute Of Dental Sciences, Pondicherry.

⁵Professor, Dept. of Oral & Maxillofacial Surgery, Indira Gandhi Institute Of Dental Sciences, Pondicherry

How to cite this article :

Madhu K, Deepika S, Monica S, Venugopalan V, Sathyanarayanan R. Management Of Temporomandibular Joint Ankylosis Gap Vs Interpositional Arthroplasty Journal of Scientific Dentistry 2015 ; 5(1) : 25-29

Source of Support : Nil, **Conflict of Interest :** None declared