Treatment of Long Standing Bilateral Temporomandibular Joint Ankylosis with Condylar Prosthesis

Syed Sirajul Hassan · Manjunath Rai

Received: 4 November 2009 / Accepted: 14 October 2010 / Published online: 25 November 2010
© Association of Oral and Maxillofacial Surgeons of India 2010

Abstract

Introduction TMJ ankylosis is a condition which results in partial to complete inability to open the mouth due to fusion of head of condyle and glenoid fossa.

Case Report A 28 year old man reported to our department with a complaint of inability to open mouth since 13 years. On basis of clinical examination, radiographs and CT scans, he was diagnosed with complete bilateral bony TMJ ankylosis. The treatment plan included bilateral condylectomy with coronoidectomy through a combination of endaural and rhytidectomy incision and interpositional grafting with temporalis myofascial flap. Reconstruction of the TMJ was done with specially designed stainless steel partial condylar prosthesis. Extended genioplasty was done to advance the chin. Post-operative early physiotherapy was initiated with a custom made oral physiotherapy device. Complete oral rehabilitation was done with fixed partial dentures, and patient is on regular follow up.

Results Patient had mouth opening of 29 mm and also had a satisfactory esthetic appearance.

Keywords Ankylosis · TMJ ankylosis · Bony fusion · Condylar prosthesis

Introduction

Temporomandibular joint is a finely balanced structure with high degree of anatomic precision. Oral and maxillofacial surgeon, otolaryngologists, and other clinicians through the years have been challenged by the temporomandibular joint due to unique anatomy and its relation to various important structures especially facial nerve and auriculo-temporal nerve. Temporomandibular joint ankylosis can be defined as an ‘inability to open the mouth due to either a fibrous or bony union between the head of the condyle and the glenoid fossa’. Kazanjian [1] classified ankylosis as true or false. Any condition that gives rise to osseous or fibrous adhesion between the surfaces of the temporomandibular joint is a *true ankylosis* as compared to *false ankylosis* which results from pathologic condition not directly related to the joint.

TMJ ankylosis is most commonly associated with trauma (31–98%), Local or systemic infection (10–49%), systemic disease (10%), neoplasm. Many operative techniques for TMJ ankylosis have been reported, but the results have been variable.

Case Report

A 28-year-old male patient reported to our department with a chief complaint of inability to open the mouth. Patient had a history of fall from a tree 13 years back, for which he was given bandages for about 3 months as a treatment by a general practitioner. Patient noticed gradual decrease in mouth opening, and mouth opening became almost nil over a period of time.

Extra oral examination revealed no condylar movements or any palpable swelling in the TMJ region. Antagonial

S. S. Hassan (✉)
Department of Oral & Maxillofacial Surgery, Farooqia Dental College, Umar Khayyam Road, Mysore, Karnataka, India
e-mail: siraj827@hotmail.com; siraj827@gmail.com

M. Rai
Department of Oral & Maxillofacial Surgery, KVG Dental College, Sullia, India

Fig. 1 a, b Pre-operative pictures of the patient. c, d One year post-operative pictures of patient. Note the advancement of chin due to advancement genioplasty

notch was palpable, mandible was micrognathic with a reduced neck chin angle. The interincisal opening was 0 mm and his oral hygiene was poor. Lips were incompetent (Fig. 1a, b). Orthopantomogram (Fig. 2) was taken which confirmed a radio opaque mass obscuring the joint space and the condyle. Three dimensional CT scan (Fig. 3b) confirmed the extension of the mass from the exterior to the medial aspect of the joint and completely obliterated the joint space bilaterally and also there was

Fig. 2 Pre-operative OPG of the patient showing ankylosis of bilateral TMJ (arrows). Note, also the bilateral Well defined antegonial notch

bilateral elongation of coronoids. On the basis of clinical and radiological assessment it was diagnosed as post-traumatic, bilateral, complete bony TMJ ankylosis was diagnosed.

The operation was done under nasotracheal anesthesia using nasofibroscope. A modified type of endural and rhytidectomy incision (Fig. 4) was used to access the temporomandibular joint [2]. During the operation the joint space was found to be completely occupied by the bony mass. Total resection of the bony ankylosed mass bilateral total resection of bony ankylosed mass was removed. The maximum interincisal opening attained was 20 mm. So bilateral coronoidectomy was performed through the same approach and the maximal incisal opening increased to 38 mm. A concavity was shaped in relation to inferior part of the zygomatic arch which actually served as the glenoid fossa where in the condylar prosthesis was supposed to articulate. Finger shaped temporalis myofascial flaps (Fig. 5) [2] for use as interpositional grafts, extending 8 cm from the zygomatic arch to give the proper length for lining the glenoid fossa was elevated and sutured with 3-0 vicryl to the medial distal and transosteal tissues, with the periosteal surface lining the glenoid fossa and the fascia surface facing the condylar surface (Fig. 6).

A specially designed Vitek–Kent [8] type stainless steel partial TMJ condylar prosthesis (Figs. 7, 8) [2], with a spherical head resembling a natural mandibular condyle which articulates with the natural glenoid fossa was fastened to the mandibular ramus with three long screws of about 2.5×12 mm, for reconstruction of ramal condylar unit (RCU) was done through the same approach. Since the patient was young requiring better esthetics and maintenance of vertical ramal height this type of prosthesis was planned. The main advantage of condylar prosthesis is it maintains vertical ramal height.

Advancement genioplasty was performed through an extraoral mandibular degloving approach (Fig. 9); this gave a very good accessibility for securing of screws in the lower part of TMJ condylar prosthesis in the ramus.

Five days post-operatively jaw opening exercises and aggressive physiotherapy was started. Physiotherapy included heat, massage and manual stretching exercises. Jaw opening exercises were performed with special custom made mouth exerciser (Fig. 10) which was fabricated with self cure acrylic and stainless steel springs with an upper and lower fitting.

The patient was initially administered a soft diet, which progressed to solid diet over the next 5 weeks. After 12 months the mouth opening was 29 mm. Post-operative radiographs (Figs. 1c, d, 11) showed the prosthesis in situ between the temporal and the ramus of mandible.

Fig. 3 **a** Coronal CT showing bilateral condylar bony fusion to zygomatic arches well within the joint space. **b** 3D CT showing the condylar bony fusion with zygomatic arches

Fig. 4 A modification of endaural and rhytidectomy incision with temporal extension

Fig. 6 Ankylosed mass

Fig. 5 Temporalis myofascial flap raised for lining of glenoid fossa

Fig. 7 Partial condylar prosthesis for reconstruction of TMJ

Discussion

Trauma, particularly in childhood is the predominant factor in TMJ ankylosis [3], it has been seen that up to the second year of life, there are many vascular channels within the condylar head, but they vanish shortly thereafter [4].

Whenever injury occurs to TMJ region then these vascular channels cause extensive hemarthrosis and subsequently due to reduced functioning of the mandible it can result in fibrosis and eventually leading to complete fibrosis cause fibrosis and eventually leading to complete ankylosis. Active movement of the mandible is particularly important in preventing ankylosis in this highly vascularized and osteogenic environment. TMJ ankylosis can be prevented by early diagnosis and proper early treatment of condylar fractures.

The loss of mandibular function and major dento-facial sequelae cause various psycho-social problems. For that

Fig. 8 Condylar prosthesis secured on the lateral posterior border of ramus. Note the concavity on the inferior part of zygomatic arch

Fig. 9 Advancement genioplasty done along with rigid fixation with manipulates and screws

Fig. 10 Specially made mouth exerciser used for post-operative physiotherapy for the patient

reason, the study and correction of TMJ ankylosis are important. Early and effective treatment to repair function and facial development is therefore desirable [5]. There are many reported surgical procedures and accepted protocols

Fig. 11 One year post-operative OPG confirming the condylar prosthesis in situ

[6] with the use of various grafts like chondroosseous grafts and alloplastic prosthesis for the purpose of reconstruction of TMJ, but still there is no standard concept for treatment of TMJ ankylosis. General agreement is that patient cooperation, early surgical intervention and postoperative physiotherapy are the most important for long term good results.

Frequently applied surgical methods for TMJ ankylosis are: gap arthroplasty, interpositional arthroplasty, and reconstruction of the joint using autogenous or alloplastic materials [5]. In contrast to such disadvantages as shortening of the ramus and increased recurrence rates following gap arthroplasty, complications such as donor site morbidity and foreign body reaction in cases of alloplastic material have been reported following interpositional arthroplasty [5, 6]. Intraoral distraction osteogenesis and autogenous bone grafts can be used for adjustment of secondary post-operative deformities.

Interposition arthroplasty for TMJ ankylosis has been in use for over 100 years; Risdon (1934) used gold foil. Later, Eggers (1946) used tantalum foil, whilst Boracbakan (1968) and Sawhney (1986) reported acrylic spacers for treating ankylosis. The purpose of using mobile spacers was to enable free movement of the mandible. The use of some auto-grafts has also been reported for the treatment of ankylosis [7]. However, the difficulty in fixing the metatarsal bone to the mandibular fragment, and excessive growth of costochondral grafts in younger patients was the disadvantages of these techniques. Blair and Murphy (1914) popularized and standardized the temporal muscle interposition arthroplasty. Its advantages are autogenous nature, resilience, adequate blood supply and proximity to the joint allows for a pedicled transfer of vascularized tissue into the joint area.

Kent et al. (1972), Speissl (1976), Silver et al. (1977), Raveh et al. (1982), Boyne et al. (1987), Van Loon [8] have shown that alloplastic condylar prosthesis maintains the gap which has been created after the resection of ankylotic mass. Various materials such as proplast, stainless steel,

polymethacrylate (PMMA), and titanium have been used. The main disadvantage with this is wearing of some parts of glenoid fossa. So for this purpose autogenous or alloplastic interpositional grafting should be done. A follow-up study done by Lindqvist et al. [8], showed 8 of 11 operated joints did have resorption of at least some part of the glenoid fossa. It was concluded that bone resorption probably cannot be prevented without the use of interpositional autogenous material or glenoid fossa implant.

Conclusion

Various surgical techniques have been advocated for the treatment of TMJ ankylosis but radical and sufficient resection of the ankylosed bone; early post-operative exercises, appropriate physiotherapy and close follow-up of the patient play important roles in the prevention of postoperative adhesions and re-ankylosis.

References

1. Kazanjian VH (1955) Temporomandibular joint ankylosis. *Am J Surg* 90:905
2. Quinn PD (2000) Alloplastic reconstruction of the temporomandibular joint. In: Fonseca RJ (ed) *Textbook of oral and maxillofacial surgery*, vol 4. WB Saunders, Philadelphia, pp 316–332
3. Guven O (2000) A clinical study on temporomandibular joint ankylosis. *Auris Nasus Larynx* 27:27–33
4. Myall RWT (1994) Condylar injuries in children: what is different about them? In: Worthington P, Evans JR (eds) *Controversies in oral and maxillofacial surgery*. WB Saunders, Philadelphia, pp 191–200
5. Erol B, Tanrikulu R, Gorgun B (2006) A clinical study on ankylosis of the temporomandibular joint. *J Cranio Maxillofac Surg* 34:100–106
6. Kaban LB, Parrot DH, Fisher KA (1990) Protocol for management of temporomandibular joint ankylosis. *J Oral Maxillofac Surg* 48:1145–1152
7. El-Sheikh MM, Medra AM (1997) Management of unilateral temporomandibular joint ankylosis associated with facial asymmetry. *J Cranio Maxillofac Surg* 25:109–115
8. Van Loon JP, De Bont L, Boering G (1995) Evaluation of temporomandibular joint prosthesis. *J Oral Maxillofac Surg* 53:984–996