

RECONSTRUCTION OF UNILATERAL TMJ ANKYLOSIS WITH METALLIC CONDYLAR PROSTHESIS : REPORT OF A CASE

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Abstract

Destruction of normal temporomandibular joint architecture may produce serious functional and cosmetic deficiencies. The literature is well documented as to the etiology and pathogenesis of temporomandibular joints.

Numerous surgical procedure have been advocated for temporomandibular joint ankylosis from condylectomy to arthroplasty, cartilage transplant, metallic prosthesis, interpositional implant. These were to able reconstruct the normal mandibular function, and any even procedure could obtain the satisfactory results.

In this paper, we reviewed young adult patient with TMJ ankylosis and facial asymmetry who was treated with metallic condylar prosthesis and orthognathic surgery.

INTRODUCTION

Ankylosis of the TMJ is often classified as true and false. False ankylosis is said to exist when the mouth cannot be opened owing to an extracapsular fibrous or bony union, whereas true ankylosis is considered to be present only when the union is intracapsular^{1,2,3}.

Conditions such as ankylosis, limited mandibular function, give rise to poor nutrition, impairment of speech, dental deterioration, and facial deformity, particularly if ankylosis occurs early in life⁴.

In most series the cause of ankylosis have fallen into two categories; a) post-traumatic and b) post-infective. Martinez Garcia (1971) feels that initially the commonest aetiological factor was infection, but now the incidence of traumatic ankylosis is higher. He feels that this may be due to the role of present day antibiotics^{2,5,6,7}.

The earlier the ankylosis, the greater is the degree of deformity of the face. The deformity occurs due to (a) the physical damage to the growth centre of the condyle and (b) loss of functional movements of the mandible, which stimulates its growth^{2,8}.

In historical background of treatment, Eschmach (1851) first attempted surgery of TMJ ankylosis. Venecuil (1860) first suggested interposition arthroplasty. Stuteville and Lanfranchi (1955) reported the first successful autogenous transplant of the second metatarsal joint to the TMJ after condylectomy^{1,9,10}.

In this paper, we reviewed young adult patient with TMJ ankylosis and facial asymmetry who was treated with metallic condylar prosthesis and orthognathic surgery.

CASE REPORT

The patient first visited our oral surgery depart-

ment, in January of 1988, when he was 18 years old. At that time, he felt difficulty of the mouth opening (about 17mm) and facial asymmetry. In past medical history, he experienced surgical drainage at the left preauricular area due to massive swelling and fever at the age of one. Ten year after the operation, limitation of mouth opening, facial asymmetry and malocclusion gradually developed. Oral examination revealed the midline deviation and tilting of occlusal plane. There is multiple dental caries in posterior teeth and poor oral hygiene (Fig. 1, 2).

In February of 1988, the patient was hospitalized. A left condylectomy was performed through the

preauricular and submandibular incision (Fig. 3). The condylar stump was a cluster of hard mass which cannot be distinguished from the disc and the articular fossa. After condyle resection on inferior two third of the ramus, there was an apparent increase in mouth opening during operation with forcible use of mouth-gag (Fig. 4). Interpositional implant was not inserted between articular fossa and metallic condyle. Stainless steel condylar prosthesis whose shank were fixed with screws was applied into resected site of condyle. It was inadequate to obtain the vertical ramus height with titanium condylar prosthesis due to undeformity and narrow choice of its ready size.



Fig. 1. Pronounced facial asymmetry due to growth centre injuries of of early in life.



Fig. 2. Showing patient's inability to open his mouth.



Fig. 3. Showing preauricular and submandibular approach for condylar prosthesis application.



Fig. 4. Showing forcible mouth opening with Mouth-gag after condylectomy.



Fig. 5. Showing increased maximum mouth opening postoperatively.

Rigid intermaxillary fixation was applied with the arch bar. Lateral decortication of the ramus was performed and the prosthesis was secured on the ramus with three self tapping screws. The head of the prosthetic condyle was easily placed in the glenoid fossa with proper position. Bleeding control and meticulous 3 layer sutures were carried out as a usual method.

Broad spectrum antibiotic therapy and a soft diet are maintained for three weeks following surgery. The patient is asked to begin active opening and lateral exercises several times each hour by the second postoperative week, using a tongue blades, or other devices. Training elastics may be needed to minimize deviation. Opening to 30mm is recommended by the third postoperative week. A baseline panoramic radiograph and lateral and posteroanterior cephalograms are taken for comparison with future radiographs. Intermaxillary fixation was removed 2 weeks postoperatively, and motion without chewing was encouraged for the next two weeks, followed by gradual return to a regular diet by the sixth postoperative week.

Eleven months after first surgery, the second surgery was followed to improve the facial asymmetry with Le Fort I osteotomy and mandibular vertical ramus osteotomy, C-sliding osteotomy and body augmentation with Medpor. With prefabricated occlusal splint, maxillary total segment was moved superiorly



Fig. 6. Showing improvement of facial appearance postoperatively.

in the right side and inferiorly in the left side about 6mm amount as axis of midpalatine suture line and was secured with 4 miniplates and screws for rigid fixation after filling the gap with allogeneic bone graft. Finally, chinpoint was shifted to the right side with amount of 8mm. Intermaxillary fixation enhanced maximandibular relationship. Two weeks after surgery, the IMF was released and the patient ate a soft ground diet. Frequent active mouth opening exercise was begun. Some paresis of the right lower lip last for six months (Fig. 5, 6).

DISCUSSION

Destruction of normal temporomandibular joint architecture may produce serious functional and cosmetic deficiencies. The literatures are well documented as to the etiology and pathogenesis of temporomandibular joint^{1,2,3,4,5,6,7}.

Numerous surgical procedures have been advocated for TMJ ankylosis. In historical background of treatment for TMJ ankylosis, Eshmach in 1851 first attempted surgery of TMJ ankylosis and Venecuil in 1860 first suggested interpositional arthroplasty. Stutevile and Lanfranchi in 1955 reported the first successful autogenous transplant of the second metatarsal joint to the TMJ after condylectomy^{1,9,10}.

Various materials have been reported such as autogenous transplant of the second metatarsal bone, costochondral rib grafts, stainless steel, vitallium, chrome

cobalt, methylmethacrylate. Recent reports have presented the development and use of Proplast coated or titanium coated prosthesis and achieved good result
1. 11. 12. 13. 14. 15. 16. 17. 18)

The metallic prosthesis is indicated only when the condyle has been rendered nonfunctional; is severely diseased, damaged, or lost because of trauma; or was excised in a previous surgical procedure. It has been in the following conditions: bony or fibrous ankylosis; severe degenerative, rheumatoid, traumatic, infectious, or metabolic arthritis; congenital absence of the condyle in adults; loss of the condyle in acquired deformities due to neoplasm, infection, or trauma; or malocclusion with facial asymmetry secondary to any of the preceding conditions. Contraindications to the use of a metallic prosthesis include limited capacity of patient for postoperative cooperation, systemic disease contraindicated to the use of any alloplastic material, inadequate ramus height for implant fit and stabilization, and growth that is still taking place. We used stainless steel condylar prosthesis to replace the lost condyle, since it is adapted easily to surgical site^{19, 20)}.

Generally, in surgical procedure of TMJ ankylosis, a portion of the condylar neck and ramus is removed in sufficient width to produce an adequate gap. Reconstruction of the condylar head must maintain or restore the normal vertical height of the ramus. Interposition of materials such as cartilage, dermis, fascia, acrylics, medium-grade silicone, rubber, Proplast and metal prosthesis at the gap osteotomy site has been helpful in maintaining vertical height of the ramus and preventing recurrence of the ankylosis. Some of them did not give satisfactory results either because of the mechanical properties or biological properties of the implants failed. However, there is a trend to replace the disc if its removal is indicated. But unfortunately, our patient refused interpositional implant due to economic problem^{21, 22, 23)}.

Kent have found that at least three screws are needed for adequate stabilization of prosthesis. Stabilization is further improved with a fourth screw. We

used three screws for rigid fixation of condylar prosthesis²⁰⁾.

Options are different in regarding the duration of rigid immobilization of the mandibular joint after surgery. It depends mainly on the stability of the joint between the implant and bone. Byrd and Holton (1971) recommended 8 weeks, whereas Hinds et al (1974) favour a shorter period of 3 to 4 weeks. In view of the functionally stable method, we used, to fix the prosthesis, intermaxillary immobilization for one week as proposed by Payne et al (1977) proved to be sufficient. The danger of ankylosis or reankylosis increase as the duration of immobilization become longer^{20, 24, 24, 26)}.

Maintaining or increasing ramus height plays an important role in the success or failure of the reconstructive effort²⁰⁾. In our patient, correct ramus height was established with pre and postoperative cephalogram in 52mm long (Fig. 7). Incisal opening, probably the single most important objective measure of postoperative function in about 35mm, but lateral excursions were not sufficient in left side with 2mm excursion. Ingrid Sonnenberg (1985) suggested that protrusive movement was impossible due to loss of pterygoideus lateralis function. Lateral movement was possible with the teeth in occlusion, over a distance of 1mm to either side in the case of bilateral implantation and over a greater distance towards the operated side in the case of unilateral implantation¹³⁾. Displacement of the metallic condyle towards the middle cranial fossa owing to resorption of the glenoid fossa was observed in follow-up of 12 months after surgery. Although development of hypomobility, pain, open bite was seen till now, if any, we should plan the second surgery with well-fit interpositional implant and Proplast-coated metallic condyle.

Although many procedures introduced to resolve the facial asymmetry, we obtained the satisfactory facial symmetry with Le Fort I osteotomy, mandibular body osteotomy and C-sliding osteotomy, Medpor augmentation through the second surgery that is carried out 11 months after first surgery (Fig. 8).

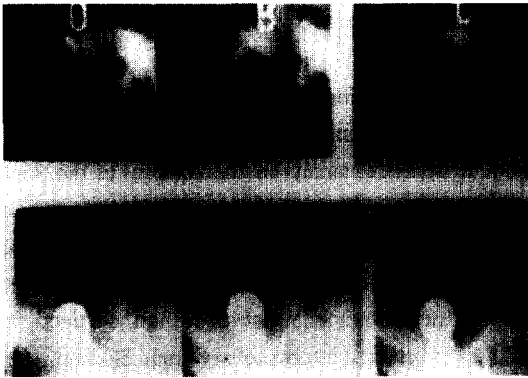


Fig. 7. Showing adequate ramus height of condylar prosthesis on postoperative transcranial projection.



Fig. 8. Showing many Miniplate to fix the osteotomy site of maxilla and mandible after second operation.

SUMMARY

We reported that the patient who has unilateral TMJ ankylosis accompanying facial asymmetry was treated with metallic condylar prosthesis and Le Fort I osteotomy, mandibular body and C-sliding osteotomy, vertical ramus osteotomy and Medpor augmentation and obtained satisfactory results.

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금속 이식물을 이용한 악관절 강직증의 치험례

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국문초록

출생 전·후 악관절의 외상 또는 감염은 과두 성장을 방해하며 편측으로 발생하는 경우 하악골의 비대칭 성장을 초래하여 심한 안모 변형과 부정교합을 유발하거나 악관절 유착의 주된 원인이 된다. 역사적으로 관절 유착은 과두절단술에서부터 연골이식, 진피이식, 금속과두 이식, 관절 성형술, 관절와 이식물 삽입에 이르기까지 매우 다양한 방법에 의해 치료되어 왔으며 하악운동이 보장되고 정상적인 기능을 회복하는데는 어떤 술식이라도 만족스런 결과를 가져다줄 수 있다.

이에 저자는 편측성 악관절 강직증 및 비대칭 안모를 가진 환자에서 과두절제술 후 금속 과두 이식을 이용한 악관절 재건과 하악 골체부 절단술 및 C-sliding 절단술, 하악지 수직 골절단술, Medpor를 이용한 증식술로 개구기능과 비대칭 안모를 개선하여 비교적 만족할 만한 결과를 얻었기에 그 치험례를 보고하는 바이다.