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Surgical management of temporomandibular joint ankylosis: initial experience

Surgical management of temporomandibular joint ankylosis: initial experience

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ÖZET

Amaç: Bu çalışmanın amacı kliniğimizin Temporomandibular eklem ankiloz cerrahisindeki cerrahi tecrubelerinin bildirilmesidir.

Gereç ve Yöntem: Bu geriye dönük çalışma Temporomandibular eklem ankilozu olan ve farklı methodlarla tedavi edilen 8 hastayı kapsmaktadır. Altı hastaya gap artroplastisi uygulanmış ve beraberinde Temporal kas-fasya flabi transpoze edilmiştir. Bir hastaya neo-kondil oluşturmak amacıyla Distraksiyon osteogenezis ve bir hastaya ise eklem protezi uygulanmıştır. Hastalar ilk ay her hafta sonraki 2 senelik dönem içerisinde 3., 6., 12. ve 24. aylarda kliniğimize çağırılmış ve kayıtları alınmıştır.

Bulgular: Preoperatif ortalama ağız açıklığı 11 mm (2-14 mm) iken 2. senenin sonunda postoperatif ortalama maksimum ağız açıklığı 31 mm (26-35 mm) ye yükselmiştir. Bütün hastalarda tatmin edici mandibular fonksyona ulaşılmıştır ve hiç bir hastada nüks eden ankiloz gözlenmemiştir.

Sonuçlar: Temporomandibular eklem ankiloz cerrahisinde olası operasyon içi ve operasyon sonrası komplikasyonların önlenmesi amacıyla hastaların klinik ve radyolojik muayeneleri dikkatli bir şekilde yapılmalıdır. Literatürede uyumlu olarak gap artroplastisi ve beraberinde temporal kas-fasya flep transpozisyonu Temporomandibular eklem ankiloz cerrahi tedavisinde etkili bir yöntem olarak gözlenmiştir.

Anahtar Kelimeler: Temporomandibular eklem, ankiloz, gap artroplastisi.

ABSTRACT

Objectives: The aim of this study is to introduce our initial clinical experience in the operative management of temporomandibular joint (TMJ) ankylosis.

Materials and Methods: This retrospective study assessed 8 patients with TMJ ankylosis who underwent different surgical procedures. Gap arthroplasty with temporalis muscle and fascia flap repositioning was performed in 6 patients, transport distraction osteogenesis was performed to form a neocondyle in one patient, and TMJ prosthesis was replaced in one patient. Patients were followed weekly at first month and at 3rd, 6th, 12th, and 24th month postoperatively. Patients were evaluated in terms of maximum interincisal opening and occlusal stability in each appointment.

Results: Mean preoperative Maximum interincisal opening (MIO) of 11 mm (2-14 mm) improved to 31mm (26-35 mm). All patients had satisfactory mandibular motions 2 years after the operation and reankylosis was not observed in any patient.

Conclusions: Radiological and clinical evaluation should be carefully performed to avoid possible intraoperative and postoperative complications in the management of TMJ ankylosis. Consistent with the literature, it was observed in this study that temporalis musculofascial flap repositioning is successful to avoid reankylosis.

Keywords: Temporomandibuar joint, ankylosis, gap arthroplasty.

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INTRODUCTION

Temporomandibular joint (TMJ) ankylosis is the fusion of disc-condyle complex to the articular surface of temporal bone that inhibits mandibular movement and causes impaired speech, difficulty in mastication, and poor oral hygiene. It is also a challenging problem in pediatric patients since it leads to restriction of mandibular growth. TMJ ankylosis commonly results from trauma, infection, and previous inadequate TMJ surgeries.[1-4]

The common treatment goals are to achieve of function, prevention of reankylosis, and in the growing patients, symmetric mandibular growth.[5]

Many treatment modalities for ankylosis have been introduced so far such as interpositional arthroplasty, gap arthroplasty, reconstruction of the ramus condyle unit with autogenous or artificial materials, and reconstruction of the condyle by distraction osteogenesis[6]. Ramus–condyle unit can be reconstructed by costochondral and sternoclavicular graft or prosthetic joint [5]. Complications of these treatment modalities are limited maximum mouth opening due to relapse, loss of vertical height of the affected ramus, foreign body reactions resulting from artificial materials, and reankylosis [7].

Intraoperative complications such as massive hemorrhage and facial nerve injury may occur during any of the techniques described above [8,9.]

The aim of this study is to evaluate the operative management of the Temporomandibular joint ankylosis and to report initial experiences.

MATERIALS AND METHOD

Eight patients with TMJ ankylosis (5 unilateral and 3 bilateral) who visited Fatih University Hospital, Department of Oral and Maxillofacial Surgery between 2008 and 2010, were retrospectively analyzed. The patient population had a female-to-male ratio of 1 (both numbering 4) and a mean age of 28 years (range 22-65). The preoperative maximum interincisal mouth opening ranged between 2 and 14 mm (mean 11 mm). The etiologic factor was facial trauma in 7 patients and osteochondroma of the condyle in one patient. The mean duration of ankylosis was 16.7 years (range 10-30 years). Both joints were assessed radiographically with orthopantomograms and computed tomograms in axial and coronal views. Micrognathia was observed clinically in bilateral TMJ ankylosis cases while unilateral cases presented with mandibular deviation to the affected side and noticeably facial asymmetry.

Surgical procedure

All surgical procedures were carried out under general anesthesia with nasotracheal intubation. A preauricular incision with temporal extension (Figure 1) (Al-Kayat Bramley incision) was performed. Dissection of the temporal region was performed over the superficial temporalis fascia to protect the facial nerve followed by direction of dissection under the superficial temporalis fascia above the zygomatic arch. Periosteum of the zygomatic arch was incised and gently dissected from ankylotic bone. Afterwards, a curved retractor was placed under the ankylotic mass not to damage maxillary artery (Figure 2). Osseous mass was removed with round burrs initially and completed with chisel until gaining a gap for 5-10 mm.

Temporalis muscle and fascia flap repositioning was performed in 6 patients (Figure 3), Transport distraction osteogenesis was performed to form a neocondyle in one patient, and TMJ prosthesis was replaced in one patient. Postoperative physiotherapy was started on the second postoperative day. Mouth opening exercises were recommended for one week followed by tongue blade

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exercises. Patients were followed weekly at first month and 3rd, 6th, 12th, and 24th month postoperatively. Patients were evaluated in terms of maximum interincisal opening and occlusal stability in each appointment.

Figure 1. Preauricular with temporal extension flap design.

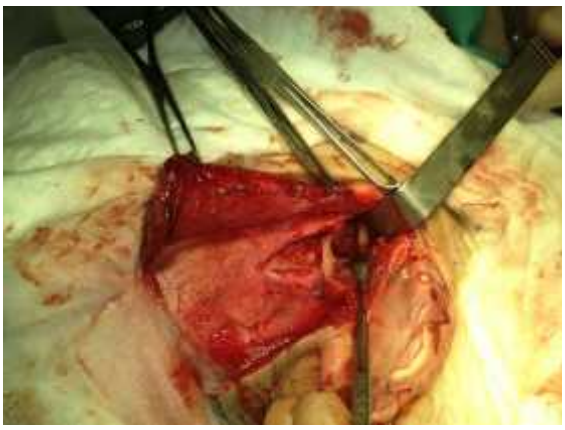

Figure 2. Positioning of a curved osteotom to protect maxillary artery injury.

Figure 3. Transpositioning of the temporalismyofascial flap.

RESULTS

The results are shown in Table 1. Eleven TMJ ankylosis surgeries were performed in 8 patients. Resection of the ankylotic mass by gap arthroplasty and transpositioning of temporalis musculo-fascial flap was performed in 6 of the 8 patients. Unilateral TMJ condyle prosthesis (Biomed) was replaced with transpositioning temporalis musculo-fascial flap in one patient and Transport distraction osteogenesis was applied to form a neo condyle in one patient (unilateral). Bilateral coronoidectomy was performed in addition to the gap arthroplasty with transpositioning temporalis musculofascial flap in one patient.

Intraoperative hemorrhage caused by injury of the maxillary artery occurred in one patient who underwent ankylosis surgery with replacement of joint prosthesis. In addition, temporary facial nerve palsy was observed in the same patient. No similar or different

complications were observed in the rest of the patients.

Maximum interincisal opening (MIO) of 11 (2-14 mm) mm was improved to 31mm (35-26 mm).

No symptoms of recurrent ankylosis were observed in any case at the end of the 2 years follow-up period.

Table 1. Distribution of age, gender and type of ankylosis of the patients.

Gender	Age	preop MMO	postop MMO	Type
M	25	9	32	B
M	32	13	34	U
M	33	14	35	U
M	38	5	26	U
F	22	2	29	B
F	23	4	30	U
F	24	3	27	U
F	65	8	35	B

M: Male, F: Female, MMO: Maximum mouth openning, B: bilateral, U: unilateral

DISCUSSION

Management of temporomandibular joint ankylosis requires surgery and subsequent early physiotherapy to restore mandibular function and prevent recurrence.[10] The main surgical methods include gap arthroplasty, interpositional arthroplasty with placement of interpositional material, ankylosis resection and reconstruction of the ramus-condyle with autogenous or alloplastic grafts.[5,11-13] Recently, gap arthroplasty without an interpositional material has not been recommended as a treatment option owing to a higher recurrence rate.[14]

In interpositional arthroplasty, autogenous or alloplastic materials are placed in the gap to prevent recurrent an kylosis. Commonly used autogenous materials include temporalis myofascial flap, fascia lata, auricular cartilage, dermis, and full-thickness flap [15].

An interpositional material was first used by Risdon in 1934. Interpositional material prevents reankylosis by forming a separation zone between the condyle and articular fossa of temporal bone [5,16]. Chossegros studied 25 patients (32 joints) with at least 3 years of follow-up and found that 92% of cases undergoing total full thickness skin grafting and 83% of cases in whom temporal muscle flap was used had satisfactory results whereas homologous cartilage gave poor results [10].

In our study, gap arthroplasty with temporalis musculo-fascial flap replacement was performed in 6 patients. This technique is one of the most commonly used surgical methods for the management of TMJ ankylosis. A review by Katsnelson et.al. reported the advantages of this technique over different methods. They stated that gap arthroplasty is superior to costochondral grafting in terms of mandibular motion.[5]

Loveless et. al compared the outcomes of total joint replacement and interpositional arthroplasty. They found no significant differences between the two procedures in terms of mandibular function and stated that although total joint replacement is preferred as the last resort; earlier treatment with prosthetic devices might lead to better outcomes.[11]

Wolford et. al., after 5 to 8 years of follow-up, reported that the total joint prosthesis replacement was a viable technique for TMJ reconstruction. [17]

Pearce and co-workers presented a case series of 5 patients who underwent total joint replacement. Four of these 5 patients had joint replacement after previous failed costochondral reconstruction. They reconstructed the joints with a custom-made prosthesis and reported favorable results.[18]

Distraction osteogenesis has become a popular and reliable alternative for the correction of craniomaxillomandibular deformities and as a promising method it has been recently used to treat ankylosis of the TMJ.[19]

Simultaneous gap arthroplasty and DO for treatment of ankylosis of the TMJ was first reported in 1999. Hongbo Yu and co – workers performed gap arthroplasty and distraction osteogenesis simultaneously in 11 patients with unilateral ankylosis of the TMJ and micrognathia, reporting satisfactory results at the end of the follow up period [6]. In the present study one patient underwent Transport distraction osteogenesis to form a condyle and achieved good mandibular motion, consistent with the literature.

The most common complication of TMJ ankylosis surgery at the postoperative period is restriction in jaw mobility and recurrence of ankylosis. Other complications related to the surgery include facial nerve involvement, maxillary artery injury, and anterior openbite.

In the present study, one patient who underwent TMJ prosthesis replacement experienced temporary palsy of the facial nerve. A risdon approach is performed additionally to reach the facial surface of the ramus and to fix the prosthesis to inferior segment of ramus. Aggressive retraction may be required for fixation in this area. Facial nerve was probably injured because of the aggressive retraction of the flap.

In the same patient, a severe bleeding developed due to injury to the maxillary artery. Bleeding was controlled by ligation of the artery. The maxillary artery is a major vessel with high arterial flow responsible from massive hemorrhage in maxillofacial surgery[8]. The measurements in the study by Balcioglu et al. revealed that the maxillary artery runs very close to the condylar process. Therefore, sub-periosteal dissection of the medial side is of great importance to prevent extensive intraoperative and postoperative hemorrhage [8].

CONCLUSION

Our initial clinical experiences revealed that gap arthroplasty and temporalis myofascial flap repositioning is a well-documented and reliable method in surgical management of TMJ ankylosis. However, patients should be evaluated by the help of clinical and radiological findings and surgical procedure and possible complications should be determined accordingly.

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