

Gap Arthroplasty with Custom-made Acrylic Mouth Opener

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Abstract

Ankylosis of temporomandibular joint (TMJ) involves the fusion of mandibular condyle to the base of the skull. When it occurs in a child, it can have devastating effects on the future growth, development of jaws and teeth, and also has a negative influence on the psychosocial development of the patient because of the obvious facial deformity, which worsens with growth. Impairment of speech and mastication, poor oral hygiene, caries, and compromise airway pose a severe psychological burden on the tender minds of children. Hereby, we present a case of 10-year-old female who reported with inability to open mouth, diagnosed with right bony TMJ ankylosis. The surgical approach consisted of gap arthroplasty followed by vigorous physiotherapy by custom-made acrylic mouth opener. The treatment of TMJ ankylosis poses a significant challenge because of technical difficulties and a high incidence of recurrence. It includes a team of oral and maxillofacial surgeons, pediatric dentist, and anesthetist.

Keywords: Ankylosis, gap arthroplasty, temporomandibular joint

INTRODUCTION

Ankylosis of temporomandibular joint (TMJ) is an intracapsular union of the disc-condyle complex to the temporal articular surface that restricts the mandibular movements including fibrous adhesions or bony fusion between condyle, disc, glenoid fossa, and eminence. It is a debilitating condition usually affecting children and young adults results in poor oral hygiene, increased dental caries, malocclusion, weight loss, and stunted growth because of difficulty in chewing solid food. TMJ ankylosis is most commonly associated with trauma (13%–100%), local or systemic infection (10%–49%), or systemic diseases (10%) such as ankylosing spondylitis, rheumatoid arthritis, and psoriasis.^[1]

Ankylosis can also occur as a result of TMJ surgery without early mobilization^[1] and requires surgery to restore mouth opening.

TMJ ankylosis earlier in 1938 was classified into two types by Kazanjian^[2] as intra-articular and extra-articular ankylosis. The present classification includes bony, fibrous, fibro-osseous, complete, and incomplete.^[3] In children, unilateral ankylosis of TMJ causes facial asymmetry due to the deviation of the chin toward the affected side. The effective treatment of TMJ ankylosis is based on a detailed preoperative radiographic assessment of the type and extent of ankylosis.

Here, a case report of unilateral TMJ ankylosis and its successful management by gap arthroplasty (GA) along with custom-made acrylic mouth opener (CAMO).

CASE REPORT

A 10-year-old girl reported to the Department of Pedodontics and Preventive dentistry, CDCRI, Rajnandgaon, Chhattisgarh, India, with a chief complaint of inability to open the mouth. The patient had a minimal mouth opening at birth and progressively decreased to became nil over 2 years [Figure 1]. At initial presentation, her height was 129 cm and weight was 24 kg. She was healthy, and no complications had been reported at birth. In history, no etiological factor was found. The extraoral assessment revealed hypoplastic mandible. The facial profile was convex with incompetent lips. Facial asymmetry with mandible deviated toward the right side of the face with fullness of the cheek on the right side and flatness of the cheek on the left side with midline shift of 8 cm [Figure 2]. Lymph nodes

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were not palpable. On intraoral examination, normal soft-tissue mucosa was seen. Dental caries was seen in 85 and crowding with upper and lower anterior teeth. Radiographic examinations comprised orthopantomogram and computed tomography that revealed lack of structural organization in the right TMJ region. The diagnosis of the right TMJ ankylosis was confirmed.

After complete clinical and radiographical evaluation, a surgical treatment of GA on the right TMJ was planned under general anesthesia. A mouth opening of 11 mm was noted postoperatively, and vigorous physiotherapy was started with Heister's mouth gag. After 2 weeks, the opening of 15 mm was noted. Then, the patient was given a CAMO to be used at home. After 1 week of follow-up, interincisal mouth opening is 23 mm [Figure 3].



Figure 1: Extra oral photograph showing asymmetry of face & hypoplastic mandible.



Figure 2: Intraoral view.



Figure 3: Mouth opening exercise using CAMO.



Figure 4: View of Alkayat Bramley's incision marking.



Figure 5: Removal of ankylotic mass and gap created.



Figure 6: Post surgical mouth opening.

Treatment

The patient was intubated using fiber optica nasal intubation. A Popowich modification of Alkayat and Bramley's preauricular incision was employed [Figure 4].

The flap was raised and ankylotic mass was exposed following an arthrotomy cut was given.

Bone was removed using surgical burs, chisel, or osteotome [Figure 5].

The bony margins were smoothed and irrigated with betadine.

Suturing was done without interpositional grafting.

Postsurgery 11mm of interincisal mouth opening was obtained [Figure 6].

Postoperative course

Active mouth-opening exercises were started after 24 h. The patient was encouraged to start gentle, active, and gradually increasing mouth-opening exercises using her own fingers as a monitor to start with, to gain self-confidence, and she was allowed to take a soft diet. CAMO was used thereafter with gradually increasing rotations according to the patient's tolerance and avoiding any active force or pain. This is performed under strict supervision for 15 min five times a day. Weekly and monthly follow-ups were done for 1 year.

DISCUSSION

In children, TMJ ankylosis can result in mandibular retrognathism associated with esthetic and functional deficits. To reestablish harmonious jaw function, early intervention is required.^[4] Aggressive resection, early mobilization, and intensive postoperative physiotherapy will produce satisfactory outcome. The clinical findings of TMJ ankylosis in children are affected by the age of onset, the duration, and type of ankylosis. Unilateral ankylosis reveals unilateral hypoplasia of the mandible and deviation of the chin to the affected side. Night snoring and obstructive sleep apnea are the other clinical findings in ankylosis.^[5] The long-standing ankylosed joints result in chronic isometric contractions of the masticatory muscles. This gives rise to shortening of the mandibular ramus/rami recession of the chin and its elongation in a cephalocaudal direction, and the development of the antegonial notch owing to the antagonistic actions of the pterygomasseteric sling and the depressor muscles.^[6] The advantages of this technique are the very less relapse rate which was followed in our case.

Controversies are there in between GA and interpositional arthroplasty (IA). According to meta-analysis, maximum interincisal mouth opening (MIO) is obtained by IA, and there is no significant difference found between GA and IA regarding decrease incidence and reankylosis.^[7] Hence, considering the advantages of GA over IA, we chose

GA along with CAMO as a physiotherapeutic regimen to achieve MIO.

CAMO is custom-made conical-shaped acrylic mouth opener measuring 8.5 cm in length, anteriorly measuring postoperative MIO and posteriorly width of expected MIO which is placed on the posterior teeth for 4–5 times a day in a screwing motion until the patient feels minimal pain and followed by regular checkup and trimming of the anterior part of the opener.

On the surgical front, our team comprised two pediatric dentists, an oral and maxillofacial surgeon and anesthetist. TMJ arthroplasty following physiotherapy was planned.

Advantages of CAMO are as follows:

- It can be used by patients on their own on daily basis
- Less cost
- Easy to handle
- Easy to fabricate.

CONCLUSION

TMJ ankylosis in children is a challenging problem. Traumatic injury to the TMJ should be considered as a risk of ankylosis in children. A careful surgical technique and meticulous long-term physiotherapy are considered essential to achieve a satisfactory result.

Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent forms. In the form the patient(s) has/have given his/her/their consent for his/her/their images and other clinical information to be reported in the journal. The patients understand that their names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

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Conflicts of interest

There are no conflicts of interest.

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