Temporomandibular Joint Ankylosis Surgery in a Child: Case Report

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ABSTRACT

Temporomandibular joint ankylosis is one of the most significant disorders of the stomatognathic system because it causes pain associated with severe functional limitations, such as difficulty in chewing and psychological and clinical problems due to poor oral hygiene. These disorders are quite significant in children, since the treatment is even more complex due to the fact that the condylar region is a site of active growth. The earlier the diagnosis is established, the better the treatment prognosis. Ankylosis can be treated by interposition arthroplasty of the temporalis muscle fascia in conjunction with ipsilateral coronoidectomy. The purpose of the present study was to report a clinical case of temporomandibular joint ankylosis in a pediatric patient treated by interposition arthroplasty of the temporalis muscle fascia associated with coronoidectomy.

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Temporomandibular ankylosis is an incapacitating condition that causes chewing, digestion, speech, appearance, and hygiene problems.¹ According to Chossegros et al.,² the term temporomandibular ankylosis refers to a disorder resulting from permanent mandibular dysfunction caused by fibrous tissue or bony fusion with unilateral or bilateral occurrence. This condition is rarely associated with pain; therefore, most patients only become aware of the problem due to difficulties in speaking and eating or when they undergo dental treatments. Temporomandibular joint (TMJ) ankylosis involves fusing of the mandibular condyle and skull base.^{3,4} In most cases, radiographic images show reduction or complete obliteration of the articular

space, with fusion between the condyle and the glenoid fossa and enlargement of the coronoid process.⁵

Temporomandibular ankylosis is a disorder possibly caused by trauma or local and systemic infection.⁶ The main cause of TMJ ankylosis is condylar fractures. TMJ ankylosis, however, is extremely rare as a consequence of fracture of the mandibular condyle, and it is estimated to occur in only 0.2% to 0.4% of the fractures.⁷

Bilateral condylar fractures with medial displacement can produce the highest risk for ankylosis because of the increased immobility associated with this condition. Surgical treatment should not be indicated for most cases. Therapy should consist of maxillomandibular immobilization for a period of seven to ten days, followed by intense physical therapy. When the patients are children, physical therapy often includes immediate immobilization of the TMJ.⁴

Ankylosis developed during childhood or at an early developmental stage is an articular disorder that causes severe facial deformity and poor occlusion.^{3,6,8} TMJ ankylosis may cause difficulties in speaking, opening the mouth and chewing. The limitation of mouth opening

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produces occlusal disharmony, poor oral hygiene, rampant caries, generalized gingivitis, and periodontal disease.^{5,9}

TMJ ankylosis treatment requires removal of a sufficient amount of bone to allow for free mandibular movement and interposition of material between the condylar segment and the articular fossa.²

Treating ankylosis in children is difficult, and its success depends on several factors, such as the patient's age, type and severity of ankylosis, and the material used in the reconstruction or interposition.³ TMJ ankylosis patients should be treated as early as possible, because the maxillary and mandibular growth and the inclination of the anterior teeth can be severely affected. Early surgical correction not only helps to improve the mandibular function and facial profile, but also adjusts the previously impaired maxillary growth.⁸

A large number of surgical techniques have been developed to restore normal TMJ function, but surgical intervention is often followed by reankylosis, occlusal disorders, mandibular retrusion, sleep dyspnea, and alteration in the chewing movements. These complications can be prevented by aggressive resection of the bone or fibrous segment, mainly in the TMJ's medial aspect.¹⁰

Sufficient and radical resection of the ankylosed bone, early postoperative exercises, appropriate physical therapy, and follow-up of the patient are very important measures to prevent adhesions and reankyloses.^{2,6}

TMJ ankylosis treatment is a great challenge because of the technical difficulties and high incidence of relapse. It usually requires appropriate excision of the structures involved, with or without immediate reconstruction using interposition of autogenous or alloplastic material.¹

A variety of autogenous materials have been used after arthroplasty, such as costochondral grafts, skin, and temporalis muscle or fascia.¹¹ A small portion of the temporalis fascia and muscle can be used between the condyle and the glenoid fossa for surgical treatment of TMJ ankylosis.¹²

Temporalis fascia and muscle graft still remains the most popular choice of interposition graft. Dissection of the temporalis muscle, however, can cause a contracture of the donor site, which may worsen trismus, unless an ipsilateral coronoidectomy is performed. Ipsilateral coronoidectomies are often performed in pediatric patients, but contralateral coronoidectomy can be an option associated with the surgical technique carried out in the affected site, depending on the degree of mouth opening.⁹

CASE DESCRIPTION

An 8-year-old female patient was taken by her parents to the Oral and Maxillofacial Surgery and Traumatology Service of Hospital Independência, Porto Alegre, Brazil. They reported that she had been experiencing difficulties



Figure 1. Limitation of the patient's mouth opening.



Figure 2. Coronal computed tomography scan showing osseous ankylosis of the patient's right temporomandibular joint.



Figure 3. Preauricular surgical approach.

in opening her mouth since she was 3-years-old. Her mother reported that the child stayed in the hospital for 2 weeks after birth due to preterm delivery and low birth weight. The mother also reported that the infant fell out of her crib during her hospital stay.

Upon physical examination, the child presented with severe limitation of mouth opening, as well as several



Figure 4. Clinical aspect of the bony fusion between the condoyle and the articular fossa.



Figure 5. Arthroplasty performed with repaired articular anatomy.



Figure 6. Interposition of the temporalis muscle fascia.

carious lesions probably caused by the difficulty in performing adequate oral hygiene (Figure 1). An additional exam (computed tomography of the TMJ) was requested to confirm the presumed diagnosis of articular ankylosis (Figure 2).

After evaluating the results of the additional exam, we confirmed the diagnosis of unilateral TMJ ankylosis because of the complete fusion between the mandibular condyle and the articular fossa of the temporal bone, and the need for surgical treatment. The following tests were requested: a full blood test; a partial thromboplastin time (PTT); a prothrombin time (PT); and a blood type test. The thoracic surgery team in charge of preanesthetic preparation for patients undergoing surgery at Hospital Independência was asked to perform a tracheostomy since it was not possible to intubate the patient using the conventional route because of the limited mouth opening.

We used the preauricular route (Figures 3 and 4) to treat the right TMJ by means of an arthroplasty associated with ipsilateral coronoidectomy using multibladed drill no. 702 at a low rotation speed receiving continuous flow of physiological solution followed by interposition of the temporalis muscle fascia (Figures 5 and 6). The incision was sutured with single stitches using 5.0 ethicon nylon thread (Figure 7). Active and passive physical therapy was initiated 48 hours after the surgery with the purpose of promoting relaxation, analgesia, and gradual increase and maintenance of mouth opening.

The treatment was provided by the functional physical therapy team of Hospital Independência using transcutaneous nerve electrical stimulation and ultrasound to promote analgesia and relaxation, respectively. The treatment also consisted of active maximum opening and lateral and protrusion movements to practice the physiological movements of the stomatognathic system. The treatment was implemented for a 6-month period with weekly follow-up of the clinical outcome at the hospital outpatient clinic. There was significant improvement of the mouth opening from 7 mm before the surgery to 27 mm following treatment (Figure 8).

The patient was referred to the pediatric dental care service of the School of Dentistry of the Lutheran University of Brazil, Canoas, Rio Grande do Sul, Brazil, to receive dental treatment. All her clinical needs in terms of dental restoration were fulfilled within a 3month period. After her dental treatment was completed, the patient continued to be followed at the Oral and Maxillofacial Surgery Service and the Orthodontics and Dentofacial Orthopedics Service of Hospital Independência for the purpose of monitoring the evolution of mandibular growth and maintenance of the mouth opening.

The purpose of this paper was to report on the case of an 8-year-old girl who sought medical care for severe limitation of her mouth opening, without evident



Figure 7. The patient's surgical incision was sutured with single stitches using 5.0 ethicon nylon thread.



Figure 8. The patient's mouth opening 7 days after surgical treatment.

facial deformity, and who complained of difficulties with eating and cleaning her teeth. After asking for some additional exams, we confirmed the diagnosis of temporomandibular joint ankylosis.

DISCUSSION

Based on the information provided by the patient's mother, the etiology of this case of ankylosis is probably related to a traumatic injury experienced after birth. This agrees with the reports from the literature, which demonstrates that condylar fractures are the most common causes of articular ankyloses, according to Ellis⁷ and Erol et al.⁶

Surgical treatment of TMJ is quite complex and has a rather unpredictable prognosis, mainly in pediatric patients, since much of its success depends on the patient's postoperative adherence to the treatment by means of intense physical therapy to maintain the surgical result. TMJ ankylosis can be treated by arthroplasty, which is an opportunity to solve the problem with only one surgical intervention aimed at the separation of the condyle from the articular fossa by performing plasty of these 2 bone components.¹³ In the present case, we performed arthroplasty of the TMJ with interposition of the temporalis muscle fascia associated with the resection of the coronoid process on the same side in an attempt to reduce the risks of relapse.

According to Dimitroulis,⁹ the temporalis muscle fascia graft remains the most popular interposition graft choice when it is followed by ipsilateral coronoidectomy. As stated by Ko et al.,⁸ a costochondral graft can bring good results due to its excellent growth and regeneration potential; however, excessive growth associated with reankylosis is quite frequent. Su-Gwan¹⁰ achieved good results treating TMJ ankylosis by interposition arthroplasty on temporalis muscle and fascia flap. Using the same technique, Balaji¹⁴ also obtained excellent results. This author observed significant increase in the mouth opening, reduced pain in the postoperative period, absence of deviation or noise when opening the mouth, absence of fibrosis or reankylosis, and good occlusion.

The TMJ is a growth center and any biomechanical stimulation causes changes in its proliferative activity, leading to alterations in its original structure.^{15,16} Therefore, it is extremely important, in face of the changes occurring either by trauma or surgery, that a complementary treatment is effectively implemented using physical therapy to prevent ankylosis relapse.

Costochondral grafts, the interposition of skin, and temporalis muscle or fascia between the condyle and the glenoid fossa have been used together with arthroplasty.¹¹ Regardless of the technique chosen to treat articular ankylosis, physical therapy is crucial for the success and maintenance of the result. According to Chidzonga,⁵ patients must be advised to initiate aggressive physical therapy by practicing mouth-opening movements 24 hours after the surgery.

According to Erol et al.,⁶ articular ankylosis patients present with reduced mouth opening, which results in poor oral hygiene, promoting the occurrence of caries and making treatment complicated because of difficult access to the oral cavity, as was diagnosed in the case reported here. After the surgery, the immediate recovery of appropriate oral health of these patients is very important to provide them with better quality of life.

Based on a review of the literature, it is possible to conclude that the main cause of temporomandibular joint ankylosis is related to trauma, which is the most common etiological factor in this pathology. The treatment of choice depends on each particular situation and must be related to the patient's age and the case's severity. The treatment must always be associated with the use of physical therapy so that increased predicability of success can be achieved. It should be emphasized that offering these patients dental treatment after the surgery is extremely important to provide them with better oral health and quality of life.

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