

## Management of Traumatic Undiagnosed Condyle Fracture in Children

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**Background:** Condyle trauma is considered to be the major cause of TMJ ankylosis but it is also the most neglected and under-managed problem in children. TMJ ankylosis leads to be malocclusion and facial disfigurement. The aim of early treatment is to restore the mandibular mobility and to enhance further growth in order to reduce the possibility of future facial asymmetry.

**Patients and Methods:** We report two patients with inability to open mouth few months following injury. They most probably suffered missed diagnosis condyle fracture by the previous physician. The latest physical examination and radiological finding shows the mandible was micrognathic and unilateral TMJ ankylosis was confirmed. A sequential protocol of TMJ ankylosis management based on aggressive resection of ankylotic mass was performed and followed with physiotherapy.

**Result:** In 2 month-follow up, both patients showed significant improvement in mouth opening and the mastication function was restored, accompanied with physical therapy to gain maximum mouth opening for at least a year.

**Summary:** A detail history, clinical and functional examination, radiographic examination facilitating correct diagnosis followed by immediate surgical intervention, and physiotherapy can help us to restore physical, psychological, and emotional health of the child patient.

**Keywords :** *pediatric, condyle trauma, ankylosis TMJ*

**Latar Belakang:** Trauma condilus diduga sebagai penyebab utama ankilosis TMJ pada anak, namun sering tidak dikenali dan tidak tertangani. Ankilosis TMJ menyebabkan maloklusi disertai perubahan bentuk wajah. Tujuan terapi dini pada ankilosis TMJ adalah untuk mengembalikan mobilitas mandibula dan mengurangi kemungkinan pertumbuhan wajah yang asimetri.

**Pasien dan Metode:** Kami melaporkan dua pasien dengan ketidakmampuan membuka mulut beberapa bulan setelah trauma. Kemungkinan terbesar mereka mengalami fraktur condilus yang tidak terdiagnosa oleh dokter terdahulu. Pada pemeriksaan fisik dan radiologis terakhir tampak mandibula mikrognatik dan ankilosis TMJ unilateral, kemudian dilakukan reseksi agresif massa ankilosis, dilanjutkan dengan fisioterapi.

**Hasil:** Pada evaluasi 2 bulan, kedua pasien menunjukkan kemajuan yang signifikan dalam membuka mulut dan fungsi mastikasi tercapai, dilanjutkan dengan latihan untuk membuka mulut maksimal setidaknya selama satu tahun.

**Kesimpulan:** Anamnesis yang detil, pemeriksaan klinis, fungsional, dan radiologi dalam mendiagnosis, intervensi operatif dini dan fisioterapi dapat membantu mengembalikan kesehatan fisik psikologis dan emosi pasien.

**Kata Kunci :** *pediatric, condyle trauma, ankylosis TMJ*

**A** nkylosis of the temporomandibular (TMJ) joint involves fusion of the mandibular condyle to the base of the skull. It is a challenging problem for both the patient and the plastic surgeon. Trauma is the most common etiologic factor causing ankylosis that leads to a restriction of

the mouth opening from partial reduction to complete immobility of the condyle.<sup>1,2,3</sup>

Although ankylosis of the TMJ is one of the most common pathologies afflicting the facial skeleton, it is also the most overlooked and under-managed problem in children. When missed diagnosed and left untreated,

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*Presented in The 16th Annual Scientific Meeting of Indonesian Association of Plastic Surgeon, Sibolangit, North Sumatra, Indonesia*

**Disclosure:** *The authors have no financial interest to declare in relation to the content of this article.*

condyle trauma will develop into ankylosis of the TMJ that will lead to malocclusion and facial disfigurement. Management of TMJ ankylosis in children is complicated. The aim of early treatment is to restore the mandibular mobility and to enhance further growth in order to reduce the possibility of future facial asymmetry. Successful treatment of TMJ ankylosis in children depends on many factors such as age of the patient, type and severity of the ankylosis, as well as the materials used for reconstruction and interposition.<sup>4</sup>

## PATIENTS AND METHODS

### Case 1

A 5-year-old boy presented inability to open his mouth since 1 year ago. History revealed that he had facial injury 3 months before. He developed swelling in his right preauricular, which resolved by time. No intra oral or facial bleeding was noted at the time of injury. After the resolution of swelling, his mouth opening started to reduce gradually, for which he consulted a local doctor who seemingly missed the diagnosis and could only prescribe some analgesic medications. Parents recognized the inability to open mouth at the time the child started with solid diet. Further evaluation in our department, extra oral examination revealed facial asymmetry with fullness of cheek on the right side and micrognathic mandible. The child showed almost nil mouth opening.

Radiographic examinations comprised of computed tomography revealed a lack of structural organization and obliteration of right TMJ space. Based on these findings, a diagnosis of unilateral right bony TMJ ankylosis was confirmed.

### Case 2

A 16 year-old girl with the complaint of inability to open her mouth maximally. History revealed that she might have an unrecognized episode of trauma to her chin when she was about 2 or 3 years old. She had been consulted a local doctor in Lampung who seemingly missed the diagnosis. She had difficulty in mastication, so she can only eat

soft food and drink. Her oral hygiene was also poor with lots of caries. When she was examined at our outpatient clinic, her mouth opening was as little as 5 mm, and her TMJs were tender on palpation. Her face also showed significant facial disturbances described as bird face deformity.

## RESULT

Radiographic evaluation comprised of a facial CT-Scan revealed mandible hypoplasia and maxillo-mandibular bony fusion of the right TMJ. Based on all these findings, a diagnosis of TMJ bony ankylosis and mandible hypoplasia was confirmed.

After complete evaluation, both patients underwent surgical treatment. The surgical approach consisted of preauricular incision. Full thickness mucoperiosteal flap was reflected and the ankylotic mass was exposed. We performed condylectomy procedure at the pathologic side, arthroplasty and interpositional tissue transfer to the TMJ with temporalis superficial fascia flap.

The post-operative course was uneventful. Two days after surgery, a mouth opening of 12 mm in the first patient and 15 mm in the second patient.

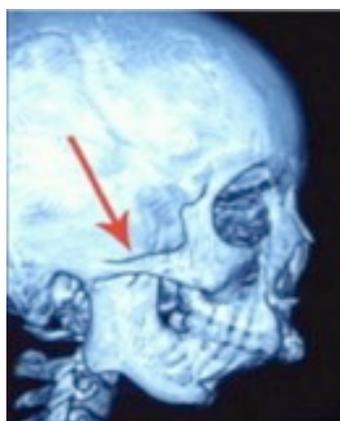
Vigorous post-operative physiotherapy was started to maintain the mobility of the joint. After 5 days with physiotherapy using wooden spatula, mouth opening was noted to be 30 mm in the first patient and 35 mm in the second patient. In 2 month-follow up, both patients showed significant improvement in mouth opening and the mastication function is restored. The patient also was instructed to continue physical therapy for at least a year.

## DISCUSSION

Ankylosis of Temporomandibular joint (TMJ) is a disabling condition of mastication. Hypo-mobility affects the surrounding structures as well as TMJ. The causes of ankylosis of TMJ are the well known trauma and local-systemic infection. Trauma is the most common etiologic factor in causing TMJ often resulting in haematoma, which eventually organizes and ossifies.<sup>1,2</sup>



**Figure 1.** (Left) Showed limitation of mouth opening of case 1. (Middle and Right) Trismus and hypoplasia of case 2.



**Figure 2.** Mandible hypoplasia and maxillomandibular bony fusion of the right TMJ as shown by red arrow.



**Figure 3.** (Left) Right condylectomy. (Right) Replacement by muscle Inter-positioned.



**Figure 3.** (Left) After the right condylectomy of case 1. (Right) Post-op

Growth of the mandible occurs by two related processes: translational growth driven by the condylar growth center (epiphysis) and resorptive depository growth causing mandibular enlargement. Disruption of either of these two can lead to profound consequences. Damage and restriction to the condylar growth center not only affects growth directly in this region, but leads to secondary hypoplasia of the pterygomasseteric sling. Without this dynamic loading of the mandible, further bony hypoplasia occurs. Coupled with normal or perhaps compensatory growth on the unaffected side, a progressive deformity results.<sup>5</sup>

The clinical features of unilateral ankylosis of the TMJ include; facial asymmetry, chin deviation to the affected side, elongation and flatness on the unaffected side with roundness or fullness on the affected side when observed from a frontal view. A bony thickening is often felt in the preauricular area of the affected TMJ. The lateral profile has a reduced mandibular projection with "bird face deformity" in the most severe cases. The degree of mandibular recession depends on the severity, unilateral or bilateral joint involvement, age of onset, and duration of TMJ ankylosis.<sup>5,6</sup>

The mandibular morphology is severely influenced in terms of size and shape with marked antegonial notch, enlarged coronoid process, reduced vertical ramus height on the affected side; and flattened mandibular body and ramus on the non-affected side. The ankylosed mandibular condyle can be hyperplastic with irregular contours and absent joint spaces.<sup>5</sup>

Joint structures are a combination of bone, cartilage, and fibrous tissue. Ankylosis may involve each, resulting in osseous, fibrous, or cartilaginous union. Two or more tissues may also be involved and hence the fusion may be fibro-osseous, osteocartilaginous, etc.<sup>4,7,8</sup>

TMJ ankylosis, which occurs after the completion of mandibular growth, typically results in only a restriction of jaw opening. In contrast, ankylosis, which occurs during the period of active growth, has more terrible consequences. Unlike the congenital hypoplastic mandible which, although causing

asymmetry, does not produce a progressive asymmetry. Early ankylosis not only results in growth restriction and mandibular hypoplasia with progressive deformities of the occlusion, but the restricted jaw opening leads to poor oral hygiene, dental caries, periodontal disease, and may compromise the airway, speech, and nutrition.<sup>1,2,4</sup>

A sequential protocol for the treatment of TMJ ankylosis is based on aggressive resection of ankylotic mass. While resecting, a special approach has to be directed particularly from the medial aspect of the joint which is in close proximity with internal maxillary artery to ensure that bony, fibrous, and granulation tissues are completely removed.<sup>3,6,9</sup>

Ankylosis of the TMJ has classically been managed by a combination of osteoarthrectomy (joint release) and optional reconstruction in the form of a costochondral graft or implant, with or without inter-positional arthroplasty (synthetic, muscular, fascial). However, the treatment of TMJ ankylosis in children is often unsuccessful. This is not necessarily a failure of surgery, but a failure of postoperative management. In the younger child, it is frequently impossible to actively exercise a joint recently released, due to pain and poor cooperation. Additionally, the malocclusion present may prevent adequate fitting of commercially available activating devices leading to abnormal pressure on isolated teeth. The key to successful surgery depends as much on proper aftercare as it does on the surgical technique. Adequate patient cooperation and pain relief to engage in frequent active and passive TMJ motion with the assistance of a variety of commercially available devices is necessary. The problematic patients with TMJ ankylosis share multiple factors. These patients are characterized by unilateral or bilateral severe proliferative bony ankylosis, which typically presents as a large bony block fusing the condylar remnant to the cranial base and frequently to the adjacent zygomatic arch, pterygoid plates and maxilla. These patients are usually young, in the phase of active growth, and develop a progressive deformity.<sup>3,6,8</sup>

We have identified several such patients who appear to have no history of trauma and a disease process that is hence idiopathic and

congenital in origin. Experience with these patients with radical resection early in childhood, before adolescence, has led to a high rate of bony relapse. These patients appear to have a proliferative bony process that is the cause of their disease. Despite release, resection, and arthroplasty, exuberant new bone formation is seen and ankylosis recurs despite physical therapy, which, as mentioned, is difficult. With the proper vector selection, it also creates the opportunity to expand the lower jaw vertically, to provide an open-bite deformity, and hence protect the airway and improve nutrition, oral hygiene, and speech. It also prepares the patient for definitive reconstruction and places the mandible in an acceptable position for postoperative therapy.<sup>2,5,7,8</sup>

### SUMMARY

Condyle trauma is considered to be the major cause of TMJ ankylosis but it is also the most overlooked and under-managed problem in children. Missed diagnosed and untreated jaw trauma will develop to TMJ ankylosis. Any pathology that afflicts the TMJ and restricts the mouth opening hence carries a mental stigma that outweighs the physical disability posed by the problem in growing children. Such children are psychologically handicapped and hence call for a unique approach towards their rehabilitation. Ankylosis of TMJ, not only hinders the integrity of the craniofacial skeleton, but also affects the normal growth and development of jaws and occlusion.

The main goal of treating temporomandibular joint ankylosis is to achieve adequate mouth opening with minimal chance of recurrence in long term follow up. A

detailed history, clinical and functional examination, radiographic examination facilitating correct diagnosis followed by immediate surgical intervention, and physiotherapy can help us to restore physical, psychological, and emotional health of the child patient.

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