

# Temporo-Mandibular Ankylosis in Adults: Our Recent Experience About 22 Cases

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**Abstract: Introduction:** Temporomandibular ankylosis is defined as a permanent constriction of the jaws with a mouth opening of less than 30 mm. It can be uni or bilateral. The aetiologies are dominated by the traumatic origin, the infectious origin is the rarest. The treatment is surgical, several techniques are used. **Patients and methods:** This is a retrospective study of cases collected at the department of maxillofacial surgery and stomatology of the IBN SINA university hospital in Rabat-MOROCCO. It covers the period between January 2014-December 2018. All of our patients treated for intra-articular temporomandibular ankylosis underwent a surgery of resection with interposition of a costal cartilage graft. **Results:** No cases of recurrence were observed during the postoperative follow-up of our patients, with a follow-up of at least 1 year. **Discussion:** Temporomandibular ankylosis is a quite common condition, especially in developing countries. The origin of temporomandibular ankylosis is dominated by trauma. The management of this condition is difficult, several surgical techniques have been described in the literature and the results are different from one team to another.

**Keywords:** temporomandibular ankylosis, reconstruction, autologous graft

## Introduction :

Temporomandibular ankylosis is defined as a permanent constriction of the jaws. The mouth opening, measured between the incisors, is less than 30 mm. It happens when the mandibular condyle is partially or completely fused to the base of the skull by bony or fibrotic tissues [1].

It is a pathologic condition of a variable severity which can be functionally, morphologically and psychologically disabling [2]. The main symptoms of TMJ ankylosis is a limitation of the mouth opening less than 30mm, which may be associated with retrognathia and / or laterognathia.

In growing children, functional and aesthetic complications are in the foreground with a mandibular growth retardation, retrognathia, micrognathia, or dental malocclusion [3].

TMJ ankylosis is most commonly due to trauma, the infectious origin are the rarest, we see them especially in the developing countries. CT scan remains the key examination to diagnose the stage and severity of this ankylosis.

The treatment is surgical, several techniques are used to remove the obstacle to oral opening, remove pain and prevent any recurrence.

This article aims to describe the attitude of our maxillofacial surgery and stomatology department in the diagnosis, management and the follow-up of patients with TJM ankylosis.

## Patients and methodes :

This is a retrospective study, covering the period from January 2014 to December 2018.

All of our patients treated for intraarticular temporal mandibular ankylosis underwent surgical treatment, we did a resection of the ankylotic block and interposition arthroplasty using costal cartilage graft. We exclude patients under 18 years of age.

All the patients had a post-operative follow-up of at least 1 year. A total of 22 patients were included.

All our patients had a complete clinical examination, radiological explorations including an orthopantomogram and a cranio-facial CT scan.

This group of patients (fig1) consists of 08 females and 14 males, with the range of age between 19-49 years (average of 27.09).

In our serie the mouth opening varied between 0-15 mm, and the origin of this ankylosis was traumatic in 21 cases and infectious in a single case. The ankylosis was bilateral in 03 patients and unilateral in 19 patients. According to the Topazian classification, ankylosis was classified as stage I in 03 cases, stage II in 17 cases and stage III in 2 cases.

<b>Patients</b>	<b>Year</b>	<b>Age</b>	<b>Sex</b>	<b>Evolution (years)</b>	<b>Mouth openning MM</b>	<b>Type TOPAZIAN</b>	<b>Localisation</b>	<b>Origin</b>
<b>1</b>	2014	23	F	16	10	II	D	T
<b>2</b>	2014	20	M	03	0	II	G	T
<b>3</b>	2014	49	M	20	10	II	G	T
<b>4</b>	2014	20	M	12	15	II	D	T
<b>5</b>	2015	30	M	08	10	II	D	T
<b>6</b>	2015	29	F	10	15	II	G	T
<b>7</b>	2015	22	M	04	5	II	D	T
<b>8</b>	2015	34	M	13	15	I	D	T
<b>9</b>	2015	28	M	23	20	I	G	T
<b>10</b>	2015	28	F	20	15	II	G	T
<b>11</b>	2016	33	M	09	2	III	G	T
<b>12</b>	2016	22	F	08	8	II	G	T
<b>13</b>	2016	29	M	12	15	II	G	T
<b>14</b>	2016	19	M	06	0	II	Bilateral	T
<b>15</b>	2016	20	F	07	7	II	G	T
<b>16</b>	2017	25	F	13	5	II	D	INF
<b>17</b>	2017	21	M	10	10	II	G	T
<b>18</b>	2017	28	F	Infancy	5	II	D	T
<b>19</b>	2017	26	M	15	10	II	G	T
<b>20</b>	2018	20	M	Infancy	5	II Bil	Bilateral	T
<b>21</b>	2018	38	M	10	2	III Bil	Bilateral	T
<b>22</b>	2018	32	F	05	4	I	G	T

**Figure 1 :** list of patients treated in our department between 2014 and 2018  
(F : Female / M : Male / Bil : Bilateral / INF : Infectious / T : Traumatic)

All of our patients were operated under general anaesthesia using nasal intubation under nasofibroscopy.

preauricular incision was used extended into the temporal region with a 45° angle. The treatment consisted in a resection of the entire ankylosis block, leaving no bone bridge between the temporal bone and the ramus (fig2, 3).

A systematic coronoidectomy was performed at the same time in all patients classified Stage I and Stage II of Topazian.

In patients classified as Stage III of Topazian (fig4), the coronoid process was fused to the block of ankylosis that was completely removed.

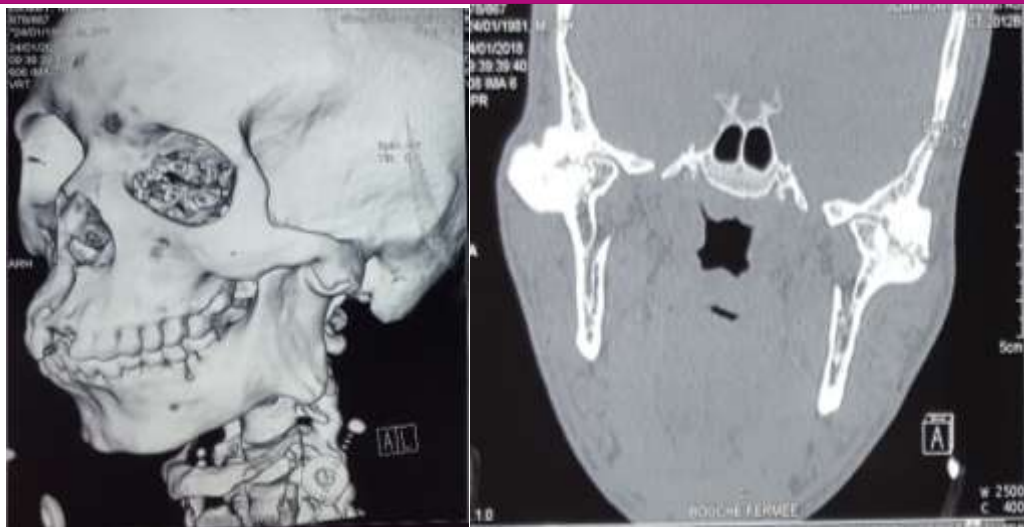
Then a disinsertion of the masseter muscle was performed in all our patients.



**Figure 2 :** resection of ankylotic block through extended preauricular incision.



**Figure 3:** ankylotic block resected from a patient classified stage III of topazian



**Figure 4:** CT scans of a patient showing a stage III topazian

The reconstruction of the TMJ was made by a graft of the costal cartilage, taken from the cartilage of the 4th or 5th rib (fig5).



**Figure 5:** 4th and 5th rib costal cartilage

The height of this graft was calculated to create a ramus as long as that on the lateral side (fig6 and 7). Early, intensive and prolonged postoperative rehabilitation, was started for all our patients, either at the first or second day of the postoperative.



**Figure 6:** Costal cartilage graft modeled according to the gap area



**Figure 7:** interposition of the costal cartilage graft

### **Results:**

Improvement in the mouth opening between 35-40mm (fig8) and resumption of TMJ function was successful in all our patients, with a follow-up of at least 1 year. A mouth opening of 30mm was observed in 2 patients without recurrence with a follow-up of 03 years.

In our study, two patients were already operated for a unilateral ankylosis of the TMJ in another department, where they had a resection of the ankylotic block without any arthroplasty, the evolution of these 2 patients was marked by the recurrence of the ankylosis with an average follow-up of 2.5 years.



These 2 patients were operated again in our department using our technique. Postoperative evolution was favourable, currently their mouth opening is between 33mm and 38mm.

No cases of recurrence have been reported.

No cases of facial nerve damage were observed.



**Figure 8:** mouth opening 1 year after surgery

#### Discussion:

Temporomandibular ankylosis is a quite common condition, especially in developing countries, given the inaccessibility to specialists and consequently to the treatment of facial trauma, as well as their negligence by patients [1, 4].

The origin of temporomandibular ankylosis is dominated by trauma, untreated condyle fracture [1,5]. In second place is the infectious etiology which has regressed thanks to antibiotics, followed by inflammatory and congenital origin which are very rare [1, 5].

From a pathological point of view, after one month of the traumatic event, the formation of an intra-articular hematoma is noted, responsible for hypomobility. The evolution is towards the filling of almost the entire joint with fibrous connective tissue. After three months, the joint space is completely filled by fibrous ankylosis and the presence of bone tissue, as well as areas of endochondral ossification near joint surfaces may be detected [13,14]. Septic arthritis of TMJ is a rare cause of ankylosis. The

infection is most often the result of a contiguous spread during otitis media or mastoiditis, but it may also be due to the haematogenic spread of infections.

However, some authors believe that ankylosis of unknown origin and some congenital forms are largely the result of unrecognized or undiagnosed septic arthritis [13, 14]. Ankylosis of infectious origin is mainly due to the reactive formation of fibrous or bone tissue in the intra-articular abscess, this is done in a faster and more important way than in the traumatic origin [13].

The other rarest remaining causes are systemic diseases including, ankylosing spondylitis, rheumatoid arthritis and psoriasis [14].

The management of the TMJ ankylosis is difficult, several surgical techniques have been described and the results differ from one team to another [4, 6, 7].

The techniques the most reported in literature are the excision of the block of ankylosis [1, 7, 8], others prefer the interposition of an autologous graft: chondrocostal, bone (used by some but more rarely: iliac crest, fibula, metatarsal, sterno-clavicular joint [1, 9]), muscle or temporal fascia or skin [5, 7, 10]. Other teams have opted for the use of biocompatible inert material: acrylic, silicone [7, 10], and / or titanium [6].

In our series we opted for the interposition of an autologous graft made of costal cartilage. This graft has several advantages such as its anatomical and biological characteristics similar to the meniscus of the mandibular condyle as well as the low morbidity and accessibility of the donor site [11, 12]. The use of this graft in adults eliminates any potential for unpredictable growth of the graft ; and made it possible to benefit from its non-consolidating nature with the bone. Also it allowed to gain height of the ramus thus avoiding occlusal openings or even dental disorders.

Resection of the ankylosis block with the interposition of autologous material has shown over time its effectiveness in the treatment of ankylosis in TMJ. In our serie, the costal cartilaginous graft gave very satisfactory results in terms of relapse of ankylosis, which does not exist in our serie, and the mouth opening. We also believed that coronoidectomy have helped to prevent recurrence, by eliminating any inter-articular contact, and allowed us to gain in mouth opening. The disinsertion of the masseter muscle that we performed showed its interest and it saved us a few more mm in mouth opening. Long-term ankylosis leads to fibrosis and muscle atrophy, which are additional factors that limit mouth opening [15]. Immediately after the surgery we started a postoperative rehabilitation, which in some cases has exceeded 1 year.

Posnik and al [16] reported 09 cases of temporomandibular ankylosis that they operated. They did an excision of the ankylosis block and an interposition of a chondrocostal graft, they had no recurrence with a follow-up of 03 years. Also Valentini and al [13] found that the ideal treatment for TMJ ankylosis is the complete excision of the ankylosis block and the interposition of an autologous material, in their serie they used the temporal fascia, with a long-term rehabilitation. Better results have been obtained with these methods compared to the interposition of biomaterial [13].

The ankylotic block removal is a quick simple method. However, the space created by the resection of the ankylosis block can be a factor of recurrence of the ankylosis [17]. Belmiro and al [4] performed a resection of ankylosis block in a group of 10 patients without reconstruction, they had 2 recurrences and several patients had occlusal disorders.

The ankylotic block resection has been abandoned in recent years by several teams considering the multiple disadvantages of this intervention as [15, 17, 18]: disorders of occlusion and facial growth such as latero-deviation and mainly the high risk of recurrence which is one of the biggest challenges with this treatment [2, 17].

The risk of damaging the temporal facial nerve while the surgical approach of the TMJ is high. The use of the approach described by Al-Khayat and Bramley [19] as in our serie, reduces this risk. Paresis of this nerve may result from its compression during the tissues separation, usually steroid and vitamin therapy (vitamin B) helps patients recover.

To summarize, our department adopts a well-defined management of the TMJ ankylosis. The 1st step is surgery, that consists in a complete and aggressive resection of any bone contact between the temporal bone and the ramus (ankylosis block). The coronoid process is resected as well. Than we realise a disinsertion of the masster muscle and finally we interpose the costal cartilage.

The second step, as crucial as the surgery, is physiotherapy that is essential in our protocol, with a rigorous and close follow-up of our patients especially during the 1st year after surgery.

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