

Detailed Invention Developed for the Treatment of TMJ Ankylosis

A Mukhtar Tantawi*

Arabic Board Maxillofacial Surgery Chairman and Cleft Lip Research and Surgery Society, USA

***Corresponding Author:** A Mukhtar Tantawi, Arabic Board Maxillofacial Surgery Chairman and Cleft Lip Research and Surgery Society, USA.

Received: March 21, 2018; **Published:** August 23, 2018

Abstract

Ankylosis of the temporomandibular joint (TMJ) is an intracapsular union of the disc-condyle complex to the temporal articular surface that restricts mandibular movements, including the fibrous adhesions or bony fusion between condyle, disc, glenoid fossa, and eminence. It is a serious and disabling condition that may cause problems in mastication, digestion, speech, appearance, and hygiene.

Keywords: Temporomandibular Joint (TMJ); Ankylosis

Introduction

Due to the large number of patient suffering from TMJ ankylosis, and the great possibility of failure to have a good permanent functioning joint, despite all the surgical improvement, I tried to move the joint area to the angle of the jaw of the effected side.

A Titanium of two parts joint was designed to be mounted in the area of the surgically created joint.

The posterior part represents the fossa which guides the anterior part in its movement that represents the condyle. Each part has three holes to be used for fixation with bony screws. The two parts are adapted to each other in a way makes the moving part under the guidance and control of the posterior part (Figure 1 and 2).

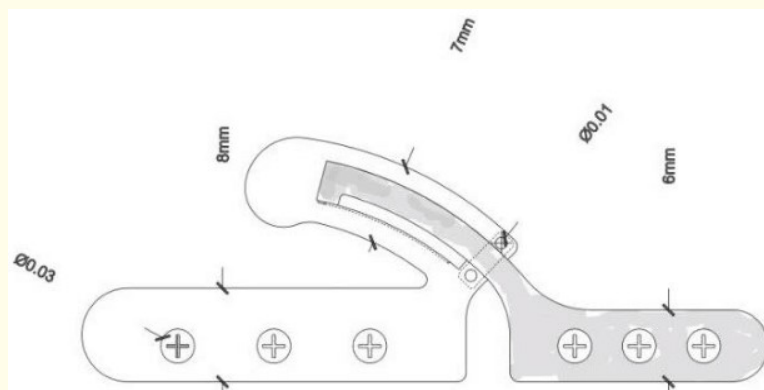


Figure 1: External view of the joint. we notice the overlap of the right moving arm (highlighted) inside the fixed one.

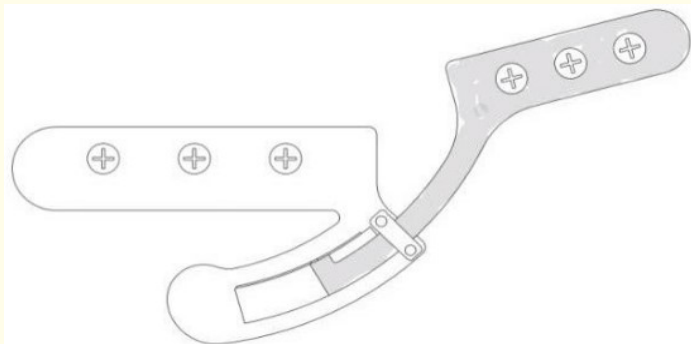


Figure 2: Internal view of the joint (path section), with a barrier fixed on the body with bolts to prevent the moving arm from leaving its path.(Circled)

The shape and the line of movement that guided by the posterior part that is in 30 degrees angle. That was found after a long study for many types of normal TMJ axial and transfers' movement (Figure 3).

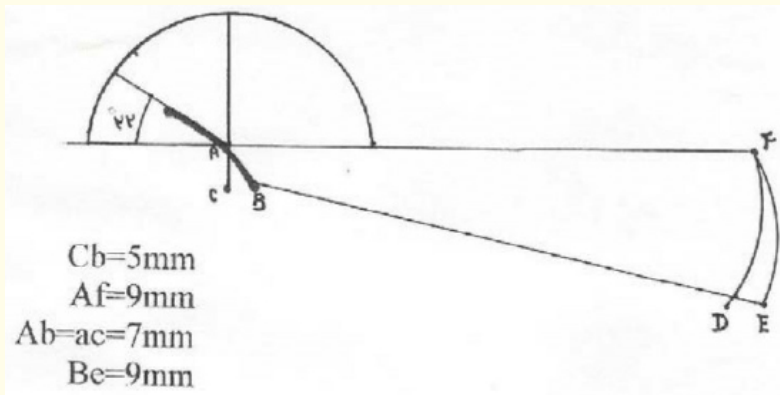


Figure 3

This 30 degree angle will secure a will balanced movement of the effected part to the normal joint movement on the other side.

After surgery the patients were engorged to practice opening and closing the mouth to keep the jaw movement well secured. In few cases I have used my advanced device that is (preferable on Prof. Shuchard device) (Figure 4).



Figure 4: The Advanced device.

This invention has been Registered at The Ministry of Internal Trade and Consumer Protection, Documented Decision No.1813 Dated 03/07/2016/ Decree No. /46/ Dated 23/06/2012 (Figure 5-8).

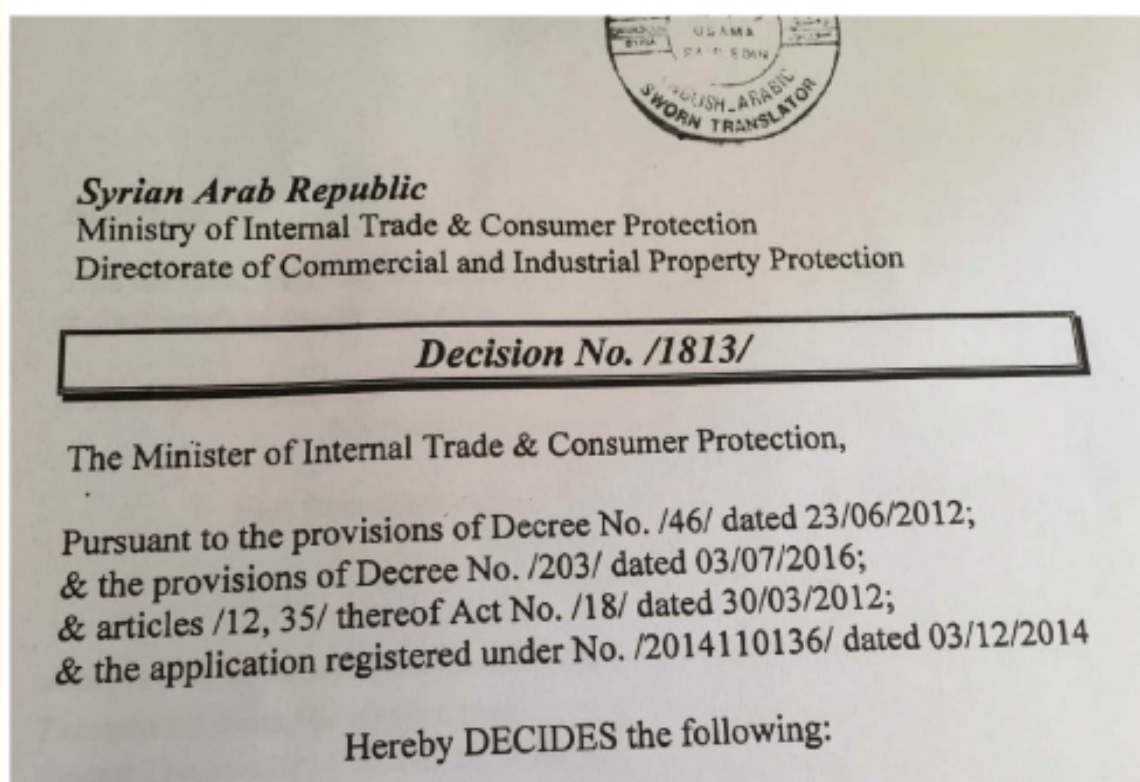


Figure 5

Article 1)

Prof. Dr. A. Mukhtar Tantawi, resident in Damascus – Arnous Sq., shall be granted Patent No. /5945/ in title "Synthetic joint for treatment of maxillo-temporal ankylosis" for twenty years as of the application filing date on 03/12/2014 non-renewable.

Figure 6

Article 2)

Rights of the patent owner will be waived unless he invests the said invention within three years, unless he proves that such invention is offered directly to competent industrialists to execute his invention, and unless he unreasonably rejects investment applications of this invention.

Figure 7

Article 3)

This patent does not entitle any right of manufacture or investment without obtaining the regular licenses.

Figure 8

Imaging the device on a dry skull (Figure 9 and 10).



Figure 9: The device is mounted in closing position.



Figure 10: The device in opening stage ,notes how the jaw is moved about $\frac{1}{2}$ cm forward.

Case Report

A 17-year-old boy was referred to my private office. for investigation and treatment of congenital right TMJ ankylosis No complications had been reported at birth, and there was no subsequent history of trauma to the facial skeleton. As a result of his ankylosis, the right mandible had become hypo plastic. At initial presentation, his height and his weight were some what under normal. He was otherwise healthy.. The initial clinical examination revealed an obviously hypoplastic mandible with a class II dental relationship. The mandibular midline was 4 cm to the right of the facial midline (Figure 11 and 12).



Figure 11



Figure 12

The occlusal plane was canted. Maximum opening was minimal, and there was no palpable movement over the right TMJ and only slight rotation on the left side. Radiographic images confirmed bony ankylosis of the right TMJ.

The following 3-stage treatment plan was developed:

1. Extraction of the right impacted 3rd molar through an extra oral approach under local anesthesia. This tooth was located in the area where our new articulation (Figure 13).
2. Surgery through a submandibular approach to cut and create our new articulation anterior to the angle of the jaw where our new device was installed and mounted. The initial surgery was accomplished under general anesthesia (Figure 14).

During the procedure, the surgeon noticed an increase in maximum opening to about 15 mm.

3. Impressions for fabrication of the device that might be used to help on the jaw movement (Figure 15).

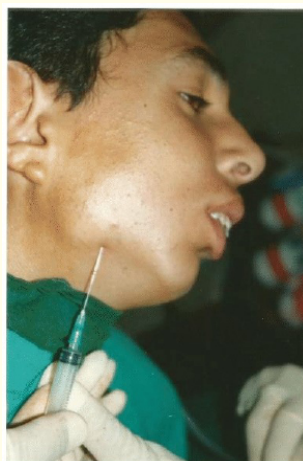


Figure 13



Figure 14

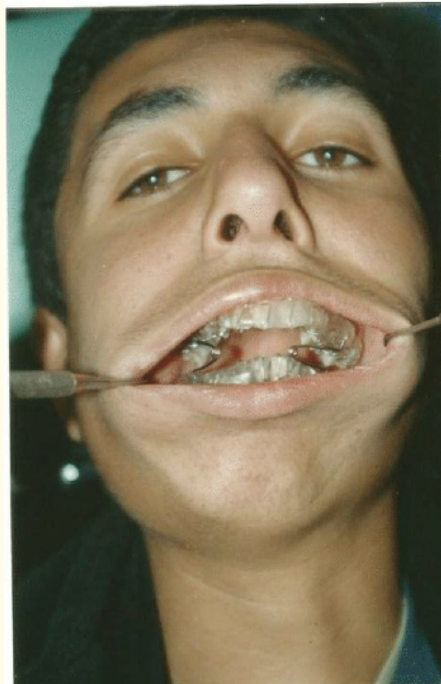


Figure 15

Surgery follow up was uneventfully, creating final mouth opening of 5.4 cm with a free jaw movement (Figure 16).



Figure 16

This report describes a case of a 17-year-old boy with inability to open his mouth, diagnosed with unilateral right bony TMJ ankylosis. The surgical approach consisted a new location to the joint with replacement of a device to guide the jaw movement.

Discussion

The simplicity in which the procedures is performed; and the mechanisms the device does work in reducing the rate of recurrence; comparing to the classical TMJ surgery will make the handling of what is complicated a simple and could be done by any maxillofacial surgeon, without being involved in any kind of complications.

Conclusion

Regularly, the most predictable treatment for the ankylosed TMJ patient includes: 1) Release of the ankylosed joint; removal of the heterotopic and reactive bone with thorough debridement of the TMJ and adjacent areas; 2) Reconstruct the TMJs with a custom-fitted total joint prosthesis; Coronoidotomies.

Autogenous fat graft (harvested from the abdomen or buttock) packed around the prosthesis in the TMJ area; These complicated procedure beside the hazarded complications that might be found is eliminated by moving the area of articulation and also by using this new device [1-11].

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Volume 17 Issue 9 September 2018

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