

Limitation of Mandibular Movement: A Rare Case Report of Unilateral Zygomatico-Coronoid Interference

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Abstract

Introduction: Zygomatico-coronoid interference is a rare type of mandibular extracapsular ankylosis. There is a lack of information on the treatment of these cases in the literature. Condylectomy and coronoidectomy are not always the best options for the treatment of limitations in mandibular movement.

Case Presentation: A 51-year-old woman presented with mouth-opening limitation due to zygomatic bone displacement and interference with the coronoid process. The treatment plan was bilateral coronoidectomy through an intraoral approach and osteotomy of the right zygomatic arch through an extraoral incision. The patient was able to open her mouth to approximately 40 mm after surgery. The patient underwent physiotherapy during follow-up appointments. There was no relapse after three months of follow-up.

Conclusions: This study shows that simultaneous arch osteotomy and coronoidectomy may be an appropriate treatment procedure for zygomatico-coronoid interference.

Keywords: Ankylosis, Osteotomy, Zygomatic Arch

1. Introduction

Ankylosis of the temporomandibular joint (TMJ) can lead to several complications, including limitation of mouth opening, limited mandibular movements, and problems with function and phonetics (1). Treatment of TMJ ankylosis is an important issue for patients and physicians (2).

TMJ ankylosis is divided into intracapsular or extracapsular types, based on the origin of the problem. Intracapsular ankylosis is either bony or fibrous (3). The etiologic factors of extracapsular ankylosis are outside of the glenoid fossa, and are not related to the temporomandibular fossa or disc, causing limitations in lower jaw movements. Previous trauma to the zygoma, elongation of the mandibular coronoid process, infection, and trismus are the main etiologies of extracapsular ankylosis (4). Zygomatico-coronoid ankylosis is a rare etiologic factor of extracapsular ankylosis. The interference of the coronoid process with the zygomatic arch may lead to limitation of mouth opening. Union between the zygomatic arch and the coronoid process causes bony ankylosis, preventing mouth opening (5). Zygomatico-coronoid interference is one of the rare causes of mandibular hypomobility, and few cases have been reported in the literature (6-8).

Extracapsular ankylosis is an important issue due to

its technique-sensitive treatment. However, there are no specific treatment guidelines for these types of TMJ ankylosis (9). The purpose of this study is to present a rare case of zygomatico-coronoid interference, and the treatment plan used to manage it.

2. Case Presentation

A 51-year-old woman from Afghanistan, with a chief complaint of inability to chew, was referred by a dentist to the department of oral and maxillofacial surgery at Ayatollah Taleghani hospital in Tehran, Iran. The patient mentioned that she had undergone a surgical procedure in childhood due to a right zygomatic and mandibular infection. The patient's maximum mouth opening (MMO) gradually diminished after the surgery, until she was eventually unable to open her mouth (MMO = 3 - 4 mm). The patient did not mention any specific past medical complications, and she did not have any unusual habits. There were no abnormal findings on laboratory tests.

On extra oral examination, the middle one-third of the face was asymmetric (Figure 1). The midline of the chin was deviated 7 mm to the left, and the right malar eminence was flat and displaced downward and inward.

The right eye was about 5 mm lower than the left, with a canted occlusal plane. The right mandibular condyle had less movement than the left, and the left condyle could only move in the horizontal plane. Computed tomography (CT) and panoramic x-rays showed a hyperplastic

right coronoid process (Figure 2). Interference between the right coronoid process and the zygomatic arch due to downward and inward displacement of the zygomatic bone was observed on the three-dimensional CT scans and panoramic x-ray views.

Figure 1. Preoperative View of the Patient With Limitation in Mouth Opening



Right orbital vertical dystopia and malar depression are evident. Downward displacement of the right zygomatic bone is noticeable.

Figure 2. Preoperative CT Scan



Interference between the right coronoid process and the zygomatic arch is shown by arrows on the 3D view.

The patient underwent a surgical procedure under general anesthesia. The treatment plan for this surgery was coronoidectomy of both sides via an intraoral approach and osteotomy of the right zygomatic arch through an Al-Kayat and Bramley preauricular incision. First, a 1 cm incision was created in the anterior right ramus. The right coronoid process was cut and excised, and a left coronoidectomy was performed similarly. We were able to open the patient's mouth approximately 20 mm after bilateral coronoidectomy. This was followed by cutting a 5 × 5 mm segment of the zygomatic arch, which interfered with the movement of the coronoid process, through a preauricular approach. We used a temporal muscle interposition flap in the arch-splitting site to prevent bone formation or recurrent zygomatico-coronoid interference. We were able to open the mouth approximately 40 mm after the zygomatic arch osteotomy (Figure 3). Active and passive physiotherapy was performed during the follow-up period. No relapse was observed after about three months.

Figure 3. The Patient Postoperatively



She was able to open her mouth without difficulty.

3. Discussion

TMJ ankylosis of any etiology is an intolerable problem, and appropriate treatment is important to help patients return to normal life. Trauma to the TMJ and infection are the most common etiologic factors of TMJ ankylosis, and patients with a history of these problems should be examined regularly to prevent future ankylosis (5). The key to appropriate treatment is an exact clinical and paraclinical examination.

There are several treatment plans presented in the literature for each type of ankylosis. Interference of the coronoid process with the zygomatic is a rare but important ankylosis type (7), and some studies have been done in these cases, but there is no sole treatment approach that is advocated (10). The treatment of these patients may be difficult, requiring several surgeries, and in some cases, there may be relapse after surgery. Conservative therapy is usually unsuccessful in these patients, who will eventually need surgical treatment (10).

According to the available investigations, coronoidectomy is an appropriate treatment for zygomatico-coronoid ankylosis (6, 7). The aim of this treatment plan is to eliminate the interference of the coronoid process with the zygomatic arch by cutting the coronoid process. The case presented by Guven in 2012 is one of the 14 reports of zygomatico-coronoid ankylosis presented in the literature (7). Guven treated the patient with coronoidectomy via an intraoral approach, and postoperative examinations did not show recurrence or coronoid process regrowth (7).

Although coronoidectomy in cases similar to Guven's may be successful, in some cases, such as ours, the overgrowth of the coronoid and displacement of the zygomatic body lead to the failure of coronoidectomy alone. In the present case report, interference between the coronoid process and the zygomatic arch was the etiology of the limitation in mouth opening. This interference was the result of downward and inward displacement of the zygomatic arch and body. The mouth opening of the patient after bilateral coronoidectomy via an intraoral approach was insufficient (approximately 20 mm), so we attempted to reach to the right zygomatic arch via a preauricular incision, and to split the arch. We were able to open the mouth to approximately 40 mm after the splitting and osteotomy of the zygomatic arch.

The main concept of the present study underscores the importance of the clinical examination. Condylectomy is not always the best treatment choice for mandibular ankylosis. The current case report suggests that condylectomy is not a successful treatment plan for extracapsular ankylosis and that there may be important complications, such as hematoma or damage to the anatomical structures. Inspection and palpation are required in a patient who has limitation of mandibular movement. In our case, the flattened right malar eminence, vertical dystopia of the right eye, and asymmetry of the middle

one-third of the face suggested that the cause of the ankylosis may be related to the right zygomatic bone. In this case, both temporomandibular joints had slight movement and the patient was able to open her mouth approximately 3 - 4 mm, suggesting that the interference was extracapsular and the function of the joint was normal. After clinical examination, radiographic assessment is useful to detect the main cause of ankylosis. Panoramic x-ray views and CT scans are excellent paraclinical studies for detecting extra- or intracapsular ankylosis.

After the examination and the detection of the main etiology of the ankylosis, an appropriate treatment plan should be decided upon that has the fewest complications and the easiest approach. In our case, condylectomy was not necessary, since the ankylosis was extracapsular. According to the available articles in the literature, bilateral coronoidectomy has been performed to eliminate interference between the coronoid process and the zygomatic arch, and we chose this approach. After coronoidectomy, we were unable to open the mouth completely, so we decided to split the zygomatic arch and to perform an osteotomy in order to omit the interference because the downward and inward displacement of the zygomatic bone was excessive and the interference could not be eliminated by coronoidectomy alone. After arch-splitting, we were able to open the mouth approximately 40 mm. There are no exact reports of arch-splitting to solve this problem in similar cases in the literature. Arch-splitting may be a good method to eliminate interference between the zygomatic arch and the coronoid process, and simultaneous coronoidectomy may be the best option for the treatment of zygomatico-coronoid interference due to displacement of the zygomatic arch and body.

According to the present report, it seems that coronoidectomy, and in severe cases, simultaneous zygomatic arch

osteotomy, may be appropriate treatment approaches in zygomatico-coronoid ankylosis.

Footnote

Authors' Contribution:All authors contributed equally. Fahimeh Akhlaghi was the supervisor of the project and performed the surgery. Mohammad Esmaeelinejad wrote the manuscript and participated in the surgery.

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