

The effect of arthrocentesis on maximum mouth opening after bilateral coronoidotomy procedure: A case of coronoid hyperplasia

Bilateral koronoidotomi prosedürü sonrası artrosentez'in maksimum ağız açılmasına etkisi: Bir koronoid hiperplazi olgusu

Assist. Prof. Nazife Begüm Karan
Recep Tayyip Erdoğan Üniversitesi,
Diş Hekimliği Fakültesi, Ağız, Diş Ve Çene Cerrahisi,
Rize, Türkiye
Orcid ID: 0000-0003-1027-792X

Research Assist. Neziha Keçecioğlu
Recep Tayyip Erdoğan Üniversitesi,
Diş Hekimliği Fakültesi, Ağız, Diş Ve Çene Cerrahisi,
Rize, Türkiye
Orcid ID: 0000-0002-8971-9569

Research Assist. Hüseyin Ozan Akıncı
Gazi Üniversitesi, Diş Hekimliği Fakültesi,
Ağız, Diş Ve Çene Cerrahisi,
Ankara, Türkiye
Orcid ID: 0000-0001-8971-025X

Geliş tarihi: 24 Ağustos 2017

Kabul tarihi: 12 Aralık 2017

doi: 10.5505/yeditepe.2019.69672

Corresponding author:

Yrd. Doç. Dr. Nazife Begüm Karan
Recep Tayyip Erdoğan Üniversitesi, Diş Hekimliği
Fakültesi, Ağız, Diş Ve Çene Cerrahisi, Rize, Türkiye
Tel : +905302927644
Fax: +904642220000
E-mail: karanbegum@gmail.com

SUMMARY

The etiopathogenesis of coronoid process enlargement has not been clearly clarified and no mechanism has been found to explain this overgrowth yet. Coronoid process hyperplasia cause the limitation of the mouth opening by the impingement of the coronoid process to the zygomatic arch. Treatment method may comprise surgical removal of the process or osteotomy alone. In the present case, a 22-year-old male patient with bilateral coronoid hyperplasia without any metabolic syndrome related disorder is reported. Coronoidotomies were performed bilaterally under general anesthesia. Temporomandibular joint (TMJ) problems like clicking, popping, and pain were encountered after physiotherapy. Arthrocentesis was performed for both joints. TMJ problems subsided after the arthrocentesis procedure. In the first year of the follow-up, no relapse was reported.

TMJ problems might arise as a consequence of fibrous ankylosis of the articular joint due to the restriction which was present for several years. Arthrocentesis could be beneficial after the coronoidotomy or coronoidectomy procedure.

Keywords: Coronoid process, hyperplasia, elongation

ÖZET

Koronoid prosesin uzamasının etyopatogenezisi henüz açıklığa kavuşmamıştır ve henüz bu aşırı büyümeyi açıklayan hiçbir mekanizma bulunmamıştır. Koronoid proses hiperplazisi, koronoid prosesin zigomatik arka çarpmasıyla ağız açıklığının sınırlandırılmasına neden olur. Tedavi yöntemi, prosesin cerrahi olarak çıkarılmasını veya tek başına osteotomiye içerebilir. Mevcut olguda, metabolik sendrom ile ilişkili herhangi bir bozukluğu olmayan bilateral koronoid hiperplazisi olan 22 yaşındaki erkek hasta bildirilmektedir. Koronoidotomiler genel anestezi altında bilateral olarak uygulandı. Fizyoterapiden sonra temporomandibuler eklem (TME)'de klik, krepitasyon ve ağrı gibi problemlerle karşılaşıldı. Her iki eklem için artrosentez uygulandı. TME sorunları artrosentez prosedürünün ardından düzeldi. Takip edilen ilk yılda relaps bildirilmedi.

TME problemleri, birkaç yıldır var olan ağız açmada kısıtlılık nedeni ile eklem fibröz ankilozunun bir sonucu olarak ortaya çıkabilir. Artrosentez, koronoidotomi veya koronoidektomi prosedürünün ardından yararlı olabilir.

Anahtar kelimeler: Koronoid proses, hiperplazi, uzama

INTRODUCTION

Limited mouth opening could be a consequence of many different situations such as articular problems, zygomatic process fracture, oral cancer, radiotherapy or fibrosis of the masticatory muscles.¹ Coronoid hyperplasia is a unique infrequent condition that may lead to the restriction at mouth opening and seen both unilateral or bilateral.² The mean maximum mouth opening (MMO) is reported as 58.2 mm and 45 mm in adults and children respectively.³ Impingement of the coronoid processes on the zygomatic bone give cause for me-

chanical restriction of mouth opening.² According to the literature, measured maximum inter-incisal opening less than 34 mm is considered to be limited.³ Coronoid process hyperplasia (CPH) was firstly described in 1853 by Langenbeck.² Several theories have been hypothesized for the etiology of CPH such as mandibular hypomobility, trauma, and increased temporalis muscle activity.⁴

The diagnosis of CPH can be established by clinical and radiographical examination. Patients commonly have limited mouth openings without pain even though they have normal protrusive and lateral movements. Further imaging techniques like computed tomography (CT) could also provide detailed information about the three dimensional hyperplastic bone and relation between the process and the zygomatic bone.³

The limited mouth opening is basically caused by a mechanical obstruction; therefore, the considered treatment option is surgical excision. Approach to the coronoid process could either be intraoral or extraoral. The advantage of the intraoral approach is having enough surgical operation site to detach the excessive bone and leaving no visible scar. The main disadvantage of this approach is the possibility of fibrosis and postoperative hematoma. Preauricular, submandibular, endoscopic approaches are some of the described extraoral approaches to this area. Supposed advantages are better appearance of the planned surgical area and the anatomical structures, less fibrosis, and postoperative hematoma formation. The disadvantages of this approach are extraoral scar and possible risk of facial nerve injury.⁴ Two types of surgery have been reported in the literature for the treatment of CHP; coronoidectomy and coronoidotomy. The osteotomy is performed by subsequent stripping of the temporalis muscle fibers from the process and the whole elongated bone is removed in coronoidectomy operation. On the contrary, in coronoidotomy, excessive bone left in situ after the osteotomy.⁴

Physiotherapy plays an important role to increase the MMO after the operation. Stretching exercises are essential with or without the use of various devices such as traditional bite blocks and spatulas or dynamic devices.⁴

Farrar and McCarty⁵ have declared that more than 20% of the patients having internal derangements could usually be treated with non-surgical methods as splints, physiotherapy, and arthrocentesis. Studies have shown significant increase in MMO and reduction in pain after the lavage of the temporomandibular joint.⁶ Arthrocentesis is a traditional procedure, which is defined as a lavage of the joint. Tissue debris caused by internal derangements, and pain mediators that present in the articular joint can be washed away.⁷ Sodium hyaluronate or hyaluronic acid which is produced by chondrocytes and synoviocytes is responsible for the viscosity of synovial joint. If the con-

centration of the hyaluronic acid reduces, TMJ problems may arise.⁸

In the present case, arthrocentesis of the both joint was performed after bilateral coronoidotomy operation to subside the TMJ complaints of the patient.

Case Report

A healthy 22-year-old male patient was referred to our hospital with a chief complaint of limited mouth opening. He had no history of pain or trauma around the temporomandibular area or surrounding tissues; however, he had been suffering from insufficient chewing and talking for more than 4 years due to the progressive reduction in mouth opening. On physical examination, there was no evidence of facial asymmetry. The patient's MMO was measured as 18 mm (Figure 1).



Figure 1. 18 mm of maximum mouth opening, pre-operatively.

Bilateral hypertrophy of the coronoid process was observed on panoramic radiograph (Figure 2).



Figure 2. Bilateral hypertrophy of the coronoid process, on panoramic radiograph.

CT scan was performed to confirm the diagnosis. Both coronoid processes were detected above the zygomatic arch through the level of the orbital rim (Figure 3,4,5).



Figure 3. 3 Dimensional computed tomography scan image, right coronoid process



Figure 4. 3 Dimensional computed tomography scan image, left coronoid process



Figure 5. Computed tomography scan image, sagittal view

No metabolic syndrome related disorder was reported and biochemical, and hematological tests were all normal. Bilateral coronoidotomies were performed (Figure 6) intraorally under general anesthesia and 25 mm of inter-incisal opening was achieved at the end of the procedure (Figure 7).



Figure 6. Panoramic radiograph after bilateral coronoidotomies.



Figure 7. Maximum inter-incisal opening post-operatively.

The patient was asked to perform stretching exercises using the bite blocks for about three weeks when the post-operative edema was reduced. TMJ problems like clicking, popping, and pain occurred immediately after the exercises with no accompanying muscle disorder. Arthrocentesis by perfusion of 100 mL saline and intra-articular injection of sodium hyaluronate was performed for both joints and thus MMO was increased from 28 mm to 38 mm indeed (Figure 8).



Figure 8. Maximum inter-incisal opening after arthrocentesis.

Anti-inflammatory painkillers were prescribed after the procedure and followed for two weeks. No signs of TMJ problems were present after two weeks of the arthrocentesis procedure and maximal inter-incisal opening was measured as 40 mm at the end. At the latest follow-up visit, postoperative 6th month, neither articular nor chewing nor pronunciation problem was present and the patient was content with the outcome. In the first year of the follow-up, no relapse was reported and the patient is still under control.

DISCUSSION

Limited mouth opening may occur as a result of articular problems, fractures, infections and bone disorders. Treatment is challenging, yet necessary to prevent undesired consequences. The most common cause of limited mouth opening is the impingement of the coronoid process on zygomatic bone as a result of fractures or hyperplasia of the process presenting with typical signs and symptoms.³

Elongation of the coronoid process has been reported with some of the related conditions as oral submucous fibrosis and temporomandibular joint ankylosis. Pathogenesis of this coronoid elongation has been still unclear and no certain explanations have been reported. However, some authors have believed that increased masticatory muscle activity could be one of the reason leading to this condition.⁹

Epidemiological studies have revealed no accurate information about CPH. Only a high predilection for male

gender and a mean age of 23 were reported. The bilateral form was encountered much more than the unilateral form. The unilateral form was found slightly more frequent in women and the bilateral form was more common in men.⁴

Recommended treatment options for CPH are reported as coronoidectomy and coronoidotomy. For coronoidectomy, many surgeons prefer the intraoral approach and some of them use the combination of the extraoral and intraoral techniques. The intraoral technique provides direct access without the risk of facial nerve injury; however, if the hyperplasia is huge, an extraoral approach may become a necessity and the only option.¹⁰ In the surgical procedure of coronoidectomy, whole elongated bone should be removed. One of the advantages of this technique is the accessibility of the specimen for the histological diagnosis. However, releasing of the temporalis muscle from the hyperplastic process is a challenging procedure.³

Coronoidotomy has believed to cause less trauma and yield better results. The disadvantages of this procedure are the inability to obtain histological diagnosis and the possible recurrence of the restriction which may occur by the reattachment of the coronoid process. In addition, stripping of the masseteric muscle needed to be performed in some cases due to the fibrotic changes after a significant period of disuse.⁴

In the present case, myofibrotic contracture of the muscles were eliminated on the basis of negative clinical findings. TMJ problems like clicking, popping, and pain were encountered after the stretching exercises. The related TMJ problems might arise as a consequence of fibrous ankylosis of the articular joint due to the restriction which was present for several years. According to a study, CPH may considered to be an outcome of the long term disc displacement.⁵ The presence of the CHP may give a cause for TMJ problems or vice versa. In both scenarios arthrocentesis could be beneficial after the coronoidotomy or coronoidectomy procedure.

Intraoral coronoidotomy is an appropriate surgical technique to enhance the inter-incisal opening in CPH, without the risk of facial nerve injury. In addition, the arthrocentesis may be useful after coronoidotomy procedure in patients with limited mouth opening for several years.

REFERENCES

- 1.Wang WH, Xu B, Zhang BJ, Lou HQ. Temporomandibular joint ankylosis contributing to coronoid process hyperplasia. *Int J Oral Maxillofac Surg* 2016;45:1229-1233
- 2.Tavassol F, Spalthoff S, Essig H, Bredt M, Gellrich NC, Kokemüller H. Elongated coronoid process: CT-based quantitative analysis of the coronoid process and review of literature. *Int J Oral Maxillofac Surg* 2012;41:331-338

- 3.**Lehman H, Fleissig Y, Abid-el-raziq D, Nitzan DW. Limited mouth opening of unknown cause cured by diagnostic coronoidectomy: a new clinical entity? *Br J Oral Maxillofac Surg* 2015;53:230-234
- 4.**Mulder CH, Kalaykova SI, Gortzak RA. Coronoid process hyperplasia: a systematic review of the literature from 1995. *Int J Oral Maxillofac Surg* 2012;41:1483-1489
- 5.**Farrar WB, McCarty WL Jr. Inferior joint space arthrography and characteristics of condylar paths in internal derangements of the TMJ. *J Prosthet Dent* 1979;41:548-555
- 6.**Al-Moraissi EA. Arthroscopy versus arthrocentesis in the management of internal derangement of the temporomandibular joint: a systematic review and meta-analysis. *Int J Oral Maxillofac Surg* 2015;44:104-112
- 7.**Barkin S, Weinberg S. Internal derangements of the temporomandibular joint: the role of arthroscopic surgery and arthrocentesis. *J Can Dent Assoc* 2000;66:199-203
- 8.**Cömert Kiliç S, Güngörmüş M. Is arthrocentesis plus platelet-rich plasma superior to arthrocentesis plus hyaluronic acid for the treatment of temporomandibular joint osteoarthritis: a randomized clinical trial. *Int J Oral Maxillofac Surg* 2016;45:1538-1544
- 9.**Chakranarayan A, Jeyaraj P. Coronoid hyperplasia in chronic progressive trismus. *Med Hypotheses* 2011;77:863-868
- 10.**Choi JG, Kim SY, Perez-Atayde AR, Padwa BL. Bilateral coronoid process hyperplasia with pseudocartilaginous joint formation: Jacob disease. *J Oral Maxillofac Surg* 2013;71:316-321