Uşak Üniversitesi
Diş Hekimliği Fakültesi Dergisi
Journal of Dentistry Faculty of Usak University
dergipark.org.tr/tr/pub/usakdhf
e-ISSN: 2980-3195

Vaka Raporu

Dentoalveolar Anomalinin Maksiller Segmental Osteotomi ile Tedavisi: Vaka Sunumu

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Makale Geçmişi
Alındı : 30.11.2023
Düzeltildi : 18.02.2024
Kabul Edildi: 17.04.2024

Anahtar Kelimeler
Ortognatik Cerrahi,
Maksiller Anterior
Segmental Osteotomi
Openbite,

Öz

Segmental osteotomi çok yönlü bir tekniktir. Segmental osteotomi, iskeletsel malformasyonu ve maloklüzyonu iyileştirmek için dişlerin alveolar kemik parçalarını hareket ettiren ve operasyon yerine göre ön ve arka segmental osteotomiye ayrılan cerrahi bir işlemdir. Tedavinin asıl amacı dentofasiyal estetiğin optimal seviyede düzeltilmesidir. Openbite vakaları, ankiloze, protrüze ya da retrüze pozisyondaki anterior dişlerin tedavisi anterior segmental osteotomi ile yapılabilir. Bu teknik ile ön segment öne, geriye,aşağı ve yukarıya konumlandırılıp döndürülebilir. Ortodontik tedavi sonrası ankiloze olan sol santral ve lateral dişlerinden dolayı openbite şikayeti ile bize başvuran hastamıza anterior maksiiler segmental osteotomi yapıldı. Sonuç: Ameliyat sonrası ideal pozisyona getirilen anterior segment ile uygun oklüzyon ve estetik görüntü elde edildi.

Treatment of Dentoalveolar Anomaly with Maxillary Segmental Osteotomy: Case Report

Article History
Received : 30.11.2023
Revised : 18.02.2024
Accepted : 17.04.2024

Keywords
Orthognathic Surgery
Maxillary Anterior
Segmental Osteotomy,
Openbite

Abstract

Segmental osteotomy is a versatile technique. Segmental osteotomy is a surgical procedure which moves alveolar bone fragments of the teeth to improve skeletal malformation and malocclusion and is divided into anterior and posterior segmental osteotomy according to the location of operation. The main goal of the treatment is the optimal correction of dentofacial aesthetics. Openbite cases and anterior teeth in ankylosed, protruded or retrused positions can be treated with anterior segmental osteotomy. With this technique, the anterior segment can be positioned forward, backward, up and down and rotated. Anterior maxillary segmental osteotomy was performed on our patient who applied to us with the complaint of openbite due to ankylosing left central and lateral teeth following orthodontic treatment. Conclusion: Appropriate occlusion and aesthetic appearance were obtained with the anterior segment, which was brought to the ideal position after the surgery.

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Introduction

The concept of orthognathic surgery on the maxilla dates back to 1859 when Von Langenbeck initially described it for the removal of nasopharyngeal polyps (1). Günther Cohn-Stock later performed segmental osteotomies on the maxilla in the early 20th century to address overjet and overbite issues between the maxillary central teeth. Evaluations of this procedure were subsequently developed by Wassmund, Wunderer, and Cupar, following Cohn-Stock's original report. These variations aim to ensure adequate blood flow to the maxilla while allowing for proper access for instrumentation (2,3).

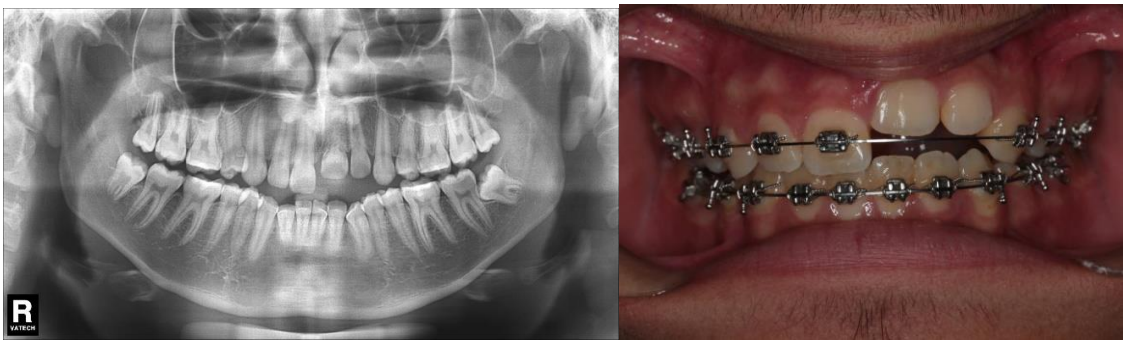
The reliability of total maxillary osteotomy has paved the way for the use of segmental osteotomies in specific situations. These procedures are particularly beneficial in dentofacial deformities where the defect is confined to one part of the arch, and dental and skeletal relationships remain normal in other regions. The primary advantage of segmental osteotomies lies in their ability to reduce morbidity (4).

One notable type of segmental osteotomy is the anterior maxillary segmental osteotomy. This procedure is employed to correct prominent maxillary protrusion in cases where incisor inclination is normal compared to the alveolar bone. It is also utilized to close anterior openbites in the absence of vertical maxillary excess. In situations where conventional orthodontic treatment cannot achieve the desired results, such as cases of root resorption or ankylosis where orthodontic tooth movement is not recommended, anterior maxillary segmental osteotomy proves effective. Additionally, it can be used to reduce the protrusion of the upper lip relative to the nose and lower face (4).

This case report aims to present the treatment of an adult male patient with an anterior open bite through anterior maxillary segmental osteotomy.

Case Report

A 26-year-old male, in good systemic health, presented to our clinic with concerns about an openbite and aesthetic appearance. Upon clinical and radiographic evaluation, a vertical dental deformity was noted in the left maxillary anterior region. In the resting position with lip closure, there were no extraoral issues, but a level difference between the maxillary incisors was observed in the front view during the intraoral examination. Additionally, bilateral maxillary first premolar teeth were found to be missing (Figures 1-2)



Figures 1-2. Pre-surgery intraoral photograph and radiograph of Case.

Following orthodontic braces treatment, it was observed that the patient's anterior teeth became ankylosed. A plan was formulated for anterior openbite correction, specifically targeting the infraposition of the left central and lateral teeth.

After thorough preoperative model analysis, clinical and radiological examinations, and obtaining the patient's informed consent, a decision was made to proceed with maxillary anterior segmental osteotomy.

Under nasotracheal general anesthesia, a horizontal incision was made on the alveolar mucosa, positioned 5 mm apical to the apex of the teeth and 3 mm below the nasal floor. A vertical osteotomy was executed between the central teeth on the right and between the lateral-canine teeth on the left. Consequently, the upper anterior segment was completely freed and moved downwards (Figure 3).

Utilizing the orthodontic guide prepared before the operation, the released anterior segment was lowered to the level of occlusion and securely fixed. A synthetic graft was added, and the flap was closed with a membrane (Figure 4). Postoperative antibiotics and painkillers were prescribed, and the patient's sutures were removed 10 days later.

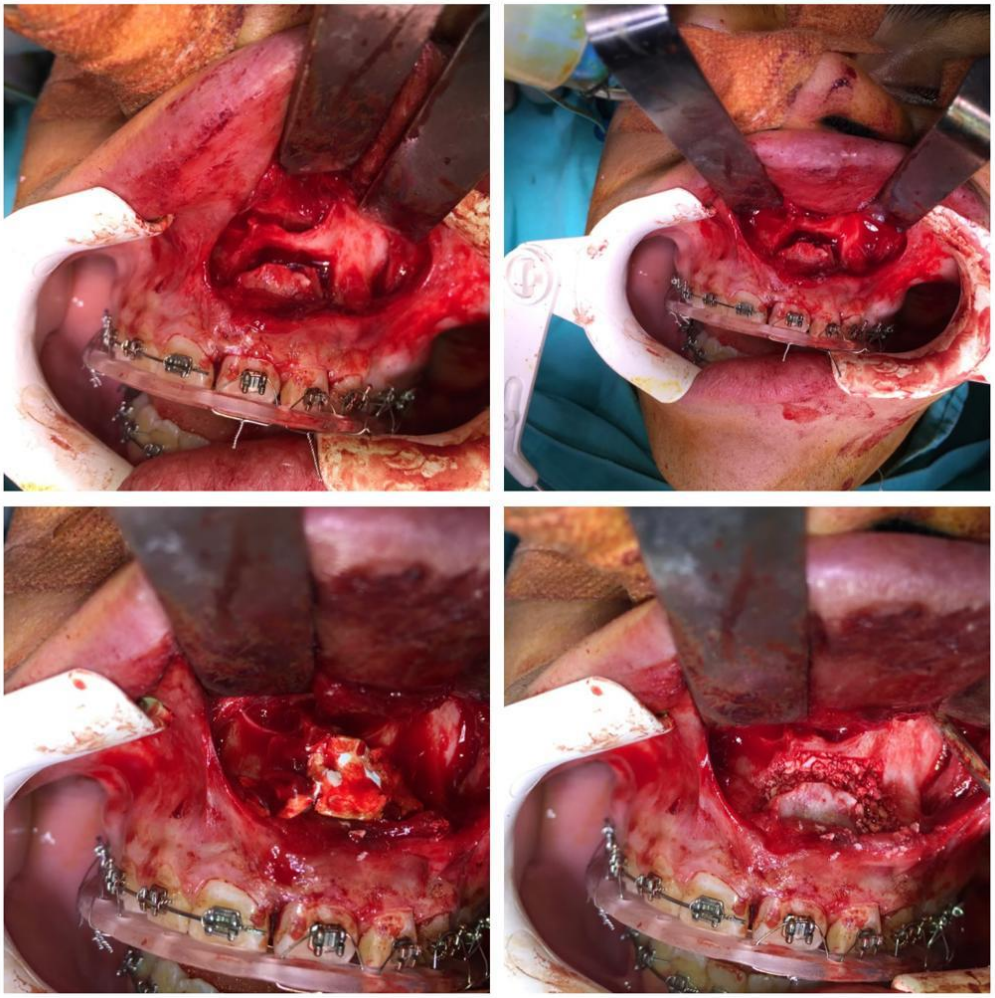


Figure 3. Intraoperative photographs

Figure 4. Fixation with orthodontic guide

At the first year postoperative follow-up, a panoramic radiograph was captured, and a thorough intraoral examination was conducted (Figure 5). The results indicated a favorable progression in the patient's recovery process, demonstrating positive signs of healing and successful intervention.

Remarkably, a radiograph taken after a 9-year follow-up revealed no issues (Figure 6). This successful case highlights the efficacy of maxillary anterior segmental osteotomy in correcting vertical dental deformities and achieving long-term stability.

Figure 5. Post-operative radiograph 1st year

Figure 6. Radiograph taken after 9 years of follow-up

Discussion and Conclusion

While orthodontic treatment is currently the preferred method for addressing dental malocclusions, it may occasionally lead to undesirable complications. Among these complications, ankylosis presents as one of the more challenging issues to treat. The conventional approach to ankylosed teeth involves extraction and subsequent reconstruction using prostheses (5). However, this technique often results in a significant alveolar bone defect, especially when dealing with ankylosed teeth extracted during the puberty phase. This complication tends to be more intricate and induces aesthetic challenges during the restoration (6).

Ankylosed teeth, when left untreated, persist in infraocclusion, ultimately leading to the development of an open bite. The term 'open bite' denotes a condition in occlusion characterized by a lack of dental contact or overlap, occurring in either the anterior or lateral regions. Open bite deformities present both aesthetic and functional challenges for patients, prompting physicians to frequently address and correct this malocclusion (7).

In adults with fully developed bone structures, a variety of orthodontic approaches can be employed to correct anterior dental malocclusion. Specifically, when dealing with cases involving both a posterior Class-I bite and anterior malocclusion, the most suitable surgical option often becomes anterior segmental osteotomy (8). Careful planning of surgical interventions in the anterior region is crucial to avoid disrupting the posterior bite, particularly in instances of anterior malocclusion with a Class I posterior bite. In cases where alveolar development failure is localized to one jaw, anterior segmental osteotomy can be selectively performed on either the upper or lower jaw(8). Since Cohn-Stock first introduced vestibulopalatal osteotomy for the correction of prognathism, many modifications have been made by maxillofacial surgeons for the ease of operation (7).

Concerns about complications such as vascularization of the maxilla, the possibility of recurrence, necrosis of the repositioned anterior segment, devitalization of the teeth, and enlargement of the nasal wings led to the design of various modifications of the technique. Three common techniques used in anterior segmental osteotomy of the maxilla are the Wassmund, Wunderer, and Cupar osteotomy techniques. Wassmund introduced palatal tunneling to palatal osteotomy for bodily movement of the segment without causing a deep overbite (8).

Gupta et al.(7) utilized the Wassmund technique in five cases, noting a longer operation time compared to alternative methods. This is attributed to the procedure's relatively blind execution, posing challenges in accessing

the superior and palatal aspects of the anterior maxilla. Wunderer and Cupar modified the technique to preserve the vascularity of the mobilized segment through the posterior nasal septal and nasopalatal artery, respectively. Additionally, they enhanced accessibility during the operation by employing circumvestibular incision. The average time taken for these procedures per case was remarkably similar (7).

After addressing concerns and modifications related to the Wassmund technique, it is essential to emphasize that in cases where both aesthetic and functional requirements are essential, anterior maxillary or mandibular segmental osteotomies become the preferred treatment choice.

In cases where both aesthetic and functional requirements are essential, anterior maxillary or mandibular segmental osteotomies are the preferred treatment choice. This preference stems from the relatively lower complexity of segmental osteotomies compared to alternative procedures, ensuring both stability and favorable outcomes.

For adults, the treatment of dentoalveolar deformities often leans towards surgical techniques that yield rapid results, as opposed to opting for prolonged orthodontic interventions. In such scenarios, the use of segmental osteotomies, whether in the anterior or posterior regions, proves to be a reliable and effective approach.

Ethical Consideration

Ethics committee approval is not required because this study was conducted for the purpose of treating the patient and did not have an experimental purpose.

Conflict of Interest Statement

The authors declare no conflict of interest. The funders had no role in the design of the study; in the collection, analyses, or interpretation of data; in the writing of the manuscript, or in the decision to publish the results.

Author Contributions Statement

All authors equally contributed to the design, execution, and creation of the study. The processes of data collection, analysis, and interpretation were carried out collaboratively. The article was jointly written by all authors, each making significant contributions. All authors critically reviewed and edited the manuscript to ensure the equal distribution of intellectual contributions.

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