






## Covid-19 Pandemisi Sırasında İleri Yaş Hastalarda Uzun Lateral Mandibular Defektlerin Rekonstrüksiyonun Rekonstrüksiyon Plağı ile Fonksiyonel Sonuçları

### The Functional Outcomes of Reconstruction with Reconstruction Plate of the Large Lateral Mandibular Defects in Elderly Patients During Covid-19 Pandemic

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#### ÖZET

**GİRİŞ ve AMAÇ:** Covid-19 pandemisinden sonra dünyada tüm sağlık sisteminin yeniden düzenlenmesi gerekti. Bu olağandışı durumda, hızlı çözümlere ihtiyaç vardı. Bu çalışmada, 6 ileri yaşlı hastanın lateral mandibular defektinin konservatif tedavisini araştırdık ve bunların temporomandibular eklem (TME) bozukluğunun fonksiyonel sonuçlarını gözlemledik.

**YÖNTEM ve GEREÇLER:** Ağustos 2020'den Mayıs 2021'e kadar dört erkek ve iki kadın hastaya 4 cm'den daha uzun lateral segmental mandibulektomi uygulandı. Defektler sadece rekonstrüksiyon plağı ile onarıldı. Ameliyattan en az 6 ay sonra tüm hastaların TME fonksiyonu fizik muayene ile değerlendirildi.

**BULGULAR:** Hastaların ortalama yaşı 70'di. Kemik defekleri 41 ile 70 mm arasındaydı. Wilkes sınıflamasına göre, hastalar ipsilateral tarafta evre 1 ile 3 TME bozukluğuna sahipti. Tüm hastalarda kontralateral TME bozukluğu evre 1'di. Ayrıca defekt boyutu ile TME fonksiyonu arasında herhangi bir ilişki bulamadık. ( $p>0,05$ ) Tüm hastalar estetik sonuçlardan memnun kaldı.

**TARTIŞMA ve SONUÇ:** Lateral mandibula defektlerinin rekonstrüksiyon plağı ile rekonstrüksiyonu erken postoperatif dönemde ciddi problemlere neden olmaz. Büyük lateral mandibular defektlerin konservatif tedavisinde "bekle ve gör" stratejisi yaşlı hastalarda pandemi gibi koşullarda tercih edilebilir.

**Anahtar Kelimeler:** covid-19, lateral mandibula defekti, rekonstrüksiyon plağı, temporomandibular eklem bozukluğu

**INTRODUCTION:** After Covid-19 pandemic, all the healthcare system components in the World must have been reorganized. In this extreme situation, there was a need for quick solutions. In this study, we researched the reconstruction with reconstruction plate of the lateral mandibular defect of six elderly patients and observed the functional outcomes of temporomandibular joint (TMJ) disorder of them.

**METHODS:** From August 2020 to May 2021, four male and two female patients underwent lateral segmental mandibulectomy with over 4 cm length. The defects were reconstructed with only reconstruction plate. At least 6 months postoperatively, TMJ function of all patients were evaluated using physical examination.

**RESULTS:** Mean age was 70 years. Bone defects were ranging 41 to 70 mm. According to Wilkes classification of TMJ internal derangement, the patients have been staged from 1 to 3 TMJ disorder on the ipsilateral side. On the contralateral side, all patients had only stage 1 TMJ disorder. We also did not find any correlation between the defect size and TMJ function. ( $p>0,05$ ) All patients were satisfied with the aesthetic results.

**DISCUSSION AND CONCLUSION:** Reconstruction of the lateral mandibular defects with reconstruction plates do not cause serious problems at early postoperative period. "Wait and see" strategy of conservative management of the large lateral mandibular defects is preferable in a pandemic condition for elderly patients.

**Keywords:** covid-19, lateral mandibular defect, reconstruction plate, temporomandibular joint disorder

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## INTRODUCTION

Segmental defects of the lower jaw have a variety of causes, including neoplasms, trauma, and osteomyelitis. The primary goal of reconstruction of both anterior (including the symphysis and parasymphysis regions) and lateral (including the corpus, angulus and ramus) mandibular defects is to achieve good esthetic results with dental rehabilitation. However, each defect has different options for reconstruction. Patients with lateral segmental defects may better tolerate bone deficiencies. Vascularized bone flaps are the most commonly used technique for the treatment of large bone defects (> 4 cm); (1,2) they are used in long and complicated microsurgical procedures. In addition, patients may need to be transferred to the intensive care unit for a while after microsurgical procedures; This probability is higher in elderly patients.

The outbreak of the novel coronavirus disease 2019 (COVID-19) in China in December 2019 caused health systems to collapse in many countries. (3) The World Health Organization declared a global epidemic on March 11, 2020. All health system components had to be reorganized, which led to the near cessation of elective procedures in many countries. (4,5)

During the pandemic, we had six patients whose quality of life was severely reduced due to lateral jaw diseases. According to the grade-based plastic surgery triage scale of the American College of Surgeons (6), such patients do not have an identifiable grade. We preferred a patient and pandemic-based treatment approach. Our aim was to perform a short operation without the need for hospitalization in the intensive care unit. We investigated the treatment of lateral mandibular defects in six elderly patients.

## METHODS

Four male and two female patients were included in this study between August 2020 and May 2021. The patients had complaints related to chewing, speaking, and pus formation. The patients underwent lateral segmental mandibulectomy. (Table 1) The defects were over 4 cm and reconstructed using only a reconstruction plate. The patients were provided with exercises.

**Table 1. Patients summary**

Patient	Age	Sex	Cause	Diseases
1	83	F	Osteomyelitis	Asthma, Hypertension
2	67	M	Osteomyelitis	Diabetes Mellitus, Hypertension
3	57	M	Gunshot Wound	Ischemic cerebrovascular event
4	73	M	Osteomyelitis	Multiple Myeloma, Hypertension
5	71	M	Giant Cell Tumor of Mandible	
6	73	F	Ameloblastoma	Diabetes Mellitus, Hypertension

Physical examination was performed for all patients at least 6 months postoperatively. If any patient had  $\geq$  stage 2 temporomandibular joint (TMJ) disorder on physical examination, bilateral TMJ was investigated by magnetic resonance imaging. The patients were evaluated using the Wilkes classification of TMJ internal derangement, as shown in Table 2. (7) For statistical analysis, the Kruskal-Wallis H test was used to compare the measurements according to the groups. Following this, a post-hoc test with Bonferroni correction was used to identify different groups. Spearman correlation coefficients were calculated to determine the relationship between continuous measurements. The statistical significance level was set at 5%, and the SPSS [IBM SPSS for Windows, ver.26] for statistical package program was used.

We investigated patient satisfaction using a verbal rating scale. Functional and aesthetic results were evaluated using five grades (very bad, bad, fair, good, and excellent) based on the patients' responses. The following questions were included:

1-Considering your capacity to chew several foods—from soft to hard—and speak in daily life, please classify your functional capacity postoperatively as very bad, bad, fair, good, or excellent compared with that of the preoperative situation.

2-Considering your aesthetic outcome, including your mirror image and self-confidence, please classify your appearance as very bad, bad, fair, good, or excellent.

**Table 2. Wilkes classification. (Modified by Wilkes CH: Internal arrangement of the temporomandibular joint: pathological variations, Arch Otolaryngol Head Neck Surg 115:469-477, 1989)**

Stage	Clinical Features	Imaging
I	Painless clicking, no restricted function	Slight anterior disk replacement that reduces on opening, normal anatomy
II	Occasional painful clicking, intermittent locking	Slight anterior disk replacement that reduces on opening, early disk deformity
III	Joint pain and locking, painful restricted function	Anterior disk displacement that does not reduce on opening, moderate disk deformity
IV	Chronic pain, restricted function with crepitus	Anterior disk displacement that does not recapture on opening, marked disk deformity, degenerative osseous changes
V	Joint crepitus	Anterior disk displacement that does not recapture on opening, marked disk deformity, degenerative osseous changes

## RESULTS

The mean age of the seven patients was 70 years. The bone defects ranged from 41 mm to 70 mm. All patients were followed up for at least 6 months. (Table 3) There were no statistically significant differences ( $p > 0.05$ ) between defect

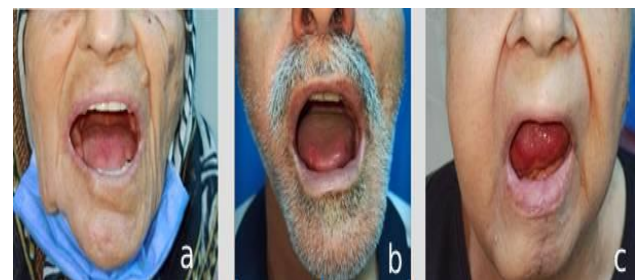
size, distance of mouth opening, and ipsilateral TMJ function. During radiologic examination, we controlled the position of the reconstruction plates; (Figure 1) all reconstruction plates were stable.

On physical examination, chin deviation from the resected side was observed in all cases ( $n = 6$ ). (Figure 1) Only one patient ( $n=1$ ) required another scar revision surgery owing to chemotherapeutic drugs for multiple myeloma affecting the wound.

All patients were satisfied with the aesthetic results. All patients, except one, indicated that the outcome was as good as they had expected.



**Figure 1 a) Patient 6 had a 51 mm ameloblastoma mass in the lateral side of right mandible. b) The defect was reconstructed with a reconstruction plate.**



**Figure 2 a-c) Patient 1 (who was the oldest patient), Patient 5 (who had no diseases) and Patient 6 (who had the most mandibular defect) had chin deviation to the defect side.**

**Table 3. The examination of the patients.**

Patient	Defect Length (mm)	Follow-up (months)	Mouth Opening Distance (mm)	TMJ Function of the Ipsilateral Side (Wilkes's Classification)	TMJ Function of the Contralateral Side (Wilkes's Classification)	Patient Satisfaction (Functional Result)	Patient Satisfaction (Aesthetic Result)
1	42	10	36	Stage 2	Stage 1	Good	Good
2	63	16	40	Stage 2	Stage 1	Good	Good
3	52	9	36	Stage 2	Stage 1	Good	Good
4	64	9	42	Stage 3	Stage 1	Fair	Good
5	41	6	38	Stage 2	Stage 1	Good	Good
6	70	7	34	Stage 1	Stage 1	Good	Excellent

## DISCUSSION

The main goals of surgical reconstruction are reestablishing function, acceptable cosmetic results, and a reasonable quality of life. Hidalgo introduced a fibula flap for the restoration of segmental mandibular deformities. (8) Since then, no consensus has been reached regarding plating, that is, whether a soft-tissue free flap or free bone flap could be an optimum treatment for composite segmental mandibular defects. (9) When mandibular continuity must be restored in patients with cancer who have limited survival, titanium plates are suitable, providing good short-term functional rehabilitation and a decrease in operating time and risks. (10-12) Our patients had only bone defects without composite defects in soft tissue, mucosa, or skin. Considering the COVID-19 pandemic, possible admission to the intensive care unit, and hospital stay of our older patients, we preferred to adapt this method to treat three patients with osteomyelitis, two with tumors, and one with a gunshot injury.

Reconstruction of mandibular continuity after lateral segmental resection is not obligatory because lateral mandibular defects have a smaller effect on aesthetic and functional results than do anterior defects. Nonetheless, chin deviation to the resected side, limited range of motion in lateral and protrusive movements, malocclusion, lower facial third asymmetry, or masticatory

problems may be seen in these patients. (13) All our patients accepted these possible complications, which were mentioned in our informed consent form, owing to the extraordinary circumstances concerning COVID-19.

Long-term unilateral mastication contributes to mandibular asymmetry, which leads to mandibular midline deviation to the contralateral side. (14) This situation affects both temporomandibular joints— first, on the side where mastication is not performed, and subsequently, on the side where mastication is performed. In our study, TMJ disorders were expected to be an inevitable outcome. Therefore, we investigated the development of TMJ disorders, patient comfort, and tolerance. Our strategy was to “wait and see” during the COVID-19 pandemic.

We gave the following instructions and recommended exercises to our patients to reduce pain related to TMJ disorders:

- Eat soft foods
- Do not chew gum
- Do the following exercise each day as much as you can: Sit in front of a mirror and be relaxed. Close your mouth. Let the tip of your tongue rest behind your front teeth. Curl the tongue backward slowly so that you feel it run over the hard palate and then against the soft palate. Continue to push

your tongue as hard as you can, keeping it in contact with the soft palate. Slowly open your mouth. Check the mirror to ensure that you are opening your mouth vertically and that your mouth is not deviating to one side. Remain in this position for 5 seconds, relax for 5 seconds, and repeat the exercise.

None of the patients had problems with opening the mouth, indicating that we did not encounter an advanced TMJ disorder for at least 6 months postoperatively. However, ipsilateral TMJ disorders were usually observed. We also did not find any correlation ( $p > 0.05$ ) between defect size and TMJ function. The contralateral TMJ function in all patients was Stage 1 in the Wilkes classification. Our study reveals that reconstruction of lateral mandibular defects with reconstruction plates does not cause serious problems in the early postoperative period. However, the long-term success and the body's tolerance of the mandibular reconstruction plate depend on the skill of the reconstructive surgeon. (15)

Reconstruction of large lateral mandibular defects with a reconstruction plate was a quick solution that did not require management in an intensive care unit. The aesthetic outcomes were also optimal. Although the patients were older, and there was low compliance with the exercises, the functional outcomes of the patients were optimal. Thus, this procedure is useful in older patients with malignancies, osteomyelitis, or gunshot wounds.

**Ethics Committee Approval:** Institutional review board approval was obtained. This study conducted in accordance with the tenets of the Declaration of Helsinki.

**Author's Contribution:** Mehmet Tapan designed the study. Mertcan Karagül and Ramazan Furkan Akman collected the data. Mehmet Tapan and Mertcan Karagül wrote the manuscript. Critical review was made by Özlenen Özkan and Ömer Özkan.

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**Informed Consent:** All patients signed the informed consents

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