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Olgu Sunumu

Compartment of Two Different Augmentation Techniques in Maxilla: A Case Report

Maksillada İki Farklı Ogmantasyon Tekniğinin Karşılaştırılması: Olgu Sunumu

Ilgın Arı[1], Selen Adiloğlu[2]

ABSTRACT

Introduction: Dental implant applications are the most common treatment methods for rehabilitation of edentulous jaws. The severe bone deficiency cannot be always allowed implant therapies. Various augmentation methods can be used for reconstruction. In this case report, tent-pole and onlay grafting techniques were performed at edentulous maxilla with radiological evaluation at 6 months follow-up.

Case Report: CBCT (Cone beam computed tomography) was obtained from patient. Extraction of all teeth and explantation of 2 implants were planned because of periodontal problems. The ramus onlay grafting was decided to apply for both anterior side of the maxilla and tent pole technique for right premolar area of maxilla. It was observed that 3.5 mm horizontal bone gain at the right maxillary anterior side, 4.8 mm horizontal bone gain at the left maxillary anterior side;3.4 mm horizontal and 6.8 mm vertical bone gain at right premolar side after 6 months.

Conclusion: Tent pole and onlay grafting methods are successful treatment options for alveolar ridge augmentation. Nevertheless, in situations like this, xenografts and allografts applications with tent pole technique could be preferred as an effective method for alveolar ridge augmentation both horizontally and vertically.

Keywords: Alveolar ridge augmentation; Onlay grafting; Tent pole.

ÖZ

Giriş: Total dişsiz çenelerin rehabilitasyonunda en sık kullanılan tedavi yöntemi dental implant uygulamalarıdır. Ancak çenelerdeki alveolar kret rezorbsiyonu her zaman implant tedavilerine izin vermeyebilir. Alveolar kret rehabilitasyonu için çeşitli ogmentasyon yöntemleri kullanılabilir. Bu olgu sunumunda dişsiz maksillada tent tekniği ve onley greftleme teknikleri uygulanmış ve 6 aylık takipte radyolojik olarak yeni kemik oluşumu değerlendirilmiştir.

Olgu Sunumu: Maksilladaki diş eksikleri sebebiyle implant tedavisi için kliniğimize başvuran hastadan KIBT (Konik ışınlı bilgisayarlı tomografi) alınmış ve yapılan rayolojik incelemede şiddetli alveolar rezorbsiyonu olduğu görülmüştür. Periodontal problemler nedeniyle tüm dişlerin çekimi ile 2 implantın eksplantasyonu ve aynı seansta maksilla anterior bölgeler için onley ramus grefti, sağ maksiller premolar bölge içinse tent tekniği planlanmış ve uygulanmıştır. İşlemden 6 ay sonra yapılan radyolojik incelemede sağ maksiller anterior bölgede 3,5 mm hrizontal, sol maksiller anterior bölgede 4,8 mm horizontal ve sağ premolar bölgede ise 3,4 mm horizontal ve 6,8 mm vertikal kemik kazancı elde edildiği görülmüştür.

Sonuçlar: Tent ve onley greftleme teknikleri alveoler kretin horizontal rekonstrüksiyonu için başarılı tedavi seçenekleridir. Her iki teknikte de çeşitli greft materyalleri kullanılabilir, ancak otojen greftler osteogenez için hala altın standarttır. Bununla birlikte, intraoral donor sahalardan alınan otojen greftler, şiddetli rezorbsiyon izlenen vakalarda ogmentasyon için yeterli miktarlarda toplanamayabilir. Bu durumda, tent tekniğinde ksenogreft ve allogreft uygulamaları hem vertikal hem de horizontal olarak alveolar rekonstrüksiyon için etkili bir seçim olabilir.

Anahtar Kelimeler: Alvoler kret ogmentasyonu; Onley greftleme, Tent tekniği

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INTRODUCTION

Physiological resorption of maxillary alveolar crest is observed 0.1 mm in each year at buccal side because of more cancellous structure than mandible. Alveolar crest resorption can have many of reasons such as age, gender, osteoporosis, malnutrition, tooth extraction and occlusal forces.[1] However, the most crucial reason of alveolar crest resorption is tooth extraction. After tooth lost, the resorption process starts horizontally and proceeds vertically. The exception of this process is posterior side of maxilla by sinus membrane pneumatization tendency, so vertical bone deficiency can be observed initially.[2]

Conventional implant therapies are the common treatment methods for rehabilitation of edentulous jaws. On the other hand, various augmentation methods can be used for the increased bone amount such as sinus lift, onlay grafting, Khoury technique, tent pole technique, interpositional grafting, crest split technique at insufficient crest.[3]

Onlay graft can be harvested from intraoral or extraoral sides nevertheless intraoral sides are the most preferred areas because of easy access such ramus or symphysis by their cortico-cancellous structure. This structure provides rehabilitation in both horizontal and vertical dimension by osteogenic potential and strong structure of the autogenous grafts. Stabilization of graft and soft tissue closure are important factors for the success in this technique.[4]

Tent pole technique is vertical bone augmentation method depending on guided bone regeneration rules. In this technique the main aim is to augment the crest with graft material, screws and prefabricated membrane to prevent soft tissue inoculation. Various graft material can be used for alveolar ridge augmentation. Corticotomy should be performed for osteoprogenitor cell migration to the area.[5]

In this case report, it is presented that tent-pole and onlay grafting techniques were performed at edentulous maxilla of 56 years old female patient with the radiologically evaluation at 6 months follow-up.

CASE REPORT

56 years old female patient referred in Hacettepe University Oral and Maxillofacial Surgery Department for rehabilitation of maxilla with conventional implants. The patient had osteoporosis with oral bisphosphonate usage for 10 years. Alveolar ridge was evaluated by CBCT (Cone beam computed tomography scans), and clinical examination was performed. It was planned that extraction of $1^{4,15,26}$ teeth and explanation of 2 of the 3 implants at ^{13,22,25} because of periodontitis and periimplantitis related with prosthetic rehabilitation. The ramus onlay grafting was planned to for the anterior side of the maxilla for horizontal augmentation. Tent pole technique was decided to be performed for vertical and horizontal augmentation of right premolar area. The patient was consulted to internal medicine department because of her oral bisphosphonate usage. B-ctx value was measured as 371 pg/ml. On the other hand, recent studies were indicated that CTX test is not predictive of the development of medication related osteonecrosis of jaws.[6] Informed consent was signed by the patient after surgery approval was obtained from the internal medicine. Then full thickness mucoperiosteal flap was elevated. (Figure 1) Both retromolar area were opened and onlay ramus grafts were harvested by piezo electric surgery. The harvested graft was stabilized to the right and left anterior side of the maxilla with titanium micro screws. (Figure 2) In the right premolar area 3 titanium screws were applied to the area for the preparation of tent pole technique (2 of them horizontally, 1 for vertically), (Figure 3) particulate xenografts were applied around the screws. Then the area was covered with prefabricated membrane. Platelet rich fibrin (PRF) was located to the surgical area and flap was closed primarily. At 6. month follow up, CBCT scan was taken for evaluating alveolar ridge. It was observed that 3.5 mm horizontal bone gain at the right maxillary anterior side (Figure 4), 4.8 mm horizontal bone gain at the left maxillary anterior side (Figure 5) and 3.4 mm horizontal and 6.8 mm vertical bone gain at right premolar side (Figure 6).

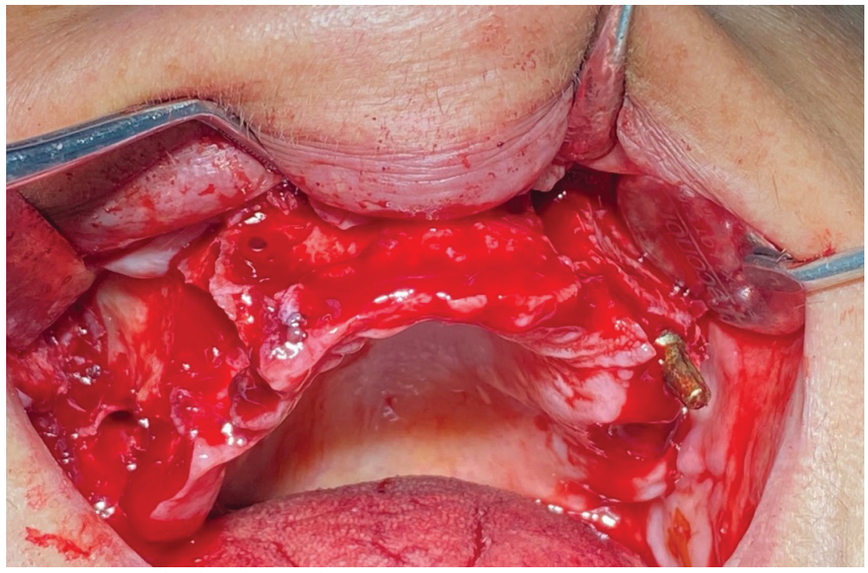

Figure 1. The patient's intraoperative clinical view.

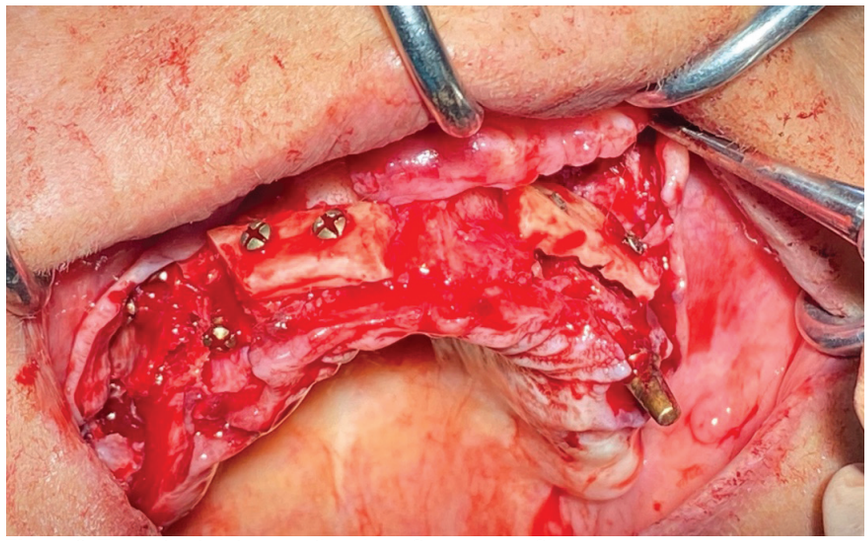

Figure 2. The patients intraoperative view after onlay grafting.

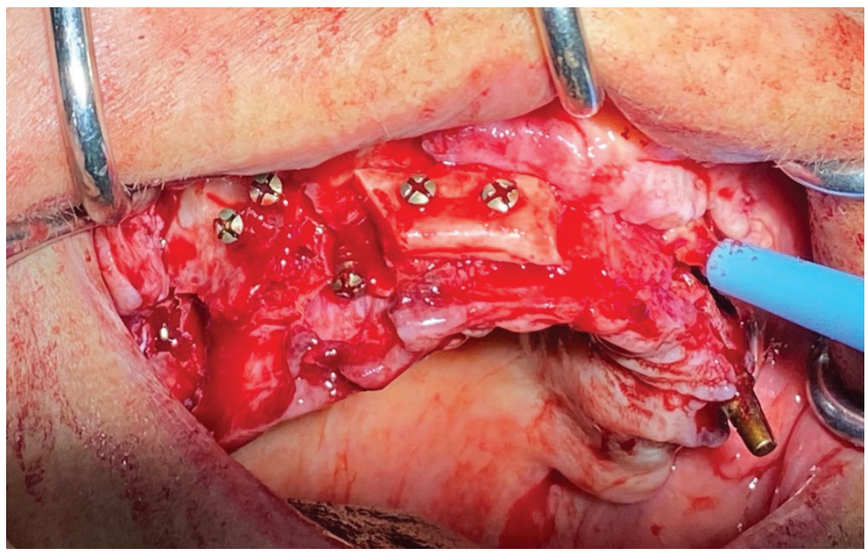

Figure 3. The patients intraoperative view after tent pole technique.

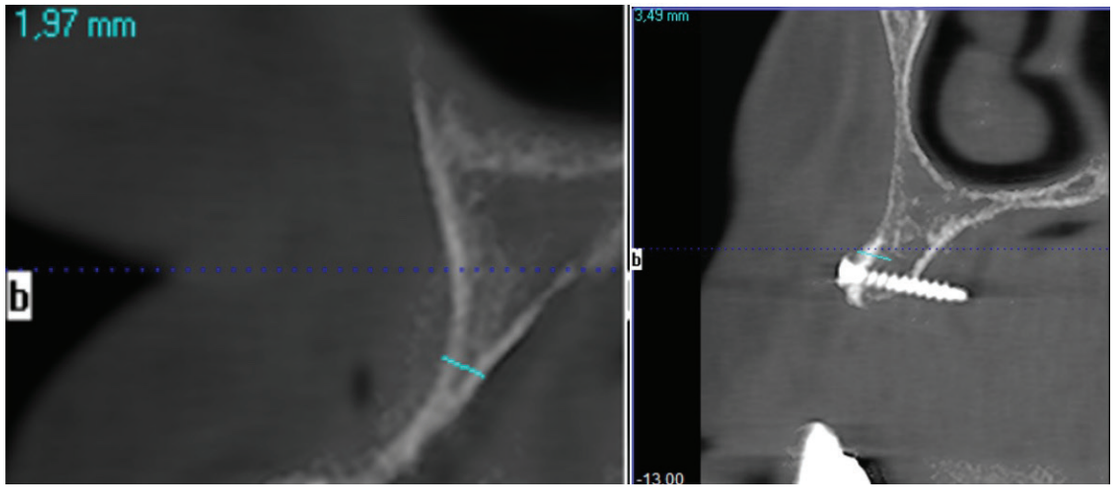

Figure 4. The right maxillary anterior side preoperative and postoperative radiological views.

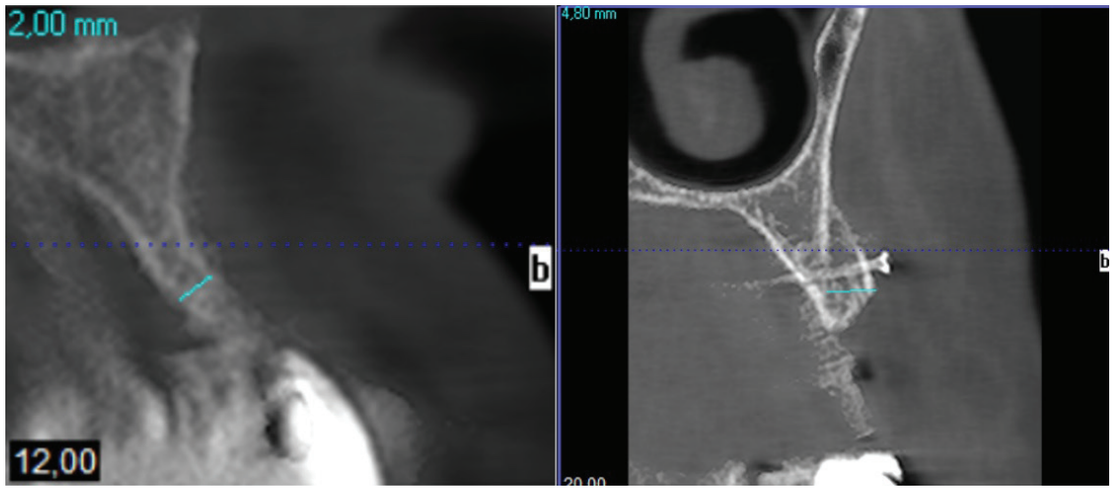

Figure 5. The left maxillary anterior side preoperative and postoperative radiological views.

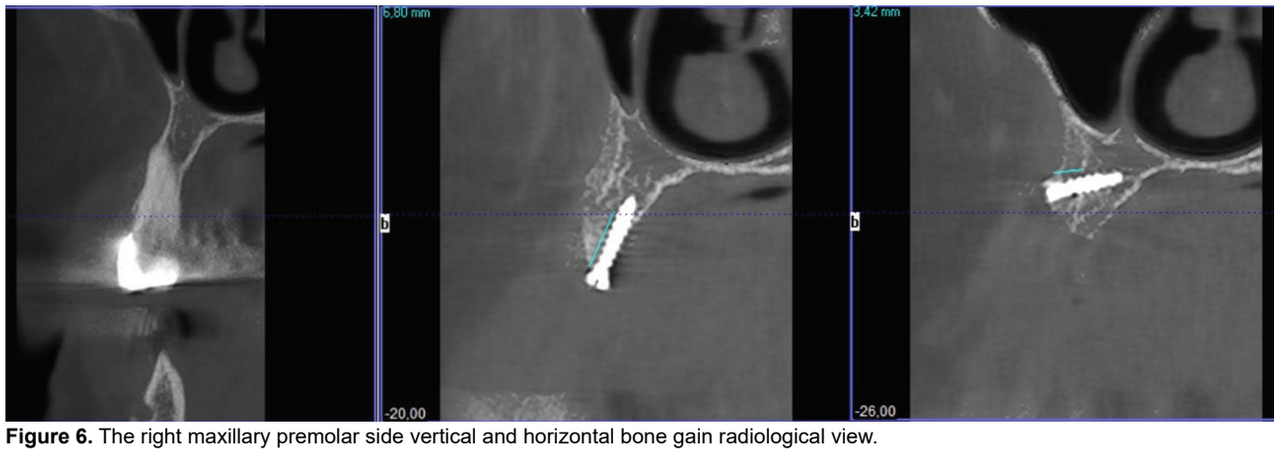

Figure 6. The right maxillary premolar side vertical and horizontal bone gain radiological view.

DISCUSSION

Maxillary bone resorption occurs faster than mandibula, after tooth extraction. Various augmentation methods can be used for increasing bone formation in horizontal and vertical dimensions. In this case report two different augmentation techniques (tent pole and onlay grafting) were performed at maxilla in one patient.

Onlay grafting is a very common technique for augmentation. It can be harvested many different regions in the intraoral aspect. Although autogenous bone grafts need a second surgical intervention, they are accepted as a gold standart thus their high osteogenic potential. The mandibular retromolar side is one of the most common donor sites in the maxillofacial region and it is formed by intramembranous ossification.[7] Dolanmaz *et al* [7] was evaluated outcomes autogenous mandibular bone block grafts (ramus and symphysis) were obtained for augmentation of alveolar defects. The donor and recipient sites' healing in the postoperative period, graft resorption was evaluated. Twenty-nine patients were grafted with onlay grafts (24 ramus graft, 5 symphysis graft) for reconstruction of alveolar cleft, lateral crest augmentation before dental implantation and sinus floor augmentation. In alveolar sides which were grafted with ramus graft, 5 of them were exposed and lost. In symphysis group only one graft was lost. In all the patients, amount of the resorption was considered approximately 1.5 mm according to screw head appearance. The authors indicated that the usage of mandibular block grafts is a simple and effective treatment modality for reconstruction of different types of alveolar defects and it also reduces cost of treatment. In our case we used mandibular ramus onlay graft for reconstraction of maxillary anterior side and approximately 4.5 mm new bone formation obtained horizontally. There was not any complication for healing and postoperative period.

Doan *et al*[8] was investigated effect of the tent-pole technique in horizontal ridge augmentation. Six patients with an initial ridge width of smaller than 4 mm were included to the study. The tent-pole technique was applied at 9 defects sites with 1.5 mm diameter screws, particulate xenograft and resorbable collagen membrane. CBCT scans were obtained from 6 patients. The mean horizontal bone gain was 3.21 ± 1.04 mm (1.83-4.57 mm), while the mean reduction in dimension was 0.38 ± 0.33 mm. The healing was uneventful, and no infections or membrane exposure were observed. The authors indicated that tent-pole technique is an effective method for increasing the horizontal bone formation. 1.5 mm diameter screws, particulate xenograft and resorbable collagen membrane were applied in our case and approximately 3.4 mm horizontal new bone formation was obtained such as Dohan *et al*'s[8] results.

El Fattah *et al*[9] investigated "tent-pole" grafting technique for reconstruction of mandibular ridge vertical defects at twelve patients with posterior mandibular defects were treated with tent-pole technique. Osteosynthesis mini- screws were applied on the alveolar ridge with 2-3 mm of their length exposed, alloplastic material surrounded the screws completely and a resorbable membrane is used for the guided bone regeneration. Preoperatively, the mean vertical bone height value was 7.18±0.49 mm after six months the mean bone height value was 9.23±1.25 mm. The authors indicated that the screw tent -pole grafting method with guided bone regeneration is a crucial technique for mandibular vertical bone augmentation. In our case, tent pole method was used in maxillary region and 6.8 mm vertical bone gain was obtained. It was more new bone gain were obtained than El Fattah et.al[9] results. The new bone formation difference could be explaining xenograft application. Because xenografts resorbed slower than allografts. It is possible that xenografts slow resorbed pattern provide space for osteoprogenitor cells in long term period. While the use of tent poles is more advantageous because it is not a secondary surgical field, it may be more costly in terms of grafts and screws. Dehiscence may only occur in areas of screws. Although autogenous grafting is also the gold standard, it can be disadvantageous when the resorption rate is high, and dehiscence may be seen in the postoperative period depending on the cortical structure of the graft.

CONCLUSION

Tent pole and onlay grafting methods are successful treatment options for alveolar ridge augmentation. In both techniques various graft materials can be used, however, autografts are still gold standard for osteogenesis. Nevertheless, in this situation, xenografts

and allografts applications with tent pole technique could be the effective choice for alveolar ridge augmentation both horizontally and vertically.

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