



**ESTHETIC AND FUNCTIONAL RECONSTRUCTION OF PATIENT WITH
MAXILLARY AND MANDIBULAR BONE LOSS DUE TO TRAFFIC ACCIDENT**

**TRAFİK KAZASI SONUCU MAKSİLER VE MANDİBULAR KEMİK KAYBI OLAN
HASTANIN ESTETİK VE FONKSİYONEL OLARAK YAPILANDIRILMASI**

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ABSTRACT

Bone and soft tissue loss are common problems after lose of tooth and that can lead to excessive length of clinical crowns. In large amount of bone loss, a number of graft materials have been used in vertical and horizontal ridge augmentation to enable implant placement in optimal positions. Autogenous block grafts from intraoral or extraoral regions have been used with positive results. Allograft blocks with cortical bone are also used for ridge augmentation. In this case report a 21-year-old male patient with maxillary and mandibular bone loss due to traffic accident was rehabilitated. An allograft block was used for horizontal and vertical augmentation of the maxilla and mandibula. The observed increase in ridge width allowed subsequent implant placement after a 5 month healing period. After 4 months from placement of the implants, implant-retained fixed prosthesis was performed

Key Words: Implant, traffic accident, bone loss

ÖZET

Diş kaybından sonra kemik ve yumuşak doku kaybı en sık görülen sorunlardan biridir ve yapay dişlerin boyunun normalden uzun yapılmasına neden olur. Büyük miktarda kemik kaybında, implantı uygun pozilyonda yerleştirmek için vertikal ve horizontal sırtların yükseltilmesinde bir miktar greft kullanılabilir. Ağız içi ve ağız dışı bölgelerden alınan otojen blok greftler olumlu sonuçlar vermektedir. Allogreftler ise genellikle, kemik sırtı yükseltme amacı ile kullanılır. Bu vakada trafik kazası sonucu maksiller ve mandibular kemik kaybına uğramış 21 yaşında erkek hastanın tedavisi anlatılmaktadır. Maksilla ve mandibulayı yükseltmek için bir allograft kullanılmıştır. 5 aylık iyileşme sürecinden sonra kemikte yeterli oluşum sağlanmış ve implantlar yerleştirilmiştir. 4 ay sonrada implant üstü protezler yapılmıştır.

Anahtar Kelimeler: İmplant, trafik kazası, kemik kaybı

INTRODUCTION

Providing maxillofacial prosthetic treatment for patients with congenital and craniofacial defects should not only address physical and functional deficiencies but, ideally, should also evaluate the possible psychological effects of these deformities.¹

The main reason for the bone loss, especially in the mandibula, is generally the resorption depending on aging or because of unfavorably balanced prosthesis, but tumours and traumatic injuries are also among the reasons of severe mandibular bone loss.^{2,3}

Dental implants are a biologically compatible and predictable treatment modality for both partial

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and complete edentulism.^{4,5} The predictability of dental implants is also accepted in the rehabilitation of maxillofacial defects.⁶ Defects that are congenital or acquired by trauma and ablative tumor resection surgery can result in significant esthetic deformities and functional disorders, and may result in psychological sequelae.^{7,8}

In many cases due to trauma, loss of bone volume from periodontal disease, neoplasms, or long-term edentulism, alveolar ridge augmentation is necessary for proper positioning of implants.⁹ Especially, the severe postoperative tissue loss by the total or partial resection of the mandibula, owing to the malign and benign tumors, leads to some difficulties in prosthodontic process, both for the patient, such as reduced stability, insufficient retention, impaired load bearing capacity, and for the clinician, such as establishment difficulties.^{3,10,11}

The incapacitating nature of the defect makes the reconstruction of the maxilla and mandibula challenging.¹² The primary goal of reconstruction is to restore the structural integrity and continuity lost as a result of maxillary and mandibular defects, including an alveolar ridge with appropriate dimension and form.^{13,14}

Extensive soft and hard tissue loss usually requires an implant-supported or retained prosthesis to obtain adequate facial support and restoration of oral functions.^{15,16} Rehabilitation of oral function can be accomplished with the placement of endosseous implants to support dental prostheses with improved stability and retention.¹⁷ The purpose of this report is to present esthetic and functional reconstruction of a patient with maxillary and mandibular bone loss due to traffic accident using an implant-supported fixed partial denture (FPD) in combination with 4 maxillary and 6 mandibular implant-supported, cemented, metal-ceramic crowns.

CASE REPORT

A 21-year-old man with a surgically reconstructed mandibular and maxillary traffic accident defect was referred to the Department of Prosthodontics. The patient's history revealed that a number of reconstructions had been previously performed involving hard and soft tissue(Figure 1). The medical history did not reveal any conditions that

would compromise periodontal treatment and the patient was a nonsmoker. A comprehensive examination was done to determine the periodontal status of all teeth. Probing depth, bleeding sites, and mobilities were within normal limits. In clinical and radiographic evaluation, mandibular right first molar, first and second premolar, canine and central and lateral incisors had been previously extracted. The mandibular left root of second premolar, maxillary lateral incisors' roots and mobil canine teeth were extracted. Also, the bone loss was determined in mandibular and maxillary anterior region.(Figure 2)



Figure 1. a-Reconstructions of hard and soft tissue before implant and prosthetic therapy, b- the bone loss of maxillary anterior buccal region, c,d,e,f- Mandibular and maxillary implant placement



Figure 2. a,b-Casting individual abutments, c,d,e,f-Definitive restorations

Three different treatment plans were considered: a cement-retained FPD, a bar-retained removable partial denture supported by 6 implants, and a screw-retained FPD for the mandibula. The patient was informed about clinic and laboratory procedures of three definitive prosthodontic treatment. The patient importuned implant supported fixed partial denture. Due to high-cost of screw-

retained FPD, consequently, the option of a cement-retained FPD for the mandibula and maxillary anterior region was selected.

Written informed consent was obtained before the surgery. Following extraction, the reconstruction of these regions had been accomplished formerly via bone grafting with allograft. After a 5 month healing period, four internal implants (BioHorizons Implant Systems Inc, Birmingham, AL) were inserted maxilla, which were 3.5 mm in diameter and 15 mm and 12 mm in length. Five tapered internal implants and one internal implant were inserted in the mandibula which were 4.6 mm, 3.8 mm and 3.5 mm in diameter and 15 mm and 12 mm in length (Figure 3). The implants were left in place for 4 months, then the site was re-entered to uncover the implant cap and those placed distally; gingival healing cuffs 3 mm in height and 3.5 mm and 4.5 mm in diameter were placed. The soft tissue was then allowed to heal for two weeks before starting the planned restorations.

Despite many esthetic and functional surgical treatment of soft and hard tissues, mandibular vertical height was unsatisfactory. Therefore, standart prefabricated abutments could not be used. Plastic transfer copings (BioHorizons Implant Systems Inc, Birmingham, AL) 12 mm heigh were used to provide casting individual abutments (Figures 4,5). The healing abutments were removed, plastic transfer copings were attached to mandibular implants. Standart prefabricated abutments were attached to maxillary implants. Impressions of both arches were taken using polyether impression material (Impregum Duo Soft, 3M ESPE, Seefeld, Germany). After the impressions were removed, plastic transfer copings and standart prefabricated abutments were removed and attached to implant laboratory analogues (BioHorizons Implant Systems Inc, Birmingham, AL), then were placed to the sockets into the impression. Silicone-based resilient lining material (Ufi Gel, Voco, Cuxhaxen, Germany) was placed around the cervical portion of the analogues. Type IV improved dental stone (FUJIROCK EP, GC America Inc. USA) was poured into the impressions to obtain final casts. The individual abutments were cast by laboratory technician. Metal-ceramic fixed partial dentures were fabricated. Final casting and prefabricated abutments were screwed to maxillary and mandibular implants. Metal-ceramic restorations were adjusted and were

cemented by zinc polycarboxylate cement (Adhesor Carbofine, SpofaDental, Czech Republic) (Figure 6).

DISCUSSION

When significant trauma or surgery causes serious difficulty in solving esthetic or occlusal problems, the use of an implant-supported removable or fixed partial denture may be beneficial. The main goal in the prosthetic rehabilitation of the mandibula with severe atrophy or large bone defect is to establish such a prosthesis that ensures full patient satisfaction, as well as ease of cleaning ability.^{11,16} In this case report, an alternative treatment to the implant supported fixed partial denture might be a mandibular removable partial denture over the implant abutments, but the patient persistently refused to use such a prosthesis. Feine et al^{14,17} noted that patients' attitudes should be considered when the design of a prosthesis was being planned for an individual patient; so constructing an implant supported fixed partial denture was chosen, as mandibular and maxillary anterior regions with bone defect could be reconstructed. Maintenance of the prosthesis and implants to be constructed was the most important factor for selecting the type of treatment.¹¹

An other possible treatment option could be fabrication of a screw-retained metal-acrylic FPD supported by 6 implants and it would have been the most acceptable treatment option. The patient could have more easily maintained hygiene with this type of restoration. However, high-cost of screw-retained FPD impeded such a treatment. Acceptable placement of mandibular and maxillary implants enabled that a cement-retained FPD for the mandibular and maxillary anterior region could be used.

The surgical decision to reconstruct, augment, or perform osteoplasty should depend primarily on, and be dictated by, the desired prosthetic result.¹² The diagnostic arrangement is critically important, as the definitive prosthesis, the number and location of ideal implant sites, and the occlusal scheme must be selected before surgery. In this clinical situation, detailed presurgical planning and evaluation would have minimized the difficulty of the prosthetic rehabilitation. It is important to control implant occlusion within physiologic limit and thus provide optimal implant load to ensure a long-term implant success.¹⁸

SUMMARY

This clinical report details the clinical evaluation of a 21-year-old man with a mandibular defect due to traffic accident and surgical-prosthetic rehabilitation using an implant-supported cement-retained FPD. Despite the limitations imposed by implant malposition, the esthetic and functional demands of the patient were fulfilled by this prosthetic rehabilitation. The importance of detailed prosthetic planning and evaluation before implant surgery is emphasized.

REFERENCES

1. Hickey AJ, Salter M. Prosthodontic and psychological factors in treating patients with congenital and craniofacial defects. *J Prosthet Dent* 2006;95:392-6.
2. Stegersjo G, Kahnberg KE. Prosthetic restoration following maxillary' resection without an oroantral defect: a case report. *Int J Prosthodont* 1999;12:391-4.
3. Mericske-Stern RD, Taylor TD, Belser U. Management of the edentulous patient, *Clin Oral Implants Res* 2000;11:108-25.
4. Branemark P-I. Introduction to osseointegration. In: Branemark P-I, Zarb GA, Albrektsson T, editors. *Tissue-integrated prostheses: osseointegration in clinical dentistry*. Chicago: Quintessence; 1985: p. 11-76.
5. Lekholm U, Van Steenberghe D, Hermann I, Bolender C, Folmer T, Gunne J, et al. Osseointegrated implants in the treatment of partially edentulous jaws. A prospective 5-year multicenter study. *Int J Oral Maxillofac Implants* 1994; 9: 627-35.
6. Landes CA. Zygoma implant-supported midfacial prosthetic rehabilitation: a 4-year follow-up study including assessment of quality of life. *Clin Oral Implants Res* 2005; 16: 313-25.
7. Tjellstrom A, Jansson K, Branemark P-I. Craniofacial defects in advanced osseointegration surgery. In: Worthington P, Branemark P-I, editors. *Advanced osseointegration surgery: maxillofacial applications*. Chicago: Quintessence; 1992. p. 263-312.
8. Weischer T, Mohr C. Ten-year experience in oral implant rehabilitation of cancer patients: Treatment concept and proposed criteria for success. *Int J Oral Maxillofac Implants* 1999; 14: 521-8.
9. Wallace S, Gelin R. Clinical Evaluation of a Cancellous Block Allograft for Ridge Augmentation and Implant Placement: A Case Report *Implant Dentistry* 2008;17:151-5.
10. van Waas MA. The influence of clinical variables on patients' satisfaction with complete dentures. *J Prosthet Dent* 1990;63:307-10.
11. Aydın M, Yılmaz A, Katiboglu B, Tunç EP. ITI implants and Dolder bars in the treatment of large traumatic defect of mandibula: a clinical report. *Dent Traumatol* 2004;20:348-52.
12. Cakan U, Anil N, Aslan Y. Prosthetic rehabilitation of a mandibular gunshot defect with an implant-supported fixed partial denture: A clinical report . *J Prosthet Dent* 2006;95:274-9.
13. Tideman H, Samman N, Cheung LK. Functional reconstruction of the mandibula: a modified titanium mesh system. *Int J Oral Maxillofac Surg* 1998;27:339-45.
14. Leung AC, Cheung LK. Dental implants in reconstructed jaws: patients' evaluation of functional and quality-of-life outcomes. *Int J Oral Maxillofac Implants* 2003;18:127-34.
15. Van SteenbergheD, LekholmU, Bolender C, Folmer T, Henry P,Hermann I, et al. The applicability of osseointegrated implants in the rehabilitation of partial edentulism. A prospective multicenter study on 558 fixtures. *Int J Oral Maxillofac Implants* 1990;5:272-81.
16. Anibard AJ, Fanchiang JC, Mueninghoff L, Dasanayake AP. Cleansability of and patients' satisfaction with implant-retained overdenture: a retrospective comparison of two attachment methods. *J Am Dent Assoc* 2002; 133:1237-42 .
17. Feine JS, de Grandmont P, Boudrias P, Brien N, LaMarche C, Tache R, et al. Within-subject comparisons of implant-supported mandibular prostheses: choice of prosthesis. *J Dent Res* 1994;73:1105-11.
18. Vanlioğlu B, Özkan Y, Kulak Özkan Y. İmplant destekli restorasyonlarda okluzyon. *Atatürk Üniv Diş Hek Fak Derg* 2011; 4:57-64.

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