

Management of Necrosis Occipital Bone Graft After Augmentation In Atrophic Maxilla

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Ahmet Bülent KATİBOĞLU^{1*}, Çiğdem MERCAN², Gökçen ERDEM³, Gülay KATİBOĞLU⁴

1. Beykent University, Department of Oral and Maxillofacial Surgery, Istanbul, Turkey, ORCID No: 0000-0001-7505-9953
2. Private Practice, Oral and Maxillofacial Surgeon, Istanbul, Turkey, ORCID No: 0000-0002-0256-7962
3. Istanbul University Faculty of Dentistry, Oral and Maxillofacial Surgery, Istanbul, Turkey, ORCID No: 0000-0003-4477-4393
4. Private Practice, Istanbul, Turkey, ORCID No: 0000-0001-9865-4552

Abstract: Alveolar atrophy and bone defects are very important problems to implant placement in jaws. Bone grafts are the most useful materials to augmentation this bone defects. Allografts, xenografts or alloplastic grafts may be used. Autogenous bone grafting is known as a gold standard for augmentation. If insufficient intraoral donor site, the graft is harvested from the extraoral site; iliac, calvarial or rib. Calvarial bone grafts are often an alternative option, reported to show less resorption, we reported that 78-year-old female patient with necrosis of calvarial graft in maxillary site. We presented management of calvarial bone graft necrosis in the maxilla.

Keywords: dental implant, alveolar ridge augmentation, alveolar bone grafting

Introduction

Alveolar atrophy often lead to many problems such as insufficient retention of total prosthesis, loss of soft tissue support, , speech and eating difficulties, pain. As a solution, most of these problems can be solved with implant-supported dentures.¹

Bone grafts that provide to complete the defect and refunction the organism are the most commonly used grafts in both oral and maxillofacial and reconstructive surgery. A large atrophic maxilla and mandibula would be augmented by means of bone grafts One of the harvested bone grafts in this procedure is autogenic calvarial grafts that have been used for alveolar crest augmentation.^{1,2,3}

Calvaria, the region where bone graft materials are most frequently tested, includes both parietal bone, squamous fragments of the occipital and temporal bone, frontal bone and part of the large wing of the sphenoid bone extending from the supraorbital margin to the external occipital incisor. The ossification of the calvarium is membranous ossification therefore the calvarial wound models are similar to the maxillofacial region and also calvaria is physiologically similar to the atrophic mandibular when evaluated from the cortical bone angle. Anatomically, the calvaria consists of spongiform bones between the two cortical layers, such as mandibles.^{2,3}

Compared with other bones the skull is biologically inactive, resulting in less blood supply and relatively few bone marrow. Despite the presence of a primitive nourishing artery in the long bones, there is no primitive nourishing artery in the human skull. The main blood supply for cranium is provided by the middle meningeal artery.⁴ Dural arteries and small arterioles are accessory vessels that support blood supply. In addition, cranial arterial blood support is provided from the temporal muscle attachment site. For this reason, even a small defect in the human skull can not heal spontaneously.^{1,2,3}

Case Report

A 78-year-old female patient was referred to our clinic with complaint of oral infection. In clinical examination, to underwent bone augmentation due to excessive resorption of the upper jaw bone about 1 year ago was observed. Occipital bone grafts were preferred for bone augmentation of posterior right and left maxilla.. The graft material was fixed to the relevant region with only one screw on right maxilla, but the operation was not successful due to infection. Radiographic and clinical images of the patient were approved for use in the article.

Approximately one year later, clinically, rupture and necrosis of the soft tissue due to infection in the right maxilla were observed. The implanted graft material teared by rupture of the mucosa and the necrosis part sagged into the mouth. On the radiological examination, it was clearly seen that in the panoramic view, the radiopaque selected graft materials were separated from the right and left maxilla. On the Cone Beam Computed Tomographic sections, this distinction is clear.(Figure1)

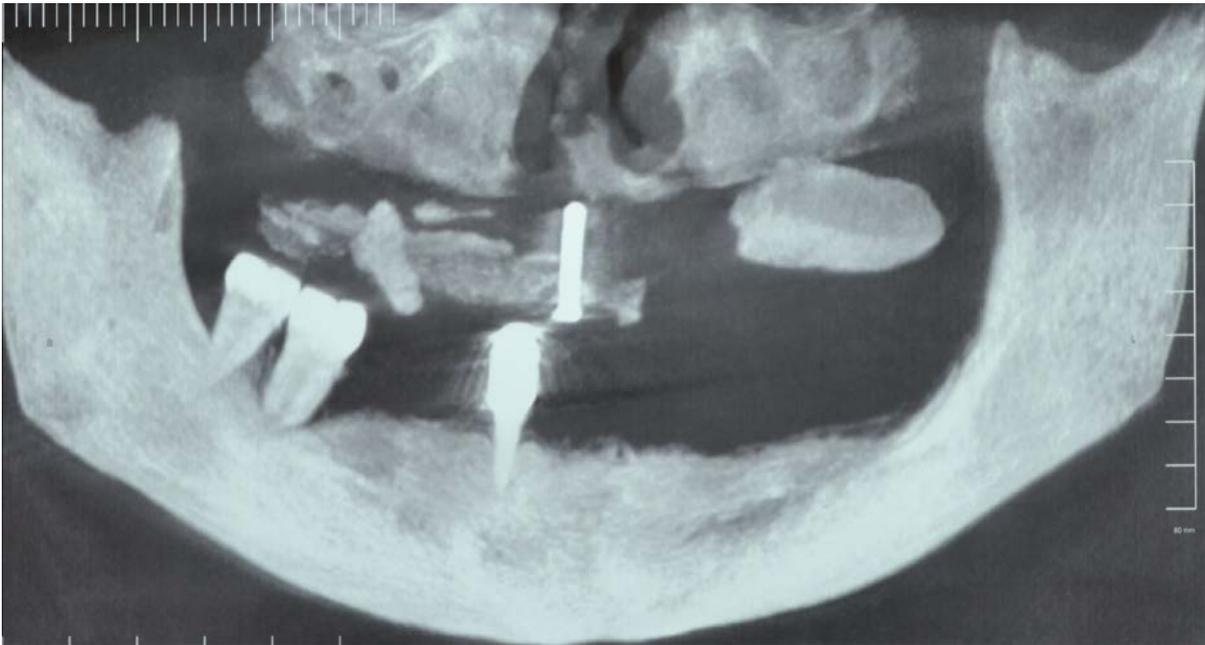


Figure1. The unstable screw in the midmaxiller area is not sufficient to bone stability

2.5 cm x4 cm necrotic bone material was removed under general anesthesia from right maxilla. Full flap incision was preferred. Necrotizing soft tissue was removed. The granulation tissues were

curretaged and cleaned to the point where intact bone tissue was reached. The flap was sutured as primary. (Figure 2,3)

The graft on the left maxilla was not extracted therefore there was no any infection as it was partially mobile.



Figure 2: Necrotic bone is removed.

After the operation, we suggested to the patient, zygomatic implant, distraction osteogenesis, iliac or fibular graft operation but the patient denied surgical treatment options.

Discussion

Extraoral bone grafts have been more preferred for augmentation of bone defects in the jaws by clinicians. These extraoral donor sites are: iliac, tibia, cranium and less orbital ribs and fibula. However, some disadvantages of iliac and rib graft applications have been reported by authors.^{5,6} Calvarial bone, consisting of large amounts of cortical bone, are an alternative to iliac and rib bones graft.^{7,8}

Occipital bone grafts can be used to reconstruct areas such as mandibula, maxilla, orbita base, orbita ceiling, malar region, and nasal region. It can also be used for augmentation after Lefort I, II, III osteotomies. It can be used to provide adequate bone support to dental implants in defects

resulting from trauma, prosthesis or disease, alveolar resorption, elevation of ramus, treatment of mandibular fractures, repair of defects following cyst and tumor removal. ^{2,3,9}

Calvarial bone grafts offer advantages, such as provide a large amount of cortical bone, high implant survival rate, and low complication rate with donor site. The geometry and convexity of the calvary make it more compatible for maxillofacial reconstructions. If the donor area is covered with scalp, the scar tissue to be formed is preserved. ^{8, 9,10}

Occipital bone grafts can be used to provide adequate bone support to dental implants in defects following trauma, prosthesis, or disease-causing formation, alveolar resorption, ramus elevation, treatment of mandibular fractures, repair of defects following cyst and tumor removal. ^{11,6} In this case report the patient had a large atrophy in maxilla and the clinicians performed the calvarial bone for augmentation.

Zaniboni et al. reported that the use of calvarial bone grafts may have some complications such as dural dehiscence or perforations, cerebrospinal fluid (CSF) leakage, donor site hematomas, hairy deep tenderness, headache. If there is dehiscence wound in the the grafting area infected and infection can not be controlled and causing osteomyelitis and necrosis. This can lead to complete or partial loss of the graft. ⁵ Jackson et al.offered that intracranial hemorrhage, dural tear, intracerebral hemorrhage, and even cases of cerebral cortex destruction. ⁸ According to the patient story there was no complication in the donor area. Meanwhile excessive infection was observed in the grafting area. The infection was not undercontrolled as a consequence partially graft loss was carried out.

We also performed an extraoral necrosis bone graft applied to maxilla with very large resorption in our case. Surgery was done by primary wound closure.

The iliac and calvarial bone graft augmentations performed on 68 patients with alveolar bone resorption. Putters et al. have been reported that calvarial bone grafts as a result of control radiographies are significantly superior to the iliac crest in increasing alveolar bone height. ⁹

Calvarial bone grafts provide high bone quality for the primary stability of dental implants. In addition, the use of calvarial bone grafts during implantation of dental implants provides grafting and placement of the implant, thus avoiding a second operation.⁹

The lack of cosmetic deformity at the graft site indicates the superiority of calvarial grafts in that it is easily accessible to the bone to be grafted with a bikoronal incision commonly used in craniofacial surgery or scalp incision, requires immobilization and can be removed from the hospital in a short time, easily shaped in the graft, and limited resorption.

The use of calvarial bone grafts may have some complications such as dural openings or even perforations, openings in the dura mater and associated CSF leakage, donor site hematoma, hairy deep tenderness, headache. Even a second surgical operation may be needed to remove some complications. Other possible complications of calvarial bone grafts include alopecia, haemorrhagic seroma or hematoma, intracranial hemorrhage, CSF flow, meningitis, and brain infection. In a study published in 2005 by Tessier et al., They reported that the proportion of these complications was less than 0.25%.¹⁰

Infection or necrosis may occur if there is an open wound at the site where the graft is applied. This may cause the graft to be completely or partially lost.⁵

In such graft applications, complications related to grafting may occur if the surgical procedure is not performed in sterile conditions, if the antibiotic protocol is not followed, if adequate stitching and fixation are not performed in the recipient area, and appropriate seams are not used to close the flap on the graft. This may result in the loss of the graft.

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