Treatment of Exposed Bone With Acellular Dermal Matrix in a Smoker Patient After Dental Implant Surgery: A Case Report

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Acellular dermal matrix is a biocompatible material derived from human and animal connective tissue. This material is created by a chemical process in which all epidermal and dermal cells are removed but the bioactive dermal matrix is left intact. The bioactive dermal matrix has the capability to promote natural revascularization and cell repopulation and to undergo tissue remodeling as it contains elastin, collagen, bioactive proteins, and blood vessel channels. Recently, ADM materials have successfully been used as grafts in numerous surgical procedures to increase the size of the attached gingiva surrounding the teeth and implants, to fill in gingival recession defects to enhance root coverage, to manage soft-tissue ridge deformities, and to repair oronasal fistulae. The aim of this case report is to evaluate the use of the acellular dermal matrix in a 45-year-old patient with an area of exposed bone after the placement of a dental implant.

Key Words: acellular dermal matrix, dental implant, exposed bone, soft-tissue augmentation

INTRODUCTION

Acellular dermal matrix (ADM) is a biocompatible material derived from human and animal connective tissue. This material is created by a chemical process, in which all epidermal and dermal cells are removed; however, the bioactive dermal matrix is left intact. The bioactive dermal matrix has the capability to promote natural revascularization and cell repopulation and to undergo tissue remodeling as it contains elastin, collagen, bioactive proteins, and blood vessel channels.[1] Recently, ADM materials have successfully been used as grafts in numerous surgical procedures to increase the size of the attached gingiva surrounding the teeth and implants, to enhance root coverage in gingival recession defects, to manage soft-tissue ridge deformities, and to repair oronasal fistulae.[2–5]

The aim of this case report is to evaluate the use of the ADM in a 45-year-old patient with exposed bone after the placement of a dental implant.

CASE REPORT

A 45-year-old male patient was referred to the Department of Oral and Maxillofacial Surgery of Van Yuzuncu Yil University for implant placement. The patient had a nonspecific medical history. He reported that he brushed his teeth at least once a day, but he smoked 2 packs of cigarettes every day. The patient was advised to stop smoking, but he kept smoking 5 cigarettes a day. Clinical and radiographic evaluation revealed an inadequate structure of the alveolar crest bone. Therefore, a bone augmentation procedure was scheduled for the entire maxillary arch and the lower left mandibular arch for ridge expansion (Figure 1). Our treatment plan was to insert 6 implants in the entire maxilla and 2 implants on each side of the mandible for preparing the setup for placing a fixed prosthesis. During the follow-up visit scheduled for the removal of sutures 2 weeks after the implant surgery, we noticed a slight exposure of the bone in the lower left mandibular area. We decided to follow up with the patient; therefore, we scheduled another visit for 2 weeks later. One month following the implant placement, we noticed that the area of exposed bone became larger (Figure 2). Therefore, to prevent implant failure, bone necrosis, and other complications, we decided to close the area with ADM. An incision was made vertically from the mesial side of the canine and then proceeded horizontally on the crest, and it was terminated with an oblique incision in the molar area. A full-thickness mucoperiosteal flap was detached and extended apically to the exposed area. Human ADM (Integra HuMend, Integra Life Sciences, Plainsboro Township, NJ) with a thickness of 2 mm and a size of 2×2.5 cm was placed on the bone to cover the exposed area (Figure 3). Following the insertion of ADM, the area was closed by suturing with 3/0 nylon sutures (Figure 4). The patient was prescribed 1 g of amoxicillin + clavulanic acid and 600 mg of ibuprofen to be taken after this procedure twice daily for 7 days. Mouthwash with 0.12% chlorhexidine digluconate and 0.15% benzydamine hydrochloride was prescribed to the patient for 15 days after the procedure. After 2 weeks following the ADM placement, we noticed that

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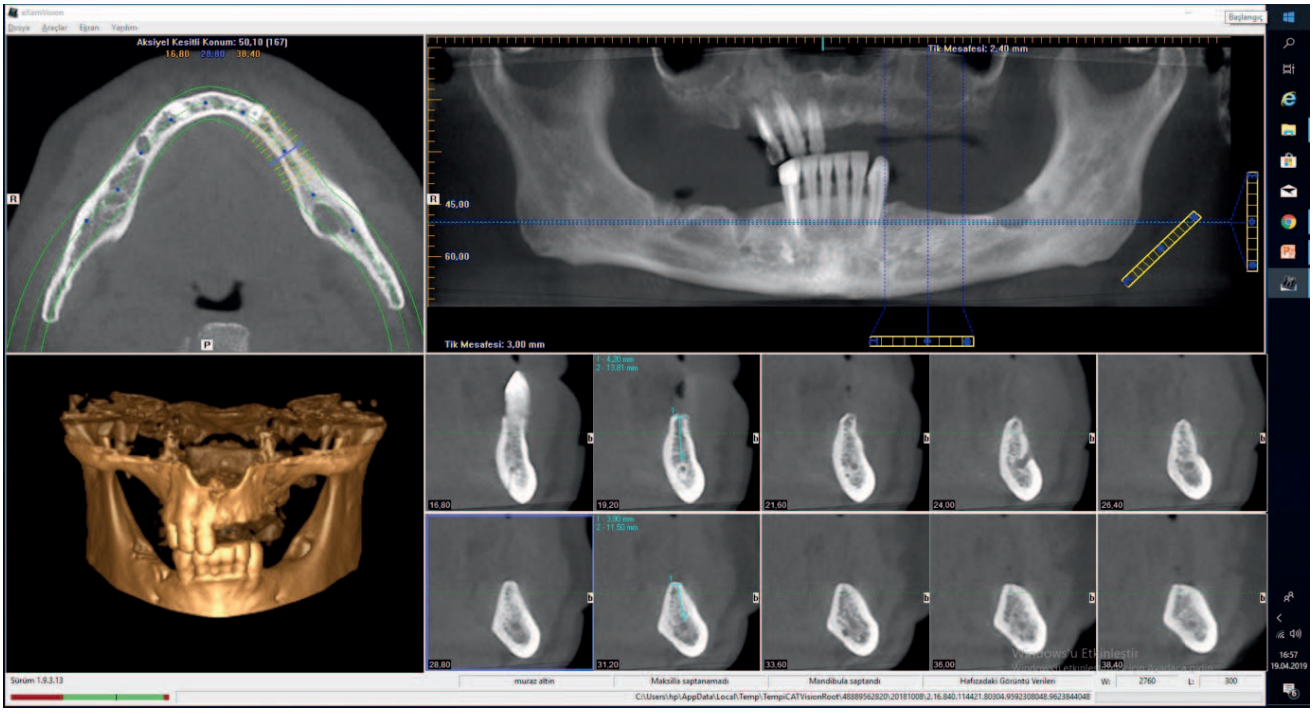


Figure 1. Preoperative cone-beam computerized tomography image.

the ADM was exposed. Thus, we irrigated the area with sterile saline solution every week for 8 weeks (Figure 5). Two months after the operation, we noticed that the ADM was completely covered with soft tissue, and the area was healed (Figure 6). Four months after the operation, there was no bone exposure or complications. The patient was able to continue his treatment for the placement of the fixed prosthesis, which was performed at least 6 months after the bone augmentation period (Figure 7).

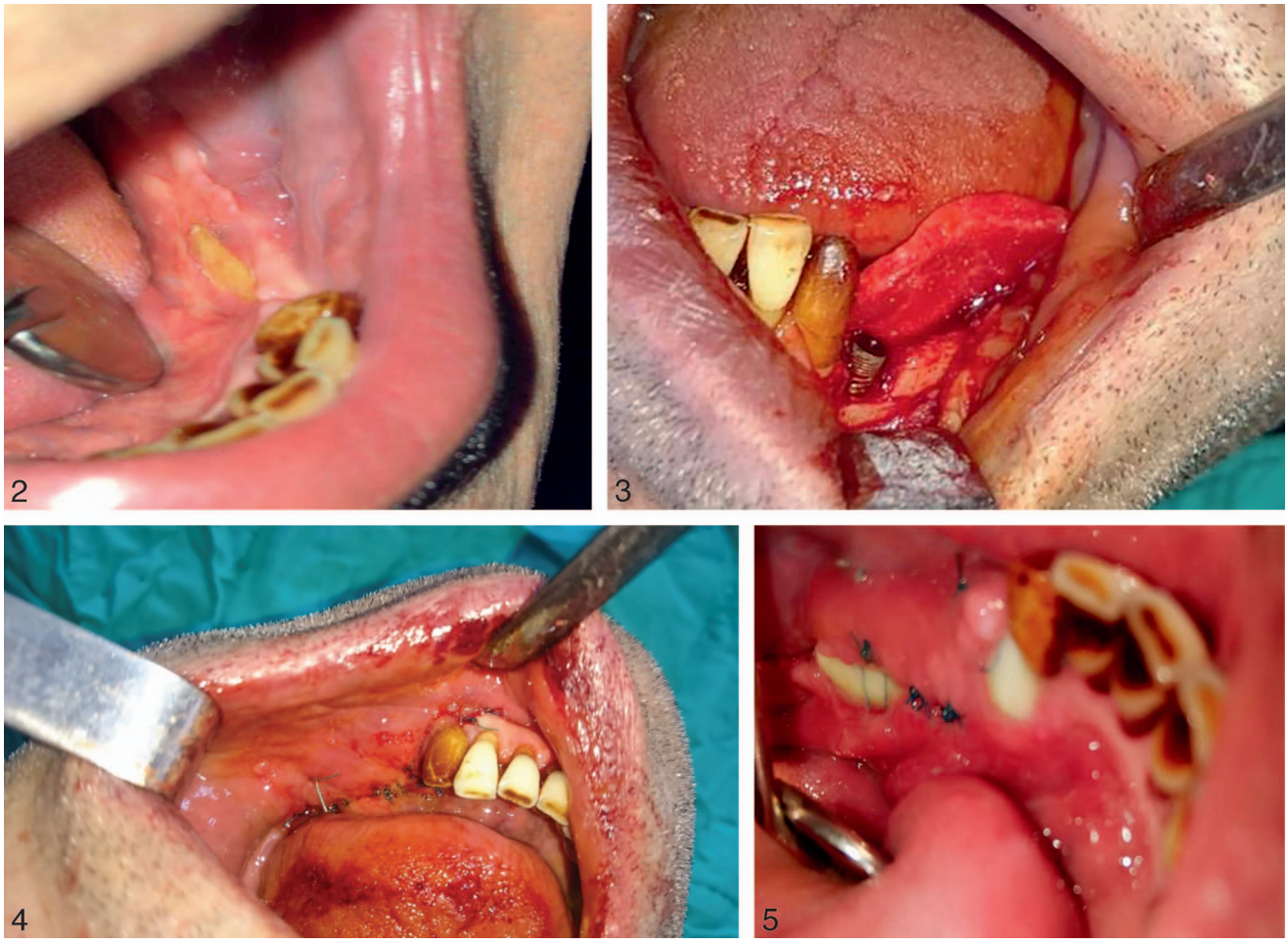
The author has read the Helsinki Declaration and has followed the guidelines to prepare this case report. Ethical approval was not required because this case report is not associated with any ethical problems.

Discussion

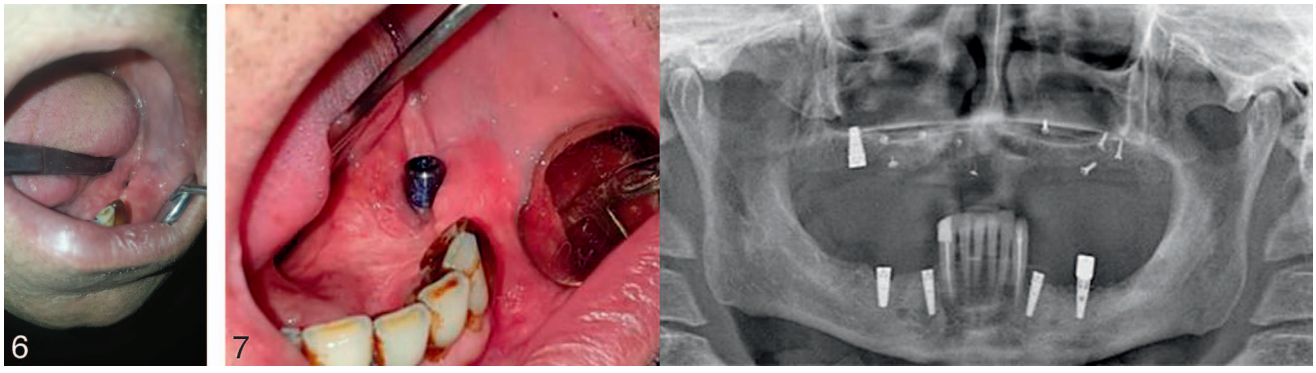
In the patient in this case presentation, ADM was used for the treatment of bone exposure, which emerged after implant surgery. Acellular dermal matrix provides us an adequate quantity of tissue with natural-looking soft-tissue architecture. This feature of ADM makes it a perfect substitute for soft-tissue autografts as it excludes donor site morbidity and reduces the risk of multiple surgeries.[6] The most important characteristic feature of ADM as a soft-tissue graft is its contribution to promoting the proper blood supply to the area of intervention.

Smoking exerts negative effects on these surgical procedures because it impairs the soft- and hard-tissue revascularization processes, adversely affecting tissue healing.[7] Patients who are smokers must be encouraged to discontinue smoking to improve the outcomes of the therapeutic and healing processes. The risk of increased complication rates should be kept in mind when using ADM in smoker patients. Gapski et al[8] reported that ADMs showed results similar to those of autogenous connective tissue grafts and coronally shifted flaps in covering the root surface. Also, the authors showed similar results with autogenous free gingival grafts in increasing the amount of keratinized gingiva.[8] Wallace[9] used a decellularized dermal matrix over the extraction sites in 6 patients for socket preservation. No postoperative complications (infections or openings) were observed during the recovery period. Furthermore, the matrix remained stable without resorption. They stated that the decellularized dermal matrix could be used in socket augmentations.[9]

Fernandes et al[10] analyzed the use of ADM with and without bone grafts for socket protection in a 19-patient study. ADMs were embedded in 1- to 2-mm depth on the incision line to increase the keratinized tissue width. The authors concluded that ADMs were suitable for graft stabilization and might be preferred in socket protection.[10] Although most of the reports in the literature suggest that healing occurs in the 4–6 weeks after the ADM placement, it took 8 weeks for our patient to achieve complete healing. Smoking could be a risk factor affecting the time required for healing since our patient smoked 5 cigarettes a day. Furthermore, this case was unique in the sense that the size of the exposed bone was massive in our patient, potentially negatively affecting the duration of healing. In conclusion, ADM was found to be a preferable method in the treatment of exposed bone surfaces. Treatment of smoking individuals can be difficult and complicated. Further studies are needed to support the use of ADMs for this purpose.



Figures 2–5. Figure 2. Exposed bone 1 month after implant surgery. **Figure 3.** Acellular dermal matrix (Integra HuMend, Integra Life Sciences) with a thickness of 2 mm and a size of 2 × 2.5 cm). **Figure 4.** The area was closed with 3/0 nylon sutures. **Figure 5.** The intraoral photograph shows the acellular dermal matrix (ADM) exposure after 2 weeks following the ADM placement.



Figures 6 and 7. Figure 6. The intraoral photograph shows the status 2 months after the ADM placement. ADM was completely covered with soft tissue. **Figure 7.** The intraoral photograph shows the status 2 months after the ADM placement. ADM was completely covered with soft tissue. The intraoral photograph shows the status 4 months after acellular dermal matrix placement. The area healed without any complications.

Abbreviation

ADM: acellular dermal matrix

Note

The author has no conflict of interest.

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