Combined soft and hard tissue augmentation for a localized alveolar ridge defect

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Abstract

Ideal alveolar ridge width and height allows placement of a natural appearing pontic, which provides maintenance of a plaque-free environment. The contour of a partially edentulous ridge should be thoroughly evaluated before a fixed partial denture is undertaken. Localized alveolar ridge defect refers to a volumetric deficit of the limited extent of bone and soft-tissue within the alveolar process. These ridge defects can be corrected by hard tissue and/or soft-tissue augmentation. A 30-year-old male patient was referred to the Department of Periodontology for correction of Seibert's Class III ridge defect in the lower anterior region. Granulation tissue/connective tissue present at the base of the defect was removed after elevation of full thickness flap. MucoMatrixX, an animal derived, collagen based soft-tissue graft was sutured to the labial flap and bone graft was placed into the defect. If a soft-tissue graft material could be used to replace the palatal grafts, then all the possible complications associated with donor site would be eliminated and above all periodontal plastic surgery and ridge augmentation would be better accepted by patients.

Keywords: Bone grafts, MucoMatrixX, ridge augmentation, ridge defects

Introduction

Localized alveolar ridge defect refers to a volumetric deficit of the limited extent of bone and soft- tissue within the alveolar process.[1] The contour of a partially edentulous ridge should be thoroughly evaluated before starting the process of fabrication of a fixed partial denture. Siebert has classified residual ridge deformities into three categories: Class I defect: Facio-lingual loss of tissue width with normal ridge height, Class II defect: Loss of ridge height with normal ridge width, Class III defect: A combination of loss in both dimensions.[2] The ideal ridge width and height allows placement of a natural appearing pontic, which provides maintenance of a plaque-free environment. Such type of ridge defects can be corrected by surgical ridge augmentation that can be accomplished by the addition of either soft or hard tissues.[3]

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This case was done and followed up in Kanti Devi Dental College and Hospital, Mathura, India, when Dr. Srinivas S R was working there

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Case Report

This was a case report of a 30-year-old male patient who was referred to the Department of Periodontology, Kanti Devi Dental College and Hospital, Mathura, India for correction of ridge defects in the lower anterior region. Patient gave a history of extraction of the mandibular right canine due to periodontal reasons around 6 months back. On intra-oral examination, loss of ridge height and loss of facio-lingual width was noticed. Hence, a diagnosis of Seibert's Class III alveolar ridge defect was made [Figure 1]. Grade I recession was noticed on the mandibular right lateral incisor and canine. A treatment plan involving augmentation of the alveolar ridge defect with bone grafts and soft-tissue grafts was formulated, informed to the patient and consent was obtained.

After achieving adequate local anesthesia, vertical releasing incisions were placed on the distal line angle of lateral incisor and mesial line angle of first premolar. A full thickness flap was elevated until the muco-gingival junction and partial thickness flap was reflected beyond the muco-gingival junction [Figure 2]. Granulation tissue/connective tissue present at the base of the defect was removed. A template was used to determine the size of the soft-tissue graft needed to augment the defect. MucoMatrixX, an animal derived, collagen based soft-tissue graft was sutured to the labial flap [Figure 3]. Bone graft was placed into the defect. Labial flap was coronally advanced and interrupted sutures were placed to unite the labial and lingual flaps. Periodontal pack was placed and patient was recalled after 10 days for suture removal. Post-operative instructions were given and

analgesics were prescribed for pain control. After 10 days, sutures were removed and remarkable improvement in ridge thickness and height was noticed. One month later, after evaluation of the ridge contour and dimensions, patient was referred to Department of Prosthodontics for placement of the prosthesis. All possible prosthetic options were discussed with the patient. Due to financial constraints, patient could not afford for implant supported prosthesis, instead patient choose for a fixed prosthesis. A porcelain fused to metal crown with mandibular left lateral incisor and mandibular left first premolar as abutment was delivered to the patient [Figure 4]. Patient is being followed without any major complaints.

Discussion

The structural loss of the residual alveolar ridge can occur as a result of congenital defects, periodontal disease, tooth extraction or surgical procedures.[4,5] During healing, the overlying soft- tissue collapses into the bone defects, creating contours that make it difficult or impossible to make esthetic functional prostheses.[4] In this case, Seibert's Class III defect was noticed because the mandibular right canine was extracted due to periodontal reasons resulting in loss of both tissue width and height.

Soft-tissue grafts (free gingival grafts, sub-epithelial connective tissue grafts) can be harvested from the patient's hard palate. However, these autogenous soft-tissue grafts have a disadvantage of a second surgical site. An acellular dermal matrix graft (Alloderm), which uses medically processed human skin tissue as source has been successfully used. Human skin is also considered to be a separate organ and stringent human organ transplantation rules apply for the use of processed human dermis as allograft. Due to these stringent human organs transplantation rules, which varies in different countries import of acellular dermal matrix (Alloderm) into many countries is prohibited.

MucoMatrixX is a collagen tissue matrix derived of animal dermis that passes through a multistep cleaning process,

Figure 1: Clinical image of Seibert's Class III alveolar ridge defect involving loss of both ridge width and height in relation to mandibular left anterior region

Figure 2: Crestal incision was placed on the alveolar ridge, vertical incisions were placed at the line angles of the adjacent teeth and full thickness flap was reflected till the mucogingival junction

Figure 3: The desired size of MucoMatrixX was procured, soaked in saline/patient's blood and placed in the ridge defect (inset shows the desired size of MucoMatrixX)

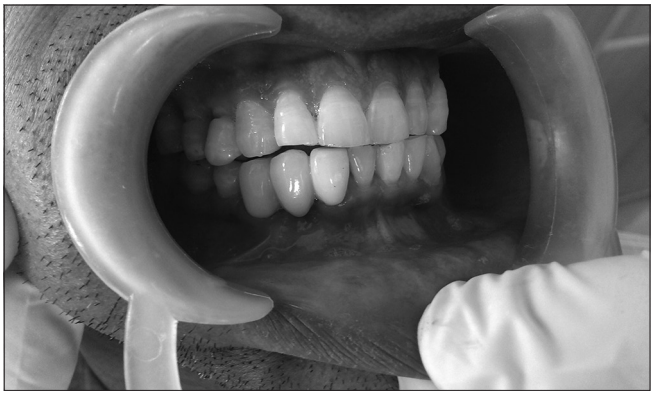

Figure 4: Clinical image 4 months after the surgical procedure with porcelain fused to metal crown being placed with the support of adjacent abutment teeth. Note the resolution of the alveolar ridge defects

which removes all potential tissue rejection components from the dermis. This results into a three-dimensional stable matrix consisting of collagen and elastin. MucoMatrixX supports revascularization and fast soft-tissue integration and is a valid alternative for patients own connective tissue. After placement, the patient's blood infiltrates the MucoMatrixX graft through the three-dimensional soft-tissue network, bringing host cells to the soft-tissue graft surface and starting the revascularization process.

There are various other prosthetic and surgical options for improving esthetics in patient with ridge deformities.[6] Long pontic design or gingival (pink) ceramic in the cervical region can enhance esthetics in such cases. Surgical procedures using soft-tissue autogenous graft, various alloplastic materials, autogenous bone graft and guided tissue regeneration can correct such type of ridge defects.[6] In the present case, we have used a combination of bone grafts and soft-tissue xenograft for the purpose of hard and soft-tissue augmentation. Use of soft-tissue allografts and xenografts is a very useful alternative to harvesting soft-tissue graft from the palate. The prospect of a second surgical site and its inherent risks and complications, which may include pain, discomfort and bleeding, is especially undesirable.[7] The requirement to harvest donor tissue necessitates the need for additional local anesthesia and surgical trauma to a site often distant from the area of concern. If a graft material could be used to replace the palatal grafts, then all the possible complications associated with donor site would be eliminated and above all periodontal plastic surgery and ridge augmentation would be better accepted by patients.[7]

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