

Healing Of Extraction Socket Grafted With Cortico- Cancellous Bone And Acellular Dermal Matrix : A Clinico – Histologic And Radiographic Follow Up Of 2 Years

Abstract

Augmentation of the bone is done to create the sufficient bone volume for ideal implant placement. This case report presents the histologic , radiographic and clinical efficacy of socket augmentation using corticocancellous graft and acellular dermal matrix on the principle of guided bone regeneration.with a two year follow up post restoration.

Key Words

guided bone regeneration , alloderm GBR , acellular dermal matrix , extraction socket , socket augmentation , ridge augmentation

Introduction

Extraction sockets generally heal with bone tissue after 1 to 2 months, and this healing process usually occurs with substantial reduction of the original height and width of the alveolar bone. Ridge defects often hamper the placement of ideally shaped artificial crowns and are basically treated with soft or hard tissue grafts. Resorption of the residual alveolar ridge is an inadvertent process after extraction. Chen^[1] and Schropp^[2] have reported an average 0.34 to 7.7 mm horizontal and 0.2 to 3.25 mm vertical bone loss 6 month after extraction. To reduce these difficulties ridge bone maintenance procedures using biomaterials were utilized to preserve the ridge anatomy and increase the possibility of rehabilitation after tooth extraction. Various materials have been used to prevent or minimize ridge collapse after tooth extraction in an attempt to improve implant placement.

Acellular dermal matrix (ADM) is a processed allogenic material obtained from human skin, and is processed in such a way that the epidermal layer and all cells in the dermis are removed.(ref)In this case report, an extraction socket was grafted with ADM as GBR (guided bone regeneration membrane) and corticocancellous bone graft. Bone healing was evaluated by harvesting a bone sample at the time of implant placement.

Case Description

A 54 year old male presented with pain in lower right region of the mouth. Intraoral examination showed 47 sensitive to percussion with deep buccal pocket (7 mm) with furcation involvement. Radiographic evaluation revealed a fractured 46 with poor prognosis (Fig 1-3) Treatment planned for the case included : extraction of the tooth, socket augmentation, a delayed placement of the implant retained prosthesis.

Treatment Planning

Radiographic interpretation of the case presented perio-endo lesion in relation to 47 with a poor prognosis. On removal of the crown there was a midline vertical fracture in the tooth. Treatment planned was : Guided bone socket augmentation to be followed with implant supported prosthesis.

Surgical Stage

After administering local anaesthesia, failing 47 was extracted. Thorough debridement of the socket was done to remove the diseased granulation tissue. (Fig 4) A wide buccal dehiscence was present (6 mm long and 4mm wide, as measured with the William's periodontal probe) Horizontal bone width was measured with bone caliper after tooth extraction with reference to the centerpoint of the buccal defect as 5.7 mm. Socket walls were decorticated to infuse the fresh bleeding. Corticocancellous graft Mineross

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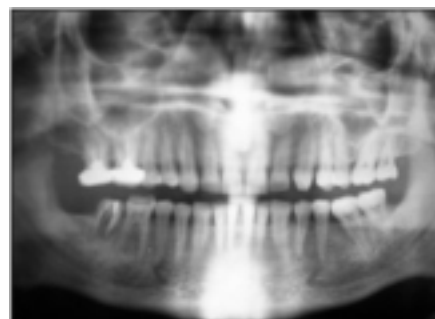


Fig 1 : Perio-Endo Lesion In Relation To 47

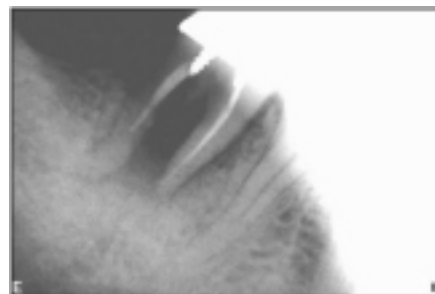


Fig 2 : Poor Prognosis 47



Fig 3 : Extraction Socket

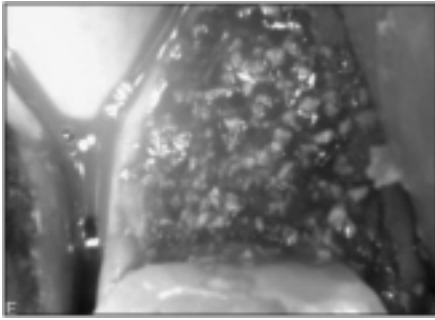


Fig 4 : Mineross Grafted Into The Extraction Socket

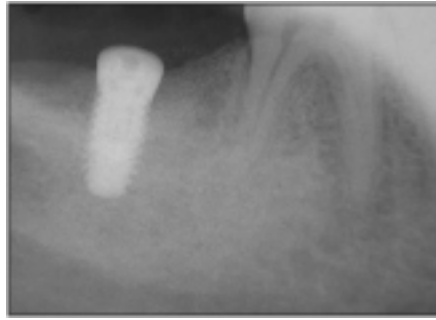


Fig 9 : Biohorizon (4.2x10mm) Implant In Place

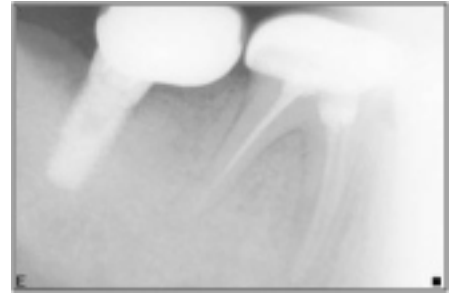


Fig 14 : 25 Month Post Restoration

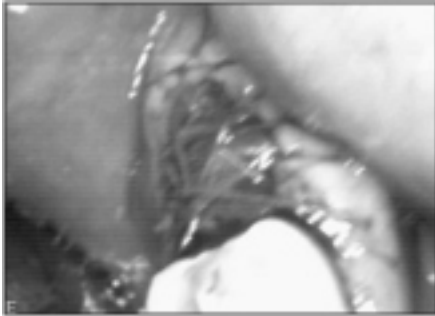


Fig 5 Alloderm Tacked And Suturing Done

(Biohorizon , AL) was filled into the extraction socket to the crestal confines of the socket. (Fig 5) Alloderm GBR (Biohorizon, AL) was tacked over the socket buccally and lingually. Soft tissue was coronally advanced and 5-0 nylon Ethicon (Johnson and Johnson) sutures were placed in. (Fig 6) Augmentin (Glaxosmithline)was prescribed as 675 mg for 5 days. After 12 days the sutures were removed. Radiographic evaluation at 9 months presented as well condensed bone (Fig 7) and a thick keratinized soft tissue . (Fig 8) Ridge mapping revealed a midbuccal horizontal width and the soft tissue thickness as 6.1mm and 2.3mm respectively. Trephine bone core biopsy was done for histologic examination. Bio-horizon (4.2 x 10mm) implant was placed in. (Fig 10) Histological examination under (H&E x400) magnification revealed active bone formation in the areas adjacent to the graft material. (Fig 9)

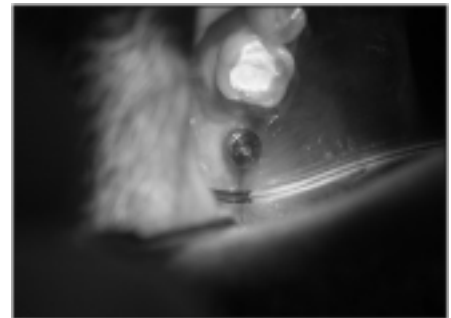


Fig 10 : Healing Abutment In Place



Fig 6 : 9 Months Post Ridge Augmentation

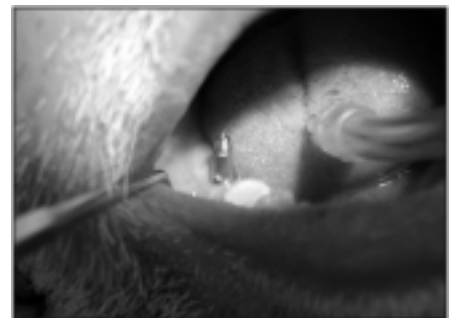


Fig 11 : Preparation For Impression



Fig 7 : Thick Keratinized Mucosa Overlying The Augmented Site

Prosthetic Stage

At 4 months cover screw was removed and a 2mm healing abutment was placed-in. (Fig 11) 2 weeks later, impression was recorded for PFM prosthesis (Fig 12). Owing to the reduced interocclusal space, a screw retained prosthesis was seated in. (Fig 13-14) The abutment screw was ratched at 35 Ncm and the access hole was sealed. Patient was put on the maintainence follow up of 6 months interval and was followed upto 2 years with clinical and radiographic evaluation

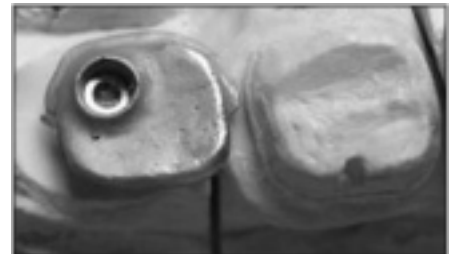


Fig 12 : Metal Frame Work For Screw Retained Prosthesis

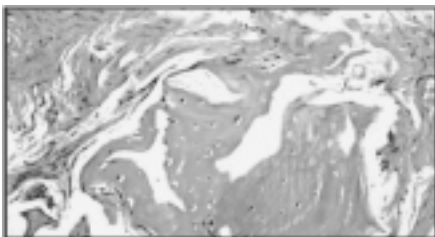


Fig 8 : Active Bone Formation Adjacent To The Resorbing Graft Particles (H&e X400)

Results

25 months follow up post- restoration revealed a stable prosthesis in function. The soft tissue assessments presented a periimplant sulcus depth of 4mm with a thick keratized mucosa around.

Discussion

Post extraction resorption rate is higher buccally than lingually.^[3] The loss of width of the alveolar ridge is always



Fig 13 : Screw Retained Prosthesis In Place

higher than the ridge height.^{[4],[5],[6],[7]} Higher resorption has been reported in the maxilla than mandible.^[5] Socket augmentation helps to reduce the localized ridge deformities and help in a successful rehabilitation with endosseous implants^[8]. Research has shown that ridge bone maintenance procedures with the use of the biomaterials, helps in decreasing the expected bone loss and increases the success of rehabilitation after tooth extraction.^{[9],[10]} Combination of bone grafts with other materials e.g PRP, GTR membranes, collagen plug etc were introduced to maximize the effect of the bone formation. In this case we evaluate clinically, histologically and radiographically the tissues formed around the implant in a socket presenting buccal bone defect utilizing the guided bone regeneration technique with corticocancellous graft and allograft GBR membrane. The GBR technique resulted in 0.4mm increase of horizontal width and a quantum bone fill around the implant. Appreciable keratinized mucosa resulted after healing. Histological section showed a viable bone formation in the vicinity of the bone graft with absence of any inflammatory cell findings.

Conclusion

The results from this case report reveal

that ridge preservation presents a predictable option to prepare the extraction site for future implant supported rehabilitation especially in cases where delayed implants is the opted option

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