

Ridge Preservation Procedure

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Introduction

The alveolar processes in the jaws are tooth dependent structures that undergo significant structural changes whenever the teeth are lost. Studies show that most of the resorption occurs during the first 3 months of healing, although dimensional changes are observed up to 1 year following tooth extraction. This results in approximately 50% reduction of the bucco-lingual dimension of the alveolar ridge, mainly due to the resorption of the buccal bone plate. Preservation of alveolar bone volume following tooth extraction facilitates subsequent placement of dental implants and leads to an improved esthetic and functional prosthodontic result.

To counteract the early tissue changes after tooth extraction, different socket preservation therapies have been proposed, ranging from a careful flapless tooth extraction aiming for an undisturbed socket healing, to the immediate placement of dental implants, to filling the resulting alveolar socket with different grafting materials, with or without barrier membranes. However, a gold standard as to the ideal graft material or whether a technique with or without barrier membranes should be followed has not yet been established. Among the various techniques employed, the "ice cream cone" technique has been advocated in type 2 extraction sockets (a socket having the presence of facial soft tissue with a partial or complete dehiscence of the buccal bone plate).

Case Report

A 21 year old male patient reported with pain and swelling in relation with tooth #21. On examination, a draining sinus was noticed in the labial vestibule (Fig. 1). The radiograph revealed a periapical infection in the previously endodontically treated tooth #21. Treatment plan agreed upon was extraction followed by replacement with an implant-supported prosthesis.



Fig. 1 Pre operative view showing a draining sinus in connection with tooth #21.

The tooth was atraumatically extracted using periostomes under local anesthesia. On performing bone sounding, it was observed that there was a large dehiscence defect with complete absence of the labial cortical plate. It was decided to undertake a Socket grafting procedure utilizing a slowly resorbing xenogenic bone Substitute material along with a resorbable collagen membrane employing the “ice cream cone” technique.(Fig. 2)



Fig. 2 Extraction socket.

The infected site was thoroughly curetted and irrigated with 1:1 mix of Betadine solution and saline. A 30mm X 20mm collagen membrane (**Conform, Ace Surgicals**) was cut into an ice cream cone shape (Fig. 3). The membrane was contoured and carefully tucked labially to cover the dehiscence defect (Fig. 4a-4b). Thereafter, a bovine xenogenic graft material (**Cerabone, Botiss**) was placed into the socket and condensed using light force (Fig. 5). The membrane was tucked into the palatal portion of the socket in order to completely cover the bone graft (Fig. 6). A figure of 8 PTFE suture was used to suture and secure the membrane over the site to prevent dislodgement or loss of the particulate bone graft material and blood clot during initial healing (Fig.7). The missing tooth was replaced at same appointment by using a Fiber Reinforced bridge made in the laboratory prior to the extraction (Fig. 8a-8b). The bridge was bonded to the palatal portion of the adjacent teeth using dual cured resin cement (**Variolink, Ivoclar**).The patient was followed up after 6 months (Fig. 9).



Fig. 3 Collagen membrane shaped in the shape of an ice cream cone and Xenograft.

On removal of the provisional bridge, it was observed that there was no collapse of the labial portion of the ridge, typically seen post extraction routinely. Ridge mapping ensured that there was adequate width of bone to allow implant placement.



Fig. 4a Placement of the collagen membrane into the socket.



Fig. 4b Adaptation of the membrane in the extraction socket.



Fig. 5 Placement of the Xenogenic graft material in the extraction socket.



Fig. 6 Tucking the membrane palatally.

A **Biohorizons Tapered Plus** implant of the size 3.8 X 12mm was placed under local anesthesia using a flapless procedure(Fig. 10). The provisional bridge was bonded and the implant was allowed to heal. Second stage surgery was done 3 months after placement of the implant. As seen in the Fig. 11 adequate tissue contours were observed 2 weeks after second stage surgery. An open tray impression was made



Fig. 7 PTFE sutures securing the membrane over the site.



Fig. 8a Fiber reinforced bridge bonded immediately after surgery.



Fig. 8b Fiber reinforced bridge bonded to the palatal surfaces of adjacent teeth.



Fig. 9 Post operative view at follow up after 6 months.

and a Screw retained Porcelain fused to metal crown was fabricated. The crown was fixed over the implant and the internal screw was tightened at a torque of 30 Ncm (Fig. 12).

Conclusion

The ice cream cone technique allows for the reconstruction of a buccal



Fig. 10 Flapless placement of implant.



Fig. 11 Good tissue contours observed two weeks post second stage surgery.



Fig. 12 Definitive Screw retained PFM crown.



Fig. 12b Pre operative, Immediate Post operative and Post loading radiographs.

plate dehiscence to enable the placement of an implant. It utilizes a flapless technique leaving the soft tissue intact.

Augmentation of bone volume is achieved using Guided Bone Regeneration (GBR) inside the socket by lining the defect with bioresorbable collagen membrane prior to inserting the xenogenic graft material. The ice cream cone technique offers repair with technical ease and less soft tissue manipulation while allowing for secondary wound healing.