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CLINICAL REPORT

Treating Dehiscence During Implant Placement and Loading on Angled Abutment in Maxillary Lateral Incisor Region: A Case Report

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Abstract The primary factor causing recession is the morphology and anatomy of the dentition. The facial bony plate overlying the root is usually very thin. The complete absence of bone over the facial root surface is referred to as dehiscence. Such buccal bone defects in case of implant dentistry threaten the survival of dental implant. Many surgical techniques are introduced to enhance alveolar bone volume for placing the dental implants. Guided bone regeneration (GBR) is one such established surgical technique for correcting buccal dehiscence defects, along with the use of various barrier membranes for the same. This case report describes an implant placement in the maxillary left lateral incisor region showing dehiscence on the labial cortical plate, along with bone graft and GTR membrane.

Introduction

Implant therapy is regarded as an extremely reliable approach to replace missing teeth. As a general principle in implant surgery implant surfaces should be surrounded by alveolar bone [1]. Following loss of teeth, natural process of bone resorption occurs. Buccal bone is relatively thin and bone resorption after tooth extraction in buccal areas is faster and more prevalent compared with lingual bone. While preparing implant sites in narrow ridges, dehiscence or fenestration defects may occur frequently that threaten the survival of implants [2]. This condition is most frequently observed in incisors, canines and seldom in the molars (except for the mesio-buccal root of maxillary first molars). Treatment of dehiscence and fenestration lesions with guided bone regeneration (GBR) technique and placing of implants simultaneously have predictable results. Recent clinical studies have proven that the use of bone substitute materials together with placing implants led to successful coverage of pre-exposed implant surfaces [3]. This case report describes an implant placement in the maxillary left lateral incisor region showing dehiscence on the labial cortical plate, along with bone graft and GBR membrane. The implant was loaded using an angled abutment and porcelain fused to metal prosthesis.

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Case Report

A male patient of age 23 years reported with a missing tooth 22 since 1 year (Fig. 1). Patient had a history of trauma due to which the particular tooth was lost. Panoramic radiograph, intra oral periapical radiographs and blood investigations to rule out systemic disorders were advised. Following complete clinical and radiographic evaluation implant prosthesis was planned. On the day of surgery, patient was made to rinse with 10 ml of 0.2 % chlorhexidine gluconate solution followed by extraoral scrubbing with Betadine. Patient was administered local infiltration anesthesia (2 % Lignocaine Hydrochloride with 1:80,000 concentration Adrenaline). Midcrestal and crevicular incisions were made to elevate a mucoperiosteal flap extending from 21 to 23. On elevation of the flap, bone dehiscence was observed on the labial plate. The osteotomy site was prepared (Fig. 2). A threaded internal hex, root form, two stage implant fixture (Adin Dental Implant Systems Ltd, Afula, Israel) of dimension 3.5 × 11.5 mm was choosen and placed. After achieving a final torque of

Fig. 1 Pre-operative

Fig. 2 Preparation of osteotomy site

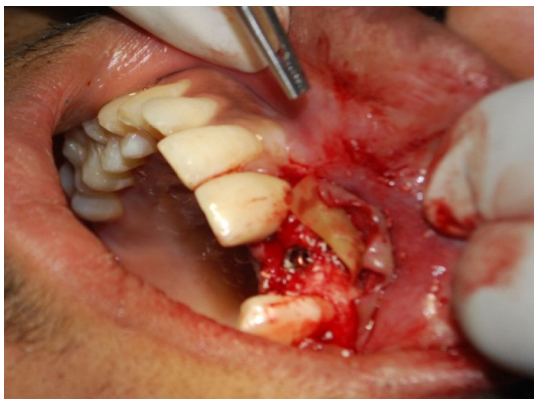

Fig. 3 Placement of implant, bone graft and GBR membrane

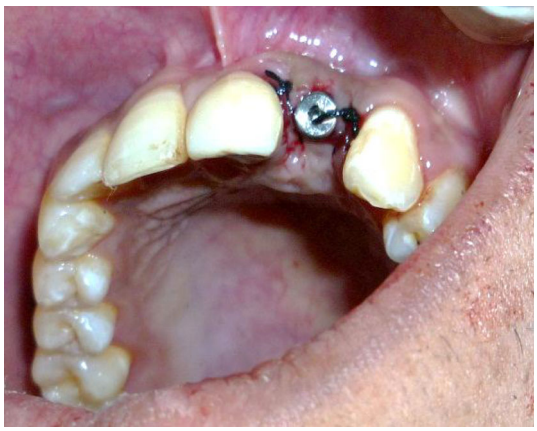

Fig. 4 Placement of healing cap

Fig. 5 25° angled abutment

Fig. 6 Final prosthesis

45 N cm [2], bone grafting was performed to close the dehiscence and GBR membrane covering the graft and sutured (Fig. 3). Suture removal was done after 8 days. The success or failure of the GBR procedure was assessed at the second-stage surgery when flaps were reflected to place healing abutments. Clinical photographs were used to determine results of treatment. Complete success, partial success, and failure were based on previously published clinical criteria. Complete success was defined as coverage of all threads or exposed implant surfaces. Partial success was deemed as incomplete coverage of most threads or

exposed implant surfaces with a maximum of two threads or 2 mm of implant surface left uncovered. Failure was defined as no coverage beyond two threads or 2 mm of implant surface [4]. Complete closure of dehiscence was observed. Healing cap was placed over the implant and the soft tissue sutured. Suture removal was done after 10 days (Fig. 4). A 25° angled abutment was milled and tightened onto the implant (Fig. 5). Impression was made and porcelain fused to metal prosthesis was fabricated and cemented (Fig. 6). All the instructions for implant maintenance were given to the patient and follow up was carried out on a regular basis.

Discussion

The management of dehiscence on the labial aspect of the maxillary left lateral incisor during implant placement is presented. A predisposing factor for the cause of dehiscence is an unfavorable frenum pull, prominent root contours, malpositioning of teeth, labial protrusion of root, thin bony plates and long standing trauma. Methods to reconstruct the destroyed alveolar bone include osteoconduction, osteoinduction and GBR. Buser et al. [5], Oda et al. [6], Cordaro et al. [7], Donos et al. [8] discussed methods to enhance alveolar bone volume for placing implants. These include grafting techniques, distraction osteogenesis, bone building using splitting method and expanding the bone and guided tissue regeneration (GTR) [5–11]. The grafting techniques to correct bone defects include placing autogenous bone graft along with non-resorbable membrane, bone graft along with resorbable membrane. Klokkevold PR suggested Guided bone regeneration (GBR) along with the use of various barrier membranes to be a reliable method for the treatment of dehiscence type of defect. GBR involves the placement of an occlusal barrier which prevents invasion of non-bone forming cells from the surrounding soft tissues into the defect. It allows time and space for the bone forming cells to repopulate the defect [12].

In the past expanded polytetrafluoroethylene (e-PTFE) membranes were proven effective but exposure, inflammation and compromising bone regeneration were frequently reported by Becker et al. [12] and Nowzari and Slots [13]. The disadvantage of non-resorbable materials is the need for a second surgical procedure to remove the membrane. This led to the development of resorbable membranes. Resorbable membranes have shown improved tissue healing, decreased morbidity and fast resorption and reducing the risk of bacterial contamination (Lorenzoni 14). Jung et al. [15] showed in most cases of GBR, membranes are supported by protective materials consisting allografts, synthetic materials and xenografts. Demineralized bone graft is one of the allograft material which has osteoinductive potential, because this substance contains some major bone morphogenetic proteins (BMPs) of donor tissue matrix [12–15].

A surgical technique for management of flap was discussed by Rosen and Reynolds [16] where a releasing incision was extended beyond mucogingival junction and into buccal turn of vestibule. This allowed the flaps to be passively drawn together. Lee et al. [17] described a technique using autogenous drilling dust (ADD) and mandibular particulated bone (MPB) and histopometrically compared the effects of the combined use of resorbable membranes and ADD or xenografts for the treatment of dehiscence-type defects around implants. Results show ADD appears to be useful material for closing dehiscence type defects around implants.

The use of angled abutments facilitates paralleling nonaligned implants, thereby making prosthesis fabrication easier, aids in avoiding anatomical structures when placing the implants, can reduce treatment time, fees and the need to perform guided bone regeneration procedures further studies by Cavallaro [18] have shown there was no additional bone loss adjacent to implants that supported angled abutments compared with straight abutments. Moreover, an angled abutment used result in stresses usually within physiological tolerances, does not result in an increased amount of bone loss, nor is associated with additional screw loosening.

Conclusion

Presence of dehiscence during implant procedure can be successfully treated by GBR procedures. Simultaneous procedure of implant placement and GBR using bone grafts and membranes yield good results. The procedure helps in bone formation and prevents failure of implants and improves the prognosis.

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