CASE REPORT

Soft and hard tissue ridge augmentation around dental implant surgical site

Faris M. Alqahtani
Department of Periodontics and Community Dental Sciences, College of Dentistry, King Khlaid University, Abha, 62217, Saudi Arabia

Correspondence:
Faris M. Alqahtani
Department of Periodontics and Community Dental Sciences, College of Dentistry, King Khlaid University, Abha, 62217, Saudi Arabia
Email: faris05440@gmail.com

ABSTRACT
Recently dental Implant therapy has become a widely accepted treatment option for thereplacement of missing teeth.According to available literature, successful maintenance and regeneration of the keratinized gingiva and bonewhich are lost following tooth extraction at implant site is very important for long term survival of implant. In present case report, A 24-year-old Saudi femalestudent, was referred to replace her missing tooth #46. Through clinical and radiographic examination revealed inadequate keratinized gingiva and horizontalbone loss in the area of #46. After phase I therapy, soft tissue augmentation was achieved by using free gingival autograft.After three months of healing, we placed the dental implant with hard tissue augmentation by using xenograft. Six months post-operative follow-up yielded positive results with respect to esthetic and function. Prosthetic rehabilitation of the implant was done with a ceramic crown for reestablishment of masticatory function. A comprehensive treatment planning is essential for achieving positive outcomes. The presence of a bunch of soft and hard tissue improves long term survival ofimplant and makes plaque maintenance easier around it.
Keywords: Attached gingiva, Alveolar ridge augmentation, Dental Implant, success and survival

INTRODUCTION

Patients who are edentulous or partially edentulous require a variety of treatment options to restore their missing teeth, including dental implants. With a 10-year follow-up, 96.4 % of implant placements have been successful. After tooth loss from any reason (Caries, periodontal, and other reasons) [1], attachment loss can occur horizontally or vertically. Bone deformities or a lack of quality and quantity of soft tissue can cause attachment loss. Augmentation of the edentulous region improves implant placement for prosthetically driven implants. Soft tissue and hard tissue augmentation procedures are frequently performed in conjunction with or before implant placement[2,3].

The presence of keratinized gingiva (KG) is required for implant placement or guided tissue regeneration in able to preserve suturing in place and secure the surgical site [4]. Furthermore, a lake of keratinized gingiva can cause peri-implant inflammation and make plaque control difficult. It's recommended to have at least 2mm of KG around dental implants [4-7]. There are variety of techniques and materials that can be used to increase KG, but the most common approach is free gingival autograft (FGG). Until present, restricted to case study which advised soft tissue grafting done 3 months before implant placement provides

best timing for tissue maturation[8,9].Guided bone regeneration (GBR) is defined as the use of a barrier membrane to keep some tissue out and allow new bone to grow in its place.GBR can be done in two stages or as a one-stage treatment (combined method) (staged approach). The one-stage approach involves placing the implant at the same time as the bone augmentation surgery [10,11].Although autogenous bone is the gold standard for bone augmentation treatments, it can still be used with other bone grafts depending on their origin [12].

This case report describes a clinical presentation of soft tissue augmentation before implant placement and hard tissue augmentation in conjunction with implant placement to predict a long-term function and survival rate of placed implant.

CASE REPORT

A 24-year-old Saudi female patient, student by profession, was referred to the Department of Periodontology, College of Dentistry, King Khalid University, with the chief complaintof replacement of missing tooth in lower right back tooth region for one year. Clinical examination revealed missing tooth is #46 and that was making mastication difficult (Figure. 1). On general examination, no relevant medical or familial history and drug allergies have been reported. Extra-oral and intra-oral examinations reported no abnormalities.

Periodontal examination recorded that the plaque index (O'leary) was 33% and the bleeding index (Ainamo and Bay) was 34%. The results of all clinical and radiographic examination have been acquired. During clinical examination we found a minimal KG and horizontal bone defect (according to Seibert classification class I) in the area of #46.Completion of phase I therapy resulted in good oral hygiene maintenance and ultimate reduction in plaque and bleeding index.

After successful completion of phase I therapy the patient was shifted to phase II therapy (surgical phase) that included FGG to increase width of KG followed by implant placement with GBR.

Free gingival autograft: After administration of local anesthesia, recipient site was prepared by partial thickness dissection by using scalpel blade no 15c on the buccal side of alveolar ridge in the region of #46. A free gingival graft was obtained from the right-side portions of the palate, approximately 2 mm below the gingival margin. The harvested graft was placed covering the recipient periosteal bed and fixed by compression sutures using absorbable thread (Vicryl–Ethicon, Johnson & Johnson) to remain stable and in close contact with the bed. The palatal donor site was covered with periodontal dressing and acrylic surgical stent to promote hemostasis and clot stabilization. Patient was discharged after postoperative instruction and medication and recalled after two weeks for suture removal and postoperative evaluation of healing (Figure. 2). Further recall was done at one month, three months to evaluate the width of KG (Figure. 3), at same visits instructions regarding home oral hygiene techniques were reinforced.

Implant and GBR: Three months after the FGG surgery, we planned for implant placement with GBR in one stage in region of #46. After administering local anesthetic, flap reflection was doneby making a mid-crestal incision, then a crevicular incision around the teeth, followed by a vertical incision on mesial side of the buccal flap for better access and primary closure. Implant placement was done (Straumann 4.1 by 10 mm BLT) in the predetermined site under strict infection protocol, followed by augmentation of bone by autograft and xenograft blended in a ratio of 50:50 to enhance the buccal area (Figure. 4,5 and 6). The bone graft was covered with a designed resorbable membrane (20*30mm) to make the surgical site more convenient, create space, and preserve the bone graft.4-0 expanded-polytetrafluoroethylene (e-PTFE) sutures were used for flap closure. The patient was given postoperative medications and instructions. After ten days, the patient was recalled for suture

removal. After a 6-month post-operative evaluation, re-entry was performed to complete the second stage, which included replacing the cover screw with a Healing abutment (Figure. 7). After 1 month, the implant was restored with a ceramic crown, and the results were satisfactory (Figure. 8).

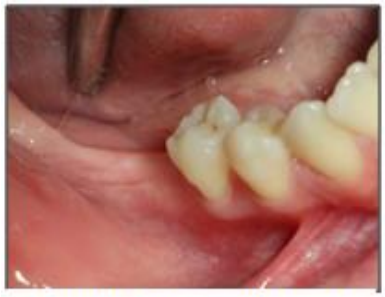

Figure.1 Preoperative view of edentulous space #46

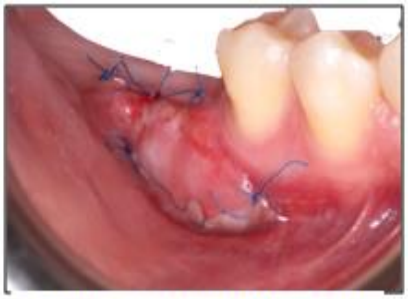

Figure. 2 Healing of FGG graft

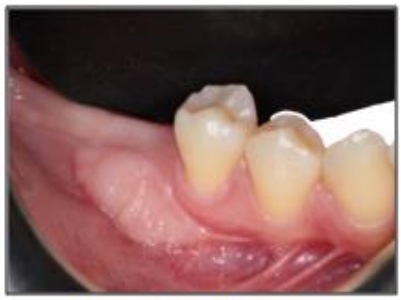

Figure. 3 Month follow-up

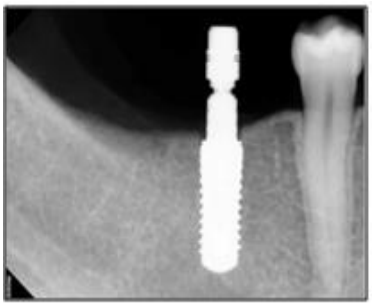

Figure. 4Implant in place #46 (periapical radiograph)

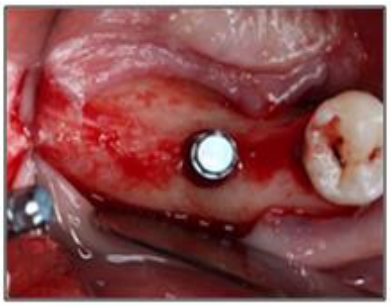

Figure. 5 bone defect around dental implant

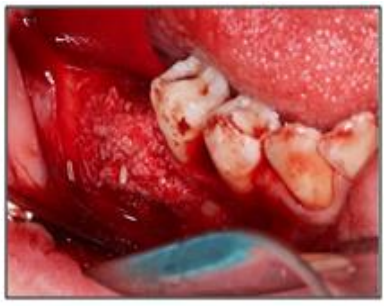

Figure. 6 Xenograft placed around the implant

Figure 7 New bone formation around implant collar

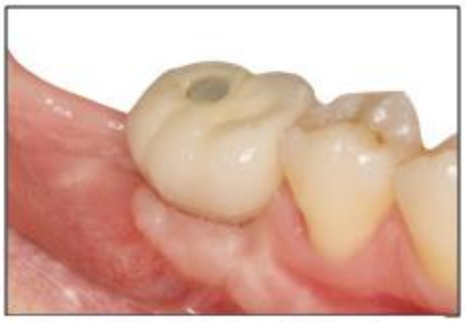

Figure 8 Prosthetic rehabilitation of the implant

DISCUSSION

Inadequate KM around the dental implant, could resultininsufficient oral hygiene, excess plaque accumulation, peri-implant mucositis, bleeding on probing, recession, and bone loss around the implant that could affect the long-term survival of dental implants and prosthesis [1-3]. In the current case report, examination of the patient revealed soft and hard tissue insufficiency in #46 tooth region. The mental nerve poses a challenge for soft tissue grafting in our case, but careful treatment planning ensures the best and most uncomplicated outcome. Many classifications, such as Seibert's and Allen's, are related to compensating and increase ridge defect (soft/hard tissue defects). The ridge defect in our situation is classified as class I by Seibert [5]. Several surgical procedures have been used to increase KM around implant including free gingival grafts, connective tissue grafts, pedicle grafts, and apically positioned flaps.Free gingival graft is a successful and predictable technique among all the described

technique [12].One limitation of this technique is that it involves two surgical sites, causing morbidity in both.

The width and length of the ridge can be determined clinically using a bone caliper or radiograph x-rays (periapical and cone-beam computed tomography (CBCT)), but the CBCT is the gold standard for evaluating the ridge and deciding whether to place the implant alone, with or without a bone graft (one stage), or with a bone graft and delayed implant placement (two stage). In our situation, the decision to insert the implant with bone grafting was made (one stage) [13]. We used autograft to augment the area with xenograft to reduce resorption and contour the ridge, as it is the gold standard in bone graft. Autograft transports bone from a donor site to another site in the same patient, so we used it to augment the area with xenograft to reduce resorption and contour the ridge [10].

Nevertheless, patient education and motivation about optimum plaque control and consistent follow-up will provide the long-term maintenance of the successful outcome of the present case.It is imperative that implant specialists evaluate the presenting condition of each case individually, and carefully consider the consequences of the surgical interventions and their timing, to be able to achieve an acceptable result.

CONCLUSION

The case report presented above illustrates impotence of soft and hard tissue augmentation to get the optimal results around the implant and predict long-term success and survival.This study can expand existing knowledge on this topic and help clinicians to achieve favorable results while considering the experience that was described.

DECLARATION OF PATIENT CONSENT

The authors certify that they have obtained all appropriate patient consent forms.

FINANCIAL SUPPORT AND SPONSORSHIP

Nil.

CONFLICTS OF INTEREST

There are no conflicts of interest.

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