Mucosal dehiscence coverage for dental implant using sprit pouch technique: a two-stage approach

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Purpose: Soft tissue recessions frequently cause esthetic disharmony and dissatisfaction. Compared with soft tissue coverage around a tooth, the coverage of an implant site is obviously unpredictable. Particularly in the cases of thin mucosa, a significant greater amount of recession takes place compared to thick mucosa. To overcome this problem, this case report demonstrates a two-step mucosal dehiscence coverage technique for an endosseous implant.

Methods: A 33-year-old female visited us with the chief complaint of dissatisfaction with the esthetics of an exposed implant in the maxillary left central incisor region. A partial-thickness pouch was constructed around the dehiscence. A subepithelial connective tissue graft was positioned in the apical site of the implant and covered by a mucosal flap with normal tension. At 12 months after surgery, the recipient site was partially covered by keratinized mucosa. However, the buccal interdental papilla between implant on maxillary left central incisor region and adjacent lateral incisor was concave in shape. To resolve the mucosal recession after the first graft, a second graft was performed with the same technique.

Results: An esthetically satisfactory result was achieved and the marginal soft tissue level was stable 9 months after the second graft.

Conclusions: The second graft was able to resolve the mucosal recession after first graft. This two-step approach has the potential to improve the certainty of esthetic results.

Keywords: Case report, Dental Esthetics, Mouth mucosa, Oral surgical procedures.

INTRODUCTION

Soft tissue recessions around dental implants have frequently been observed. A recession during the early phase after implant crown placement originates from the process of modeling of the peri-implant mucosa [1]. Cardaropoli et al. [2] reported that bone resorption and soft tissue recession were manifested as 0.7 and 0.6 mm at the buccal aspect of the implants during the period between implant placement and abutment connection. Muller et al. [3] has suggested that thin mucosa is friable and recesses more readily following mechanical stress and surgical procedures than does thick mucosa. Furthermore, the quantity, quality, and position of the existing peri-implant bone also affects soft tissue recession [4]. Soft tissue recessions often cause esthetic disharmony and dissatisfaction. Burkhardt et al. [5] surgically covered soft tissue recessions using a coronally advanced flap (CAF) in combination with a free connective tissue graft. Although the implant sites revealed a substantial, clinically significant improvement following coronal mucosal displacement, clinically significant soft tissue shrinkage was observed after one month of healing. Thin mucosa underwent significantly more...
recession than thick mucosa. We hypothesized that a two-step approach is useful in acquisition of esthetic results because the first graft can increase the thickness of the peri-implant mucosa. Furthermore, the second graft probably compensates for the mucosal recession after first graft. The present case demonstrates a two-step mucosal dehiscence coverage technique in an endosseous implant. Sufficient soft tissue regeneration was achieved and the marginal soft tissue level was stable with an esthetically satisfactory result.

CASE DESCRIPTION

The patient was a 33-year-old female who visited us on October 2008 with a chief complaint of esthetic dissatisfaction in the exposed implant of the maxillary left central incisor region. A zirconia abutment and temporary crown had been already fitted to the implant. Periodontal examination revealed a healthy peri-implant condition with a probing depth ranging from 2 to 3 mm and satisfactory oral hygiene was observed. There was 3 mm abutment exposure in the buccal mucosa around the implant (Fig. 1). An intraoral periapical radiograph and cone beam computed tomography were taken to evaluate peri-implant bone resorption. Because only 1 mm of marginal peri-implant bone resorption was observed (Fig. 2) and the implant was a bit buccally angulated, no bone graft or removal of the implant was performed, but it was decided to carry out only soft tissue augmentation to restore esthetics.

Following local anesthesia, a circumferential partial-thickness incision was performed using a CK3 stainless steel blade (Blade Round Tip Angled 10 Deg, SWAN Analytical USA Inc., Wheeling, IL, USA) to achieve a 17 mm wide×12 mm height pouch around the dehiscence (Fig. 3). A 10×6 mm subepithelial connective tissue graft (SCTG) was harvested from the palate in the right second premolar to second molar region. The graft tissue was trimmed to fit the formerly prepared recipient bed. A horizontal incision to the bone was made 5 mm from the palatal gingival margin and the blade (Razor Blade, FEATHER Safety Razor Co., Osaka, Japan) was subsequently placed parallel to the long axis of the roots. Another horizontal incision was made 2 mm coronal to the first incision and the periosteum was dissected before removing the wedge of soft tissue. The SCTG was trimmed precisely to adapt to the

Figure 1. Preoperative intraoral view: 3 mm of vertical abutment exposure was observed.

Figure 2. Preoperative radiographical examination of the left maxillary central incisor region: intraoral periapical radiograph (A) and cone beam computed tomography (B, axial view; C, coronal view; D, sagittal view).
recipient pouch. Then, the SCTG was inserted into the recipient pouch and sutured with 7.0-nylon (Nicho Kogyo Ltd., Tokyo, Japan) to stabilize the soft tissue graft and supplemental site. The graft was positioned and fixed by a 7.0-nylon suture in apical site of the implant. After covering the SCTG graft with a mucosal flap, the flap was coronally stretched with a 7.0-nylon suture (coronally positioned flap, CPF). The donor site was sutured with 5.0-nylon (LOOK Suture 774B, Angiotech, Vancouver, BC, Canada) (Fig. 4).

At 12 months after surgery, the recipient site was partially covered by keratinized mucosa (Fig. 5A). However, the buccal interdental papilla between implant on maxillary left central incisor region and adjacent lateral incisor was in a concave shape. To achieve an esthetic result, we planned a second graft.

Following local anesthesia, a circumferential partial-thickness incision was performed using CK3 around the dehiscence. An SCTG was harvested from the palate in the left second premolar to second molar region. Then, the SCTG was inserted into the recipient pouch with the same technique. The graft was stabilized with a 7.0-nylon suture (Fig. 5B). No complications had arisen within 2 weeks post-surgery (Fig. 5C).

Because proper vertical mucosal gain was achieved at 8 months after the second graft, prosthetic treatment was started. After an impression of implant on maxillary left central incisor region and prepared adjacent lateral incisor was taken, a zirconia custom abutment was fabricated (Fig. 6). The crown-abutment margin was set up more apically than the previous abutment. The all-ceramic crowns (zirconia framework and glass-ceramic veneer material) were fixed with resin cement.

The intra-oral picture shows that the peri-implant mucosa...

Figure 4. Intraoral appearance immediately after the first subepithelial connective tissue graft.

Figure 5. (A) Intraoral appearance at 12 months after the first subepithelial connective tissue graft (SCTG): The mucosal dehiscence was partially covered by epithelium. (B) Intraoperative view in the second stage surgery: The SCTG was positioned and sutured in the pouch with normal tension. (C) Intraoral appearance at 2 weeks after the second SCTG.
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is harmonious with the right central incisor at 9 months after graft (Fig. 7). Although the interdental papilla between implant and adjacent tooth was more apical than the contralateral side, it was esthetically acceptable to the patient.

DISCUSSION

A two-step split pouch technique using an SCTG demonstrated that it was possible to achieve a substantial area of soft tissue dehiscence coverage around the endosseous implant. Burkhardt et al. [5] evaluated soft tissue dehiscence coverage using a CPF in combination with a free connective tissue graft around the implants. The soft tissue recessions were covered with a coronal overcompensation at a mean of 0.5 mm after the graft. After 1 and 6 months, shrinkage of 75% and 66%, respectively, was observed. Compared with the percentages of soft tissue coverage around the tooth [6], the implant sites clearly could not be covered consistently. A folding process further hampers vascularization of the graft and could induce extensive shrinkage.

To overcome these problems, we considered the anatomical and physiological properties of the buccal peri-implant mucosa. Burkhardt et al. [5] reported that the preoperative mucosal thickness in the implant site was positively correlated with the height of recession coverage. Nozawa et al. [7] also reported that marginal soft tissue dimensions indicated that there may be a relationship between the thickness and the height of about 1.5:1 at the platform level. The results may support the approach of acquiring thick mucosa to improve vertical mucosal regeneration. Thick soft tissue, which is obtained from the first graft, can increase the blood supply to the graft; thus, it may prevent necrosis and recession after the second graft. Furthermore, the second graft can compensate for mucosal recession after the first graft.

Coverage procedures can be categorized into pedicle grafts and free soft tissue grafts. Although pedicle grafts, such as the laterally positioned flap, double pedicle flap, oblique rotational flap and CPF have an advantage over free soft tissue grafts, there is only a limited increase in the tissue thickness and width of the keratinized gingiva. On the other hand, free soft tissue grafts, such as the free gingival graft (FGG) [8] and SCTG [9] can increase the width of the keratinized gingiva and tissue thickness. Oates et al. [10] and Roccuzzo et al. [6] reported on the advantage of the SCTG in combination with a CPF. The SCTG was statistically superior in achieving root coverage when compared to the FGG, CPF alone, guided tissue regeneration, and allogeneic tissue grafts. The CAF with envelope technique has the advantages of increasing keratinized mucosa, a better postoperative course, and a more positive esthetic evaluation than CAF with vertical releasing incisions (VRIs) [11]. The longer surgical time to complete the CAF with VRIs may have been responsible for the greater incidence of swelling and pain [12]. Furthermore, VRIs often cause unesthetic visible scars after healing that patients can find unsatisfactory. From a biologic standpoint, VRIs might damage the lateral blood supply to the flap. The blood supply to soft tissue grafts is critical for the success of the surgery.

Site-related factors such as the dimensions of the recession defect, vestibulum depth, and the level of interdental or interimplant papilla should be considered. A systematic review...
indicates that preoperative recession depth is correlated with complete root coverage [13]. Miller [14] classified the oral mucosal recession by the marginal soft tissue level and interproximal bone loss. Based on the literature, complete root coverage can be expected in class 1 and 2. However, there are no reports on the classification of soft tissue recession in dental implants. Soft tissue dehiscence of plural implants is further complicated and technically sensitive [5]. Therefore, site related factors, surgical methods, and the patient’s expectations should be cautiously taken into account.

CONFLICT OF INTEREST

No potential conflict of interest relevant to this article was reported.

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