

Enhancing the zone of keratinized tissue around implants

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Abstract

Presence or absence of a minimal zone of keratinized tissue around dental implants has been a matter of controversy. However, a consensus exists that a thick zone of keratinized zone around implants provides a prosthetic friendly environment, facilitates precise prosthetic procedures, allows oral hygiene maintenance, resists recession, and enhances esthetic blending. The aim of the present case series was to increase the zone of keratinized soft tissue around dental implants supporting overdentures. Three different surgical techniques modified palatal roll technique with and without apical positioning and connective tissue graft (CTG) were used to achieve this goal. There was a significant gain of keratinized soft tissue with all the three techniques, which remained stable over a period of 6 months. Modified palatal roll technique with and without apical positioning and CTG are simpler surgical techniques, which can be successfully and predictably used for increasing the zone of keratinized tissue around implants.

Key Words: Implant supported overdentures, keratinized tissue, modified palatal roll technique

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INTRODUCTION

Soft tissue barrier at the transmucosal passage of the implant unit plays an important role in the maintenance of stability and function of the load bearing implant. Presence or absence of a minimal zone of keratinized tissue around dental implants has been a matter of controversy.^[1,2] Many investigators have concluded that so-called attached peri-implant soft tissue does not provide any long-term advantage over alveolar mucosa.^[3,4] However, a growing number of researchers and newer systematic reviews extol its virtue, correlating it with improved soft tissue health, greater patient satisfaction, and fewer complications.^[5-7]

Keratinized tissue extends from the gingival margin to the mucogingival junction. Peri-implant tissues lack the perpendicular arrangement of the supracrestal collagen fibers, thereby creating a much weaker mechanical attachment compared to natural teeth. Hence, a wider keratinized tissue zone ensures a long-term success of the dental implant.^[8,9]

Several techniques have been advocated to increase keratinized tissue surrounding implants, including free gingival grafts (FGGs) and connective tissue grafts (CTGs), pedicle grafts (PGs), apically positioned flaps (APFs).^[10-12]

Modified palatal roll technique described by Abrams and later modified by Scharf and Tarnow can be performed during implant placement, second stage surgery or at the time of delivery of the final prosthesis.^[13,14]

Apically repositioned flap as described by Friedman has been successfully used to increase the width of attached gingival around natural teeth, this can be modified and used around implants in cases with thick gingival biotype, it has the advantage of low morbidity (as it precludes the need

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of second surgical site), and results in an aesthetic color blending.^[15]

Connective tissue graft introduced first by Edel in 1974 is a highly predictable surgical procedure indicated to increase the attached gingiva, root coverage, and ridge augmentation around natural teeth. CTG has numerous indications around implants where it is used to cover dehiscences, to increase soft tissue during guided bone regeneration procedures, in socket preservation, and to increase keratinized tissue in deficient sites.^[16]

This case series describes three different surgical techniques, modified palatal roll technique with and without apical positioning, and CTG to increase the zone of keratinized soft tissue around dental implant-supported overdentures.

CASE REPORTS

Case 1

A 65-year-old male patient was referred from Department of Prosthodontics to Department of Periodontics, Sri Rajiv Gandhi College of Dental Sciences, Bengaluru, for evaluation of soft tissue around implants. Clinical examination with roll test performed with periodontal probe revealed inadequate keratinized tissue around the implants placed in the region of 33 and 43 which was evident by bunching up of alveolar mucosa [Figure 1]. Modified palatal roll technique modified for mandible^[14] was planned in the region of 33 to increase the keratinized gingiva, the mucosa covering the implant was first demarcated with a horizontal incision onto the lingual aspect of the implant and two vertical incisions with number 15-c blade. Deepithelialization was done on the flap within the incision using rotary burs, then a full-thickness flap was raised to expose the implant and a buccal pouch was created between the buccal flap and mucoperiosteum. Rectangular portion of the raised flap was then folded into the pouch and sutured using 4-0 vicryl suture.



Figure 1: Inadequate keratinized tissue around implants at 33 and 43

A similar surgical procedure was performed on 43, with a modification of apically displacing the buccal pouch which was prepared using a horizontal incision on to the lingual aspect of the implant and two vertical incisions with number 15-c blade. Deepithelialization was done on the flap within the incision using rotary burs, then a full thickness flap was raised to expose the implant and a buccal pouch was created between the buccal flap and mucoperiosteum, thereafter periosteal separation was done to displace the flap apically, rectangular portion of the raised flap was then folded into the pouch and sutured using periosteal suturing and to the adjacent tissues using 4-0 vicryl sutures.

Periodontal dressing Coe Pak was applied over the surgical site. The patient was prescribed with antibiotic therapy, that is, amoxicillin 500 mg, thrice a day and analgesic, that is, ibuprofen 400 mg twice a day for 5 days. Toothbrushing was discontinued for the first 2 weeks at the surgical site and 0.2% chlorhexidine mouth rinse was instructed until 2 weeks after surgery. Coe Pak was replaced every week for 4 weeks after the surgical procedure. Sutures were removed after 2 weeks. Healing was uneventful with minimal postoperative discomfort to the patient. After 1-month patient was recalled at 3 months and 6 months for follow-up.

Six months postoperatively, there was an increased zone of keratinized tissue around both the implant sites [Figures 2-5].

Case 2

A 61-year-old female patient who presented with recurrent inflammation around a loaded implant supporting an overdenture placed in the region of 33, was referred from Department of Prosthodontics to Department of Periodontics, Sri Rajiv Gandhi College of Dental Sciences, Bengaluru for evaluation of peri-implant tissues. Clinical examination with roll test performed with periodontal probe revealed inadequate keratinized tissue around the implants placed in the region of 33 which was evident by bunching up of alveolar mucosa revealing implant to be surrounded by thin unattached mucosa

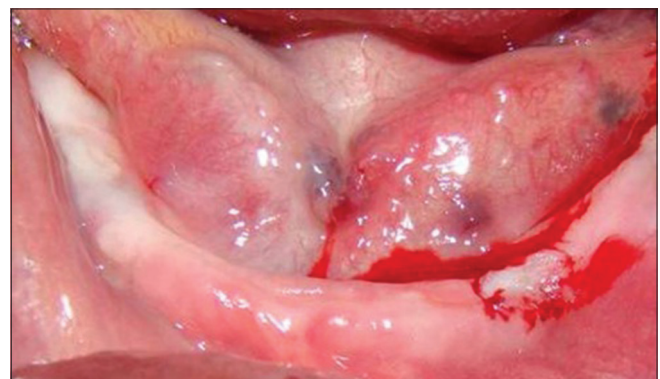


Figure 2: Horizontal and vertical incisions outlining the surgical area

on the buccal aspect [Figure 6], so it was planned to increase the zone of keratinized tissue by a pouch technique utilizing a CTG harvested from palate. A horizontal incision was made at the buccal aspect of the implant and a supra-periosteal pouch was created using number 15-c blade, tin-foil template was prepared, was transferred to the palatal donor site to harvest the graft using trap door technique^[16] utilizing a horizontal incision 3–4 mm away from the gingival margin with two vertical incisions on the either end of the first incision, creating a door, the door is then undermined and opened using a sharp dissection, the underlying connective tissue is then harvested using a periosteal elevator, and the door was then sutured using 4-0 silk sutures. Graft was then transferred to the recipient site and sutured to the periosteum. Buccal flap was then sutured apically with 4-0 silk sutures [Figure 7].

Periodontal dressing Coe Pak was applied over the surgical site. The patient was prescribed with antibiotic therapy, that is, amoxicillin 500 mg, thrice a day and analgesic, that is, ibuprofen 400 mg twice a day for 5 days. Toothbrushing was discontinued for the first 2 weeks at the surgical site and 0.2% chlorhexidine mouth rinse was instructed until 2 weeks after surgery. Coe Pak was replaced every week for 4 weeks after the surgical procedure. Sutures were removed after 4 weeks. Healing was uneventful with minimal postoperative discomfort to the patient. After 1-month patient was recalled at 3 months and 6 months for follow-up.

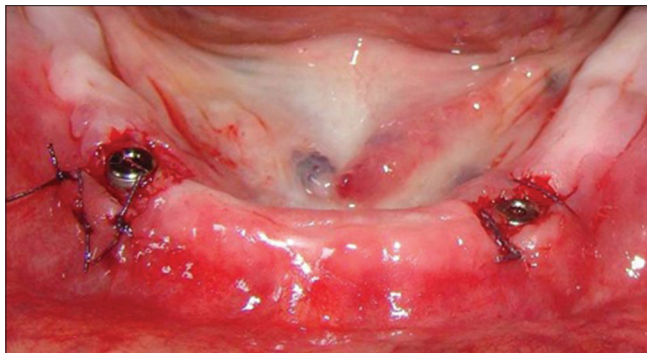


Figure 3: Flaps sutured, apically displaced flap at site 43



Figure 5: Cuff of keratinized tissue around implants at both the sites

Six months postoperatively, there was an increased zone of keratinized tissue [Figure 8].

RESULTS

Six months postoperatively, there was an increased zone of keratinized tissue with all the three techniques utilized which was free from inflammation.

DISCUSSION

Over time, different surgical procedures have been advocated to augment keratinized tissue around natural teeth and implant restorations. Each technique has its own inherent advantages and limitations. Thorough knowledge of these techniques helps the surgeon in the appropriate selection in specific indications. Conventionally described techniques are CTG or FGG, PG, APF.^[10-12] First described by Abram's and later modified by Scharf and Tarnow described palatal roll flap technique for increasing the zone of keratinized tissue. Modified palatal roll flap procedure is an easy surgical approach to increase the zone of keratinized tissue, which does not require a second surgical site, and has an advantage of pedicled blood supply but can only



Figure 4: Six months post-operative, increased keratinized tissue around implants at both the sides



Figure 6: Pre-operative, lack of keratinized tissue around the implant placed at the site 33

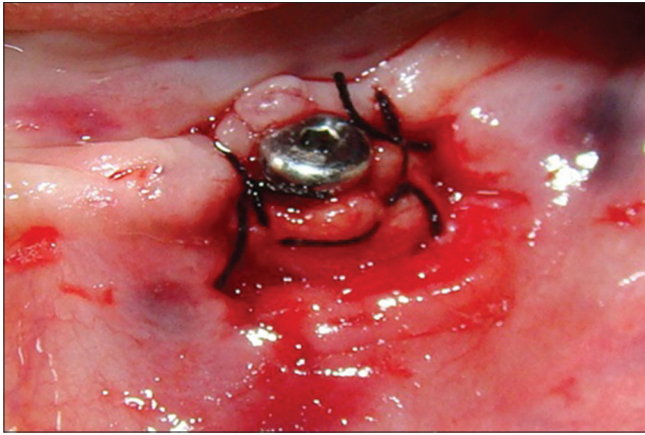


Figure 7: Graft transferred into the buccal pouch and sutured, buccal pouch positioned apically



Figure 8: Six months post-operative, increased zone of keratinized tissue around implant

be undertaken for mild to moderate augmentation, however it can only be used in situations with thick tissue overlying the implant which was case in the first patient, however with respect to the implant placed at 43 modified palatal roll technique was used with apical positioning so as to compare the increased keratinized tissue achieved with both the techniques.^[13,14] CTG is an alternative in cases where there is a lack of keratinized tissue around implants, but it has the drawback of requiring a second surgical site and is technically demanding. This technique was utilized for the second patient as the implant was already in use and there was no tissue covering the implant to be utilized for modified palatal roll technique.

CONCLUSION

When planning for implant restorations, a preoperative assessment of the width and thickness of keratinized tissue is an important step. When necessary, keratinized mucosa augmentation should be done prior to implant placement or at the second stage. To summarize in spite of conflicting data in the literature most experienced clinicians agree that an adequate zone of attached tissues with intimate adaptation to the emerging implant structures is critical for long-term success of an implant restoration in a partially and fully edentulous patients.

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