Management of advanced gingival recession defects in mandibular anterior teeth using gingival unit graft - Case Series

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Abstract

Objectives: Gingival recession leads to exposure of the root surface of the tooth due to apical migration of marginal gingiva relative to the cement-enamel junction. The increased incidence of recession has become a major concern for clinicians as dentinal hypersensitivity, esthetic issues and root caries are often associated with root exposure. Free gingival grafts are commonly used to augment attached gingiva. Gingival unit transfer is a variant of free gingival graft that was used in this case series to increase the width of attached gingiva simultaneously improving root coverage. **Methods:** This case series describes the clinical effectiveness of a gingival unit graft harvested from palate, in the treatment of RT2 gingival recession defects with respect to mandibular anterior teeth in three subjects. Clinical parameters such as recession depth (RD), width of attached gingiva (WAG) and keratinized tissue (KTW) were evaluated at baseline and post surgery. Root coverage percentage (RC%) was calculated at the end of each follow up period respectively. **Results:** At the end of the two-year follow-up period, patient 1 had 100% root coverage. At 18 months, patient 2 had partial root coverage ranging from 50 to 75% in different sites. Complete marginal root coverage was attained in patient 3 at 6 months without significant improvement in papillary height. KTW and WAG were improved in all individuals, along with gain in clinical attachment. **Conclusion:** GUT treatment resulted in improvement in KTW and vestibular depth with varied percent of root coverage in advanced mandibular recession defects.

Keywords: 1.Gingival Recession, 2.Gingiva, 3.Blood supply, 4.Mandible, 5.Palate

Introduction

Gingival recession in mandibular anterior region is often associated with aberrant frenal attachment, shallow vestibular depth and insufficient width of attached gingiva complicating oral hygiene maintenance.[1] Although many treatment options like free gingival graft (FGG), connective tissue grafts (CTG), pedicle flaps had showed significant clinical improvement,[2] preference of one technique over others depends on multiple factors which include site specific, patient specific characteristics and technique itself. Deo et al in a systematic review stated that FGG is the best option to treat gingival recession associated with shallow vestibule and inadequate width of attached gingiva.[3] Due to its inherent limitations of aesthetics, various modifications in the donor and recipient sites are being done to overcome the limitations.[4-7]

The blood vessels that predominate in the gingiva decrease in size and increase in number as they progress towards marginal and interdental gingiva. In the absence of inflammation, the vasculature is characterized by a well-organized interconnected vascular plexus with numerous capillaries that form loops extending toward the gingival margin. Marginal gingiva is rich in vascular plexus with horizontal anastomoses which do not extend on to the interproximal area.[8-10]

The synergistic relationship between recipient site and donor tissue vascularity is the significant factor in the management of gingival recession defects.[11] Site specific vascular perfusion can be benefited by inclusion of marginal and interdental papillae in the graft that could probably achieve the rapid anastomosis of the recipient site capillaries with the injured vessels of the graft.

Gingival unit graft is a variant of FGG. This technique was first described by Allen AL and Cohen DW in which palatal marginal gingiva and interdental papillae are also included in the obtained graft without increasing the graft thickness.[12] The current case series describes the clinical efficacy of gingival unit graft in management of RT 2 recession defects in three subjects

Case presentation

Patient 1

A 32-year-old female patient reported to the Department of Periodontology, SRM Dental college, with the chief complaint of sensitivity and receded gums in the lower front teeth region. There were no systemic disorders, drug allergies, or hospitalizations in the past medical history, and there were no contraindications to periodontal surgery. Patient is a non-smoker and exhibited acceptable oral hygiene status with minimal plaque deposits. Periodontal examination revealed generalized probing sulcus depth in the range of 1-3mm, localized gingival recession with marginal tissue inflammation with respect to 31.(Fig 1 a) Gingival recession had progressed all the way to the mucogingival junction (MGJ) resulting in loss of attached gingiva. In the interproximal area of 31, there was also minor interdental soft tissue loss and an abnormal labial frenum attachment. Intra oral peri apical radiograph(IOPA) revealed interproximal crestal bone loss in relation to 31.(Fig 1b) 31was diagnosed with an RT2 recession defect based on clinical and radiographic data.

Patient 2

A 38 year old male patient complaining of receding gums in lower front teeth, visited the Department of Periodontology, SRM Dental college. The patient was a nonsmoker who had no medical history or pharmacological allergies. In regard to 31, 41, and 42, clinical examination revealed moderate plaque and calculus deposits, gingival recession, and aberrant frenum with shallow vestibule. Recession depths of 3mm, 5mm, and 4mm were measured at 31, 41, and 42, respectively, with a probing pocket depth of 1mm. There was a minor distal rotation of 42. With regards to 41,42, IOPA demonstrated bone loss up to the intersection of the middle and coronal third of root. Grade I mobility was observed in 41 and 42. RT2 Gingival recession was diagnosed as these sites were also associated with interdental papillary loss (Fig:2 a).

Patient 3

A 35-year-old woman presented with a primary complaint of sensitivity and bleeding gums in the lower front tooth region. The patient was otherwise healthy, with no prior dental history or drug allergies. On clinical examination, the patient showed poor dental hygiene with deposits and generalised bleeding on probing. 31 and 41 exhibited localised gingival recession of 4mm and 2mm, papillary loss with aberrant frenal attachment and shallow vestibule, respectively. IOPA revealed crestal bone loss, and the patient was diagnosed with RT2. (Figure 3 a, 3b)

Treatment

All patients were given a comprehensive understanding of their clinical situation and treatment alternatives. Gingival unit grafts harvested from the palate were planned in the surgical therapy of recession. **The treatment strategy was explained to the patients, and written informed consent was obtained. Treatment protocol was in accordance with the Helsinki declaration.**

Baseline clinical parameters such as recession depth (RD), probing pocket depth (PPD), clinical attachment level (CAL) and keratinized tissue width (KTW), were measured with a calibrated UNC-15 periodontal probe guided by a customized composite stent. The measurements were rounded to the nearest millimeter. Subjects were reviewed after 4 weeks and scheduled for the surgical procedure after completing phase I therapy, which included scaling, root surface debridement, oral hygiene instructions, coronoplasty and splinting, in required sites.

Surgical procedure

Recipient site

The surgical procedure was performed under 2% lignocaine, 1:80,000 adrenaline. Two vertical bevelled divergent and oblique incisions were made mesial and distal to the defect, reaching 3 to 4mm apically to MGJ. A horizontal incision was used to join the vertical incisions at the base, releasing labial frenal attachment at the same time. Frenal tissue attachments in the area outlined were eliminated by sharp dissection.The outline of the recipient site was trapezoidal with a broad base that was 5mm from the most apical part of recession.The interdental papillae were deepithelialized exposing the connective tissue bed. The exposed root surfaces were debrided and planned with area specific gracey curettes and rinsed with sterile saline solution.(Fig:1 c, Fig:2 b,Fig:3 c)

Donor site

After the greater palatine nerve block, gingival unit grafts were taken from the palatal aspect of maxillary premolars in all three patients. Dimensions of the procured graft were in accordance with recipient site dimensions in terms of number of involved teeth included for recession coverage involving the marginal gingiva and interdental papillae. Excess fatty glandular tissue was trimmed off from the undersurface of the grafts if present and the thickness of the grafts were in the range of 1 to 1.5mm (Fig:1e, Fig:2 c, Fig:3 d).

The graft was then contoured, adapted and on to the recipient bed at the level of CEJ (Fig:1 f, Fig:2 d,Fig:3 e) with simple interrupted sutures at the margins using 4-0 resorbable sutures. Periosteal anchoring sutures and mattress sutures were additionally placed to secure the intimate contact of the graft over the recipient bed (Fig:1 g, Fig:2 e, Fig:3 f). Non eugenol Periodontal dressing was placed at both donor and recipient sites (Fig:1 g)

Postsurgical care

Antibiotics (amoxicillin 500mg, 8hrly) and analgesics (paracetamol 500mg, 8hrly) were administered for 5 days following surgery. Patients were advised to refrain from brushing and chewing hard food for 4 weeks. Use of 0.12% chlorhexidine mouth rinse twice daily was recommended for 1 month.At the end of two weeks, the periodontal dressing and sutures were removed. Recall appointments were set at four weeks, and once in every three months after that.

Results

In all three cases, the donor and recipient sites healed without any complications after surgery. Patient 1 had 100 percent root coverage at 31 that lasted up to the 2yr follow up period. The KTW increased to 6mm from 2mm at baseline, contributing to an increase in the vestibular depth. The graft's colour match with the surrounding tissues was satisfactory in terms of aesthetics. Patient 2 had 75% root coverage in 41 and 50% at 31 and 42 respectively. This may be attributed to the presence of moderate bone loss at baseline. KTW and vestibular depth were increased notably from baseline. (Fig:2 f) The colour match with the adjacent tissues was acceptable at the end of 18months. Though patient 3 had a 100% marginal recession coverage, interdental papillary loss was persistent post surgery. (Table 1)

Discussion

The outcomes of GUT were well studied in Miller's class I and II recession defects and limited case reports mentioned its benefits in class III recession. Kuru B and Yildirim S (2013) in an RCT investigated GUT and FGG in treating millers class I and II in mandibular anterior recession defects and concluded that GUT provided the better aesthetic, clinical and root coverage compared to FGG (RC% 91.62% ± 9.74% and 68.97% ±13.67, $p < 0.05$) at 8 months follow up.[13] In another RCT, Jenabian et al (2016) evaluated GUT and FGG in localized millers class I and II recession defects at 1, 3 and 6 months and suggested that though both the modalities achieved significant improvement in clinical parameters, GUT resulted in greater satisfaction esthetically at all three time points (p=0.05,0.024,0.024).[14] In a case report by Kuru B and Yildirim S (2015) examined FGG and GUT in mandibular anteriors millers class III defects and at 8 months follow up the authors concluded that GUT achieved better root coverage associated with creeping attachment.[15] In a case report (2018), millers class III recession with respect to 31 and 41 treated with GUT achieved complete root coverage.[16] In a recent RCT with a split mouth design conducted by Sriwil M etal (2020), 30 localised millers class I and II recessions were treated either with FGG or GUT. Both the treatment modalities achieved statistically significant root coverage at both 1 and 6 months, wherein there was a greater root coverage percentage and gain in clinical attachment in GUT treated sites at both time points and higher KTW gain at 1 month ($p<0.05$).[17]

This case series describes the clinical efficacy of GUT in RT2 recession defects. Creeping attachment is the coronal movement of marginal gingiva post operatively and this phenomenon was observed in the present case series. Isolated recession defect in patient one had creeping attachment and achieved 100% root coverage that was stable up to 2yrs. In patient 2, the irregular alignment, presence of bone loss and mobility might have compromised RC%. However, the outcomes are in accordance with the outcomes achieved by Kuru B and Yildirim S.[15] Inclusion of marginal and papillary gingiva in the graft would have resulted in good color adaptation and enhanced root coverage. The finding of this research in terms of aesthetics, vestibular depth, and increase the width of keratinized tissue along with acceptable RC% suggest the beneficial role of GUT in advanced areas of recession owing to its site specific vascular supply.

Conclusion

The observations in this case series indicate that GUT may be considered as a surgically predictable procedure for the management of RT2 recession defects in the mandibular anteriors. However presence of malocclusion, root prominences and tissue thickness are critical factors which could affect the treatment outcome. Further clinical studies with large sample size, in comparison with FGG would be needed.

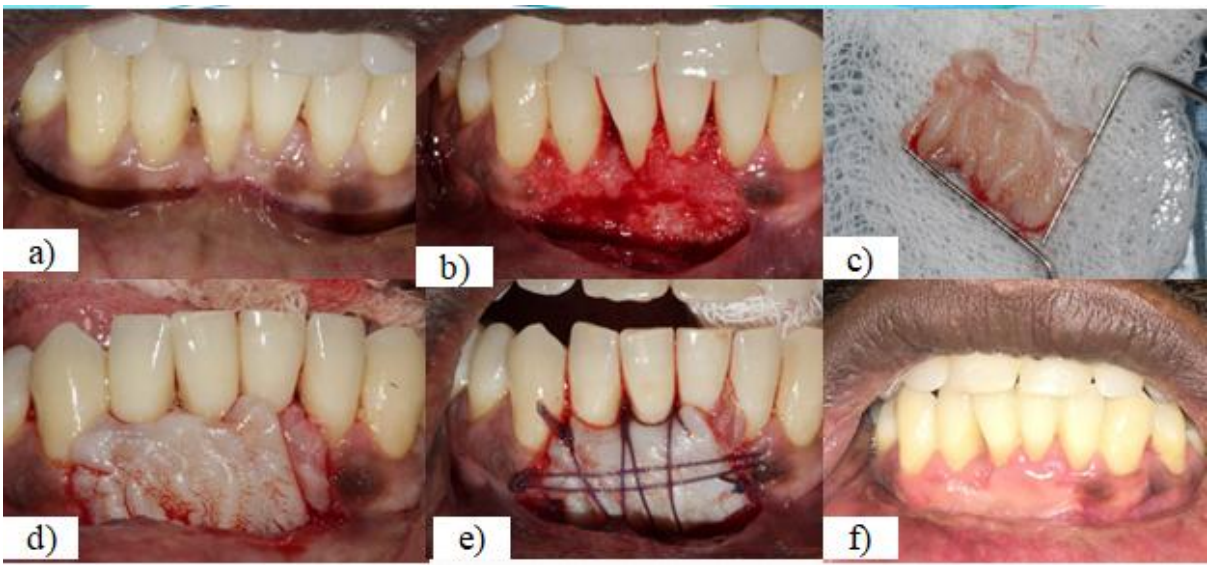
Tables:

Table 1: Table 1 showed the variations of study parameters during the observation period

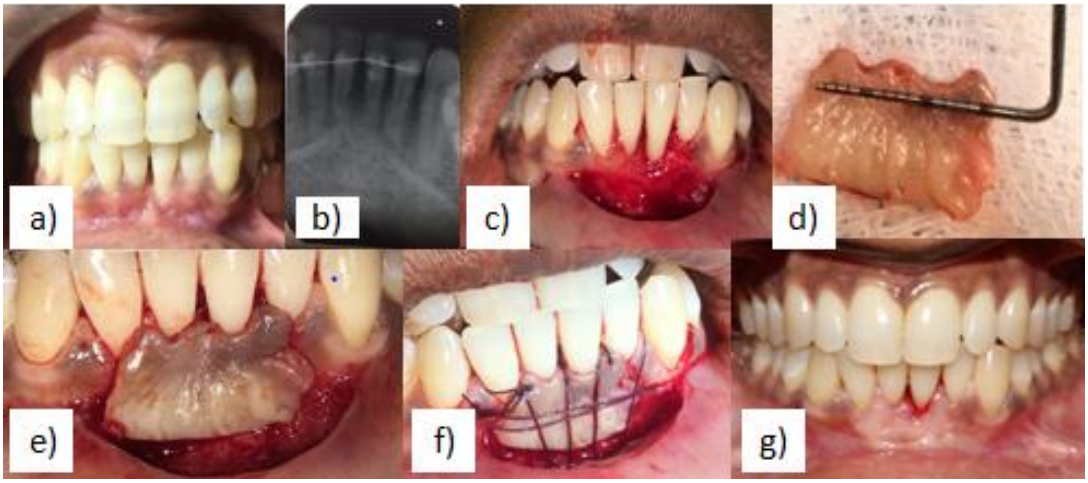
Clinical parameter	Baseline					End of review					
	RD	WAG	KTH	PPD	CAL	RD	RC%	WAG	KTH	PPD	CAL
Patient 1 (End of review- 24 months)											
31	5	0	2	2	7	0	100%	5	7	1	0
Patient 2 (End of review-18 months)											
31	3	2	3	1	4	1	66.67%	4	5	1	2
41	5	0	1	1	6	2	60%	3	4	1	3
42	4	1	2	1	5	2	50%	3	4	1	3
Patient 3 (End of review- 6 months)											
31	4	0	1	1	5	1	75%	3	4	1	3
41	2	2	3	1	2	0	100%	4	5	1	1

Figures:

Patient 1
Fig:1 a) preoperative view b) pre operative IOPA c) recipient bed preparation d) evaluating palatal tissue thickness e) GUT f) adaptation of graft g) securing with sutures h) periodontal pack application i) post operative view at 1 month j) donor site at 1 month k) post operative view at 6 months



Patient 2
Fig:2 a) preoperative view b) recipient bed preparation c) graft dimensions d)graft adaptation e) securing with sutures f) post operative view at 6 months



Patient 3
Fig:3 a) preoperative view b) pre operative IOPA c) recipient bed preparation d) graft dimensions e) graft adaptation f) securing with sutures g) post operative view at 6 months

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