

Inverted T Shape Free Gingival Graft for Treatment of RT3 Gingival Recession Defects: Reporting of Two Cases

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Running Title: Inverted T-shape soft tissue graft.

Summary: The inverted T-shape soft tissue graft may be a valuable technique for papillary reconstruction in the challenge RT3 recessions.

ABSTRACT:

Introduction: One of the most challenging aspects of treating gingival recession type 3 (RT3) is reconstructing lost interdental papilla, which is directly related to the loss of interproximal bone.

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Free gingival graft (FGG) has been successfully used to increase the width of keratinized tissue (KTW) with minimal trauma to the interdental papilla; creeping attachment also plays an additional role in improving the results.

Case Presentation: The included two case reports suggest a novel technique using a FGG that shaped in an inverted T-shape to achieve partial root coverage, improve the compromised interdental papilla, and increase the keratinized tissue width in RT3 defects.

Conclusions: This report presents a novel yet intuitive surgical technique for partial coverage of RT3 defects and reconstruction of the interdental papilla.

Key Words:

Gingival recession; Gingival diseases; Periodontal disease; Humans.

BACKGROUND

Unlike recession type (RT)1 and to an extent RT2, treatment of RT3 gingival recession is unpredictable due to severe interdental soft and hard tissue loss, and generally has very poor therapeutic prognosis^{1, 2}. Researchers and clinicians have been working to discover novel, more efficient surgical techniques to gain more predictable results^{3, 4}. The first use of free gingival graft (FGG) for treatment of Miller class IV were by Miller and Binkley in 1986 to achieve ridge augmentation and root coverage⁵. Many changes have been made since then to improve the predictability outcomes. A connective tissue graft containing marginal gingiva as a free gingival unit graft (GUG) was utilized over de-epithelized papilla with an adequate papilla base. This provides a greater blood supply for the graft and subsequently contributes to improved proximal tissue quality and predictability of root coverage of Miller Class III(RT2) and Class IV(RT3) sites^{4, 6}. Other authors reported recession reduction and keratinized tissue width (KTW) gain among GUG group compared with conventional FGG group⁷. This report describes a novel technique through which a FGG with a lingual extension in a shape of an inverted T is utilized to improve the of clinical attachment, gain partial root coverage, improve KTW, with deepening the vestibule.

Thus, the aim of this report was to demonstrate 2 cases done using the innovative “inverted-T” technique for treatment of RT3 gingival recession defects [Figure 1,2].

Case 1

Clinical Presentation:

A 43-year-old female presented at Al-Hussain private dental clinic, Tripoli, Libya in 2020 with the chief complaint of a long-standing recession on teeth number 24, 25. Medical history revealed no significant findings. Relevant dental history showed compromised oral hygiene, and difficulty in toothbrush in this area. The completed periodontal examination included probing depth (PD), clinical attachment level (CAL), KTW, and recession depth (RD) (distance between CEJ and the most apical point of gingival margin). Clinical examination revealed generalized gingival inflammation with marginal tissue recession in teeth number 24 and 25 associated with aberrant frenulum, loss of papilla and a decreased KTW. Spacing and mild proclination was noted too. Intra oral periapical radiograph of region 23-26 found horizontal bone loss extending to the apical one-third of the root. Based on the clinical and radiographic findings, the patient was found to be localized Stage III Grade B Periodontitis with localized gingival inflammation related to teeth 23-26⁸. A diagnosis of RT3 was given to teeth #23 and 24 [Figure 3a, b].

Surgical Case Management:

The treatment plan was explained, and a written informed consent was obtained before treatment. A composite splint was constructed after surgery. The preparation of the recipient site commenced by making a horizontal incision at the mucogingival junction (MGJ) as well as two vertical incisions extending to the adjacent teeth and about 3 to 4 mm beyond the MGJ. A sharp split-thickness flap was reflected, and the surfaces between these incisions were de-epithelialized [Figure 3c]. Also, all the surfaces of interdental papilla up to the lingual side were de-epithelized using 15c blade and microsurgical scissor. The exposed surface of the root was planned with hand instruments and rinsed with saline only.

The palatal donor site was designed 2 mm away from the gingival margin using template in the form of inverted T-shape and harvested from the palatal aspect of the maxillary molars [Figure 3d, e]. Care was taken to obtain an even thickness of 1-1.5mm. Final graft length was about 12 mm and width was 4mm with 3mm extension for interproximal papilla. In cases with full dentition, the 3mm extension of the harvest should extend towards the mid-palatine raphe and stay at least 2mm away from the marginal gingiva [Figure 1].

Next, the graft was contoured, adapted, and sutured at the level of the base of interdental papilla [Figure 3f]. The sutures were removed after 2 weeks [Figure 3g-i]. For the first 3 weeks, the patient was advised not to brush at the surgical site, avoid hard food, and rinse once daily with 0.2% chlorhexidine digluconate mouthwash. Resuming gentle brushing using a soft toothbrush was allowed after. Postsurgical recalls were scheduled every other week during the first month and then every three months following the surgery [Figure 3j-m].

Case 2

Clinical Presentation:

A 49-year-old female patient presented at Al-Hussain private dental clinic, Tripoli, Libya in 2020 with the same chief complaint as case 1 in addition to some esthetic concerns. Teeth 24, 25 had advanced horizontal bone loss within the coronal one-third of the root. Patient was a Generalized Stage II Grade B Periodontitis⁸. The diagnosis of the mucogingival defect at teeth 24 and 25 was RT3 [Figure 4a-d].

Surgical case management:

Same steps taken in Case 1 were performed here except at donor site the design of the extension was at palatal side with the base of the inverted-T was at gingival margin 2mm away [Figure 4e-j]. Composite restorations were made in this case to give an illusion of reduced interproximal space and to move the contact point apically, which gives an illusion of full papillary fill and may help future creeping of interdental papilla after its augmentation utilizing this technique [Figure 4k, l].

DISCUSSION

Conventional FGG is primarily to increase KTW and lengthen the vestibular depth and much less frequently for root coverage in select cases^{5,9,10}. Camargo et al. proposed that traditional thin FGG grafts showed a high rate of success for treatment of mild to moderate gingival defects¹¹. The present case demonstrates an innovative technique based on further extension of the graft to increase its survival, which was described before by Allen and Cohen as a gingival unit graft or "GUG"⁶. Despite the severity of interproximal bone loss, this technique resulted in improved interproximal tissue quality, partial root coverage and increased KTW [Table 1]. An important aspect of this technique is the presence of adequate interproximal space that allows the extension of the graft to the lingual gingiva and suture it there. A previous study reported a reduction in recession, attachment and KTW gain using GUG versus conventional FGG group³. A randomized controlled trial

done in 2020 showed that using a modified GUG for treatment of Miller class III recession defects provided better defects coverage than conventional FG⁹. Additionally, we noted that better improvement in vertical recession reduction at 1year follow-up, thanks to the creeping attachment phenomenon.

<p>Why is this case new information?</p>	<ol style="list-style-type: none"> 1. Reporting innovative technique with interproximal extension of the free gingival graft that sutured lingually with the lingual marginal gingiva. 2. Improve interdental clinical attachment phenotype and height. 3. More predictable root coverage because of increases vascularized interproximal bed for the graft to be survived.
<p>What are the keys to successful management of this case?</p>	<ol style="list-style-type: none"> 1. Having at least 2mm interproximal space for graft survival. 2. Good Extension with proper fixation of the lingual part of the graft, and stabilization of the graft.
<p>What are the primary limitations to success in this case?</p>	<ol style="list-style-type: none"> 1. limited capacity for perfusion and survival of the lingual extension due to limited vascularity. 2. More investigations are necessary to confirm the validity of this technique.

FIGURE LEGENDS

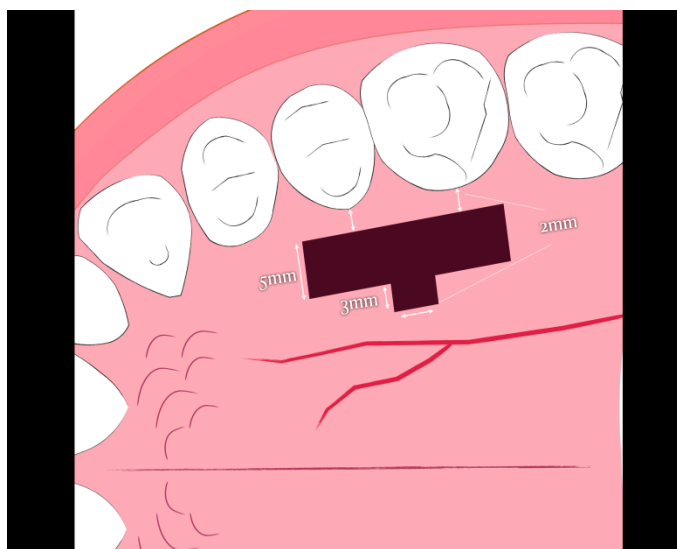


Figure 1. showing the design of the inverted T shape with respect to the marginal gingiva with 2mm away, also taking into consideration position of the greater palatine blood vessels with 5mm. 2mm is required for the width of the interproximal extension with 3mm length.

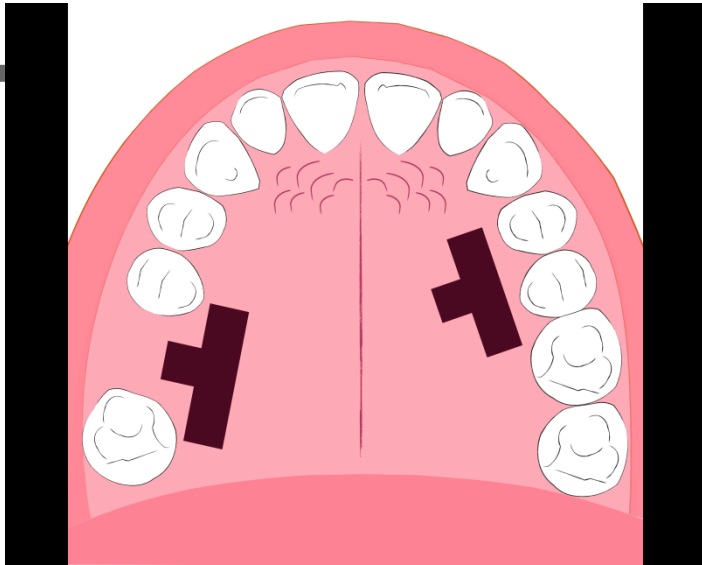


Figure 2. showing the inverted T shape FGG either taking the advantage of edentulous area with the base located inferiorly or with the base located superiorly as in dentulous area.



Figure 3: 43y old female. Clinical and radiographic examination revealed RT3 gingival recession. **a)** periapical radiograph showing the pattern and level of bone loss. **b)** clinical photo showing the degree of the root recession, deficiency in width of keratinization, high

frenulum attachment with a diastema **c)** vestibular incision with de epithelization of the interdental papilla to increase the surface area of the recipient bed **d)** FGG in the form of inverted T was harvested **e)** site of the hard palate after graft harvesting with the extension in superior edentulous area **f)** inverted T FGG inserted between the teeth to cover interproximal tissue defect and sutured lingually into the lingual marginal gingiva **g)** immediate postoperative after suturing **h)** 2 weeks follow up showing the healing of FGG with integration of the interproximal part **i, j)** showing 6 months follow up **k, l)** 1year follow up.

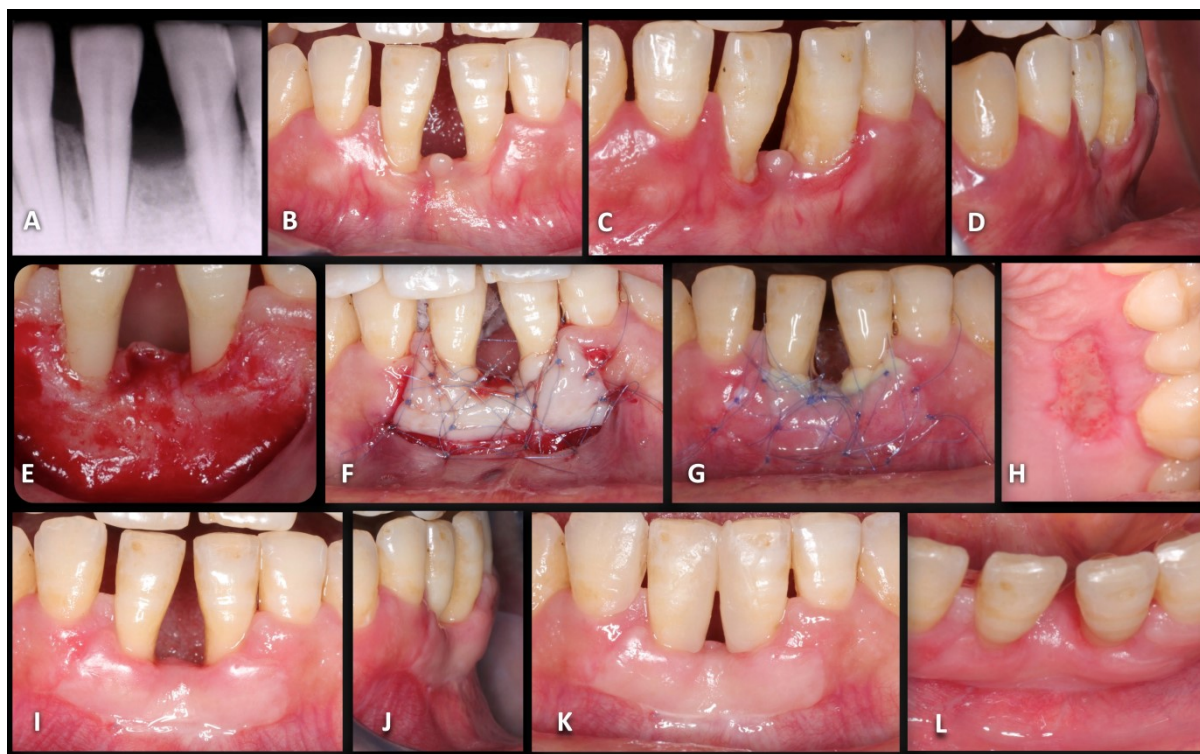


Figure 4: 49y old female. Clinical and radiographic examination revealed RT3 gingival recession. **a)** periapical radiograph showing the pattern and level of bone loss. **b, c, d)** clinical photos showing the degree of the root recession, deficiency in width of keratinization, high frenulum attachment, with a diastema from the front and lateral views **e)** vestibular incision with de epithelization of the interdental papilla until the lingual side to increase the surface area of the recipient bed and prepare the tissue for receiving the inverted T FGG **f)** inverted T FGG inserted between the teeth to cover interproximal tissue defect and sutured lingually into the lingual marginal gingiva **g)** 2 weeks follow up showing the healing of FGG with integration of the interproximal part with slight marginal necrosis for the part over the root **h) 2-week healing of the palatal donor site i, j)** showing 6 months follow up **k, l)** 1year follow up after restorative work to minimize the diastema between the roots.



Figure 5.

Table 1: Baseline and re-evaluation data for tooth number 24, 25 in both cases.

Table 1: The tabular column shows the baseline and re-evaluation data for tooth number 24, 25. PD: Probing depth, CAL: Clinical attachment level, VR: Vertical recession, KTW: Keratinized tissue width

Parameters tooth no# 24 (mm)	After phase I therapy	After 3 months	Difference/Gain	Parameters tooth no# 25 (mm)	After phase I therapy	After 3 months	Difference/Gain
Case 1							
PD	2	1	1	PD	1	1	0
CAL	5	2	3	CAL	6	2	4
VR	3	2	1	VR	5	2	3
KTW	2	4	6	KTW	1	4	5
Case 2							
PD	1	1	0	PD	1	1	0
CAL	4	2	2	CAL	5	2	3
VR	3	2	1	VR	4	2	2

KTW	0	4	4	KTW	1	4	5
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Disclaimer/Conflict of interest: The authors declare they have no conflict of interest with this study. The authors do not have any financial interests, either directly or indirectly, in the products or information listed in the paper.

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