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Research Article

SUBEPITHELIAL CONNECTIVE TISSUE GRAFT

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ABSTRACT

Gingival recession possesses a concern for a patients and a therapeutic problem for clinicians. Recession is the common finding in most of the patients visiting dental clinics. Millers Class I and Class 2 recessions can be treated surgically with predictable results. Procedure with subepithelial connective tissue graft has given good and esthetically pleasing results. Various surgical procedures have been done by harvesting free gingival graft which has tire patch appearance which is esthetically unpleasant, so this review has highlighted the positive points on the use of subepithelial connective tissue graft technique for the root coverage procedures.

INTRODUCTION

This procedure is the single most effective way to achieve anticipated root coverage with a high degree of cosmetic enhancement. Historically, the underlying gingival connective tissue has been shown to be a viable source of cells for repopulating the epithelium (Karring and colleagues, 1971) and somewhat anticipated source for increasing the zone of keratinized gingiva (Edel, 1974; Becker and Becker, 1986). Langer and Langer (1985) introduced and outlined the indications and procedures necessary for achieving success with the SCTG. Nelson (1987) modified the procedures to further enhance clinical predictability (≥ 90%). The technique gains its clinical predictability by use of a bilaminar flap (Nelson 1987; Harris, 1992) designed to ensure graft vascularity and a high degree of gingival cosmetics from the secondary intention healing of the connective tissue graft. This seems to avoid the tire patch look often associated with FGG's. Jehnke and colleagues (1993) in comparing FGG to SCTGs, found the connective tissue graft to be significantly ($p<.03$) more effective than FGG (Wennstrom, ?).

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Advantages of Subepithelial connective tissue graft

- Esthetics
- Predictability
- One-step procedure
- Minimum palatal trauma
- Multiple recession coverage
- Increased graft vascularity

Disadvantages

- High degree of technical skill

Indications of SECT

- In Millers Class I and class II recession
- Coverage of single and multiple teeth

Contraindications of SECT

- Broad shallow palates

Procedure for the subepithelial connective tissue graft (Langer and Langer's technique)

The procedure is basically a combination of a partial-thickness coronally positioned flap and a free connective tissue graft

Recipient site preparation

A no. 15 scalpel is used to outline the surgical site, making sure to raise the partial thickness flap. The scalloped papillary incisions must be made above the CEJ to get total root coverage and so that an adequate bleeding surface is prepared. (Fig 1, A & B). The vertical incisions are extended into the mucosal tissues to permit coronal positioning of the flap. The partial thickness flap is raised by sharp dissection. Fig 1- C Apically, the undersurface of the flap is released from the underlying periosteum via a horizontal incision. This will permit coronal positioning of the flap (Cosmetic gingival reconstruction in Atlas of cosmetic and reconstructive periodontal surgery).

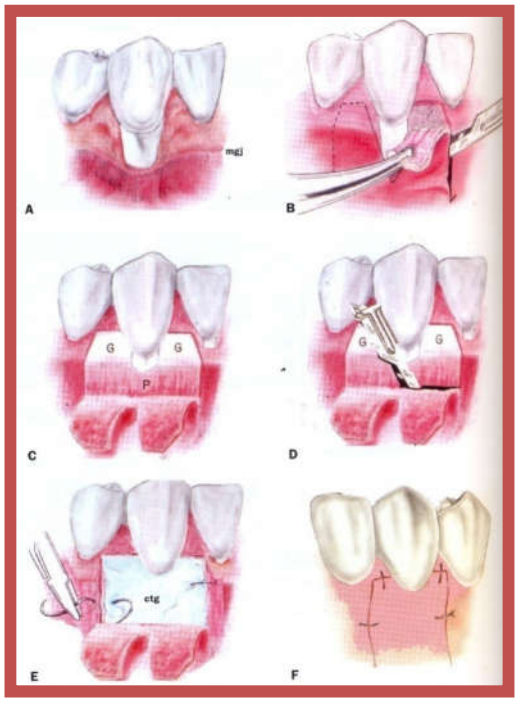

Fig. 1.

Donor site preparation (Takei et al., 2006)

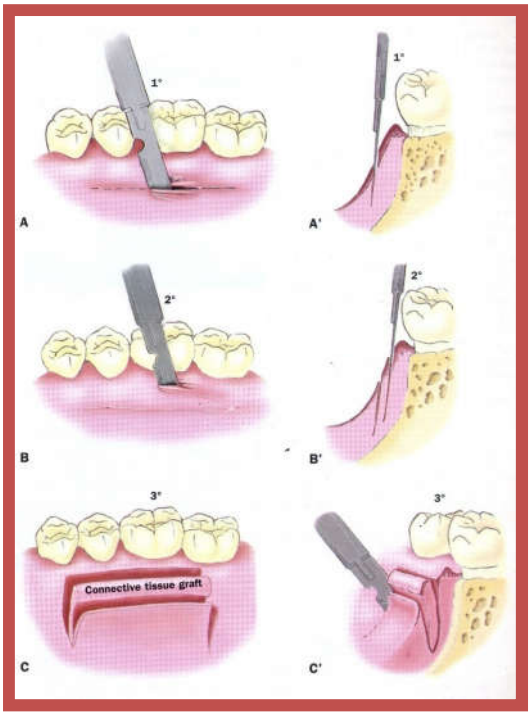

Fig 2: Subepithelial connective tissue graft: donor site (palatal and cross sectional views) A and A'. Primary horizontal partial thickness incision is given 5 to 7 mm from gingival margin. B and B', secondary horizontal incision is given 2 to 3mm from gingival margin. Incisions are directed apically to provide a connective tissue graft 1.5 to 2 mm in thickness and length sufficient to cover the exposed root surface to be covered. C and C'.

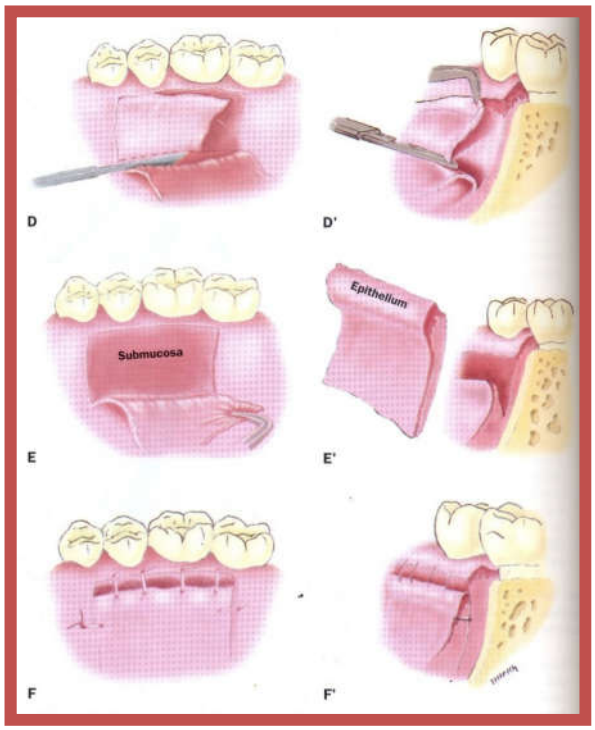

Fig 3: Graft harvested from palate. Continued D and D', The primary flap is reflected with the graft held with the tissue forceps. It is released apically with a sharp horizontal incision, E and E', the subepithelial graft is removed and the underlying submucosa exposed, F and F', primary flap sutured with almost complete coverage obtained, suturing can be continous or suspensory

Modification of the Langer and Langer technique

Envelope technique

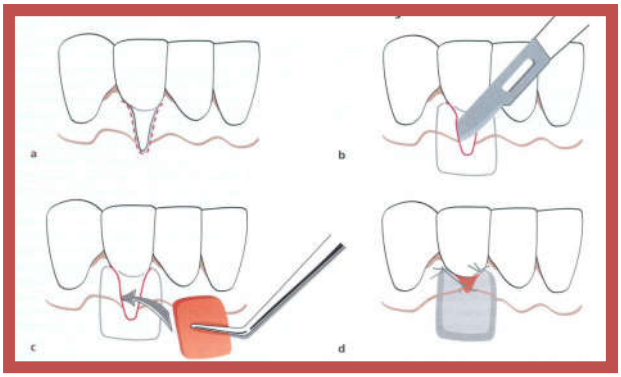

Fig 4: Preparation of the receipient site. The recipient site is prepared by first eliminating the sulcular epithelium by internal beveled incision Secondly; an envelope is prepared apically and laterally to the recession by split incisions.

The depth of the preparation should be 3-5mm in all directions. In an apical direction, the preparation of site should extend beyond the mucogingival junction to facilitate the placement of the connective tissue graft and to allow for coronal advancement of the mucosal flap at the time of suturing. The graft which is obtained by trap door approach is inserted into the prepared envelope and positioned to cover the exposed root surface. Sutures are placed to secure graft in position (Wennstrom *et al*., 1996).

Tunnel technique

In case multiple adjacent recessions are to be treated, envelopes are prepared for each tooth as described above. However, the lateral split incisions are extended so that the multi-envelopes are connected mesially and distally to form a mucosal tunnel. Care should be taken to avoid detachment of the papillae. The graft is gently placed inside the tunnel and its mesial and distal extremities are fixed with two interrupted sutures (Wennstrom *et al*., ?).

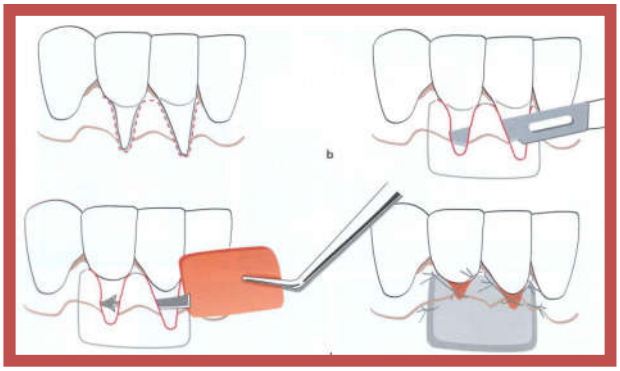

Fig. 5.

Epithelial embossed connective tissue grafts

When the significance of the epithelial collar on the subepithelial connective tissue graft was compared with the non epithelial connective tissue graft, the retained epithelial collar on the SCTG did not provide a significant benefit with regard to the clinical parameters, other than the short-term increase in keratinized width. Therefore, it is suggested that the retained epithelial collar on an SCTG may not result in a better clinical outcome compared to one without an epithelial collar (Byun *et al*., 2009).

Review results

Study was performed by Philippe Bouchard where in thirty subjects were treated with a subepithelial connective tissue graft procedure. In one group (15 sites), the surgery was carried out in a traditional fashion: the epithelial collar of the graft was preserved and left exposed (CTG group). In the second group (15 sites), the epithelial collar of the graft was removed and the recession areas were conditioned with citric acid. The graft was then sutured and completely immersed under the facial flap which was coronally repositioned (CR group). These measurements were taken at baseline and at 6 months. In addition, an esthetic evaluation was done. The differences between treatments were not statistically significant except for the augmentation of gingiva ($P \leq 0.05$). In the CR group, 3 of the 15 recessions exhibited complete root coverage; the gingival augmentation was 65.5%.

In the CTG group, 5 of the 15 recessions exhibited complete root coverage; the gingival augmentation was 94.4%. The results of this study indicate that partial success could be expected with subepithelial connective tissue grafting in Class I or Class II recession therapy. It is suggested that the CR group procedure gives better esthetic results than the CTG group procedure. However, when larger augmentation with keratinized tissue is needed, the CTG group procedure is preferred (Philippe Bouchard *et al*., 1994).

Fourteen pairs of Miller Class I defects were selected in 14 patients. In each pair, one recession was randomly assigned for treatment by GTR using a bioabsorbable membrane, and the other treated by subepithelial connective tissue graft (CTG). No difference could be found between subepithelial connective tissue graft and GTR with a bioabsorbable membrane with regard to root coverage, but the GTR technique did not increase the height of keratinized tissue and displaced the mucogingival junction more coronally at 6 months (Alain Borghetti, ?). Study was conducted by Elizabeth P to evaluate a clinical comparison of subepithelial connective tissue graft (SCTG) and guided tissue regeneration (GTR) with a collagen membrane in the treatment of gingival recessions in humans. Twenty-four defects were treated in 12 patients who presented canine or pre-molar Miller Class I and/or II bilateral gingival recessions. Both treatments were performed in all patients, and clinical measurements were obtained at baseline and 18 months after surgery. These clinical measurements included gingival recession height (GR), root coverage (RC), probing depth (PD), keratinized tissue width (KT), and final esthetic result. It was concluded that the gingival recessions treated with the SCTG group were superior for GR, RC, and KT clinical parameters, while GTR demonstrated better PD reduction. The final esthetic results were similar using both techniques **(**Elizabeth *et al*., 2000**)**.

Retrospective clinical study was undertaken by Giampiero Cordioli to 1) evaluate root coverage and mucogingival changes 1 to 1.5 years following treatment of Miller's Class I and II recession defects using 2 variants of the subepithelial connective tissue graft (SCTG) procedure, and 2) assess the effect of the surgical parameters on the postoperative gingival width. Thirty-one recessions in 10 patients treated with the envelope technique and 31 recessions in 11 patients treated with coronally positioned flap combined with connective tissue graft (CP) were retrospectively analyzed to evaluate: 1) percentage of root coverage obtained with the 2 procedures and variations in width of keratinized tissue 1 to 1.5 years postsurgery and 2) the effect of the surgical parameters on the postoperative gingival width. Treatment of human gingival recession defects by the 2 variants of SCTG resulted in significant recession reduction. When SCTG is grafted beneath alveolar mucosa using the combined technique (CP), transformation of the mucosa into keratinized tissue does not seem to occur, at least within 1 to 1.5 years postsurgery. The treatment outcome in terms of keratinized tissue width seems to be correlated with the presurgical gingival dimensions and the height of the graft that remains exposed at the end of the surgical procedure (Giampiero Cordioli *et al*., 2001). Liby John Thomas performed a study to compare the clinical efficacy of subepithelial connective tissue graft and acellular dermal matrix graft associated with coronally repositioned flap in the treatment of Miller's class I and II gingival recession, 6 months

postoperatively. Ten patients with bilateral Miller's class I or class II gingival recession were randomly divided into two groups using a split-mouth study design. Group I (10 sites) was treated with subepithelial connective tissue graft along with coronally repositioned flap and Group II (10 sites) treated with acellular dermal matrix graft along with coronally repositioned flap. Clinical parameters like recession height and width, probing pocket depth, clinical attachment level, and width of keratinized gingiva were evaluated at baseline, 90th day, and 180th day for both groups. The percentage of root coverage was calculated based on the comparison of the recession height from 0 to 180th day in both Groups and the results indicate that coverage of denuded root with both subepithelial connective tissue autograft and acellular dermal matrix allograft are very predictable procedures, which were stable for 6 months postoperatively (Liby John Thomas *et al*., 2014).

Randall J Harris conducted a study, in this study 100 patients with 146 millers class I and class II recessions were treated with subepithelial connective tissue grafts to obtain root coverage. The changes in the clinical parameters were compared between preoperative and short term results and preoperative and long term results and between short and long term results. The mean root coverage at 13 weeks was 97% and 98.4% at 27 1/2 months. The results of this study demonstrate that the subepithelial connective tissue graft is an effective method to cover the exposed roots (Randall J Harris, 2002). Ahathya RS *et al*., performed a study to determine the effectiveness of subepithelial connective tissue grafts in the coverage of denuded roots. A total of 16 sites with > 2mm of recession height were included in the study for treatment with subepithelial connective tissue graft. The clinical parameters were measured at the baseline, 3rd month and at 6th month of the study period. The defects were treated with coronally positioned pedicle graft combined with connective tissue graft. Out of 16 sites treated with subepithelial connective tissue graft 11 sites showed the complete root coverage. The mean root coverage was 87.5%. From this study it may be concluded that SECT is safe and effective method for the coverage of denuded roots (Ahathya *et al*., 2008).

The objective of G Naveen vithal kumar study was to clinically evaluate and compare the efficacy of platelet concentrate graft (PCG) with that of subepithelial connective tissue graft (SCTG) using a coronally advanced flap technique in the treatment of gingival recession. Twelve patients with a total of 24 gingival recession defects were selected and randomly assigned either to experimental site-A (SCTG) or experimental site-B (PCG). The clinical parameters were recorded at baseline up to 12 months post-operatively and compared. Both the SCTG and the PCG group resulted in a significant amount of root coverage. The PCG technique was less invasive and required minimal time and clinical maneuver. It resulted in superior aesthetic outcome and lower post-surgical discomfort at the 12 months follow-up (Naveen vithal kumar and Raja venkatesh murthy, 2013). Kolliyavar B, performed a study to determine the thickness of palatal mucosa by bone sounding technique. The association of age and gender with the thickness of palatal mucosa was also assessed. The younger age group had thinner mucosa ranged from 2 to 3.1 mm in thickness than the older age group which ranged from 3.2 to 3.7 mm. In the same age group females had thinner mucosa than males. The canine and premolar areas appear to be most appropriate donor site areas for subepithelial connective tissue grafting procedures (Bharati Kolliyavar *et al*., 2013). Christine Romagna Genon performed a randomized controlled trial to evaluate the use of bioabsorbable bilayer collagen membrane with GTR compared to subepithelial connective tissue graft in the treatment of gingival recession. The results suggests that even bioabsorbable bilayer collagen membrane with GTR can be used for root coverage procedures, but there was no significant difference between both the groups (Christine Romagna-Genon, 2001).

Chambrone *et al*., conducted a systematic review and the results show that subepithelial connective tissue grafts provided significant root coverage, clinical attachment and keratinized tissue gain. Overall comparisons allow us to consider it as the 'gold standard' procedure in the treatment of recession-type defects (Leandro Chambrone *et al*., 2008). Karam *et al*., performed a systematic review to evaluate the effects of root modification in clinical outcomes related to the root coverage procedures related to the subepithelial connective tissue graft technique, it was concluded that the use of root surface modifiers to improve clinical outcomes in gingival recession treated with SECT was not justified. More randomized controlled trials including larger sample size with longer follow ups are required (Karam *et al*., 2015).

Conclusion

The treatment of gingival recession can be accomplished with a variety of different procedures. The combination of CTG with a CPF however has been shown to demonstrate the highest success. GTR also can be used to treat recession, particularly when patients are reluctant to consent to providing palatal gingival donor sites. These techniques though proven show a great deal of variability and the operator should precisely control all the negatively influencing factors to achieve optimum success. In patients with Millers Class I and Class II recession defects complete coverage can be accomplished, In Millers Class III recession defects partial coverage can be accomplished, class IV recession defects are not amenable to root coverage. When root coverage is indicated connective tissue grafts, coronally advanced flaps and guided tissue regeneration can be used. However, connective tissue grafts were statistically significantly superior to guided tissue regeneration for improvement of gingival recession.

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