

The Role of Subepithelial Connective Tissue Graft in Achieving Effective Root Coverage

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Abstract

Gingival recession as a clinical entity has been described and documented since the last century. Recession of the gingival tissue from the root surface of the teeth has long been a concern for many patients who feel that the “long-in-the-tooth” look is universally accepted as a sign of aging. The primary causes of gingival recessions are faulty tooth brushing, abnormal frenal attachment, improper restorations, tooth malpositioning and aging. Various periodontal plastic surgical techniques have been used over the years for the treatment of gingival recession with an aim to restore the gingival margin to the cemento-enamel junction and to create a normal gingival sulcus with functional attachment. This case report highlights a case wherein both the esthetic as well as functional aspects have been considered while addressing the problem of gingival recession.

Keywords: *Gingival recession, Root coverage procedure, Connective tissue graft.*

Introduction

Gingival recession and denudation of the root surface is one of the most commonly observed periodontal problem in day to day periodontal practice. Gingival recession is defined as the displacement of the soft tissue margin apical to the cemento-enamel junction (CEJ).^[1] Gingival recessions may result in hypersensitivity, impaired esthetics and root caries. The increasing interest in esthetics and the subsequent need to solve related problems such as hypersensitivity and root caries have favoured the development of many surgical procedures that permit the coverage of exposed roots.^[2,3,4] While considering the elimination of these defects two criteria should be considered, the esthetic and the functional aspects. The former being the main concern of the patient and later being the main concern of the clinician and hence all attempts should be made to consider both while doing root coverage procedure.^[4]

A 28 year old male patient reported with a chief complaint of sensitivity and receding gums in the lower teeth since the last 06 months. The gum recession was initially very less and had gradually increased to the present state. Medical and family histories were noncontributory. Intraoral examination revealed fair oral hygiene with a total of 32 teeth and the gingiva in relation to 33 & 34 was located apical to cemento-enamel junction (CEJ). The patient was taken up for root coverage of 33 using subepithelial connective tissue graft (SCTG). Pre-anaesthetic assessment was carried out and informed written consent was obtained from the patient.

Surgical Procedure

After part preparation the area was anaesthetised using 2% Lignocaine with 1:80,000 adrenaline. Care was taken that the local anaesthetic infiltration did not give rise to “ballooning” effect in the recipient area. Measurement of recession depth and width were carried out [Figs 1].



Figure 1: Measurement of Recession Depth and Width

Horizontal incisions were made mesial and distal to the defect, at a level of the cementoenamel junction towards the adjoining tooth. The incision was terminated not less than 0.5mm away from the gingival margin of the adjacent tooth. This was to avoid creating gingival recession on adjacent teeth and to keep the interdental papilla intact. Next, vertical incisions were made perpendicular to the horizontal incisions, starting at the termination of the horizontal incisions and extending 6 to 8 mm beyond the mucogingival junction into the alveolar mucosa. A sulcular incision was placed connecting the horizontal incisions.

A partial thickness, trapezoidal flap was dissected beyond the mucogingival junction leaving the underlying alveolar bone covered with periosteum and connective tissue. The exposed root surface was thoroughly planed, contoured and the curvature was reduced with rotary instrument under normal saline coolant [Fig.2]. A blunt dissection into the vestibular lining mucosa was then carried out to release muscle tension. Tension on the flap was relieved by sharp dissection in the apical portion of the prepared recipient bed. A periosteal releasing incision was made with No. 11 blade along the entire base of the recipient bed. All tissue tags were removed. The flap was checked for any tension by all possible movements of the lips.



Figure 2: Prepared Recipient Bed

The measurement of the recipient bed was taken using the Williams graduated probe in both vertical as well as horizontal direction. The same measurement was used as a guideline while procuring the graft from the palate. The adjoining interdental papillae were stripped off the epithelium with a blade No. 11 to provide vascular connective tissue bed for receiving the coronally advanced flap. Adequate care was taken to preserve the interdental papillae. Moist gauze was placed on recipient bed to achieve homeostasis before the placement of the graft.

Graft procurement from the donor site

After preparation of the recipient bed, the donor area in the palate was anesthetized by block anaesthesia for the greater palatine nerve with 2% Lignocaine with 1:80,000 adrenaline. The selected site was posterior to rugae and not extending beyond the maxillary first molar. The greater palatine artery was assumed to be located at the junction of the vertical and horizontal walls of the palatal vault. Safety margins of 3mm from the greater palatine artery and 2 mm from the gingival margin were calculated. The previously obtained measurement was used as a guideline and the same was outlined on the donor site by an indelible pencil before harvesting of the graft. The graft harvesting was planned to exclude adipose tissue and glandular tissue, since these tissues may prevent proper revascularization of the graft on the recipient bed.

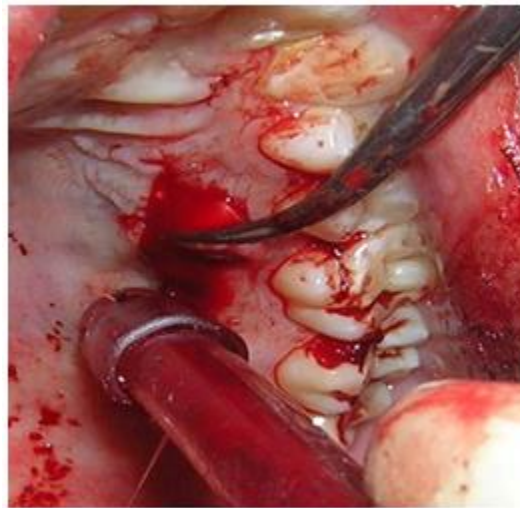


Figure 3: Liu's Class I type A incision

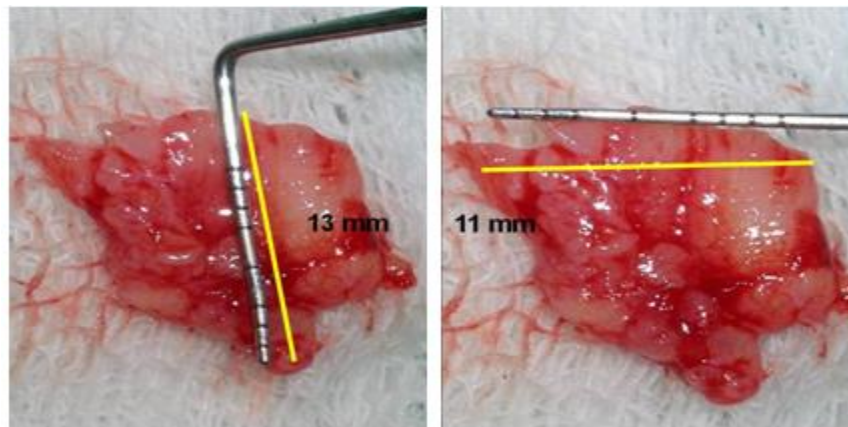


Figure 4: Harvested sub-epithelial connective tissue graft

Liu's Class I type A incision design [Fig. 3] was used for harvesting the graft. A No. 15 blade was used to make a partial-thickness horizontal incision, with a bevel of about 2 mm apical to the gingival margin from the mid palatal aspect of cuspid to the mid palatal aspect of second molar at the level of the greater palatine artery depending on the length of the connective tissue graft required. Initially the epithelium with a thin layer of connective tissue was dissected and reflected. Then a deep blunt dissection was carried out and connective tissue was separated from the underlying bone. Tissue forceps were used to lift the prepared palatal flap edge. It was reflected towards the center of the palate and the underlying connective tissue was exposed. An incision perpendicular to the bone was made around the edge of the connective tissue. The graft was held lightly with tissue forceps and dissected out with two vertical and one medial incision. The harvested connective tissue graft [Fig. 4] was preserved in normal saline. Pressure pack was placed for 5 min at the donor site to achieve haemostasis.

Once the adequate haemostasis was achieved, the donor site was sutured with 3-0 black silk to obtain primary closure. An aluminium foil was trimmed and kept over the donor area to prevent the entanglement of the suture to the non-eugenol periodontal pack (Coe-Pak™). A thin layer of the pack was applied to the inner surface of palatal stent and the donor site was covered with it. The graft was checked for its size and it was modified as per the required dimensions and excess fatty and glandular tissue was removed.

Placement of graft on the recipient bed

The connective tissue graft was sutured to the underlying connective tissue at the level of CEJ using 5-0 Vicryl suture. Stabilizing sutures were given at the apical portion of the graft [Fig 5]. Following graft stabilization, gentle pressure with moist gauze was applied to prevent dead space formation. The partial thickness flap was sutured with interdental and lateral sutures using 5-0 polypropylene suture [Fig 6]. An aluminium foil was placed over the recipient site and a periodontal dressing was given.



Figure 5: Placement of stabilization sutures



Figure 6: Graft coronally positioned and sutured

Post-operative care

Patient was made aware of the critical period of graft stabilization in the prepared bed during early phase of healing and standard post-operative instructions were given. Patient was prescribed Cap Amoxycillin 500mg tid and Tab Ibuprofen 400mg tid. The patient was reviewed after 24hrs. The periodontal dressing and sutures were removed after one week. The donor site was checked for healing and the patient was re-instructed to use soft tooth brush to clean the area for two weeks, following which he was instructed to revert to his normal hygiene practice. Comparative evaluation was performed after 02 and 09 months [Fig 7].



Figure 7A: Pre-op

7B: 02 Months post-op

7C: 09 Months post-op

Discussion

Periodontal plastic surgery is defined as surgical procedures performed to prevent, correct, or eliminate anatomic, developmental or traumatic deformities of the gingiva or alveolar mucosa.^[5]

The treatment of gingival recession with different surgical procedures depends on many factors, such as defect size, presence or absence of keratinized tissue adjacent to the defect and the thickness of the gingiva which are related to the defect and/or patient.^[6,7] The common concerns of the patients are poor esthetics, hypersensitivity and root caries. Keeping in mind the patient's desire for improved esthetics and other related problems, every effort should be made to achieve complete root coverage.^[8,9]

The ultimate goal of a root coverage procedure is the complete coverage of the recession defect with good appearance related to adjacent soft tissues and minimal probing depth. Several surgical procedures such as pedicle flaps, free soft tissue grafts, combination of pedicle flaps and grafts or barrier membranes may be indicated to improve the coronal level of the gingival margin on the root surface.^[10]

The coronally advanced flap and the SCTG with several variants are among the most widely used techniques. Originally, connective tissue grafts were used as replacements for autogenous masticatory mucosal grafts (free gingival grafts). It offers several advantages over free gingival grafts, probably the most important of which is fewer complications in the donor area. Recently, the connective tissue graft has found many uses beyond its original function as a substitute for the free gingival graft. A connective tissue graft has also been effective in restoring deformed edentulous ridges.^[11] However, the greatest use of connective tissue grafts is for root coverage procedures. Many authors have demonstrated, with multiple techniques, that esthetic root coverage can be predictably obtained.^[12-15] These root-coverage procedures may be performed for a wide variety of reasons, including elimination of sensitivity, elimination of a plaque trap, treatment or prevention of root caries and treatment of a mucogingival defect for esthetic reasons.

Langer and Langer in 1985^[2] proposed a sub epithelial graft and an overlying coronally positioned flap for covering the gingival recessions frequently found in the maxilla on both single and multiple adjacent teeth. It is important to recognize the objectives of the surgical reconstruction through the above mentioned procedures to increase the width of attached gingiva along with the root coverage.

Techniques to harvest connective tissue graft

Edel in 1974^[11] used a trap door approach without removing epithelium from the donor site for augmentation of keratinized gingiva. It has been proposed a free hand technique in which a rectangular incision design with two horizontal and two vertical incisions were used leaving a 1.5-2 mm collar of epithelium. Harris in 1992^[12] used a scalpel with parallel blades 1.5mm apart for the horizontal incisions that bordered the epithelial collar. Liu in 2002 classified the incision design for harvesting of SCTG from palatal region based on horizontal and vertical release incisions.^[15]

Wound healing

Initially the grafted tissue receives all its nourishment from the underlying tissue of the recipient site. During this period most of the superficial epithelial necrosis occurs in the free gingival graft. Initial survival of the graft is mainly from the collateral circulation developed inside the graft itself. Revascularization occurs in 3 to 4 days and increases rapidly. A connective tissue union of the graft and recipient site generally occurs within 4 – 10 days. Healing is generally complete by 4 weeks, although some creeping attachment (coronal tissue migration) may occur over the next few years.

Conclusion

The percentage of root coverage and percentage of increase in width of keratinized gingiva is better with sub-epithelial connective tissue graft along with coronally advanced flap procedure. Sub epithelial connective tissue graft is considered as the gold standard for root coverage procedures.

Conflict of Interest

Nil

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