Acellular Dermal Graft Material For The Treatment Of Gingival Recession – A case series

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ABSTRACT

The treatment of gingival recession has been a common practice in periodontics for years. As the aesthetic demands of periodontal patients increase, more root coverage procedures will be performed to satisfy their aesthetic demands. Often, the patients present with multiple areas, which requires treatment. Palatal anatomy may limit the amount of autogenous tissue that can be harvested, thus limiting the number of procedures that can be performed. A patient may not desire to have additional tissue transplanted from the palate, due to increased pain and morbidity, which are associated with multiple transplant procedures.

Key Words : AlloDerm, Acellular dermal graft, Gingival recession, Mucogingival, Periodontal disease.

INTRODUCTION

Gingival recession is defined as the displacement of the marginal tissue which is apical to the cemento-enamel junction (CEJ).[1] However, periodontal recession is a more accurate term because the alveolar bone and the cementum are also lost.[2] Numerous factors may result in gingival recession.[3] Untreated recession sites in patients are more likely to progress than the sites which are treated with gingival augmentation procedures,[4] and therefore, appropriate treatment is indicated to prevent the further loss of the periodontal tissues, as well as to improve the aesthetics. Multiple techniques have been developed to obtain predictable root coverage.[3,4,5,6] The purpose of developing newer methods for root coverage is to increase predictability, to reduce the number of surgical sites, and to improve patient comfort, together with the need to reconstruct the lost periodontal tissues.

Many different surgical procedures have been used to achieve root coverage, which include pedicle grafts (lateral sliding or double papillae) with or without connective tissue grafts, epithelialized autogenous grafts (free gingival), connective tissue grafts, coronally positioned flaps (CPF) alone, CPF preceded by a free gingival graft, and CPF with a simultaneous connective tissue graft. Each of these techniques results in varying degrees of success and offer a variety of treatments for such defects.[7]

Recently, an Acellular dermal allograft tissue (Alloderm®) (ADMA) has been used as a palatal donor tissue in soft tissue surgeries around the natural teeth and the implants to increase the zone of keratinized tissue, for tissue augmentation, and for root coverage. It is a human soft tissue, which is chemically processed to remove all the epidermal and the dermal cells (antigenic cells), while preserving the remaining bioactive dermal matrix. The intent of these procedures is principally to create a tissue barrier that is more resistant to further recession due to trauma. Other indications include soft tissue flap extension over the bone graft, amalgam tattoo correction, and soft tissue defect repair.[8,9]

PROCESSING OF THE ACELLULAR DERMAL GRAFT MATERIAL

During the processing of the Alloderm® acellular dermal graft material, the epithelium is first removed from the donor tissue, while the basement membrane is retained to promote faster reepithelialization. Next, the cells are removed from the remaining tissue by a series of detergents that eliminate the chance for an antigenic response by the recipient. The tissue is then freeze-dried and packaged for immediate use. The graft material consists of a connective tissue surface which readily absorbs blood and a basement membrane surface that does not allow blood absorption.[9]

CLINICAL PARAMETERS

Each patient was questioned about his/her satisfaction with regards to the following patient-centered criteria: root coverage attained, relief from dentinal hypersensitivity, colour of the gums, shape and contour of the gums, the surgical procedure (pain during surgery and the discomfort experienced, which is related to the duration of the procedure and handling by the operator), the postsurgical phase (pain, swelling, and postoperative complications), and cost effectiveness. The initial photographs were taken and the clinical findings were recorded. The objective criteria which were used to assess the treatment outcome included: the measurements which included recession height (measured from the cementoenamel junction (CEJ) to the free gingival margin); recession width (measured mesiodistally at the CEJ level); probing depth (PD) (measured from the gingival margin and the base of the defect); Clinical attachment level (calculated as the recession height + probing depth) and Height of the keratinized tissue (HKT) (measured from the distance between the most apical point of the gingival margin (GM) and the mucogingival junction (MGJ)).[10] The thickness of the keratinized tissue (TKT) was measured at a midpoint location between the gingival margin and the mucogingival junction by using a periodontal probe. After anaesthetizing, a straight probe was pierced perpendicularly to the mucosal surface through the

soft tissue, until a hard surface was felt. Later, a straight probe was replaced by a graduated periodontal probe (Williams probe) until the hard surface was felt and the recordings were made and rounded off to the nearest millimeters.[11]

PRE-SURGICAL MANAGEMENT

A general assessment of the patients was made through their history, their clinical examination and routine laboratory investigations. All the selected patients received Phase I therapy, which included oral hygiene instructions, scaling and root planing by both ultrasonic and hand instruments.

TECHNIQUE FOR ROOT COVERAGE BY USING ACELLULAR DERMAL GRAFT MATERIAL

On completion of the baseline examination and reevaluation, the recession defects were randomly assigned to either the control or the experimental groups. The patient was seated comfortably in the dental chair and was then asked to rinse the mouth with 10ml of 0.2% chlorhexidine gluconate solution. The extra oral surfaces of the patient were swabbed with 5% povidine iodine solution. The operative site was anaesthetized with 2% lignocaine Hcl with adrenaline (1:80,000), by using the block and the infiltration technique.

After local anaesthesia, an intrasulcular incision was made at the buccal aspect of the involved tooth. Two horizontal incisions were made at right angles to the adjacent interdental papillae, at the level of the CEJ, without interfering with the gingival margin of the neighboring teeth. Two oblique vertical incisions were extended beyond the MGJ and a trapezoidal mucoperiosteal flap was raised up to the MGJ. After this point, a split thickness flap was extended apically, thus releasing the tension and favouring the coronal positioning of the flap. The epithelium on the adjacent papillae was stripped away. The root surface was curetted and washed with saline solution. The root surfaces were conditioned with a solution of tetracycline in saline (125 mg/ml saline) for about 4 min. The root surface was burnished with cotton pellets that were changed approximately after every 30 seconds. The tooth surfaces were then thoroughly flushed with sterile saline. An acellular dermal matrix allograft was adapted after being aseptically rehydrated in sterile saline, according to the manufacturer's instructions. A template is prepared and the graft was trimmed to the shape and size of a template, which was designed to cover the root surface and the adjacent surrounding bone. The basement membrane side was placed adjacent to the bone and tooth and the connective tissue side was placed facing the flap. The coronal lateral borders of the ADMA were sutured with sling sutures by using resorbable sutures (Ethicon 4-0). The flap was coronally positioned and sutured to completely cover the allograft and was protected with a non eugenol dressing.[12]

All the patients were prescribed the systemic antibiotic, amoxicillin 500 mg tid, for 7 days post surgically. Postoperative instructions were given to all the patients and they were instructed to report to the department after 24 hours after surgery and then after ten days. During this period, plaque control was achieved with a 0.2% chlorhexidine solution rinse, which was used twice a day.

CASE DESCRIPTIONS

Case 1: A twenty three year-old female was referred for evaluation due to gingival recession. A periodontal examination resulted in the diagnosis of localized gingival recession in relation to tooth #14. The probing depth ranged from 2-3mm along this sextant. While a height of the keratinized tissue of approximately 1-2mm was appreciated, the thickness of the keratinized tissue was only ≤1mm [Fig 1a and b]. The dental history was significant for a childhood and early adult habit of brushing the teeth with a back-and-forth scrub motion by utilizing a hard toothbrush. The exposed root surfaces were sensitive to air and coldness. AlloDerm® was placed as previously described.

Fig 1a : Pre-operative photograph showing gingival recession with 14

Fig 1b : Post-operative view

Case 2: The patient was a 28-year-old female with localized recession, but it was the most pronounced at the canines.[Fig 2a and b] The pre-operative recession measured 3 mm on teeth #23. The gingival margins were very thin and transparent, and did not appear to be resistant to trauma. The patient elected to use AlloDerm and AlloDerm® was placed with the connective tissue side facing the teeth, as previously discussed in the technique section.

Case 3: The patient was a forty five year-old male with the recession generalized at the premolar/canine region. A gingival recession of 3 mm was seen at #23 and #24.[Fig 3a and b] The medical history was reviewed and was found to be non-contributory. AlloDerm® was placed, as previously described.

Fig 2a : Pre-operative photograph showing gingival recession with 23

Fig 2b : Post-operative view

Fig 3a : Pre-operative photograph showing gingival recession with 23 and 24

Case 4- Tooth #14.[Fig 4a and b] AlloDerm® was placed as previously described.

POST-OPERATIVELY

After ten days following surgery, the dressing and sutures were removed and the surgical site was irrigated with normal saline. An enquiry regarding the post surgical problems was made and the areas were checked for any membrane exposure, in which case

Fig 3b : Post-operative view

the periodontal dressing was again replaced for another seven days. The recall appointments of the patients were made after 6 weeks, 4 months and finally, at 6 months. At each visit, oral hygiene instructions were reinforced and supragingival scaling was done if required.

All the cases were re-evaluated after 6 months. All clinical

Fig 4a : Pre-operative photograph showing gingival recession with 14

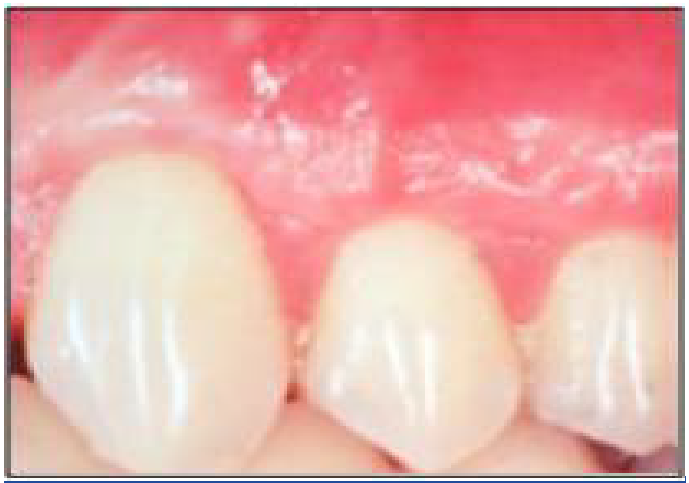

Fig 4b : Post-operative view

parameters are recorded. [Table 1] Complete root coverage was achieved in addition to increasing the thickness of the marginal

tissue. The tissue appeared to be firm and healthy, with no probing depth. In approximately 6 months, the tissue was expected to mature into a smooth contour.

DISCUSSION

Based on the previous literature, this technique is recommended for treating Miller class I and II recession defects. Although there are an increasing number of studies on this technique, the results of using an acellular dermal graft for root coverage are comparable to the results of the soft tissue grafting procedures. A long comparative study has shown similar results in terms of root coverage between the connective tissue graft and an acellular dermal graft. The use of an acellular dermal graft eliminates the need for a donor tissue surgical site that may result in complications (e.g., bleeding and necrosis of the palate) and an in patient morbidity.[13] The mean root coverage by using the acellular dermal graft, which was obtained by different authors, was found to be varied.

Case No.	Recession height (mm)		Recession width (mm)		Heights of the keratinized tisse (mm)		Thickness of the keratinized tisse (mm)		% of Root cover-age
	Pre-op	Post-op	Pre-op	Post-op	Pre-op	Post-op	Pre-op	Post-op	
Case 1	3	0	4	0	2	4	1	2	100
Case 2	2	0	3	0	3	5	1	1.5	100
Case 3(i)	3.5	0.5	3	0.5	2.5	5	1	2	83
Case 3(ii)	3	0	2	0	2	5	1	2	100
Case 4	2	0.5	3	0.5	2.5	5.5	1	1.5	83
Total Mean	**2.7**	**0.2**	**3**	**0.2**	**2.4**	**4.9**	**1**	**1.8**	**93.2**

[Table 1]: Measurements of clinical parameters at baseline and 6 months after surgery

Connective tissue grafts are currently considered as the gold standard for root coverage, since they are highly predictable procedures for treating recession defects. However, a common concern of the patients is that connective tissue grafts require an additional surgical site and produce added morbidity. Harvesting a palatal or other intraoral donor site causes additional discomfort to the patient and increases chair time for the surgeon. The availability of the acellular dermal graft material for use in mucogingival surgery can minimize or eliminate both of these problems. The acellular dermal graft material is available without creating a second surgical site.

Therefore, an ADMA has been used as an alternative source of donor tissue. The material provides an unlimited supply of graft material that could be particularly helpful when treating multiple recession sites. The ADMA allograft was found to be biocompatible and non-allergenic and did not produce any inflammatory response.[14]

A study was aimed to compare the clinical outcomes of the root coverage procedures by using a coronally advanced flap (CAF) in combination with acellular dermal matrix, with or without enamel matrix derivatives (EMD). Both treatments led to significant root coverage, but there was no significant difference between the groups, thus proving that the application of EMD does not improve the clinical efficacy of ADMA in combination with CAF in root coverage procedures.[15]

Recently, the results of a case series indicated that an ADMA which was seeded with autologous gingival fibroblasts by tissue-engineering technology, may be explored as a substitute to an SCTG for the treatment of Miller Class I and II recession defects.[16]

According to a Cochrane systematic review on root coverage procedures for the treatment of localized recession type defects, it was suggested that SCTGs, coronally advanced flaps alone or in association with other biomaterial, and GTR may be used as root-coverage procedures for the treatment of localized recession-type defects.[17]

The results of this case series demonstrated a mean of 93.2% root coverage with 100% root coverage on 3 out of 5 teeth. Graft success with the material is highly dependent on proper surgical techniques and the handling and the orientation of the material.

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