

Application of an Acellular Dermal Matrix Allograft (AlloDerm) for Treatment of Localized Gingival Recession Defect: A Case Report with One-year Follow-up

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ABSTRACT: Generalized or localized gingival recession can be caused by periodontal disease, improper flossing, aggressive tooth brushing, incorrect occlusal relationships, and dominant roots. Gingival recession remains one of the main esthetic concern for the patient. Various procedures have been employed for the management of gingival recessions. The present case report employs the use of an Acellular Dermal Matrix Allograft (Alloderm®) to increase the width of attached gingival.

KEYWORDS: AlloDerm, Acellular dermal graft, Gingival recession, Mucogingival, Tooth root.

1 INTRODUCTION

The presence of a thick keratinized gingival covering forms the basis for a healthy gingival function and serves as an effective barrier that is resistant to damage by various types of insults [1]. There are certain situations in which an adequate width of attached gingiva is important. A narrow zone of keratinized tissue favors gingival recession and inflammation in patients with subgingival restorations, impedes proper impression taking in prosthodontics, and results in an unstable attachment level after orthodontic treatment [2-4]. A band of keratinized tissue around the neck of implants is desirable from a clinical standpoint because it facilitates surgery, prosthodontics, cosmetics, and maintenance [5]. An adequate amount of attached gingiva makes plaque control more effective, decreases susceptibility to infection, and possibly prevents further recession.

Complete coverage of recession defects with the appearance similar to surrounding tissue and minimal pocket depth is the ideal result of root coverage procedures [2]. Numerous therapeutic approaches have been applied for root coverage in patients with gingival recession (e.g. laterally positioned flap, coronally positioned flap [CPF], subepithelial connective tissue graft [SCTG] also known as *Autograft*, CPF with matrix grafts, enamel matrix derivatives, and guided tissue regeneration [GTR]) [1], [2]. According to previous meta-analysis study, using SCTG, matrix grafts, and enamel matrix derivatives would be superior to the application of CPF alone in achieving complete root coverage [4].

The use of autografts has been considered the most predictable procedure for keratinized tissue augmentation and vestibular deepening. When compared to autografts, however, Alloderm®, an acellular dermal matrix allograft eliminates the need for a second surgical site, thus decreasing postoperative morbidity. It is easy and less time-consuming to use, and esthetically blends well with the adjacent tissue; and multiple sites can be treated in a single visit [6], [7], [8].

The present case was undertaken to clinically evaluate the use of an Acellular Dermal Matrix Allograft (Alloderm®) to increase the width of attached gingiva and to evaluate stability of the gained attached gingival tissue.

2 CASE REPORT

A 43-year old male patient reported with chief complaint of unesthetic right upper front region. Patient had no systemic problems and was non-smoker. There was a localized recession defect in the area of 13 (Figure1a). The affected tooth was without cervical caries or restoration. After taking informed consent, scaling, root planing, and polishing were performed and a non-traumatizing tooth brushing technique (roll method) with a soft toothbrush was instructed to the patient.

The junction of the attached and movable tissue was determined by rolling the alveolar mucosa coronally with the side of the probe (a roll-test). The width of the attached gingiva was measured at baseline and 3 and 6 month postoperatively using the subtracting method. The apicocoronal dimension of the graft used was measured at the time of placement onto the recipient bed. The amount of graft shrinkage was calculated by subtracting the apicocoronal dimension of the graft from the amount of gained attached gingiva. Plaque index [11], gingival index [12] and recession depth were measured at baseline and 3 and 6 month postoperatively. Presurgical and postsurgical measurements were made by one examiner. Measurements were made to the nearest 0.5 mm using a William's probe and an occlusal stent (with guiding grooves).

2.1 SURGICAL PROCEDURE

Patient underwent Phase-1 periodontal therapy that included oral hygiene instructions, supragingival and subgingival scaling, and root planing. The case was selected for surgery only when patient compliance about oral hygiene was found to be satisfactory. Patient was instructed to rinse with 0.12% chlorhexidine solution twice daily. After adequate anesthesia, a superficial horizontal incision was made just coronal to the mucogingival junction. The surgical blade (No. 15) was held perpendicular to the gingival surface. Two vertical incisions were made at either end of the horizontal incision (Figure1b, 1c). The periosteal recipient bed was then prepared by sharp dissection in an apical direction. 17% EDTA was used as a root conditioning agent. Following preparation, the required dimension of Alloderm® allograft was procured and rehydrated in a Petri dish with 50 ml of sterile saline solution for 5 minutes. After the protective backing paper had been floated, the Alloderm allograft was transferred to another dish with 50 ml of sterile saline solution for 5 min. The allograft was placed with the connective tissue surface toward the recipient beds and the basement membrane surface facing externally (Figure1e). The allograft was stabilized on the recipient bed by resorbable sutures. The mucoperiosteal flap was stabilized and sutured (Figure1f).

2.2 POSTSURGICAL CARE

The patient was given postoperative instructions and medications. Amoxicillin (500 mg 3 times a day for 5 days) and ibuprofen (3 times a day for 3 days) were prescribed. Continuous rinsing with 0.12% chlorhexidine solution twice daily for 3 weeks was also prescribed. The patient was advised to refrain from retracting the lips and cheeks and to avoid brushing or flossing in the grafted area for 6 weeks. Suture removal was done at the end of 10 days. The patient was seen at 6 weeks, 12 weeks, 24 weeks, and 36 weeks to monitor wound healing and plaque control. Localized supragingival scaling was done as and when required and oral hygiene instructions were reinforced routinely at each visit.

3 RESULTS

The site treated with Alloderm® demonstrated uneventful healing 15 days after surgery (Figure2b). Graft rejection and mobility of the newly created tissues was not found. However, at the 4th week postoperatively, a substantial amount of graft shrinkage could be seen. Excellent color blend was also noticed at this stage. Complete keratinization of the newly formed attached tissue was observed at the end of 12 weeks and was maintained for 6- months (Figure2c, 2d).

4 DISCUSSION

In this case report, an acellular dermal matrix (Alloderm®) was used to increase the width of attached gingiva at a site with <1 mm of attached gingiva. For years, free gingival autografts and connective tissue autografts have been used with great success. However, certain obvious limitations of the autografts forced clinical researchers to search for some alternative allografts that patients would find comfortable, compatible, and acceptable. Autografts require a second surgical site for the donor tissue. In the free gingival graft (FGG) technique, the donor site is healed by secondary intention and may result in postoperative pain and morbidity. The FGGs result in a tyre patch appearance of the recipient site and are unaesthetic. Furthermore, autografts cannot be used to increase width of attached gingiva on multiple teeth at the same visit because of the limited supply of donor tissue [11]. The use of Alloderm® has been shown to be effective in increasing the

width of attached gingiva [15], [16], [17] and can be used as a substitute for FGGs and connective tissue grafts. The studies in which AlloDerm® and connective tissue grafts have been used to increase the width of attached gingiva have shown similar results [15]. The main aim of using allograft was to minimize postsurgical complications and patient discomfort. Studies have shown that an acellular dermal matrix allograft provides a uniform thickness and is easily trimmed, well-adaptable material, and requires a short time (<10 minutes) to rehydrate before it can be used. On the other hand, harvesting of a connective tissue graft from the palate is time-consuming and only a limited size of the graft can be obtained. Moreover, a second surgical site and the amount of time consumed adds to patient discomfort.

Studies comparing FGG and AlloDerm® to increase the width of attached gingiva have shown that AlloDerm® is not as effective in increasing width of attached gingiva but more predictable in its esthetics and blending with the surrounding tissue as compared to FGG. The amount of attached gingiva gained with AlloDerm®, however, is clinically sufficient to prevent persistent inflammation [15]. The mechanism by which AlloDerm® results in an increased width of keratinized attached gingiva is still controversial. Though most of the studies support the fact that the AlloDerm® graft itself has little influence on epithelial differentiation, the type of epithelium that covers the allograft seems to be determined by the surrounding tissues. AlloDerm® acts as a scaffold to allow repopulation of fibroblasts, blood vessels, and epithelium from surrounding tissues, and it is eventually completely replaced by host tissues [16].



Figure1: (a) Pre-operative. (b) Incision placed. (c) Mucoperiosteal flap raised. (d) EDTA 17% applied (root conditioning agent). (e) GTR membrane (AlloDerm®) placed. (f) Sutures placed

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Figure2: (a) Day 10 (after surgery) on suture removal. (b) Day 15 after surgery. (c) 3-months post-operative photograph. (d) 6-months post-operative photograph.

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5 CONCLUSION

It can be concluded that a lesser but adequate amount of attached gingiva can be obtained using Alloderm® that is sufficient to maintain oral hygiene and resolve persistent gingival inflammation. Viewed subjectively, the sites showed better esthetics and blended with the surrounding tissue and caused less postoperative pain. Thus, findings suggest that Alloderm® may be effectively used as an alternative to autogenous grafts for gingival augmentation procedures.

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