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The efficacy of coronally positioned flap with or without Acellular dermal matrix in treatment of class II gingival recessions.

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Abstract

The aim of this study is to clinically evaluate the treatment of Miller's bilateral class II gingival recessions by coronally positioned flap (CPF) with or without a cellular dermal matrix allograft (ADMA). Nine patients with 18 recession defects were selected randomly into two groups of case (ADMA+CPF) and control (CPF alone) groups. The percentages of root coverage for both the case and control groups were 23.81% and 16.67%, respectively. A statistically significant difference in the amount of gingival thickness was obtained.

Keywords: Acellular dermal matrix allograft, coronally positioned flap

Introduction

Gingival recession is defined as an apical displacement of the soft tissue with respect to the cement enamel junction (CEJ).[1] Coronally advanced flap (CAF) associated with sub epithelial connective tissue graft has been revealed as a predictable method for the complete success of root coverage. [2]

From a histologic standpoint, it has been shown by Cummings LC et al. (2005) that a cellular dermal matrix works in a similar fashion to connective tissue procedure.[3]

Hence an attempt is made to evaluate the efficacy of coronally positioned flap with or without a cellular dermal matrix in treatment of class II gingival recessions.

Materials and methods

The study was designed and conducted in the Department of Periodontology, Narayana Dental College, Nellore, Andhra Pradesh. In this randomized case control study nine patients with eighteen recession defects, eight males and one female, ranging from 20 – 50 years of age were included to evaluate the clinical efficacy of Acellular dermal matrix graft (Alloderm) along with coronally positioned flap compared to the coronally positioned flap alone in the treatment of bilateral class II gingival recession for a period of 6 months.

Before the commencement of the study, an informed consent was taken from all the patients after explaining the procedure and the protocol was approved by the institutional ethical board committee.

All the patients included had recession of 2 mm or greater and probing depth lesser than 3mm with comparable bilateral millers class II buccal recessions. All the teeth were vital and the sites to be treated had no caries or restoration.

Systemically compromised patients, Smokers, Pregnant women, Lactating mothers and Patients allergic to Gentamicin, Cefoxitin, Lincomycin, Polymyxin B, Vancomycin as the Alloderm contains the traces of the above were excluded from the study.

In the presurgical evaluation, all the patients tooth brushing technique and habits were analyzed and were instructed to perform non traumatic brushing technique using a soft tooth brush. All the patients were subjected to generalized scaling and root planning of the specific defect site and no occlusal therapy was performed in any case as occlusal analysis was within normal limits.

Initial photographs were taken and an acrylic stent was prepared separately for each subject to standardize the measurement of clinical parameters at different intervals. The clinical parameters recorded included Recession height (RH): measured from Cemento-enamel junction (CEJ) to free gingival margin (GM); Probing depth (PD): measured from gingival margin to the base of the defect; Clinical Attachment Level Measurement (CAL): calculated as RH + probing depth*;* Gingival thickness measurement: After anesthetizing, the endodontic spreader was pierced perpendicularly at midpoint location between gingival margin and mucogingival junction with light pressure until a hard surface was felt. The silicone disk stop was then placed in tight contact with the external soft tissue surface. After carefully removing the spreader, penetration depth was measured with a Williams periodontal probe and the reading was recorded to the nearest millimetre; Plaque Index & Gingival Index: assessed based on Silness and Loe, 1964 and Loe and Silness, 1963 criteria.

Before surgery, extra oral antisepsis was performed with betadine and intraoral antisepsis with 0.2% chlorhexidine rinse. Lignocaine (2.0%) with 1:80,000 epinephrine was used as aesthetic.

In both the groups same surgical procedure was followed except that the control group was treated with the coronally positioned flap alone and case group was treated with coronally positioned flap and Acellular dermal matrix graft.

After obtaining Anesthesia, an intrasulcular incision was made at the buccal aspect of the involved tooth. Two horizontal incisions were made at the right angles to the adjacent interdental papillae, at the level of Cemento - enamel junction, without interfering with the gingival margin of the neigh boring teeth. Two oblique vertical incisions were extended beyond the mucogingival junction and a full thickness trapezoidal mucoperiosteal flap was raised up to the mucogingival junction. Then, a split thickness flap was extended apically, releasing the tension and favouring the coronal positioning of the flap. For the preparation of the recipient site the epithelium on the adjacent papillae was stripped away. The exposed root surface was instrumented with curets and planed to eliminate soft tissue tooth structure, undercuts, ridges, plaque and calculus and washed with saline solution.

In the test group, an Acellular dermal matrix allograft was adapted after being aseptically rehydrated in sterile saline. The graft was trimmed to a shape and size designed to cover the root surface and the surrounding bone. Then the coronal lateral borders of the matrix were

sutured to the lingual gingival tissue with sling sutures using 4-0 Ethicon resorbable sutures.

The flap was coronally positioned and sutured with simple interrupted sutures facially and interproximal Ly using 3-0 Ethicon non-resorbable sutures to completely cover the allograft and protected with non-eugenol pack.

Routine post-operative instructions were given to both groups. Systemic antibiotics were prescribed for 7 days post surgically and were instructed to take the analgesic medication. Patients were recalled after 14 days for suture removal.

Later, all the patients were recalled after 6 months post surgically and the clinical parameters were re-evaluated. Oral hygiene was stressed at all the appointments.

Statistical analysis was performed in both case and control groups by intragroup and intergroup comparisons using nonparametric methods like Wilcoxon matched-pairs test (or signed Rank Test). A *P*-value of 0.05 or less was considered for statistical significance. The results were presented as mean ± standard deviation (SD) for all the parameters.

Results

Pre- and post-operative changes and comparison between test and control groups are summarized in [Table 1], no statistical significance was shown in any of the variables except for gingival thickness.

Whereas, statistical significance was shown in all variables except probing depth and gingival index in comparison within the case group [Table 2] and no statistical significance was seen within control group variables except plaque index [Table 3].

Discussion

The principal aim in surgically treating gingival recession is to cover the exposed root and consequently improve Esthetic appearance.[4] Therefore, an effort was made in our study to evaluate the results based on clinical expertise.

A significant difference in recession height was achieved in case group between the intervals (P-value: 0.041; 36.19%). Though the above findings were lower than the studies conducted by Aichelmann - Reidy et al. (1999) who demonstrated mean root coverage of 83.4%, Dodge et al. (1998) mean recession reduction of 2.89± 1.23mm and Harris RJ (2000) with mean root coverage of 96.2%, the results obtained were within the range of reported root coverage. [4]

This may be attributed to the use of ADM which shows a better predictability in root coverage due to the presence of collagen, which forms a major portion of ADM graft extracellular matrix. It was also found that collagen stimulates platelet attachment, enhances fibrin linkage, acts chemotactic for fibroblasts, inhibits apical migration of epithelium allowing undifferentiated mesenchymal cells to repopulate the space and promote regeneration resulting in a stable attachment of the covering flap to the previously denuded root surface, thus preventing the “subsidence of epithelium”. During healing period, the ADM graft might have acted as a shock absorber, deflecting the undue forces that otherwise would be transmitted to the fragile maturing fibrin clot on the root surface. In this way, ADM graft facilitates better tissue maturation, resulting in long term coverage.[5]

But in our study no statistical significant difference was observed in the recession height of control group between the intervals (P-value: 0.317; 11.93%). It might be due to several factors, one among them is the gingival thickness being ≤ 1mm. It is attributed to the fact that the coronally positioned flap is a predictable means of root coverage under defined conditions. These conditions include: 1) shallow recession of ≤4 mm; 2) Miller Class

I recession; 3) keratinized tissue width ≥3 mm; and 4) gingival thickness of ≥1 mm. But, Baldi C et al. (1999) attributed success in coronally positioned flap, primarily to marginal thickness alone, which was reported to be ≥0.8 mm.

Other reports have evaluated the influence of various factors on CPF technique and show slightly better results for sites that received polishing alone compared to those receiving root planning and flaps sutured with no tension compared to those with tension. Whereas in the present study polishing was not included.[6]

No statistical significant difference in the recession height reduction was detected between case group (0.93±0.84) and Control group (0.57±0.53) 6 months after surgery (P-value: 0.222). This is in accordance with the study conducted by Cortes Ade Q et al. (2004), meta-analysis conducted by Gapski R et al. (2005) which did not demonstrate any difference between ADM versus CAF for recession coverage and Henderson RD et al. (2001) reported that the surface orientation of the acellular dermal matrix did not affect the treatment outcome. It can be attributed to variation in tooth position and/ or alignment and/ or the level of the gingival margin on the adjacent teeth and also to small sample size.[7] It can also be due to the small sample size and operator discrepancies. The gingival thickness in the present study was statistically significant in the case group (P-value: 0.020) at intervals and in comparison, between the groups (P-value: 0.038). These results are in correlation with the studies done by Harris RJ (1998), Henderson RD et al. (2001), Woodyard JG et al. (2004), Aichelmann-Reidy et al. (2001), and Paolantonio M et al. (2002). The increase in the thickness might be due to integration of the ADMA graft membrane with the overlying flap. The role of collagen membranes cannot be underestimated or overlooked because collagen membranes can increase tissue thickness via membrane integration.[8] In the present study, no statistical significance in clinical attachment level was shown in control group (P-value: 0.180) between the intervals and in comparison, between the groups (P-value: 0.222). But, mean gain in the clinical attachment level for case group (P- value: 0.039) between intervals was shown. Since, no histological evaluations were available, the type of healing obtained between the ADMA and previously denuded root surface can only be speculated on. Based on the reports of ADMA, matrix would revascularize via preserved vascular channel and that it would integrate into the host tissue (Bern moulin et al, 1975; Yukna et al, 1977; Vernino et al, 1986). At the same time ADMA may also act as a barrier equivalent to selective cell repopulation membrane, thus encouraging periodontal guided tissue regeneration.[9]

According to Harris RJ,1994 the observed clinical changes probably represent a combination of new connective tissue attachment in the apical half of the defect and the presence of long junctional epithelial attachment in the coronal half.[7] No statistically significant difference was shown in probing depths for case (P-value: 0.317) and control groups (P-value: 0.317) between intervals and in comparison, between the groups ((P-value: 1.00). This was in accordance with the study conducted by Mahajan A et al. (2007). This might be because only patients whose baseline probing depths were compatible with gingival health were included in the study.[5]

No statistically significant difference in gingival index and plaque index for case (P-value: 0.157, 0.046) and control groups (P-value: 0.157, 0.046) between intervals and in comparison, between the groups (P-value: 1.00, 1.00) indicates that both the groups maintained same level of oral hygiene and the slight increase in the PI

values might have been a result of exposed dentine which is sensitive to tooth brushing. However these changes are not clinically significant.[9]

In consideration of the improvement of clinical parameters, the findings of the present study indicated that, a superior thickness of the gingival tissue can be obtained with the Acellular dermal matrix.

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Legend figure

Figure 1: armamentarium

Figure 2: acellular dermal matrix in saline

Figure 3: preoperative view of control subject

Figure 4: preoperative view of case subject

Figure 5: flap incision

Figure 6: flap reflection

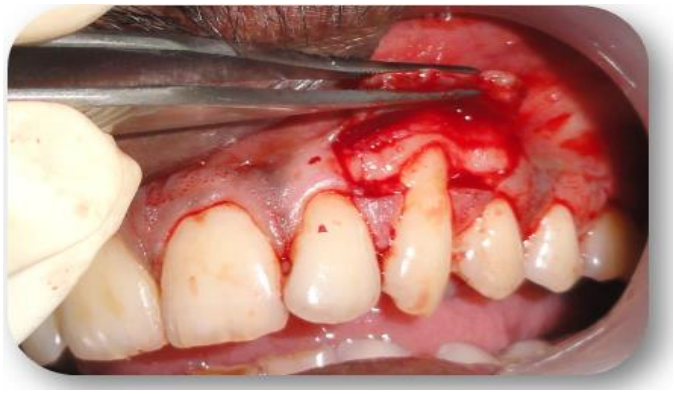

Figure 7: a cellular dermal matrix placement

Figure 8: suture placement

Figure 9: post operative view of control subject

Figure 10: post operative view of case subject

Table 1: Comparison of various periodontal parameters between the groups at baseline and 6 months

Parameter	Control Group Mean ±SD	Case Group Mean ±SD	P Value	SIG
Recession height	0.43±0.53	0.57±0.53	0.317	Not significant
Gingival thickness	0.29±0.49	0.71±0.49	0.027	significant
Plaque index	0.57±0.53	0.57±0.53	1.000	Not significant
Gingival index	0.29±0.49	0.29±0.49	1.000	Not significant
Probing depth	0.14±0.38	0.14±0.38	1.000	Not significant
Clinical attachment level	0.71±0.49	1.07±0.90	0.180	Not significant

Table 2: Comparison of various periodontal parameters within the case group at baseline and 6 months.

Variables	Baseline	6 Months	Mean Difference	P-Value	SIG
Recession height	2.43±0.53	1.86±0.69	-0.57±0.16	0.046	Significant
Gingival thickness	1.00±0.00	1.71±0.49	0.71±0.49	0.025	Significant
Plaque index	0.00±0.00	0.57±0.53	0.57±0.53	0.046	Significant
Gingival index	0.00±0.00	0.29±0.49	0.29±0.49	0.157	Not significant
Probing depth	1.14±0.38	1.00±0.00	-0.14±0.38	0.317	Not significant
Clinical attachment level	3.71±0.76	2.57±0.79	-1.14±0.03	0.038	Significant

Table 3: Comparison of various periodontal parameters within the control group at baseline and 6 months.

Variables	Baseline	6 Months	Mean difference	P-Value	SIG
Recession height	2.43±0.53	2.00±0.58	-0.43±0.05	0.083	Not significant
Gingival thickness	1.00±0.00	1.29±0.49	0.29±0.49	0.157	Not significant
Plaque index	0.00±0.00	0.57±0.53	0.57±0.53	0.046	significant
Gingival index	0.00±0.00	0.29±0.49	0.29±0.49	0.157	Not significant
Probing depth	1.14±0.38	1.00±0.00	-0.14±0.38	0.317	Not significant
Clinical attachment level	3.57±0.53	3.14±0.69	-0.43±0.16	0.180	Not Significant