



Research Article

Evaluating the efficacy of human placental amnion membrane in combination with modified coronally advanced flap technique in the management of gingival recession: An interventional study

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ABSTRACT

Aims and objectives: A common problem experienced by adults is the recession of the gingiva resulting in unpleasant appearance of their teeth. There are various techniques to achieve the gingival recession coverage (GRC). But, only few techniques such as connective tissue grafts, coronally advanced flap technique (CAF) have been proved effective in achieving 100% recession coverage. The present study aims at evaluating the efficacy of amnion membrane along with CAF in the management of GRC. **Materials and methods:** A total number of 10 patients with class I or class II gingival recession were included in the study. The clinical parameters such as Probing depth (PD), clinical attachment level (CAL), thickness of attached gingiva (TAG), width of keratinized gingiva (WKG), height of gingival recession (HGR), percentage of recession coverage (PRC) and recession coverage esthetic score (RCES) were measured at baseline, 3 months and 6 months post-operatively. The patients were treated using amnion membrane in combination with modified coronally advanced flap technique (MCAF).

Results: The patients showed statistically significant improvement in all the clinical parameters at the 3 months and 6 months follow-up visit. 97.8% CRC was observed by the end of 6 months. Moreover, the RCES showed remarkable esthetic outcome at the post-operative 6 months visit. **Conclusion:** Modified coronally advanced flap technique produces excellent clinical outcomes in terms of GRC. The use of amnion membrane aids in faster healing and improves the TAG which is an important aspect for the long term stability of the results obtained.

Keywords: Amnion membrane; Coronally advanced flap; Gingival recession; Guided tissue regeneration; Recession coverage

1 INTRODUCTION

Gingival recession (GR) can occur due to various reasons. Hall in 1984 proposed various pre-disposing and precipitating factors that result in recession of the gingiva.⁽¹⁾ However, the management of the GR is not only confined to eliminating these factors but also in repositioning the gingiva to its original position. Numerous recession coverage techniques have evolved ever since the concept of recession coverage earned fame. However, the outcome of such procedures is greatly dependent upon the class of gingival recession as given by PD Miller. 100 % recession coverage is possible in class I and class II GR cases, whereas, class III and class IV cases show fairly grim prognosis.

Zuchelli & Sanctis in 2000 demonstrated a modification of the coronally advanced flap (MCAF) and it was seen to be an effective treatment modality for the management of multiple recession defects affecting adjacent teeth in the esthetic region of the mouth.⁽²⁾ The flap was raised with a split-full-split approach in the coronal-apical direction and finally the flap was advanced and sutured in the most coronal position clinically possible. This surgical technique ensued CRC in majority of the treated cases. At the 1-year post treatment examination, 88 % of the class I and II gingival defects were successfully covered.

Guided tissue regeneration (GTR) using different allograft membranes has been employed to treat GR defects and it has produced assuring results. The impending advantage of

GTR is the likelihood of devising a different healing pattern and preferably accomplishing periodontal regeneration.

Human placental membranes i.e., amnion and chorion, have been used in the field of medicine for skin grafts, treatment of burns and ulcerated skin conditions with great success.⁽³⁾ The use of placental allografts in dentistry is a more recent development and its unique inherent biologic properties enhance wound healing and may propagate regeneration. Therefore, the idea of using these membranes for GTR evolved since then.

The foetal membranes also have unique property of anti-adhesive effects, bacteriostatic in nature, wound protection, pain reduction and epithelialization effect. The amnion membrane also lacks immunogenicity.⁽³⁾

Thus the aim of the present study is to evaluate the efficacy of amnion membrane in combination with MCAF for the management of Miller's class I and class II recession cases in the maxillary anterior teeth.

2 MATERIALS AND METHOD

Ten patients (6 females and 4 males) who reported to our department with a complaint of dentinal hypersensitivity or long tooth appearance of maxillary anterior teeth were included in the study. Both isolated defect and multiple site defects were considered. Institutional ethical committee approval was attained before commencing the study. The patients were explained regarding the treatment protocol and written informed consents were obtained from all the patients who agreed to participate in the study. The criteria for inclusion of the patients are as follows: 1. Systemically healthy individuals without any debilitating diseases 2. Miller's class I and class II GR defects in isolated or multiple adjacent teeth in maxillary anterior region (Figure 1). The exclusion criteria for the study were: 1. Patients with oral abusive habits such as smoking, tobacco chewing 2. Miller's class III and class IV defect cases 3. Pregnant and lactating women.



Fig. 1: Pre-operative image of the Miller's class I gingival recession in relation to #23

Following non-surgical periodontal therapy and oral hygiene instructions that included modified Stillman brushing technique, the clinical parameters such as probing depth (PD), clinical attachment level (CAL), width of keratinized gingiva (WKG), thickness of attached gingiva

(TAG), height of gingival recession (HGR), percentage of recession coverage (PRC) and recession coverage esthetic score (RES) were measured at baseline. PD, CAL, WKG and HGR were measured using a UNC 15 periodontal probe. TAG was calculated by means of an endodontic file and digital Vernier calliper, and the values were documented. The patients were advised to report for the surgical therapy once they showed an acceptable level of oral hygiene status. The surgical treatment was carried out in a total of 24 defect sites. The surgical procedure of MCAF was performed by the same operator (PR) to all the patients so as to avoid any chances of inter-operator bias.

The esthetic results accomplished after the therapy were gauged by the blinded examiner (MV) with the help of RCES given by Cairo et al., in 2009.⁽⁴⁾ The RCES related three photographs of the defect sites captured at the baseline and at 3 months and 6 months post-operative visits.

During the scheduled appointment for the surgery, the patients were given local anaesthesia with lignocaine HCl with adrenaline 1:1,00,000 ratio. The clinical parameters were recorded for the baseline data and oblique incisions were placed above the base of the papilla in relation to the defect sites (Figure 2). A split-full-split thickness flap without any vertical releasing incisions was reflected extending slightly beyond the mucogingival junction (Figure 3). Once the flap was tension free to coronally advance, amnion membrane was trimmed according to the size and extent of the defect and placed over the root surfaces of the involved teeth (Figures 4 and 5). After de-epithelializing the papillae, the flap was then coronally advanced and figure of 8 sutures were placed with 6-0 Vicryl resorbable suture material (Figure 6).



Fig. 2: Oblique incisions given above the interdental papillae considering the height of gingival recession and gingival zenith of the adjacent teeth

Post-op instructions and medications comprising of 500 mg of amoxicillin TID for 5 days, 400 mg of ibuprofen BD for 5 days, 10 mL of 0.2% chlorhexidine mouth rinse twice daily for two weeks was prescribed for the patients. The patients were scheduled for suture removal 10 days post-operatively, and for subsequent follow-up visits at 3 months and 6 months.



Fig. 3: Split-full-split thickness flap elevation in relation to #22, #23 and #24 to allow coronal advancement



Fig. 4: Freeze-dried and irradiated amnion membrane prepared for placement underneath the flap



Fig. 5: Amnion membrane trimmed according to the defect size and placed over the recipient site in relation to #23



Fig. 6: Flap coronally advanced and sutured using 6-0 vicryl suture material

2.1 Statistical analysis

The values of the clinical parameters recorded at baseline, 3 months and 6 months post-operatively, were analysed using SPSS software version 18. The values of each parameter was considered statistically significant if the p value was <0.001. ANOVA test and post-hoc Bonferroni test were carried out to contrast the baseline values with that of 3 months and 6 months post-operative values. The PRC was calculated using the formula $\text{baseline} - 6 \text{ months post-op}$

$\text{value}/\text{baseline} \times 100$.

3 RESULTS

At the time of suture removal, all the patients showed uneventful healing in both the donor as well the recipient sites. The patients reported minimal to no post-operative discomfort. Furthermore, none of the patients reported of pain or swelling in the operated sites.

The results of the statistical analysis revealed that there was statistically significant improvement with $p < 0.001$ in all the clinical parameters, from baseline to 3 months and 6 months (Table 1). Most importantly, the HGR reduced from $3.21 \pm 0.71 \text{ mm}$ to 0.10 ± 0.70 at the 3 months and 6 months follow-up visit (Figures 7 and 8) (Table 1).



Fig. 7: Uneventful healing and complete recession coverage achieved in relation to #23



Fig. 8: 6 months post-operative recall visit revealed that the achieved percentage of recession coverage remained stable

In terms of percentage of root coverage, 23 out of 24 sites in the ten patients achieved 100% root coverage at 3 months, 22 out of 24 sites retained the 100% root coverage 6 months post-surgically. The overall root coverage percentage achieved at 6 months post-operatively was $96.80 \pm 3.21 \%$. RES showed high aesthetic outcome of score 9.2 ± 1.0 .

4 DISCUSSION

The coronally positioned flap procedure introduced by Norberg in 1926 is an esthetic surgical procedure for root coverage with a coronally displaced mucogingival flap.⁽⁵⁾ This technique can be used for root coverage of a single tooth as well as multiple teeth, provided donor tissue is available. In 1992, Pini Prato coined the term coronally advanced flap (CAF) technique. Several modifications have been done following this with very good success rate, latest being in

Table 1: Assessment of the clinical parameters from baseline to post-operative 3 months and 6 months follow-up

| Parameters | Values (mean±SD) | P-value | Post-hoc test |
|------------|------------------|---------|---------------|
| PPD base | 3.14±0.35 | <0.001 | B>3,6 |
| PPD 3 | 1.72±0.21 | | |
| PPD 6 | 1.72±0.21 | | |
| CAL base | 4.19±0.76 | <0.001 | B>3,6 |
| CAL 3 | 2.45±0.55 | | |
| CAL 6 | 2.45±0.55 | | |
| TAG base | 1.53±0.37 | <0.001 | 6,3>B |
| TAG 3 | 2.61±0.39 | | |
| TAG 6 | 2.89±0.21 | | |
| WKG base | 4.53±1.86 | <0.001 | 3,6>B |
| WKG 3 | 6.87±1.63 | | |
| WKG 6 | 6.87±1.63 | | |
| HGR base | 3.21±0.71 | <0.001 | B>3,6 |
| HGR 3 | 0.10±0.70 | | |
| HGR 6 | 0.10±0.70 | | |

Repeatedmeasures ANOVA with post-hoc Bonferroni test

2000 and 2007 by Zuccheli and De Sanctis.^(2,6)

It is mainly indicated in Miller's class I and class II isolated or multiple gingival recession cases, in cases were esthetics is of prime concern and also in combination with free gingival graft for increasing the width of attached gingiva as two stage procedure. However, this technique is not advocated if there is lack of attached gingiva.

The advantages of employing MCAF are, it is a simple technique, there is no involvement of adjacent site unlike other pedicle graft techniques, and neither does it require a second surgical site. The results of MCAF have provided high degree of success and most importantly, multiple teeth can be treated at a time.⁽⁷⁾ Therefore, in the present study, MCAF technique was chosen as the method of choice to achieve GRC.

The noteworthy properties of amnion membrane for GTR are antimicrobial, anti- inflammatory, endorses hasty angiogenesis, epithelialization and above all a plentiful resource of stem cells.⁽⁸⁾ Thus, amnion membrane was the GTR membrane of choice for coverage of the GR.

Chakraborty in 2015 performed a study were in amnion and chorion allografts were used in combination with coronally advanced flap for the treatment of gingival recession.⁽⁹⁾ The clinical outcome of the study suggested that both amnion membrane and chorion membrane show statistically significant improvement in terms of PRC. It was concluded that these foetal membranes are versatile allograft material that can be successfully used for the treatment of root coverage.

This is in accordance with the outcome of the present study were MCAF along with amnion membrane was used to achieve GRC. The PRC achieved in the study was 96.8% and the results remained stable even during the 6 months

follow-up.

Gingival biotype i.e., thickness of attached gingiva (TAG) is a substantial forecaster for the long term stability of clinical outcome of GRC.⁽¹⁰⁾ The present study showed significant gain in TAG at both the 3 months and 6 months follow-up visits. This gain in TAG could be contributed to the use of amnion membrane which is abundant in growth factors. This is in accordance with studies by Poornima R et al and Esteves et al who used foetal membranes along with GRC procedures and the results of the studies had shown considerable improvement in the clinical outcomes.^(11,12)

5 CONCLUSION

MCAF is a promising recession coverage technique that not only achieves excellent treatment outcome, but also avoids the second surgical site. This allows exceptional patient co-operation as well as good colour match, thereby accomplishing commendable recession coverage esthetic score. This outcome is enhanced by the use of amnion membrane which not only improves the vasculature and hastens the healing, but also supplies copious amount of growth factors to aid in achieving better results. Further long-term studies are required to validate the results of the present study.

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Conflict of interest: None declared

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