

TREATMENT OF ISOLATED GINGIVAL RECESSION DEFECT USING AMNIOTIC MEMBRANE AS A GTR MEMBRANE: A CASE REPORT

Case Report

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ABSTRACT: GTR based root coverage has emerged as a promising treatment modality for gingival recession. A variety of non-resorbable and bioresorbable membranes have been used. Among resorbable membranes, collagen has been extensively studied. Recently, amnion membrane, the 3rd generation membrane which is a placental derived tissue has been introduced. On basis of the findings of the present case report, it can be concluded that amnion membrane are efficacious in the treatment of gingival recession and use of this resorbable membranes with coronally advanced flap is an effective treatment modality for root coverage of isolated buccal gingival recessions. Also, Amniotic membrane has better handling properties and a thin sectional-thickness which enables it to be moulded according to the defect anatomy and root surfaces easily.

Keywords:

Amnion membrane, Guided tissue regeneration, recession, coronally advanced flap

Source of support: Nil

Conflict of interest: None

INTRODUCTION: Gingival recession is relatively prevalent in the general population and is associated with a multitude of aesthetic and functional problems, including unfavourable aesthetics, tooth hypersensitivity, pulp hyperaemia, and root caries. It reduces the zone of attached gingiva which can further make individuals difficult to maintain proper oral hygiene. Autograft tissue currently remains the “gold standard” of periodontal plastic surgery. It provides an excellent predictability and excellent long-term root coverage, but it has limitations of donor morbidity, creation of a second surgical site and limited availability. Hence, allografts can be an effective option for root coverage procedures.[1,2,3]

Placental membrane allograft is about 10-15µm thick and constitutes of two fetal membranes, the inner amniotic membrane and the outer chorion.[4] The amniotic membrane is composed of three major layers: A single epithelial layer, a thick basement membrane and an avascular mesenchyme. It contains no nerves, muscles or lymphatics and can be easily

separated from the underlying chorion.2In the field of periodontics, recently Velez and co-workers analyzed the effects of the cryopreserved amniotic membrane on periodontal soft tissue healing and observed that it was effective in helping cicatrization, wound healing, epithelization, facilitated migration, and reinforced adhesion. Diño et al. demonstrated for the 1st time that amniotic membrane could be separated, sterilized and safely used at a later date. Gurinsky was the first person who reported processed allograft amnion as an effective alternative to autograft tissue in the treatment of gingival recession defects.[4]

Hence, reporting a case of gingival recession treated using amniotic membrane.

CASE HISTORY: A 36-year-old male patient reported to the Department of Periodontology at Rama Dental College, Hospital and Research Centre, Kanpur with a chief complaint of tooth hypersensitivity in the upper left back tooth region

since 3 months. His medical and family history was non-contributory.

CLINICAL EVALUATION: On clinical examination, Miller's Class I recession was observed in relation to maxillary left first premolar measuring 3 mm vertically (Figure 1).



Figure 1: Pre-operative view

The patient had a thin gingival biotype. The patient was evaluated for the following clinical parameters; gingival recession depth (RD), probing depth (PD), clinical attachment loss (CAL), width of attached gingiva and gingival biotype thickness, at baseline, 1, 3, and 9 months. All measurements were performed by one examiner.

TREATMENT PLANNING: The treatment plan consisted of placement of an amnion membrane in conjunction with a coronally advanced gingival flap i.r.t. [24].

CLINICAL PROCEDURE: A customized acrylic stent was fabricated and was used to make all the measurements, to ensure accuracy and reproducibility of readings. RD measured from the cemento-enamel junction (CEJ) to the gingival margin using University of north California-15 (UNC-15) periodontal probe. PD was measured as the distance between gingival margin to the bottom of the sulcus and CAL was measured as the distance from CEJ to the base of the sulcus.

RD - 3mm.

PD - 1mm.

CAL- 4mm.

SURGICAL PROCEDURE: After thorough Phase I therapy, an informed consent was taken from the patient in written. On the surgical day, the surgical area was adequately anaesthetized using Lignocaine hydrochloride 2% containing 1:2,00,000 adrenaline (Xylocaine) Preoperative measurements were made (Figure 1) Two oblique beveled incisions, one on the mesial aspect and the other on the distal aspect of the recession site, to raise a trapezoidal flap followed by two vertical incisions extending into the alveolar mucosa

were given (Figure 2).



Figure 2: Trapezoidal flap followed by two vertical incisions extending into the alveolar mucosa was raised

A trapezoidal full-thickness flap was elevated, following which the exposed root surface was thoroughly planed and convexity of root surface was reduced (Figure 3). The papillae were de-epithelialized. Tetracycline solution was applied to the root surface for root biomodification, which was followed by thorough saline irrigation (Figure 4).



Figure 3: Trapezoidal full-thickness flap reflection

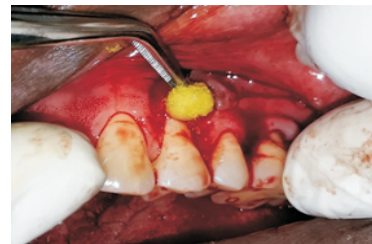


Figure 4: Root biomodification using tetracycline HCL (10% pH 2.2)

After the flap was raised, the recession height was measured using a UNC-15 probe and the amniotic membrane was trimmed 2mm more on each side, to the size of the treatment site (Procurement of amniotic membrane was done from the Tissue bank, Tata Memorial Hospital, Mumbai) (Figure 5).



Figure 5: Amniotic membrane trimmed to the size of treatment size

The membrane was then placed over the root surface (Figure 6) and the flap was coronally advanced and sutured using 5-0 non-resorbable silk suture (Figure 7). The final position of the flap margin was positioned 3-4mm coronal to CEJ of the tooth. Because of the adhesive properties of the amnion, the membrane was not required to be sutured. Periodontal dressing was given (Figure 8).



Figure 6: Amniotic membrane placement



Figure 7: Sutures placed advancing the gingival margin coronally



Figure 8: Coe-pac placed

Patient was advised postoperative oral hygiene instructions and was advised not to brush on the operated area for 10 days. Diclofenac sodium (50 mg) twice daily for 3 days and a chlorhexidine mouthrinse 0.2% twice daily for 2 weeks were prescribed to the patient. Patient was recalled after 10 days for suture removal. (Figure 9)

Thereafter, all the clinical parameters were recorded at 1, 3 and 9 months. (Figure 10-12)



Figure 9: 10th day post-operative view



Figure 10: 1 month post-operative view



Figure 11: 3 months post-operative view



Figure 12: 9 months post-operative view

Complete root coverage, with excellent tissue contour and colour blend, was observed over the 9 months period follow-up. Tissue biotype was also observed to be enhanced as compare to baseline, as assessed using the probe transparency method. The results were stable and satisfactory, with positive patient's response towards the procedure.

RD - 0mm.

PD - 0mm.

CAL - 0mm.

DISCUSSION: Present case of isolated Miller's class I gingival recession was treated using coronally advanced full-thickness flap with amniotic membrane, to achieve adequate root coverage, was found out to be successful treatment modality.

Coronally Advanced flap has been reported with many advantages such as maintaining the original blood supply, excellent tissue and colour blend postoperatively. It has been used in conjugation with amniotic membrane by Shah R et al. and Mehta TN et al. in their respective studies, observing good root coverage potential of CAF with amniotic membrane. Amnion membrane as a GTR membrane contains a variety of specialized proteins such as fibronectin,

laminin, proteoglycans, and collagen Types IV, V, and VII. It not only provides matrix for cellular migration and proliferation but also enhances the wound healing process.[4,5,6]

As the literature mentions, placental membrane has been reported to be immunomodulatory, expressing low levels of major histocompatibility complex (MHC) class I surface antigens but no expression of MHC class II antigens, neither expression of the programmed cell death receptor nor its two ligands. Mesenchymal stem cells(MSCs) in the AM decrease the secretion of the pro-inflammatory cytokines like tumor necrotic factor alpha (TNF-alpha) and interferon (IFN), while increasing the production of anti-inflammatory cytokines and interleukins such as (IL) 10, IL -4, IL-1alpha and IL- 1beta. Amnion reduces recruitment of various inflammatory cells including polymorphonuclear cells, CD3 cells, CD4 T cells, and CD11b cells to the injured site thereby expressing its Anti-inflammatory characteristic.[5,7,8]

Amnion has shown an ability to form an early physiologic “seal” with the host tissue, precluding bacterial contamination, leading to its Antimicrobial effect. This is in accordance with the study by Hao et al., which showed the ability of amnion to decrease host immunologic response via mechanisms such as localized suppression of polymorphonuclear cell migration. Firm adherence barrier with the wound is formed via fibrin and elastin linkages.[3,5,9]

Amnion has shown reduced scar tissue formation attributing to its property of secreting vascular endothelial growth factor (VEGF), hepatocytes growth factor (HGF) that maintains a proper balance between transforming growth factor-1(TGF-1) and TGF-3 that prevents scarring. Also it down-regulates TGF-beta and its receptor expression by fibroblast that causes reduction in fibrosis at the site.[4,5,10]

Reduction of pain has also been reported at the site of application. Soft mucoid lining of amniotic membrane protects the exposed nerve endings from external irritant that help to decrease pain sensation. Amnion membrane is also readily obtainable in large amounts and its preparation and storage are relatively low in cost.[4,5,11]

The present case showed success with amnion allograft in covering denuded root surface and also excellent color match to the recipient site. The results were stable for 3 and 9 months post-treatment and no recurrence of recession was observed. As explained by Borghetti and Gardella, any root coverage that is achieved after a month is considered a “creeping attachment”, the following was observed from 3 to 9 months.

Induction of increased amounts of fibroblasts and newly formed blood vessels under presence of vascular growth factor in amnion membrane could accelerate angiogenesis and tissue maturation; these may be responsible for preventing necrosis of the coronal portion of the flap, resulting in better healing and more creeping attachment.[1,12,13]

Gingival thickness also added up from thin biotype to thick biotype following use of amniotic membrane in the following case. This increase of thickness can be attributed to presence of Type I, III, IV, V, and VII collagen, in addition to laminins and fibronectin.[1]

Another few advantages of amnion over other membrane observed during surgical procedures were better handling properties. Amniotic membrane is of around 300nm in cross-sectional thickness unlike the other collagen membranes used for guided-tissue-regeneration which are around 700-800nm, enabling it to mould according to the defect anatomy and root surfaces easily.[5,14]

The results of the present case report are encouraging and suggest that amnion is highly compatible with gingival tissues. This case report paves a way for future studies to measure more accurate long-term results of amnion membrane as an allograft in periodontal therapies.

CONCLUSION : The use of resorbable membranes with coronally advanced flap is a novel and versatile treatment modality for root coverage of an isolated buccal gingival recession. However, preserved human amnion membrane is a novel tissue engineered biomaterial with certain additive advantages over other membranes. Amnion provides rich source of stem cells which strengthen the fact that membrane is indeed a reservoir for regeneration. Thinness of membrane aides it to be placed in narrow interproximal areas, while its tough core promotes rapid epithelisation, self-adhering property and enhanced wound-healing properties allow it to be an effective option for root coverage procedure.

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