

**Coronally Advanced Flap with Chorion Membrane in Treatment of Gingival Recession- A Case Report**

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**Abstract**

Various biomaterials have been used for treatment of gingival recession. Use of biomaterials in treatment of gingival recession reduces morbidity and the need for second surgical site. In this case report chorion membrane along with coronally advanced flap was used for treatment of gingival recession. Significant recession coverage along with enhancement of gingival biotype was observed 6 months postoperatively. Chorion membrane possesses distinctive properties of wound healing and may lead to

periodontal regeneration. Thus chorion membrane can be used as an alternative to other conventional procedures for treatment of gingival recession.

**Keywords:** Gingival recession, Chorion membrane, Coronally Advanced Flap

**Introduction**

Gingival recession (GR) is referred to as apical migration of marginal gingiva beyond cemento-enamel junction causing exposure of root surface. <sup>(1)</sup> It is an unwanted condition. It is prevalent in localized and generalized form

as well as in persons with good and poor oral hygiene. Possible outcome of gingival recession are root caries, hypersensitivity and are often unaesthetic. Denuded root surfaces also are liable to abrasion.<sup>(1)</sup>

Various causative factors are responsible for gingival recession such as microbial induced periodontal disease, faulty brushing, anatomical factors, aberrant frenum attachment, orthodontic tooth movement, iatrogenic factors.<sup>(2)</sup>

Various surgical measures and designs of flap, including free gingival graft (FGG), subepithelial connective tissue graft (SCTG), acellular dermal matrix (ADM), enamel matrix derivative (EMD), guided tissue regeneration (GTR) with resorbable or non-resorbable membrane, coronally advanced flap (CAF) and laterally positioned flap (LPF), have been advocated for treatment of GR. Regardless of all the afore-mentioned procedures, autografts persist as treatment of choice in periodontal plastic surgery. Added surgical site for the obtaining autogenous graft considerably increases patient morbidity while also increasing the interval of surgery.<sup>(3)</sup>

Hence various other additive materials are available like the acellular dermal matrix (ADM), Platelet Rich Fibrin (PRF) as membrane, amnion membrane (AM), chorion membrane (CM), and hyaluronic acid (HA).

Placental allografts are emerging biomaterials in treatment of GR. Fetal membranes possess characteristic properties of promoting wound healing and promoting regeneration. Fetal membranes consist of amniotic and chorion tissues.<sup>(4)</sup>

The chorion forms the external boundary of the sac which encloses the fetus and is composed of various types of collagen and cell adhesion bioactive factors. These factors help in the formation of granulation tissue by stimulating fibroblast growth and neovascularization.<sup>(4)</sup> The chorion is

rich in Type I, IV, V, and VI collagen; proteoglycans; laminin; and fibronectin. CM exhibit various distinctive properties, including antiadhesive effects, bacteriostatic properties, wound protection, pain reduction, and epithelialization effects.<sup>(5)</sup> Both CM and AM are now being used as a cost effective allogenic substitute for treatment of GR.

To overcome an additional surgical site for procurement of autologous graft for treatment of GR, in this case CM was used in an adjunct to CAF in treatment of GR

### Case Report

A 33 year old female patient reported to Department of Periodontology, Sri Aurobindo College of Dentistry, Indore (Madhya Pradesh) with chief complaint of sensitivity and receding gums in upper right front tooth region since 1 year. Her medical and family history was non contributory. On intraoral examination millers class I gingival recession was seen in relation to tooth no #13 with recession depth (distance from cemento-enamel junction to gingival margin) of 4 mm. Root coverage options were explained to her and was planned for treatment using chorion membrane (Tissue bank, Tata memorial Hospital, Mumbai) (Figure-1) along with CAF. Patient was informed about the source of material (CM) and a written informed consent was obtained

### Clinical procedure-

Routine radiographic and blood investigations were carried out. Phase I therapy was performed including scaling and root planing (SRP), oral hygiene instructions and occlusal adjustments. Patient was recalled after 1 week of phase I therapy for periodontal re-evaluation.

Measurement of recession depth was standardized using acrylic stent fabricated on cast for surgical site (Figure-2). Gingival thickness measurement was done using endodontic plugger and stopper at midpoint of line joining

gingival margin to mucogingival junction of the tooth (Figure-3).

After preoperative antisepsis and local anaesthesia of the surgical site, crevicular incision extending horizontally to adjacent papilla and two vertical incision extending beyond mucogingival junction starting from mesial and distal line angles of the adjacent teeth on both side was given and trapezoidal partial thickness flap was raised. Papillas adjacent to involved tooth were de-epithelised to create vascular beds for the surgical papilla of CAF. Exposed root surface were planed using surgical curettes. (Figure-4)

Commercially available sterilised CM (Tissue bank, Tata Memorial Hospital, Mumbai) was cut into desired shape and length with scissors and placed over recession defect (Figure-4). The flap was coronally advanced and sutured (Figure-5). A tin foil and periodontal dressing was placed over the surgical site.

She was advised to use 0.2% chlorhexidine digluconate mouth rinse, twice daily. Systemic analgesics were prescribed and patient was advised to follow the routine postoperative instructions. The dressing and sutures were removed 14 days after surgery.

Patient was re-evaluated at 3 months (figure-6) and 6 months (Figure-7) postoperatively.

At postoperative recall intervals recession depth was decreased from 4 mm to 2mm and enhancement of gingival biotype was observed.

## Discussion

There are studies supporting the predictable and evident effect of chorion membrane.

**Janice esteves (2015)<sup>(6)</sup>** in a case series treated 21 class I miller gingival recession defect with modified CAF together with chorion membrane placement. Results demonstrated 89.92%±15.59% mean percent root coverage, and 14 out of 21 treated GR sites showed 100%

Recession coverage. At 9 sites thick biotype was seen which were initially having thin biotype.

**Sonali chakraborty (2015)<sup>(7)</sup>** in a study compared Amnion membrane and Chorion membrane for coverage of recession and demonstrated improvements in several clinical parameters which consist of, reduction in Recession depth, Recession width, increment in Width of keratinized gingiva, increase in Clinical attachment level and outstanding gingival chromatic integration but CM is easier to handle as compared to Amnion membrane as thickness of chorion is more as compared to amnion membrane.

**Priyanka chopra (2018)<sup>(8)</sup>** in a study compared efficiency of CAF alone and along with CM and demineralized freeze-dried bone allografts for covering exposed root and proved favourable outcomes with chorion membrane

**Dandekar et al (2018)<sup>(9)</sup>** compared Platelet Rich Fibrin and CM along with CAF and proved that CM is more efficacious in terms of height of recession, width of recession, Width of keratinized gingiva and Gingival thickness.

Chorion membrane is made up of various types of collagen and cell adhesion bioactive factors.<sup>(10)</sup> These are identified to stimulate the formation of granulation tissue by enhancing fibroblast growth and neovascularization.<sup>(11)</sup> These characteristics indicate that a CM has significant regeneration potential. The chorion membrane used has numerous advantages because of its structure and composition. Structurally, it comprises of the following layers: 1) reticular; 2) basement membrane; and 3) trophoblasts.<sup>(6)</sup> The extracellular matrix comprises collagen Types I, III, IV, V, and VI and cell-adhesion bioactive factors, such as fibronectin and laminin.<sup>(6,12)</sup> The native property of collagen being bioabsorbable, hemostatic and also it is well tolerated which enhances

migration of adjacent autogenous connective tissue.<sup>(11)</sup> Fibronectin is responsible for many cellular processes, consisting of tissue repair, blood clotting, cell migration, and adhesion.<sup>(12)</sup> Laminin has a high affinity for binding epithelial cells, and in contrast to traditionally available membranes, this membrane allows for rapid epithelial cell growth rather than epithelial exclusion.<sup>(13)</sup> In addition, the matrix of the CM comprise of abundant growth factors, such as keratinocyte growth factor, basic fibroblast growth factor, and transforming growth factor- $\beta$ , that enhances periodontal regeneration and provide a natural environment for enhanced tissue repair.<sup>(14,6)</sup>

The increase in gingival thickness using chorion membrane may be due to the presence of large number of pro-angiogenic growth factors, including angiogenin, angiopoietin-2, epidermal growth factor (EGF), fibroblast growth factor (bFGF), hepatocyte growth factor (HB-EGF, HGF), platelet derived growth factor (PDGF-BB), placental growth factor (PIGF) and vascular derived growth factor (VEGF). These growth factors enhances endothelial recruitment and better vascularisation, promotes the potential blood supply to the flap connective tissue.<sup>(15)</sup> In basement membrane collagen type 4, fibronectins and laminins are present. Immunohistochemical staining analysis of CM provided high concentrations of laminin and laminin-5 throughout the barrier.<sup>(16)</sup> Laminin-5 is particularly important because of its high affinity to bind gingival epithelial cells for better root surface adaptation.<sup>(17)</sup> The chorion tissue contains tissue inhibitor of metalloproteinases (TIMPs) which suppress MMPs and transforming growth factor  $\beta$  (TGF- $\beta$ ) which stimulates the production of TIMPs from the surrounding tissue. Hence, these proteins suppress inflammation and collagen degradation.<sup>(18)</sup> The above properties of chorion membrane: anti inflammatory, adhesion, vascularisation, presence of collagen types with proteoglycans, adhesion

with the help laminin might be responsible in increasing the gingival thickness thus making it suitable for periodontal therapy.<sup>(19)</sup>

## Conclusion

The present report suggests that use of Chorion membrane in combination with coronally advanced flap can be considered as a treatment option for Gingival recession.

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### Legends Figures

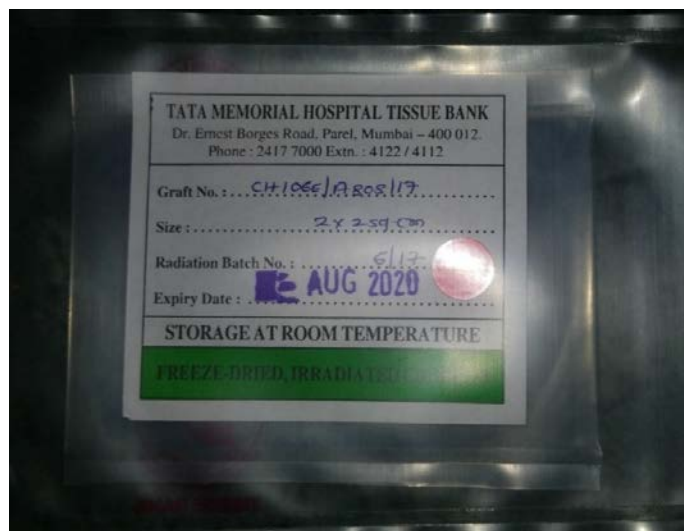


Figure1: Commercially available chorion membrane





Figure 2: Preoperative photograph showing recession depth of 4mm



Figure 3: Gingival thickness measurement using endodontic plugger and stopper at midpoint of line joining gingival margin to mucogingival junction of the tooth.



Figure 4: Flap reflection and CM placement



Figure 5: Suturing



Figure-6- At 3 months after surgery showing recession depth of 2mm.



Figure 7: At 6 months after surgery showing recession depth of 2mm.