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Recession coverage using concentrated growth factor membrane: A clinical case report and treatment outcomes

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Abstract
Background: Gingival recession is a common periodontal condition that can lead to root sensitivity, aesthetic concerns, and increased risk of root caries. Traditional surgical approaches, such as connective tissue grafts and coronally advanced flaps, have been widely used; however, adjunctive biologic materials like concentrated growth factor (CGF) membranes are gaining attention for enhancing soft tissue healing and regenerative outcomes.
Objective: This case report aims to evaluate the clinical effectiveness of a CGF membrane in conjunction with a coronally advanced flap for treating localized gingival recession.
Methods: A patient presenting with Miller Class I/II gingival recession on the maxillary anterior teeth underwent surgical treatment using a coronally advanced flap combined with a CGF membrane prepared from autologous blood. Clinical parameters, including recession depth, keratinized tissue width, and patient-reported outcomes, were assessed at baseline and at a 6-month follow-up.
Results: Postoperative healing was uneventful, with complete root coverage achieved in the treated site. The use of CGF membrane appeared to enhance tissue thickness and promote faster wound healing. At 6 months, increased keratinized tissue width and improved gingival biotype were observed. The patient reported reduced sensitivity and high aesthetic satisfaction.
Conclusion: The incorporation of a concentrated growth factor membrane with conventional recession coverage techniques may improve soft tissue healing, augment keratinized tissue, and enhance clinical outcomes. While this case report demonstrates promising results, further randomized controlled studies with larger sample sizes are needed to confirm the efficacy and long-term stability of CGF-assisted recession coverage.

Keywords: Gingival recession, Concentrated Growth Factor, CGF Membrane, periodontal surgery, soft tissue regeneration, case report

Introduction

Gingival recession, defined as the apical migration of the gingival margin exposing the root surface, is a prevalent periodontal condition affecting individuals across a wide age range. Clinically, it manifests as root surface exposure, sensitivity to thermal or tactile stimuli, aesthetic concerns, and an increased risk of root caries and cervical wear. The etiology of gingival recession is multifactorial, encompassing anatomical, physiological, and iatrogenic factors. Periodontal biotype, tooth position, alveolar bone morphology, and oral hygiene practices significantly influence the development and progression of recession. In addition, mechanical trauma from aggressive tooth brushing, occlusal forces, and habits such as piercings or misaligned restorations further contribute to gingival tissue loss. This combination of intrinsic and extrinsic factors makes gingival recession a complex clinical challenge for dental practitioners.

The clinical significance of gingival recession extends beyond mere aesthetics. Root exposure leads to hypersensitivity, often affecting patients' quality of life and dietary habits. In the long term, untreated recession may progress to severe attachment loss, compromising periodontal support and increasing susceptibility to root caries. Additionally, the aesthetic implications, particularly in the anterior maxillary region, can be a primary concern for patients, influencing self-confidence and social interactions. These functional and aesthetic consequences underscore the need for effective periodontal therapies that not only halt progression but also restore the soft tissue architecture.

Traditional surgical interventions for recession coverage include free gingival grafts, connective tissue grafts, and coronally advanced flaps. Each technique has demonstrated clinical efficacy in root coverage, yet they present inherent limitations. Free gingival grafts, while effective in increasing keratinized tissue width, often yield less favourable aesthetic outcomes due to colour and texture mismatch. Connective tissue grafts, considered the gold standard for root coverage, provide excellent predictability but require a secondary donor site, increasing patient morbidity and surgical time. Coronally advanced flaps, when used alone, may be less predictable in thin biotype cases or when recession depth is significant. The limitations of conventional techniques have driven the exploration of biologically active adjuncts to enhance healing, reduce patient discomfort, and improve long-term outcomes.

Recent advances in regenerative medicine have introduced autologous growth factors as promising adjuncts in periodontal therapy. Concentrated growth factor (CGF) membranes, derived from the patient's own blood, are rich in platelets, leukocytes, and fibrin matrix that release growth factors over time. These bioactive molecules, including platelet-derived growth factor, vascular endothelial growth factor, and transforming growth factor-beta, play critical roles in promoting angiogenesis, collagen synthesis, and soft tissue regeneration. By harnessing the body's natural healing potential, CGF membranes provide an autologous, biocompatible scaffold that enhances cellular proliferation

and tissue maturation. Their use in periodontal surgery represents a shift from purely mechanical root coverage to biologically mediated soft tissue regeneration, offering a more holistic approach to treatment.

The application of CGF membranes in gingival recession treatment is particularly promising due to several potential advantages. Firstly, CGF membranes may improve flap stability and reduce micromotion, supporting more predictable root coverage. Secondly, they may accelerate wound healing, decrease post-operative discomfort, and enhance keratinized tissue thickness. Thirdly, as an autologous material, CGF minimizes the risk of immunologic reactions or disease transmission, a limitation associated with xenografts or allografts. Collectively, these benefits suggest that incorporating CGF into conventional surgical protocols could improve both clinical outcomes and patient satisfaction.

Despite growing interest, clinical evidence supporting CGF membranes in recession coverage remains limited, primarily comprising case reports, case series, and small clinical trials. The variability in study design, patient selection, and surgical technique makes direct comparison challenging. Moreover, long-term follow-up data on root coverage stability, keratinized tissue maintenance, and patient-reported outcomes are sparse. As such, each case report contributes valuable insights into the potential applications, benefits, and limitations of this biologically active material in periodontal therapy. Detailed clinical documentation of such cases can help guide future research, refine surgical protocols, and establish standardized guidelines for CGF use.

In addition to the clinical rationale, patient-centered considerations also support the use of CGF membranes. Modern dentistry increasingly emphasizes minimally invasive procedures, faster recovery, and improved comfort. Autologous growth factor membranes align with these principles by reducing the need for donor site surgery, promoting faster tissue regeneration, and minimizing post-operative discomfort. Patients seeking aesthetic improvements often prioritize procedures that are effective yet low in morbidity. CGF-assisted recession coverage addresses both the clinical and patient-driven demands of contemporary periodontal care.

The selection of surgical technique in conjunction with CGF membranes is critical to achieving optimal outcomes. Coronally advanced flaps remain a preferred approach for treating localized gingival recessions due to their simplicity, reliability, and ability to provide predictable root coverage in favorable clinical conditions. When combined with a CGF membrane, the flap benefits from enhanced tissue healing, increased soft tissue thickness, and improved vascularization. This synergy between mechanical coverage and biologic augmentation exemplifies the modern trend toward regenerative periodontal therapy, moving beyond conventional root coverage to true tissue restoration.

This case report focuses on the application of a CGF membrane in a patient with localized gingival recession treated with a coronally advanced flap. The rationale for this study is twofold: to document clinical outcomes associated with CGF-assisted root coverage and to contribute evidence supporting biologically mediated periodontal regeneration. By presenting a detailed account of surgical technique, healing progression, and patient-reported outcomes, this report aims to provide practical insights for clinicians seeking to enhance treatment predictability and patient satisfaction. Furthermore, the case underscores the potential of autologous growth factor therapies to complement traditional surgical approaches, expanding the armamentarium of regenerative periodontal treatments.

In conclusion, gingival recession remains a significant periodontal challenge with functional and aesthetic implications. While conventional surgical techniques provide predictable root coverage, limitations in patient morbidity, aesthetic outcomes, and tissue regeneration highlight the need for biologically active adjuncts. Concentrated growth factor membranes, as autologous sources of bioactive molecules, offer a promising approach to enhancing soft tissue healing, increasing keratinized tissue, and improving clinical outcomes. By integrating CGF membranes into established surgical protocols, clinicians can leverage regenerative potential while minimizing patient discomfort and optimizing aesthetic results. This case report illustrates the clinical application of CGF membranes in recession coverage, contributing valuable knowledge to the evolving field of regenerative periodontology.

Methods

This study was designed as a clinical case report, adopting a qualitative and descriptive research approach to evaluate the outcomes of gingival recession coverage using a concentrated growth factor (CGF) membrane combined with a coronally advanced flap. Case reports, as a research design, provide an in-depth examination of individual patient outcomes, allowing for detailed documentation of clinical procedures, healing patterns, and patient-centered results. Although this design does not allow for statistical generalization, it is highly valuable in demonstrating the practical application of emerging therapies, particularly in regenerative periodontology. The objective was to present a detailed account of the surgical technique, post-operative healing, and clinical outcomes associated with the use of a CGF membrane in localized gingival recession.

The patient included in this case report was selected based on specific inclusion and exclusion criteria. Inclusion criteria comprised patients aged between 20 and 50 years presenting with Miller Class I or II gingival recession on anterior or premolar teeth, a minimum of 2 mm of keratinized gingiva adjacent to the recession site, and good general health without systemic conditions affecting wound healing. Exclusion criteria included patients with uncontrolled systemic diseases such as diabetes mellitus, history of smoking or tobacco use, pregnancy or lactation, active periodontal infection at the treatment site, or previous surgical interventions in the area of interest. The selected patient provided written informed consent after receiving a detailed explanation of the procedure, potential risks, benefits, and alternative treatment options. Ethical considerations were strictly observed to ensure patient autonomy, confidentiality, and adherence to standard clinical guidelines.

A thorough preoperative assessment was conducted to document the baseline clinical parameters. These included recession depth (measured from the cementoenamel junction to the gingival margin), width of keratinized tissue, probing depth, clinical attachment level, gingival biotype, and presence of plaque or inflammation. In addition, patient-reported outcomes such as sensitivity, aesthetic

concerns, and expectations regarding treatment were recorded using a structured interview format. High-resolution clinical photographs and periapical radiographs were obtained to provide visual documentation of the recession site and to assist in treatment planning. This comprehensive baseline evaluation ensured accurate monitoring of postoperative changes and facilitated objective assessment of treatment outcomes.

The surgical procedure was performed under aseptic conditions with the patient in a supine position. Local anesthesia was administered using 2% lidocaine with epinephrine to ensure adequate analgesia and hemostasis. The recession site was debrided meticulously to remove any plaque, calculus, or granulation tissue, exposing a clean root surface for optimal flap adaptation. Root surface conditioning was performed using mechanical scaling and root planing to enhance fibroblast adhesion and promote new attachment. Care was taken to avoid excessive trauma to the soft tissue or surrounding periodontal structures, preserving vascular supply and minimizing post-operative complications.

The concentrated growth factor membrane was prepared immediately prior to surgery. A sample of the patient's venous blood was drawn into sterile tubes without anticoagulants and subjected to a specific centrifugation protocol designed to yield a fibrin-rich matrix containing platelets, leukocytes, and growth factors. The resulting CGF clot was carefully separated and compressed into a membrane suitable for placement over the recession site. This autologous membrane was handled with sterile instruments to maintain its biological integrity and prevent contamination. The CGF membrane served as a bioactive scaffold, promoting angiogenesis, collagen synthesis, and soft tissue regeneration.

The coronally advanced flap was designed to achieve tension-free coverage of the exposed root surface. Vertical releasing incisions were placed at the mesial and distal aspects of the affected tooth, extending into the alveolar mucosa to allow for adequate flap mobility. A split-full-split thickness flap was reflected, maintaining a thin partial-thickness layer in the papilla region to preserve vascularity and a full-thickness section over the recession defect to ensure stability. The flap was gently advanced coronally to cover the entire recession site, and the CGF membrane was placed directly over the exposed root surface beneath the flap. The flap was then sutured using non-resorbable, interrupted sutures, ensuring precise adaptation without tension. The surgical site was protected with a periodontal dressing to minimize mechanical disruption and facilitate uneventful healing.

Postoperative management included administration of analgesics and, if indicated, a short course of antibiotics to prevent infection. Patients were instructed to avoid mechanical trauma to the surgical site, including brushing or flossing in the area for at least two weeks, and to use a chlorhexidine-based mouth rinse twice daily to maintain plaque control. Follow-up appointments were scheduled at one week, two weeks, one month, three months, and six months to monitor healing, suture removal, and clinical outcomes. At each visit, clinical parameters were reassessed, including recession depth, keratinized tissue width, gingival thickness, and any signs of inflammation or infection. Patient-reported outcomes, such as discomfort, sensitivity, and satisfaction with aesthetic results, were also recorded using a standardized questionnaire.

The effectiveness of the procedure was evaluated based on several key clinical and patient-centered parameters. Primary outcomes included the degree of root coverage achieved, changes in keratinized tissue width, and improvement in gingival biotype. Secondary outcomes included postoperative healing quality, patient-reported sensitivity, and aesthetic satisfaction. High-resolution clinical photographs were taken at each follow-up visit to document healing progression and provide visual evidence of treatment efficacy. Any complications or adverse events, including flap necrosis, membrane displacement, or infection, were noted and addressed according to standard clinical protocols.

Data analysis in this case report was primarily descriptive, focusing on the qualitative evaluation of clinical and patient-centered outcomes. Quantitative measurements, such as changes in recession depth and keratinized tissue width, were compared between baseline and follow-up visits to assess improvement. Patient feedback regarding pain, sensitivity, and aesthetic satisfaction was summarized to provide insight into the subjective benefits of the procedure. The combined use of objective clinical measures and subjective patient-reported outcomes allowed for a comprehensive evaluation of the treatment's effectiveness and overall impact on patient well-being.

To ensure replicability, detailed documentation of each step was maintained, including the specific centrifugation parameters used for CGF preparation, flap design and incision placement, suturing technique, and postoperative care instructions. Emphasis was placed on minimizing operator variability and maintaining a standardized approach throughout the procedure. By providing a thorough, step-by-step account of the clinical workflow, other clinicians and researchers can reproduce the technique, evaluate its outcomes, and contribute to the growing body of evidence regarding CGF-assisted recession coverage.

In summary, this case report employed a qualitative, descriptive research design to examine the clinical application of a concentrated growth factor membrane in gingival recession coverage. Patient selection followed strict inclusion and exclusion criteria, and baseline clinical assessment ensured accurate documentation of preoperative conditions. The surgical technique combined a coronally advanced flap with a biologically active CGF membrane to optimize tissue regeneration and root coverage. Postoperative care and follow-up assessments focused on both clinical parameters and patient-reported outcomes to provide a comprehensive evaluation of treatment efficacy. By detailing each procedural step and outcome measure, this report offers a replicable framework for clinicians seeking to implement CGF-assisted periodontal therapies.

Results

The patient in this case report presented with a localized Miller Class II gingival recession on the buccal surface of the maxillary right lateral incisor. Preoperative clinical evaluation revealed a recession depth of 4 mm, a probing depth of 2 mm, and a keratinized tissue width of 3 mm. The gingival biotype was classified as thin, and the exposed root surface exhibited mild cervical abrasion with patient-reported hypersensitivity to thermal stimuli. No clinical

signs of inflammation, bleeding on probing, or plaque accumulation were noted at the baseline visit. Baseline high-resolution clinical photographs and periapical radiographs were taken to document the recession site and adjacent periodontal structures. The patient reported aesthetic concerns due to the visible root exposure and discomfort during tooth brushing.

The CGF membrane was successfully prepared from 20 mL of the patient's autologous blood using a standardized centrifugation protocol. The resulting membrane was firm, pliable, and sufficiently sized to cover the exposed root surface. The coronally advanced flap was reflected without complication, and the CGF membrane was placed directly over the root surface before flap adaptation. Primary closure was achieved without tension, and a periodontal dressing was applied to protect the surgical site. The procedure lasted approximately 75 minutes, with minimal intraoperative bleeding and no complications. The patient reported only mild discomfort immediately following surgery, managed effectively with prescribed analgesics.

Postoperative healing was uneventful throughout the follow-up period. At the one-week visit, the surgical site showed no signs of infection, necrosis, or flap dehiscence. Mild edema and erythema were observed, consistent with normal post-surgical inflammatory response. The periodontal dressing remained intact, and sutures were stable. The patient reported minimal pain and no adverse events. At two weeks, the dressing was removed, and the sutures were carefully extracted. Early epithelialization of the flap margins was evident, and the CGF membrane appeared well-integrated with the surrounding soft tissue. No membrane displacement or exposure of the root surface was noted. The patient reported a noticeable reduction in hypersensitivity compared to baseline.

At the one-month follow-up, the surgical site exhibited complete epithelial coverage, with firm and resilient gingival tissue surrounding the previously exposed root. The gingival margin was positioned coronally relative to baseline, and the keratinized tissue appeared slightly thickened. Clinical measurements indicated a recession depth of 1 mm, representing a 75% reduction from baseline. Probing depths remained within the normal range, and no bleeding on probing was observed. The patient reported continued reduction in sensitivity and satisfaction with the aesthetic improvement of the treated area. High-resolution photographs demonstrated the enhanced contour and color match of the gingival tissue relative to adjacent areas.

By the three-month follow-up, the treated site demonstrated further stabilization of the gingival margin. Recession depth remained at 1 mm, while the keratinized tissue width increased to 4.5 mm, indicating a 1.5 mm gain from baseline. Gingival thickness was noticeably improved, and the tissue exhibited a healthy, pink appearance consistent with a thicker biotype. Probing depths remained stable, and no signs of inflammation, bleeding, or infection were observed. Patient-reported outcomes were favorable, with complete resolution of hypersensitivity and satisfaction with the aesthetic outcome. Clinical photographs showed a smooth transition between the treated site and adjacent gingiva, with no visible scarring or tissue irregularities.

At six months postoperatively, the surgical site demonstrated complete root coverage, with the gingival margin located at the cementoenamel junction. Recession depth was effectively reduced from 4 mm at baseline to 0 mm, indicating 100% root coverage. Keratinized tissue width measured 5 mm, representing a 2 mm increase compared to baseline. Gingival biotype appeared thickened and resilient, with consistent color and texture matching the surrounding tissue. Probing depths remained within physiological limits, and clinical attachment levels were stable. No bleeding on probing, edema, or signs of inflammation were observed. The patient reported no sensitivity and expressed high satisfaction with the aesthetic and functional outcomes. High-resolution clinical photographs confirmed complete integration of the gingival tissue, with harmonious contour and no signs of flap shrinkage or recession recurrence.

Throughout the follow-up period, the CGF membrane appeared to integrate effectively with the host tissue, with gradual replacement by newly formed connective tissue. No complications related to membrane placement were observed, including displacement, infection, or allergic reaction. The flap remained stable, with no signs of tension or necrosis, and sutures maintained primary closure during the critical initial healing phase. Patient adherence to postoperative care instructions, including plaque control and avoidance of mechanical trauma, likely contributed to the uneventful healing process.

Quantitative outcomes of the procedure were summarized as follows: baseline recession depth of 4 mm was reduced to 0 mm at six months, reflecting 100% root coverage. Keratinized tissue width increased from 3 mm at baseline to 5 mm at six months, indicating a 66% improvement. Gingival thickness, although measured qualitatively, was visibly increased compared to baseline, transitioning from a thin to a thick biotype. Probing depths remained stable at 2 mm throughout the follow-up period, with no clinical attachment loss or periodontal inflammation. These objective measures demonstrate significant improvement in the primary clinical parameters associated with gingival recession.

Patient-reported outcomes were assessed at each follow-up visit, focusing on pain, sensitivity, and aesthetic satisfaction. Immediately following surgery, the patient reported mild discomfort (rated 2 out of 10 on a pain scale), which resolved within three days with analgesic use. Sensitivity to thermal stimuli decreased progressively, with complete resolution reported at three months. Aesthetic satisfaction was rated on a five-point scale, increasing from 1 (dissatisfied) at baseline to 5 (highly satisfied) at six months. The patient highlighted the natural appearance of the gingival tissue, harmonious color match, and absence of scarring as key factors contributing to satisfaction.

Clinical photographs taken at baseline, one month, three months, and six months provided visual documentation of progressive healing and tissue regeneration. These images demonstrated gradual coronal migration of the gingival margin, increased soft tissue thickness, and improved contour of the treated site. No postoperative complications, such as infection, flap necrosis, or membrane displacement, were observed at any time point. The integration of the CGF membrane with the surrounding tissue was evident in the early stages of healing, with the membrane gradually replaced by new connective tissue, contributing to stable root coverage.

In addition to quantitative measures, qualitative observations of tissue healing were recorded. The flap exhibited normal color, texture, and resilience at all follow-

up visits. Early postoperative erythema and edema resolved within two weeks, and epithelialization progressed without irregularities. The gingival margin remained stable after initial positioning, with no evidence of relapse or recession recurrence during the six-month follow-up period. Tissue thickness and keratinized tissue augmentation were visually evident, and no areas of soft tissue deficiency were detected. These qualitative findings complement the quantitative improvements in root coverage and keratinized tissue width.

No adverse events or complications were encountered during the follow-up period. The patient adhered to all postoperative care instructions, including the use of antiseptic mouth rinse, avoidance of mechanical trauma, and maintenance of oral hygiene. No systemic complications or local infections were reported. The combination of a coronally advanced flap with a CGF membrane facilitated predictable root coverage, enhanced soft tissue regeneration, and improved patient-centered outcomes. The procedure demonstrated both functional and aesthetic success, as evidenced by stable clinical parameters and positive patient-reported outcomes.

In summary, the application of a CGF membrane in conjunction with a coronally advanced flap resulted in significant clinical improvement in the treatment of localized gingival recession. Objective findings included complete root coverage, increased keratinized tissue width, improved gingival thickness, and stable probing depths. Patient-reported outcomes demonstrated resolution of sensitivity, minimal postoperative discomfort, and high aesthetic satisfaction. Photographic documentation confirmed progressive healing and tissue integration over the six-month follow-up period. The procedure was completed without intraoperative or postoperative complications, and the CGF membrane was well-tolerated and effectively integrated with host tissue. These results provide a comprehensive account of the clinical effectiveness of CGF-assisted recession coverage in a single patient, highlighting both objective and subjective improvements in periodontal health and patient satisfaction.

Discussion

The findings of this case report provide valuable insight into the clinical efficacy of concentrated growth factor (CGF) membranes in combination with a coronally advanced flap (CAF) for the treatment of localized gingival recession. The results demonstrated complete root coverage, increased keratinized tissue width, enhanced gingival thickness, and favorable patient-reported outcomes, suggesting that CGF may serve as a promising adjunct in regenerative periodontal therapy. The successful integration of the membrane and the uneventful healing observed throughout the follow-up period support the biological plausibility of CGF in promoting soft tissue regeneration and facilitating predictable clinical outcomes. These findings align with the growing body of evidence highlighting the role of autologous platelet concentrates in periodontal regenerative procedures.

One of the most notable outcomes in this case was the complete resolution of a 4 mm Miller Class II recession, with 100% root coverage achieved at six months postoperatively. This degree of improvement surpasses typical outcomes reported in traditional coronally advanced flap procedures without adjunctive biomaterials, where partial root coverage is more commonly observed, particularly in patients with thin biotypes. The enhanced root coverage in this case may be attributed to the biologically active properties of CGF, which contains high concentrations of growth factors, platelets, and leukocytes. These components are known to stimulate fibroblast proliferation, collagen synthesis, and angiogenesis, thereby accelerating tissue maturation and improving flap stability. The integration of CGF beneath the flap likely contributed to the maintenance of coronal flap position, minimizing the risk of relapse or partial recession, which is often a limitation of conventional CAF procedures.

In addition to root coverage, the procedure resulted in a marked increase in keratinized tissue width, from 3 mm at baseline to 5 mm at six months. This augmentation is clinically significant, as an adequate band of keratinized tissue is associated with improved periodontal health, enhanced resistance to mechanical trauma, and better long-term stability of the gingival margin. The ability of CGF to promote keratinized tissue formation may be related to its fibrin-rich matrix, which provides a scaffold for cellular migration and proliferation. Moreover, the gradual release of growth factors from the CGF membrane likely facilitated epithelial and connective tissue regeneration, supporting both qualitative and quantitative improvements in tissue dimensions. The visual improvement in tissue thickness further underscores the regenerative potential of CGF, converting a thin gingival biotype into a more robust, resilient phenotype. This transition has important implications for the prevention of future recession and maintenance of periodontal health.

Patient-reported outcomes were also highly favorable, with complete resolution of sensitivity and high aesthetic satisfaction. Gingival recession often presents with hypersensitivity due to exposed dentin, and the reduction in sensitivity observed in this case is consistent with the effective coverage of the root surface by both the flap and the underlying CGF membrane. The aesthetic benefits observed, including improved tissue contour, color match, and absence of scarring, highlight the importance of integrating biologically active materials into soft tissue procedures. Aesthetic outcomes are particularly relevant in the anterior region, where even minor recession can have a significant impact on patient satisfaction and self-confidence. The combination of objective clinical improvements and subjective patient satisfaction reinforces the clinical relevance of CGF-assisted root coverage procedures.

The uneventful postoperative course observed in this case underscores the safety and tolerability of CGF membranes. No adverse events, including infection, flap necrosis, or membrane displacement, were reported throughout the six-month follow-up. This aligns with prior observations that autologous platelet concentrates are biocompatible, minimizing the risk of immune reactions or tissue rejection. Additionally, the relatively simple preparation protocol for CGF allows for chairside generation from the patient's own blood, eliminating concerns related to donor tissue or synthetic biomaterials. The ability to integrate CGF into conventional surgical techniques without significantly increasing procedure time or complexity makes it a practical adjunct for clinicians seeking to enhance regenerative outcomes in periodontal therapy.

The observed clinical improvements can also be interpreted in light of tissue healing dynamics. The early integration of

the CGF membrane likely provided a scaffold for cellular infiltration and neovascularization, contributing to rapid epithelialization and stabilization of the flap. By serving as both a biological and mechanical support, the membrane may have reduced micromotion at the root surface, promoting primary intention healing and minimizing postoperative contraction. This mechanism may explain the maintenance of coronal flap position and the absence of partial relapse, which are common challenges in traditional CAF procedures. The qualitative improvements in tissue thickness further suggest that CGF not only accelerates early healing but also contributes to the long-term maturation and robustness of regenerated soft tissue.

The outcomes of this case report are consistent with emerging evidence regarding the regenerative potential of platelet concentrates in periodontal therapy. Studies investigating platelet-rich fibrin (PRF) and other autologous fibrin matrices have similarly reported improvements in root coverage, keratinized tissue width, and gingival thickness when combined with CAF procedures. CGF, as a next-generation platelet concentrate, differs from earlier formulations in its higher density, firmer matrix, and sustained release of growth factors. These characteristics may enhance its ability to support soft tissue regeneration and maintain coronal flap stability, offering potential advantages over conventional CAF alone or older platelet concentrate formulations. Although this report involves a single patient, the observed outcomes support the hypothesis that CGF can act as a biologically active scaffold, enhancing both the quantity and quality of regenerated gingival tissue.

While the results are promising, several limitations must be acknowledged. The primary limitation is the single-patient, case-report design, which inherently restricts generalizability and does not allow for statistical inference. The favorable outcomes observed may be influenced by patient-specific factors, including overall health, compliance with postoperative instructions, and individual healing capacity. Additionally, the follow-up period of six months, although sufficient to evaluate short-term outcomes, does not provide insight into long-term stability of the regenerated tissue. Longitudinal studies with extended follow-up are necessary to confirm the durability of root coverage, keratinized tissue gain, and gingival biotype enhancement.

Another limitation relates to the absence of histological evaluation. While clinical measures and photographic documentation provide valuable information regarding soft tissue regeneration, they cannot confirm the nature of the regenerated tissue at a cellular or molecular level. Future studies incorporating histological or histomorphometric analyses would provide deeper insight into the biological mechanisms underlying CGF-assisted root coverage and clarify the extent of true connective tissue attachment versus long junctional epithelium formation. Furthermore, objective assessment of gingival thickness using methods such as ultrasonography or optical coherence tomography could enhance the precision of tissue evaluation, complementing qualitative clinical observations.

Despite these limitations, this case report offers meaningful clinical implications. The successful application of CGF in conjunction with a coronally advanced flap demonstrates that autologous platelet concentrates can be effectively integrated into routine periodontal procedures to enhance soft tissue outcomes. The predictable root coverage, increased keratinized tissue width, and improved gingival thickness observed suggest that CGF may be particularly useful in patients with thin biotypes or in cases where aesthetic outcomes are critical. Moreover, the minimally invasive nature of the procedure, combined with the safety and biocompatibility of CGF, makes it a feasible option for clinicians seeking to optimize regenerative outcomes without introducing additional risk.

The findings also highlight the importance of combining biological and surgical principles in periodontal therapy. While the coronally advanced flap provides mechanical coverage and ensures flap stability, the addition of a biologically active membrane such as CGF enhances tissue regeneration, promotes vascularization, and accelerates healing. This synergistic approach addresses both structural and biological challenges inherent in gingival recession treatment, offering a more comprehensive solution compared to flap surgery alone. It also underscores the potential of personalized regenerative therapies, leveraging autologous materials to maximize healing and patient-centered outcomes.

In comparison to traditional root coverage techniques, the use of CGF offers distinct advantages. Autologous connective tissue grafts, while effective, require a secondary donor site, increasing patient morbidity and postoperative discomfort. In contrast, CGF eliminates the need for a donor site while still providing a biologically active scaffold capable of promoting soft tissue regeneration. Additionally, the gradual release of growth factors from CGF supports ongoing tissue maturation, which may contribute to longer-term stability of the gingival margin. These factors collectively enhance the clinical feasibility and patient acceptance of CGF-assisted procedures.

Future research directions should focus on larger, controlled clinical trials to validate the findings of this case report. Comparative studies evaluating CGF against other platelet concentrates, connective tissue grafts, or conventional CAF alone would provide valuable evidence regarding relative efficacy and long-term stability. Standardized outcome measures, including objective assessment of gingival thickness, keratinized tissue width, and patient-reported satisfaction, will be essential for establishing clinical guidelines and optimizing treatment protocols. Additionally, investigations into the molecular mechanisms of CGF-mediated tissue regeneration may further elucidate the biological basis for observed clinical improvements.

In conclusion, this case report demonstrates that the use of a concentrated growth factor membrane in combination with a coronally advanced flap can achieve predictable root coverage, increased keratinized tissue width, enhanced gingival thickness, and high patient satisfaction in the treatment of localized gingival recession. The procedure was safe, well-tolerated, and resulted in favorable short-term clinical outcomes, highlighting the potential of CGF as a valuable adjunct in regenerative periodontal therapy. While further research is necessary to confirm long-term stability and generalizability, these findings support the integration of biologically active autologous materials into standard root coverage procedures, offering both functional and aesthetic benefits to patients. The synergistic combination of surgical technique and autologous biomaterials represents a promising direction in periodontal regenerative therapy, providing a foundation for future advancements in the management of gingival recession.

Conclusion

This case report demonstrates that the use of a concentrated growth factor (CGF) membrane in combination with a coronally advanced flap can achieve predictable and effective treatment outcomes for localized gingival recession. The procedure resulted in complete root coverage, a notable increase in keratinized tissue width, enhanced gingival thickness, and stable probing depths over a six-month follow-up period. Patient-reported outcomes were highly favorable, with resolution of hypersensitivity and high aesthetic satisfaction. The CGF membrane appeared to integrate well with host tissue, providing both a biologically active scaffold for regeneration and mechanical support for flap stabilization. These findings suggest that CGF can serve as a safe and effective adjunct in periodontal regenerative procedures, particularly in cases involving thin biotypes or esthetically demanding regions. While this report is limited to a single patient, the positive clinical and patient-centered outcomes highlight the potential of CGF to enhance soft tissue regeneration, improve aesthetic results, and minimize postoperative complications, supporting its incorporation into routine root coverage therapy.

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