

Use of Collagen Membranes in Aesthetic Gingival Augmentation

Miller Schupbach*

Department of Periodontology, Medical University in Wroclaw, Krakowska 26 str., Wroclaw, Poland

Introduction

Aesthetic gingival augmentation has become a key component of modern periodontal and cosmetic dentistry, as patients increasingly seek harmonious gum contours to complement their smiles. Gingival recession, volume loss, and irregular margins can significantly detract from dental aesthetics, even when teeth are well aligned and restored. Traditionally, autogenous soft tissue grafts have been used to address these concerns, but their invasiveness and limited availability have prompted the search for alternatives. Collagen membranes have emerged as a promising biomaterial in this context, offering both functional and aesthetic benefits. Derived from porcine or bovine sources, these membranes act as scaffolds that support tissue regeneration while reducing patient morbidity. Their application in guided tissue regeneration and soft tissue augmentation aligns with the goals of minimally invasive, predictable, and cosmetically pleasing outcomes in gingival reconstruction [1].

Collagen membranes are increasingly being adopted in gingival augmentation due to their biocompatibility, structural support, and ability to promote tissue integration. In aesthetic zones, where precision and subtlety are critical, these membranes provide a scaffold for new tissue formation without the need for harvesting donor tissue. This reduces surgical time, discomfort, and risk of complications, especially in patients requiring bilateral or multiple-site correction. The role of collagen membranes has expanded from periodontal regeneration to soft tissue thickening, root coverage, and papilla reconstruction all essential for smile aesthetics. As demand for non-invasive and predictable cosmetic procedures grows, collagen membranes offer a valuable tool that balances biological function with aesthetic refinement. Their ease of use and compatibility with various surgical techniques make them particularly suited for contemporary aesthetic periodontal therapy [2].

Description

Collagen membranes serve as effective scaffolds for promoting soft tissue regeneration in gingival augmentation procedures, particularly in areas of high aesthetic demand. These membranes are composed primarily of type I and type III collagen, which are the major structural proteins in natural gingival tissue. When placed over the recession or defect site, the membrane provides a protective barrier that facilitates cell migration and angiogenesis while preventing epithelial down-growth. This supports the formation of new connective tissue and enhances the volume and quality of the augmented gingiva. Compared to autogenous grafts, collagen membranes offer the advantage of eliminating donor site morbidity, thereby reducing postoperative pain and recovery time. Furthermore, they are resorbable and typically integrate well into host tissues without the need for removal. In cases of gingival recession or soft tissue

deficiencies around implants or natural teeth, collagen membranes can be combined with coronally advanced flaps or used as standalone grafting material. Their use results in thicker, healthier soft tissue that improves root coverage, reduces sensitivity, and contributes to a more symmetrical gingival margin. Clinical studies have demonstrated satisfactory aesthetic outcomes, particularly when membranes are stabilized properly and used in patients with good oral hygiene. Overall, collagen membranes are transforming gingival augmentation into a more patient-friendly and cosmetically refined procedure [3].

The integration of collagen membranes into gingival augmentation protocols has enabled clinicians to achieve more predictable and aesthetically pleasing outcomes with less surgical complexity. These membranes provide a three-dimensional matrix that supports fibroblast proliferation, collagen synthesis, and new blood vessel formation. Their porous structure allows for nutrient exchange and gradual resorption, typically within 4 to 12 weeks, depending on membrane composition. They are available in cross-linked and non-cross-linked forms, with cross-linked varieties offering extended stability for larger or more complex defects. In aesthetic applications, such as root coverage and ridge preservation, collagen membranes help restore gingival contour and improve the pink-to-white esthetic balance of the smile. Their effectiveness can be further enhanced by combining them with biologic agents like enamel matrix derivatives or platelet-rich fibrin to promote faster and more robust healing. Importantly, the placement technique and flap design are crucial to achieving optimal results; improper adaptation or inadequate vascular support can lead to membrane exposure and failure. Despite these limitations, collagen membranes offer substantial benefits in terms of patient comfort, reduced surgical morbidity, and natural-looking outcomes. Their ability to facilitate soft tissue augmentation without additional donor site surgery makes them a valuable option for clinicians focused on achieving aesthetic excellence in periodontal therapy [4].

Clinical use of collagen membranes in aesthetic gingival augmentation has shown promising results across a variety of indications, including Miller Class I and II gingival recessions, peri-implant soft tissue deficiencies, and interdental papilla reconstruction. In cases of root coverage, collagen membranes combined with coronally advanced flaps have demonstrated significant improvement in gingival thickness, root coverage percentage, and aesthetic scores. The translucent and pliable nature of these membranes allows for easy adaptation over curved root surfaces and into subgingival spaces, ensuring proper integration. When used around implants, they help create a stable soft tissue seal that not only enhances aesthetic outcomes but also supports long-term peri-implant health. Their ability to preserve soft tissue contours during healing is especially important in anterior regions where even minor gingival discrepancies can be visually noticeable. Additionally, collagen membranes have been employed in the management of black triangles through papilla augmentation techniques. While long-term comparative studies are still needed, early evidence suggests that collagen membranes can achieve results comparable to connective tissue grafts in selected cases. Patient-reported outcomes consistently highlight reduced discomfort, shorter recovery periods, and high satisfaction with the aesthetic improvements. As part of a comprehensive soft tissue management strategy, collagen membranes offer a practical and effective means of enhancing the visual harmony of the gingival architecture [5].

*Address for Correspondence: Miller Schupbach, Department of Periodontology, Medical University in Wroclaw, Krakowska 26 str., Wroclaw, Poland; E-mail: millschpbach@peridont.pl

Copyright: © 2025 Schupbach M. This is an open-access article distributed under the terms of the Creative Commons Attribution License, which permits unrestricted use, distribution and reproduction in any medium, provided the original author and source are credited.

Received: 03 November, 2025, Manuscript No. OHCR-25-167873; Editor Assigned: 05 November, 2025, PreQC No. P-167873; Reviewed: 17 November, 2025, QC No. Q-167873; Revised: 22 November, 2025, Manuscript No. R-167873; Published: 29 November, 2025, DOI: 10.37421/2471-8726.2025.11.214

Conclusion

Collagen membranes have emerged as an effective, minimally invasive solution for aesthetic gingival augmentation, offering both biological and cosmetic benefits. Their ability to support soft tissue regeneration without requiring donor site surgery has made them an attractive alternative to autogenous grafts, particularly in patients seeking enhanced smile aesthetics with less discomfort and downtime. By serving as resorbable scaffolds that promote cellular infiltration, angiogenesis, and collagen synthesis, these membranes help restore gingival volume, contour, and color in a manner that aligns with natural tissue characteristics. Their clinical versatility allows them to be used in various procedures, including root coverage, peri-implant soft tissue enhancement, and interdental papilla reconstruction. Success depends on precise surgical technique, appropriate case selection, and maintenance of excellent oral hygiene. While collagen membranes may not replace traditional grafts in all cases, they offer a valuable option for patients prioritizing aesthetics and comfort. As clinical techniques evolve and product formulations improve, the role of collagen membranes in soft tissue management will likely expand further. They exemplify the shift in periodontal therapy toward more patient-centered, aesthetically driven care achieving results that not only meet clinical objectives but also enhance personal confidence and overall quality of life.

Acknowledgement

None.

Conflict of Interest

None.

References

1. Pini Prato, Giovan Paolo, Francesco Cairo, Michele Nieri and Debora Franceschi, et al. "Coronally advanced flap versus connective tissue graft in the treatment of multiple gingival recessions: A split-mouth study with a 5-year follow-up." *J Clin Periodontol* 37 (2010): 644-650.
2. Tavelli, Lorenzo, Shayan Barootchi, Henry Greenwell and Hom-Lay Wang. "Is a soft tissue graft harvested from the maxillary tuberosity the approach of choice in an isolated site?." *J Periodontol* 90 (2019): 821-825.
3. Clementini, Marco, Nicola Discepoli, Carlotta Danesi and Massimo de Sanctis. "Biologically guided flap stability: The role of flap thickness including periosteum retention on the performance of the coronally advanced flap-a double-blind randomized clinical trial." *J Clin Periodontol* 45 (2018): 1238-1246.
4. Rasperini, Giulio, Raffaele Acunzo, Gaia Pellegrini and Giorgio Pagni, et al. "Predictor factors for long-term outcomes stability of coronally advanced flap with or without connective tissue graft in the treatment of single maxillary gingival recessions: 9 years results of a randomized controlled clinical trial." *J Clin Periodontol* 45 (2018): 1107-1117.
5. Chambrone, Leandro and Giovan Paolo Pini Prato. "Clinical insights about the evolution of root coverage procedures: The flap, the graft and the surgery." *J Periodontol* 90 (2019): 9-15.

How to cite this article: Schupbach, Miller. "Use of Collagen Membranes in Aesthetic Gingival Augmentation." *Oral Health Case Rep* 11 (2025): 214.