



Aesthetic Breast Surgery

Supplement Article

Anatomical Basis of a Posterior Intralamellar Plane in Breast Tissue–Preservation Surgery

Martin Lhuire, MD, PhD^{*}; Manuel Chacon-Quiros, MD;
Robert D. Rehnke, MD; Ruth M. Graf, MD, PhD;
Troy A. Pittman, MD, FACS; Constantin Stan, MD;
Jorge Villalobos-Alpizar, MD; Christine Clausen-Oreamuno, MD;
Michael Atlan, MD, PhD; Laurent Lantieri, MD;
and Geoffroy Noel, PhD

Aesthetic Surgery Journal

2026, Vol 46(S2) S109–S116

Accepted date: March 05, 2026.

© The Author(s) 2026. Published by Oxford University Press on behalf of The Aesthetic Society.

This is an Open Access article distributed under the terms of the Creative Commons Attribution-NonCommercial-NoDerivs licence (<https://creativecommons.org/licenses/by-nc-nd/4.0/>), which permits non-commercial reproduction and distribution of the work, in any medium, provided the original work is not altered or transformed in any way, and that the work is properly cited. For commercial re-use, please contact reprints@oup.com for reprints and translation rights for reprints. All other permissions can be obtained through our RightsLink service via the Permissions link on the article page on our site—for further information please contact journals.permissions@oup.com.
<https://doi.org/10.1093/asj/sjag059>
www.aestheticsurgeryjournal.com

OXFORD
UNIVERSITY PRESS

Abstract

Breast tissue–preservation surgery relies on the identification of anatomical dissection planes that allow surgical access while minimizing disruption of glandular and fascial structures. Although a plane between the mammary gland and the pectoralis major fascia is increasingly utilized in aesthetic procedures, its anatomical basis remains incompletely defined. The aim of this study was to describe the anatomical and histological foundations of a posterior intralamellar dissection plane located between the corpus mammae and the pectoralis major fascia and to characterize its relevance for breast tissue–preservation surgery. Eight bilateral dissections ($n = 16$ breasts) were performed on fresh cadavers at 2 academic anatomy centers between 2024 and 2025. Conventional breast augmentation approaches (subglandular, subfascial, and dual-plane) and breast tissue–preserving techniques were sequentially performed. Specimens underwent layer-by-layer anatomical dissection or sagittal sectioning. Macroscopic, endoscopic, and histological analyses were conducted at standardized anatomical locations using hematoxylin and eosin, Masson's trichrome, and Sirius Red/Fast Green staining. A consistent posterior lamella composed of laminated adipose and fascial layers was identified in all specimens, regardless of the surgical approach. This posterior intralamellar plane separated the corpus mammae from the pectoralis major fascia and demonstrated variable thickness but reproducible continuity. Atraumatic tunneling and balloon-assisted expansion preferentially propagated within this plane, creating a reproducible dissection space while preserving glandular, fascial, and adjacent neurovascular structures. Histological analysis confirmed a distinct laminated fascial architecture, clearly differentiated from both glandular parenchyma and underlying muscular fascia. The posterior intralamellar plane represents a consistent anatomical and histological dissection plane suitable for breast tissue–preservation surgery. Recognition of this plane provides an anatomical rationale for conservative surgical strategies that preserve glandular integrity and may facilitate posterior access aligned with native breast tissue architecture.

Level of Evidence: 4 (Therapeutic)

Dr Lhuire is a senior plastic surgeon and Dr Lantieri is chief of the department, Department of Plastic, Reconstructive and Aesthetic Surgery, Hôpital Européen Georges Pompidou, Assistance Publique—Hôpitaux de Paris, Université Paris Cité, Paris, France. Dr Chacon-Quiros is a senior plastic surgeon in private practice in San José, Costa Rica. Dr Rehnke is a senior plastic surgeon in private practice in St Petersburg, FL, USA. Dr Graf is an associate professor, Department of Plastic Surgery, Federal University of Paraná, Curitiba, Paraná, Brazil. Dr Pittmann is an associate professor, Department of Plastic Surgery and the Division of Breast Surgery, MedStar Georgetown University Hospital, Washington, DC, USA. Dr Stan is a senior plastic surgeon in private practice in Bucharest, Romania. Drs Villalobos-Alpizar and Clausen-Oreamuno are clinical and medical affairs physicians, Establishment Labs Holdings Inc.,

Alajuela, Costa Rica. Dr Atlan is chief of the department, Department of Plastic, Reconstructive and Aesthetic Surgery, Hôpital Tenon, Assistance Publique—Hôpitaux de Paris, Université Paris Sorbonne, Paris, France. Dr Noel is chief of the department, Division of Anatomy, Department of Surgery, School of Medicine, University of California San Diego Health, La Jolla, CA, USA.

Corresponding Author:

Dr Martin Lhuire, Department of Plastic, Reconstructive and Aesthetic Surgery, Hôpital Européen Georges Pompidou, Assistance Publique des Hôpitaux de Paris, Paris, France.
E-mail: martin.lhuire@u-paris.fr

The anatomy of the mammary gland has traditionally been described through macroscopic and microscopic observations, with emphasis on glandular, vascular, and neural structures. In breast surgery, classical augmentation approaches have historically relied on broadly defined dissection planes located deep to the mammary gland or the pectoralis major muscle.¹ These planes, however, were largely established through surgical convention rather than through detailed anatomical characterization. In contrast, the fascial architecture of the breast, including the mammary fasciae and retinacula cutis, has received comparatively limited attention, despite its central role in mechanical support and tissue organization. This relative underrepresentation is largely attributable to the inherent difficulty of studying these structures comprehensively in 3 dimensions.²⁻⁴ Conventional anatomical dissection techniques may obscure fine connective tissue layers or generate artificial or surgical planes of separation, whereas histological approaches provide only focal, limited-field analysis. Consequently, the laminated organization of breast fasciae and its potential surgical relevance remain incompletely characterized.⁴ Recent advances in anatomical investigation, including magnified dissection, microdissection, refined sectioning techniques, and modern histological analysis, allow renewed evaluation of the adipofascial lamellae surrounding the corpus mammae, as well as the circummammary and vertical retinacular systems. A more precise understanding of this fascial organization is increasingly relevant in the context of breast tissue–preservation surgery, where respect for native connective tissue architecture may minimize glandular disruption and contribute to durable aesthetic outcomes.^{5,6}

The aim of this preliminary study was to describe the anatomical and histological features of a posterior intralamellar dissection plane located between the corpus mammae and the pectoralis major fascia, thereby providing an anatomical foundation for conservative, tissue-preserving surgical approaches.

METHODS

Study Design

This study was designed as a descriptive anatomical and histological investigation of the fascial architecture of the mammary gland, with particular focus on the posterior intralamellar plane located between the corpus mammae and the pectoralis major fascia.

Specimens

Eight fresh female cadavers underwent bilateral breast dissections ($n=16$ breasts). Three cadavers were dissected at the School of Surgery of the Fer à Moulin, Assistance Publique–Hôpitaux de Paris, in October 2024, and 5 cadavers were dissected at the Division of Anatomy and the Body Donation Program of the University of California San Diego, in October 2025. This study was conducted in accordance with the ethical principles of the Declaration of Helsinki and complied with the regulations governing body donation programs at the participating institutions.

All cadavers had been previously injected with colored latex for vascular delineation, using red latex for the arterial system and blue latex for the venous system. Vascular injections were performed by selective cannulation of the deep superior epigastric arteries and veins at the level of the inferior costal margin. To optimize targeted vascular filling, the subclavian arteries and veins were proximally clamped bilaterally, thereby isolating the aortic arch and brachiocephalic veins, and the axillary arteries and veins were distally clamped beyond the origin of the subscapular vessels. This approach allowed



Figure 1. Macroscopic appearance after bilateral breast augmentation procedures. Predissection surface markings are visible in a 72-year-old female specimen. Red markings delineate the circummammary fascial boundaries and indicate the planned axis of atraumatic tunneling for pocket creation, extending from the lateral mammary scar toward the manubrial notch. Black markings correspond to the cutaneous projection of the superior mammary fold, identified after superior displacement of the mammary gland. Right breast: subfascial augmentation. Left breast: Preservé augmentation. The image illustrates symmetrical implant positioning achieved using different dissection strategies. Property of Establishment Labs (Alajuela, Costa Rica). All rights reserved, 2026. Reproduced with permission.

controlled pressurization and ensured complete latex perfusion of the breast parenchyma and its principal vascular pedicles.

Surgical Dissection Protocol

Each specimen underwent sequential breast pocket creation using commonly described augmentation approaches, including subfascial, subglandular, and dual-plane techniques, as well as 2 breast tissue–preservation techniques, Mia Femtech and Preservé (Establishment Labs, Coyol, Alajuela, Costa Rica; Figure 1).⁷⁻¹³ All procedures were performed by senior plastic surgeons in accordance with published technical descriptions to reproduce standard surgical conditions and to evaluate tissue-plane behavior during dissection and implant placement. In all but 2 breasts, silicone gel–filled breast implants were inserted following pocket creation. In 2 breasts, the inflatable balloons of the tissue-preserving, minimally invasive system were intentionally left filled with water to preserve pocket morphology and ensure structural stability during subsequent freezing and sectioning.^{6,13} Following completion of the surgical procedures, specimens were assigned to 1 of 2 postprocedural anatomical analyses by 2 independent anatomists: (1) layer-by-layer anatomical dissection ($n=10$ breasts), performed using combined blunt and sharp techniques to allow direct visualization of fascial planes, retinacular structures, and neurovascular elements; or (2) sagittal sectioning ($n=6$ breasts), performed at 1-cm intervals using a band saw after 72 h of specimen freezing, in order to preserve spatial relationships between the corpus mammae, posterior lamella, and chest wall.

Anatomical Documentation

High-resolution macrophotography was performed using smartphone-mounted optical macro lenses (75 mm focal length and 1.7× magnification) to document fine fascial structures.

Videoendoscopic visualization was additionally performed through the access channels created during minimally invasive breast procedures, allowing in situ assessment of the posterior intralamellar plane and its relationships to adjacent glandular, fascial, and vascular structures.

Histological Analysis

Targeted tissue samples were harvested from the posterior lamella at standardized anatomical locations, including the superior and inferior mammary folds, along parasagittal planes passing through the mid-clavicular level. Specimens were processed using routine histological techniques and stained with hematoxylin and eosin, Masson's trichrome, and Sirius Red/Fast Green to evaluate collagen organization, fascial lamination, and the interface between glandular, adipose, and fascial tissues.

Terminology and Anatomical Framework

In the present study, anatomical terminology follows the principles of the *Nomina Anatomica*, updated in accordance with the *Terminologia Anatomica*, second edition (TA2), as established by the Federative International Programme for Anatomical Terminology.¹⁴⁻¹⁸ The terminology used herein reflects conceptual laminar relationships within a continuous connective tissue system rather than discrete or compartmentalized anatomical entities.¹⁹ This approach is intended to describe anatomical organization and surgical behavior without implying the existence of newly defined or isolated structures.

RESULTS

Specimen Characteristics

The specimens had a mean age of 83.6 ± 8.1 years, a mean body weight of 75.2 ± 10.6 kg, a mean height of 1.64 ± 0.04 m, and a mean BMI of 27.6 ± 4.9 kg/m².

Macroscopic Anatomy and Fascial Organization

The posterior intralamellar plane and its laminated posterior lamella architecture were observed consistently across specimens, irrespective of the augmentation approach performed (subglandular, subfascial, dual-plane/retropectoral, and tissue-preserving posterior dissection techniques). In the specimens undergoing a breast-tissue-preserving approach, the atraumatic tunneling and hydrodissection, performed using a saline infiltration cannula under ultrasonographic guidance, consistently entered a laminated plane within the posterior lamella, located between the corpus mammae and the pectoralis major fascia (Figure 2). This posterior intralamellar plane was reproducible in all specimens and could be expanded by saline infiltration, including in specimens with relatively thin posterior lamellae. Interindividual variability in posterior lamella thickness was observed, although its laminated organization remained consistent across specimens. This laminar organization allowed reliable identification of the dissection plane and facilitated controlled pocket creation. At the periphery of the breast, convergence of superficial and deep fascial layers consistently defined a circummammary boundary. Neurovascular bundles were observed to course within this peripheral zone and were preserved during atraumatic tunneling and balloon-assisted dissection performed within the posterior intralamellar plane (Figure 3).

Endoscopic Observations

Videoendoscopic assessment performed through minimally invasive inframammary access channels confirmed the presence of multilayered adipofascial structures and a continuous posterior intralamellar plane located posterior to the balloon-dissected pocket. Endoscopic progression through the channel demonstrated smooth separation between laminated fascial layers without disruption of the lamellae, glandular tissue, or neurovascular structures with the tissue-preservation techniques (Figure 4).

Section Analysis and Identification of the Posterior Intralamellar Plane

In all specimens, the mammary gland was identified as a discrete, markedly atrophic glandular body corresponding to the corpus mammae, which was difficult to delineate because of advanced age-related involution. Superficial to the corpus mammae, the anterior lamella was identified as a fatty-fascial layer of variable thickness, influenced by specimen BMI and the trophicity of the subcutaneous adipose tissue. Posterior to the corpus mammae, a distinct fatty-fascial layer consistently separated the corpus mammae from the chest wall musculature fasciae. This posterior lamella demonstrated a characteristic laminated architecture, with multiple thin adipofascial sheets arranged in parallel. The structure was continuous along the craniocaudal axis and extended from the parasternal region medially to the midaxillary line laterally, delineating a stable anatomical plane posterior to the mammary gland (Figure 5).

Histological Findings

Histological analysis confirmed that the posterior lamella was composed of alternating layers of adipose tissue and collagen-rich fascia. Hematoxylin and eosin staining demonstrated a clear separation between the glandular tissue and the posterior fascial layers, with no glandular elements identified within the posterior lamella. Masson's trichrome and Sirius Red/Fast Green staining highlighted dense collagen bundles arranged in parallel bands within the posterior lamella, distinct from both the glandular parenchyma and the fascia of the pectoralis major muscle. No direct continuity between glandular epithelial structures and the posterior lamella was identified on histological sections within the limits of the specimens studied (Figure 6).

DISCUSSION

This preliminary study presents an anatomical and histological characterization of a posterior intralamellar dissection plane located between the corpus mammae and the pectoralis major fascia, with implications for conservative, tissue-preserving surgical strategies. Although classical anatomical descriptions have long acknowledged the presence of a loose plane posterior to the mammary gland, the laminated organization and surgical behavior of this region have remained incompletely defined. Our findings demonstrate that this area does not represent a single potential plane but rather a well-defined, reproducible laminated adipofascial system. This lamination delineates the posterior boundary of the corpus mammae from the anterior surface of the chest wall musculature, with no glandular tissue identified within this plane, according to the limits of the specimens and tissue samples analyzed. The posterior intralamellar plane therefore constitutes a distinct anatomical compartment, structurally separating the mammary gland from the pectoralis major fascia, with a thickness that varies according to specimen BMI.

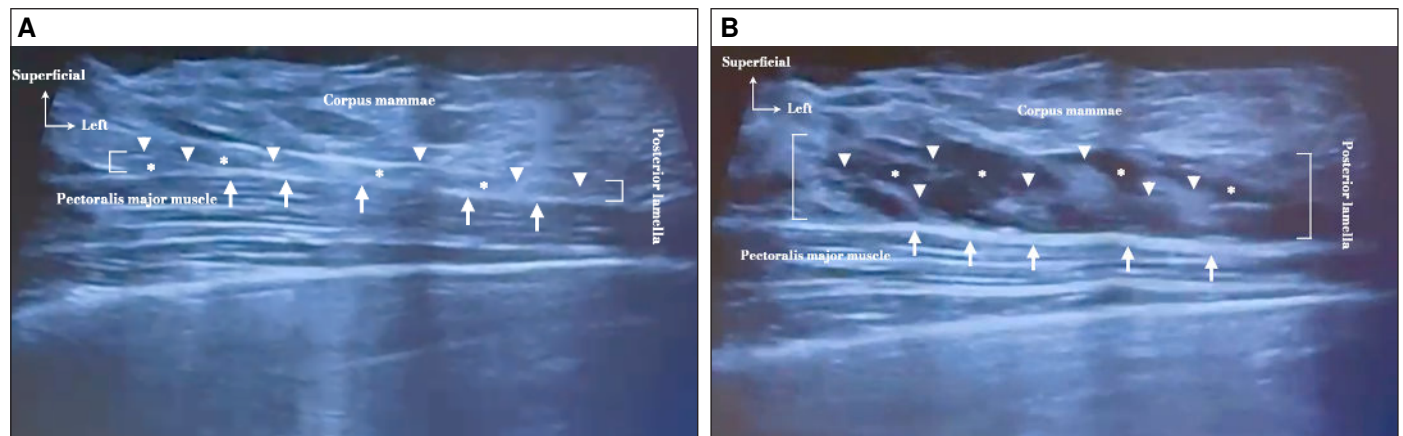


Figure 2. Ultrasonographic identification of the posterior lamella. Horizontal ultrasonographic cross-sectional images of the left breast obtained before cadaveric dissection during a tissue-preserving augmentation procedure. (A) Baseline image before saline infiltration, showing the posterior lamella as a thin, laminated adipofascial compartment (small lateral brackets) located posterior to the corpus mammae. Echogenic fascial bands (arrowheads) are interposed between hypoechoic adipose layers (asterisks), forming the native laminated architecture. (B) Image obtained after tumescent saline infiltration, demonstrating expansion of the same laminated compartment (expanded lateral brackets). Saline separates the lamellar layers (asterisks), enhancing visualization of the posterior intralamellar plane as a hydrodissection-expanded adipofascial compartment. In both panels, the interface between the posterior lamella and the pectoralis major fascia/muscle fibers is indicated by arrows. Orientation markers indicate superficial and lateral directions. Property of Establishment Labs (Alajuela, Costa Rica). All rights reserved, 2026. Reproduced with permission.

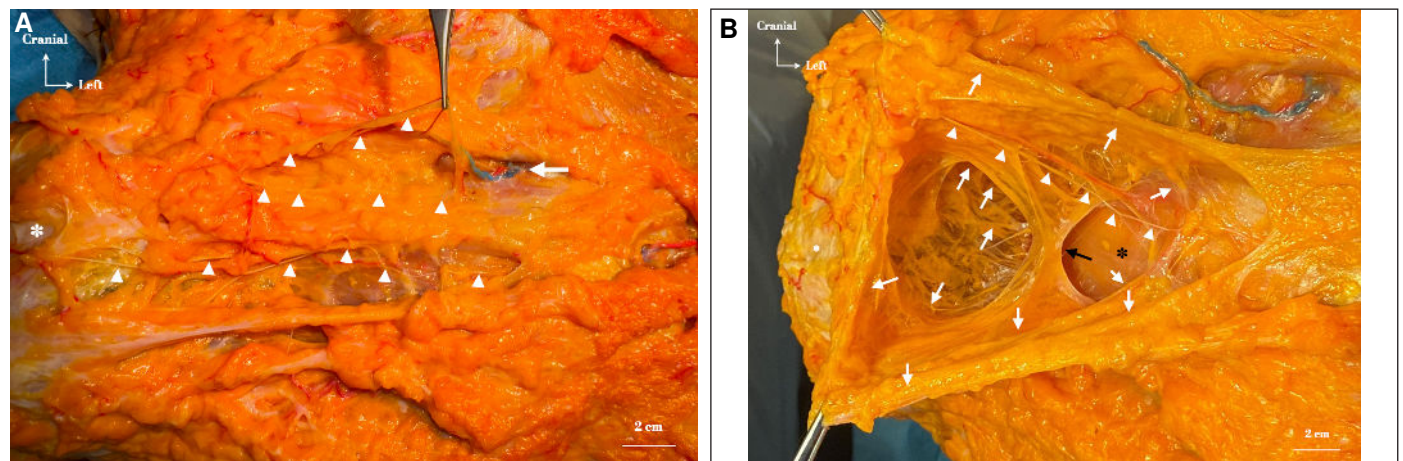


Figure 3. Macroscopic appearance of retinacular and neurovascular structures following Mia Femtech procedure. Dissection was performed following tissue-preservation access using combined blunt and limited sharp techniques to expose structures encountered after separation within the posterior intralamellar adipofascial compartment. (A) Parasternal region showing emergence of the third and fourth internal thoracic perforator arteries (red) and veins (blue), with accompanying sensory nerves supplying the medial breast. The implant elevating the corpus mammae is indicated (white star). Arrowheads indicate sensory nerve branches located within the peripheral fascial convergence zone. (B) Vertical retinacular fibers (Cooper's ligaments; white arrows) extending from the dermis toward the pectoralis major fascia (black arrow). These fibers are shown after separation along the laminated adipofascial interface, where they appear displaced rather than sharply transected. The pectoralis major muscle is indicated (black star). Property of Establishment Labs (Alajuela, Costa Rica). All rights reserved, 2026. Reproduced with permission.

Anatomical Interpretation of the Posterior Lamella

The fascial anatomy of the breast has long been subject to divergent interpretations, largely because delicate connective tissue layers are particularly susceptible to distortion during conventional anatomical dissection. As emphasized in previous anatomical studies, sharp dissection and rigid plane-by-plane separation may artificially create or obscure natural tissue planes, contributing to historical inconsistencies in descriptions of breast fascial organization and terminology.¹⁹ To mitigate these limitations, the present study employed a multimodal anatomical approach, combining blunt and sharp dissections, sectional analysis, endoscopic visualization, and histology, thereby limiting dissection-related bias and providing convergent evidence consistent with native tissue architecture. Across all specimens, the posterior lamella was consistently

identified as a laminated adipofascial structure composed of multiple fine layers of fat and fascia. This structure corresponds to what has variably been described in the literature as the posterior lamella, the deep layer of the superficial fascial system, the retro-mammary space, or the subglandular space.^{3-5,20} Rather than representing a distinct or competing entity, these terms appear to describe different perspectives of the same laminated anatomical structure. Histological analysis confirmed that the posterior lamella is structurally distinct from both glandular parenchyma and muscular fascia, with no epithelial elements identified in the plane based on the specimens analyzed. Preservation of this plane during dissection maintains the native fibrous and fascial framework of the breast, thereby preserving the intrinsic architectural scaffold that contributes to breast form and mechanical support. This structural distinction reinforces the suitability of the posterior lamella as a gland-preserving dissection plane. From a functional standpoint,



Figure 4. Videoendoscopic views following Preservé breast augmentation (left breast). Cranial orientation is indicated in the upper left corner of each panel. (A) Initial endoscopic entry through the device channel (black star) at the inframammary fold. The view demonstrates the multilayered adipofascial architecture of the fold region. Multiple thin, parallel vertical retinacular fibers (black arrows) correspond to the continued laminated connective tissue from the channel to the posterior lamella before full expansion. (B) Progression through the channel after atraumatic trocar advancement and balloon expansion within the posterior intralamellar plane. Vertical retinacular fibers (Cooper's ligaments; black arrows) are seen bridging toward the mammary gland (at the top) but are displaced rather than transected. The developing pocket remains bounded by laminated fascial layers, illustrating propagation along a preexisting connective tissue plane rather than through glandular tissue. (C) Fully expanded posterior intralamellar space (white star). The posterior lamella forms a smooth laminated inner surface, whereas the pectoralis major fascia and muscle fibers are visible through the translucent adipofascial layers posteriorly. Scale bars = 1 cm. Property of Establishment Labs (Alajuela, Costa Rica). All rights reserved, 2026. Reproduced with permission.

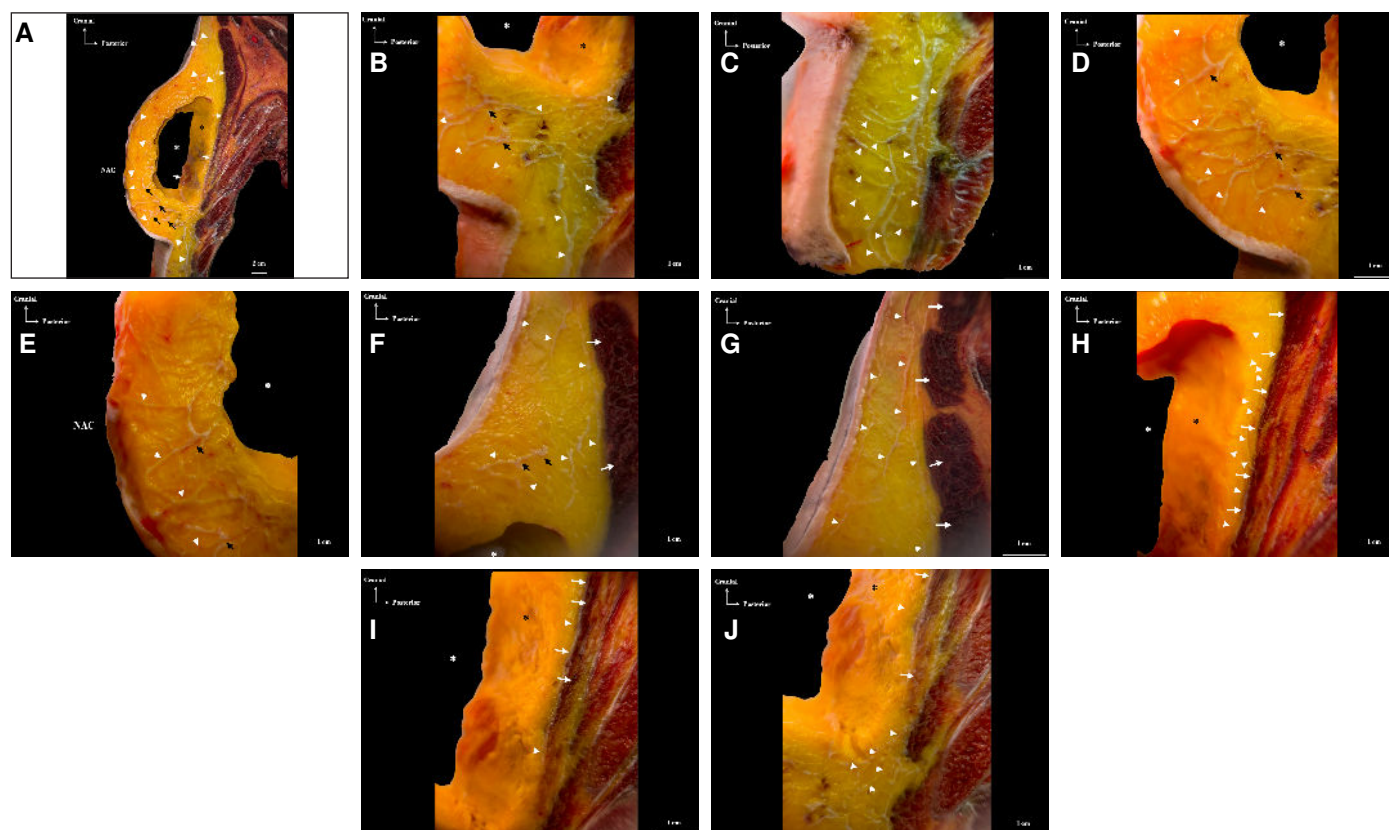


Figure 5. Paramedian sagittal section after Preservé breast augmentation (left breast). Panels illustrate the anatomical relationships between the atrophic corpus mammae (black arrows), vertical retinacular fibers (retinacula cutis; commonly referred to clinically as Cooper's ligaments), superficial fascia, and underlying chest wall musculature (pectoralis major and serratus anterior; white arrows). The balloon-dissected pocket is indicated (white star), and the posterior lamella is identified posteriorly (black star). (A) Global view. (B, C) Magnified views of the superior and inferior portions of the inframammary fold. (D) Anterior lower breast. (E) Anterior breast at the level of the nipple–areola complex (NAC). (F, G) Inferior and superior aspects of the superior mammary fold. (H–J) Posterior lamella posterior to the balloon-dissected pocket, showing superior, middle, and inferior portions. Property of Establishment Labs (Alajuela, Costa Rica). All rights reserved, 2026. Reproduced with permission.

this laminated adipofascial structure provides both structural support and a physiological gliding interface, allowing relative mobility between the mammary gland and the pectoralis major fasciae, consistent with descriptions found in classical anatomical treatises and subsequent anatomical interpretations.^{21,22} These findings align with contemporary 3-dimensional models of breast fascial anatomy, which describe the breast as an organ enclosed within a continuous fibrofatty fascial system anchored to the chest wall at its periphery.²⁻⁶

Historical Perspective, Definitions, and Nomenclature

Classical anatomical descriptions have long recognized the mammary gland as a distinct organ separated from the chest wall by a loose connective tissue plane.^{23,24} In *Gray's Anatomy: Descriptive and Surgical* (1858), the breast was described as a glandular organ separated from the pectoral muscles by a thin layer of superficial fascia, composed of lobes and lobules interconnected by fibrous septa and embedded

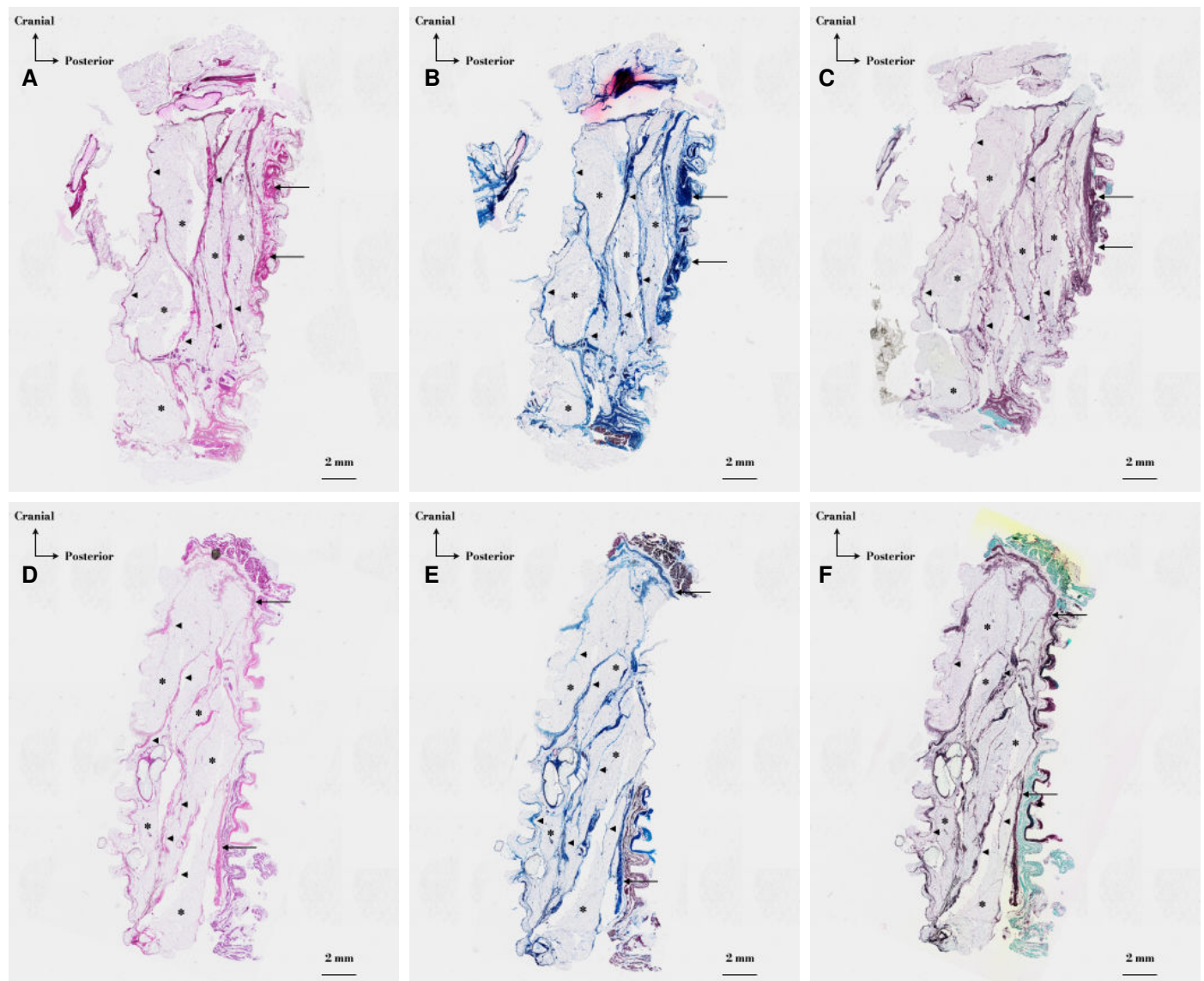


Figure 6. Histological characterization of the posterior lamella. Representative sagittal histological sections obtained along a parasagittal vertical axis at the midclavicular level are shown. Sections from the superior mammary fold are presented in A–C, and sections from the inferior mammary fold are presented in D–F. Sections stained with hematoxylin and eosin (A, D), Masson's trichrome (B, E), and Sirius Red/Fast Green (C, F) demonstrate alternating adipose tissue (asterisks) and collagen-rich fascial layers forming the posterior lamella, with laminated fascial planes highlighted (arrowheads). Black arrows indicate the fascia and muscle fibers of the pectoralis major. No glandular epithelial elements are identified within the posterior lamella. Scale bars = 2 mm. Property of Establishment Labs (Alajuela, Costa Rica). All rights reserved, 2026. Reproduced with permission.

within adipose tissue.²¹ This description already implied a layered fibrofatty organization in which connective tissue provides both structural cohesion and separation between the mammary gland and the chest wall. Testut's *Traité d'Anatomie Humaine* (1905) further refined this concept by describing a retromammary areolar plane (corresponding to the loose areolar tissue previously described by Chassaignac as the retromammary serous bursa) and a division of the subcutaneous adipose tissue into 2 laminae of unequal thickness: a thinner posterior lamina interposed between the mammary gland and the chest wall fascia, and a thicker anterior lamina located between the gland and the skin. He also described vertically oriented connective tissue septa contributing to both suspension of the gland and compartmentalization of perimammary adipose tissue, thereby foreshadowing later descriptions of retinacular and fascial support systems.²² Rouvière and Delmas further emphasized the presence of a loose laminated connective tissue layer located between the superficial fascia and the pectoralis major and serratus anterior fasciae. They described this structure as a *loose laminated connective tissue (tissu lamelleux lâche)* rather than a true serous

bursa, noting that a distinct retromammary serous bursa is rare and inconsistently observed.²⁵ According to their observations, this lamellar tissue permits relative mobility between the mammary gland and the chest wall, thereby contributing to both mechanical support and functional adaptability of the breast. This description closely parallels the anatomical organization identified in the present study and provides a classical anatomical foundation for the concept of a posterior lamella. Contemporary anatomical atlases have largely preserved these foundational concepts.²⁶

Relationship to Retinacular, Peripheral Fascial, and Neurovascular Structures

The mechanical role of vertical retinacular fibers referred to as Cooper's ligaments has been variably interpreted, ranging from rigid suspensory ligaments to diffuse retinacular fibers within the breast parenchyma.²⁷ In the present study, vertical retinacular fibers

anchoring the corpus mammae to the dermis and the pectoralis major fascia were consistently observed traversing the posterior lamella. These fibers did not form rigid septa limiting dissection but instead behaved as compliant connective strands that were displaced during balloon-assisted intralamellar dissection rather than transected. This finding could clarify the mechanical behavior of the retinacular system during posterior dissection and supports the feasibility of maintaining native ligamentous support while accessing the posterior plane. At the periphery of the breast, convergence of superficial and deep fascial layers consistently formed a circummammary boundary. Neurovascular bundles were observed to course within this peripheral zone and were preserved during blunt or balloon-assisted dissection performed within the posterior intralamellar plane.

Peripheral Fascial Boundaries and the Circummammary Ligament Theory

Fusion and convergence of superficial and deep fascial layers at the periphery of the breast defined a circumferential boundary consistent with the circummammary ligament concept described by Rehnke and colleagues.³ This structure delineates the limits of the posterior intralamellar plane and explains the natural termination of dissection at the breast footprint, corresponding to the superior, inferior, medial, and lateral mammary folds defining the cutaneous base of the breast. Similarly, the inframammary region was observed to represent a zone of fascial convergence rather than a discrete ligamentous band. This observation aligns with contemporary anatomical studies describing the inframammary fold as a multilayered fascial system characterized by gradual fusion and dissociation of septal structures, rather than a sharply defined ligament.⁵

Surgical Implication of an Intralamellar Plane

From a surgical perspective, recognition of a posterior intralamellar dissection plane provides an anatomical rationale for conservative, tissue-preserving approaches in breast surgery. The propagation of hydrodissection and balloon-assisted expansion within this region appears to be influenced by the intrinsic laminated architecture and peripheral fascial condensations that define the breast footprint. These structural boundaries likely guide expansion along the posterior intralamellar plane rather than permitting unrestricted spread into adjacent extramammary spaces. Dissection within this laminated prepectoral plane minimizes direct glandular violation, preserves the integrity of the corpus mammae, and avoids unnecessary disruption of vascular and neural structures. Macroscopic dissection, endoscopic visualization, and sectional analysis consistently demonstrated that major vascular structures are not typically encountered within this plane. Importantly, the posterior intralamellar plane differs conceptually from traditional subglandular or subfascial pockets, which are often approached as 2-dimensional areas. The laminated architecture of the posterior lamella defines a 3-dimensional structure whose boundaries are determined by fascial continuity rather than sharply demarcated anatomical borders (Figure 7).

Implications for Breast Tissue-Preservation Surgery

The findings of this study provide an anatomical foundation for surgical strategies that prioritize preservation of native connective tissue architecture. By aligning surgical dissection with intrinsic fascial planes, it may be possible to maintain internal breast architecture

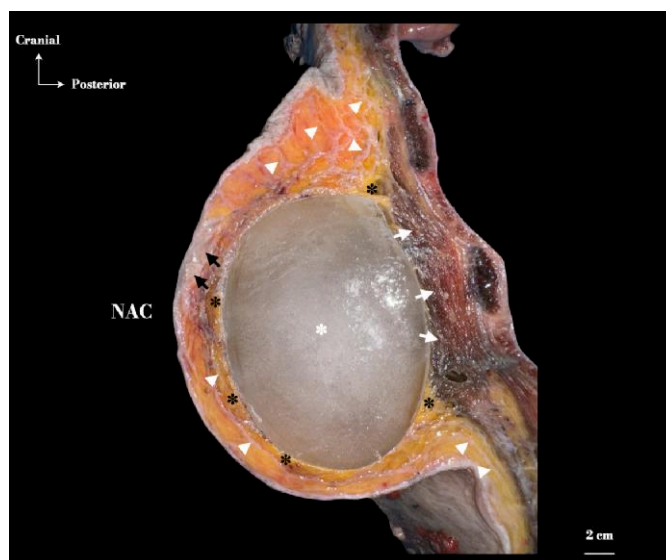


Figure 7. Sagittal macroscopic section showing implant position within the posterior intralamellar plane. The implant occupies the balloon-expanded intralamellar pocket located posterior to the corpus mammae (black arrows), preserving the glandular tissue and vertical retinacular structures (white arrowheads). The posterior lamella (black asterisks) corresponds to the laminated adipofascial interface between the gland and the pectoralis major fascia. In this macroscopic section, the posterior lamella appears as a thin, partially compressed adipofascial interval rather than a distinct thick layer, but maintains the anatomical separation between the implant pocket and the mammary gland anteriorly and pectoralis major fascia posteriorly. Property of Establishment Labs (Alajuela, Costa Rica). All rights reserved, 2026. Reproduced with permission.

and potentially support stable implant positioning and durable aesthetic outcomes.^{6,13} These principles are particularly compatible with minimally invasive approaches that rely on atraumatic tunneling and balloon expansion rather than sharp dissection.

Limitations

This study has limitations inherent to cadaveric anatomical research. Multiple augmentation approaches were intentionally performed to reproduce common surgical conditions and to probe the reproducibility of tissue-plane behavior; the study was not designed or powered to compare techniques, and no technique-specific comparisons are inferred; future studies would be required for technique-specific evaluation. The number of specimens was limited, and all dissections were performed in a nonphysiologic state, which may influence tissue compliance and spatial relationships. In addition, the specimens represented an elderly population with advanced age-related involution and marked glandular atrophy, which may limit extrapolation to younger patients or breasts with higher glandular density. Gravitational effects and functional tissue dynamics present in vivo were not assessed, and the study was not designed to evaluate clinical outcomes. Further anatomical and microanatomical studies, including higher-resolution histological and imaging techniques, are warranted to clarify this aspect of breast anatomy and its potential surgical relevance.

CONCLUSIONS

This multimodal anatomical study suggests that the posterior lamella of the breast constitutes a consistent, laminated adipofascial structure defining a reproducible intralamellar dissection plane posterior to the corpus mammae, which, upon controlled expansion, delineates a potential anatomical space. Recognition of this plane refines the anatomical understanding of the mammary region and provides a

morphological basis for conservative, tissue-preserving surgical approaches aligned with native breast connective tissue architecture.

Acknowledgments

The authors gratefully acknowledge the donors of the School of Surgery of the Fer à Moulin—APHP and the UCSD Division of Anatomy Body Donation Program and their families, whose generous contributions make anatomical research, advancing medical knowledge, and the education of future healthcare professionals possible. The authors gratefully acknowledge the technical support of Russell Pryor, Mark Gary, Jamie Lee, and Scott T. Barton from the Division of Anatomy, Department of Surgery, University of California San Diego, whose assistance was essential for the preparation and execution of the anatomical dissections. Microscopy imaging was performed at the UCSD School of Medicine Microscopy Core, supported by grants NS047101, OD030505, and OD036455. The authors also wish to acknowledge the support of the Moores Cancer Center Biorepository and Tissue Technology Shared Resource, which is supported by the National Cancer Institute of the National Institutes of Health under award number P30CA23100. The content is solely the responsibility of the authors and does not necessarily represent the official views of the National Institutes of Health. The authors acknowledge using ChatGPT (GPT-5.2, OpenAI, LLC, San Francisco, CA) for text editing to improve the fluency of the English language in the preparation of this manuscript on January 6, 2026. The authors affirm that the original intent and meaning of the content remain unaltered during editing and that ChatGPT had no involvement in shaping the intellectual content of this work. Following artificial intelligence–assisted editing, the manuscript was thoroughly reviewed, corrected, and formally approved by all co-authors, who assume full responsibility for the accuracy, integrity, and originality of the content presented.

Disclosures

Dr Lhuairé receives compensation for time dedicated to anatomical research activities supported by Establishment Labs. Dr Chacon-Quiros is a consultant for Establishment Labs Holdings Inc., receives compensation for clinical and anatomical study–related activities, and holds equity interests in the company. Drs Rehnke, Graf, Pittman, and Stan and Prof. Atlan are medical consultants for Establishment Labs and receive compensation for clinical and anatomical study–related contributions. Drs Villalobos-Alpizar and Clausen-Oreamuno are healthcare professionals employed by Establishment Labs. Drs Lantieri and Noel declared no potential conflicts of interest with respect to the research, authorship, and publication of this article.

Funding

The authors received no individual financial support for the research, authorship, and publication of this article.

Supplement Sponsorship

This article appears as part of the supplement “The Building Blocks of Breast Tissue Preservation,” sponsored by Establishment Labs Holdings Inc. (Coyol, Alajuela, Costa Rica) which provided funding for publication.

Rights and Permissions Notice

Figures 1–7 have been made available for use by Establishment Labs and are not covered under the Open Access (CC BY NC ND) license.

These materials remain the copyright of Establishment Labs. All rights to Figures 1–7 are reserved by Establishment Labs. Permission for reuse or reproduction of these specific materials must be obtained directly from the copyright holder at: medical@establishmentlabs.com.

REFERENCES

1. Flageul G, Grolleau JL, Sitbon E, eds. Les implants mammaires en chirurgie esthétique et reconstructrice. *Ann Chir Plast Esthet*. 2005;50:333-704. doi: [10.1016/j.anplas.2005.07.005](https://doi.org/10.1016/j.anplas.2005.07.005)
2. Matousek SA, Corlett RJ, Ashton MW. Understanding the fascial supporting network of the breast: key ligamentous structures in breast augmentation and a proposed system of nomenclature. *Plast Reconstr Surg*. 2014;133:273-281. doi: [10.1097/01.prs.0000436798.20047.dc](https://doi.org/10.1097/01.prs.0000436798.20047.dc)
3. Rehnke RD, Groening RM, Van Buskirk ER, Clarke JM. Anatomy of the superficial fascia system of the breast: a comprehensive theory of breast fascial anatomy. *Plast Reconstr Surg*. 2018;142:1135-1144. doi: [10.1097/prs.0000000000004948](https://doi.org/10.1097/prs.0000000000004948)
4. Duncan AM, Al Youha S, Joukhadar N, Konder R, Stecco C, Wheelock ME. Anatomy of the breast fascial system: a systematic review of the literature. *Plast Reconstr Surg*. 2022;149:28-40. doi: [10.1097/prs.00000000000008671](https://doi.org/10.1097/prs.00000000000008671)
5. Takaya K, Sakamoto Y, Imanishi N, Kishi K. The fascial structure of the breast: new findings on the anatomy of the inframammary fold. *J Plast Reconstr Aesthet Surg*. 2022;75:1632-1638. doi: [10.1016/j.bjps.2021.11.109](https://doi.org/10.1016/j.bjps.2021.11.109)
6. Chacon-Quiros M, Sforza M, Solis-Chaves P, et al. The 3-year results of a 100-patient prospective study of safety and effectiveness of Mia Femtech. *Aesthet Surg J*. 2025;46:250-259. doi: [10.1093/asj/sjaf196](https://doi.org/10.1093/asj/sjaf196)
7. Graf RM, Bernardes A, Rippel R, Araujo LR, Damasio RC, Auersvald A. Subfascial breast implant: a new procedure. *Plast Reconstr Surg*. 2003;111:904-908. doi: [10.1097/01.Prs.0000041601.59651.15](https://doi.org/10.1097/01.Prs.0000041601.59651.15)
8. Graf RM, Bernardes A, Auersvald A, Damasio RC. Subfascial endoscopic trans-axillary augmentation mammoplasty. *Aesthetic Plast Surg*. 2000;24:216-220. doi: [10.1007/s002660010036](https://doi.org/10.1007/s002660010036)
9. Rehnke RD. Reply: subfascial breast implant: a new procedure. *Plast Reconstr Surg*. 2020;145:194e-195e. doi: [10.1097/prs.00000000000006330](https://doi.org/10.1097/prs.00000000000006330)
10. Lhuairé M, Derder M, Hivelin M, Lantieri L, Hunsinger V. Minimally invasive inframammary breast augmentation. *Plast Reconstr Surg*. 2019;144:1126e-1127e. doi: [10.1097/PRS.00000000000006283](https://doi.org/10.1097/PRS.00000000000006283)
11. Tebbetts JB. Dual plane breast augmentation: optimizing implant-soft-tissue relationships in a wide range of breast types. *Plast Reconstr Surg*. 2001;107:1255-1272. doi: [10.1097/00006534-200104150-00027](https://doi.org/10.1097/00006534-200104150-00027)
12. Hedén P, Jernbeck J, Hober M. Breast augmentation with anatomical cohesive gel implants: the world's largest current experience. *Clin Plast Surg*. 2001;28:531-552. doi: [10.1016/S0094-1298\(20\)32393-2](https://doi.org/10.1016/S0094-1298(20)32393-2)
13. Chacón-Quiros M. Breast tissue preservation: a paradigm shift in aesthetic breast surgery. *Clin Plast Surg*. 2026;53:255-265. doi: [10.1016/j.cps.2025.11.015](https://doi.org/10.1016/j.cps.2025.11.015)
14. Kamina P. *Petit dictionnaire d'anatomie, d'embryologie et d'histologie*. Maloine; 1990.
15. Dauber W, Feneis H. *Lexique illustré d'anatomie*. Flammarion Médecine-Sciences; 2007.
16. Federative International Programme for Anatomical Terminology. *Terminologia Anatomica*. 2nd ed. Federative International Programme for Anatomical Terminology; 2019.
17. Kachlik D, Baca V, Bozdechova I, Cech P, Musil V. Anatomical terminology and nomenclature: past, present and highlights. *Surg Radiol Anat*. 2008;30:459-466. doi: [10.1007/s00276-008-0357-y](https://doi.org/10.1007/s00276-008-0357-y)
18. Federative Committee on Anatomical Terminology. *Terminologia Anatomica: International Anatomical Terminology*. Georg Thieme Verlag; 1998.
19. Neumann PE, Labib H, Lhuairé M, et al. What is it? What is it good for? *Clin Anat*. 2025;39:262-272. doi: [10.1002/ca.70047](https://doi.org/10.1002/ca.70047)
20. Dickerson Rehnke R. Reply: anatomy of the superficial fascia system of the breast: a comprehensive theory of breast fascial anatomy. *Plast Reconstr Surg*. 2019;144:320e-322e. doi: [10.1097/prs.00000000000005815](https://doi.org/10.1097/prs.00000000000005815)
21. Gray H. *Anatomy: Descriptive and Surgical*. John W. Parker and Son; 1858.
22. Testut L. *Traité d'Anatomie Humaine*. Octave Doin; 1895.
23. Cruveilhier J. *Traité d'anatomie descriptive*. Vol. 1-3. J.-B. Baillière; 1834.
24. Cruveilhier J. *Traité d'anatomie descriptive*. P. Asselin; 1874.
25. Rouvière H, Delmas A. *Anatomie Humaine. Descriptive, topographique et fonctionnelle*. Tome II. Tronc. 11 ed. Masson; 1974.
26. Netter FH. *Atlas of Human Anatomy*. Saunders Elsevier; 2014.
27. Cooper AP. *On the Anatomy of the Breast*. Vol. 1. Longman, Orme, Brown, Green, and Longmans; 1840.