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Optimizing Outcomes in Breast Augmentation: Seven Years of Experience with the Subfascial Plane

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Abstract. *Introduction:* Breast augmentation has enjoyed worldwide acceptance in the last few decades. In order to optimize the outcomes of this operation, numerous variables such as incision location, pocket plane, implant design, and materials, and individual tissue characteristics must be carefully considered. Although no combination of choices may be considered superior, satisfactory results depend on adjusting the available options to each patient's requirements. In this paper, the authors present a seven-year experience with augmentation mammaplasty using the subfascial plane, analyzing important aspects of surgical technique, benefits and trade-offs when compared to other approaches, and the resulting outcomes.

Method: A total of 241 primary and secondary breast augmentation procedures were performed over a seven-year period, employing anatomical high-cohesivity gel textured implants (McGhan 410 Style). After choosing the appropriate approach and performing the skin incision, dissection proceeds parallel to the skin (as in skin-sparing mastectomies) for approximately 4 cm. The breast's parenchyma is then incised in a radial direction (perpendicular to the skin incision) and vertically until the fascial layer is reached. Dissection of the implant's pocket is then performed in the well-defined subfascial plane. After insertion of the implants, the distance between the areola's inferior border and the inframammary fold should be approximately equal to 6–7 cm (or X). The distance between the areola's superior border and the uppermost point of the breast should be approximately equal to 9–10.5 cm (or $1.5X$). Another important parameter is the distance between the implants, which should be approximately 2–3 cm. Finally, the distance between the areola's medial border and the midsternal line should be about 9–10 cm. Postoperative care issues are specified.

Results: Pleasing long-term results have been obtained, with maintenance of a natural breast shape, a smooth transition between the soft tissues and implant in the upper pole, and low morbidity. The rate of capsular contracture was extremely low and there were no complaints regarding displacement of the implants with contraction of the pectoralis major muscle.

Conclusion: The presented technique offers improved long-term aesthetic results due to the creation of a stronger supporting system for the implant's superior pole. This tends to keep the implant's upper third from altering its shape and position over time and combines the potential benefits of the subglandular approach with the improvements that may be achieved by having more tissue available to cover the implant's upper pole. The trade-offs of the subpectoral approach have been significantly reduced and factors such as morbidity and postoperative recovery are acceptable. The presented technique is extremely versatile and may also be used in patients requiring removal and replacement of breast implants.

Key words: Mammaplasty—Breast augmentation—Subfascial plane

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Introduction

Breast augmentation has enjoyed worldwide acceptance in the last few decades due to factors such as current cultural trends, development of more modern implants, and refinement of the available surgical techniques. In order to optimize the outcomes of this operation, numerous variables—such as incision location, pocket plane, implant design and materials, and individual tissue characteristics—must be carefully considered. Although no combination of choices may be considered superior, satisfactory results

depend on adjusting the available options to each patient's requirements.

In breast augmentation, pocket plane selection is one of the most influential factors in the dynamics established between the implants and soft tissues after surgery. Nowadays, the most commonly employed pocket planes are subglandular, partial retropectoral, and totally submuscular. The unique indications, benefits, and trade-offs of each strategy have been extensively analyzed in the literature [2,3,7–12].

Utilization of the subfascial plane has only recently been reported by authors performing transaxillary breast augmentation [4]. Some of the reported benefits of utilizing the pectoralis major fascia as an extra unit for implant coverage, which have offered more natural long-term outcomes, are the improved concealment of implant borders and rippling, and the reduced rates of capsular contracture [1,4].

In this paper we present a seven-year experience with augmentation mammaplasty using the subfascial plane, analyzing important aspects of surgical technique, benefits and trade-offs when compared to other approaches, and the resulting outcomes. These concepts originated from the senior author's extensive experience with the ablation of breast cancer and breast reconstruction.

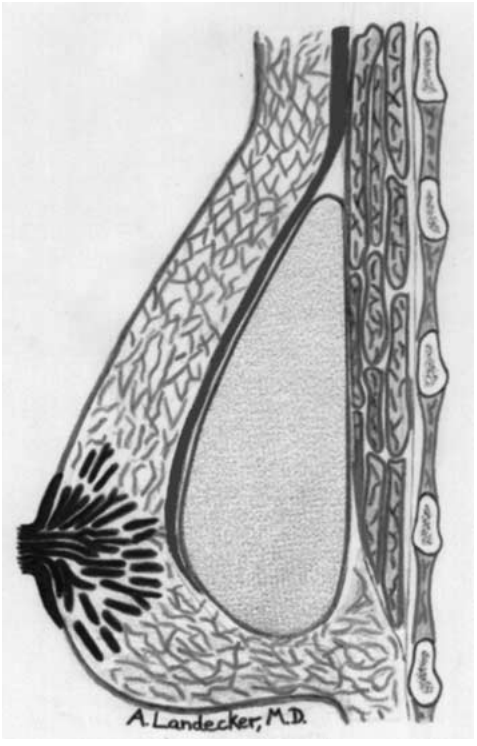

Fig. 1. Placement of the implant in the subfascial plane. The anterior wall of the implant's pocket consists of pectoral fascia, breast parenchyma, subcutaneous tissue, and skin. The strongersupporting system that results from placing the implant under the fascia tends to keep the implant's upper third from altering its shape and position over time.

Method

A total of 241 primary and secondary breast augmentation procedures were performed by the senior author between 1995 and 2002, employing anatomical high-cohesivity gel textured implants (McGhan 410 Style).

Technique

The operative procedure begins with the patient under general anesthesia and already marked. Incision choice should be based on a thorough discussion with the patient regarding factors such as individual preference and the advantages and trade-offs of each approach. In patients desiring an areolar approach, incision location depends on whether or not a change in the position of the areola is anticipated. In other words, the incision should be placed in the lower half of the areola when its position is considered satisfactory. In patients requiring lifting of the areola and/or breast tissues, the incision should be placed in the upper half of the areola (and may be combined with vertical or inverted -T incisions if necessary). Other approaches should be performed when the diameter of the patient's areola is too small for the required or desired implant.

The inframammary approach offers well-known advantages, such as easy access (ensuring accurate dissection and hemostasis of the pocket), nondisruption of the breast's parenchyma, and the possibility of using virtually any type/size of implant. The incision is usually 4 cm long and should be located slightly lateral to the NAC's inferior projection on the inframammary fold and approximately 0.5 cm above the anticipated new fold. Axillary approaches are generally avoided due to factors such as the resulting scar (which may be problematic in countries where exposure of the body is frequent), more difficult hemostasis, a potentially less accurate creation of the implant's pocket, and an increased tendency towards superior displacement of the implant with time.

In the areolar approach, dissection after the incision is performed parallel to the skin, as in skin-sparing mastectomies, for approximately 4 cm. The breast's parenchyma is then incised in a radial direction (perpendicular to the skin incision) and vertically until the fascial layer is reached. Dissection of the implant's pocket is then performed in the well-defined subfascial plane using a high-frequency electrocautery.

When planning the inframammary fold's position, it should be lowered so that the horizontal midaxis of the implant is centered on the nipple and the amount of lowering correlates with the implant's diameter [6]. When doing this, the attachments from the fascia to

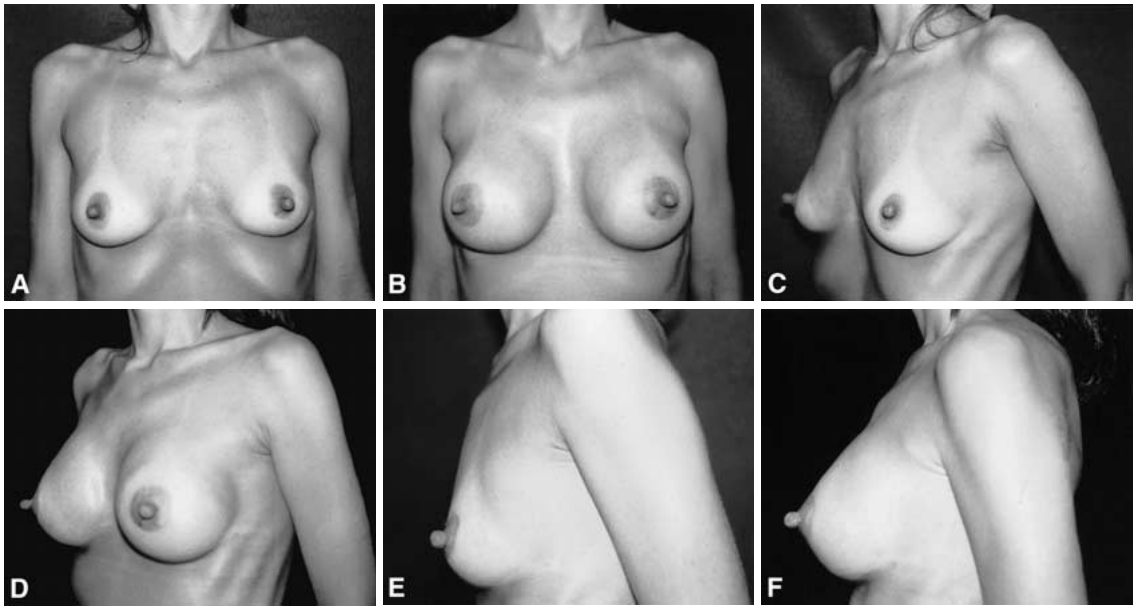

Fig. 2. (**A**) Preoperative frontal view of a 22-year-old patient. (**B**) Breast augmentation with 270-cc, anatomical implants in the subfascial plane: result after six months. (**C**) Preoperative oblique view. (**D**) Postoperative oblique view. (**E**) Preoperative lateral view. (**F**) Postoperative lateral view.

the skin at the fold's level must be disrupted in order to avoid deformities, such as high-riding implants and "double-bubble" contours in the lower breast [1]. Undermining should not be extended laterally beyond the lateral breast border due to the NAC's innervation and to avoid implant displacement after surgery.

After meticulous hemostasis, the implant is bathed in Cephalothin solution and is inserted into the subfascial pocket (Fig. 1). Layered wound closure is performed using absorbable sutures (in the subcutaneous and subdermal planes) and Monocryl subcuticular running sutures. Suction drains are inserted usually through the axilla and are kept until the output is less than 30 cc/day on each side.

An accurate assessment of the final proportions is mandatory in order to maximize the chances of a satisfactory outcome. In general, the distance between the areola's inferior border and the inframammary fold should be approximately equal to 6–7 cm (or X). The distance between the areola's superior border and the uppermost point of the breast should be approximately equal to 9–10.5 cm (or $1.5X$). Another important parameter is the distance between the implants, which should be approximately 2–3 cm. Finally, the distance between the areola's medial border and the midsternal line should be about 9–10 cm.

At the end of the operation, Tegaderm dressings are placed around the breast in a triangular fashion (somewhat like a bra) in order to shape, support, and modestly compress the soft tissues; these are removed after approximately one week. An elastic band or strap should be used over the superior poles of the breasts for two to four weeks in order to avoid superior displacement of the implants, keep the newly created inframammary fold in the desired position, and to expand the tissues in the inferior pole of the breast.

In terms of postoperative care, one of the most important goals is obtaining adequate adherence between the tissues and implants. Therefore, early massaging or mobilization of the breasts (which may lead to the accumulation of liquid around the implants), should be avoided for at least three weeks.

Results

Pleasing long-term results have been obtained by employing the proposed technique, with maintenance of a natural breast shape, a smooth transition between the soft tissue and implant in the upper pole, and low morbidity. The rate of capsular contracture was extremely low and there were no complaints regarding displacement of the implants with contraction of the pectoralis major muscle (Figs. 2–6)

Discussion

The pectoral fascia, a thin layer of tissue that lies over the pectoralis major muscle, is attached to the sternum, clavicle, and is continuous with the fascia of the shoulder, axilla, and thorax inferolaterally [5]. At the caudal border of the pectoralis major muscle, the clavipectoral, pectoral, and serratus anterior fasciae become continuous and form suspensory ligaments

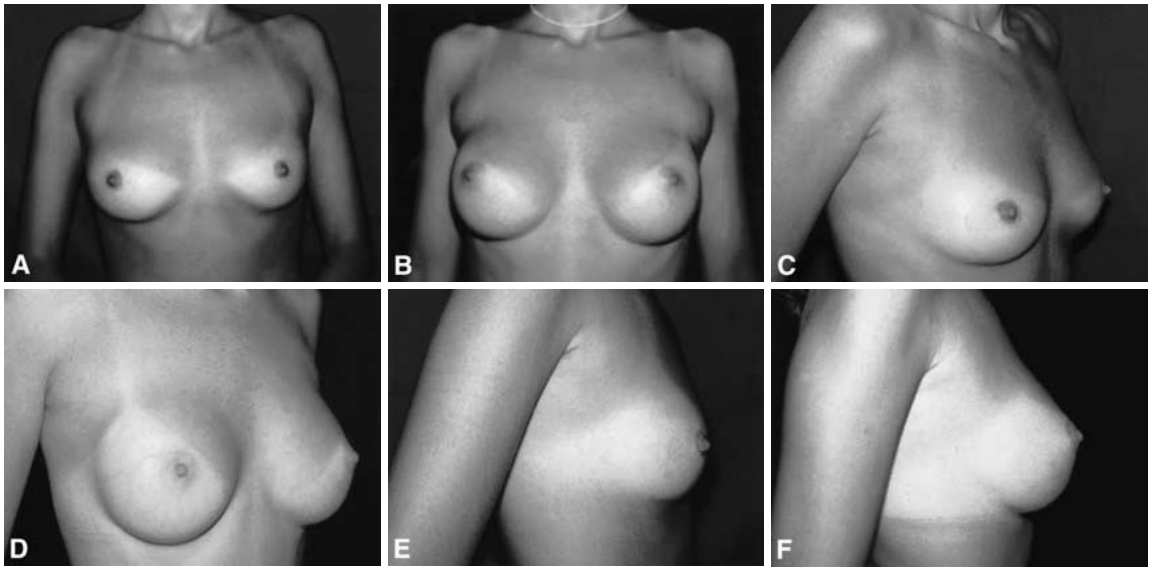

Fig. 3. (**A**) Preoperative frontal view of a 25-year-old patient. (**B**) Breast augmentation with 270-cc anatomical implants in the subfascial plane: result afters six months. (**C**) Preoperative oblique view. (**D**) Postoperative oblique view. (**E**) Preoperative lateral view. (**F**) Postoperative lateral view.

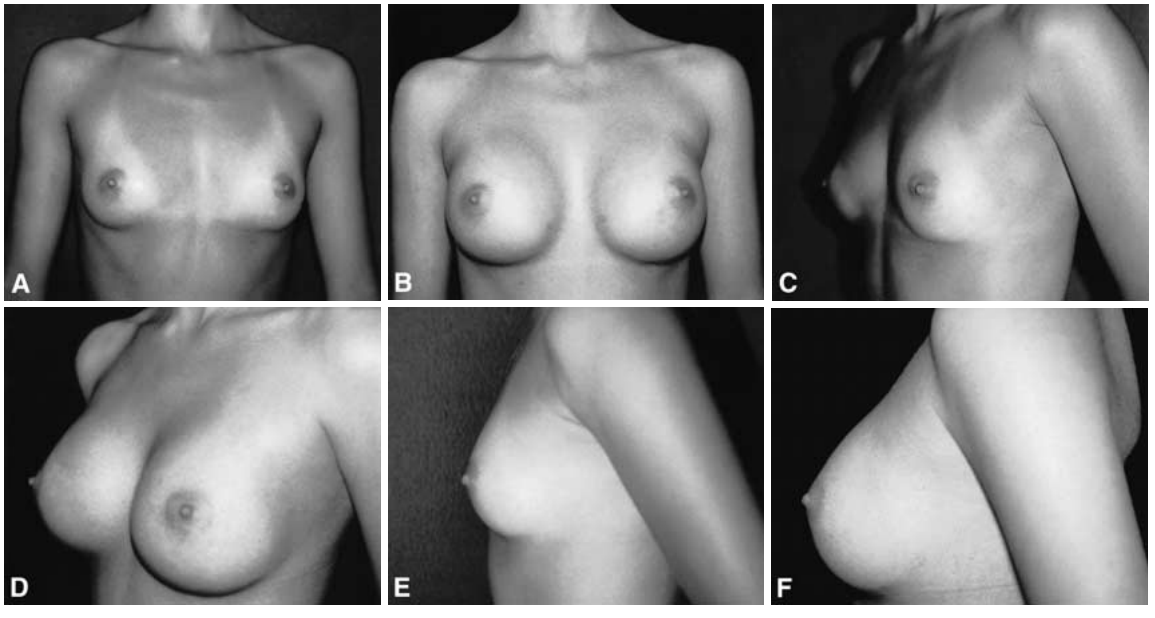

Fig. 4. (**A**) Preoperative frontal view of a 28-year-old patient. (**B**) Breast augmentation with 235-cc anatomical implants in the subfascial plane: result after six months. (**C**) Preoperative oblique view. (**D**) Postoperative oblique view. (**E**) Preoperative lateral view. (**F**) Postoperative lateral view.

that extend to the breast's inframammary fold and its investing fascia [1].

Intraoperatively, although individual variations may occur, we have observed that the pectoralis major fascia tends to be thin and more fragile over the lower two-thirds of the muscle. The progressive thickening of the fascia along the upper third of the muscle constitutes the basis of the subfascial augmentation technique. In this area the fascia is sufficiently consistent, offering the surgeon an additional anatomical structure to cover the implant and improve the long-term aesthetic results. Therefore, in the presented technique, the anterior wall of the implant's pocket consists of pectoral fascia, breast parenchyma, subcutaneous tissue, and skin (Fig. 1).

One of the most important principles of the presented technique involves trying to avoid any type of communication between the skin and parenchyma incisions. This is achieved by incising the skin transversely, continuing the dissection parallel to the skin

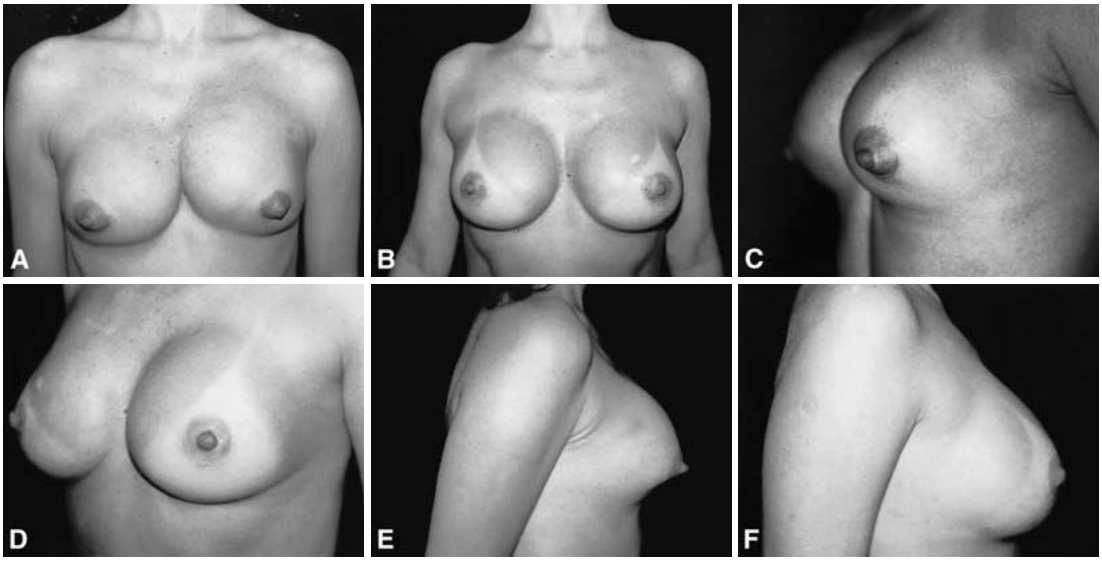

Fig. 5. (**A**) Preoperative view of a patient presenting significant capsular contracture. (**B**) The patient was submitted to removal and replacement of the breast implants. The new 270-cc anatomical implants were placed in the subfascial plane and a segmental pectoralis major flap was used to protect the implant's upper pole; result after six months. (**C**) Preoperative oblique view. (**D**) Postoperative oblique view. (**E**) Preoperative lateral view. (**F**) Postoperative lateral view.

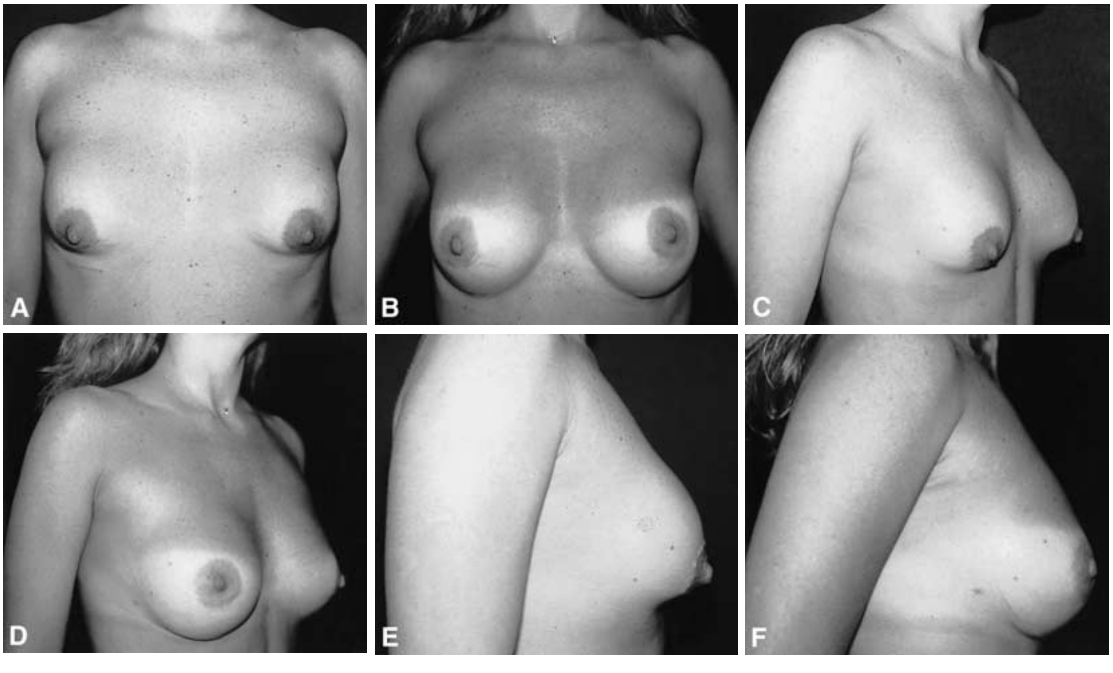

Fig. 6. (**A**) Preoperative view of a patient presenting displacement of submuscular breast implants. (**B**) The patient was submitted to removal and replacement of the breast implants. The new 270-cc anatomical implants were placed in the subfascial plane: result after six months. (**C**) Preoperative oblique view. (**D**) Postoperative oblique view. (**E**) Preoperative lateral view. (**F**) Postoperative lateral view.

(as in skin-sparing mastectomies) for approximately 4 cm, and then approaching the breast's parenchyma in a radial direction (perpendicular to the skin incision) and vertically until the muscle layer is reached. After inserting the implant, closure of the incised tissues establishes a more secure isolation system between the implant and the atmosphere, reducing the risk of infection.

Additionally, radial dissection of the breast's parenchyma facilitates the adjustment/rotation of glandular flaps for breast shaping. This is especially useful when ptosis and insufficient upper pole full-

ness are present. Also, in patients submitted to tumor resection, reconstruction can be performed very effectively by combining insertion of the implant with glandular flap manipulation to reshape the breast.

The creation of a stronger supporting system for the implant's superior pole is one of this technique's main features. Implant displacement in the superior direction is avoided because the upper pole is placed between the muscle and the fascia, which constitutes a stronger supporting system than only the breast parenchyma and/or subcutaneous tissue in the conventional submammary approach. In other words, the implant tends to remain securely in place and a natural outcome is enhanced because the skin and subcutaneous tissue in the upper third of the pocket are not directly in contact with the implant. Therefore, the skin and subcutaneous layers are able to move freely and independently as a separate system.

Also, after performing numerous cases in the submammary plane, we observed that the implant's superior border had a tendency to project itself in the anterior direction after variable time periods. This caused somewhat unnatural results in previously pleasing outcomes due to visibility of the implant's border in this area. The stronger supporting system that results from placing the implant under the fascia tends to keep the implant's upper third from altering its shape and position over time.

Although the subfascial approach may be considered especially useful in patients presenting inadequate soft-tissue coverage in the upper pole of the breast, in some cases harvesting part of the pectoralis major muscle may be necessary to help protect and conceal the implant's upper pole. Examples include very thin patients, those requesting larger implants, and in patients presenting rippling. In these cases, a segmental pectoralis major muscle flap (based on perforators located along the sternal border) may be employed to help protect and cover the implant's superior-medial pole. This maneuver, added to placement of the implant in the subfascial plane, has significantly alleviated problems such as the potentially unnatural results that may occur due to implant border visibility. Also, lateral/superior dislocation of the implants resulting from contraction of the pectoralis muscle (which is frequently seen in submuscular augmentation) is avoided because only a strip of the muscle is mobilized.

In patients requiring removal of submuscular implants, the remaining fascia may be too fragile and/or insufficient. However, the new implants should be placed in the subfascial plane whenever possible. Capsulectomy and fixation of the pectoralis muscle to the thorax are routinely performed to avoid the creation of a pocket and the accumulation of liquid, which may be a source of infection and other complications.

Another interesting reoperative scenario involves patients with excessive caudal migration of the implants. In these cases, inferior pole reinforcement may be performed by incising the fascia and/or muscle 2–4 cm above the planned inframammary fold, creating a small inferiorly based flap. Placement of the implant under this fascia and/or muscle flap may help secure the new implants in place after fixation of the inframammary fold in its correct position.

The presented technique possesses numerous advantages because the surgeon is able to combine the potential benefits of the subglandular approach (more accurate control of both breast shape and inframammary fold position, more rapid postoperative recovery, and lack of distortion with pectoralis muscle contraction) with the improvements that may be achieved by having more tissue available to cover the implant's upper pole. Although the fascia offers less tissue for coverage than the pectoralis major muscle, we feel that some of the potential benefits of using the latter have been achieved. Also, trade-offs of the subpectoral approach such as the tendency for lateral and superior displacement/malposition over time, increased morbidity in terms of pain and recovery, less control over the inframammary fold's position have been significantly reduced.

Utilization of the subfascial plane requires special care regarding hemostasis because dissection of the pocket in this plane results in increased bleeding (and therefore lengthening of the operation) when compared to the conventional submammary plane. In our technique, performance of the entire dissection with a high-frequency electrocautery has alleviated these problems, maximizing the benefits outlined previously.

In conclusion, the subfascial breast augmentation technique offers improved long-term aesthetic results because the dynamics between the implant and soft-tissues have been optimized. Also, important aspects of this operation such as morbidity and postoperative recovery have not increased significantly. The presented technique is extremely versatile and may also be used in patients requiring removal and replacement of breast implants. In these patients, the new implants may be placed in the subfascial plane according to the outlined principles herein.

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