Aesthetic Plastic Surgery

Volume 31 • Number 2
March/April 2007

Official Journal of the International Society of Aesthetic Plastic Surgery

Official English-Language Journal of the Australasian Society of Aesthetic Plastic Surgery

Springer

ISSN 0364-216X
31(2) 111-210 (2007)

Aesth. Plast. Surg. 31:147–153, 2007
DOI: 10.1007/s00266-006-0128-2

Aesthetic Plastic Surgery

Complete Submuscular Breast Augmentation: 650 Cases Managed Using an Alternative Surgical Technique

Hans Hendricks, M.D.

KÖ-Klinik GmbH, Privatklinik für Kosmetische und Plastische Chirurgie, Königsallee 60 C, 40212 Düsseldorf, Germany

Abstract.
Background: An alternative complete submuscular surgical technique for primary breast augmentation is presented. Since 1998, the author has refined the procedure for total submuscular placement of textured silicone gel implants, with good results for more than 650 patients.
Methods: The submuscular plane is accessed via a semicircular periareolar incision. Round or anatomic implants are placed beneath the pectoralis major and external oblique muscles, the rectus sheath, and the serratus anterior muscle fascia, which together create a contiguous structure that completely separates the implant from the breast tissue.
Results: High-riding implants were the main complication in early cases, through creation of an insufficiently large submuscular pocket. Only a very low incidence of Baker II capsular fibrosis was observed, and there were no Baker III or IV capsular contracture revisions. There were no cases of infection or "bottoming out." Areolar scarring was well concealed, and rippling and implant distortion were virtually nonexistent. Even in thin women, the implant edge was scarcely visible or palpable. Patient satisfaction levels were very high, with the majority viewing the implants as their own tissue in terms of natural feel and appearance.
Conclusions: The advantages of the described surgical method are several-fold, particularly for lean patients. It offers a promising alternative to subglandular and partial submuscular implant placement and to other total submuscular techniques for primary breast augmentation. Furthermore, it provides a solution for tuberous and ptotic breasts, coupled with mastopexy as required, and good results have been achieved with correctional surgery for subglandular capsular contracture, bottoming out, and rippling.

Correspondence to Hans Hendricks M.D.; *email:* hanshendricks@hotmail.com

Key words: Breast augmentation—Complete submuscular —Complete submusculofascial—Periareolar incision

Subglandular and partial submuscular areas are established pocket locations for breast augmentation prostheses. The advantages and disadvantages of both positions are well-known and documented [5,7,8,10,11,14,18,21,23]. Ultimately, the optimal surgical choice for a given individual depends on numerous factors, including the patient's physique and breast morphology, existing deformities, and the surgeon's skill set.

Partial submuscular implantation typically covers the top one- to two-thirds of the implant with the pectoralis major muscle, and thereby minimizes visibility and palpability of implant edges through the skin, better conceals upper pole rippling, has a lower risk of capsular contracture and infection, and provides more accurate mammogram imaging. On the other hand, patients often experience upward malpositioning or implant distortion when the pectoralis muscle contracts [21].

Retromammary placement is associated with shorter surgery time. The operation can be performed with intravenous sedation and local anesthesia, leading to faster postoperative recovery with less pain and swelling. However, this pocket site requires adequate inherent soft tissue coverage and has a higher rate of rippling, downward implant migration, "bottoming out," and capsular contracture.

Dual-plane techniques position the implant partially behind the pectoralis muscle and partly in a retromammary location, similar to traditional partial subpectoral implantation. These procedures seek to optimize soft tissue coverage superiorly while

permitting a controlled degree of contact between the implant and the parenchyma for improved prevention of deformities [24].

In 1978, Jarrett et al. [12] first presented total submuscular placement of implants directly after mastectomy. Since then, elevation of the pectoralis major and serratus anterior muscles and the rectus sheath has become commonplace for implantation of tissue expanders in immediate breast reconstruction [3,9,11,22,25]. Surgeons also have applied a complete submuscular approach to primary breast augmentation, either with or without the use of steroids, in an effort to address better the drawbacks of subglandular placement. The implant pocket can be created beneath either entirely muscular or musculofascial planes, with coverage by different combinations of the pectoralis major, external oblique, rectus abdominis and serratus anterior muscles, and their fascia [4,17,19].

The advantages and trade-offs of alternative incision approaches are similarly well described for primary augmentation [2,6,11,13,15,18,19,23]. The inframammary route is popular with surgeons because it provides good access to most pocket locations, but from the patients' point of view, it may lead to unacceptable scarring on the breast. Transaxillary access is used primarily with submuscular placement to avoid scarring on the breasts, but has a greater risk of haematoma formation and may require endoscopy for precise implant positioning. Periareolar entry is the most versatile by offering excellent pocket access to all types of implants and good scar concealment [6,8,19]. Use of the periumbilical approach is the least widespread because it is associated with the greatest degree of tissue trauma and can be used only with saline implants [11,23].

The author has adopted and further developed a complete submusculofascial technique, in conjunction with periareolar incision, to address complications observed with traditional methods, especially in slim small- to medium-breasted women. The operative details of this procedure, which places the mammary prosthesis below the pectoralis major muscle, rectus sheath, external oblique muscle, and fascia of the serratus anterior muscle, are described, and the clinical outcomes, benefits, and limitations are evaluated.

Materials and Methods

Since 1998, the author has performed more than 650 cases of complete submuscular mammoplasty for the purpose of aesthetic augmentation. Textured cohesive silicone gel implants (Mentor Corporation, Santa Barbara, CA) were used exclusively. Approximately 65% of the devices were Siltex Round High Profile or Siltex Round Moderate Plus Profile, and the remainder were anatomic (Contour Profile Plus Tall or Contour Profile Medium), either at the specific request of the patient or in ptotic cases.

Preoperative Assessment and Preparation

Comprehensive consultation with the patient, including a thorough assessment of her intrinsic physique and discussion of the most suitable surgical options, precedes the operation. Consideration is given to breast skin and tissue characteristics, rib shape and direction, size and structure of the nipple, inframammary fold height, and any asymmetry or other deformities. Approximately 90% of candidates are suitable and opt for the complete submuscular procedure. Patients are given the opportunity to try out different implant sizes and shapes with a sports brassiere and white T-shirt in front of a mirror.

Preoperatively, a single prophylactic dose of cephalosporin 2.0 g is administered to all patients unless contraindicated by allergy status. Implantations are performed with the patient under general anesthesia and seated throughout, as if in an easy chair. The patient's arms are angled at 45° and fixed on gel pads.

Primary Augmentation: Complete Submuscular Surgical Technique

The operation begins with a semicircular periareolar incision, from approximately the 8 o'clock to the 4 o'clock position. In the subcutaneous fat, dissection moves in a direct caudal direction down to the lower border of the pectoralis major muscle, circumventing the breast tissue and leaving the mammary ducts and nipple sensory innervation intact. Because the edge of the pectoralis major muscle is thin and fragile, it is important to dissect cranially along the pectoralis fascia to approximately the third intercostal space. The muscle is split bluntly in the direction of the fibers to enter the subpectoral space (Fig. 1).

During exposure of the ribs, care should be taken not to pierce the intercostal membrane or injure the pectoralis minor muscle. The cavity is held open with two Roux hooks and bluntly dissected with a finger in a cranial direction. A sweep is made both medially and laterally to detach and lift the pectoralis major muscle together with the underlying fat and fascia, preserving the sternal attachments of the pectoralis major. Under visualization from this point onward, the caudal muscle attachments are transected on the fourth and fifth ribs to free the pectoralis major origins completely along the inframammary fold. Here, the ever-present third perforating branch of the internal thoracic artery must be coagulated. At the sixth rib, the rectus sheath origin is tightly attached and must be completely released, exposing but not lifting the rectus abdominus muscle. Mobilization of

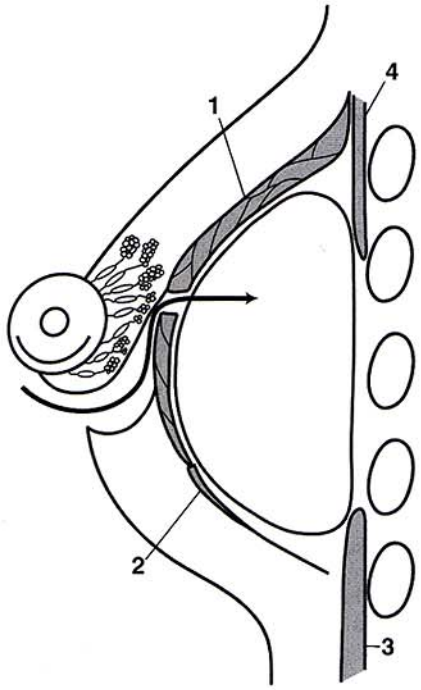

Fig. 1. A 3- to 4-cm inferior circumareolar incision is made, avoiding damage to the retroareolar gland and sensory tissue. Blunt transection of the pectoralis major muscle is at the level of the third intercostal space. [1] pectoralis major muscle, [2] rectus sheath with external oblique muscle, [3] rectus abdominis muscle, [4] pectoralis minor muscle.

the rectus sheath can be difficult and may require scissors if the fibers cannot be released forcibly with a finger.

The surgeon should proceed next in a slightly lateral direction to release fully the upper portion of the external oblique muscle from its attachment between the ribs. Again, considerable force with a finger or blunt instrument is necessary. The sweep should be carried in a lateral direction, with the finger glided beneath the serratus anterior muscle fascia, and thereafter superficially to the pectoralis minor muscle. Movement through this plane is without obstruction. Proper release of the muscles and fascia is paramount to enable free movement of the implant within the sheath and fascia, with no constriction. The pectoralis minor muscle, ribs, and rectus muscle are left untouched as an intact underlying plane. Blood vessels, including the perforating artery, are electrocauterized throughout the procedure.

A saline sizer is used to determine the most appropriate implant, with due consideration given to the patient's preferences and expectations. In most nonptotic cases, a round implant is appropriate and generally preferred. Creation of a pocket space slightly larger than the implant dimensions is critical to allow adequate mobility of the implant within the envelope, and to enable positioning adjustments for symmetry and good centralization of the nipple–areolar complex on the breast mound. In cases of inframammary fold asymmetry, tissue mobilization of the higher side should be extended to achieve bilateral alignment. Likewise, in ptotic patients, more extensive release is required to avoid an abnormal "double bubble" contour. Positioning adjustments and hemostasis are made before insertion of the implant to prevent bleeding. No irrigation of the pocket is necessary.

Drainage is through the axilla, using sterislit drains. Closure of the wound is performed in layers, using resorbable sutures for the muscles and nonresorbable sutures for the skin. The pectoral muscle is closed with undyed 3–0 Monocryl sutures. The areola muscle is sutured with subcuticular inverted 4–0 Monocryl, and dyed Prolene 4–0 is used for intracutaneous skin closure. Suturing of the breast tissue is not necessary. The operating time is 1 to 2 h.

Modification of the Complete Submuscular Technique for Subglandular Revisions

For revisions of capsular contracture, rippling, and bottoming out after subglandular implantations, a periareolar incision is again used. The breast parenchyma is freed from the fibrotic capsule, with as much of the capsule removed as possible, particularly the ventral part, without damage to the underlying muscle. A complete submuscular pocket is created as per the aforementioned technique. The muscle layer is stretched forcibly to conform to the outer skin, and the new implant is inserted. If the breast is very ptotic, a concurrent mastopexy should be performed.

The wound is closed as described for primary augmentations. The breasts are taped in a cranial direction, with the tapes left in place for 2 to 3 weeks for closure of the subglandular space.

Postoperative Management

The patient is wrapped with a nonadherent bandage in the form of a brassiere, or placed in a tight bra, and kept in the clinic with drainage for 2 nights. A sports or underwire bra is then worn for 6 weeks. The skin sutures are removed 2 weeks after surgery, and silicone patches are applied for 12 h per day as long as the scar remains active. Where necessary, a small degree of corrective relocation is possible within the first 6 to 8 postoperative weeks by having the patient wear a sports or underwire bra for upward implant migration, or by applying firm massage and an adjustable Velcro strap across the upper pole for downward movement.

Results

To date, there have been no infections or capsular contracture revisions after the described procedure, nor any occurrences of lung injury or pneumothorax. In one patient, a sudden unilateral sterile seroma developed 2 years after the initial surgery. The problem resolved after drainage for 4 days and an exchange of implant.

Bruising of the breast was marginally more extensive than with partial submuscular implantation. Only rarely did small subcutaneous hematomas empty after removal of the skin sutures. Unilateral hematoma under the muscle occurred in three cases, with hemoglobin levels reduced to between 6 and 8 g/dl. Revision was necessary for one patient. In this instance, the original procedure was a normal primary augmentation in an overweight patient. The hematoma was able to expand in the cavity under the muscle because the excess adipose tissue made detection more difficult than might have been the case with a subglandular operation. Another of the three haematoma cases was diagnosed subsequently as having von Willebrand syndrome, a coagulation disorder.

Postoperative swelling was minimal, with most patients requiring 2 to 4 weeks to normalize. The patients had more direct postoperative pain than with partial submuscular coverage, but this diminished quickly, in 2 to 4 days, and most patients were pain free by week 3 after surgery. Direct injection of 10 ml of 0.25% bupivacaine into the pectoralis major muscle considerably reduced postoperative pain. The majority of patients returned to normal activity within 2 weeks.

Scarring of the areola was inconspicuous, and only in rare instances did the scar appear more lightly colored on a darker areola. Even with black skin, there were no keloids, and satisfactory color and quality were achieved. Slight scar indentation occurred in fewer than 5% of patients, and reverted naturally with time, requiring no intervention.

In the early development stages of this technique, about 25% of patients reported sensory disturbances to the nipple–areolar complex. The dissection path through the breast tissue has since been altered to go around and caudally, rather than directly through, the retroareolar region. Now, far fewer patients experience reduced skin sensitivity, and within 6 months, 95% have regained full sensation.

The incidence of capsular contracture was unusually low, with fewer than 5% of patients experiencing Baker grade II, and none classified as grade III or IV. Only a small minority of patients experienced distortion of the implant or displacement with dynamic muscle action, even among more athletic individuals with greater pectoralis muscle development. No atrophy or decreased strength of the pectoralis muscle was observed. There were no cases of bottoming out, and the problem of rippling was virtually eliminated.

The majority of patients viewed the implants as their own tissue in terms of natural feel and appearance. The implant edges could barely be seen or felt, even in lean patients with little upper pole tissue. None reported the implants as too large, but once patients adjusted to the augmentations after several months, approximately 10% believed them to be somewhat smaller than they would have wished. During the preoperative consultation, patients should be advised to consider and try out slightly larger implants.

The overall results with this complete submuscular technique were similarly encouraging for revisions of capsular contracture, bottoming out, and rippling after previous subglandular breast augmentation. The procedure has not been used for partial submuscular revisions because existing muscle destruction prevents creation of a new fully submuscular pocket.

The primary complication during the development of this technique was insufficient release of the rectus sheath and external oblique muscle fibers, which restricted mobility of the implant within the pocket and resulted in the device resting in too high a position. In cases for which postoperative compression exercises and a strap across the upper pole failed to move the implant downward, reoperation was necessary. With experience, this revision rate has been reduced from approximately 5% to less than 1%.

Discussion

The author first began augmenting with total submusculofacial coverage to avoid the problems of implant contour palpability and visibility, rippling/wrinkling, capsular contracture, and muscle movement over the implant. All these problems are adverse sequelae of retromammary and partial retropectoral pocket location. With the current method of complete submuscular placement, a continuum of the pectoralis major and external oblique muscles, the rectus sheath, and the serratus anterior muscle fascia entirely separates the implant from the breast parenchyma (Fig. 2).

The procedure provides significant advantages (Table 1), and is ideal for small to medium nonptotic breasts (Figs. 3 and 4). Even with slender and athletic patients, the implant periphery is barely palpable or visible, and there is virtually no rippling in the upper pole. Because the inferior edge of the pectoralis major muscle remains connected to the rectus sheath, muscle movement over the implant and implant deformation is less during contracture than with partial submuscular placement. The weight of the implant is held securely, with the musculofascial plane behaving as a natural "built-in" bra, resulting in less ptosis over time and preventing bottoming out. A 3- to 4-cm periareolar incision is wide enough for insertion of a round implant and yields a subtle scar. The rate of cap-

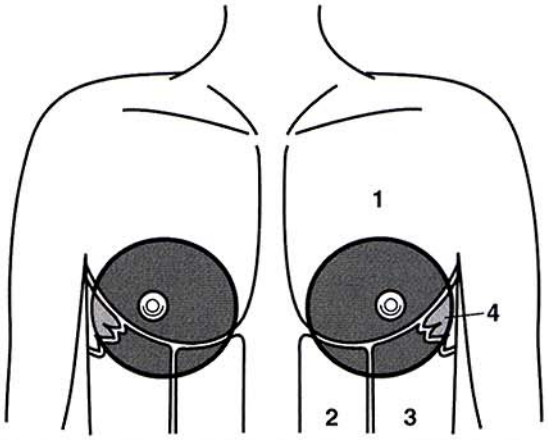

Fig. 2. Complete musculofascial coverage of the implant (*shaded areas*) by the [1] pectoralis major muscle, [2] rectus sheath, [3] external oblique muscle, and [4] serratus anterior muscle fascia.

sular fibrosis is extremely low, and in the author's experience, no capsulectomies have been necessary.

Although patients reported increased tenderness the first few days after surgery, this dissipated thereafter at a rate similar to that for partial submuscular procedures. Pain is minimized by ensuring that a sufficiently large pocket space is created, averting undue muscle pressure on the implant. Elliott [7] also reported increased postoperative pain for the first 2 to 3 days, but at that point, the pain intensity subsides to a level essentially the same as for partly submuscular or non–muscle-splitting submammary implantation.

Patients are instructed to confine exercise to leg and light upper body workouts for 4 weeks after surgery, and to avoid strenuous use of the pectoralis muscle. Any correlation between loss of muscle strength or function and the surgical technique is difficult to assess because many patients are overly cautious after surgery and underuse their chest muscles. The author believes that the procedure does not weaken the pectoralis muscles. A study performed by Beals et al. [1] supports the notion that subpectoral placement of mammary implants does not cause statistically significant long-term loss of upper extremity strength performance.

A periareolar approach is preferred because its central incision, directly above entry through the pectoralis major muscle, gives the best overall intraoperative view of the submuscular cavity, enabling accurate dissection to all margins of the pocket, and leaves a virtually invisible scar. Access to the full submuscular pocket area via the inframammary route is more difficult with this procedure, and the incision, 1 to 2 cm lower than the original fold, does not always match the level of the newly created inframammary crease.

Round prostheses are used in nonptotic breasts, for which the nipple can be centered directly above the horizontal midaxis of the implant, pointing forward. All sizes of round implants may be used with this procedure. If the breast is ptotic, an anatomic device is appropriate for alignment of the nipple over the highest point of implant projection. Simultaneous mastopexy, using the vertical scar technique, may be required.

The fully submuscular technique is not without limitations. Subglandular placement is better for patients who desire more natural hanging of the breasts or prefer their breasts to fall laterally when supine. Because the complete submuscular method is relatively difficult to master [8,16,19], the author recommends instruction by a surgeon who is already a skilled practitioner. Surgeons must be cautioned to dissect around the retroareolar tissue following the skin incision, because direct transection through the retroareolar parenchyma to the submuscular entry point can lead to sensory disturbances. Also, it is advisable to begin with straightforward cases before moving on to more challenging ptotic or tuberous patients.

High-riding implant deformity is a common complaint with subpectoral placement [4,21]. Avoidance of implant malposition with the current technique very much depends on adequate pocket dissection, with sufficient mobilization of the rectus sheath and external oblique muscle. Otherwise the implant is pushed upward, creating too full a superior projection and the impression of a "pseudoptosis."

The pectoralis major muscle, its dorsal fascia, and serratus anterior fascia are easily detached because they lie loosely on the ribs and pectoralis minor muscle. The rectus sheath and external oblique muscle are more difficult to mobilize because of anchorage to the chest wall. Nevertheless, their full release is essential to avert inferior constriction and high-riding malposition of the implant. Too much superior pole fullness must not be tolerated during surgery in the expectation that positioning will be self-correcting because only slight displacements are feasible postoperatively. On the other hand, if inferior mobilization of the pocket perimeter is overextensive, this can be corrected postoperatively by having the patient wear an underwire bra for 2 to 4 weeks. The aim is for the envelope to exert the same inferior and superior pressure, as well as equal medial and lateral pressure, thereby preventing distortion or dislocation. The method also is excellent for primary augmentation of tuberous breasts, but again, extreme inferior mobilization is essential to overcome constriction.

Tebbetts [23,24] asserted that total muscular coverage is neither necessary nor desirable in primary breast augmentation, and cites a number of potential disadvantages. Certainly, surgical and recovery times are longer with the current method, and in the early stages, the author was confronted with complications sometimes seen with other total submuscular methods such as implant displacement, inframammary

Table 1. Advantages and limitations of the complete submuscular method with periareolar incision

Advantages	1. The implant is barely visible or palpable, even in thin patients. 2. The musculofascial coverage acts as a natural "bra" for the implant and minimizes later ptosis. 3. The capsular contraction rate is extremely low. 4. Minimal distortion of the implant with pectoralis muscle contraction was observed, in comparison with partial subpectoral methods. 5. Virtually no rippling. 6. Inconspicuous scar. 7. Easier mammogram imaging.
Limitations	1. In ptotic cases, mastopexy may be necessary. 2. The method is difficult to learn. 3. Longer surgical time and postoperative recovery.

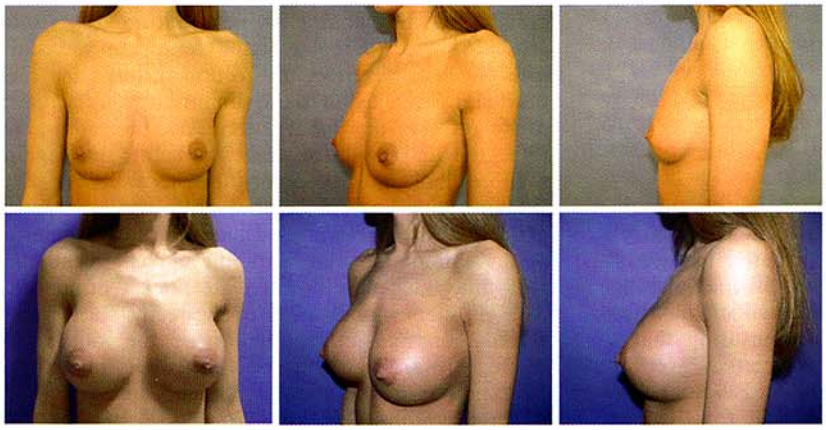

Fig. 3. Preoperative condition and 1-month postoperative results for a 23-year-old patient using a periareolar approach and complete submuscular placement of 300-ml Mentor Siltex Round High Profile implants.

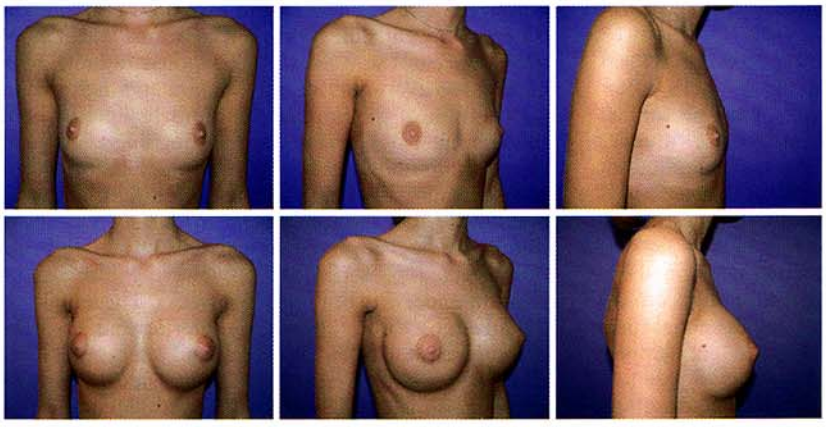

Fig. 4. Preoperative and 6-month postoperative views of a thin 24-year-old patient. Mentor Siltex Round Moderate Plus 250-ml implants were placed fully submuscularly via periareolar incision.

fold irregularities, and distortion of breast shape with pectoralis contraction. However, with improvement of the surgical procedure over time, these problems have become rare occurrences.

Although other authors describe successful submuscular augmentation procedures [3,4,6,8, 16,18–20], none positions the implant pocket beneath the pectoralis major and external oblique muscles, rectus sheath, and fascia of the serratus anterior muscle. Not only is the current procedure safe and versatile for primary breast augmentation, it also can be used with good success in revisions for capsular contracture, rippling, and bottoming out after submammary augmentation.

Conclusion

Primary breast augmentation with complete musculofascial coverage has yielded excellent results, both cosmetically and in terms of a low rate of complications. The described procedure, although technically demanding, is particularly beneficial for small breasts, overcoming limitations frequently seen with subglandular and partial submuscular placement. Different styles of implants can be used with most breast types, deformities, and degrees of ptosis, in combination with mastopexy where indicated. Indeed, the author routinely uses the technique in 90% of primary augmentations. The pleasing aesthetic outcomes have been reproducible and long-lasting, meeting patient expectations and producing high levels of satisfaction.

Acknowledgments. Mentor Corporation very kindly provided financial support for the preparation of this article.

References

1. Beals SP, Golden KA, Basten M, Kelly KM: Strength performance of the pectoralis major muscle after subpectoral breast augmentation surgery. *Aesthetic Surg J* **23:**92–97, 2003
2. Becker H: The intraareolar incision for breast augmentation. *Ann Plast Surg* **42:**103–106, 1999
3. Brown MH, Shenker R, Silver SA: Cohesive silicone gel breast implants in aesthetic and reconstructive breast surgery. *Plast Reconstr Surg* **116:**768–779, 2005
4. Candiani P, Campiglio GL: Augmentation mammoplasty: Personal evolution of the concepts looking for an ideal technique. *Aesth Plast Surg* **21:**417–423, 1997
5. Codner MA, Cohen AT, Hester TR: Complications in breast augmentation: Prevention and correction. *Clin Plast Surg* **28:**587–595, 2001
6. Davidson BA: Submuscular breast augmentation. *Aesth Surg J* **23:**293–299, 2003
7. Elliott LF: Breast augmentation with round, smooth saline, or gel implants: The pros and cons. *Clin Plast Surg* **28:**523–529, 2001
8. Gruber RP, Friedman GD: Periareolar subpectoral augmentation mammaplasty. *Plast Reconstr Surg* **67:**453–457, 1981
9. Gruber RP, Kahn RA, Lash H, Maser MR, Apfelberg DB, Laub DR: Breast reconstruction following mastectomy: A comparison of submuscular and subcutaneous techniques. *Plast Reconstr Surg* **67:**312–317, 1981
10. Heden P, Jernbeck J, Hober M: Breast augmentation with anatomical cohesive gel implants: The world's largest current experience. *Clin Plast Surg* **28:**531–552, 2001
11. Hidalgo DA: Breast augmentation: Choosing the optimal incision, implant, and pocket plane. *Plast Reconstr Surg* **105:**2202–2216, 2000
12. Jarrett JR, Cutler RG, Teal DF: Subcutaneous mastectomy in small, large, or ptotic breasts with immediate submuscular placement of implants. *Plast Reconstr Surg* **62:**702–702, 1978
13. Lindsey JT: Importance of the periareolar approach in the augmentation of the ptotic breast. *Ann Plast Surg* **48:**460–463, 2002
14. Matarasso A, Hutchinson OHZ: Augmentation mammaplasty: Subpectoral augmentation using the periareolar or inframammary approach. *Plast Recontr Surg* **7:**93–99, 2000
15. Momeni A, Padron NT, Fohn M, Bannasch H, Borges J, Ryu SM, Stark GB: Safety, complications, and satisfaction of patients undergoing submuscular breast augmentation via the inframammary and endoscopic transaxillary approach. *Aesth Plast Surg* **29:**558–564, 2005
16. Pelle-Ceravolo M, Del Vescovo A, Bertozzi E, Molinari P: A technique to decrease breast shape deformity during muscle contraction in submuscular augmentation mammaplasty. *Aesth Plast Surg* **28:**288–294, 2004
17. Seckel BR, Costas PD: Total versus partial musculofascial coverage for steroid-containing double-lumen breast implants in augmentation mammaplasty. *Ann Plast Surg* **30:**296–301, 1993
18. Sohn BK, Chung YJ, Kim G, Yoon WJ: Submuscular periareolar approach to augmentation mammoplasty in Korean women. *Aesth Plast Surg* **24:**455–460, 2000
19. Spear SL, Matsuba H, Little JW III: The medial periareolar approach to submuscular augmentation mammaplasty under local anesthesia. *Plast Reconstr Surg* **84:**599–606, 1989
20. Stokes RB: Breast augmentation in thin women: Patient satisfaction with saline-filled implants. *Aesth Plast Surg* **28:**153–157, 2004
21. Strasser EJ: Results of subglandular versus subpectoral augmentation over time: One surgeons's observations. *Aesth Surg J* **26:**45–50, 2006
22. Talbert G (2002) Two-stage reconstruction with the Contour Profile 6200 Tissue Expander. In: Issues and answers, Fall 2002. Mentor Corporation, Santa Barbara, CA
23. Tebbetts JB: Alternatives and trade-offs in breast augmentation. *Clin Plast Surg* **28:**485–500, 2001
24. Tebbetts JB: Dual plane breast augmentation: Optimizing implant–soft tissue relationships in a wide range of breast types. *Plast Reconstr Surg* **107:**1255–1272, 2001
25. Woods JE, Irons GB Jr, Arnold PG: The case for submuscular implantation of prostheses in reconstructive breast surgery. *Ann Plast Surg* **5:**115–122, 1980