Contemporary Breast Augmentation Practice in the United States

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Abstract: Breast augmentation is one of the most commonly performed cosmetic surgical procedures in the United States. Modern breast augmentation has evolved with the development of various implant options, as well as surgical techniques. To achieve ideal result, it is important for the surgeon to develop a systematic approach to evaluate each patient. The 5 key steps in determining the best surgical plan include: (1) assess the need for concurrent mastopexy, (2) implant selection, (3) pocket plane, (4) inframammary fold position, (5) choice of incision. The purpose of this review is to discuss the principles behind each of these key concepts and how to utilize them in achieving the optimal outcome in breast augmentation.

Key Words: breast augmentation, implant, breast, medical practice, United States

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Breast augmentation remains the most commonly performed cosmetic surgical procedure in the United States since 2006.[1] According to statistics released by American Society of Plastic Surgeons (ASPS), there were more than 300,000 breast augmentations performed in the United States in 2017, this represents a 41% increase compared with the statistics released by ASPS in 2010.[1] Although primary augmentation mammaplasty using autologous tissue, such as fat grafting, has been described,[2] implant-based augmentation remains the most common procedure performed in the United States.[1] In recent years, breast augmentation has sparked considerable political debate regarding the safety of breast implant, particularly with the role of textured implant in breast implant-associated anaplastic large cell lymphoma (BIA-ALCL).[3] However, when the appropriate implant and techniques are chosen, implant based breast augmentation can be safely performed to achieve aesthetically pleasing results. The main challenges of the procedure can be distilled into 5 distinct decision points that must be addressed by the surgeon in preoperative planning: (1) assess the need for concurrent mastopexy, (2) implant selection, (3) pocket plane, (4) inframammary fold (IMF) position, (5) choice of incision.

PREOPERATIVE CONSIDERATIONS

Augmentation Versus Augmentation With Mastopexy

When evaluating the patient for breast augmentation, it is important to note whether there is ptosis in addition to hypovoluminous breasts. For patients with ptotic and deflated breasts, augmentation or mastopexy alone would not achieve the ideal aesthetic outcome. These patients would benefit from both an increase in breast volume as well as lift. Whether these 2 procedures are to be performed simultaneously or in a staged fashion has been the subject of debate over the years. One-stage breast augmentation with mastopexy was first described by Regnault[4] and Gonzalez-Ulloa[5] more than 60 years ago. Historically, surgeons were dissuaded from performing these procedures simultaneously for fear of higher risk of patient dissatisfaction and unpredictability when compared with a 2-staged procedure.[6,7] In more recent years, single staged procedure has been gaining popularity, and a few large series have confirmed the safety of this approach.[8,9] The decision to pursue staged or combined procedure should ultimately be based on the specific clinical scenario, surgeon's comfort level and patient choice. Simultaneous breast augmentation with mastopexy is considered by many to be one of the most challenging cosmetic breast surgeries. The difficulty is because of the multiple opposing goals that are embedded in this procedure; namely, to increase the breast volume, change the shape of breast, and simultaneously decrease the size of skin envelope. Although there is a high learning curve, majority of these patients can achieve good aesthetic outcome with single stage procedure with low risk for revision in the senior author's experience. Therefore, combined mastopexy with augmentation is our preferred approach when indicated. Should the surgery be staged, breast augmentation is often performed first, followed by mastopexy in 6 months. With proper planning, good patient selection, and proper surgical technique, both 1- or 2-stage mastopexy with augmentation can achieve successful outcomes.

Implant Selection

Modern breast implants are manufactured with an outer shell made up of impermeable silicone elastomer, which is filled with a stable filling material, either saline solution or silicone gel. The conception of this shell and filler type implant can be attributed to Cronin and Brauer,[10] who invented the first generation of silicone gel-filled implant in 1962. The earlier silicone gel implants were plagued with high failure rate because of the diffusion or microbleed of silicone molecules through the thin, permeable shell into the surrounding intracapsular space. The safety concerns regarding silicone gel implants led to a temporary restriction of the device by the U.S. Food and Drug Administration (FDA).[11] As a result, silicone breast implants were taken off the U.S. market in 1992. Saline implants were the only available option in the United States for 14 years until the FDA approval of fourth generation silicone implants in 2006.[12] This new generation of silicone implants had better shell with improved strength and durability, as well as more cohesive silicone gel through the technique of crosslinking. The cohesive gel implant is a form stable device that maintains its shape. Even when the shell is cut or ruptured, the shape of implant remains intact and silicone does not run out. The fifth-generation implants introduced by the major U.S. manufacturers around 2012 offered even more cohesive gel filling, as well as anatomically shaped implants with textured surface.

Surface texturing was historically found to decrease capsular contracture compared with smooth implants. This was especially true for subglandular breast augmentation[13]; however, this difference seems to decrease when both smooth and textured implants are placed in subpectoral plane. Another important aspect in the evolution of textured implants is its ability to stabilize implant in the breast pocket. This is achieved through tissue in-growth leading to adhesive effect. Of all the textured implants in use today, none are created in the same manner, and each manufacturer has a proprietary process in place. In 2011, the FDA first reported a possible link between breast implants and anaplastic large cell lymphoma.[14] In recent years, evidence has shown that BIA-ALCL is highly associated with textured implants.[3] Furthermore,

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majority of the confirmed cases were reported to have Allergan BIOCELL implant (Allergan Plc., Dublin, Ireland) at the time of diagnosis. BIOCELL textured implants is associated with 6 times the risk of BIA-ALCL compared with textured implants from other manufacturers.[14] This has led to the recall of all BIOCELL textured implants by Allergan at the request of the FDA in 2019. Because of the risk of BIA-ALCL associated with textured implant, it is our preference to use only smooth round implants for primary breast augmentation.

Although primary breast augmentation using the technique of fat grafting is gaining popularity in other countries, its practice in the United States remains limited. Historically, using autologous fat for breast augmentation was highly controversial in the United States. In 1987, the American Society of Plastic and Reconstructive Surgeons (ASPRS) committee on new procedures issued a statement unanimously deplore the use of fat graft for breast augmentation.[15] This was driven largely by the concern that injected fat in the breast can cause microcalcifications and interfere with breast cancer detection. As more data became available overtime, studies have found that breast cancer related calcifications have different radiological aspects from lesions secondary to transplanted fat.[2] The 2009 ASPS Fat Graft Task Force found no evidence suggesting autologous fat graft interferes with breast cancer detection.[16] Although it has been shown to be safe, there are other factors that cause fat grafting to remain an unpopular choice for primary breast augmentation in the United States. One main disadvantage of fat grafting is that the amount of fat that can be injected each time is limited, and the overall augmentation that can be achieved is moderate at best. This is true even after several rounds of grafting. The patient population in the United States often desires bigger size augmentation compared to Europe or Asia, and such results are often unattainable through fat grafting alone. For these reasons, implants remain the most popular choice in the United States for primary breast augmentation.

Saline Versus Silicone

Since 2006, silicone breast implants have again been approved by the FDA for use in women 22 years or older, both for cosmetic surgery and reconstruction after breast cancer. For patients younger than 22, saline implants remain the only option approved by the FDA. There are a few advantages of saline implants. They are more affordable compared with silicone implants. They also require a smaller incision for implant insertion. For routine monitoring after breast augmentation, mammography is adequate for saline implants. Silicone implants, on the other hand, requires MRI 3 years after initial placement, then every 2 years while the implant is in place. Finally, a rupture in saline implant is easily detectable. Silicone implant, however, will maintain its shape, and the rupture could remain undetected for long period of time.

Silicone implants are more expensive, but it offers a more natural feel, and is lighter in weight compared to saline implants. Both of these lead to better patient comfort. Excluding the textured implants, the fourth- and fifth-generation smooth implants are safe. There has not been any evidence to show a link between silicone gel-filled implants and systemic medical illnesses, such as autoimmune disease or connective tissue disorder.[11,17] It is important to discuss the pros and cons of saline versus silicone implants when consulting the patient. Either type of implant can achieve aesthetically pleasing results, the final decision will need to be based on each patient's personal preference.

Implant Size and Type

When selecting the appropriate size of implant, the decision should start with the evaluation of the patient's nascent breast dimensions, as well as the desired breast size. All modern methods for selecting breast implants place an essential weight on respecting the base diameter of patient's breast, this is defined as the distance from medial breast to the anterior axillary line. The senior author's preference is to select an implant with a diameter slightly smaller than the nascent breast base diameter. Therefore, the base diameter serves as a starting point for estimating the implant size. The next critical step in initial evaluation is to assess the compliance and the characteristics of the soft tissue envelope. This can be achieved using anterior-posterior skin stretch, nipple to fold stretch, medial and lateral skin pinch, and other similar measurements to quantify and categorize the volume, quality, and elasticity of the patient's breast envelope. The senior author prefers to use the anterior-posterior stretch test, with 2 to 3 cm stretch considered adequate to accommodate planned implant. If there is less than 2 cm stretch, then we will subtract 30 mL in implant size; if there is greater than 3 cm stretch, we will add 30 mL or more in implant size.

Besides the volume and base diameter, another important aspect in implant selection is the projection profile. A moderate profile implant has a wider base diameter, and less vertical height. As a result, it provides a more natural look after augmentation. On the other hand, a high profile implant has narrower base and more pronounced vertical height, which entails better cleavage. However, this may also lead to an unnatural look for certain patients. Therefore, this needs to be taken into consideration, and discussed with the patient to determine what will best suit each individual's need.

Pocket Plane

In the earlier years of breast augmentation, implants were placed in the subglandular plane. This was the most rational place to start, and it generally achieved satisfactory results in many patients. Over time, it is found that this technique is most effective in patients who have adequate soft tissue coverage for the implants. In patients with less breast tissue, problems emerged with implant visibility and sharp transition in the upper pole. There is also substantial evidence showing that subglandular plane is associated with a higher incidence of capsular contracture,[18] and is less ideal for mammography.[19]

The technique of total muscle coverage of the implant was developed to reduce implant visibility and lower the risk of capsular contracture. The trade-off of this approach is the poor lower-pole shape and inadequate IMF definition. There is also the risk of superior migration of the implant over time. In addition, the gravitational effects on the breast against an implant that is still supported by the lower muscle can create pseudoptosis in a number of women.

The third option for implant placement is subpectoral plane, which generally refers to partial coverage of the implant superiorly by the pectoralis major muscle, with the inferior portion of the implant being in subglandular plane. This plane seems to achieve similar rate of low capsular contracture rate compared with total muscle coverage. It has the benefit of providing good upper breast pole contouring by using muscle to blunt the transition from upper breast tissue to the implant while maintaining lower pole fullness and IMF definition. The pocket dissection is relatively easy in the subpectoral loose areolar plane. There is minimal risk for breast parenchyma devascularization, which is optimal for any concurrent breast shaping or mastopexy.

In senior author's experience, the most commonly employed pocket selections are subglandular and subpectoral planes. In patients with adequate soft tissue, measured as greater than 2 cm upper pole subcutaneous tissue on pinch test, subglandular plane is the preferred implant pocket. Patients with significant breast ptosis are at higher risk for developing double-bubble deformity when subpectoral plane is chosen. In patients that with less than 2 cm of subcutaneous tissue on pinch test, subpectoral plane is the preferred pocket.

IMF Position

Preoperative physical examination should also note the position of the IMF. Maintaining ideal nipple to IMF distance is important in achieving aesthetically pleasing outcome. It is the senior author's preference to not attempt an alteration to the IMF position whenever

possible. Others have advocated routine repositioning of the IMF during breast augmentation.[20,21] Some argue that lowering of IMF is indicated to accommodate larger breast implant. However, in our experience, we have not found this to be necessary. Furthermore, disrupting the IMF can lead to uncertain long-term results, including implant malposition, bottoming out and double bubble deformity. The exceptions are patients with inadequate nipple to IMF distance, in whom lowering of IMF is required. This should be noted in the preoperative planning, because it can influence the type of incision that is suited for breast augmentation.

Choice of Incisions

Various techniques of breast augmentation have developed over the years aiming to minimize or hide the incision. Currently, there are 3 widely practiced incisions for breast augmentation: inframammary, periareolar, and transaxillary. The risks and benefits of each approach should be discussed with the patient. Often times, patients present with certain anatomical constraints and desires that make one approach more advantageous than the others. The best recommendation will depend on a number of factors, including implant selection, surgeon comfort and ability, patient anatomy and preference.

Inframammary incision offers unsurpassed direct visualization of both the subglandular and submuscular pocket compared with other incisions. It is perhaps the simplest and most straightforward approach to breast augmentation. The scar is often inconspicuous and well hidden under well-formed IMF. The incision length can be customized to fit various size of implants. In patients with significant hypoplasia or ill-defined IMF, accurate placement of the incision can be challenging. In these cases, the incision may end up above or below the new inframammary crease once the implant is placed. This could lead to visible scars either above or below the IMF. Therefore, inframammary incision works best when the preoperative natural fold closely approximates the fold after augmentation.

Periareolar incision is best suited for patients with a large nipple areolar complex (>3 cm in diameter). Patients who have a sharp demarcation in their areolar pigment tend to have a more well-hidden scar compared with those whose pigment fades into the breast skin. The incision offers central access to all breast quadrants and is compatible with all types of breast implants and both planes of dissection. This approach is particularly useful for significant lowering of IMF or scoring of breast tissue in tuberous breast deformity. This is also a logical choice when simultaneous mastopexy is planned. The disadvantage of this

FIGURE 2. An intraoperative photo shows that breast implants are soaked with a triple antibiotic solution to further reduce possible contamination of bacteria to the implants. full color online

approach is that the length of incision is limited by the diameter of the areola. Areolas with 25 mm in diameter will only allow for the creation of 4-cm incision along one half of the areolar circumference. In patients with lightly colored areola that fades into the surrounding breast skin, the scars do not hide well. There is also concern that periareolar approach present higher risk for change to nipple sensation and lactation ability.[22]

Transaxillary incision's main appeal is that it completely avoids incision on the breast, instead, the scar is hidden in the axilla. Like the inframammary incision, it does not violate the breast parenchyma. Endoscope is used to perform both subglandular and submuscular dissection, which offers direct visualization, accurate hemostasis and precise release of muscular attachment. It allows placement of both saline and silicone implants. Despite these advantages, there are some important trade-offs to consider when contemplating this approach. Compared with other more direct incision options, the transaxillary approach lacks the same degree of maneuverability and control, this can lead to a higher risk of asymmetry and implant malposition. Furthermore, any subsequent revision will be

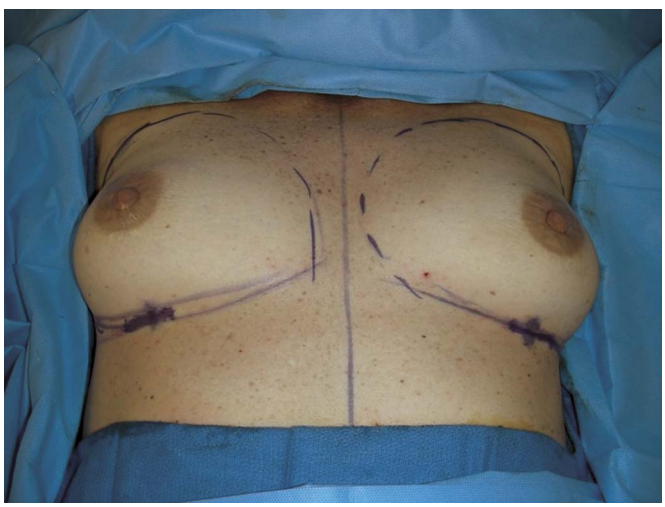

FIGURE 1. An intraoperative photo shows that both nipples are covered with a Tegaterm occlusive dressing to avoid possible contamination from the mammary ducts during the surgery. full color online

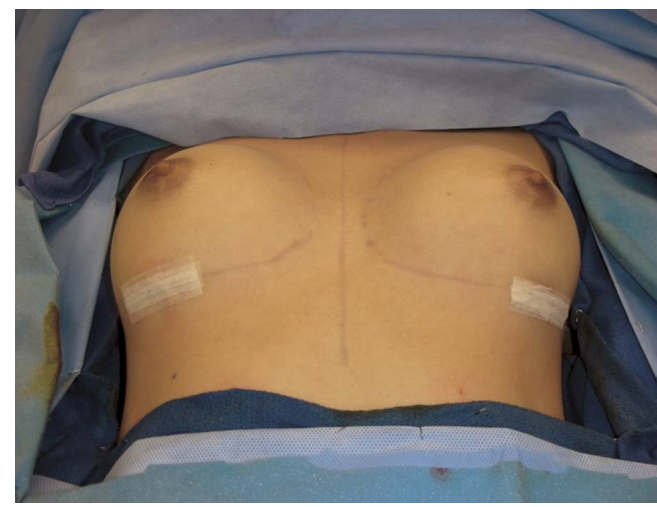

FIGURE 3. An intraoperative photo shows that both inframammary incisions are covered with steri-strips to possibly reduce scaring. full color online

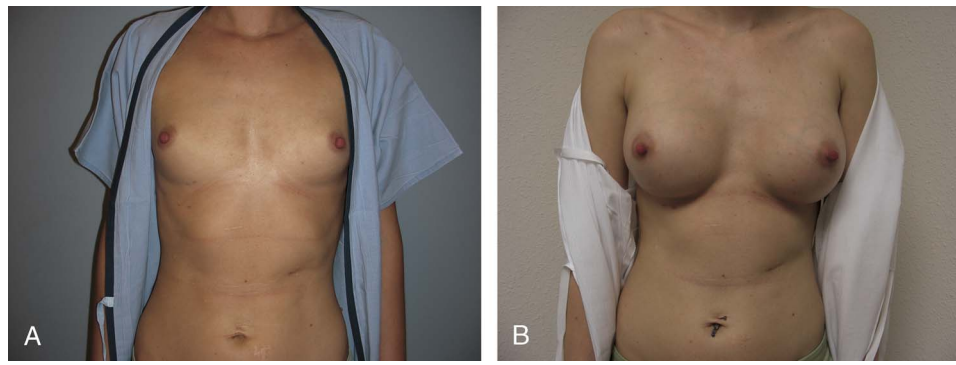

FIGURE 4. A 36-year-old White woman underwent subpectoral breast augmentation with 300 mL high profile smooth round silicone breast implant via inframammary approach. A, Preoperative view and (B) the result at a 10-month follow-up. full color online

extremely difficult if not impossible without making a new incision that is directly on the breast. Transaxillary incision is also not recommended when substantial parenchyma rearrangement is required, such as the tuberous breast deformity, because it would be difficult to adequately manipulate the breast tissue.

REFINED SURGICAL TECHNIQUES

Many other important aspects of the surgical technique also need to be considered when performing breast augmentation. With any incision, the dissection of implant pocket should be done under direct visualization without blunt dissection. This was championed by Tebbetts,[23] who demonstrated that direct visualization combined with prospective hemostasis is more efficient and results in less blood loss compared with blunt dissection. Attention should be paid to achieve proper size of the pocket, to best accommodate the size and type of chosen implant. This will minimize the risk of implant malposition and migration over time.

Studies have found that the development of subclinical infection likely contributes to the development of capsular contracture.[24–26] Therefore, it is paramount to maintain a sterile field to avoid any contamination of the implant during surgery. Our preference is to cover both nipples with Tegaderm (3M Inc., St. Paul, MN) occlusive dressing before incision to avoid possible contamination from the mammary ducts (Fig. 1) Before implant insertion, triple antibiotics solution, containing 1 g cefazolin, 80 mg Gentamicin and 50,000 U Bacitracin in 500 mL normal saline, is used to irrigate the pocket and soak breast implant for minimum of 5 minutes. This has been shown to clinically reduced incidence of capsular contracture.[27] (Fig. 2) Keller Funnel (Allergen Plc., Dublin, Ireland) is routinely used to allow easy insertion of silicone implant through a small incision, as well as to facilitate "no touch technique" (Video 1 http://links.lww.com/SAP/A578). Finally, once the pocket is ready for implant insertion, all personnel will change to new set of sterile gloves before handling of the implants to further minimize any risk of contamination. After the implant is properly positioned it is the senior author's preference to close the incision in 3-layered fashion. 3-0 PDS (polydioxanone) (Ethicon Inc., Somerville, NJ) suture is used to approximate breast tissue and superficial fascia, followed by 3-0 Monocryl (Ethicon Inc.) for subdermal, and 4-0 Monocryl for subcuticular closure. Steri-strips (3M Inc.) are applied over the incision as dressing to reduce tension and improve scarring (Fig. 3).

POSTOPERATIVE CARE AND EXPECTED OUTCOME

Patient education is an important part of postoperative care. Detailed instructions should be given to the patients to ensure they understand what to expect after the surgery, how to properly care for their surgical incisions and manage surgical pain. Patients are instructed to leave the Steri-Strips in place for 1 to 2 weeks. A comfortably fitting surgical bra is used up to 6 weeks after the surgery for support. We encourage all patients to be fully ambulating as tolerated at home to prevent venous thromboembolic events. Patients are to refrain from heavy lifting for 6 weeks, but most can resume light exercises after 2 to 3 weeks. Breast massage is recommended to the patient for possible reduction of implant capsular contracture 6 weeks after the surgery if she feels no pain from her surgical site. Several cases with subpectoral, subfascial, or subglandular placement of breast implant through inframammary or transaxillary incision are demonstrated to highlight the senior author's experience with contemporary breast augmentation practice in the United States. (Figs. 4–7)

DISCUSSION

A common misconception of primary breast augmentation is the belief that the surgery is little more than placing an implant in a pocket.

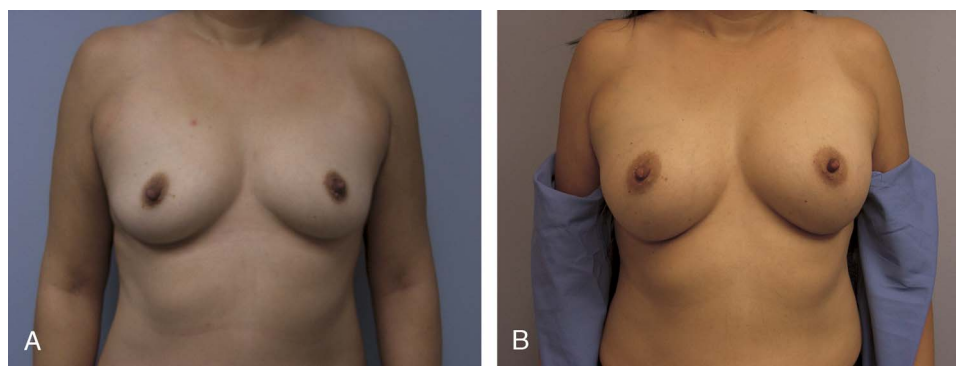

FIGURE 5. A 39-year-old Hispanic woman underwent subfascial breast augmentation with 350 mL high profile smooth round silicone breast implant via inframammary approach. A, Preoperative view and (B) the result at a 6-month follow-up. full color online

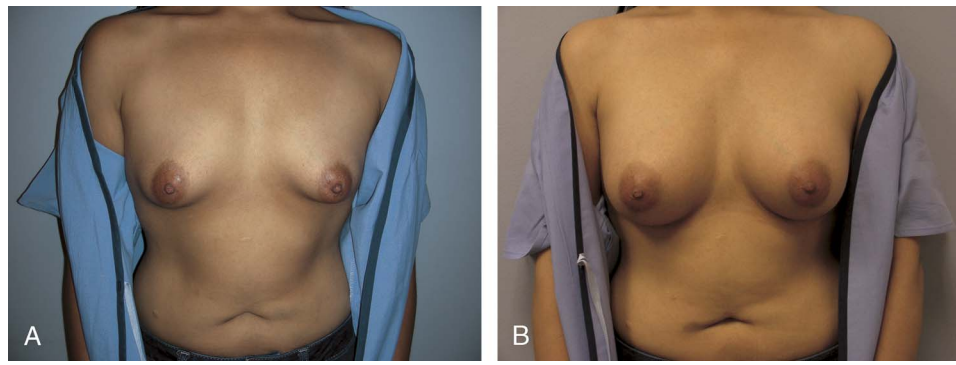

FIGURE 6. A 29-year-old White woman underwent subglandular breast augmentation with 250 mL high profile smooth round silicone breast implant via inframammary incision. A, Preoperative view and (B) the result at an 8-month follow-up. full color online

However, this is far from the reality. It takes expertise and deliberate practice to achieve consistent results while minimizing surgical complications. Controlled studies continue to show significant reoperation rates as high as 15% to 24% at 3 years for this elective procedure.[28,29] To minimize complications and the need for revision, Adams[30] has advocated to view breast augmentation as a *process* with 4 defined segments: (1) patient education and informed consent, (2) tissue-based operative planning, (3) refined surgical technique, (4) defined postoperative care.

One of the advantages for IMF incision is that the surgeon may use this approach to change IMF position. With this approach, a proper position of IMF can be adjusted and then secured precisely. This will allow the surgeon to place a bigger size of breast implant once the IMF is lowered as desired by the patient. Obviously, it would be hard to accomplish the same goal if periareolar or transaxillary incision is used. However, superior or inferior periareolar incision can be combined with periareolar mastopexy when indicated.

The most common complication after implant-based augmentation is capsular contracture. In the Allergen Silicone Primary Augmentation Pre-Market Approval (PMA) study, there was 13.2% rate of capsular contracture at 4 years. The Allergan saline PMA data reported 9% capsular contracture rate for primary augmentation.[31] The 3-year data for Mentor PMA study showed 8% capsular contracture for the silicone implant at 3 years.[32] Furthermore, capsular contracture is the most commonly reported reason for revision surgery, accounting for 15% to 30% of the reoperations after primary augmentation.[13,33,34] The exact etiology of the development of contracture remains elusive, and is likely a multifactorial process. Today, most plastic surgeons and researchers would agree on 2 main causal theories: subclinical infection theory and hypertrophic scar theory.

The infectious theory has been supported by multiple studies including those by Burkhardt et al., Adams et al,[35] Wiener,[36] and Pajkos et al.[26] The theory involves seeding of an implant by low-level contamination of skin bacteria, most commonly *Staphlococcus epidermidis*, which then leads to development of biofilm around the implant. Over time, capsular contracture develops as a result of the persistent subclinical infection. This insight has led us to follow a strict protocol when handling implants to avoid potential bacterial contamination. The breast pocket and the implants are soaked with triple antibiotic solution for at least 5-minute contact time as advocated by Adams et al,[35] which includes Bacitracin 50,000 units, Cefazolin 1 gram, and Gentamicin 80 mg in 500 mL of normal saline. We also practice glove changes before implant handling and "no touch" techniques to further prevent contamination. Others have reported success using Betadine (povidone-iodine; Purdue Frederick, Stamford, CT) for pocket irrigation. This practice was initially banned by the FDA in 2000, but as new evidence emerged, the decision was reversed and received approval by the FDA in 2017. The initial ban was based on data FDA received from Mentor as part of their PMA submission, which indicated Betadine was associated with a higher rate of saline implant deflation. The implication was that Betadine could degrade the silicone shell of breast implant, and the warning against using Betadine made its way into product labeling by all the major manufacturers. It was later revealed that majority of the deflations in the Mentor's PMA data came from a single surgeon. Since 2000, multiple investigators have published studies that showed Betadine irrigation did not lead to higher deflation rate of saline implant, and in fact, does lead to lower capsular contracture.[37] This eventually led to removal of the labeling against Betadine by Allergen in 2017, which was approved subsequently approved by the U.S. FDA, effectively reversing this policy after 17 years of its implementation.

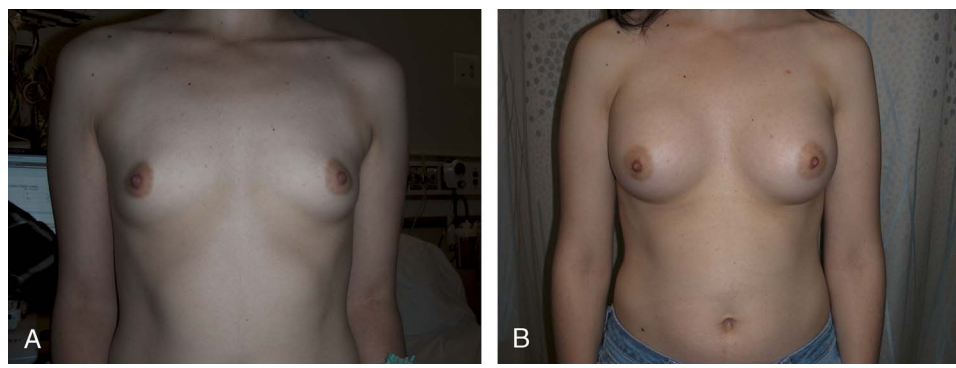

FIGURE 7. A 29-year-old White woman underwent subpectoral breast augmentation with 275 mL high profile smooth round silicone breast implant via endoscopically assisted transaxillary approach. A, Preoperative view and (B) the result at a 12-month follow-up. full color online

The hypertrophic scar theory suggests that when noninfectious material, such as blood or seroma, collects around the implant, it can become a source of irritation and initiate a process of tissue contracture. This is supported by clinical studies that noted increased rate of capsular contracture in patients who developed hematoma or seromas postoperatively that were not drained.[38–40] For this reason, we minimize unintentional tissue trauma by always performing pocket dissection under direct visualization using sharp dissection as advocated by Tebbetts.[23] There should be a low threshold for drainage of postoperative hematoma, as to minimize the risk of capsular contracture. Some surgeons have advocated the use of small short-term drains to further decrease the risk of capsular contracture, however, this is less commonly used in primary augmentation.

The second most common complication after primary augmentation is implant malposition. This is a broad category that includes lateral malposition, IMF malposition (bottoming out), and medial malposition (with synmastia as an extreme example). Most of the problems with implant malposition can be attributed to surgical technique and are largely preventable. Lateral and medial malpositions often result from overdissection of the lateral breast pocket or overrelease of the pectoralis major muscle from its medial sternal attachment. For both submuscular and dual plane pocket dissection, care must be taken to release the pectoralis muscle from the underlying ribs, but the sternal attachment medially should be preserved. To prevent IMF malposition, it is our practice to preserve patient's nascent IMF position whenever possible. Violating the fascia system at the IMF can lead to bottoming out of the implant, causing double-bubble deformity over time. Another common cause for double-bubble deformity is a mismatch between the implant diameter and the base width of the breast. Therefore, it is important to choose an implant that is the same or slightly smaller than the breast base diameter.

Postoperative hematoma and seroma have been reported and range from 0.5% to 2%. As mentioned previously, there should be a low threshold for surgical evacuation. Undrained hematoma and seroma are likely to cause capsular contracture in the long term. As demonstrated by Tebbetts,[23] following the refined surgical technique as outlined in his article, with judicious prospective hemostasis he was able to achieve dissection of entire breast pocket often with less than 1 mL blood loss. Tebbetts[23] reported 0.2% of hematoma rate in the group of 627 patients where his refined technique was implemented. All patients received 800 mg of ibuprofen postoperatively, and were encouraged to return to full normal activities immediately.

Finally, implant size change remains one of common causes of reoperation after primary breast augmentation. This can be largely seen as a failure of the first 2 steps in the *process*, namely patient education and informed consent, as well as tissue based surgical planning. Selecting the right implant size remains one of most difficult aspect of the preoperative planning stage. It is important to understand the individual desire of each patient. At the same time, it is surgeon's role to educate each patient, making sure they have the realistic expectation on what the surgery can and cannot achieve. The surgeon could show multiple before and after photos for similar breasts, and have the patient try sizers or bra stuffing. Whatever method the surgeon chooses to employ, the importance of patient understanding and their partake on the decision making cannot be overemphasized. Preoperative planning using 3D imaging are becoming increasingly popular; however, one should be cognizant as to use this as only an educational tool and not to oversell results that cannot be delivered via surgery. Ultimately, when the 4 *processes* advocated by Adams are properly executed, consistent results can be achieved in primary breast augmentation with low reoperation rate.

CONCLUSIONS

Modern breast augmentation has evolved with the introduction of new implants and new techniques to become a more objectively determined aesthetic procedure. To achieve optimal result, it is imperative for the surgeon to be familiar with the advantages and limitations of each technique. The process of evaluating each patient can be standardized with the 5 key steps in decision making: (1) assess the need for concurrent mastopexy, (2) implant selection, (3) pocket plane, (4) IMF position, (5) choice of incision. The surgeon must combine these considerations along with patient's aesthetic goal to create a sound surgical plan for each individual patient.

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