Advocates of subglandular and subpectoral breast augmentation each see benefits to their method that the other side somehow fails to appreciate. It is given that both techniques, properly executed, produce comparable results under normal conditions over limited periods of time. Implant displacement following subpectoral augmentation has been a problem, but its exact prevalence is unknown. I decided to undertake a comparative analysis of subglandular and subpectoral augmentations over time. This study was not intended to be a statistical analysis, as there were too many variables and only limited patient data available to me for such a study. I was looking for the natural evolution of the results under normal conditions over an extended period of time.

Method

My office files provided an adequate supply of subglandular augmentation patients. With respect to subpectoral cases, I had a problem finding suitable candidates because too many demonstrated initial high-riding implants resulting from either technical variations or an inadequately performed procedure. Since there is also considerable variation in normal pectoral muscle anatomy and variation in the extent of muscle release, I decided to include patients from my practice
who had undergone subpectoral augmentations by many different surgeons, as long as they had an initial satisfactory result with chest muscles relaxed. Although some of these patients came to see me because of breast issues, many of the consults were not breast related. I felt that including these patients helped decrease technical variation effects and gave a better indication of subpectoral implant behavior. In this way, I collected a series of patients whose surgeries were performed by 19 identified and 3 unidentified plastic surgeons from around the country.

Data were collected from 100 patients who underwent subglandular augmentation and 100 who underwent subpectoral augmentation between 1993 and 2002. An initial satisfactory result by evaluation or patient declaration was a prerequisite for inclusion in the study. While recognizing that reliance on patient memory is a limitation of this study, I felt it appropriate in this instance in view of available resources and the patients’ expressed certainty about the initial result. All patients with a history of breast augmentation were questioned as to implant position, surgeon, and level of satisfaction with the initial result in the relaxed position. Patients with any apparent early implant displacement or early dissatisfaction with the result in the relaxed position were excluded. Those patients included in the study were examined both in the relaxed position and with chest muscles contracted to mimic real life conditions and verify implant position. All patients were evaluated for malposition, distortion, asymmetry, contour deformity, and scarring.1,2 Patients were also questioned about their perceptions of change over time. The shortest postoperative follow-up among the patients included in the study was 7 years, the longest 15 years.

**Results**

Subglandular augmentation limitations included capsular contracture, implant palpability, and rippling visibility; these factors varied with implant types and breast tissue volume. Capsular contracture produced flaws including malposition, distortion, asymmetry, contour deformity, and scarring. Rippling produced asymmetric contour deformities circumferentially, which were most severe when patients bent forward (Figure 1). Otherwise, no temporally related implant changes were noted. Of course, breast contours evolve as the aging process progresses, but I focused on intact implant-related breast changes only.

Subpectoral augmentations were associated with varying degrees of muscle contraction–induced deformities, including malposition, distortion, asymmetry, and contour deformity (Figure 2). These deformities were directly related to muscle strength and development and inversely related to the amount of breast tissue present (ie, the stronger the muscle, the greater the deformity, and the more breast tissue present, the less severe the apparent deformity). Rippling over the superior pole of the breast was less visible than in subglandular augmentations, but rippling was essentially the same in the inferior portion of the breast.

Capsular contracture also occurred but differed from the subglandular augmentation cases in that, at 7-year follow-up, upward implant displacement was noted in 94% of the patients who underwent subpectoral augmentation (Figure 3).

**Discussion**

Subglandular augmentations are affected by the type of implants used and the amount of tissue coverage. Rippling was observed more often with textured saline-filled implants than with gel-filled implants. However, the greater the breast tissue cover, the better the implant flaw concealment. Conversely, with decreasing breast tissue cover, implant characteristics become more important.

Subpectoral augmentation provides better concealment of superior pole rippling, as would be expected given the increased tissue interposed between the implant and the skin. This improvement, however, comes at a price. Unlike nonoperated breasts and subglandular augmentations, when the pectoralis major contracts in patients who have undergone subpectoral augmentation, muscle contraction–induced deformities become apparent (Figure 4). These create varying degrees of malposition,
with widened cleavage and upward or superiolateral implant (ie, mound) displacement, distortion of normal mound shape, and asymmetry. The implants frequently perform unequally, so that contour deformities and accompanying muscle tension lines develop over the upper poles (Figure 2, B). These muscle contraction-induced deformities were most severe in patients who exercised regularly and consequently developed strong, thick muscles and decreased breast tissue. Surprisingly, patients claimed they were not informed of this possibility preoperatively, and assumed this to be an inevitable consequence of breast augmentation. Patient acceptance of muscle contracture-induced deformities ranged from a lack of concern to extreme distress. The greater the patient’s concern, the more likely it was that she indicated a desire to have been informed about the possibility preoperatively.

A trade-off for the benefit of increased tissue cover in subpectoral augmentations is a high incidence of implant displacement (94% in this series). In the early stages of this problem, patients thought that either their breasts were drooping, creating an impression of ptosis (pseudoptosis), or that their implants were leaking and

Figure 2. A, Subpectoral augmentation with muscles relaxed. B, Same patient with pectoral muscles contracted. Note the wide cleavage, mound malposition, distortion, asymmetry, and contour deformity. C, D, Typical appearance of poorly placed, high-riding implants shortly after subpectoral augmentation.
shrinking. Even with advanced implant displacement, most patients thought they needed a breast lift. (Figure 5) Severe, deforming implant displacement occurred with or without capsular contracture (Figures 6 and 7). The high incidence of implant displacement initially surprised me. On careful intraoperative examination of both augmentation tissue planes, I concluded that this problem is inherent in the subpectoral procedure. I advise all my augmentation patients preoperatively of the high likelihood that an operation to correct implant displacement will be necessary within 7 years of subpectoral augmentation.

The benefit of easier mammography in patients with subpectoral versus subglandular augmentation is legendary but questionable. Skinner et al found no difference in mammography sensitivity in women with subpectoral versus subglandular augmentations, although Silverstein et al found less breast tissue concealment after subpectoral implant placement. The use of breast implant displacement views as proposed by Eklund et al, while requiring greater effort, has led to improved visualization. If comparable mammogram results are obtainable regardless of the approach, irrespective of the effort, then the issue of mammograms in the alternate implant positions becomes a moot point. In general, the presence of implants appears not to significantly affect cancer diagnosis. Miglioretti et al found that, “Despite the lower sensitivity of mammography in women with augmentation, these women were diagnosed with cancer of similar stage, size, nodal status, and estrogen receptor status and lower grade compared with women without augmentation.” Other studies have also suggested that among symptomatic women who have undergone breast augmentation, the tumor prognostic characteristics are better due to smaller size, lower grade, and estrogen-positive status.

Implant leaks and deflations were rare events in either position. Because of implant variability over time, no

Figure 4. A, A 31-year-old body builder without implants, relaxed. B, Body builder without implants, with chest muscles contracted. Note the deepening of the medial fold. C, The same body builder with subglandular implants, 6 months postoperatively. D, Body builder with subglandular implants, with chest muscles contracted. Note that the breasts behave as they did before augmentation.
Results of Subglandular Versus Subpectoral Augmentation Over Time: One Surgeon’s Observations

Specific information about implant types was meaningful. Although I did not evaluate complete muscle/fascia implant cover for augmentations, based on experience in breast reconstructions and careful anatomic analysis, I expect that increased implant migration occurs in subglandular versus subpectoral augmentations.

The question ultimately comes down to which implant position is better for a particular patient. With implant improvements and the recent recommendation by a US Food and Drug Administration panel that silicone gel-filled implants be approved for use in the United States, I predict that the subglandular position will gain in popularity. In the meantime, I believe patient preferences should be considered carefully when deciding on implant placement. As surgeons, we must provide complete information to our patients for informed consent, discussing with them the advantages and disadvantages of each technique. In the long-term, we must evaluate our results critically and objectively to determine which techniques are truly in the best interests of our patients.

**Conclusion**

Subglandular augmentations are vulnerable to implant deficiencies manifested by varying degrees of implant palpability, visible rippling, and capsular contracture. The first two flaws are most noticeable in patients with minimal breast tissue who receive textured saline-filled implants and are maximized when patients bend over. These problems decrease if patients have adequate breast tissue and gel-filled implants are used.

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**Figure 5.** A, A 53-year-old patient with high-riding subpectoral implants wanted implant removal and a breast lift in her 10th postoperative year. She was pleased with her result until the point at which she felt the aging process had caused changes. B, View 3 months after implant removal without implant replacement or mastoplexy.

**Figure 6.** A, This 40-year-old patient with an initially satisfactory result thought she needed a breast lift and repositioning to correct high-riding implants with capsular contracture. B, View 9 years after explantation and subglandular augmentation without breast lift.
Subpectoral implant placement decreases superior pole palpability and visible rippling by increasing the soft-tissue implant cover. This benefit comes at the price of muscle contraction–induced deformities, including widened cleavage, implant movement distortions, muscle tension lines, breast contour deformities, asymmetries, and eventually, a high likelihood of upward implant displacement that creates a pseudoptosis. Subpectoral augmentations, therefore, are less predictable than subglandular augmentations, and bring into play muscle tissue–induced variables that alter the mammary dynamics and can require frequent reoperations. A complete discussion between doctor and patient of the benefits and limitations of either tissue plane allows the patient to participate in the choice, based on informed consent.

References


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