Correction of Small Volume Breast Asymmetry Using Deep Parenchymal Resection and Identical Silicone Implants: An Early Experience

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Abstract

Background: Virtually all patients presenting for augmentation mammoplasty will exhibit some degree of asymmetry. The use of asymmetric implants to address small-volume breast asymmetry introduces uncontrolled variables into the longevity of postoperative results.

Objectives: We described a novel method of addressing small-volume asymmetry using deep parenchymal resection (DPR) to achieve symmetry prior to insertion of identical implants. We also compared our results with this technique to a cohort of standard augmentation mammoplasty patients.

Methods: All patients underwent 3-dimensional (3D) imaging during consultation. In patients with small-volume breast asymmetry, a uniform disk of deep parenchymal tissue was resected from the base of the larger breast cone through an inframammary incision. A standard submuscular augmentation was then completed. Five patients (DPR group) with appreciable small-volume asymmetry underwent DPR in the larger breast prior to insertion of identical implants. Fifty-six consecutive patients with no appreciable volume asymmetry (standard group) underwent standard submuscular breast augmentation.

Results: Using 3D imaging preoperatively, DPR-group patients had an estimated breast volume asymmetry of 86 ± 58 g and had 55 ± 27 g excised from the larger breast intraoperatively, allowing for insertion of identical implants. Complications in the standard group included 1 case of rippling and 2 cases of malposition. One case of malposition was noted in the DPR group. No other complications were recorded in either group over 6 months.

Conclusions: Our novel method of addressing small-volume breast asymmetry allows for the use of identical implants and presents no increase in early complications.

Level of Evidence: 4

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Symmetry has long been regarded as one of the single most important aspects of beauty.1 Female breasts, however, commonly present with minimal or major asymmetry, which are now considered to be heterogeneous disorders rather than a single disease entity.2,3 The asymmetric appearance of the breast is often secondary to differences in breast shape or volume but can also be caused by asymmetry of the chest wall or variability in nipple size, shape, and/or position.4 The incidence of some type of breast asymmetry is virtually universal among patients requesting aesthetic breast surgery.5-7

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Since breast asymmetry can be described in either shape or volume, these parameters must be individually addressed. Severe breast asymmetries may require a shape change by mastopexy with volume adjusted either by breast reduction or with the addition of an implant—either a unilateral implant or bilateral different-sized implants to obtain volumetric symmetry.

Traditionally, smaller asymmetries are compensated for with the use of asymmetrical breast augmentation, using implants of different size, projection, and even shape.\(^{8,12}\) Others advise the use of adjustable implants in breast augmentation,\(^{12,13}\) or in cases where saline implants are used, an adjustment of 25-50 cc is allowed to balance a small discrepancy in size.\(^{10}\) The use of asymmetric implants, however, may cause different effects within each breast, leading to differences in complications or changes in breast shape over time.

In this study, we describe a novel single-stage method to address minor breast volume asymmetry. We propose a uniform disk-like resection of deep parenchymal breast tissue from the larger breast to achieve symmetry of breast volume prior to insertion of identical implants on each side.

**METHODS**

**Study Design**

A retrospective review was conducted of all patients who underwent primary breast augmentation by the senior author (GS) between November 2011 and December 2013. This population included 56 women with no clinically obvious asymmetry who underwent standard breast augmentation (standard group). These patients were used as a comparison group to the 5 women with appreciable small-volume breast asymmetry who underwent unilateral deep parenchymal resection (DPR) of the larger breast and bilateral symmetrical implant augmentation (DPR group). These patients represented 61 consecutive primary augmentation patients. All patients gave informed consent prior to their surgery.

All patients were monitored closely for the first 6 weeks and then as required (but at least annually). Specific postoperative complications, including hematoma, seroma, infection, nipple sensation, capsular contracture, implant malposition, and unsatisfactory breast symmetry, were recorded. This study was conducted following the guidelines specified within the Declaration of Helsinki.

**Preoperative Assessment**

Preoperative evaluation of the breast augmentation patient is essential to identify any breast asymmetry. Important factors contributing to breast asymmetry include the presence of a unilateral breast lesion, changes during menarche, pregnancy and lactation, previous breast surgery, and body weight change.

We recommended waiting at least 6 months after stopping breastfeeding or after achieving a stable body weight before undergoing breast surgery.

If there was a history of significant breast change through menses, we preferred to examine patients mid-cycle. As per our normal practice, we obtained breast imaging by an experienced breast radiologist as part of our assessment.

Key physical examination points included taking note of postural status and structural asymmetry such as rib irregularity, pectus excavatum/carinatum, sternal rotation, scoliosis, and thoracic hypoplasia. Standard breast measurements were documented, including comments on skin quality and skin stretch. Other factors such as any degree of breast constriction, breast ptosis, asymmetric breast footprint, or nipple areolar irregularity were recorded but are beyond the scope of this paper.

Finally, patients underwent a 3D photographic analysis using the Vectra XT Imaging System (Canfield Scientific, Fairfield, NJ). A number of breast measurements were recorded by the imaging system, including an estimate of the differences in both breast shape and volume.

**Surgical Techniques**

Importance was placed on symmetric patient positioning on the operating table with arms abducted 45 degrees and secured to allow for intraoperative assessment with the patient upright. A standard inframammary approach was used in both patient groups described in this study.

In standard-group patients (standard augmentation), the pectoralis major was released from its inferior attachments and a standard subpectoral pocket was created for insertion of the implant bilaterally. In DPR-group patients (minor asymmetry), prior to creation of the subpectoral pocket in the larger breast, the breast gland was released from the pectoralis fascia. This release had to be generous enough to allow sufficient exposure for a uniform excision of a flat disk of breast tissue from the base of the breast parenchyma (Figure 1A). This disk-like excision of the whole base of the breast was started at the inferior pole of the breast just cephalad to the inframammary sulcus. To avoid any irregularity, it was important to commence the dissection of the breast tissue in a graded manner, growing deeper as the dissection continued upwards and then thinned again to complete the dissection just short of the upper pole of the breast (Figure 1B). The amount of breast resected was estimated by preoperative 3D analysis; but as seen in Table 1, this was found to be inaccurate and hence could not be relied upon. Intraoperative resection was adjusted by visualizing breast symmetry on the table with the patient both supine and elevated to the sitting position. The result of the
resection was a slice of breast tissue, in the form of a disk, removed from the base of the breast cone (Figure 2). The final breast size was evaluated with the patient in the supine and upright position by visual comparison with the contralateral breast, and additional excision of tissue was performed to match the smaller breast as required. Excellent symmetry should be obtained prior to insertion of any implant.

With breast volume symmetry obtained, the subpectoral pocket was created in the standard manner. To ensure that the implant was secure under the pectoralis and to limit exposure of breast parenchyma to the implant, the pectoralis major muscle’s inferolateral border was sutured to the breast parenchyma. Identical implants were inserted bilaterally and wound closure was obtained (Figure 3).

RESULTS

A total of 61 consecutive subpectoral primary bilateral breast augmentations were performed. In 56 of 61 (92%) of these women (average age 31 ± 11 years; range 19-56 years) there were no clinically significant breast asymmetry noted and standard breast augmentation was performed (standard group).

Five of 61 women (8%; average age 31 ± 8 years; range 21-49 years) presented with minor breast asymmetry and underwent unilateral parenchymal reduction and symmetrical augmentation (DPR group). Using the 3D volumetric analysis preoperatively, DPR-group patients were measured to have an average breast volume discrepancy of 86 ± 58 g.

Intraoperatively, an average of 55 ± 27 g was excised from the larger breast in these patients. Table 1 describes the measured volume asymmetry by 3D analysis and compares this with the intraoperatively excised volume in each patient.

The inframammary fold incision was used in all patients. Smooth, round silicone implants were used in all patients aside from 3 patients in which polyurethane implants were used (standard group). Implant size ranged from 205 to 470 cc in the standard group and 270 to 400 cc in the DPR group.

Table 1. 3D-Measured vs Excised Volume Discrepancy in Patients Who Underwent Deep Parenchymal Resection

<table>
<thead>
<tr>
<th>DPR-group Patients n = 5</th>
<th>Larger Breast Side</th>
<th>3D-Measured Volume Difference, g</th>
<th>Intraoperatively Excised Volume, g</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>L</td>
<td>17</td>
<td>30</td>
</tr>
<tr>
<td>2</td>
<td>R</td>
<td>113</td>
<td>50</td>
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<tr>
<td>3</td>
<td>R</td>
<td>115</td>
<td>100</td>
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<tr>
<td>4</td>
<td>L</td>
<td>151</td>
<td>55</td>
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<tr>
<td>5</td>
<td>L</td>
<td>35</td>
<td>40</td>
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DPR, deep parenchymal resection; 3D, three-dimensional.
Mean follow-up time was 8.4 months in the standard group and 6.9 months in the DPR group. Table 2 describes additional comparative data between these two groups.

Figure 4 is a representative case illustrating the preoperative 3D imaging performed on all patients. Figure 5 illustrates the postoperative result in an asymmetric augmentation patient.

In the standard group, postoperative complications were recorded in 3 patients. One patient with unilateral rippling was observed 5 months postoperatively and underwent an implant exchange. Two patients with an implant malposition underwent a second operation to adjust the pocket and reposition the implant.

In the DPR group, a single complication was recorded in 1 patient whose prominent medial ribs were noted to be more noticeable with lateral movement (while supine) of a smooth, round implant in a large subpectoral pocket. This
was corrected successfully by lateral capsulorrhaphy and bilateral exchange to a polyurethane implant. This further highlights the importance of chest wall evaluations during preoperative assessment. 

**DISCUSSION**

The main purpose of this study is to describe a novel method to address small-volume asymmetry in breast augmentation surgery. In addition, we have provided preliminary evidence from our recent experience with this technique to demonstrate its safety in a short follow-up period. The purpose of including a comparison group is to give a general idea of the complications that may occur in a single surgeon’s cohort and to show that this novel technique did not change the overall complication rate in this surgeon’s experience over a short follow-up period.

Traditionally, in cases where the patient desired augmentation and breast asymmetry is minor, asymmetric implants have been used to compensate for differences in size or even shape. While others have described various excisional methods based on the principles of breast reduction/mastopexy to achieve symmetry, our method is novel in that it involves a disk-like excision of tissue from the base of the larger breast cone to produce volumetrically symmetrical breasts prior to inserting identical implants.

Numerous potential problems with the use of asymmetric implants have led us to develop our DPR technique. The first and most obvious is the difference in the size and weight of the implants and the resulting varied effect that these differences can have on the surrounding parenchyma over time.

An attempt to gain symmetry by placing a larger implant in a small skin envelope of the smaller breast will inevitably require the breast base envelope to accommodate the larger base implant. This can result in a more palpable implant or a prominent implant edge in the smaller breast. Inserting a higher projecting implant with the same base dimension (to avoid implant show at the edges) may result in excessive pressure being placed on the breast tissue, which may result in subsequent parenchymal atrophy and sensory or nursing difficulties. For these reasons, we suggest that reducing the size of the larger breast to achieve the greatest possible symmetry will allow the surgeon to focus on the smaller breast and avoid adding more volume than ideal for the breast’s dimensions and tissue characteristics.

In addition to the differences in size and shape of asymmetric implants, we must consider the variable foreign body reaction of human tissue secondary to the use of a silicone device. The exposure to asymmetric amounts of implant surface and the varied pressure or tension created by the use of asymmetric implants may result in different tissue responses, which over time can lead to further asymmetries. If the same device is used on each side, there is more chance of equal reaction and hence a better sustained breast symmetry.

Differences in breast tissue atrophy over time are a second consideration. While atrophy is an expected consequence of aging, breasts with different amounts of breast tissue or breasts exposed to different pressures from asymmetric implants may atrophy in different ways, leading to additional variability in shape or position over time. The variability of the soft-tissue covering over different shaped/sized implants may contribute to increased differences in overall breast shape and size as aging progresses. Future long-term studies could address this concern by comparing breast tissue volumes over time and evaluating if asymmetric augmentation becomes more evident after breast tissue atrophy.

Long-term results in breast augmentation surgery are secondary to a number of variables that include the following: implant characteristics such as size, shape and texture; technique-related factors such as pocket selection and incision type; and anatomical factors such as skin quality, parenchymal volume, and chest wall differences. The approach we described is an attempt to keep as many of these variables the same between the two sides during breast augmentation surgery.

However, the additional tissue trauma and exposure of breast parenchyma to the implant on the larger side, as we proposed, is not without potential problems. Specifically, exposure of the healing breast parenchyma to the implant surface may lead to differences in capsule formation and therefore possible ongoing asymmetry. Regarding this, however, exposure of the implant is partially limited by the overlying pectoralis muscle. Additionally, by resecting tissue from the larger breast, there is also the possible increased risk of bleeding, seroma, and/or infection. Fortunately,
increased rates of complications have not been observed so far in this small presented series.

Regarding the need to perform a resection to achieve symmetry, the amount of asymmetry relative to the native breast size must be considered. A 20 cc volume difference in a 100 cc breast (A cup) is proportionately much larger than the same difference in a 300 cc breast. Therefore, the decision for tissue resection is also dependent on the initial breast volume as well as the intended augmentation volume. Most importantly, however, the decision to treat asymmetry can only be made with a well-educated patient who understands that some degree of asymmetry is virtually universal.

Furthermore, we must keep in mind that this study describes a method to address minor breast asymmetry. The approach to major asymmetry, as seen in congenital disorders or after lumpectomy, may require a significantly different approach. These cases may require a formal breast reduction, mastopexy, or other type of reconstruction prior to placement of implants as needed.

Volumetric asymmetry has always been difficult to assess objectively. In this study, 3D imaging was used to illustrate volumetric asymmetry. This method was fraught with difficulties in accuracy and served only as a guide. Preoperative and intraoperative clinical evaluation provided our ultimate measurement for resection volume and achievement of symmetry. This is clearly evidenced by the discrepancy between the 3D-predicted volume of asymmetry and our intraoperative resected weights (Table 1). In our practice, 3D photography is a tool for patient education, and restoring symmetry is done through preoperative and intraoperative clinical assessment. Practically, the resection of the deep parenchymal disk may be done with iterative slices taken; the patient should be evaluated for symmetry while supine and sitting, and further slices should be taken if necessary.

**Limitations**

The small sample size and the relatively short follow-up time represent significant limitations in describing both the applicability and long-term safety of this method. We present this study specifically as a description of a novel method to achieve symmetry prior to insertion of identical implants. We hope that our preliminary follow-up data will

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**Figure 4.** (A) This 3D representation of a 32-year-old patient demonstrates the calculation of volume asymmetry of 115 g and (B) multiple 3D images, including the front, and (C) left lateral, (D) birdseye, and (E) left oblique views.
provide the basis for surgeons to consider this technique and report on its ongoing success in future publications.

**CONCLUSIONS**

With many variables affecting the long-term success of breast augmentation surgery, we feel that attempts to improve symmetry prior to implant insertion may lead to more consistent long-term results in patients. While recognizing and conceding that there will always be a tissue-implant interface reaction that is not completely controllable, the insertion of identical implants represents one significant attempt to limit variability. For the patient with minor breast asymmetry, we recommend an inframammary incision to resect a disk-like slice of basal breast parenchyma from the larger breast to achieve breast volume symmetry prior to augmentation, and we recommend using identical implants through the same incision. A detailed

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**Figure 5.** (A, C, E, G, I) This 32-year-old woman underwent deep parenchymal resection of 100 g from the right breast base and augmentation with identical 270 cc smooth, round gel implants. (B, D, F, H, J) One-year postoperative photographs.
description of this method has been presented as well as short-term results that demonstrate no new complications compared with standard breast augmentation.

**Disclosures**

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**REFERENCES**


