The "Neosubpectoral" Pocket for the Correction of Symmastia

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Background: Symmastia is a rare but challenging problem to correct. A number of techniques have been proposed, but each has drawbacks in terms of reliability, accuracy, and difficulty. A recently described technique to treat subpectoral symmastia is reported whereby a new pocket is created between the deep surface of the pectoralis major muscle and the anterior surface of the periprosthetic capsule, the boundaries of which are limited by the adherence between the capsule and overlying tissue. The "neosubpectoral" pocket is therefore not a "repair" of the excessively medialized symmastia pocket, but is a new pocket, limited at its perimeter by the patient's own tissues rather than by sutures or a patch.

Methods: A precise neosubpectoral plane is developed between the pectoralis major and the anterior implant capsule wall, with dissection limited to creating only the space necessary for proper placement of the implant. The technical details of this procedure are described. A chart review was conducted of all patients who underwent symmastia correction using this technique since December of 2003 at Georgetown University Hospital in the practices of Steven Teitelbaum, M.D., and G. Patrick Maxwell, M.D.

Results: A total of 23 patients underwent symmastia correction using the neosubpectoral technique. Several of these patients presented for recurrence after failed capsulorrhaphy. There has been no recurrence of symmastia to date in this study. The average follow-up was 22 months. One postoperative hematoma and one seroma occurred. One patient had uncorrected, underdiagnosed inferior malposition from an earlier procedure requiring revision.

Conclusions: The neosubpectoral technique is a method for the correction of symmastia that may offer a more efficient, accurate, and effective solution in a single stage. It is an appealing concept that allows for a site change while maintaining the subpectoral position. This procedure is technically straightforward and may offer a reliable means of correcting many other forms of implant malposition and difficult reconstructions. (*Plast. Reconstr. Surg.* 124: 695, 2009.)

Symmastia is an uncommon but very deforming complication of breast augmentation that can be challenging to correct. It has been previously defined as displacement of one or both implants beyond the midline.[1] Symmastia may be caused by excessive medial dissection with disruption of the pectoralis attachments along the sternal border and/or placement of too large an implant with an inappropriately wide base width or excessive projection. Patients with chest wall deformities such as pectus excavatum may also be more prone to acquiring symmastia.

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Whereas subglandular symmastia can be corrected by conversion to a retromuscular pocket, correction of retromuscular symmastia, while still maintaining a submuscular position, is considerably more difficult. A wide array of techniques has been proposed for the correction of retromuscular symmastia: capsulorrhaphy, capsular flaps, AlloDerm or other materials, adjustable implants, explantation with delayed reimplantation, and

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change to a subglandular pocket.[1–5] These techniques, however, all have drawbacks in terms of reliability, technical difficulty, and convenience. Creating a new subglandular pocket is a simple and reliable solution, but there are benefits of the submuscular position that the patient and surgeon may wish to preserve. The likelihood of rippling, palpability, capsular contracture, skin stretch, and parenchymal atrophy and the potential for impairing mammography all may increase with a subglandular site change.[6]

The application of the "neo" pocket technique to symmastia, which was the focus of this clinical study, is an extension of "site change" concepts for revisionary breast surgery introduced by Maxwell and others in the late 1980s[7,8] and also described for subpectoral implants by Spear et al.[12] Maxwell and Heden independently developed the utilization of the subpectoral-precapsular space ("neopectoral," "neosubpectoral," or "neoretropectoral" pocket) for some revisionary breast surgery almost a decade ago.[9,10] While their work has focused on capsular contracture, tissue thinning, and utilization of anatomical, form-stable implants, no previous clinical series has been reported specifically on analysis of the use of the neosubpectoral pocket in treatment of symmastia deformities.

This article describes a precise and reliable method for correcting symmastia by developing a plane between the pectoralis major muscle and the anterior surface of the preexisting implant capsule. The dense adhesions between the pectoralis and the implant capsule allow for an accurate and stable pocket dissection in a virgin plane. This *neosubpectoral* space uses a patient's own tissue to create a new pocket that remains submuscular.

METHODS

Clinical Data

All charts since November of 2003 (when this procedure was first performed for symmastia correction in Nashville, Tennessee, in the practice of Patrick Maxwell, at Georgetown University Hospital, and in the practice of Steven Teitelbaum, M.D.) were reviewed for cases using the neosubpectoral technique for the correction of symmastia. Outcomes were reviewed in terms of symmastia recurrence and complications. All data were obtained by chart review, photographs, and follow-up telephone calls to the patients.

Technique

This technique is for symmastia as well as other types of implant pocket malposition after subpectoral breast augmentation that require reducing the size of the pocket in one or more areas. Preoperative planning begins with evaluating the patient while she is standing or sitting upright. Sometimes the symmastia is not obvious at rest and may be more evident when the patient flexes the pectoralis muscles, displaces the implants manually toward the midline, or leans forward.

The projected boundaries of the new implant pocket are then carefully marked, with particular attention drawn to reducing the medial positioning of the implant. The lateral border of the sternum may serve as a useful landmark for this proposed medial breast pocket. The idealized inframammary fold is marked as well, because inferior implant malposition, and particularly inferomedial implant malposition, frequently coexists with symmastia. The proper nipple to inframammary fold distance is a function of the base width of the breast. Once it is determined and marked, the inferior border of the breast can be traced toward the medial aspect of the breast, further assisting in determining the ideal medial border of the neosubpectoral pocket.

The choice of which incision to use is largely dependent on the anatomy, previous incision, and findings of the specific case. When the initial incision was periareolar, then it is often used again to correct the symmastia, unless the areolar diameter and parenchymal thickness do not allow for direct visualization of the limits of the pocket, precise dissection, and atraumatic placement of the device. The neosubpectoral pocket cannot be dissected with current instrumentation through the transaxillary or periumbilical pockets, but it is not inconceivable that one day it might be achieved. When the initial procedure was inframammary, either that incision can be reused or a periareolar incision can be used.

Located at the center of the breast, nearly equidistant from what will be the borders of the new pocket, the periareolar incision allows for clear, equal, and direct visualization of the entire perimeter of the pocket. By virtue of the areola's location near the "equator" of the implant, it allows visualization from "the high ground" down toward the limits of the pocket. It is closest to and allows the most access to the medial border of the neosubpectoral pocket, the most critical area to correct in symmastia. If the patient has an inframammary scar, then the surgeon must evaluate whether or not to reuse this incision, because it may not provide adequate exposure to dissect the neosubpectoral pocket up and over the implant,

especially if the inframammary incision is low and the implant is large.

Dissection is facilitated by leaving the implant in place as long as possible. Although a projecting implant does not handicap periareolar dissection, it can restrict visualization from the inframammary approach. In this case, dissection is continued with the implant in place for as far as visualization is excellent, after which point the implant is removed and dissection continues without the implant providing countertension. The final choice of incision is a tactical one and should be based on which method will allow the surgeon the best visualization in that particular patient.

Dissection is identical as when performing the anterior portion of a complete capsulectomy; after incision, dissection is carried down to the implant capsule and then dissection proceeds along the surface of the capsule. Superomedially, there will be muscle on the superficial surface of the pocket; inferiorly and laterally, there will be gland on the superficial surface of the new pocket. So although this procedure is termed neosubpectoral, the surgeon should be reminded that there is not going to be pectoralis major muscle overlying the entire new pocket, just as there was not at the time of the initial augmentation. The extent of muscle coverage of the pocket will vary according to whether the initial implant was placed in the partial subpectoral position (pectoralis origins along the inframammary fold left intact) or "dual plane," with those fibers divided and the muscle allowed to slide superiorly (Fig. 1, *left*).[12–15]

Pocket dissection is always stopped short of the intended limits of the new pocket; once the implant is removed and stretch is removed from the pocket, the dissection always appears to have gone farther than initially appreciated. It is better to underdissect and reassess the limits of the pocket with a sizer in place and incrementally enlarge the pocket. Dissecting in this plane is often so easy that one must be vigilant to avoid overenlargement of the new pocket. Unlike a primary augmentation in which the dissection is mostly through a loose, areolar plane, this is a dissection through scar tissue. This allows for smooth, precise, and stable borders of the new pocket.

The plane of dissection is most distinct between gland and capsule; as the dissection proceeds cephalad and under the muscle, the capsule often thins and can be very adherent to the deep surface of the pectoralis. The caudal edge of the pectoralis can be grasped with an Allis clamp and retracted inferiorly and anteriorly to facilitate this dissection, aided by downward pressure on the implant and capsule (Figs. 1, *right*, and 2).

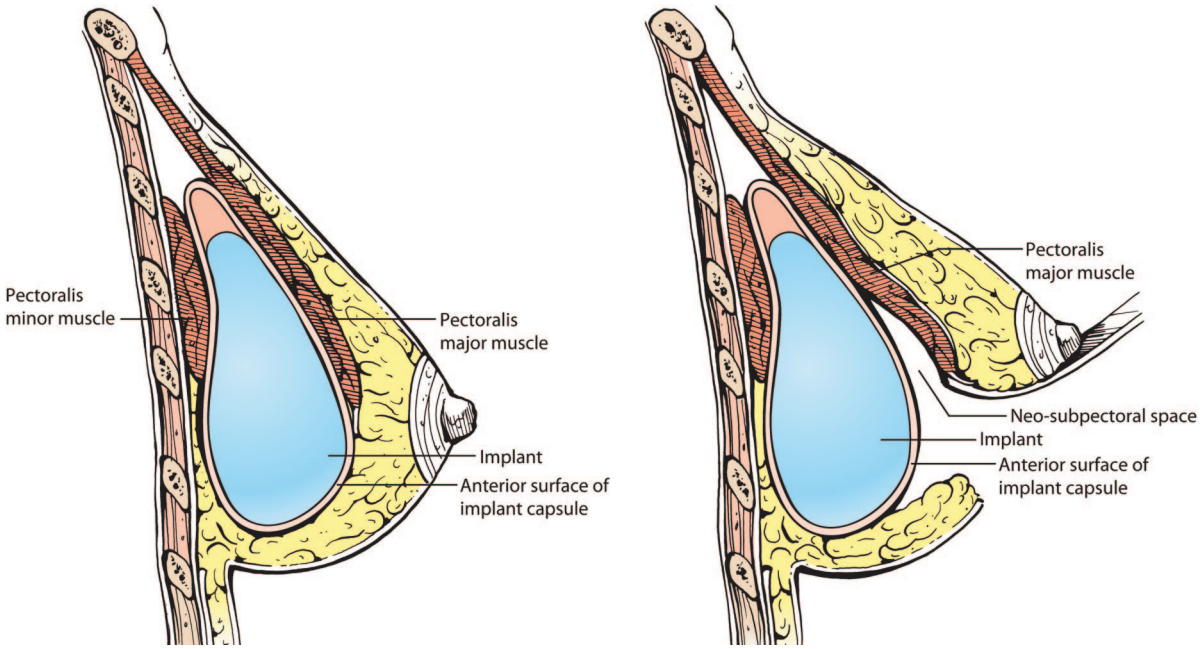

Fig. 1. (*Left*) The relationship of the breast implant and the various layers of soft tissue as present preoperatively. (*Right*) The neosubpectoral plane is shown located between the anterior surface of the implant capsule and the posterior surfaces of the pectoralis major muscle superiorly and breast parenchyma inferiorly. This dissection is performed and the neosubpectoral space created using the previously described dual-plane technique.

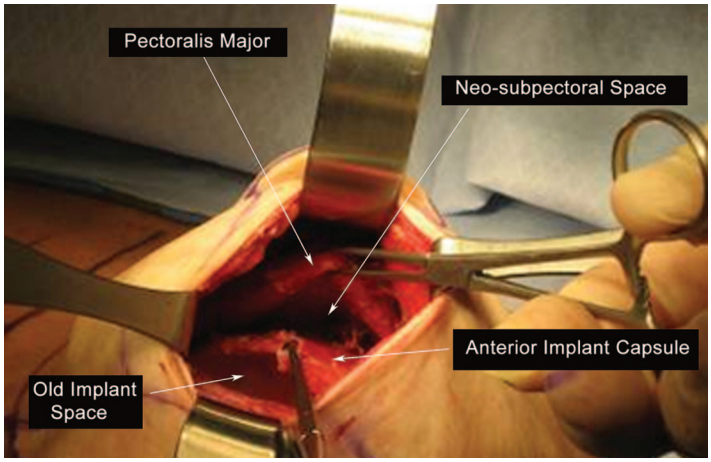

Fig. 2. An intraoperative view of the plane of dissection between the pectoralis major muscle and the anterior leaflet of the implant capsule.

The capsule is tightly bound to the underlying parenchyma and muscle. Although blunt finger or instrument dissection can be used, in many cases, the capsule itself is more delicate than the plane between it and the overlying tissues, thereby leading to inadvertent tearing of the capsule rather than dissection along the intended plane. The ease of this dissection is directly proportional to the thickness of the capsule; with translucent gossamer capsules, this dissection can be tedious, and tears can be made in the capsule. But with careful dissection, the operation can still be conducted, and none of our procedures needed to be abandoned for this or any other reason. When the capsule is thicker, the plane between it and the breast tissue becomes more distinct, and it allows for more counter-tension, which facilitates a speedier and easier dissection without concern for tearing the capsule.

Dissection continues with the old implant in place until the pocket is nearly complete or the presence of the implant impairs visualization, at which time the implant is removed via a capsulotomy. The capsulotomy should be performed at a place that gives the surgeon access to the intracapsular space to place sutures to obliterate it.

After the completion of the pocket dissection, a medial capsulorrhaphy is performed to obliterate the old space using as many interrupted and running sutures that seem necessary. Unlike a capsulorraphy that is performed to delineate the medial border of the pocket when used to repair the symmastia, these sutures serve more to stabilize the anterior and posterior leaves of the old capsular space and potentially obliterate it. After the repair is completed, which may include inferior and lateral pocket excesses as well, the two edges of the capsulotomy are then approximated and tacked back down to the chest wall (Fig. 3). In some cases, there may be excess capsule, which can be trimmed. It should be noted that completely obliterating this old symmastia space is not an absolute requirement to repairing the actual symmastia; but sealing off the old space serves to stabilize the capsule and prevent the implant from migrating back into the old space. The actual repair is a result of creating the properly positioned neosubpectoral pocket, and the final implant pocket or position thus does not depend specifically on the capsulorrhaphy sutures.

A sizer, the old implant, or a new implant is now placed anterior to the old capsule but behind the pectoralis major muscle in the newly created neosubpectoral space (Fig. 4). Final pocket dissection should be reserved for this moment so as to avoid repeating the overdissection of the previous surgery. Once the implant is in place, closure proceeds as in any other breast augmentation, including a layered closure of gland, superficial fascia, and dermis. Closed suction drains are placed so as to effectively drain both the old and new space, and postoperative management includes taping the breasts and instructing the patient to wear a comfortable support bra.

RESULTS

A total of 23 women have undergone the neosubpectoral technique for correction of symmastia since November of 2003 when we first performed this procedure (Table 1). The follow-up has ranged from 10 to 60 months, with a mean follow-up of 22 months. All cases of symmastia were

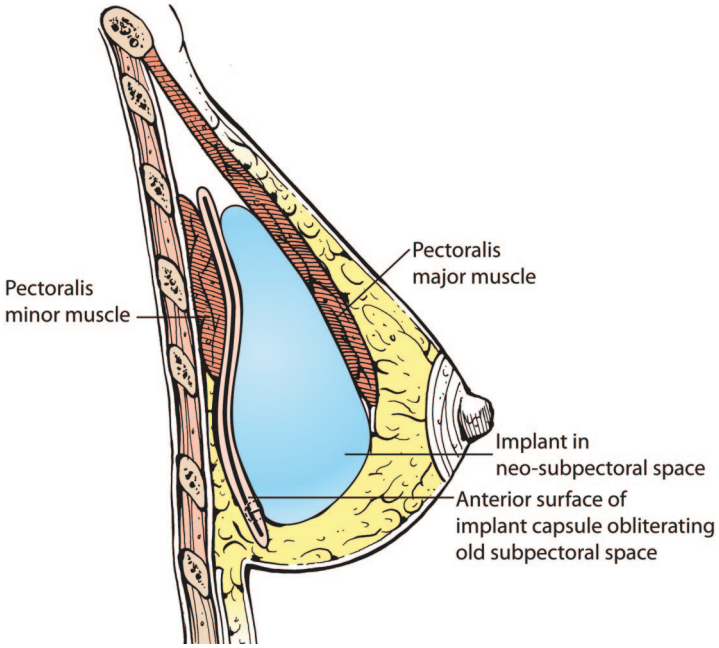

Fig. 3. The implant is shown in the neosubpectoral space on top of the obliterated old implant space.

successfully corrected without any recurrence to date. One patient experienced a hematoma; it occurred in the neosubpectoral space on postoperative day 11 requiring evacuation. One patient developed a seroma that required office aspiration. Underlying inferior malposition that was left uncorrected required revision in one patient. Fourteen patients had their implant size reduced, eight patients had larger implants placed, and one patient received the same size implant. A neosubpectoral dissection was technically possible in all patients who presented with symmastia in this study. Representative cases are shown in Figures 5 through 7.

DISCUSSION

The neosubpectoral technique for the correction of symmastia is a new method that may offer a more efficient and effective one-stage solution. It is an appealing concept that allows for a site change while maintaining the subpectoral position. Although capsulorrhaphy has been successfully used, it is a technically more challenging procedure and more difficult to judge intraoperatively than the neosubpectoral approach. With capsulorrhaphy, the implant also acts as a wedge to oppose the repair and open the old space. Symmastia correction using capsulorrhaphy alone completely relies on the strength of the sutures and the expectation that the repaired capsule itself will overcome the constant tension placed by the implant. In addition, the multiple rows of capsulorrhaphy sutures may cause significant discomfort to the patient.

There have also been recurrences with the capsulorrhaphy technique, as demonstrated in the first case reported here. The patient in Figure 5 presented with symmastia after undergoing breast augmentation at an outside institution. Despite one prior capsulorrhaphy attempt by the senior author, the symmastia, although improved, remained undercorrected. This problem was successfully treated using the neosubpectoral technique with a stable result 15 months postoperatively.

Adjustable implants, advocated by Becker et al., have been utilized to address this dilemma in the early healing phase.[2] The implant is only partially filled at the time of the symmastia repair to allow for healing under minimal tension. The implant is then filled to the target volume at a later date. In Becker et al.'s study, five patients were successfully treated using adjustable implants. Adjustable implants, however, come with certain complexities, including a remote valve and questions regarding the timing of implant filling so as to protect the repair on the one hand but maintain the desired periprosthetic space on the other hand. Nonetheless, an adjustable implant is compatible with the neosubpectoral technique.

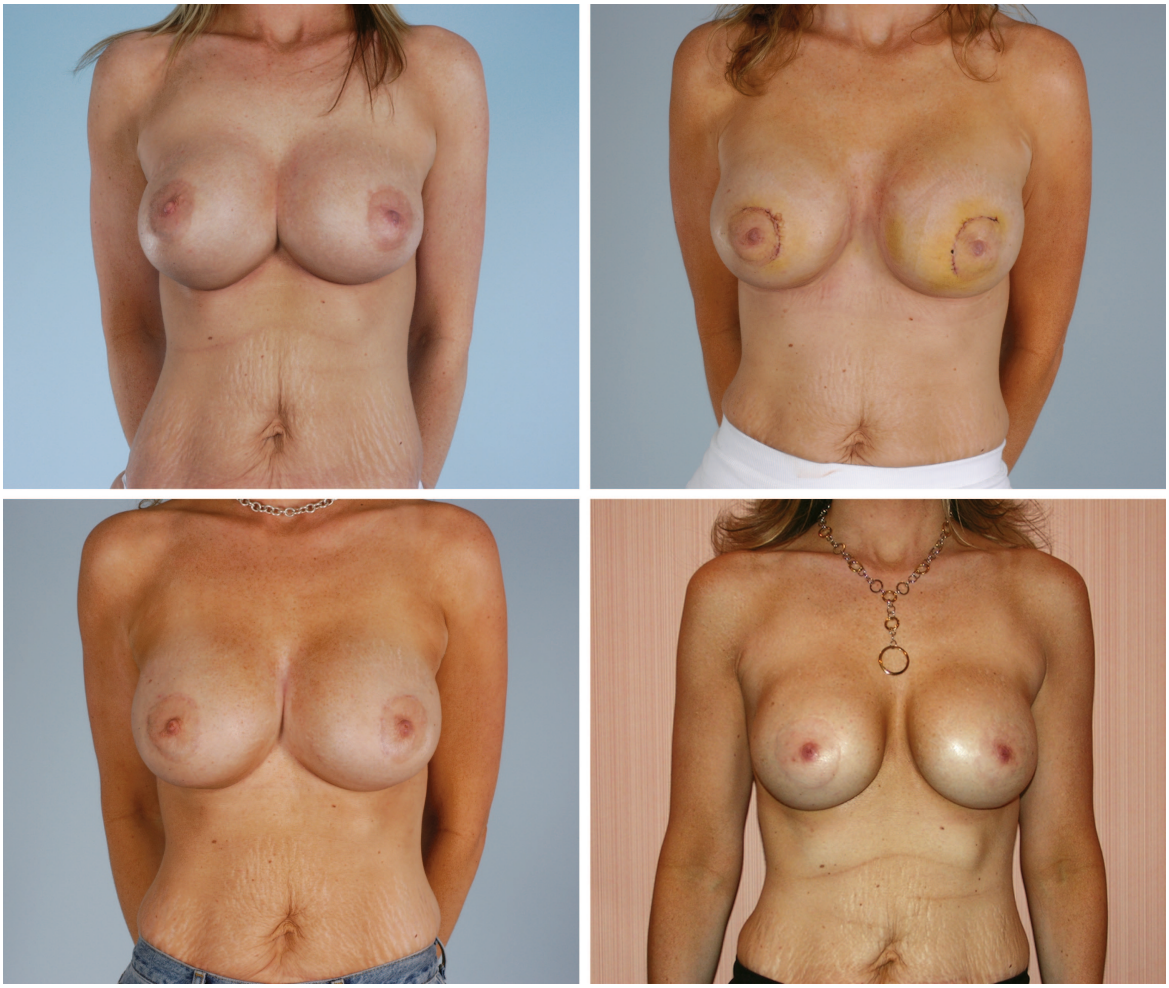

Fig. 4. After undergoing breast augmentation at an outside institution, this patient presented with symmastia (*above, left*). Despite one attempt at capsulorrhaphy, the symmastia remained undercorrected. (*above, right*; *below, left*). The implants were moved further laterally using the neosubpectoral technique with a stable result 15 months postoperatively (*below, right*). The original implants were 550-cc saline implants and were changed to 450-cc round smooth saline implants filled to 530 cc.

Acellular dermal matrix materials have also been used to treat symmastia. In an article by Baxter,[3] two patients were treated using AlloDerm, and one of them had a recurrence of the symmastia. Similarly, AlloDerm, Strattice, Surgimend, and other acellular dermal matrix materials are compatible with this technique and could be used to bolster the repair in the old space or to support the new pocket.[3,11]

The technique presented in this study is fundamentally different from capsulorrhaphy in that it is not a repair of an aberrant pocket but rather the creation of an entirely new space. Creating a new space is technically less difficult and more precise than attempting to work backward and reduce an already distorted space. Unlike the loose areolar plane dissection in a primary breast augmentation, the neosubpectoral dissection is carried out through dense adhesions between the capsule and the pectoralis muscle. These adhesions at the margins of the neosubpectoral space account for the stability and precision of this new pocket. Thus, the symmastia correction does not rely specifically upon the strength of the suture or the quality of the capsule to which it is anchored.[15] In addition, in this series, eight patients had their implant size increased after symmastia correction. This is a viable option in the carefully selected patient because the implant is in a new space. Placing a larger implant in the old space with a capsulorrhaphy repair would place greater tension on the suture line and might increase the likelihood of recurrence.

Table 1. Summary of Symmastia Patients*

Patient	Age	Original Implant	New Implant	Complications	Follow-Up (mo)
1	22	335 saline	300 saline	None	12
2	31	550 saline	530 saline	None	15
3	28	390 saline	425 silicone	None	10
4	21	325 saline	390 saline	None	18
5	42	550 silicone	270 saline	Hematoma	10
6	32	350 silicone	400 silicone	None	24
7	24	350 saline	375 silicone	None	15
8	30	339 silicone	450 silicone	None	36
9	43	360 saline	500 silicone	None	16
10	45	350 silicone	450 silicone	None	19
11	36	480 saline	360 silicone	None	23
12	38	420 silicone	300 silicone	None	21
13	40	500 saline	500 silicone	None	17
14	31	350 saline	397 silicone	None	13
15	28	450 saline	300 silicone	None	11
16	48	300 saline	240 silicone	None	10
17	39	300 saline	265 silicone	None	10
18	32	550 silicone	500 silicone	None	60
19	42	325 saline	275 silicone	None	54
20	43	400 silicone	325 silicone	None	39
21	28	375 saline	350 silicone	None	36
22	36	575 saline	500 silicone	None	26
23	42	375 silicone	325 silicone	Seroma	16

*There were no recurrences.

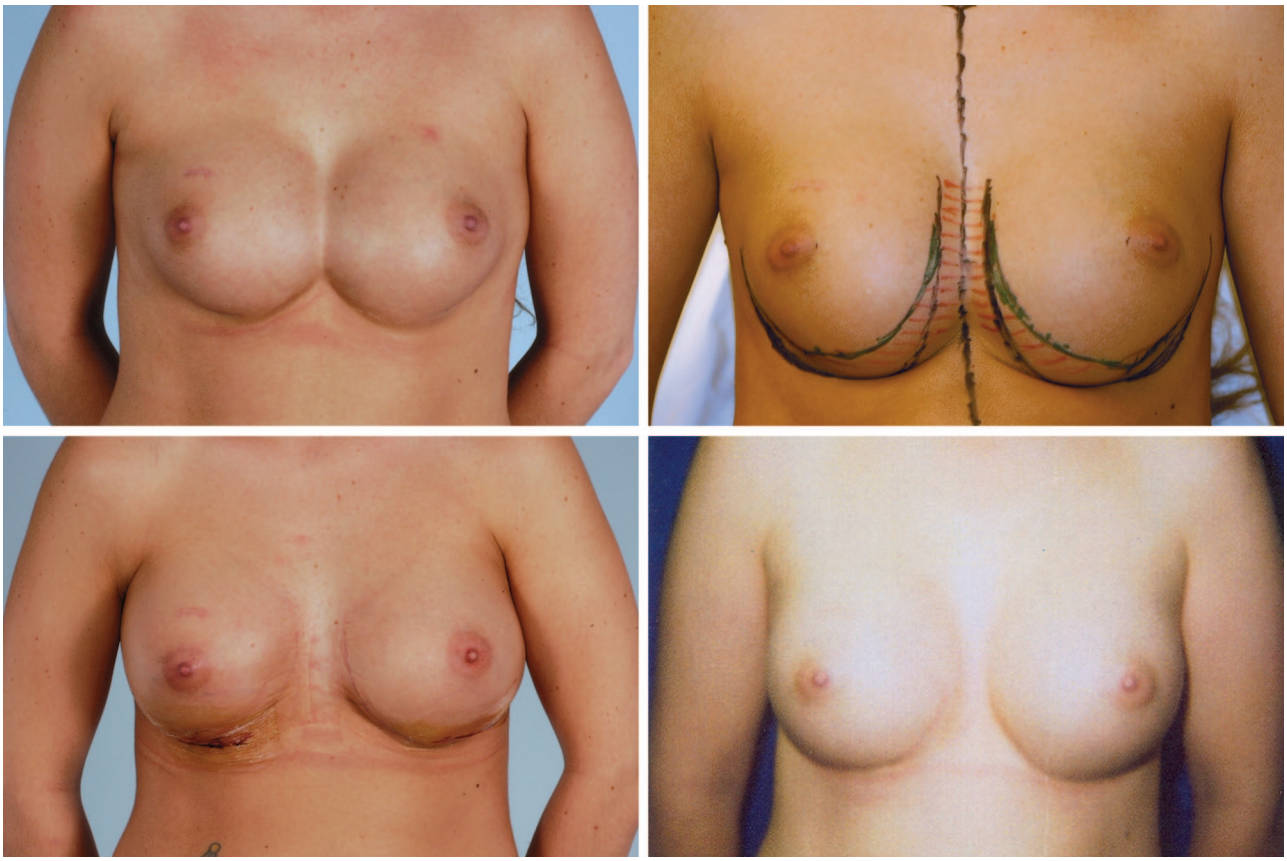

Fig. 5. This patient is shown preoperatively and at 15 months postoperatively after symmastia correction. The breast augmentation was performed at an outside institution (*above*). The original implant was a smooth round 330-cc saline implant filled to 390 cc and was changed to a 425-cc silicone gel implant (*below*).

Fig. 6. This patient presented with symmastia after undergoing breast augmentation at an outside institution (*left*). Successful correction of symmastia shown at 9 months postoperatively (*right*). The original 325-cc saline implants were changed to smooth round 330-cc saline implants filled to 390 cc.

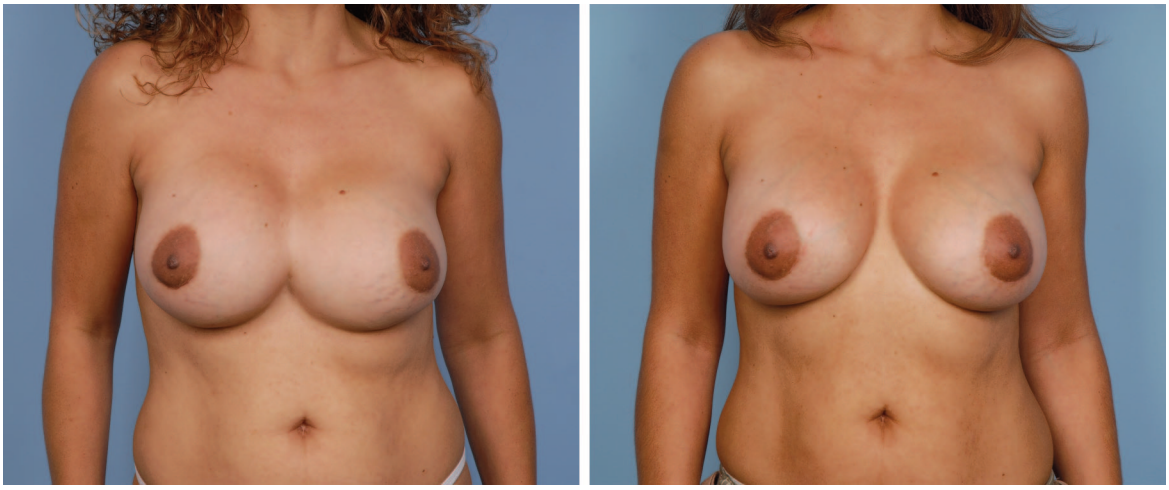

Fig. 7. This 36-year-old patient presented with symmastia after undergoing breast augmentation at an outside institution (*left*). Successful correction of symmastia shown at 1 year postoperatively (*right*). The original implant was a 480-cc silicone implant and was changed to a 360-cc silicone gel implant.

The neosubpectoral technique also does not require overcorrection, nor does it expect the result to improve over time as the capsule stretches and implant settles. In contrast to suture techniques, the early result can look excellent, even on the table. It is our impression, though it was not specifically studied, that these patients experienced less pain, probably as a result of not having so many sutures placed between the capsule and the chest wall, as would be required with a suture-only technique. Although it is impossible to make a direct comparison because each symmastia case is so different, it is our impression that because there is less trial and error with this technique, operative times with the neosubpectoral approach are shorter than with other techniques.

Because there are so few cases of symmastia reported in the literature, it is difficult to make conclusions as to the superiority of one technique over another. The neosubpectoral technique is presented here as another option for solving a difficult problem. Not only has it been successful in our hands where other techniques have failed, but it is substantially easier to execute than other procedures. It is technically straightforward and offers a useful means of correcting many forms of implant malposition in breast augmentation and reconstruction in addition to symmastia.

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