Circumareolar Mastopexy With SERI® Surgical Scaffold Reinforcement

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M. Mark Mofid, MD, FACS
Jahan Tajran

Short-scar, periareolar mastopexy techniques with and without the assistance of nonabsorbable meshes and permanent sutures have been variously described for nearly the last 40 years since the first introduction of this procedure by Bartels et al in 1976.[1-7] In Gruber and Jones' study[8] of 13 patients in 1980, every single patient developed areolar dilatation over the follow-up period of up to 3 years. These techniques have been criticized for areolar enlargement, flattening of the breast mound, widening of scars, and high rates of need for revision of up to 50%.[9] Of all of the techniques available to surgeons, including inverted-T, vertical scar, and combination techniques, the periareolar mastopexy is reported to have the lowest rate of surgeon satisfaction, representing more than 60% of all mastopexy liability claims.[10]

Despite the previously mentioned problems with the periareolar mastopexy, it continues to represent nearly a third of all mastopexy procedures performed in the United States.[10] There is no question that exceeding the technical limitations of this procedure for nipple-areolar complex repositioning, reduction of areolar size, and breast mound

modifications places patients at high risk for poor outcomes **(Fig. 1)**. The contribution of mesh to this procedure, as first described by Góes and colleagues[3,11] using mixed polyester or polypropylene and polyglactin, has been generally shunned in the United States because of concerns about infection, abscess formation, poor tissue integration, interference with breast tumor surveillance, and medical/legal risks. The contribution of acellular dermal matrix, given the inherent nature of allograft and xenograft skin to stretch, is unlikely to provide the necessary long-term tensile strength to prevent areolar dilation or to maintain glandular support.[12]

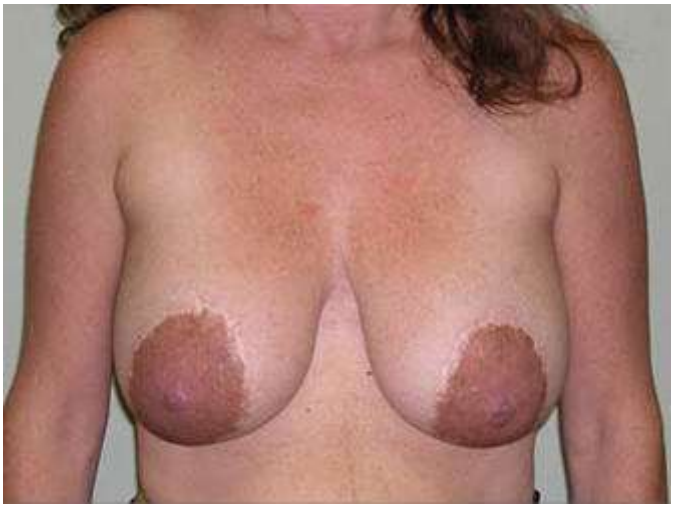


Fig. 1 Exceeding the technical limitations of the periareolar mastopexy places patients at risk for poor outcomes, as shown in this patient.

By far the most common technical adjunct to commonly performed circumareolar mastopexy techniques performed in the United States today incorporate permanent monofilament or polyfilament sutures using a “round block” technique, as popularized by Benelli[13] in 1990. Despite the limited yet enthusiastic reports of long-term success with this technique, most experienced plastic surgeons have recognized for years the inherent limitations to using permanent sutures to prevent skin from stretching. Laden with elastin fibers, skin is designed to stretch to minimize skin tension equally over a large surface area. The use of

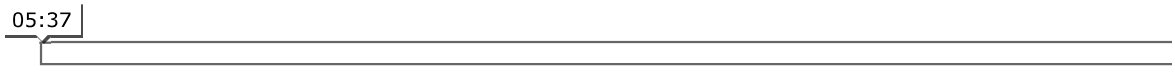
permanent sutures to prevent areolar dilatation over time is a conceptually improbable effort. Revision and rerevision of the dilated areola that has resulted from a round block circumareolar procedure with further cerclage sutures is akin to the myth of Sisyphus, rolling a boulder uphill only to watch it roll back down again. Consequently, revision periareolar mastopexy following areolar dilatation will require more than permanent purse-string sutures; something must be done to minimize skin tension of the periareolar skin envelope and to reinforce the repair. In many cases, primary circumareolar mastopexy may benefit from the contribution of an absorbable mesh to maintain the size of the areola after circumferential periareolar mastopexy.

SERI Surgical Scaffold (Allergan, Irvine, CA) is a silk-derived FDA 510 (K)–approved transitory bioprotein scaffold for soft tissue support and repair and for reinforcing deficiencies where weakness or voids require the addition of material to obtain the desired surgical outcome. Interstices within the mesh facilitate a rapid generation of native, neovascularized tissue in and around the scaffold, which is completely resorbed over time through a self-limited and mild foreign body response, leaving behind tissue that is two to three times as strong as fascia.[14] It is hypothesized that the use of SERI Surgical Scaffold in lieu of permanent sutures will demonstrate a reduction in areolar size enlargement up to 12 months after surgery.

Methods

Institutional review board approval (Western IRB, Puyallup, WA) was obtained for the prospective and retrospective study of areolar diameter changes over 12 months using SERI Surgical Scaffold under periareolar mastopexy skin flaps to minimize areolar tension in women undergoing primary and revision circumareolar mastopexy (ClinicalTrials.gov Identifier: NCT02293798). Between October 2013 and May 2014, eight

women underwent SERI Surgical Scaffold reinforcement under mastopexy skin flaps and were followed for a period of at least 6 months (range 6 to 12 months) until November 2014 for inclusion within the study. As demonstrated in **Video 1**, the procedures were performed using a round disc of SERI Surgical Scaffold with a small hole cut through the center to allow passage of the native nipple-areola complex. 2-0 and 3-0 polydiaxone sutures and barbed sutures were used to stabilize the mesh to the breast mound and the secure the mastopexy skin flaps to the scaffold and breast mound. All areolae were sized to either 38 mm or 42 mm using standard cookie cutters and imaged using both 2D and Vectra analysis (Canfield Scientific, Inc., Fairfield, NJ) every 2 months. Complications were tabulated, including scaffold palpability, infection, seroma, prolonged pleating of the areolar skin edges, and areolar dilation.



Results

There were no cases of infection, abscess, seroma, or mesh exposure in any patients over the duration of the study. The scaffold was palpable in the subcutaneous plane in all patients at 4 months and in 5 of 8 (62.5%) patients at 6 months. Areolar dilation of up to 6 mm (representing 16% of the original areolar size) was observed over a period of 6 to 12 months, as tabulated in **Table 1**. Virtually all areolae dilated, although considerably less than anticipated using standard permanent suture techniques.

TABLE 1 ***Areolar Diameter With SERI Surgical Scaffold Technique***

Patient Number	Preoperative Areolar Diameters (mm)	Postoperative Areolar Diameters (mm)	Areolar Diameter Set at Time of Surgery (mm)	Follow-up (months)
1	Right: 67 Left: 58	Right: 44 Left: 42	38	12
2	Right: 71 Left: 69	Right: 48 Left: 44	42	9
3	Right: 58 Left: 62	Right: 42 Left: 42	38	9
4	Right: 56 Left: 59	Right: 43 Left: 42	38	8
5	Right: 54 Left: 56	Right: 40 Left: 41	38	8
6	Right: 68 Left: 75	Right: 44 Left: 48	42	7

7	Right: 58 Left: 56	Right: 41 Left: 40	37	7
8	Right: 63 Left: 57	Right: 45 Left: 44	42	6

Patient Examples

This 34-year-old woman is shown before **(Fig. 2, A)** and 10 months after **(Fig. 2, B)** bilateral revision with SERI Surgical Scaffold–reinforced periareolar mastopexy, bilateral breast silicone implant exchange, and left breast inferior pole capsulorrhaphy reinforcement with SERI Surgical Scaffold.

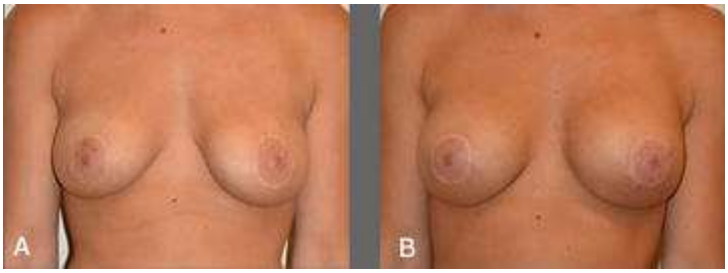


Fig. 2 Preoperative (**A**) and 10 months postoperative (**B**).

This 31-year-old woman is shown before **(Fig. 3, A)** and 7 months after **(Fig. 3, B)** bilateral dual-plane breast augmentation with SERI Surgical Scaffold–reinforced periareolar mastopexy.

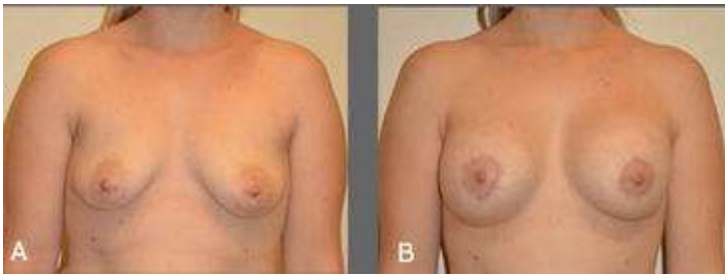


Fig. 3 Preoperative (**A**) and 7 months postoperative (**B**).

This 39-year-old woman is shown before **(Fig. 4, A)** and 6 months after **(Fig. 4, B)** bilateral revision augmentation with silicone implant

exchange, lateral capsulorrhaphy, and periareolar mastopexy with SERI Surgical Scaffold.

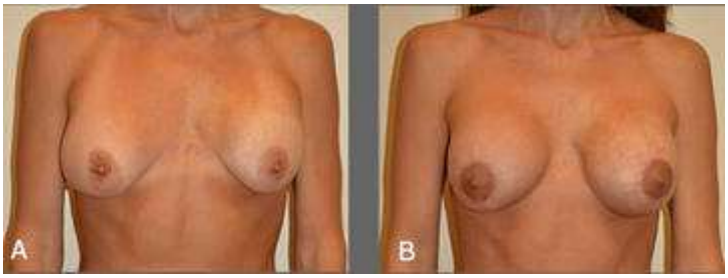


Fig. 4 Preoperative (**A**) and 6 months postoperative (**B**).

Conclusion

Periareolar mastopexy is a procedure fraught with high rates of surgeon and patient dissatisfaction and prone to occurrence and recurrence of areolar dilatation. Permanent suture and permanent mesh techniques to prevent areolar enlargement have been described in the last three decades, although permanent suture techniques are known to result in infection and extrusion at the site of the buried knot and poor outcome from pronounced areolar dilatation. Permanent mesh techniques using polypropylene and polyester have not been widely accepted because of concerns about poor tissue integration, infection, foreign body response, interference with breast tumor surveillance, and medical/legal risks. We describe a novel technique for the placement of SERI Surgical Scaffold, a transitory mesh that is completely resorbed over time (1 to 2 years), leaving behind a lattice of tissue that is two to three times as strong as fascia. We hope that the use of SERI Surgical Scaffold will provide the benefits of permanent mesh techniques without the concomitant risks associated with placing permanent materials in the breast, with unreliable tissue integration.

Disclosure: Dr. Mofid is a consultant and speaker for Allergan SERI Surgical Scaffold. The study presented in this article was supported by Allergan.

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