



# Surgical Delay Facilitates Pedicled Nipple-sparing Mastectomy and Reconstruction in the Ptotic Patient

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**Summary:** Significant ptosis is a relative contraindication for nipple-sparing mastectomy and reconstruction. Repositioning of the nipple on the reconstructed breast is best accomplished using a pedicled approach that is risky in the immediate setting. We utilized a surgical delay before reconstruction that allowed for repositioning of the nipple-areola complex on an inferior pedicle. This also allows for resizing of the nipple-areola complex, reliable complete coverage of the prosthesis with viable tissue, and creation of an ideal skin envelope in patients with skin excess. Here, we present the first description of a surgical delay to facilitate pedicled nipple-sparing mastectomy and reconstruction. (*Plast Reconstr Surg Glob Open* 2016;4:e735; doi: 10.1097/GOX.0000000000000743; Published online 13 June 2016.)

The nipple-sparing approach has well-documented aesthetic and psychosocial benefits for women undergoing mastectomy and reconstruction.<sup>1,2</sup> Although oncological safety is the foremost consideration, both the cancer and the reconstructive surgeon must also decide if anatomical considerations preclude safe nipple preservation. Patients with significant ptosis are at significant risk for nipple compromise and necrosis secondary to vascular insufficiency.<sup>3</sup> In addition, significant ptosis results in unpredictable final positioning of the nipple on the reconstructed mound. These patients often have excess skin that requires surgical revision. They are also at higher risk for implant-related complications and likely benefit from better coverage of the prosthetic.<sup>4</sup> To address these issues, we used a surgical delay in improving the vascularity of the nipple, allowing for safe and reliable

pedicled repositioning of the NAC at the time of reconstruction on an inferiorly based mastectomy flap. The excess skin is also retailed during the reconstruction, deepithelialized, and used to cover the prosthetic.

## SURGICAL TECHNIQUE

Four patients underwent 3 surgical procedures with ptosis precluding safe preservation of their NAC. Three patients were undergoing prophylactic surgery and 1 patient had completed neoadjuvant chemotherapy. The initial surgery composed of the surgical delay procedure. This involved an incision just above the areola with complete undermining of the NAC off the breast, raising a mastectomy flap down to the inframammary fold (IMF; Fig. 1). A representative patient is demonstrated in Figure 2. One patient underwent surgical delay during mediport placement before beginning preoperative chemotherapy. Reconstruction of the tissue expander with complete coverage of the prosthetic by the deepithelialized inferior mastectomy flap and pectoralis was performed 3 weeks later. The NAC was resized and transposed into its ideal position supported on the inferior mastectomy flap similar to an inferior pedicle reduction mammoplasty. The third operation involved exchange of the tissue expanders for definitive prosthetics (Fig. 3). We have used this

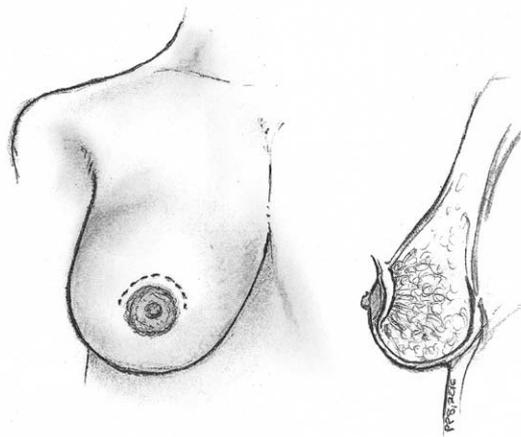
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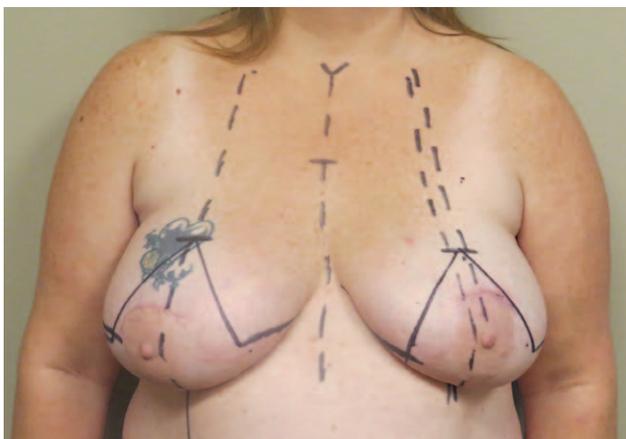
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**Fig. 1.** Schematic drawing of the supra-areolar surgical delay procedure.

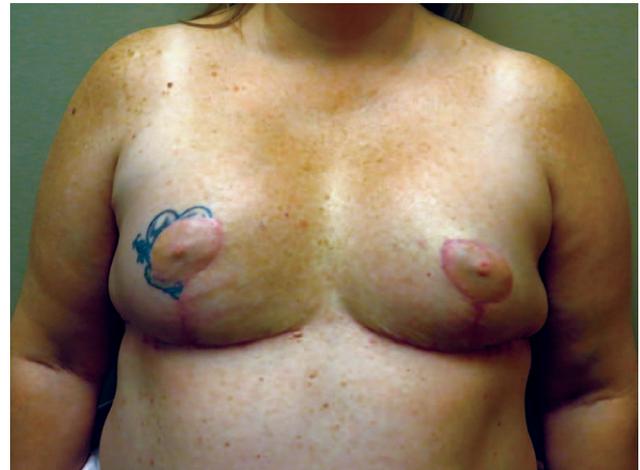


**Fig. 2.** Representative 47-year-old female with strong family history of breast cancer status post supra-areolar delay procedure. She had significant ptosis with a sternal notch to nipple distance of 31 cm and was a high-risk candidate for nipple-sparing mastectomy.

technique in 4 patients (8 nipples) with 1 nipple undergoing partial compromise, which ultimately made a full recovery (Table 1).

## DISCUSSION

Ptosis is a known relative contraindication for nipple-sparing mastectomy. The primary complication that must be prevented is nipple necrosis secondary to vascular insufficiency. The concept of a surgical delay has been around for hundreds of years to improve tissue survival. Multiple studies have documented the utility of a surgical delay to improve nipple survival after nipple-sparing mastectomy in



**Fig. 3.** Final result 1 month after exchange of her tissue expanders for definitive implants.

nonideal patients.<sup>5-7</sup> The delay presumably facilitates the dilation of existing vessels and/or growth of new blood vessels into the area of compromise that improves the likelihood that the area in question will survive further future insults. The delay described here involves a supra-areolar incision with undermining down to the IMF in the mastectomy plane. Others have described total nipple-sparing mastectomy as the initial delay procedure.<sup>8</sup> We have preliminary results that suggest that the most effective delay may involve a nipple-sparing mastectomy and immediate design of the inferior pedicle at the initial surgery putting immediate maximal stress on the nipple; this delays both the nipple and the Wise patterns flaps and obviates any concerns regarding immediate definitive cancer treatment (unpublished data, Jean-Claude D. Schwartz, MD, PhD, and Piotr P. Skowronski, MD, 2016). We used the supra-areolar delay in our patients and described the first such procedure to facilitate a pedicled repositioning of the NAC at the time of reconstruction. The use of a pedicle allows for significant flexibility in correcting nipple position over the greatest distances<sup>9</sup> and will likely allow us to extend the nipple-sparing technique to patients with the most significant ptosis.

We have performed this delay in 4 patients (8 nipples) with 1 nipple requiring 3 weeks of conservative wound care before initiating tissue expansion. The sternal notch to nipple distances ranged from 28 to 35 cm with nipple to IMF distances of 11 to 15 cm (Table 1). We have not identified maximum anatomical parameters as our lone complication occurred in a patient with a sternal notch to nipple distance of 27 cm and nipple to IMF distance of 11 cm.

Ptotic patients also have excess skin that must be addressed such that the skin envelope and prosthetic

**Table 1. Patient Characteristics, Anatomical Variables, and Complications after Supra-areolar Delay**

Patient Age	Sternal Notch to Nipple (cm)	Nipple to IMF (cm)	Complications	Cancer
47	31	13	No	No
55	27	11	Yes (minor)	No
42	35	15	No	No
52	28	11	No	Yes

are appropriately matched. These larger patients are also at higher risk for implant-related complications, and total prosthetic coverage with viable tissue is important. In addition to providing improved blood flow and allowing for transposition of the nipple, our technique allows us to immediately tailor the skin envelope and cover the prosthetic with viable autologous tissue. This allows for a precise initial match between the reduced skin envelope and the pectoralis and the temporary prosthetic and allows them to be expanded in unison. In a standard nipple-sparing mastectomy, one relies on a large empty skin envelope to adapt to the serially expanded prosthetic/pectoralis that may require revision. In addition, our technique facilitates precise control of the final nipple position and allows us to place it in the appropriate position in relation to the expander. In standard nipple-sparing reconstructions, the nipple is initially free to move in relation to the implant and can result in a variable and a nonideal final position, which can be very difficult to correct. Using our technique, the nipple is fixed into ideal position over the implant and is not free to migrate as it is locked into position by the overlying skin flaps and is probably immediately adherent to the underlying muscle in its set position. This creation of a pedicle and the locking of the nipple position by the overlying flaps likely puts significant additional vascular stress on the nipple, which is alleviated by the delay. We believe the total nipple-sparing mastectomy through Wise incisions with immediate creation of the inferior pedicle may be the most effective surgical delay to achieve the goals mentioned above.

### CONCLUSION

We present here the first description of a surgical delay to facilitate a pedicled nipple-sparing mastectomy and reconstruction. This technique also allows for better tailoring of the skin envelope, resizing

of the NAC, more reliable nipple positioning, and better coverage of the prosthetic.

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### PATIENT CONSENT

*The patient provided written consent for the use of her image.*

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