

The Hybrid Delay: A New Approach for Nipple-sparing Mastectomy in Macromastia

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Background: Patients with macromastia or breast ptosis can undergo a nipple-sparing mastectomy if their mastectomy flaps are delayed or if they are subjected to a breast reduction procedure and later undergo mastectomy.

Methods: In this report, we describe a new technique to combine these two approaches by initially performing a subtotal mastectomy through a Wise keyhole incision in combination with the retention of the nipple-areolar complex on an inferior pedicle flap. A tissue expander and an allograft are routinely placed during this first stage. At a second stage, the inferior pedicle tissue is removed and submitted for pathological examination at the same time as the tissue expander is removed and replaced with a silicone or saline implant or autologous flap.

Results: The Hybrid Delay procedure has been performed on three women (six breasts). Nipples were preserved in all patients. Final pathology did not reveal any cancer in the inferior pedicle preserved during the first procedure but removed and tested following the second.

Conclusion: By allowing the nipple to be safely transferred using the inferior pedicle flap, and then removing the inferior pedicle tissue during the subsequent reconstructive stage, women with macromastia and breast ptosis can be offered nipple-sparing mastectomy in the usual 2-stage reconstructive timing. (*Plast Reconstr Surg Glob Open* 2020;8:e2940; doi: [10.1097/GOX.0000000000002940](https://doi.org/10.1097/GOX.0000000000002940); Published online 23 June 2020.)

INTRODUCTION

In his 1962 report, Bromley Freeman¹ described his experience with an inframammary crease incision for nipple-sparing mastectomy (NSM) and immediate placement of silicone implants, and mentioned that when mastectomy skin appeared questionable, reconstruction with an implant was delayed. Thus, the concept of using the improvement of blood supply observed during wound healing (the delay phenomenon) to the patient's benefit has been used in the setting of NSM since the first modern reports. Delaying or "staging" mastectomy skin flaps before mastectomy has been recommended in high-risk patients and in patients for whom definitive subareolar pathology^{2,3} is required before NSM (ie, in patients who might be denied NSM because of concerns about subareolar margin).

After initial experience with NSM, Spear et al⁴ concluded in their "Georgetown Algorithm" that NSM should not be offered to patients with "excessively large or ptotic breasts." A critique⁵ of Spear's early proposed algorithm contested this conclusion by reporting on a patient with large and ptotic breasts who safely underwent NSM following a pre-mastectomy delay procedure.

Spear revisited his initial conclusion on the rejection of NSM for patients with large or ptotic breasts and proposed a novel solution: patients with large or ptotic breasts could undergo a mastopexy or reduction mammoplasty⁶ at least 4 weeks before mastectomy. This approach had the benefit of staging the procedure (using the delay phenomenon to increase the chance of nipple survival following mastectomy) and the further advantage of reducing the skin envelope and ensuring optimal nipple positioning following mastectomy, but it had the disadvantage of postponing a patient's cancer treatment. Recently, this approach has been refined and updated⁷ so that an oncologic reduction mammoplasty/mastopexy is performed as a first stage and NSM is performed several months later as a second stage.

We propose a new approach that offers excellent post-mastectomy nipple positioning without the disadvantage of a special delay procedure or a formal reduction mammoplasty procedure followed by NSM.

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METHOD

Patients are informed that the hybrid delay procedure is the combination of an inferior pedicle flap (routinely used in a Wise-pattern reduction mammoplasty) and a subtotal mastectomy (extended lumpectomy) and that both procedures are routinely used in oncoplastic surgery. Patients are excluded from this procedure if they had preoperative imaging, which suggested the involvement of the tissues of the inferior pedicle. Patients are marked in the standing position (Fig. 1), and the markings are made as for a standard Wise-pattern inferior pedicle reduction mammoplasty procedure. Sentinel node mapping and biopsy are performed as per the surgical routine. An 8 cm inferior pedicle is dissected as it would be in a reduction procedure, with great care given to maintain as many vascular connections as possible to the underlying chest wall. The remainder of the breast gland is removed at the usual level of oncologic dissection. A perforated or meshed allograft is used to line the mastectomy flaps above the mostly deflated tissue expander, which is positioned superior to the inferior pedicle. No effort is made to place the expander under the pectoralis muscle as this would potentially disrupt the blood supply to the inferior pedicle. The medial and lateral skin flaps are closed over the de-epithelialized inferior pedicle (Fig. 2).

The patient is returned to the operating room following other treatments or after 3 months if no other cancer treatments are planned. At the time of the tissue expander removal, the lateral limb of the Wise-pattern incision is used (Fig. 3). The tissue expander is removed, and the residual inferior pedicle is then carefully dissected from the overlying tissues in the plane of oncologic mastectomy and submitted for pathologic examination. Perforated or meshed allograft may be placed between the newly placed implant and the overlying mastectomy skin flap (which was previously attached to the inferior pedicle). The final skin envelope (Fig. 4) contains no inferior pedicle and may be filled with an implant or autologous tissue.



Fig. 1. A 51-year-old woman presented with macromastia and a large resected left ductal carcinoma in situ. She sought nipple-sparing mastectomies despite the large size of her breasts and a higher risk of nipple necrosis.



Fig. 2. After the first procedure, the patient was left with de-epithelialized inferior pedicles supporting the nipple-areolar complexes. The remainder of the breast was removed; allograft and tissue expanders were placed above the inferior pedicle.

RESULTS

The hybrid delay procedure has been performed on 6 breasts (3 women). None of the patients were active smokers. One had a history of radiation therapy involving 1 breast 2 years earlier. The distance from the suprasternal notch to the nipple ranged from 26 to 36 cm (mean 29 cm). Distance from the inframammary crease to the



Fig. 3. At the second operation, the inferior pedicle was removed, and breast implants were placed.



Fig. 4. The final result demonstrates full nipple and skin flap survival following 2 operations.

nipple ranged from 12 to 18 cm (mean 14 cm). The mean weight of the mastectomy specimen plus the inferior pedicle (collected during the second procedure) was 624 g (range, 423–899 g). The mean weight of the resected inferior pedicle was 115 g (range, 59–147 g).

No nipple necrosis was observed following any of the procedures. Surgical biopsies performed during the second stage of the procedure were all free of breast cancer. Two of the 3 women developed an area of delayed healing in the lateral flaps of the Wise pattern, near the inverted T overlying the inferior pedicles following the first procedure. Both areas healed without operative intervention.

DISCUSSION

Reports of experience with a pre-mastectomy delay continue to grow. Martinovic et al⁸ reported performing a delay procedure in 26 high-risk patients with local anesthesia and sedation. Martinez et al⁹ placed a silicone sheet under the subcutaneously delayed skin and demonstrated improved nipple survival against a control group that was not delayed. Zenn¹⁰ considers the NSM itself to be the delay procedure (as did Bromley Freeman) and reports his experience with initiating reconstruction 2 weeks following mastectomy. He observes (again agreeing with Freeman) that the immediate placement of an implant after a suitable delay results in consistent nipple-areolar viability. Schwartz and Skowronski¹¹ also choose not to place an implant at the time of mastectomy. Using a delayed skin envelope, they de-epithelialized an inferior pedicle 1 month following NSM and placed a tissue expander. Final implant reconstruction was performed during a third procedure.

Patients with tumors near the inferior pedicle are not candidates for this approach, although such nipples may be safely transferred using a medial pedicle. The hybrid delay procedure could be performed on any viable de-epithelialized pedicle.

The hybrid delay preserves the aesthetic advantage offered by subjecting the mastectomy patient to a breast reduction or mastopexy procedure but consolidates this step with the mastectomy and allows the addition of a tissue expander. Thus, nipple sparing can be accomplished in this high-risk group in 2 procedures without compromising oncologic safety, as all patients are left with complete oncologic mastectomies.

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