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Breast

Pedicled Descending Branch Latissimus Dorsi Mini-flap for Repairing Partial Mastectomy Defect: A New Technique

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Summary: Volume loss is 1 of the major factors influencing cosmetic outcomes of breast after partial mastectomy (PM), especially for smaller breasts, and therefore, volume replacement is critical for optimizing the final aesthetic outcome. We present a novel technique of raising a pedicled descending branch latissimus dorsi (LD) mini-flap for reconstruction of PM defects via an axillary incision. After PM, the LD mini-flap is harvested through the existing axillary incision of the axillary dissection or the sentinel lymph node biopsy. The descending branches of thoracodorsal vessels and nerve are carefully identified and isolated. The transverse branches are protected to maintain muscle innervation and function. The LD muscle is then undermined posteriorly and inferiorly to create a submuscular pocket and a subcutaneous pocket between LD muscle and superficial fascia. Once the submuscular plane is created, the muscle is divided along the muscle fibers from the deep surface including a layer of fat above the muscle. Finally, the LD mini-flap is transferred to the breast defect. Given the limited length and mobility of the LD mini-flap, this approach is best utilized for lateral breast defects. However, for medial defects, the lateral breast tissue is rearranged to reconstruct the medial breast defect, and an LD mini-flap is then used to reconstruct the lateral breast donor site. This technique can therefore be employed to reconstruct all quadrants of the breast and can provide aesthetic outcomes without scars on the back, with minimal dysfunction of LD muscle. *(Plast Reconstr Surg Glob Open 2018;6:e1692; doi: 10.1097/GOX.0000000000001692; Published online 13 March 2018.)*

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Received for publication October 13, 2017; accepted January 12, 2018.

Supported by the National Natural Science Foundation of China (Project No: 81772835 and 81630079), the Science and Technology Project of Guangdong Province (Project No: 2017A020215032), the Science and Technology Project of Guangzhou (Project No: 201707010086), the Medical Scientific Foundation of Guangdong Province (Project No: 20160302).

Neither the article nor any part of its essential substance, figures, has been or will be published before appearing in PRS.

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DOI: 10.1097/GOX.0000000000001692

INTRODUCTION

Volume loss is 1 of the primary reasons for contour deformities after partial mastectomy (PM).[1,2] When PM defects encompass more than 20% of the breast, volume supplement is often necessary for cosmetic outcomes, and several oncoplastic techniques have been introduced to improve aesthetics, including latissimus dorsi (LD) myocutaneous flap, thracodorsal artery perforator flap, and implant.[3–6]

The LD flap has been widely used in breast reconstruction. However, harvesting the entire LD musculocutaneous flap can lead to postoperative functional defects and poor aesthetics of donor site.[7] Recently, the pedicled descending branch LD flap technique has been reported for breast reconstruction, maintaining muscle innervation, function, and aesthetics.[8–10] How-

Disclosure: *The authors have no financial interest to declare in relation to the content of this article. The Article Processing Charge was paid for by the authors.*

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ever, its use for reconstruction of PM defects has never been reported. We developed a novel technique of raising the pedicled descending branch LD mini-flap for PM reconstruction via an axillary incision without a scar on the back, and the procedures are described as follows.

METHODS

Surgical Technique

The patient is positioned by elevating the ipsilateral body to approximately 30° abducting the upper limb by 90°. Outlines of the tumor and excision margins are marked on the skin. A standard S-shaped axillary incision (7–8 cm) was also marked for sentinel node biopsy or axillary node dissection and raising the pedicled descending branch LD mini-flap. The size of mini-flap is designed based on the excision volume. The descending branch pedicle is identified, making sure the length from the bifurcation with the transverse branch to the distal mini-flap is sufficient for transfer (**see video, Supplemental Digital Content 1,** which demonstrates the surgical technique of partial breast reconstruction with pedicled descending branch LD mini-flap. This video is available in the "Related Videos" section of the Full-Text article on PRSGlobalOpen.com or available at ***http://links.lww.com/PRSGO/A685***).

Partial Mastectomy

The design of incisions is determined by the location of the tumor. When the tumor is located in the upper outer quadrant, the PM can be performed through the S-shaped axillary incision. A periareolar incision is utilized for tumors in the lower outer quadrant, and a circumareolar incision is used for medially located tumors. The tumor including margins is then resected, and frozen sections are performed to confirm adequate resection before designing and harvesting the LD mini-flap.

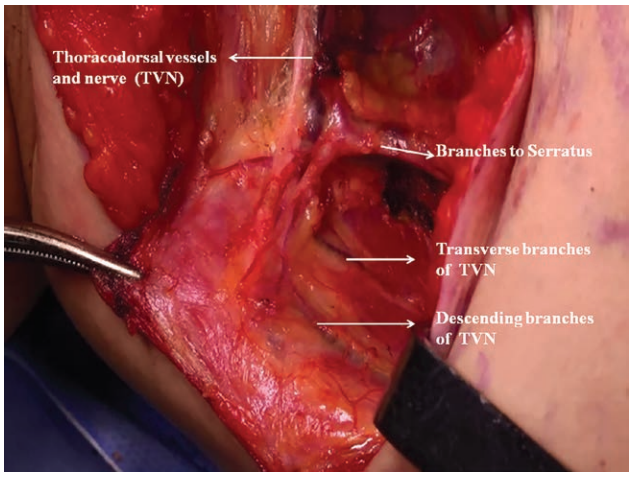
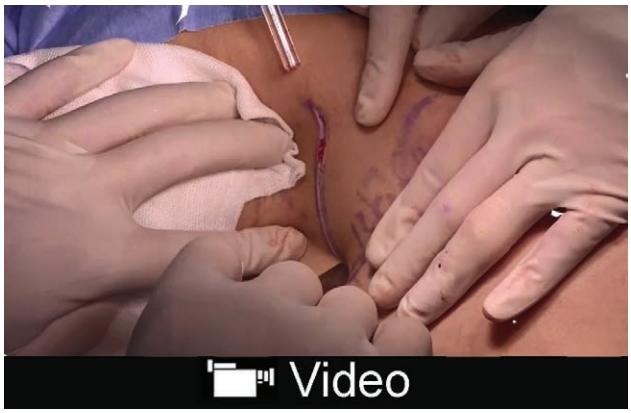


Fig. 1. Identification of TVN, branches to serratus anterior muscle, transverse branches, and descending branches.

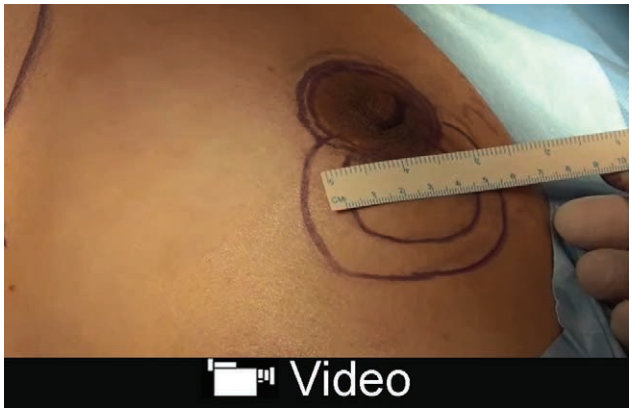
Axillary Surgery and Flap Mobilization

An S-shaped axillary incision is made for access to the axillary nodes. After the axillary surgery, the LD muscle is separated from the serratus anterior muscle through the same axillary incision. The thoracodorsal vessels and nerve (TVN) are identified where they divide into branches supplying the serratus anterior muscle, and the transverse and descending branches (Fig. 1).

Distal to the bifurcation of TVN, the descending branches of TVN are carefully dissected from a distal to proximal direction. Care should be taken to protect the transverse branches to maintain innervation, function, and the favorable appearance of donor site. The LD muscle is then elevated off the chest wall only enough to provide enough volume for the PM defect to minimize any dead space and donor-site morbidity. The muscle is then divided along its fibers including a component of the overlying fat again based on the volume needed. The fat overlying the muscle is harvested in a sub-Scarpa plane, and



Video Graphic 1. See video, Supplemental Digital Content 1, which demonstrates the surgical technique of partial breast reconstruction with pedicled descending branch LD mini-flap. This video is available in the "Related Videos" section of the Full-Text article on PRSGlobalOpen.com or available at ***http://links.lww.com/PRSGO/A685***.



Video Graphic 2. See video, Supplemental Digital Content 2, which displays the operative technique about combining pedicled descending branch LD mini-flap with breast tissue rearrangement. This video is available in the "Related Videos" section of the Full-Text article on PRSGlobalOpen.com or available at ***http://links.lww.com/PRSGO/A686***.

therefore, no additional incision on the back is needed. When sufficient length and volume have been mobilized, the LD mini-flap is divided inferiorly and superiorly and split medially along the muscle fibers. Careful hemostasis is critical for the difficult exposure of surgical field. The LD mini-flap, attached only by its neurovascular bundle, is harvested and transferred to the breast defect.

Local Breast Tissue Rearrangement

Due to the limited pedicle length, the LD mini-flap is ideally suited only for lateral breast defects. However, in the setting of a medial PM defect, our strategy is to fill the medial defect with the lateral breast parenchyma using local breast tissue rearrangement, and then reconstruct the lateral defect with the LD mini-flap.

Through a circumareolar incision, the lateral breast skin is separated from the underlying targeted breast parenchyma. Then the targeted breast parenchyma is separated from the pectoralis major muscle. The lateral breast tissue is mobilized by dividing it from the remaining lateral parenchyma, and the entire breast tissue is moved inward toward the medial defect. Absorbable sutures are performed to reshape the medial contour of the breast. Finally, the lateral defect is repaired by LD mini-flap (**see video, Supplemental Digital Content 2,** which displays the operative technique about combining pedicled descend-

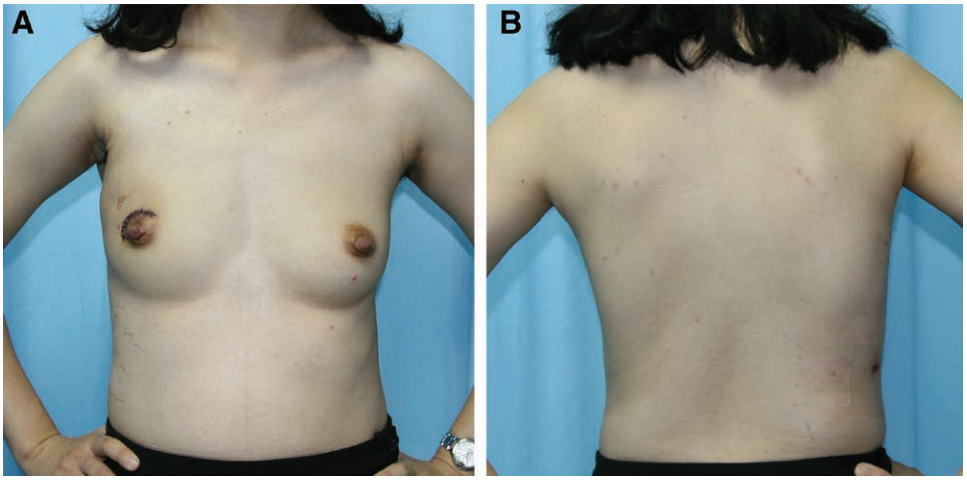


Fig. 2. A, 2-week Postoperative view of a 34-year-old woman with invasive ductal carcinoma located in the 10-o'clock position of the right breast. The diameter of the tumor was about 3 cm, and the lumpectomy sizes were about 5 × 5 cm. Oncoplastic surgery was performed after PM with the pedicled descending branch LD mini-flap. The size of the latissimus harvested was about 11 × 5 cm (B). Postoperative view of the donor site, and there is no scar.

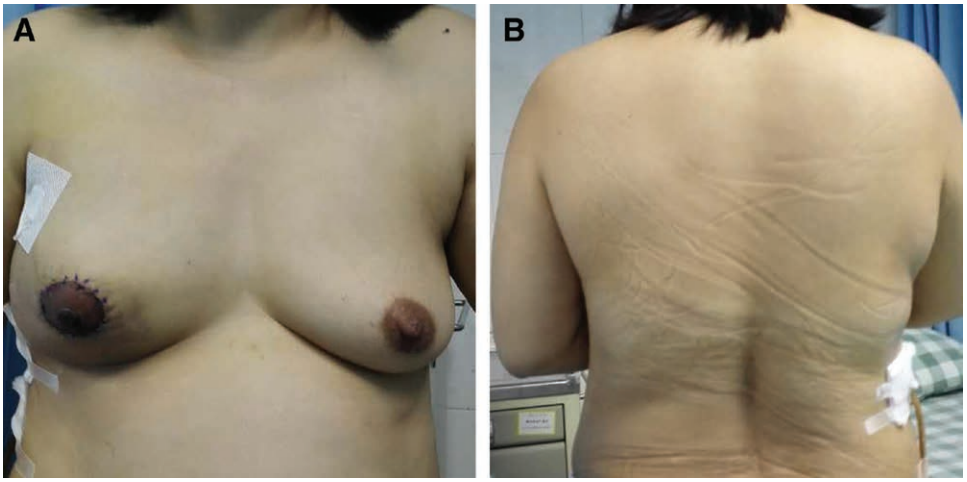


Fig. 3. A, 1-week Postoperative view of a 43-year-old woman who presented with a history of invasive ductal carcinoma in the inner quadrant of right breast. The diameter of tumor was about 4 cm, and the lumpectomy sizes were about 6 × 5 cm. Immediate breast reconstruction was performed with the pedicled descending branch LD muscle mini-flap combined with breast tissue rearrangement. The size of the latissimus harvested was about 12 × 6 cm. After surgery with right breast swollen. B, Postoperative view of the donor site.

ing branch LD mini-flap with breast tissue rearrangement. This video is available in the "Related Videos" section of the Full-Text article on PRSGlobalOpen.com or available at ***http://links.lww.com/PRSGO/A686***).

Reconstruction

A tunnel is created through the retromammary space from the axillary wound into the lateral breast defect. The LD mini-flap is then transferred to the defect without tension. Removal of moderate breast tissue around the tunnel may be required in some patients for the symmetry of both breasts. Sutures are used to fix the mini-flap to the adjacent breast parenchyma and reshape the lateral breast mound. If tissue rearrangement is performed as in reconstruction of medial defects, 2 suction drains are placed, 1 in the axillary donor site and the other in the lower level of the breast. For lateral defects, 1 suction drain placed in the donor site is sufficient. Cosmetic results are shown in Figures 2, 3.

CONCLUSIONS

Thirty-four patients underwent breast oncoplastic surgery using this technique after PM between October 2015 and January 2017. Seroma of the donor site occurred in 2 cases (2 of 34), which might be due to the removal of the drains too early, and healed satisfactorily by secondary intention. No nipple-areolar complex necrosis or other major complications have been observed.

This novel technique can reconstruct all quadrants of the breast defects, particularly for smaller breasts requiring volume supplementation. This technique allows more extensive local breast resection, reduces the rates of mastectomy and postoperative reexcision while treating larger tumors, and may provide excellent recipient-site and donor-site aesthetic outcomes. The technique also maintains the innervation and function of LD muscle and leaves no scar on the back. Careful preparation, protection of the branches of the thoracodorsal neurovascular bundle, matching of the length and tissue volume of LD mini-flap with the breast defect, good exposure of surgical field, and careful hemostasis are the key components of this procedure. However, larger cohorts with long-term follow-up are required to evaluate the safety of this procedure and its cosmetic results.

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