A partial mastectomy is usually followed by a sentinel lymph node biopsy and closed with the oncoplastic technique or perforator flaps in the lateral chest wall area. The intercostal artery perforator flap, TDAP flap, and LTAP flap have been reported as well-established and useful techniques to reconstruct this type of defect. But in some cases, patients with a partial mastectomy need axillary lymph node dissection and have separate defects in the breast and axillary area. Actually, an axillary defect can be closed primarily with a suction drain, but sometimes, this dead space causes postoperative hematoma or seroma, which needs extra treatment. In addition, some patients claim that they have continuing pain and wound stiffness of the axillary area postoperatively. To prevent these complications or problems, 1 pedicled flap with a rather large volume or 2 separate local flaps are needed. But harvesting 2 separate local flaps in the adjacent area is rather difficult to perform, and harvesting a large pedicled flap, such as the latissimus dorsi myocutaneous flap, is a too invasive procedure for a partial mastectomy reconstruction. Therefore, we introduce a revised flap design, the L-positioned perforator flap (LPPF), to settle this problem with less donor-site morbidity.

METHODS

The flap was designed in the lateral chest wall region after a preoperative Doppler echo examination as a perforator-based propeller flap to fill both the breast and the axillary defect. Usually an intercostal artery perforator flap, TDAP flap, or LTAP flap is used as a propeller flap for the defects. The most adequate flap is normally chosen during the surgery according to the condition of the preserved vessels in the axillary area after the axillary lymph node dissection. A flap harvest was performed in the usual fashion and dissected from surrounding tissues ensuring that the flap had enough mobility to fill the defect without any tension and wound stiffness of the axillary area postoperatively. To prevent these complications or problems, 1 pedicled flap with a rather large volume or 2 separate local flaps are needed. But harvesting 2 separate local flaps in the adjacent area is rather difficult to perform, and harvesting a large pedicled flap, such as the latissimus dorsi myocutaneous flap, is a too invasive procedure for a partial mastectomy reconstruction. Therefore, we introduce a revised flap design, the L-positioned perforator flap (LPPF), to settle this problem with less donor-site morbidity.

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being applied to the transferred flap. The entire flap was deepithelialized, and it was bent into an L shape. A small lobe of the LPPF was placed in the axillary area to fill the dead space, and a long lobe of the LPPF was placed in the partial breast defect to reconstruct the breast shape (Fig. 1).

Case Reports

Case 1

A 47-year-old woman had breast cancer in the upper outer quadrant and had a partial mastectomy with an axillary lymph node dissection. There were separate defects in the breast and axilla. The flap was designed in the lateral chest wall region after a preoperative Doppler echo examination and was based on a TDAP flap (Fig. 2). The flap size was 5 × 15 cm², and 2 adjacent perforators were included in this flap. The flap was bent into an L shape. A long lobe of the LPPF was inserted into the partial breast defect to reconstruct the breast shape, and a small lobe of the LPPF was inserted into the axillary area to fill the dead space (Fig. 3). All of the flap was deepithelialized, and the tip of the long lobe of the LPPF was folded back to obtain flap thickness to form breast projection. The donor site was closed in the usual fashion with a single suction drain. The reconstructive time was 1 hour and 38 minutes.

The patient was successfully provided with a safe and aesthetically acceptable breast reconstruction without postoperative complications and discharged from the hospital 9 days postoperatively. This patient had postoperative radiotherapy after 7 months of surgery without any late complications. After 1 year and 2 months of follow-up, there were no complaints of pain, stiffness, or scar contracture of the axillary region, but the patient felt a slight hardness of the transferred flap in the reconstructed breast (Fig. 4).

Case 2

A 46-year-old woman with breast cancer in the upper outer quadrant had almost the same procedure as case...
1. The flap was designed as an LTAP flap with a size of 7 × 20 cm². As with case 1, the flap was bent into an L shape and inserted into the partial breast defect and the axillary dead space. The reconstructive time was 2 hours.

This patient was also successfully given a safe and aesthetically acceptable breast reconstruction without complications and discharged from the hospital 11 days postoperatively. The patient had postoperative radiotherapy after 1 month of surgery. After 1 year and 6 months of follow-up, there were no complaints of the axilla.

**DISCUSSION**

The propeller flap was originally reported to have a revised perforator flap harvesting design, so that the defect and donor sites could be closed with the same flap easily and safely by providing 2 rotating flap lobes.⁵ After several reports on the usability of a propeller flap were made, a definition of the propeller flap was given by Pignatti et al.⁶ According to the propeller flap concept, basically a small lobe of a propeller flap is used for closing a donor site, but we revised this to use this small lobe to fill the dead space in the axillary area caused by lymph node dissection.⁵ With additional revision of the propeller flap technique, patients could achieve safe and aesthetic partial breast reconstruction with less donor-site morbidity. By using a well-vascularized flap to fill not only the breast defect but also axillary dead space, patients were successfully given postoperative radiotherapy without complications and without complaining of axillary complications, such as a pain, stiffness, and contracture.

But there is a limitation of this flap design, namely, a limitation of the flap volume. For patients with a rather large breast volume, where the defect is a result of partial mastectomy, the LPPF does not have enough volume to fill the breast defect and give decent breast volume and projection because the flap size is limited.

**SUMMARY**

The LPPF might provide an alternative reconstructive option for a partial mastectomy with an axillary lymph node dissection. With this technique, patients could have safe and aesthetic partial breast reconstruction with less donor-site morbidity.

**REFERENCES**

1. Hamdi M. Oncoplastic and reconstructive surgery of the breast. *Breast*. 2013;22(suppl 2):S100–S105.
2. McCulley SJ, Schaverien MV, Tan VK, et al. Lateral thoracic artery perforator (LTAP) flap in partial breast reconstruction. *J Plast Reconstr Aesthet Surg*. 2015;68:686–691.
3. Hamdi M, Spano A, Van Landuyt K, et al. The lateral intercostal artery perforators: anatomical study and clinical application in breast surgery. *Plast Reconstr Surg*. 2008;121:389–396.
4. Hamdi M, Van Landuyt K, Hijjawi JB, et al. Surgical technique in pedicled thoracodorsal artery perforator flaps: a clinical experience with 99 patients. *Plast Reconstr Surg*. 2008;121:1632–1641.
5. Hyakusoku H1, Ogawa R, Oki K, et al. The perforator pedicled propeller (PPP) flap method: report of two cases. *J Nippon Med Sch*. 2007;74:367–371.
6. Pignatti M, Ogawa R, Hallock GG, et al. The “Tokyo” consensus on propeller flaps. *Plast Reconstr Surg*. 2011;127:716–722.