

Many of the initial reports in the literature introduced the topic of partial breast reconstruction as a way of correcting breast conservation therapy deformities years after completion of radiation therapy. European series were already discussing the immediate correction of defects at the time of tumor excision. The vast majority of publications are focused on the immediate reconstruction of tumor defects before irradiation. Of the 115 clinical series in the literature, 91.4 percent (105 of 115) were immediate reconstruction, 7.8 percent (nine of 115) were delayed reconstruction, and 0.8 percent (one of 115) covered both. There were, however, situations in the immediate series where reconstruction was delayed until confirmation of negative margins (delayed-immediate) but still before radiation therapy, which is determined by surgeon preference and patient selection factors. One could assume from the significant focus in the literature on immediate reconstruction that this is preferred clinically over the delayed reconstruction of breast conservation therapy deformities. The general sentiment in the field also seems to favor immediate reconstruction, for reasons previously pointed out in the literature.<sup>3</sup>

It is evident from reviewing the literature that the oncoplastic approach to breast conservation therapy has gained significant momentum over the past decade. As acceptance grows, refinements in technique will become evident. Optimizing results in terms of oncologic safety, morbidity, and aesthetic outcomes is crucial to continued evolution of these techniques. Although there are now some larger oncoplastic series,<sup>4</sup> we definitely need more level I and II evidence-based studies. Multicenter, prospective, and possibly even randomized trials with direct comparisons will further support our assumptions and demonstrate additional safety and efficacy. Although many of the points discussed in this communication are based on speculations from reviewing the literature trends, it does provide us with some insight and a reasonable representation of the current thinking when it comes to oncoplastic breast surgery. DOI: 10.1097/PRS.0b013e31823aef32

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## A Plea for Recipient Vascular Pedicle Versatility in Microvascular Breast Reconstruction: The Conundrum of Absent Internal Mammary Veins

**Sir:**

**A** bdominal free flaps, usually based on the deep inferior epigastric artery and vein, are a popular method for immediate and delayed breast reconstruction. These vessels are routinely anastomosed to either the internal mammary vessels<sup>1</sup> or the thoracodorsal vessels.<sup>2</sup> Until recently, the latter were the most commonly used recipients worldwide. However, over the past 15 years, the internal mammary vessels have increasingly become the vessels of choice in free flap breast reconstruction<sup>2,3</sup> because of their ease of use, reliability, and superior flap inset.<sup>2</sup> The advantages and disadvantages of the subscapular-thoracodorsal vascular pedicle for free flap breast reconstruction are summarized in Table 1.<sup>2–4</sup> In our unit, the internal mammary vessels are used preferentially until it became necessary to use the thoracodorsal/circumflex scapular branches of the subscapular-thoracodorsal system because of absent internal mammary veins in two patients. One was a 52-year-old undergoing immediate breast reconstruction with internal mammary vessel exposure in the second and third intercostal spaces following removal of the third costal cartilage, and the other was a 60-year-old undergoing delayed breast reconstruction 3 years after previous radiotherapy with extensive dissection in the second intercostal space using the total rib preservation technique.<sup>5</sup> Both had normal sized pulsatile arteries with no veins.

Absence of the internal mammary veins must be very rare, as it has not hitherto been reported in the English language medical literature. In an anatomical study of 100 cadavers, there were no absent veins. Similarly, the most comprehensive studies of this subject, including 230 cadaveric examinations and 840 in vivo cases, did not report a single case of absent internal mammary veins.<sup>1,2,6,7</sup>

The intraoperative difficulties of using the internal mammary vessel system have not been widely discussed. Venous recipient alternatives include the thoracodorsal system, cephalic vein loop, pectoral vessels, or contralateral internal mammary vessels if they exist. However, the cephalic venous loop leads to excessive vessel discrepancy, and pectoral vessels are difficult to dissect and have short intramuscular courses. The contralateral internal mammary vessels have reach limitations, thereby needing vein grafts, doubling the anastomoses and their complications, in addition to prolonging the ischemia times.

The senior author (C.M.M.) has performed over 300 free flap breast reconstructions using the internal mam-

**Table 1. Advantages and Disadvantages of Subscapular-Thoracodorsal Vessel Recipients for Free Flap Breast Reconstruction**

Advantages	
Thoracodorsal vessels	Exposed by breast surgeons during axillary clearance
	Quick exposure
	Caliber match acceptable
	No rib sacrifice
	Second-look at the axillary nodal basin following mastectomy permits incidental detection of metastases*
Circumflex scapular vessels	
	Consistently not affected by radiotherapy because of their location
	Never damaged by general surgeons during axillary clearance because they are deep
	Good caliber match for deep inferior epigastric vessels
	Anatomically the vessels “flick” into view when divided and face the “right way” for anastomoses
Disadvantages	
	Position of surgeons not favorable; thus, largely single-hand anastomoses
	Deep position and more difficult exposure of the vessels in the axilla
	Anastomoses are performed with the microscope at an angle
	Sometimes affected by scarring from axillary clearance and radiotherapy
	Inadvertent damage to pedicle of latissimus dorsi flap (lifeboat for a failed flap)
	Inferior flap inset often leading to excessive lateral fullness and medial emptiness
	Less powerful flow in the arteries
	Venturi effect in veins
	Possible pedicle avulsion by sudden abduction of shoulder
	Higher rate of fat necroses†
	Flap seroma rate higher

\*Loiselle F, Schrag C, Magi E, et al. Occult malignancy rate associated with thoracodorsal vessel dissection for free flap breast reconstruction. *J Surg Oncol.* 2008;98:94–96.

†Kropf N, Macadam SA, McCarthy C, et al. Influence of the recipient vessel on fat necrosis after breast reconstruction with a free transverse rectus abdominis myocutaneous flap. *Scand J Plast Reconstr Surg Hand Surg.* 2010;44:96–101.

mary vessels as recipients over the past 10 years. However, only two cases of absent internal mammary veins were encountered during that period. Preoperative vascular screening (computed tomography or magnetic resonance angiography) would therefore not be justified because of the rarity of this anatomical finding.

There are a variety of reasons for failing to locate the internal mammary vein during recipient vessel exposure for free tissue transfer. Congenital absence is a likely cause if the patient has not had previous surgery as in immediate reconstructions. An aberrant course of the internal mammary vein under the sternum may prevent its visualization and create difficult access. Damage to the internal mammary vein during previous mastectomy can result from injudicious diathermy to bleeding internal mammary perforators. Significant radiotherapy vascular damage can occur especially if a boost was given to the internal mammary lymphatic chain. In patients with previous advanced cancer, the

internal mammary vein could be occluded by occult tumor encasement (as later revealed in our second patient). A less likely reason is infection at the time of mastectomy causing retrograde internal mammary vein thrombosis and subsequent fibrosis. Abnormal anatomy of the internal mammary veins is likely in cases such as our second case, in which abnormal coronary artery vascular anatomy was revealed by previous angiography for angina. Another consideration is that if a patient has had a coronary artery bypass using the internal mammary artery, the vein is usually ligated and divided and therefore is not available for breast reconstruction.

In view of the above, we would like to make a plea to plastic surgery trainees and trainers not to totally abandon the subscapular-thoracodorsal vessel system for free flap breast reconstruction in their rush to embrace the internal mammary vessels. Although preoperative angiography or color duplex can determine whether patent internal mammary vessels are present or not, we do not think that routine preoperative vessel screening is cost-effective because of the rarity of this condition. Our two cases highlight the importance of the ability to adapt the surgical plan intraoperatively to unexpected anatomical findings.

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#### DISCLOSURE

*The authors have no financial interest to declare in relation to the content of this article.*

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### Septocutaneous Gluteal Artery Perforator Flap in Lateral Decubitus Position for Breast Reconstruction

Sir:

**W**e read with great interest the article by Tuinder et al. entitled “Introducing the Septocutaneous Gluteal Artery Perforator Flap: A Simplified Approach to Microsurgical Breast Reconstruction” published in the February issue of the *Journal*.<sup>1</sup> In this article, the authors reported the use of the septocutaneous perforator originating from the superior gluteal artery to perform septocutaneous gluteal artery perforator (sc-GAP) flap surgery. We agree with the authors regarding the many advantages of the sc-GAP flap. As highlighted in their article, the procedure is facilitated by the absence of intramuscular dissection of the perforator vessel. Moreover, the lateral emergence of the vessels makes the pedicle longer, allowing better skin paddle placement.

We would like to share our experience and to point out other advantages of this flap. The gluteal artery perforator flap is our second choice when the deep inferior epigastric perforator flap is not available. Since 2001, we have performed over 15 gluteal artery perforator flaps based on the septocutaneous perforator arising between the gluteus maximus and medius muscles.<sup>2</sup> We initially described flaps based on these vessels for the coverage of sacral pressure sores.<sup>3</sup>

The surgical technique we used was grossly the same as that described by other teams,<sup>4,5</sup> and the whole procedure takes place in the lateral supine position. Lo-Tempio and Allen<sup>4</sup> reported interest in use of such a position, such as the possibility of a double-team approach. The mastectomy, in case of immediate reconstruction, and the dissection of recipient vessels can be performed simultaneously with the harvesting of the flap. The microsurgical anastomoses can be performed in the lateral position, changing the tilt angle of the operating table (Fig. 1). This approach also reduces the length of flap ischemia, as the recipient vessels are already available when the flap is raised. In our expe-

rience, the mean operative time was 6 hours and has been shortened with the systematic use of preoperative computed tomographic scans.

The inset of the flap is more difficult in the lateral position, and preoperative marking on the patient must be accurate, especially considering the interbreast distance. However, the gluteal fat and skin are, respectively, more firm and thick than in the abdomen, and good projection of the breast can be achieved easily (Fig. 2). The gluteal scar is more visible with the sc-GAP flap but is generally hidden with underwear as emphasized by Tuinder et al.



**Fig. 1.** Microsurgical anastomosis in the lateral decubitus position.



**Fig. 2.** Result before contralateral symmetrization.