Confirming perforator patency and cross midline arterial arborisation in DIEP flap surgery

Dear Sir,

In our unit we have been carrying out DIEP flap surgery for breast reconstruction for many years and would like to share a simple technique we have recently been using during flap harvest to demonstrate perforator patency in unilateral DIEP flap based breast reconstruction.

We employ a standard approach to flap harvest whereby lower and upper incisions are completed down to anterior abdominal wall and the hemi DIEP flap is raised from lateral to medial until we encounter a suitable perforator or, on occasion, two perforators. Next, we encircle the perforator(s) and complete the dissection of the hemi DIEP flap through the muscle down to the deep inferior epigastric artery and venae commitantes (DIEA and VC) which are divided near to their origin from the external iliac artery and vein.

Having divided the pedicle, we continue dissection of the abdominal tissue to just beyond the midline (Figure 1(a)) so that the whole flap is now perfused from the contralateral DIEA with no vascular input from the ipsilateral side. At this point we pause and examine the divided pedicle for backflow from both artery and vein (Figure 1(b)). As the DIEP is still connected on the contralateral side, the observation of bleeding from both artery and vein within the pedicle demonstrates both that the perforating artery and vein into the flap are patent and secondarily that there are vascular connections allowing arterial backflow across the midline of the DIEP flap.

Having confirmed backflow from both artery and vein, we then proceed to raise the contralateral flap. If there is poor or no backflow from either artery or vein we are concerned that there may be damage to the perforating vessels and will consider whether we need to dissect out the perforators and use the contralateral DIEA and VC.

There are many methods proposed for monitoring free flaps ranging from implantable Doppler probes to clinical examination with the latter being the most reliable. The method here described is a useful intraoperative step which can help to identify potential perforator problems and allows the operative plan to be adjusted to increase the success rate of DIEP flap surgery.

Successful perforator flap surgery requires meticulous attention to detail and for each step of the procedure to go well — failure at any of these steps can result in overall flap failure. We are of the opinion that most flaps fail due to technical error which most commonly results in venous drainage problems which can be difficult to detect at a stage that is early enough to allow the error to be corrected. Whilst seeing clear backflow from the venous pedicle prior to elevation of the contralateral side does not guarantee there will be no venous problems, the observation can help to identify potential perforator injury may occur due to direct mechanical or thermal damage during the dissection.

Demonstrable backflow along the pedicle once the flap is elevated across the midline also indicates that there is vascular arborisation across the midline and gives the surgeon increased confidence that he may safely recruit part of the contralateral abdominal tissue (Hartramf zone II or Holm zone III). Further, the rate of venous flow along the pedicle gives a suggestion of the adequacy of venous drainage from the flap — a slow rate can indicate the flap has a dominant superficial venous system and may require an accessory venous anastomosis.

Here we describe a simple intraoperative step that can be carried out during DIEP flap harvest to demonstrate both perforator patency and midline vascular crossover. Although good backflow bleeding does not guarantee flap survival and cannot be used as an absolute guarantee that the flap will not suffer venous congestion, it is one more piece of information that can be simply gleaned and be used to improve the success of DIEP flap surgery.

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None.

**Conflicts of interest**

None declared.

**Ethical approval**

Not required.

![Figure 1](image1.png)

**Figure 1** a) DIEP flap raised just beyond midline with contralateral side not yet incised; b) Deep inferior epigastric artery and venae comitantes examined to demonstrate backflow and perforator patency on clamp release.
Geometric nipple reduction technique: An approach to management of nipple hypertrophy

Dear Sir,

Nipple hypertrophy is a seldom-discussed topic in aesthetic breast surgery. However, it is an important condition that often detracts from the results of an otherwise satisfactory aesthetic breast surgery. There are numerous techniques for nipple reduction described in literature. A satisfactory nipple reduction should provide an aesthetically pleasing form without compromising the neurovascular status of the nipple-areolar complex and be easily reproducible.

We present a technique for management of hypertrophic nipples that is simple, reproducible and consistent that allows for reduction in both height and circumference. Moreover, it is applicable to a patient with very long nipples with a narrow base. In such cases, the dog-ears created at the base of the areola maximize sensation to the nipple, especially over the central mound, by providing a non-obstructive path to and from all areas of the nipple to the areola.

Termed “geometric nipple reduction”, three triangular-shaped skin markings are made on the nipple, with apex of the triangle located well below the central mound of the nipple and the base of the triangle drawn flush with the base of the nipple-areolar interface (Figure 1). Each side of the triangle is angulated outwards with the pivot located around midpoint of the limb. The vertical and horizontal reduction is dependent on the length and angle of divergence of each triangular limb. A small cuff of skin at base of nipple is spared between each of the three triangles so that the nipple is not discontinuous with the surrounding areola. Next, these pre-marked triangular skin wedges are excised at a full-thickness level and then 5-0 Monocryl (Ethicon, Somerville, NJ) is used to tack down pivot point of each side limb to base of the excised portion at the nipple-areolar junction. The dog-ears on either side of the nipple base are excised and several 5-0 Monocryl interrupted sutures are placed to secure the nipple into its new position. Wounds are dressed with Xeroform gauze, which is taken off at first post-operative visit.

From 2007 to 2012, 18 female patients with nipple hypertrophy were treated utilizing this technique. All procedures were performed by a single surgeon as an adjunct to other aesthetic breast surgeries, including mastopexy with or without subglandular or submuscular implant augmentation, augmentation alone and reduction mammaplasty. A retrospective review of these patients was performed with a minimum of one-year follow-up period to assess for results and complications. All patients were satisfied with the results of nipple reduction and all nipples remained sensate with maintenance of erectile function. The average post-reduction nipple measured 1.1 cm in diameter and 0.9 cm in height (Figure 2). Complications included transient pigment changes to the nipples in one patient, over-reduction in one patient and nipple asymmetry in another patient. Three patients, all of whom had concurrent reduction mammaplasty, had transient sensory changes to the nipple that resolved with time.

Geometric nipple reduction technique provides for a consistent and an easily reproducible result without a steep learning curve to the practicing surgeon. It provides for reduction in both height and circumference and can be applied safely as an adjunct to other aesthetic breast procedures without adding significant operative times, which can be a decisive factor to a cash-paying cosmetic patient. Although the nipple reductions in our case series were performed in conjunction with other aesthetic breast procedures, the technique can be performed as a stand-alone, office-based procedure. Moreover, it can be applied to reconstructive breast surgeries, such as in unilateral breast reconstruction cases, where it may be necessary to reduce the size of the native nipple to match the reconstructed nipple.

All of the patients maintained nipple sensation as well as erectile function after the procedure, a common problem seen with existing nipple reduction techniques. We believe that two technical points to this procedure are important for preservation of these two functions. First, maintaining the central mound not only provides for an inconspicuous scar, but also avoids a scar in an area that is important for sensory function of the nipple. Although none of the patients required lactiferous function, this technique preserves lactiferous ducts and should allow for adequate lactation, if needed. Second, although preservation of terminal branches of sensory nerves to nipple is not mandatory for sensory function, we believe that sparing a cuff of skin at base of the nipple so that the nipple is not discontinuous with the surrounding areola maximize sensation to the nipple, especially over the central mound, by providing a non-obstructive path to and from all areas of the nipple to the areola.

One drawback to this technique is that it may not be applicable to a patient with very long nipples with a narrow base. In such cases, the dog-ears created at the base of nipple can be prohibitively long. We believe that geometric nipple reduction is a very useful technique that allows for reduction in both height and circumference. Moreover, it is a simple and easily reproducible and consistent technique that improves form while preserving function.

References


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