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DIEP flap with implant: a further option in optimising breast reconstruction

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Summary Recent advances in breast reconstruction allow for high expectations regarding long-term symmetry and aesthetic appearance. The DIEP flap is currently considered as an ideal autologous reconstruction. However, there are situations in which the amount of tissue from a DIEP flap is not enough to achieve adequate symmetry. Indications and outcomes for a combined use of DIEP flap and implants are discussed in order to describe and examine a further scenario in optimising breast reconstruction. Between January 2004 and January 2006, all patients who underwent combined DIEP/implant breast reconstruction have been collected and followed prospectively. When clinical assessment demonstrated inadequate amount of tissue in the abdominal region to achieve a suitable unilateral or bilateral reconstruction with DIEP flaps, the patients were counselled about the opportunity of primary augmentation of the DIEP flaps. In cases where DIEP breast reconstruction has been done previously and there is a considerable asymmetry, delayed flap augmentation was considered. Patient's age, indication for surgery, preoperative and postoperative radiotherapy (RT), operative procedure, implant size, location and timing of insertion, complications, outcomes, and follow-up have been gathered. In all cases, textured round silicone gel implants have been used. After 12 months, four-point scales were used to analyse patients' satisfaction and aesthetic outcome. During the study period, 156 patients underwent breast reconstruction with 174 DIEP flaps. Fourteen patients (8.9%) had breast reconstruction with 19 DIEP flaps and 18 implants. The mean follow-up was 20.6 months (range 12–32 months). Fourteen implants were placed primarily at the time of DIEP reconstruction. The average implant weight was 167.2 g with range between 100 and 230 g. Implant/flap weight ratio is about 1:5 corresponding to 20%. In six flaps, the patients had RT before the reconstruction, whilst in three cases of delayed DIEP flap augmentation the patients had RT after the DIEP post-mastectomy reconstruction. One infection and one haematoma, both followed by flap partial necrosis, occurred. After 12 months following the completion of reconstruction, aesthetic scores were all between good and excellent. Surgical indications and outcomes available from this series demonstrate that

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primary and delayed DIEP/implant augmentation can be a safe and effective option in optimising breast reconstruction with autologous tissue.

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Recent advances in reconstructive surgery offer a wide spectrum of choices for women who choose to have breast reconstruction following mastectomy. The use of autologous tissue allows for high expectations regarding long-term symmetry and aesthetic appearance.¹ The DIEP flap is considered as an ideal autologous reconstruction to be fulfilled.^{2–4} However, there are situations in slender patients with larger breasts who wish to use their abdominal tissue for reconstruction of the breast, wherein the amount of tissue from a DIEP flap is not enough to achieve symmetrical breasts. In breast, or in those patients who wish to avoid donor-site morbidity from latissimus dorsi (LD) flap but have limited abdominal excess, or in those patients who require a larger area of skin to resurface the defect, additional strategies are needed. Use of gluteal artery flaps,⁵ transverse upper gracilis flaps,⁶ supercharging of the DIEP^{7–14} flap, or use of autologous fat grafting techniques^{15–17} have been described to deal with similar problems. The addition of an implant underneath the DIEP flap may be a further reasonable option. It is well known that LD and TRAM flaps can be used in combination with prosthesis for breast reconstruction.^{18–23} This article highlights the opportunity to enhance the breast reconstructive options offered to patients who are candidates for breast reconstruction. Indications and outcomes are discussed in order to describe and examine a further scenario in optimising breast reconstruction with DIEP flaps.

Patients and methods

Between January 2004 and January 2006, 156 patients underwent breast reconstruction with 174 DIEP flaps (18 bilateral procedures corresponding to 11.5%, 42 delayed procedures corresponding to 24.2%, and 132 immediate procedures corresponding to 75.8%). During this period, all patients in whom a combined use of DIEP flap and implant was performed were collected and followed prospectively. The following data were gathered: patient's age, indication for surgery, preoperative and postoperative RT, operative procedure, implant size, location and timing of implant's insertion, complications, outcomes, and follow-up (Table 1).

In those patients who chose to have DIEP flap reconstructions of their breasts, when clinical assessment demonstrated a limited amount of tissue in the lower abdominal wall to achieve a suitable unilateral or bilateral reconstruction, the patients were counselled about the opportunity of primary or delayed augmentation of the DIEP flap. In few cases of previously done DIEP flap breast reconstruction, breast asymmetry was corrected by placing an implant underneath the flap. Further to discussion with the oncological surgeons, and depending on individual selected cases, patients who had a high probability of postoperative irradiation were excluded from having primary implant placement.²⁴

Selected indications for the combined use of DIEP flap and implant were (Table 1):

- 1) Unilateral reconstruction in slim patients with large-size breasts who wish to avoid back scars or functional morbidity as from LD flap breast reconstruction or tissue expansion period (three patients);
- 2) slim patients with previous breast augmentation requiring mastectomy (one patient);
- 3) patients with large breasts requiring unilateral mastectomy with radical skin excision (two patients) (Figure 1);
- 4) postoperative breast asymmetry after unilateral DIEP flap reconstruction (four patients) (Figure 2);
- 5) bilateral reconstruction in slim patients with large breasts (four patients) (Figure 3);

In all cases, textured round silicone gel implants were used (Figure 4). In cases where primary augmentation was planned, the implant volume was decided on the basis of the difference between the mastectomy specimen and the DIEP flap after discarding zone IV.²⁵ In delayed cases, the asymmetry was assessed clinically and the size of the implant was estimated.

In all cases, the primary implant insertion was placed in a sub-muscular pocket (Figure 5). This was done to hold the implant away from the pedicle and protect the implant in a separate compartment. In all cases, the anastomoses were done either to the thoraco-dorsal vessels or to the second intercostal perforating vessel from the internal mammary vessels. In cases of delayed augmentation of DIEP flap-reconstructed breast, the implant was placed underneath the flap. Following completion of the procedure, all patients were asked to undergo nipple/areola reconstruction after 3 months.

Details of complications and of contra-lateral symmetrisation procedures were collected.

After 12 months, following the completion of reconstruction, the patients were asked to assess their satisfaction with the reconstruction using a four-point scale ranging from 'dissatisfied' to 'very satisfied'. At the same time, a panel of three examiners, who did not participate in the reconstruction (a nurse, a hospital secretary, and a consultant plastic surgeon not involved in the study), used the four-point scale, described by Kronowitz *et al.*,²⁰ to objectively evaluate the breast reconstruction in terms of breast volume, shape, and symmetry.

Results

During the study period, amongst the 156 breast-reconstructed patients (average age of 47.8, range: 28–69 years) with 174 DIEP flaps, there was no flap loss; 22 (12.6%) flaps were re-explored successfully within the first 24 postoperative hours for venous congestion (11 flaps), haematoma

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