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The pleasing end result after DIEP flap breast reconstruction: a review of additional operations

T.H.C. Damen [a], M.A.M. Mureau [a], R. Timman [b,c], H.A. Rakhorst [a], S.O.P. Hofer [a,d,*]

[a] *Department of Plastic and Reconstructive Surgery, Erasmus Medical Center Rotterdam, P.O. Box 2040, NL-3000 CA Rotterdam, The Netherlands*
[b] *Department of Medical Psychology and Psychotherapy, Erasmus Medical Center Rotterdam, The Netherlands*
[c] *Department of Human and Clinical Genetics, Leiden University Medical Center, Leiden, The Netherlands*
[d] *Division of Plastic Surgery, University of Toronto, University Health Network, Toronto, Ontario, Canada*

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Summary *Background:* Breast reconstruction with deep inferior epigastric perforator (DIEP) flaps is typically a three-stage procedure, but additional operations may be required to deal with complications or to improve the aesthetic result. The purpose of this study was to evaluate the total number of operations needed after DIEP flap breast reconstruction to achieve a satisfactory end result for the patient.
Patients and methods: From December 2002 to October 2006, 99 DIEP flap breast reconstructions obtained an end result in 72 patients. Data were collected in a structured database. Additional operations and complications were evaluated for the entire group. A study-specific questionnaire was used to evaluate patient satisfaction.
Results: The mean number of additional operations was 1.4 per patient. Patients with complications required more operations than patients without complications. Women who chose nipple reconstruction were younger than women who did not and were more likely to have had a primary or secondary than a tertiary reconstruction. The number of additional aesthetic operations was neither related to the occurrence of complications during the initial reconstruction, nor to patient satisfaction. Overall, patients were very satisfied with the end result.
Conclusions: Completion of DIEP flap breast reconstruction involved the initial reconstruction and an average of 1.4 additional operations. Patients were generally very satisfied with the end result.

* Corresponding author. Division of Plastic Surgery, University Health Network, University of Toronto, 8N-865, 200 Elizabeth Street, Toronto, M5G 2C4, Canada. Tel: +1 416 340 3449; fax: +1 416 340 4403.
E-mail address: stefan.hofer@uhn.on.ca (S.O.P. Hofer).

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In the USA and western European countries the incidence of breast cancer is high. In The Netherlands the lifetime risk for women is around 11%.[1] Detection and treatment of breast cancer have improved over the past years leading to better survival rates and contributing to an increasing demand for breast reconstruction after mastectomy.

There are essentially three types of breast reconstruction, either using implant material, autologous tissue, or a combination of both. All techniques have their own place in the current practice of breast reconstruction. To allow patients to make an informed decision, accurate patient education is of vital importance and should include positive as well as negative aspects, offering a truthful perspective of the entire reconstruction process. Realistic expectations lead to increased patient satisfaction.[2,3]

In our setting, the deep inferior epigastric perforator (DIEP) flap is the preferred method to supply autologous tissue for breast reconstruction. Advantages of this procedure have been reported previously.[4–9]

Regardless of the type of breast reconstruction, three stages can be identified: breast mound and inframammary fold (IMF) creation, nipple reconstruction, and nipple areola complex (NAC) tattooing. Additional operations are sometimes necessary to deal with complications or to improve the aesthetic result. The total number of operations is an important aspect of the reconstruction process and should therefore be addressed.

Additional procedures after breast reconstructions have been evaluated previously, but specific information on (the number of) additional operations after DIEP flap breast reconstruction is limited.[10–12]

The purpose of this study was to evaluate the total number of operations needed after DIEP flap breast reconstruction to achieve an aesthetically pleasing end result, based on patient satisfaction, in order to improve patient information.

Patients and methods

Patient sample characteristics

Between February 2002 and October 2006, 204 consecutive DIEP flap breast reconstructions were performed in 155 patients. On 1st October 2006, patients with an end result were identified in our database. A completed breast reconstruction was defined as a breast with a reconstructed nipple. Patients were also included if they had declined additional operations 1 year after DIEP flap breast reconstruction or if they had undergone an additional operation but refrained from further surgery 1 year after the last operation. The first 24 patients (30 flaps) of our series were excluded, as we showed previously that these patients represented our learning curve.[13] Patients who had died during the follow-up period were also excluded.

Breast reconstruction protocol

Our DIEP flap protocol was described in detail previously.[13,14] Breast reconstruction was introduced to the patient as a three- or four-stage protocol. After the actual reconstruction of breast mound and IMF, additional aesthetic operations (such as nipple reconstruction) and finally NAC tattooing were offered to all patients. If appropriate, as many procedures as possible were performed in one additional operation. Mean time between operations was 8 months (range 2–15 months) and mean time between initial reconstruction and nipple reconstruction was 10 months (range 3–31 months). These long intervals were mainly caused by surgery waiting lists.

Measures

Patient satisfaction. A study-specific questionnaire was developed, based on questionnaires described in the literature.[15,16] Nine questions measured patient satisfaction with the end result of DIEP flap breast reconstruction. Overall satisfaction was rated on a 10-point scale, ranging from 1 (extremely dissatisfied) to 10 (extremely satisfied). Specific satisfaction items were rated on a five-point Likert scale, ranging from Yes! (extreme satisfaction) to No! (extreme dissatisfaction). The self-report questionnaire was mailed to all patients who met the inclusion criteria and patients were requested to return it. Two weeks after mailing the questionnaire, non-responders were sent a reminder. One month later remaining non-responders were contacted by phone. No patients were lost to follow up.

Medical data. All patient data were obtained retrospectively from a structured database in which patient characteristics, medical history, number of operations and types of procedures, and complications had been collected prospectively. Written informed consent was obtained from all patients and the study was conducted in concordance with the ethical guidelines of the institutional clinical research committee.

Definition of additional operations. In this study additional operations were defined as any surgical manipulation of the reconstructed breast, the contralateral breast, or the donor site.[11] Nipple reconstruction, despite being an integral part of the breast reconstruction process, was also considered an additional operation. Adjustments to the contralateral breast aimed at improving symmetry were taken into account, those performed purely for functional reasons were not. NAC tattooing was not considered an operative procedure, and was therefore not part of the evaluation.

We focused primarily on operations aimed at improving aesthetic outcome of the breasts or donor site, rather than on operations dealing directly with complications, such as partial flap loss or abdominal wound healing problems. The latter have been described in detail previously.[13]

Statistical analysis

The number of additional operations was studied in relationship to patient satisfaction, complications, and reconstruction characteristics. Distribution of patient satisfaction was skewed, requiring root transformation to obtain a normal distribution for further analysis. To detect possible differences between groups Chi-square tests and Fisher's exact tests were used for categorical variables. Differences between groups regarding continuous variables (such as age and satisfaction) were analysed with