Journal of Plastic, Reconstructive & Aesthetic Surgery (2015) 68, 815—821

JPRAS
An International Journal of Surgical Reconstruction
www.JPRASurg.com

Direct delayed breast reconstruction with TAP flap, implant and acellular dermal matrix (TAPIA)

Mikkel Børsen-Koch [a], Gudjon L. Gunnarsson [b], Ann Udesen [c], Susanne Arffmann [a], Jordan Jacobs [d], Andrew Salzberg [d], Jørn B. Thomsen [a,*]

[a] *Department of Plastic Surgery, Lillebaelt Hospital/Odense University Hospital, Vejle, Denmark*
[b] *Department of Plastic Surgery, Telemark Hospital, Skien, Norway*
[c] *Department of Plastic Surgery, Odense University Hospital, Odense, Denmark*
[d] *Division of Plastic Surgery, New York Medical College, New York, NY, USA*

Received 18 February 2014; accepted 3 February 2015

KEYWORDS
Breast reconstruction;
Thoracodorsal perforator flap;
Latissimus dorsi flap;
Acellular dermal matrix;
Breast cancer

Summary *Background:* The latissimus dorsi (LD) flap is considered one of the working horses within the field of breast reconstruction and it offers several advantages. However, donor-site morbidity may pose a problem. This article describes a new and modified technique for delayed breast reconstruction combining the use of a propeller thoracodorsal artery perforator (TAP) flap with an acellular dermal matrix (ADM) and an implant.
Methods: The paper presents 43 delayed breast reconstructions in 38 women using a modified technique for harvesting the TAP flap in combination with an ADM and an implant for total breast reconstruction. The focus of this paper is the refinements of our technique and short-term outcome in complication rates. The data presented were collected retrospectively.
Results: Three patients experienced major complications including hematoma, partial flap necrosis, and venous congestion. In addition, seven patients experienced minor complications including small partial flap necrosis and epidermolysis. There were no cases of infection and all flaps survived. The reconstructive goal was achieved in a single-stage procedure in all but one, 42/43 cases (98%).
Conclusions: The propeller TAP flap combined with an ADM and an implant can safely be used for delayed breast reconstruction. The technique offers a single-stage reconstruction and the donor-site morbidity is limited. The method is safe and reliable with complication rates comparable to those of similar methods. Although there is a learning curve, this simple

* Corresponding author. Department of Plastic Surgery, Lillebaelt Hospital, Kabbeltoft 25, 7100 Vejle, Denmark. Tel.: +45 79 40 54 11.
E-mail address: jbth@dadlnet.dk (J.B. Thomsen).

http://dx.doi.org/10.1016/j.bjps.2015.02.004

modified technique does not demand any perforator or other vessel dissection. Any trained plastic surgeon should be able to adopt the technique into the growing armamentarium of breast reconstruction possibilities.

Introduction

As breast cancer survival rates seem to be increasing,[1,2] there is a heightened demand for satisfactory reconstructive options. The post-mastectomy patient faces a variety of choices in terms of available techniques. The most appropriate reconstruction is dependent on a number of factors, including the stage of breast cancer, the need for adjuvant therapy, and the condition of the native tissue in the area where the breasts are to be reconstructed.

On a broad scale, the available options can be divided into expander/implant-based methods and autologous methods.[3] Although implant-based breast reconstruction is the most widely used technique in the United States, there are many situations in which patients are considered to be poor candidates, that is, due to damaged skin and subdermal tissues after external radiation therapy.[4] Furthermore, a large number of women prefer autologous reconstruction due to the superior result in terms of aesthetics and natural feel.[5]

Flaps in breast reconstruction can be used either alone or in combination with an implant. While the last decade has shown a trend toward the use of free flaps, pedicled flaps are still the most commonly used autologous method of breast reconstruction in the United States.[6]

Among the pedicled flaps, the latissimus dorsi flap (LD flap) is considered a working horse and offers several advantages.[7,8] An extended version of the flap can be used for autologous reconstruction, but it is often combined with an implant to provide sufficient volume.[9] The flap is well described and its vascular supply is generally regarded to be consistent and reliable.[10] However, donor-site morbidity is debated and may pose a problem, mainly in the form of back seroma formation, chronic pain, and impaired function of the shoulder and upper arm on the affected side. The extent of the latter is poorly described in the literature and confusing evidence exists on this particular subject.[11–18] A muscle-sparing technique, which leaves the latissimus dorsi muscle nearly intact, has been described for breast reconstruction, although the advantages of this particular method have not been investigated more thoroughly.[19]

The skin paddle dissected with the LD flap can also be raised as a fasciocutaneous flap as described by Angrigiani et al., in 1995 and it has a blood supply deriving from a perforator vessel from the descending branch of the thoracodorsal artery, the thoracodorsal artery perforator flap (TAP flap).[20] Different designs and applications of this flap have been described, primarily for correction of post-ablative breast deformities.[21] In the context of breast reconstruction, the TAP flap may be used in combination with either a tissue expander or a permanent implant as described by Hamdi et al.[21–23] The advantage of this approach is that the muscle is left intact, leading to a reduction or even an elimination of the shoulder-related sequelae described for the LD flap.[24]

The use of acellular dermal matrix (ADM) in modern breast reconstruction has gained increasing popularity since it was first performed by Salzberg in 2001.[25] In addition to providing complete coverage of the underlying implant, this biological matrix offers inferior pole support and reestablishes the inframammary fold. A consequent reduction of pressure to the overlying skin flaps reduces the risk of vascular compression and compromised blood supply.

The combined use of the TAP flap with an ADM and an implant for both immediate and delayed breast reconstruction has previously been described.[26] The goal of combining the TAP flap with an ADM is to create an internal bra supporting the implant and thus preventing any displacement. Furthermore, the ADM works as a substitute of the latissimus muscle to create a biocapsule and it seems to be beneficial for this "shape-and-drape" technique. This internal support system may also reduce the risk of compromised blood flow to the flap caused by pressure from the implant and thereby increase the chance of a successful reconstruction.

The purpose of this paper is to share our experience with a further development of a new oblique and simplified flap design in which the harvest of the flap is done without any perforator or thoracodorsal vessel dissection.

Material and methods

Between July 2011 and September 2013, 43 delayed breast reconstructions were performed in 38 patients using the propeller TAP flap in combination with an ADM and an implant. Thirty-three cases were unilateral and five cases bilateral. The procedures were performed at five different hospitals, including Lillebaelt Hospital and Odense University Hospital in Denmark, Telemark Hospital in Norway, and St. Johns Riverside Hospital and White Plains Hospital, NY, USA. Two plastic surgeons experienced with breast reconstruction performed the procedures at the five different centers.

The operative indication and patient selection criteria were the same as those that apply for LD flap reconstruction, including post-mastectomy radiation therapy, heavy scar tissue formation in the area, a skin envelope not amenable to expansion, and patients not eligible for breast reconstruction with a free flap.