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# A single-centre, retrospective proof-of-concept review of salvage of infected or exposed implant breast reconstructions with explantation and one-stage free flap replacement



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## KEYWORDS

Breast reconstruction;  
Implant failure salvage;  
Autologous free flap;  
DIEP;  
TUG

**Summary** *Introduction:* Implant-based breast reconstruction has relatively high complication rates. Removal of infected implants and immediate autologous reconstruction is a safe single-stage procedure that preserves the native breast skin envelope.

*Methods:* A single-centre, retrospective proof-of-concept review of all salvage procedures performed for acute/chronic infected or exposed implant-based reconstructions by a single surgeon over a 6-year period.

*Results:* We present 13 cases of a particularly difficult subgroup of acute/chronic infection/extrusion over a 6-year period. All were successfully salvaged in a single procedure by implant removal and immediate free flap reconstruction with no significant complications. All patients had a change of pocket from subpectoral to subcutaneous and partial capsulectomies. Four patients had unilateral DIEP flaps for unilateral reconstruction, 3 bi-pedicle DIEP flaps for unilateral reconstruction, 2 bilateral TUG flaps for unilateral reconstruction, 3 bilateral DIEP flaps for bilateral reconstruction and 1 unilateral DIEP and implant for unilateral reconstruction. *Conclusions:* These patients are often slim with limited donor sites and pose technical challenges, often requiring double free flap reconstructions. Single-stage implant removal and autologous reconstruction preserves the breast skin envelope to maximise cosmesis in a single procedure. The introduction of healthy, well-vascularised tissue may also help treat the infection. © 2017 British Association of Plastic, Reconstructive and Aesthetic Surgeons. Published by Elsevier Ltd. All rights reserved.

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## Introduction

In 2009, the National Mastectomy and Breast Reconstruction Audit (NMBRA) showed that 21% of patients having a mastectomy undergo immediate reconstruction.<sup>1</sup> These figures have continued to increase. Sixty percent of the patients having mastectomies in our unit now have undergone form of immediate reconstruction. There has been an increase in autologous free flap reconstructions and a reduction in the number of latissimus dorsi flaps and two-stage expander based procedures, but the number of overall implant-based reconstructions has dramatically increased with the introduction of acellular dermal matrices (ADMs). All types of implant-based reconstruction have relatively high complication rates. The NMBRA showed a 9% implant loss rate at 3 months in immediate reconstructions.<sup>2</sup> ADMs are avascular (usually animal derived) products requiring tissue integration that can be structurally useful for the reconstruction, but published series have suggested high rates of infection and implant loss, with up to 27% of patients having either unilateral or bilateral procedures requiring an implant removal constituting an implant loss rate of up to 17%.<sup>3</sup>

Salvage of infected implant-based reconstructions is challenging, and whilst conservative management may be possible, it is often inadequate. The current standard surgical management after failed trials of antibiotics is multi-staged implant removal and delayed reconstruction with either tissue expanders or autologous flaps. This compromises the aesthetic result as there is usually a skin deficiency. It also prolongs the patient pathway considerably, particularly with the current National Health Service waiting lists for delayed free flap breast reconstruction in many UK trusts.

However, most infected or exposed implants can be removed and simultaneously converted to an autologous reconstruction in the same procedure. These patients have often been chosen for implant-based reconstructions in the first place because they are slim with limited donor sites. They can therefore present additional microsurgical challenges that add a layer of complexity to the cases over and above the standard unilateral abdominal free flap. This approach and the outcomes obtained are reported here to adhere to a governance duty to assess the outcome of such an approach and seek comment from peers.

## Methods

This is a detailed 6-year single-centre, retrospective proof-of-concept review of all acutely infected/exposed implant-based reconstructions salvaged with an immediate autologous free flap at the same procedure from 2009 to 2015. All patients deemed appropriate for the treatment proposed who presented with acute infection or extrusion of implant-based breast reconstructions were managed on first principles rather than by study protocol. Prospective informed consent was obtained for the course of action adopted. Appropriate institutional consent for publication of clinical details and photographs was obtained for each patient. All patient demographic data, operative details, cancer treatment history, infection treatment, additional procedures and complications were recorded.



**Figure 1** Complete removal of ADM if present.

## Technique

All patients with acute or chronic infected, exposed or extruding implant-based breast reconstructions received breast wound swabs and targeted antibiotics. Patients deemed to require more than simple conservative management were considered for immediate autologous salvage. These procedures are conducted on planned microsurgical theatre lists. All patients received intravenous antibiotics on induction. The wound edges are always excised and the implant removed. Any necrotic or poorly vascularised tissue is excised, with tissue samples sent for culture and sensitivities. The ADM, if present, is excised and discarded (**Figure 1**). The implant cavity is then thoroughly irrigated. The procedure is identical in the presence of frank pus. An anterior and inferior capsulectomy is then performed. Only posterior capsulotomies are performed, leaving the posterior capsule in situ. A new pocket is then dissected in the subcutaneous plane. The layer of subcutaneous scarring on top of the pectoralis major muscle is left on top of the muscle and freed off the deep layer of the skin flap to ensure compliancy of the skin flap, which is otherwise restricted by thick scar tissue. The pectoralis major muscle is then re-secured onto the chest wall (**Figure 2**). A muscle-splitting myotomy is performed to access the internal mammary vessels (**Figure 3**). The free flap harvest, anastomoses, inset, drain insertion and donor site closure are performed as for primary cases. Patients routinely get two further doses of post-operative IV antibiotics. Patients with acute cellulitis/frank pus receive further antibiotics.

## Results

Over the 6-year period from 2009 to 2015, we performed 13 cases of implant removal and immediate free flap reconstruction as a single-stage salvage procedure (**Table 1**). The median time to salvage surgery was 12 months after the initial implant-based reconstruction. The average age was 47 and average BMI was 24.6. Eight patients had a BMI of 20–25, 4 patients had a BMI of 25–30 and 1 patient had a BMI of 30–35. One patient had insulin dependent diabetes. No

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