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# The versatility of the islanded posterior arm flap for regional reconstruction around the axilla<sup>☆</sup>



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Received 16 June 2014; accepted 5 March 2015

## KEYWORDS

Axilla;  
Flap;  
Hidradenitis  
suppurativa;  
Posterior arm flap;  
Reconstruction;  
Skin graft

**Summary** *Introduction:* Defects in the region of the axilla pose a difficult reconstructive problem. Various methods for restoration have been described. We present our experience with the islanded posterior arm flap for regional reconstruction around the axilla.

*Patients and methods:* Between 2008 and 2013, all patients receiving a posterior arm flap for regional reconstruction around the axilla were entered in a prospectively maintained database. Patient data, surgical details, complications and the need for revisional procedures were recorded.

*Results:* In the study period, 35 posterior arm flaps were used in 24 patients (f:m = 11:13; mean age at surgery: 41,3 ± 18,5 years; 11 bilateral procedures) with defects predominately due to hidradenitis suppurativa (n = 31). The remaining indications included tumor resection (n = 2), burn contracture release or thoracic surgery (n = 1 each). The majority of defects were located at the axilla, but also in the proximal upper arm or the adjacent thoracic wall. Major wound complications such as total or partial flap necrosis were not encountered in our series. Minor complications included partial superficial wound dehiscence (n = 4) and superficial wound infection (n = 1), all of which were managed conservatively. In 4 patients a secondary flap trimming procedure was required.

*Conclusion:* In our hands, the posterior arm flap is an excellent choice for axillary reconstruction due to its constant anatomy, robust vascularity, unrivaled freedom of flap inseting, excellent recipient site matching and favorable donor site morbidity. Besides axillary defects, the

<sup>☆</sup> The results of this study were presented in parts at the 9th Congress of the European Federations of Societies for Microsurgery in Turku, Finland in 2008 and at the 5th Congress of the World Society for Reconstructive Surgery in Okinawa, Japan in 2009.

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posterior arm flap may additionally be employed for defects of the adjacent thoracic wall or the proximal two thirds of the upper arm.

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## Introduction

The anatomic region around the axilla is unique in a way that it is very mobile allowing for movement in the shoulder joint and passing vital structures such as nerves and big vessels within its depth from the thorax to the arm. Furthermore, it is hair-bearing and contains a special type of sweat glands (apocrine glands).

The need for reconstruction of this area is infrequent, however, there are certain clinical scenarios, in which it becomes important. One of the most common indications for axillary surgery is hidradenitis suppurativa (HS). HS is a chronic, recurrent, debilitating skin follicular disease characterized by painful inflammatory nodules, abscesses, sinus tracts, and scarring in the apocrine gland-bearing areas of the body, most commonly involving the axillary region.<sup>1</sup> Although conservative therapy may have some efficacy in early stages,<sup>2</sup> the nature of this follicular disease is progressive and radical excisional surgery along with different reconstructive options offers the only chance of cure removing completely the affected areas. Other indications for reconstruction in this area, although more infrequent, include defects after release of burn sequelae,<sup>3,4</sup> tumor excision<sup>5</sup> or non-healing ulcers.

Various methods for restoration (i.e. skin grafting, random local or pedicled flaps) of the integrity of the axilla have been described.<sup>6–11</sup> However, many of these options may have inherent drawbacks, such as donor site issues or limited capacity for optimal functional and/or aesthetic reconstruction. Functional impairment of shoulder abduction might occur especially after application of skin grafts. Further disadvantages of skin grafting include poor graft take or significant color mismatch. In case of exposure of deep structures, such as the main vessels and nerves of the arm, defect coverage with an adequate soft tissue flap is mandatory. Local flaps and, recently, pedicled perforator flaps were described with good results, however, one of their main limitation is restricted mobility.

The posterior arm flap (PAF) is an often-overlooked option in axillary reconstruction. The blood supply of the PAF is derived from an unnamed artery originating from the brachial or deep brachial artery which traverses the aponeurosis of the triceps brachii muscle near the termination of the tendon of the teres major.<sup>12</sup> Its first description is credited to Masquelet et al.,<sup>13</sup> but this author used it as a free flap. However, the pedicled variant of the PAF is also a very versatile fasciocutaneous flap that is suitable for axillary reconstruction and has been described after wide excision of the hair-bearing skin in patients with severe HS<sup>14–15</sup> or for release of axillary burn contractures.<sup>16</sup> In this article, we want to present the versatility of the completely islanded posterior arm flap for regional

reconstruction around the axilla including the adjacent thoracic wall and the proximal two thirds of the upper arm.

## Material & methods

### Patients

Between 2008 and 2013, all patients receiving a PAF for axillary or remote axillary reconstructions were followed in a prospective manner. In most patients, the defect resulted from radical excision after HS and they had a long-standing history of multiple insufficient incisional or excisional procedures finally resulting in referral to our plastic surgical service. Patient data, surgical details, complications and the need for revisional procedures were recorded in a prospectively maintained database.

A detailed patient synopsis is given in [Table 1](#).

### Surgical technique

(See [Figure 1A–E](#) and supplementary video content)

Supplementary video related to this article can be found at <http://dx.doi.org/10.1016/j.bjps.2015.03.002>.

The ellipsoid-shaped flap is outlined with its long axis positioned on a line connecting the olecranon and the posterior axillary fold. Flap width is determined by the dimensions of the defect and the amount of available donor site tissue allowing for primary closure, respectively. The proximal edge of the flap is placed 3–4 cm distal to the posterior axillary fold or the most posterior part of the axillary defect, thus leaving a small skin bridge intact, which prevents scar contracture and leads to a lengthening of the vascular pedicle ([Figure 1a](#)). This facilitates flap transposition and enables a more distal flap inset if required. Dissection is begun distally. Skin and subcutaneous tissue are incised down and through the posterior brachial fascia, including the fascia into the flap. The flap is raised in a relative avascular plane between the triceps brachii muscle and the fascia, from distal to proximal, until the supplying vessels are visualized from the undersurface of the flap running within the fascia ([Figure 1b](#)). The proximal edge of the flap is now incised carefully preserving the deep investing fascia including the vascular pedicle. The flap is now completely islanded and the vascular pedicle is mobilized towards the posterior aspect of the axilla to the desired extent. After undermining of the remaining skin bridge in a subcutaneous plane taking care not to injure the pedicle, the flap is tunneled into the defect ([Figure 1c](#)). The flap is trimmed according to the needs of the defect and sutured in a two-layered fashion ([Figure 1d](#)).

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