There is a paucity of literature when it comes to the use of breast tissue for the purposes of upper extremity reconstruction. Granick and Gamelli claim that flaps have an advantage because they bring independent vascularized tissue to the area requiring coverage. Vascularity makes it possible to cover any soft tissue loss, particularly in wounds where there is bone and/or tendon exposure. The vascularity allows for tissue integration into its surrounding structures, which enhance wound healing. In contrast, skin grafts do not provide their own blood supply and therefore cannot provide durable coverage.

We present the case of a 35-year-old woman who sustained a shotgun blast injury to the left forearm and chest wall causing significant soft tissue loss of the extensor compartment. The patient suffered a Gustilo IIIB open radial shaft fracture requiring orthopedic stabilization and plastic surgery intervention. As a result, the patient eventually was reconstructed with the use of a pedicled breast flap. Because of the patient’s macromastia and her large forearm wound and morbid obesity, an individualized approach was developed such that a breast flap was designed because of its proximity to the upper extremity. The advantage of this type of reconstruction is a more natural contour to the forearm with minimal donor site morbidity. Before creation of the flap, the patient expressed interest in a reduction mammoplasty because of her symptomatic macromastia. Overall, this was a 2-step operation whereby first the breast flap was created, and then a few weeks later, once the arm healed, the reduction mammoplasty was performed. Other types of flaps for upper extremity reconstruction include the rectus abdominis myocutaneous, transverse rectus abdominis myocutaneous, vertical rectus abdominis myocutaneous, groin, and latissimus dorsi. The pedicled breast flap is an innovative approach to upper extremity soft tissue coverage and can be tailored to the specific needs of patients similar to our case presentation. (Plast Reconstr Surg Glob Open 2016;4:e609; doi: 10.1097/GOX.0000000000000577; Published online 22 January 2016.)

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CASE REPORT

A 35-year-old morbidly obese woman with a past medical history of asthma, diabetes mellitus, and seizures presented as a trauma alert with shotgun wounds to her left forearm and chest. The patient was shot multiple times resulting in numerous projectile fragments located in the chest, bilateral breasts, and left upper and lower extremities (Fig. 1).

Physical examination revealed a left wrist drop and large soft tissue loss of the dorsal surface of the forearm. She did have intact digital flexion but no extension. Examination findings were consistent with a radial nerve injury. She did have palpable radial and ulnar pulses in the left wrist. Upon close inspection of her forearm, she was missing 8 × 8 cm of skin, subcutaneous fat, and muscle with evidence of exposed extensor tendons (Fig. 2). On arrival to the trauma bay, she was in respiratory distress and suffered a left hemopneumothorax. Because of her respiratory insufficiency, morbid obesity, and lung collapse, she was immediately intubated and a left thoracostomy tube was inserted. Despite the severity of the injury, she remained hemodynamically stable.

A few days later, the patient underwent irrigation and debridement of the wounded areas, open reduction and internal fixation of the left radius, and wound vacuum dressing placement to the left forearm (Fig. 1). After her left open radial shaft fracture was stabilized, the plastic surgery service was consulted for reconstruction of the forearm defect. The novel approach of a left pedicled breast flap was employed to provide durable soft tissue coverage of her wound (Fig. 3). This procedure was performed along with neuroplasty of the left radial nerve branch and tenolysis of the extensor tendons.

DISCUSSION

Groin, thigh, or abdominal flaps are common methods to reconstruct large forearm wounds. Chow et al² reviewed the groin flap in reconstructive surgery of the upper extremity and found that it allows for free movement at the wrist, metacarpophalangeal, and interphalangeal joints. Early movement of these structures decreases edema and stiffness of the extremity.² In addition, Goertz et al³ studied 85 patients who underwent groin flap upper extremity reconstruction and found that it is a reliable option for soft tissue coverage. Alternatively, according to Chen and Tang,⁴ anterolateral thigh flap has become the workhorse for reconstruction of skin and soft tissue defects since Song et al first described it in 1984.

Other flaps employed within plastic and reconstructive surgery to cover wounds have been studied by Person et al.⁵ They referred to the use of the latissimus dorsi as a myocutaneous flap that provides blood supply via perforating vessels.⁵ The latissimus dorsi is an expendable muscle because of the lack of functional morbidity after it has been harvested.⁵ In our case, the latissimus dorsi was not utilized as a

Fig. 1. Gross bullet fragments seen in chest and bilateral breasts. Wound vacuum dressing placed on left forearm.

Fig. 2. Gross open forearm status post-gunshot trauma to forearm.

Fig. 3. Detailed constructed pedicled left breast flap to forearm pictured.
flap because of the patient’s morbid obesity. Instead, because of the patient’s significant macromastia, a pedicled breast flap was used to reconstruct the defect. The breast tissue was of adequate volume to provide complete coverage of the forearm wound. This allowed for protection of the exposed extensor tendons.

The rectus abdominis muscle flap has also been used in upper extremity reconstruction. According to Kotti,6 the rectus abdominis myocutaneous flap is one of the most commonly used flaps in reconstructive surgery. Our patient did not undergo a rectus abdominis myocutaneous flap because of the challenge of harvesting this muscle in a morbidly obese patient.

This case presents a challenge because of the size of the soft tissue injury along with the patient’s morbid obesity. Therefore, an individualized approach was taken to reconstruct her complex radial forearm wound. Because of the patient’s macromastia, a breast flap was engineered due to its proximity to the upper extremity. The advantage of this type of reconstruction is a more natural contour to the forearm with minimal donor site morbidity. However, a disadvantage to this procedure is the potential difficulty in monitoring for breast cancer in the tissue transferred to the arm. Despite the disadvantage, this procedure was able to satisfy many of the patient’s needs.

Before creation of the flap, the patient expressed interest in a reduction mammaplasty due to her symptomatic macromastia. She agreed to proceed with the breast flap with eventual division and inset of the breast tissue at the forearm along with concomitant bilateral breast reduction. Overall, this was a 2-step operation whereby first the breast flap was created, and then a few weeks later, once the arm healed, the reduction mammaplasty was performed (Fig. 4).

Although numerous types of flaps are available to reconstruct a large complex forearm wound, this case was unique, in that breast tissue was used to resurface the soft tissue loss and provide protection to the underlying extensor tendon mechanism. It is important to note that the patient eventually underwent tendon transfer to regain function of her left upper extremity. She is currently in hand therapy recovering from her procedure. The utilization of the breast as a pedicled flap is rare and is the first of its kind performed by the plastic and reconstructive surgery team at Memorial Regional Hospital in Hollywood, Fla.

![Fig. 4. Final completed operation s/p left pedicled breast flap with reduction mammaplasty.](image)

**PATIENT CONSENT**

The patient provided consent for the use of her image.

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