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The wrist as an immediate free flap carrier for reconstruction of the pelvis; a case report

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Summary—A case is reported of the immediate transfer of a free flap to the lateral pelvic wall utilising radial wrist vessels as a temporary vascular supply as no recipient pelvic vessels were available for anastomosis.

The use of microsurgical techniques has greatly enhanced the surgeon's ability to transfer tissue to distant sites in order to reconstruct complex defects. Such transfer is dependent upon the suitability of the donor tissue as a replacement and the availability of arterial and venous vessels for revascularisation. Occasionally the recipient site does not possess vessels of adequate size to permit free tissue transfer. A previous report from this Centre described the revascularisation of a groin flap attached at its medial end to vessels in the wrist some days prior to division of the flap from the groin and transference to the lower limb (Morrison and Pribaz, 1980).

The case reported here involves a 14-year-old boy who required the transfer of a large cutaneous flap for resurfacing the lateral pelvis where there were no identifiable vessels of adequate size to support a flap. In this patient a two-stage procedure was performed in which a free parascapular flap was transferred immediately and revascularised via vessels at the wrist so that the flap resurfaced the lateral pelvis. The flap was detached from the wrist at a later operation.

Case report

A 14-year-old male Australian citizen was run over by many wheels of a large semitrailer in December 1982 in Virginia in the United States. His initial injuries included multiple pelvic fractures, bilateral ilio-femoral arterial disruption with devascularisation of both lower limbs, and severe wounds of his genitalia and perineum. Despite intensive resuscitation, attempted revascularisation of both legs, colostomy, suprapubic cystostomy and reduction of the pelvic fractures and posterior sacro-iliac dislocations, the patient eventually required bilateral hip disarticulations, amputation of the penis, left orchidectomy and debridement of his bony pelvis. After wounds were healed, including extensive split thickness skin grafting to the pelvis, the patient was left with a large area of unstable skin graft on the weight-bearing area of his left pelvis (Fig. 1). He then returned to Australia,

Fig. 1

Figure 1—a 14-year-old boy with bilateral hip disarticulation, suprapubic cystostomy, colostomy, amputation of the penis, left orchidectomy and unstable skin graft of the left pelvis.

referred to St Vincent's Hospital, Melbourne for evaluation and resurfacing of his left pelvis prior to fitting of a bucket-type prosthesis.

An aortogram failed to reveal any accessible pelvic arteries of sufficient size to vascularise a free flap transfer, and the abdominal wall had much scarring that prevented local flaps. An external fixateur to secure his posterior sacro-iliac dislocation was removed.

Preoperative planning eliminated the latissimus dorsi as donor tissue because the patient required all the muscle strength of the upper trunk for movements and transfers to and from a wheelchair. Because of the colostomy and cystostomy sites and associated scarring the rectus abdominis flap was not available. The parascapular flap (Nassif *et al.*, 1982) was selected because a considerable amount of tissue was required for transfer, the vascular pedicle was relatively large and the flap did not sacrifice muscle.

On July 29, 1983 a 10 × 26 cm left parascapular flap was elevated on the descending vessels of the circumflex scapular system. The flap included skin, subcutaneous tissue and deep fascia extending from the spine of the scapula to the upper lumbar area (Fig. 2). The flap was then detached from the chest and revascularised by suturing the circumflex scapular vessels in an end-to-side fashion to the left radial artery and end-to-end anastomosis to the cephalic vein. After excision of the unstable skin graft area (Fig. 3) the left arm was then positioned so that the flap covered the pelvis (Fig. 4). An ulnar-based flap on the radial border of the wrist was used to cover the anastomoses and a small portion of the inset of the free flap. The parascapular donor site was closed primarily with suction drainage. The arm was held in position using soft dressings.

At 3 weeks a tourniquet was inflated around the left arm and revealed adequate neovascularisation of the flap to allow the flap vessels to be divided at the wrist. One week later the remainder of the flap was divided and inset. Subsequent healing was without difficulty (Fig. 5).

Since discharge from hospital the patient has received much rehabilitation. The left pelvis continues to have good soft tissue cover which has withstood weight bearing (Fig. 6). The patient has been fitted with a bucket-type prosthesis (Fig. 7). He is now ambulant on crutches (Fig. 8) and the strength of his arms and shoulder girdles enables him to be very agile without his crutches (Fig. 9).

Discussion

Although it is uncommon to encounter tissue defects requiring free flap transfer without adequate vessels adjacent or in proximity to the wound, certain circumstances such as massive trauma with proximal vascular injury could preclude successful free tissue transfer even with long vein grafts. This case presents an alternative method for immediate distant flap transfer without the necessity of long

Fig. 2

Figure 2—Left parascapular flap, 10 × 26 cm based on the circumflex scapular vessels.

Fig. 3

Figure 3—Area of unstable skin graft in the left pelvis outlined prior to excision.

Figure 4—Left parascapular flap resurfacing the left side of the pelvis, and vascularised by the left radial artery and drained via the left cephalic vein.

Fig. 4

Fig. 5

Figure 5—Stable flap cover of the left side of the pelvis at 3 months.

Fig. 6

Figure 6—Same stable flap at 3 years.

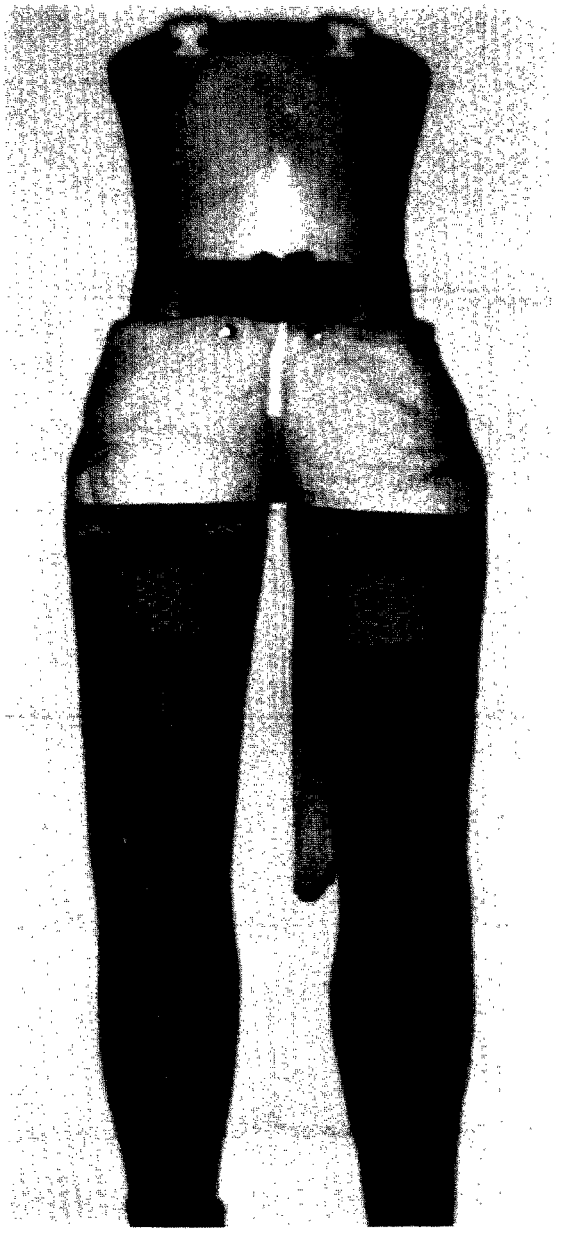

Fig. 7

Figure 7—Bucket-type prosthesis.

Fig. 8

Figure 8—Patient ambulant on crutches.

vein grafts or multiple delay procedures. The use of the radial artery as a temporary nutrient vessel enables the transfer of free flaps to virtually any area on the body. However, it does require a co-operative patient, particularly if the arm is to be immobilised in an awkward position until neovascularisation of the flap has been achieved. The parascapular flap provided a generous source of durable skin without the necessity of sacrificing vital shoulder musculature.

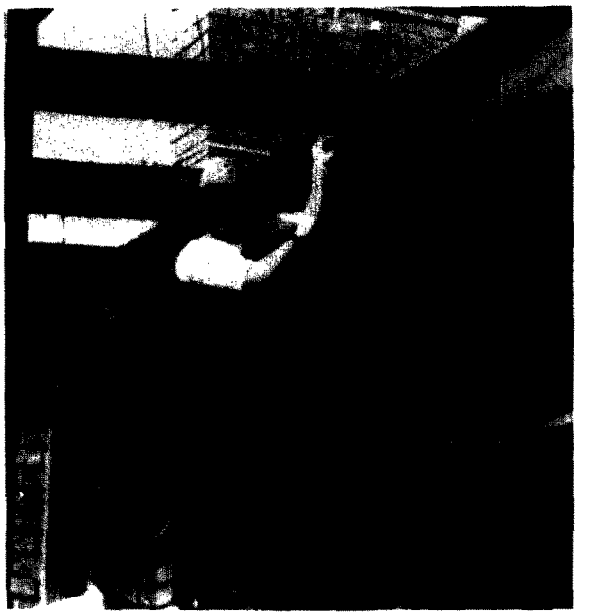

Fig. 9

Figure 9—Strength and agility of this patient without prosthesis and crutches.

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