

## VASCULARISED TUBE PEDICLE: A case report

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The justification for a tube pedicle repair has diminished with the acceptance and widespread mastery of free flap transfer. Economic loss from prolonged hospitalisation and time off work, patient discomfort, limitation of choice of suitable donor sites, the hazards of multistaged procedures with no greater guarantee of success (Stranc *et al.*, 1975) all ring the knell of change. Despite these drawbacks, circumstances still exist where, because of insufficient recipient vessels, free flap transfer is contra-indicated.

The following case report illustrates such a situation and describes a method of streamlining the transfer of a tube pedicle using the wrist as a vascularised carrier.

### CASE REPORT

A 13-year-old boy sustained a complete bilateral amputation of his legs at the mid tibial level. Their suitability for replantation was limited because of a large amount of proximal muscle and skin loss. Despite this, the more favourable right leg was replanted because of the patient's age and the bilateral amputation (Fig. 1).

The posterior tibial artery and nerve and venae comitantes were repaired as well as the posterior compartment muscles. The tibial fragments were stabilised with an external fixation device. A critical area of skin and muscle failed to become revascularised and this resulted in exposure of the bone and the fracture site anteriorly.

After an initial skin grafting operation to clean and localise the defect (Fig. 2) a large free groin flap was transferred and revascularised on the anterior tibial artery. A sudden arterial



FIG. 1. Amputated right leg.

FIG. 2. Proximal skin loss.

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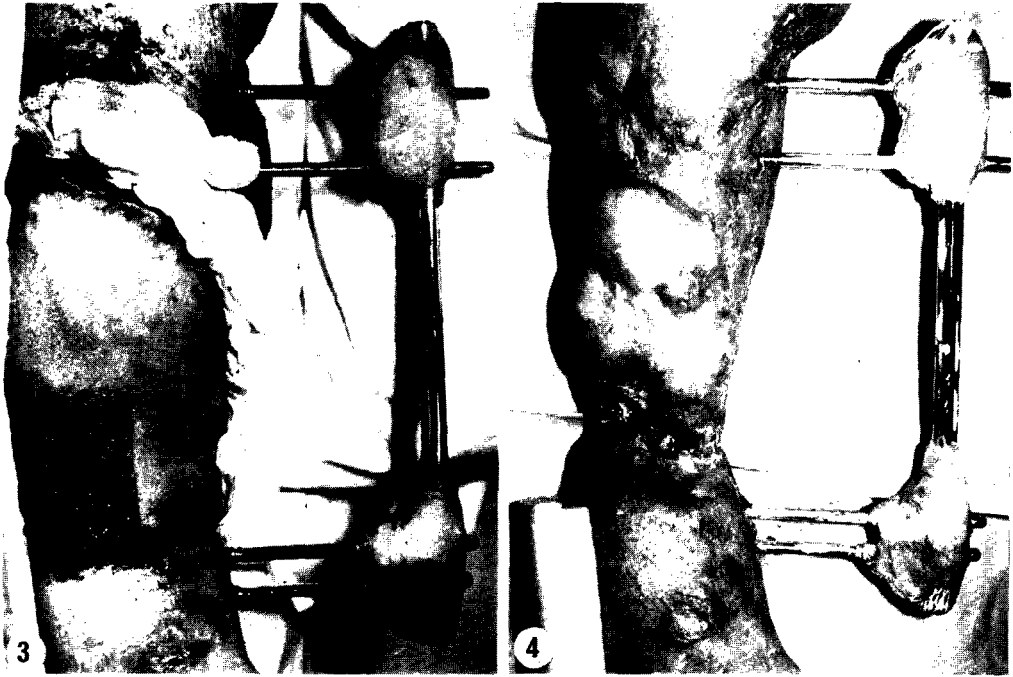


FIG. 3. Free groin flap with distal necrosis.

FIG. 4. Ultimate defect.

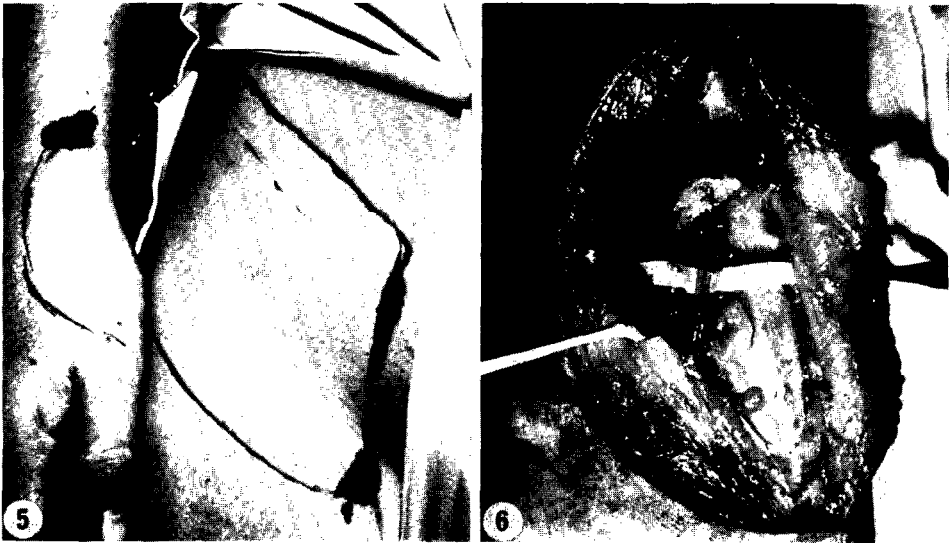


FIG. 5. Right groin flap outlined for attachment to right wrist.

FIG. 6. Recipient vessels at right wrist.

thrombosis occurred on the 7th day and despite revision of the anastomosis the distal critical portion of the flap covering the bone became necrotic (Fig. 3).

The application of split skin grafts achieved a thin temporary cover but the need for good flap cover to promote bone union still remained.

No opposite leg was available for a cross leg flap and no adequate vessel in the replanted leg could be spared for a further free flap transfer. A tube pedicle seemed the only solution.

A 1-stage vascularised transfer of a groin flap attached at its medial vascular end to vessels in the wrist and its distal end applied directly to the leg defect was considered (Fig. 4). The emotional behaviour of the 13-year-old boy and the importance of the last available flap tempered enthusiasm for a 1-stage transfer. Instead, a preliminary separate, short stage of revascularisation of the medial end of the groin flap but leaving the distal portion unelevated was performed in August 1978 to assure initial patency of the anastomoses and to accustom the patient to his impending immobilisation (Fig. 5). The superficial circumflex iliac artery and vein were anastomosed to the dorsal branch of the radial artery and cephalic vein at the wrist.

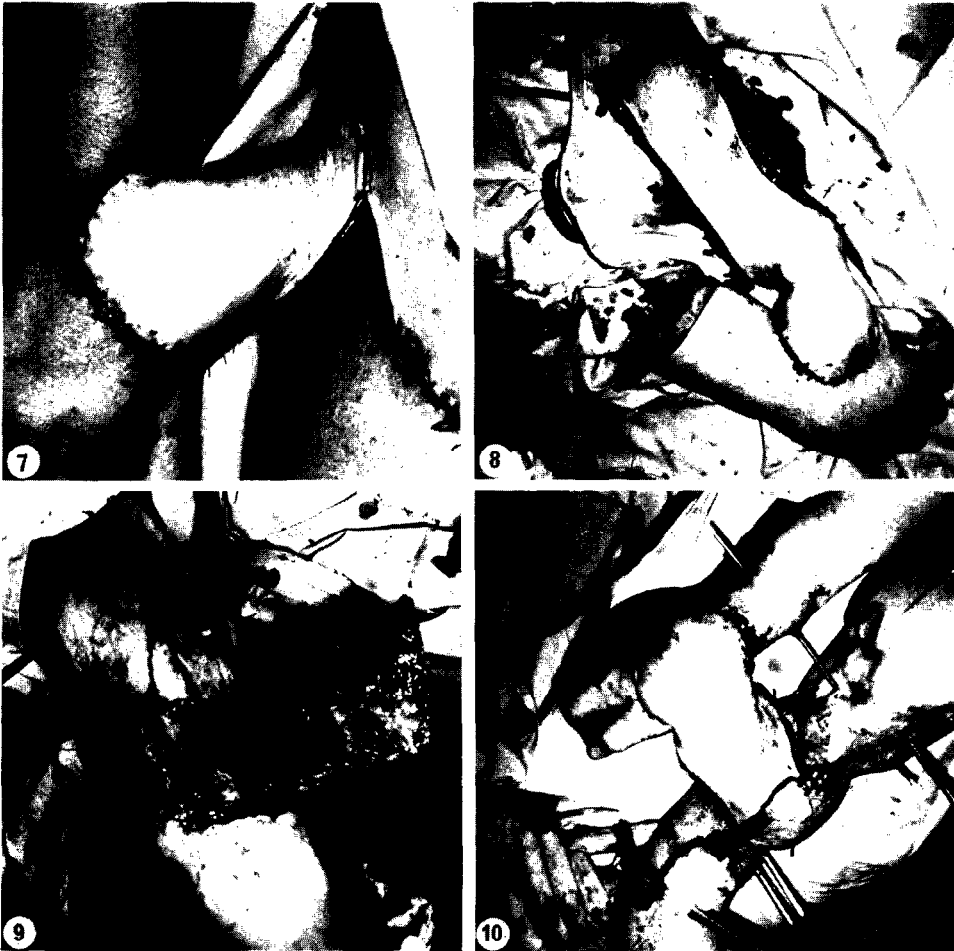


FIG. 7. Revascularisation of medial end of tube pedicle from the right wrist.

FIG. 8. Tube pedicle detached from groin 5 days after wrist attachment of tube pedicle.

FIG. 9. Transfer to anterior aspect of leg defect.

FIG. 10. Lateral view.

Five days later the large distal segment of the flap which now measured  $30 \times 9$  cm was detached and transferred to close the leg defect circumferentially (Figs. 6, 7, 8, 9 and 10). Immobilisation was secured by a threaded pin transfixing the radius to the tibia.

Three weeks later, a preliminary division of the vascular pedicle was performed and at 4 weeks the flap was completely detached from the wrist and inset into the leg without loss (Figs. 11, 12, 13 and 14).

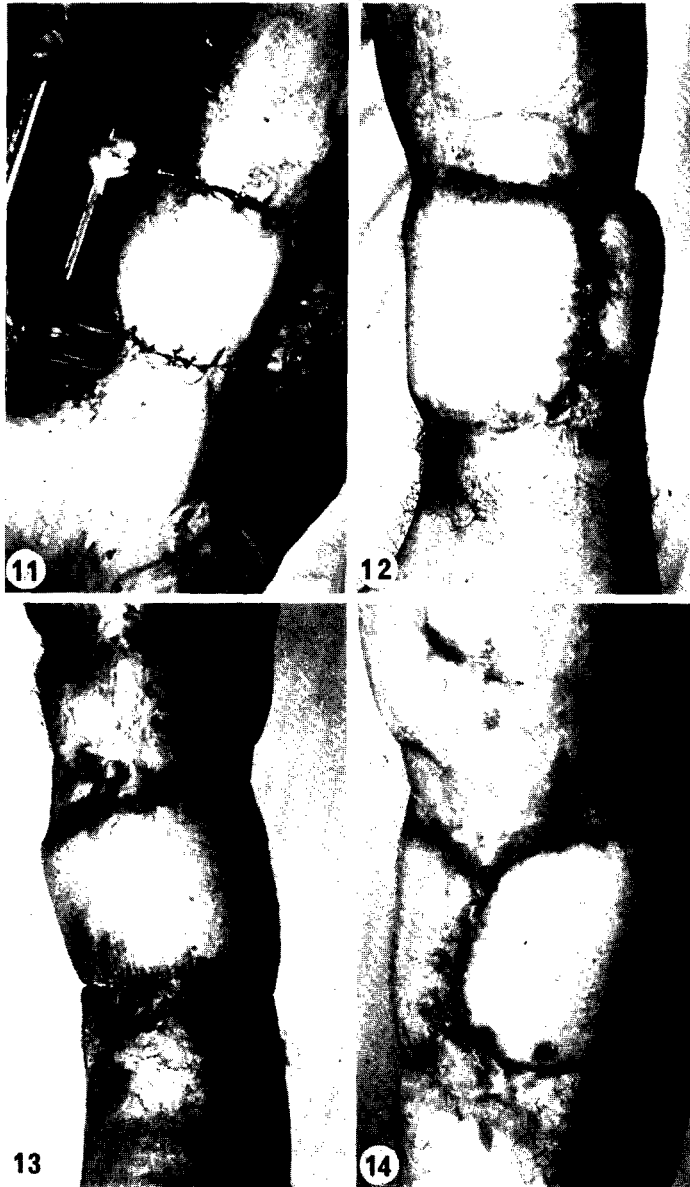


FIG. 11. Detachment from wrist and inset into right leg at 4 weeks.

FIG. 12. Result 6 months postoperative medial view.

FIG. 13. Anterior view at 6 months.

FIG. 14. Posterior view at 6 months.

## DISCUSSION

The groin flap (McGregor and Jackson, 1972) with its axial vasculature has eliminated the first stage of the creation of the conventional tube pedicle flap transfer. It allows direct transfer of one end of the flap to the wrist, saving one operation and 4, or often more, weeks hospitalisation.

Vascularised transfer of the medial end of the flap to the wrist allows the whole of the flap to be migrated from the groin to its final destination in one stage. Two operations and at least a further 4 weeks of hospitalisation and patient discomfort are now eliminated. This case demonstrated excellent flap circulation via the wrist at the time of detachment from the groin and in future the precautionary 2-stage detachment would not be considered.

The timing of separation from the wrist just as with conventional groin flap separation poses problems because of the excellent arterial inflow and lack of stimulus for distal vascularisation. In this case the very large area of circumferential inset assured good distal circulation and an inflated tourniquet on the carrier arm confirmed reverse filling in the flap.

The final stage of the tube pedicle transfer, the application of the flap to the distal site, in this case the leg, is the worst for patient discomfort, ease of nursing, and survival of the flap. These difficulties still prevail despite the modifications in transfer. In this case a stiff hip and knee made posturing awkward, not only postoperatively, but also on the operating table under anaesthesia. For those of us brought up on free flaps, this brief interlude and intrusion into the past world of pedicle migration highlighted the revolution that free flap transfer has caused.

## SUMMARY

The conventional 4-stage migration of a tube pedicle extending over a period of several months can be reduced to a 2-stage procedure taking 4 weeks. By using the groin flap and revascularising its medial end by anastomosis to wrist vessels, the flap can be applied to its intended site in one stage. Four weeks later it is detached and inset.

This method of transfer could sound the death knell of the tube pedicle as conventionally conceived if economics and patient comfort are to be considered.

## REFERENCES

- STRANC, M. F., LABANDTER, H. and ROY, A. (1975). A review of 196 tube pedicles. *British Journal of Plastic Surgery*, **28**, 54.  
MCGREGOR, I. A. and JACKSON, I. T. (1972). The groin flap. *British Journal of Plastic Surgery*, **25**, 3.