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Economical use of the "groin" flap: then and now

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Summary—It is uncommon to be able to use the same flap to resurface a defect of the hand and another extremity of the body. Two cases are presented. In one, the hand and neck and in the other, the hand and foot were resurfaced from the same flap. In the former a tubed pedicle flap was used and in the latter, part of a groin flap was transferred as a free flap.

Part of the art of plastic surgery is the economical use of the patient's tissues and, if possible, his time. In the past, through force of circumstance, the latter was often neglected.

Flaps derived from the region of the groin, the abdominal tubed pedicle flap (Gillies, 1935), the thoraco-epigastric flap (Webster, 1937), the inferior epigastric flap (Shaw, 1944) and the groin flap (McGregor and Jackson, 1972), have protean uses. Whilst the tubed pedicle flap could be waltzed all over the body by the practised surgeon, a new versatility to flaps based on the superficial inferior epigastric and superficial circumflex iliac vessels was ushered in with the advent of microvascular free tissue transfer (Taylor and Daniel, 1973). The following cases illustrate the timing and use of tissue transfer "then" and "now".

Case 1

In 1969 Mr D.R., then aged 45, sustained severe burns of his neck, face, chest and hands when attempting suicide by incineration. A severe neck contracture developed and an abdominal tubed pedicle flap was raised to treat this. However, prior to the flap being transferred to the wrist "carrier", the patient absconded from hospital.

Over 2 years later, a patient presented to the Emergency Department of our hospital with a severe compound comminuted fracture of the metacarpus of the left hand. During routine physical examination our Japanese resident discovered a beautifully prepared tube pedicle flap on the patient's left flank!

Seeing the fortuitousness of the situation, the tubed pedicle flap was first used to resurface the dorsum of the man's hand: then the flap, with the hand as carrier, was taken to the neck to treat the contracture, the original objective. Thus two distant defects were successfully resurfaced with the same flap (Fig. 1 A-F).

Interestingly, the protracted time scale for his treatment is as follows. On the first admission it took 12 weeks to prepare the tube pedicle ready for transfer. On the second admission over two years later, 24 weeks elapsed between transfer of the flap to the hand and its inset into the neck. Eight weeks later, final distribution of the skin flap was complete and the patient was discharged. He commenced work in another 7 weeks.

The combined hospital stay of 12 weeks for the first admission and 39 for the second totalled 51 weeks.

Case 2

In 1985 Mr B.A., a 32-year-old machine operator, sustained full thickness burns to his right hand and both feet when 11 000 volts "arced" down a crane jib, injuring his right hand which was on a control knob, and exited through the first and second toes in each foot. The patient was resuscitated by a passer-by then admitted to our Intensive Care Unit in first degree heart block. After his condition stabilised, two débridements of dead tissue were needed before viable wound edges were obtained. Prior to reconstruction there was a large raw area surrounding the head of the right second metacarpal following amputation of the index finger, and a similar area around the head of the first metatarsal of the right foot.

The little finger of the right hand had been amputated and closed directly, as had the first and second toes of the left foot.

Two weeks after admission a long right groin flap was applied to the hand defect. After 3 weeks the flap was divided and the proximal portion was raised on the superficial circumflex iliac vessels and transferred to the right foot as a free flap. The free groin flap was anastomosed to the dorsalis pedis artery and vein end-to-end. Thus one groin flap was used to resurface extensive electrical injuries of the right upper and lower extremities. Three months later, after physiotherapy and rehabilitation, the patient returned to full work wearing his steel-capped boots again (Fig. 2 A-H).

It only took 6 weeks from this man's initial surgery to the time he was walking again with the healed groin flap in place. His total time off work was only 4 months compared with almost 1 year for the first case.

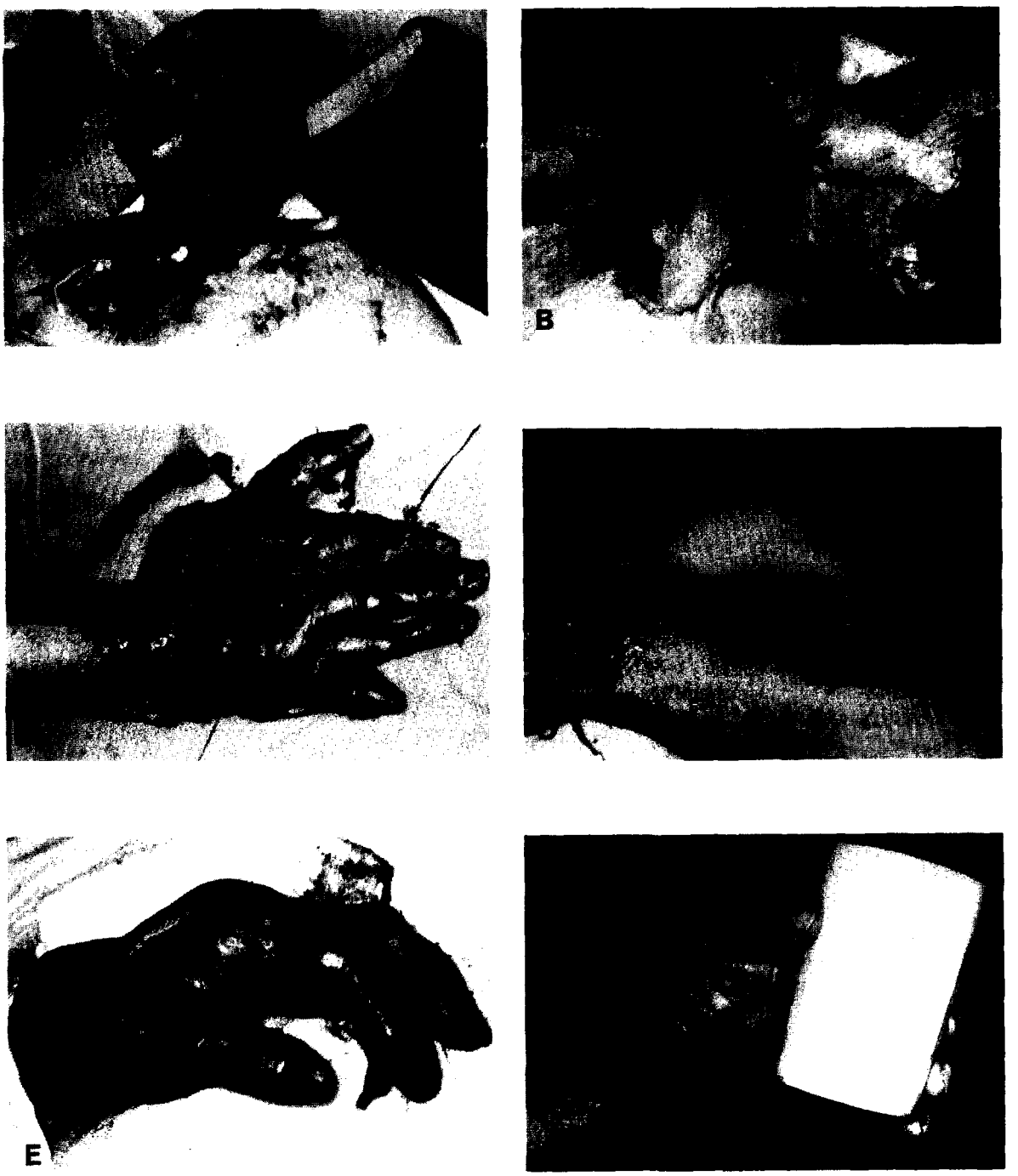

Fig. 1

Case 1.

Figure 1—(A) In Intensive Care Unit, first day post-burn. (B) Over 2 years later, the abdominal tubed pedicle flap has been inset into the neck after transfer using the injured left hand as a carrier. (C) This man's crushed left hand with dorsal skin loss, about 2 years after his burn injury. (D) The fortuitously placed abdominal tubed pedicle flap awaiting transfer to the injured hand. (E) The flap set into the hand defect. (F) The hand, now free, can be used to hold a plastic beaker following separation after the tube was set into the neck.

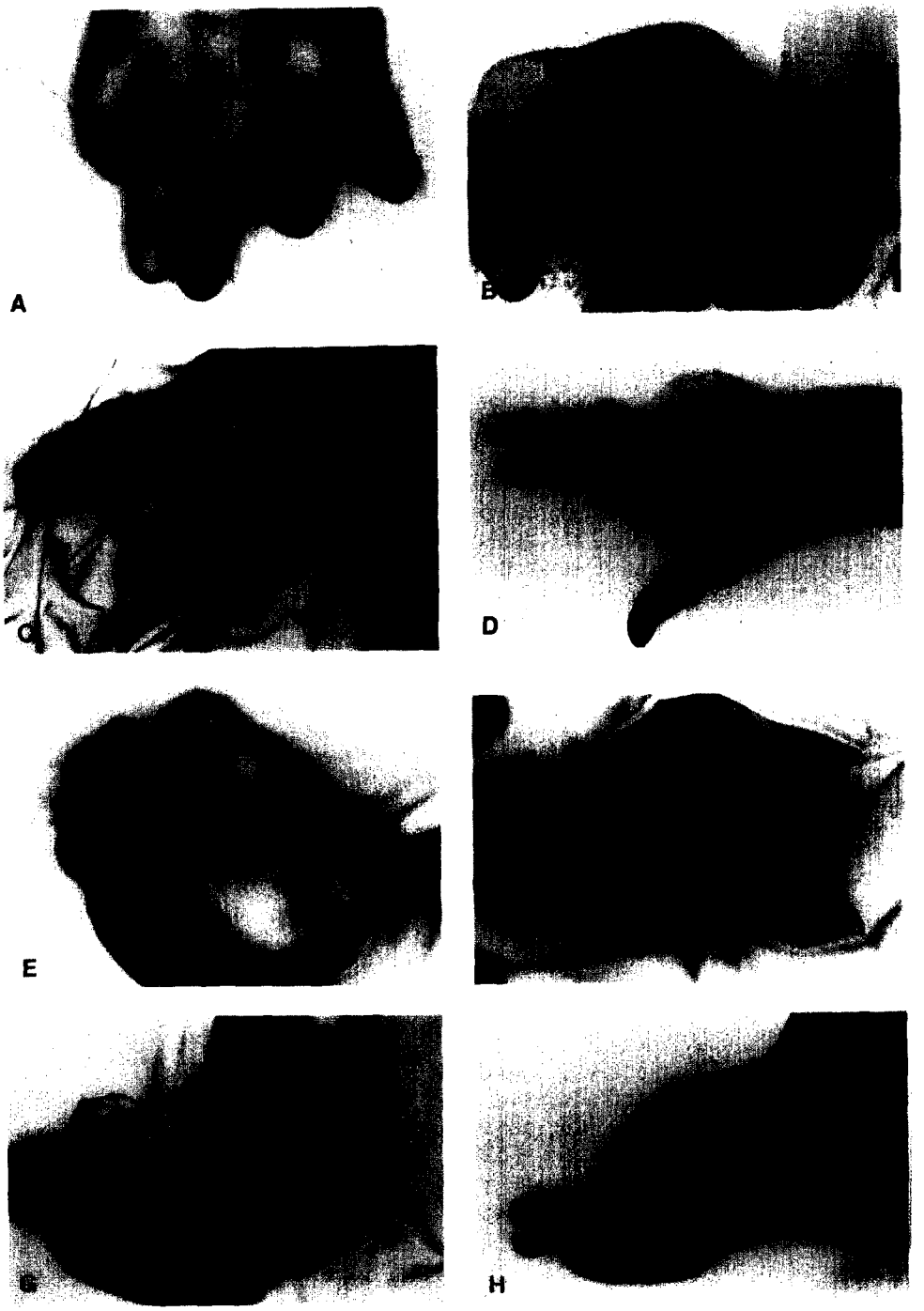

Fig. 2

Case 2

Figure 2. (A) Electrical burns of right index, middle and little fingers. (B) The index finger and adjacent parts of the middle finger have been excised. The little finger has been amputated. (C) A classical groin flap is in use to resurface the hand defect. (D) The right hand after transfer of the groin flap. (E) Electrical burns to the right great toe. (F) The right foot after excision of necrotic tissue. (G) The raw area was dressed and allowed to granulate for 3 weeks until release of the hand from the groin flap. (H) The successful free microvascular transfer of the medial part of the same groin flap to the raw surface of the foot.

Discussion

Prior to the advent of the first successful clinical free tissue transfer by Taylor and Daniel in 1973, the abdominal tubed pedicle flap and its variants were the mainstay of the reconstructive surgeon's armamentarium for dealing with large skin defects distant from the groin. Taylor and Daniel put one era to rest and ushered in a dramatic new era in plastic and reconstructive surgery.

They, like many innovators, had stood on the shoulders of great men before them. Gillies (1920, 1932, 1935) had perfected the abdominal or thoraco-abdominal tubed pedicle flaps possibly without realising the true significance of the axial pattern blood supply in the groin region. The very important elucidation of the "cart-wheel" axial pattern system of blood supply to the groin and lower abdomen was made by McGregor and Jackson (1972). This was a timely discovery which set the stage for the advent of the free flap. The pioneers of free flap surgery used the groin flap, as its blood supply was known and suited such a purpose. Nowadays, micro-surgeons know that the free groin flap is a relatively difficult flap to raise because of its short pedicle which is often buried in a considerable thickness of subcutaneous fat.

Prior to 1973 plastic surgeons had to master the art of raising and transferring tubed pedicle flaps to resurface distant extremities. Today, competence in microsurgery has become essential for the same reason.

The increasing knowledge of cutaneous vascular anatomy of this region (Taylor *et al*, 1979a & b; Boyd *et al*, 1984) spurred by the microsurgical revolution and the "re-discovery" of the works of Manchot (1889, 1983) and Salmon (1936), has permitted today's reconstructive micro-surgeons to offer single-stage repairs with hospital admissions of relatively short duration, instead of the multi-stage multi-month procedures of the past era. This is not to say, however, that where microsurgery is not available tubed pedicle flaps have no value, because they do.

These two cases illustrate these points.

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