



(CASE REPORT)



McGregor Flap for coverage hand defect: Report case

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Abstract

The McGregor flap, a pedicled inguinal flap, is highly effective in addressing hand and forearm soft tissue defects. Despite its two-stage surgical requirement, it remains a preferred option in hand surgery due to its reliability. This study aims to evaluate its advantages and disadvantages through a case study of a 62-year-old woman with upper limb injuries from a road accident. The surgical technique involves careful dissection of the flap, preserving key structures like the superficial circumflex iliac artery. Postoperative management includes mobilization exercises. The flap's reliability, minimal donor site sequelae, and low complication rates make it a valuable option, especially for surgeons less experienced in microsurgery.

Keywords: McGregor flap; Hand surgery; Soft tissue defects; Surgical technique

1. Introduction

The coverage of hand and forearm soft tissue defects presents a significant surgical hurdle.

The McGregor flap, also known as the pedicled inguinal flap, poses as a solution. This axial pattern distant flap is renowned for its reliability in addressing extensive tissue loss on the hand, wrist, or forearm, extending up to the elbow. Despite its effectiveness, a notable drawback is its requirement for two surgical stages.

Nonetheless, it remains the flap of choice in the therapeutic arsenal of hand surgery, whether in emergency or closed surgery. The aim of this study is to demonstrate its value by weighing up its advantages and disadvantages.

2. Case report

We present a case involving a 62-year-old female housewife who was admitted to the emergency department due to polytrauma sustained in a road traffic accident. Upon examination, she was found to be conscious but hemodynamically unstable, with a crush injury to her right upper limb resulting in a Mess score of 9. Additionally, she had an open dislocation of the left thumb at the metacarpophalangeal and soft tissue defects in the zone six and seven of the extensors according to the Verdan classification of the left hand without extensor involvement.

Following hemodynamic stabilization, the patient underwent a body scan and standard X-rays, which revealed crush injury to her right upper limb and the metacarpophalangeal dislocation of her left thumb. Subsequently, she was taken to the operating room under general anesthesia, the initial surgical procedure was a transbrachial amputation, followed by arthrodesis of the metacarpophalangeal joint and debridement of the dorsal hand wound.

After 48 hours, she was readmitted to the operating room for coverage of the soft tissue defect.

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3. Surgical Technique

The groin flap is a type of axial flap that relies on the superficial circumflex iliac artery, a branch of the femoral artery. It typically follows an oblique path, ascending laterally, with a diameter of 1.5–2 mm at birth. Variations in the arterial and venous structures of the flap's pedicle are common. During the procedure under general anesthesia, the patient is positioned in dorsal decubitus, with support under the ipsilateral buttock for better access to the donor site.

Key landmarks such as the anterior superior iliac spine, pubic bone, inguinal ligament, and femoral artery are identified. A practical method for defining the flap's boundaries involves the "2 fingers width" rule, positioning the superficial circumflex iliac artery's origin below the inguinal ligament at a distance of 2 fingers width. The upper limit of the flap extends 2 fingers with above the inguinal ligament, following the artery's course to the anterior superior iliac spine. The lateral and lower limits depend on the recipient site's size (FIG 1).

In our case, a tissue loss of 8 × 8 cm was observed, and the flap size needed was estimated accordingly (FIG 2). Careful palpation of the common femoral artery helped locate the superficial iliac circumflex artery's emergence. The flap was raised from lateral to medial, preserving the subcutaneous tissue but ensuring inclusion of fascia near the sartorius muscle to protect the arteriovenous package. Dissection halted at the sartorius muscle's medial edge, The lateral cutaneous nerve of the thigh is protected at the lateral edge of the sartorius.

Tubing is conducted with a preference for longer lengths to prevent maceration and enable the hand to be lifted from the abdominal plane, facilitating range of motion exercises for the hand, elbow, and shoulder.

The flap measured 12cm in length by 10 cm in width. Closure of the donor site with drainage was straightforward due to skin elasticity, but detaching integuments from the abdominal wall and flexing the hip can help if needed (FIG 3).

Postoperative management involved tubing the flap base for comfort and mobility exercises. Thin areas of the flap were managed cautiously to avoid arterial damage. Suturing prioritized the more challenging posterior edge before the anterior edge, with attention to beveling fat at the skin edge to reduce tension and necrosis risks. Dressings were applied, and limb support was provided for comfort and to protect the flap's pedicle. Gradual mobilization and ambulation were allowed post-surgery, with final division typically done around the 3rd week, resulting in good anatomical and functional outcomes as well as patient satisfaction with the aesthetic and functional results (FIG 4).



Figure 1 Clinical image of soft tissue defects.

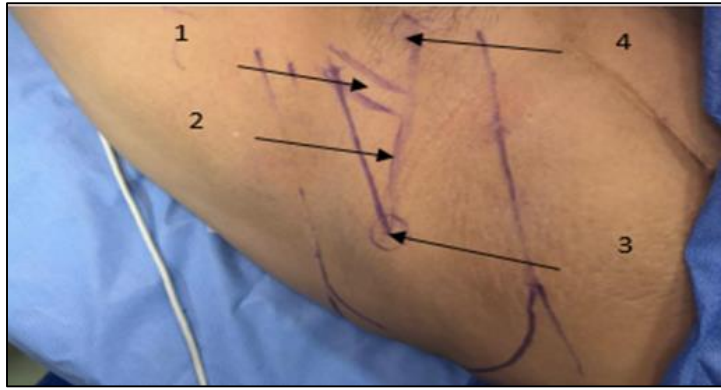


Figure 2 Surgical landmarks 1: femoral artery, 2: inguinal ligament, 3: anterior superior iliac spine,, 4: pubic bone



Figure 3 Clinical image of defect covered with McFregor flap



Figure 4 Clinical image of the flap 3 months later

4. Discussion

The inguinal flap is a reliable flap, with a surface that can be adapted to different substance losses [1]. Depending on the position and size of the flap, several variants have been described: the string flap and the Mitz slip flap, which are small flaps cut directly opposite the superficial circumflex iliac artery or its branches [2]. Sequelae at the donor site are minimal, making them the flap of choice for women. The disadvantages are those of remote pedicled flaps and the need for two operative steps and therefore prolonged hospitalization [6]. The position of the hand in a downward position may aggravate the hand edema inherent in the initial trauma. However, the possibility of tubulating the foot of the flap facilitates rehabilitation movements and improves patient comfort. It can also be criticized for not allowing complete wound closure, which is incompatible with internal osteosynthesis. Flap necrosis is a rare complication, occurring in no more than 14% of cases [3] and often in distal areas. It is thought to be related to poor posture of the flap due to pedicle plication, or in the case of extreme flaps (average surface area 200 cm²). The low rate of necrosis in this flap confirms its reliability and ease of execution [4]. According to Baron [5], infection is all the more frequent when the flap is used urgently. The same author suggests that tubulation of the flap at its base reduces maceration and thus infection. We believe it is essential for young surgeons to familiarize themselves with this flap, especially given the lack of experience with microsurgery and free flaps. This flap can thus be a useful plastic alternative, offering a practical and effective solution in a variety of substance loss contexts.

5. Conclusion

The McGregor groin flap is a technique that demonstrates vascular reliability and does not necessitate extensive preoperative preparation. It can be swiftly executed and requires standard technical skills achievable by all surgeons. This technique provides effective coverage for extensive tissue defects in the hand, wrist, and forearm, whether in emergency or elective surgery. It is a procedure that every orthopedic surgeon should be capable of performing, especially when microsurgical options are unavailable.

Compliance with ethical standards

Disclosure of conflict of interest

No conflict of interest is to be disclosed

Statement of ethical approval

Informed consent was obtained from all individual participants included in the study

Author's contributions

All authors contributed to the patient's care and to the drafting of the manuscript. All authors have read and approved the final version of the manuscript

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