

# Coverage of extensive hand injury with a pedicled groin flap using a suprafascial approach. A case report

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## Case Report

PLASTIC SURGERY



**Abstract:** The pedicled groin flap is a reliable and rapid reconstructive option for the coverage of extensive hand defects. Traditionally, groin flap removal is subfascial and includes the superficial circumflex iliac artery (SCIA) and the fascia of the sartorius muscle. This report details the case of a 23-year-old patient with a history of complex left hand trauma who was managed in a second-level hospital by performing a pedicled groin flap with a suprafascial approach, preserving the deep fascia of the sartorius. The suprafascial dissection of the groin flap is a modification of the traditional technique described by McGregor, which was created to reduce the risk of injury to the femoral cutaneous nerve and the volume of the flap, obtaining good results for the management of extensive hand injuries.

**Keywords:** Pedicled groin flap, McGregor flap, Superficial Circumflex Artery.

## Introduction

Covering defects in the hand is a challenge for the surgeon from an anatomical and functional point of view. One of the most widely used options for this purpose is flaps, which are useful for repairing medium and large defects that would be impossible to manage by primary closure or skin graft.<sup>1</sup>

In the current era of microsurgery, free flaps are the gold standard for upper limb reconstruction; However, numerous recent publications describe the use of pedicled groin flaps for upper limb reconstruction.<sup>2-4</sup>

Suprafascial dissection of the pedicled inguinal flap is a technique that takes advantage of and combines the benefits of the McGregor inguinal flap<sup>9</sup> and the SCIA perforator flap.<sup>5</sup> This modification is simple and easy to perform. The objective of this report is to present the case of a 23-year-old patient with a history of complex trauma to the left hand who was managed in a second-level care hospital by performing an inguinal flap using a suprafascial approach.

## Case report

A 23-year-old male attended the emergency room due to a 3-hour history of a left hand crushing and abrasion injury with heavy machinery. Physical examination revealed the left hand with the presence of an avulsive traumatic lesion in D1, with a dorsopalmar dermabrasive lesion with irregular borders at the proximal phalanx, partial diaphyseal loss of the 2nd and 4th metacarpals, complete

up to the carpometacarpal joint (**Figure 1A** and **1B**). Total loss of mobility and sensitivity. The decision was made to perform a pedicled inguinal flap with the suprafascial dissection technique.

## Preoperative marking

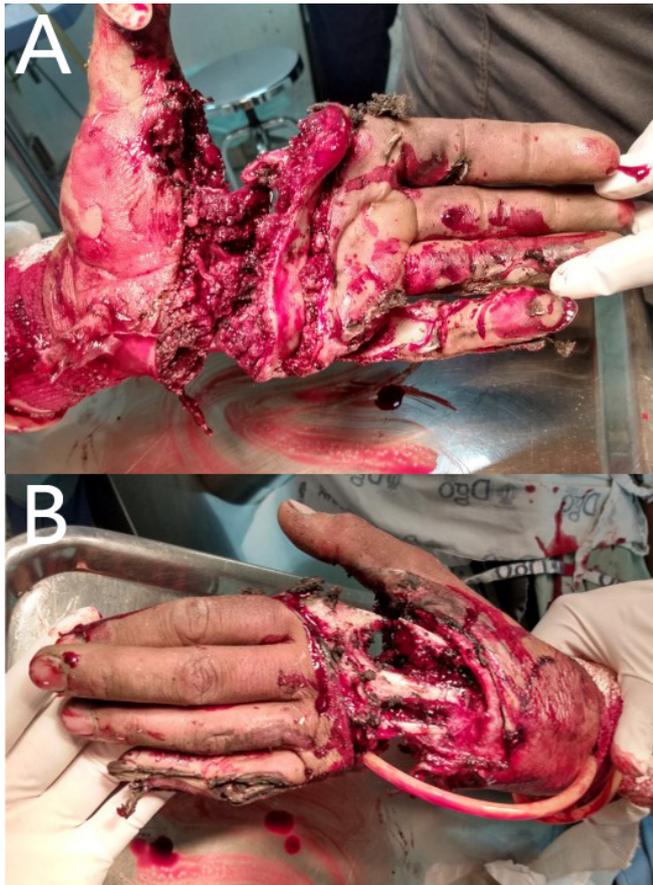
The anterior superior iliac spine (ASIS), the pubic tubercle, and the inguinal ligament were identified and marked. The origin of the SCIA was located two finger widths below the inguinal ligament on the pulse of the femoral artery, then the theoretical course of the SCIA was traced. The flap design was centered on this axis, the dimensions were 20 cm long × 10 cm wide (**Figure 2**).

## Description of the surgical technique

Under general anesthesia an approach was made through a skin incision of the flap design. Beginning the dissection from the lateral portion towards the medial portion, including skin, dermis and subcutaneous cellular tissue on the suprafascial plane. The dissection was completed 1.5 cm lateral to the femoral artery (**Figure 3A**). The proximal part of the flap was tubulized and the donor area was faced with intradermal stitches with Nylon 3-0 (**Figure 3B**). The 3rd and 4th metacarpal were amputated and the flap was sutured to the edges of the hand defect with 3-0 nylon (**Figure 3C**).

The patient was discharged from the service on the second day of hospital stay with a follow-up every third day by outpatient consultation, without

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**Figure 1.** A. Trauma to the left hand with bone, tendon, nerve and skin injuries in the volar region. B. Dorsal view.

showing areas of necrosis or infection. Three weeks after fixation, the flap was released under local anesthesia, after clamping the pedicle for 10 minutes with an intestinal clamp to verify the vascularization of the flap. The patient had adequate and favorable evolution, without evidence of necrosis of the flap or infection of the wound. After a 3-month follow-up, it showed adequate skin coverage of the hand without excessive bulkiness (**Figure 3D**). The donor area showed an aesthetic and discreet scar. The anatomical and functional results were considered good, allowing the return to daily, normal living activities.

## Discussion

In 1972, McGregor and Jackson, proposed the McGregor pedicled groin flap, based on the SCIA, which can be used as a pedicled or free flap. It is a very reliable flap for the repair of extensive defects in the hand and the distal two thirds of the forearm.<sup>6</sup>

The pedicled groin flap is traditionally elevated in a subfascial plane and taken with the deep fascia of the sartorius. It is performed in two stages with release taking place approximately 21 days after it has created its own vascularization.<sup>4</sup>

Among the advantages of the pedicled groin flap are the adequate coverage against extensive tissue



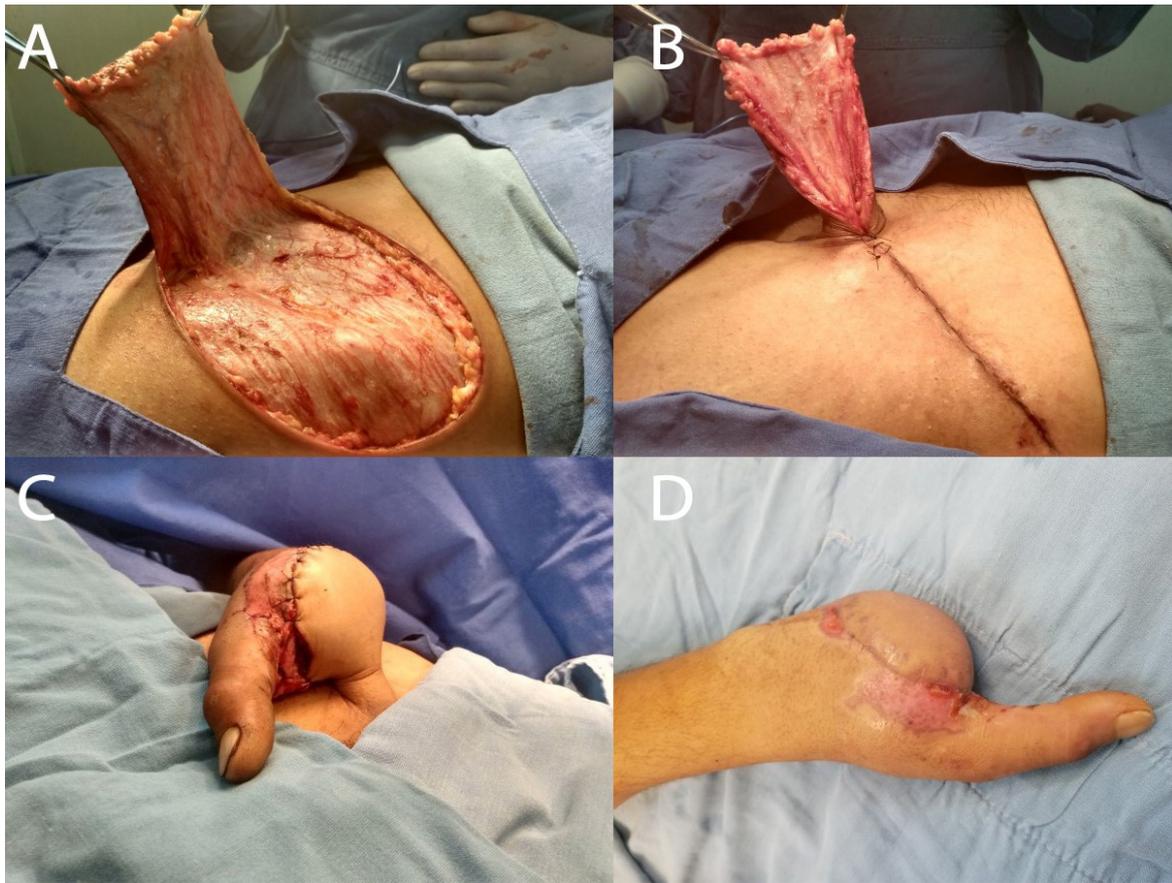
**Figure 2.** Flap design. Flap limits: 1. Pubic spine; 2. Inguinal ligament; 3. Upper edge: to two finger widths (FW) above the inguinal ligament in the axis of the flap; 4. Anterosuperior iliac spine; 5. Lower edge: of two finger widths below the origin of the pedicle, on the axis of the SCIA; 6. Flap axis (between the anterosuperior iliac spine and the point that passes two finger widths under the inguinal ligament, that is, the origin of the SCIA).

loss without compromising the blood supply to the hand, the ability to perform it easily and quickly, low morbidity and that it allows the primary closure of the donor site, obtaining a hairless skin flap. However, it has been condemned for its excessive volume (especially in obese subjects) and the risk of paraesthetic meralgia due to lesion of the femorocutaneous nerve.<sup>7,8</sup>

Currently, the main indications for the use of the pedicled groin flap are complex hand defects in children under two years of age, coverage of digital stump defects in preparation for toe-to-hand transfers, high voltage electrical burns, patients with vascular injury or atherosclerosis that make it impossible to perform vascular anastomosis, and mutilation of the hand that leaves a “functional” thumb, as in the present case.<sup>3,9</sup>

Multiple design and dissection strategies have been described that promote rapid and safe harvesting of the inguinal flap.<sup>10-13</sup> The pedicled inguinal flap with a suprafascial approach is a technique that takes advantage of and combines the benefits of the McGregor inguinal flap<sup>6</sup> and the SCIA perforator flaps.<sup>5</sup> This modification is simple and easy to harvest since in the suprafascial plane loose areolar tissue is found which permits a clean and fast dissection. The deep fascia of the sartorius is not invaded, minimizing the morbidity of the donor site including lesion of the femorocutaneous nerve.<sup>14</sup>

McGregor's flap necrosis does not exceed 14% of cases, which is related to extensive flaps (mean surface area of 200 cm<sup>2</sup>).<sup>2</sup> Mohamed et al.<sup>14</sup> demonstrated the efficacy of suprafascial pedicled flap



**Figure 3.** A. Suprafascial dissection of the pedicled groin flap. B. Tubulization of the flap. C. Left hand coverage with the flap. D. Evolution of the flap 3 months after release of the pedicle.

dissection in their series, where 8.2% of the subfascial flaps had partial necrosis compared to 3.6% in the suprafascial flaps.

The disadvantages of the pedicled groin flap, regardless of the approach, be it subfascial or suprafascial, is that it requires two surgeries and immobilization of the limb for three weeks that may elicit elbow and shoulder stiffness, especially in the elderly.<sup>7,9</sup>

### Conclusion

The pedicled groin flap is an excellent option for those patients who require coverage of the hand and the distal third of the forearm and who are not candidates for microsurgery. This clinical case shows the usefulness of suprafascial dissection of the pedicled groin flap and should be known by surgeons as a therapeutic alternative when other options have been exhausted.

### Conflicts of interest

None of the authors has a financial interest in any of the products, devices, or drugs mentioned in this manuscript.

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