



Fig. 4. Postoperative photograph ("X" mark, original skin opening; dotted line, preoperatively evaluated location of the needle; solid line, migrated location of the needle).

not to speak or chew too much to prevent needle migration, which might be caused by facial muscle contraction. Therefore, when we performed the removal operation, the embedded needle was located 2 cm away from the opening (Fig. 4).

In this case, the embedded foreign body had migrated. Acupuncture needles, fish bones, and broken dental needles are very hazardous foreign bodies that can migrate to other locations. Such migration can cause injury to critical structures or cause the foreign body to move to a deep layer where it may be difficult to remove. Almost all articles and case reports published thus far on this topic have reported the necessity of early surgical removal if the patient has exhibited any symptoms, irrespective of the size of the foreign object and its location with respect to a critical structure. Thus, early surgical removal of a sharp foreign object is important to minimize the risks that might be caused by the foreign body.

There are many unlicensed individuals who perform acupuncture using unsafe materials, which can potentially lead to infections and can cause confusion with respect to the identification of the actual material of the embedded foreign object (Fig. 5). The embedded foreign body is likely to migrate, particularly in the facial area. Moreover, such migration may cause a critical injury. We are deeply concerned about the reality of the practice of acupuncture with inappropriate materials in certain cases. In light of the case presented here, we wish to direct the clinician's attention to the risk of migration of an unsafe foreign object used in acupuncture and the need for an urgent removal operation, particularly when the object is embedded in the facial area.

References

1. Ho AS, Morzaria S, Damrose EJ. Management of

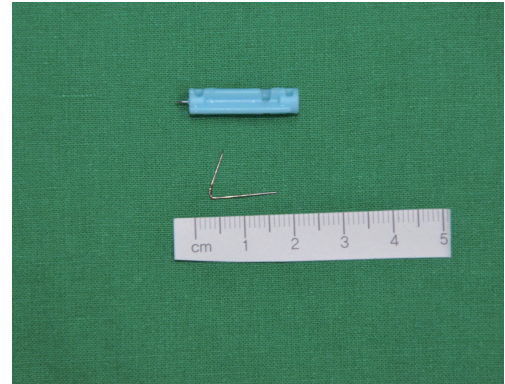


Fig. 5. Removed foreign body (blood lancet needle).

intraoral needle migration into the posterior cervical space. *Auris Nasus Larynx* 2011;38:747-9.

2. Gerard PS, Wilck E, Schiano T. Images in clinical medicine: acupuncture-needle fragments. *N Engl J Med* 1995;332:1792-3.
3. Sreetharan SS, Prepagaran N, Singh S. Migratory foreign body in the neck. *Asian J Surg* 2005;28:136-8.
4. Gutierrez V, Radice F. Late bullet migration into the knee joint. *Arthroscopy* 2003;19:E15.
5. Hama Y, Kaji T. A migrated acupuncture needle in the medulla oblongata. *Arch Neurol* 2004;61:1608.

Innervated Free Groin Flap

Jose Couceiro, Marcos Sanmartin

Hand Surgery Unit, Department of Orthopaedics, Povisa Hospital, Vigo, Spain

Correspondence: Jose Couceiro
Hand Surgery Unit, Department of Orthopaedics, Povisa Hospital,
Calle Salamanca, 5, 36211, Vigo, Spain
Tel: +34-676230437, Fax: +34-986413144, E-mail: couceirox@gmail.com

No potential conflict of interest relevant to this article was reported.

Received: 19 Feb 2015 • Revised: 4 Apr 2015 • Accepted: 23 Apr 2015
pISSN: 2234-6163 • eISSN: 2234-6171
<http://dx.doi.org/10.5999/aps.2015.42.4.494> • *Arch Plast Surg* 2015;42:494-497

Copyright © 2015 The Korean Society of Plastic and Reconstructive Surgeons
This is an Open Access article distributed under the terms of the Creative Commons Attribution Non-Commercial License (<http://creativecommons.org/licenses/by-nc/3.0/>) which permits unrestricted non-commercial use, distribution, and reproduction in any medium, provided the original work is properly cited.

The pedicled groin flap as been extensively used for the reconstruction of soft tissue injuries of the hand [1]. Two main disadvantages have limited its use: the hand must be attached to the groin region for three weeks and the flap does not have sensitivity, which is

critical to the function of the hand. In 1973, Daniel and Taylor [2] described the free groin flap, obviating the need for a second procedure, improving patient comfort, and allowing early rehabilitation protocols.

In 1977, Joshi [3] described a technique involving “neural repair for sensory restoration of a groin flap.” In order to obtain innervation, he harvested the lateral cutaneous branch of the twelfth thoracic nerve with the flap and carried out an end-to-end repair with an available sensory nerve branch in the operative field. The procedure was designed for a pedicled groin flap, as the nerve enters the flap opposite to the pedicle. This creates problems in adapting this technique to a free groin flap, because it is difficult to find a donor nerve at the distal aspects of the wound.

We describe the use of an innervated free groin flap to repair a post-traumatic soft tissue defect at the volar aspect of the hand. To the best of our knowledge, this is the first reported case of such a procedure.

A 46-year-old woman sustained trauma to her right hand with a conveyor belt, producing an injury to the soft tissues of the palm and comminuted fractures of the bases of the proximal phalanxes of the long, ring, and small fingers. All of the digits except for the thumb were ischemic at her arrival to our emergency department, which occurred eight hours after the initial trauma. Three revascularization attempts with vein grafts were unsuccessful. Reperfusion was only achieved for the palmar aspect of the index finger up to the distal interphalangeal joint.

Four days later, the patient returned to the operative room for debridement of devitalized tissue

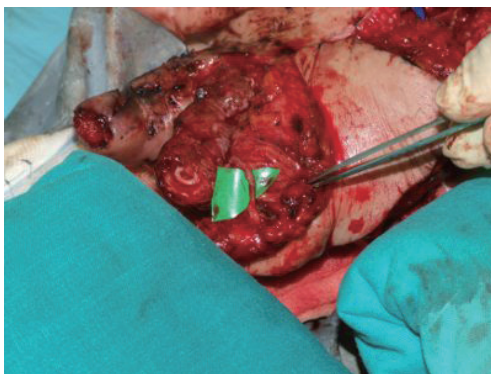


Fig. 1. A free groin flap was elevated to cover the defect. The lateral cutaneous branch of the twelfth thoracic nerve was harvested along with the flap and was sutured in an end-to-end fashion with the ulnar collateral nerve of the long finger.

at the palm and amputation of the small finger through the metacarpal neck and fingertips of the index, middle and ring fingers. The palmar aspect of the long and ring fingers was also excised. A free groin flap, measuring approximately 10 cm × 6 cm, was obtained from the contralateral side for coverage. The lateral cutaneous branch of the twelfth thoracic nerve was harvested and was coapted with the ulnar collateral nerve of the long finger (Figs. 1-3). The flap required two additional debulking procedures along with syndactyly release; these debulking procedures were performed following the first signs of re-innervation. The debulking procedures were performed in a very specific fashion, starting opposite to the nerve coaptation area and slowly progressing towards it. We stopped 1 cm from the nerve coaptation area; in an attempt to preserve the nascent nerve branches on the flap we focused on the deep fat lobules and tried to preserve the smaller superficial fat lobules [4]. Recovery of sensation was observed two months after the main procedure.

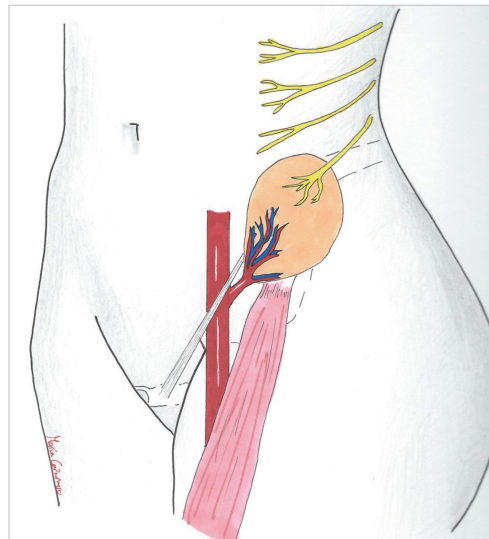


Fig. 2. Line diagram showing the anatomy of the donor area. The lateral cutaneous branch of the twelfth thoracic nerve can be seen entering the flap proximally.

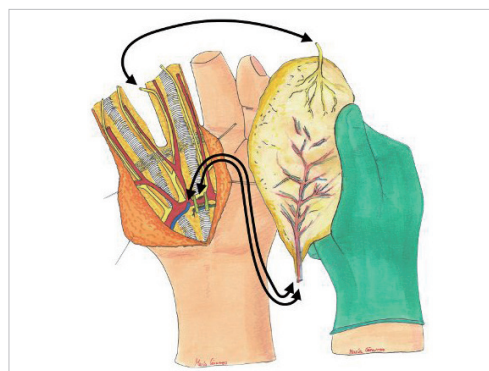


Fig. 3. Line diagram showing the surgical technique including the vascular anastomosis and the nerve coaptation sites.



Fig. 4.
Following two debulking procedures, the patient was satisfied with the result.

One year later, the results of the Semmes-Weinstein monofilament test were 4.31 (2 g) on her long finger and 5.07 (10 g) on her ring finger. She was able to discriminate hot and cold temperatures, but had no static or dynamic two-point discrimination. Her grip strength, as measured with a Jamar dynamometer (Baseline Instruments, White Plains, NY, USA) was 10 kg in her right affected hand and 28 kg in the uninjured hand. The patient reported no cold intolerance or discomfort (Figs. 4, 5).

In order to innervate a free iliac flap, the surgeon must address the fact that the nerve is located opposite to the pedicle. If preservation of the digital nerves is possible after the early debridement of necrotic tissue at the palm of the hand and digits, neurotisation can be achieved. When the receptor nerves do not reach the distal aspects of the wound, it is also possible to further extend the dissection of the flap and harvest a greater length of donor nerve.

According to previous reports describing neurotised pedicled groin flaps, better sensory recovery occurs when a nerve is sutured to a sensory nerve of the groin flap, in comparison to other flaps from the abdomen or the groin without neurotisation [3,5].

In his original article, Joshi [3] states that his procedure led to a result of S2+ on the Highet scale. White and Bain [5] reported static two-point discrimination of 3 mm two years after resurfacing the dorsal aspect of a thumb.

Nonetheless, conflicting reports exist in the literature regarding sensation recovery in non-innervated iliac or groin flaps. Tare and Ramakrishnan [6] described the use of a free mini-groin flap for digital resurfacing and found no recovery of sensation, even with radical thinning of the flap. Pan et al. [7] utilized non-innervated free iliac flaps to treat multiple skin defects of the hand and digits, and described an average static two-point

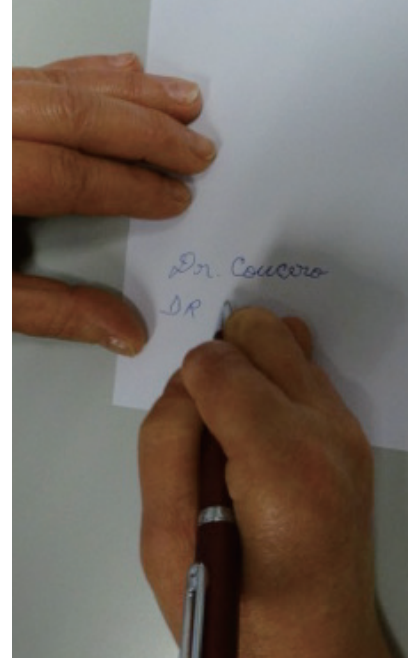


Fig. 5.
At the latest follow-up, the patient retained protective sensation on the area of the flap as well as functional pinching ability with her uninjured thumb.

discrimination of 15.4 mm in five out of the eight patients after an average of 20.4 months, whereas the remaining patients only exhibited sensation to pressure.

For a non-sensate flap to recover two-point discrimination, a random process of nerve ingrowth must originate from the underlying receptor area. This process can take longer than two years and may be facilitated by thinning the flap. However, secondary debulking procedures can hamper this process. Our patient underwent two debulking procedures, which were not found to affect the recovery of sensation.

We believe that the earlier recovery of sensation, as was observed in our case, may help in the rehabilitation process and avoid complications involving burns, ulcerations, and cold intolerance during the first two years. Yan et al. [8] reported the results of innervated versus nonsensate flaps for fingertip reconstruction and concluded that insensate flaps resulted in poorer sensation recovery and significant subjective discomfort in terms of cold intolerance. They also observed a trend for lower grip strength measurements in the nonsensate flap group.

Neurotisation of a free groin or iliac flap, whenever possible, is a relatively simple and worthwhile

procedure, since it enables the quicker recovery of sensation and aids in the prevention of the development of cold intolerance and discomfort. Of the many options available for reconstructing moderately sized to large defects of the palm of the hand and fingers, an innervated free groin flap combines a maximally concealed donor area with functional sensory recovery. It was this combination of concealment and functional recovery that prompted us to choose an innervated free groin flap over other reconstructive options for the management of our patient's condition.

References

1. McGregor IA, Jackson IT. The groin flap. *Br J Plast Surg* 1972;25:3-16.
2. Daniel RK, Taylor GI. Distant transfer of an island flap by microvascular anastomoses: a clinical technique. *Plast Reconstr Surg* 1973;52:111-7.
3. Joshi BB. Neural repair for sensory restoration in a groin flap. *Hand* 1977;9:221-5.
4. del Pinal F, Garcia-Bernal FJ, Studer A, et al. Super-thinned iliac flap for major defects on the elbow and wrist flexion creases. *J Hand Surg Am* 2008;33:1899-904.
5. White CP, Bain J. The neurotized groin flap: a refreshing approach to a reconstructive workhorse. *J Plast Reconstr Aesthet Surg* 2011;64:1252-3.
6. Tare M, Ramakrishnan V. Free 'mini' groin flap for digital resurfacing. *J Hand Surg Eur Vol* 2009;34:336-42.
7. Pan ZH, Jiang PP, Xue S. Free iliac flap for treating multiple skin defects of the hand and digits. *J Hand Surg Eur Vol* 2013;38:952-8.
8. Yan H, Gao W, Zhang F, et al. A comparative study of finger pulp reconstruction using arterialised venous sensate flap and insensate flap from forearm. *J Plast Reconstr Aesthet Surg* 2012;65:1220-6.

The Role of the Plastic Surgeon in Sentinel Lymph Node Biopsy of Internal Mammary Nodes

Justin B Hellman¹, Manas Nigam¹, Julie E Park²

¹Pritzker School of Medicine, University of Chicago; ²Department of Surgery, Section of Plastic and Reconstructive Surgery, University of Chicago, Chicago, IL, USA

Correspondence: Julie E Park
Department of Surgery, Section of Plastic and Reconstructive Surgery, The University of Chicago Medicine and Biological Sciences, 5841 S. Maryland Ave., Rm. J-641, MC6035, Chicago, IL 60637, USA
Tel: +1-773-702-6302, Fax: +1-773-702-1634
E-mail: jpark@surgery.bs.uchicago.edu

This study was presented at Midwestern Association of Plastic Surgeons 53rd annual scientific meeting on May 10th, 2014 in Chicago, IL, USA.

No potential conflict of interest relevant to this article was reported.

Received: 9 Feb 2015 • Revised: 23 Mar 2015 • Accepted: 21 Apr 2015
pISSN: 2234-6163 • eISSN: 2234-6171
<http://dx.doi.org/10.5999/aps.2015.42.4.497> • Arch Plast Surg 2015;42:497-499

Copyright © 2015 The Korean Society of Plastic and Reconstructive Surgeons
This is an Open Access article distributed under the terms of the Creative Commons Attribution Non-Commercial License (<http://creativecommons.org/licenses/by-nc/3.0/>) which permits unrestricted non-commercial use, distribution, and reproduction in any medium, provided the original work is properly cited.

The presence of lymph node metastasis is the single most important prognostic factor in the staging of breast cancer. While the majority of lymphatic drainage of the breast is to the axillary nodes, the most common extra-axillary site of lymph drainage is the internal mammary chain (IMC). The primary method for assessing the tumor status of these nodes is a sentinel lymph node (SLN) biopsy, which allows a surgeon to sample only the primary drainage sites of the tumor rather than performing a complete dissection of the nodal basin. Currently SLN biopsy is routinely used to determine axillary lymph node status in clinically node negative patients with breast cancer, however it is not commonly used to sample IMC SLNs [1]. Although there is much literature arguing for and against routine IMC SLNs, none specifically describe techniques for biopsy of these nodes, particularly when the nodes are more difficult to access. We believe that IMC SLN biopsies can alter the course of treatment and that the plastic surgeon, who has experience working in that difficult-to-navigate region of the thorax, is ideally equipped to perform them.

A 47-year-old woman with a history of stage II (T2N0), estrogen receptor (ER) positive, progesterone receptor (PR) negative, and human