

## Reconstruction of a Digital Avulsion Using a Colson Flap-Graft

I. Moutahir<sup>1\*</sup>, M. Diallo<sup>1</sup>, I. Moustakbal<sup>1</sup>, C. Hmidi<sup>1</sup>, J. Hafidi<sup>1</sup>, N. Gharib<sup>1</sup>, A. Abbassi<sup>1</sup>, S. Elmazouz<sup>1</sup>

<sup>1</sup>Plastic and Reconstructive Surgery Department, Chu Ibn Sina, Rabat, Morocco

\*Corresponding author: I. Moutahir

Plastic and Reconstructive Surgery Department, Chu Ibn Sina, Rabat, Morocco

### Article History

Received: 17-06-2025

Accepted: 24-06-2025

Published: 01-08-2025



### Abstract:

Digital avulsions are complex surgical emergencies that present both functional and aesthetic challenges. Among the various reconstruction techniques, the Colson flap-graft represents a reliable option for digital soft tissue loss, particularly in the pulp. This article aims to describe the principles, indications, surgical technique, and outcomes of this mixed reconstruction method.

**Keywords:** Digital avulsion, Colson flap-graft, Soft tissue reconstruction, Pulp injury, Surgical technique.

### Review Article

Copyright © 2025 The Author(s): This is an open-access article distributed under the terms of the Creative Commons Attribution 4.0 International License (CC BY-NC 4.0) which permits unrestricted use, distribution, and reproduction in any medium for non-commercial use provided the original author and source are credited.

### INTRODUCTION

Digital avulsion injuries frequently cause significant soft tissue loss, sometimes exposing deep structures such as tendons, bone, or neurovascular elements. Initial management must aim to quickly restore skin coverage and digital function. Described by Colson, the flap-graft combines a temporary pedicled flap with a secondary skin graft, offering stable and viable coverage. This technique is particularly useful when local flap options are limited.

We report a case of complete avulsion of the skin sheath and nail apparatus of the fourth finger by a ring, with preserved finger mobility. Emergency coverage of the exposed finger was achieved using a Colson flap-graft.

### Clinical Case

A 16-year-old male sustained a ring avulsion injury to the fourth finger of the left hand (Figure 1). Upon admission to the emergency department, he presented with complete avulsion of the skin sheath from the first phalanx to the distal tip, including nail bed loss. The digital collateral arteries were torn at the level of the first phalanx. The collateral nerves

were bruised but continuous. The denuded finger showed no bone, joint, or tendon injury. Joint mobility was preserved. Concerned about the future appearance of his hand, the young patient wished to retain the finger. Emergency skin coverage was performed using a Colson flap-graft harvested from the right inguinal region. Skin dissection was carried out in the subdermal plane, and the dermal pedicle flap was wrapped around the exposed finger and sutured (Figure 2). The left upper limb was immobilized to avoid tension. Flap detachment was carried out three weeks later as an outpatient procedure. The inguinal donor site was closed with direct suturing. No flap necrosis was observed. Rehabilitation began immediately after flap detachment.

Three months after the procedure, the patient regained finger function. However, the flap appeared discolored and hypertrophic, requiring debulking to achieve the desired thinness, flexibility, and a satisfactory aesthetic appearance. Six months after surgery, the patient had no functional limitations. Joint mobility was comparable to the contralateral side, and the aesthetic result was relatively satisfactory (Figure 3).



**Figure 1: Avulsion of the fourth finger of the left hand by a ring**



**Figure 2: Immediate postoperative appearance**



**Figure 3: Result after flap detachment**

## DISCUSSION

The Colson technique provides stable, vascularized coverage well-suited for complex distal losses. Its relative technical simplicity, lack of need for microsurgery, and feasibility under regional anesthesia make it an attractive option, especially in centers lacking advanced facilities.

The main limitations include prolonged immobilization, donor site morbidity, and risk of joint stiffness if physiotherapy is not properly managed.

### What is a flap-graft?

Colson, the pioneer of this technique, defined it as a flap that is immediately defatted, initially nourished by its pedicle, and later sustained by its deep surface, like a graft [1]. In his original description in 1966, Colson located the donor site on the anterolateral

aspect of the contralateral arm. For reasons of patient comfort and to minimize scarring, we place the donor site on the abdomen.

This technique is simple to perform and combines the permanent vitality of a flap with the plastic qualities of a full-thickness skin graft [2-4]. It is only required when vital structures (such as bone or tendon apparatus) are exposed and cannot be covered by a dermo-epidermal graft [3-5].

The flap-graft technique has been used for many years, including in the treatment of severe burn sequelae. The flap-graft (or dermo-epidermal flap) relies on random vascularization, meaning it is not dependent on specific vessels. Since it is defatted, it lacks hypodermic vascularization. It requires two or even three surgical stages. In fact, some

authors recommend autonomization before proceeding with flap detachment.

The advantages are numerous: it is a simple, reliable, and quick procedure. A large surface can be harvested, and intraoperative defatting gives it good elasticity, allowing early coverage of exposed critical structures (tendons, bones, or neurovascular pedicles) with high-quality tissue [6].

However, the drawbacks stem from the technical characteristics of this flap: the need for immobilization can cause pain and stiffness. Maceration is frequently observed, and sometimes partial suffering or even necrosis of the flap may occur. Lastly, the scars are sometimes unaesthetic [7].

## CONCLUSION

The Colson flap-graft is an effective, reproducible, and reliable technique for reconstructing digital avulsion injuries. When well-executed, it enables functional and aesthetic restoration with a low complication rate.

## REFERENCES

1. Forli, A *et al.*, (2005). The abdominal flap-graft: relevance for the coverage of dorsal hand and finger soft tissue loss in burn patients. About six cases. *Ann Chir Plast Esthet*, 50(2), 146–153.
2. Colson, P *et al.*, (1967). Use of defatted flaps (flap-grafts) in hand reconstructive surgery. *Ann Chir Plast*, 12, 298–308.
3. Colson, P., & Janvier, H. (1984). The flap-graft. In: Tubiana R, editor. *Treatise on Hand Surgery*, Volume 2. Masson; 1984. p. 277–307.
4. Colson, P. (1970). The dermo-epidermal flap. Its biological behavior: The flap-graft. Its use in hand surgery. *Chirurgie; Memoires de L'academie de Chirurgie*, 96(10), 639-643.
5. Barillo, D. J., Arabitg, R., Cancio, L. C., & Goodwin, C. W. (2001). Distant pedicle flaps for soft tissue coverage of severely burned hands: an old idea revisited. *Burns*, 27(6), 613-619.
6. Voulliaume, D., Mojallal, A., Comparin, J. P., & Foyatier, J. L. (2005, August). Severe hand burns and flaps: indications. In *Annales de chirurgie plastique et esthetique* (Vol. 50, No. 4, pp. 314-319).
7. Baux, S., Bodin, H., Dhont, F., Chaouat, M., & Mimoun, M. (2001). The classic or expanded defatted hetero-brachial Colson flap. *Brûlures*, 2(1), 40–48.