# Non-meshed split-thickness skin grafting for traumatic lower extremity reconstruction. A case report

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Case Report

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**Background:** Split-thickness skin grafts (STSGs) are a widely used reconstructive option for the management of soft tissue defects resulting from trauma, burns, chronic wounds, and oncologic resections. Both meshed and non-meshed grafts provide effective wound coverage; however, non-meshed grafts may offer superior aesthetic outcomes in selected patients with favorable wound characteristics.

**Case Presentation:** A 52-year-old male with no significant medical comorbidities sustained a traumatic soft tissue injury to the right lower extremity following a motorcycle accident. Physical examination revealed a 15 × 10 cm wound with healthy granulation tissue, minimal fibrin deposition, and no evidence of infection or deep structure involvement. Repeated wound cultures were negative, and the patient received intravenous clindamycin and levofloxacin during hospitalization. After surgical debridement and wound bed optimization, definitive coverage was achieved with a non-meshed split-thickness skin graft harvested from the ipsilateral thigh using an air-powered dermatome. On postoperative day five, the graft demonstrated satisfactory integration, with less than 30% partial graft lysis confined to the distal third of the grafted area and no signs of infection. The patient was discharged with adequate wound coverage and continued outpatient follow-up.

**Conclusion:** This case highlights the successful use of a non-meshed split-thickness skin graft for coverage of a traumatic lower-extremity wound in a healthy patient with a well-vascularized, infection-free wound bed. Careful wound preparation, appropriate graft selection, and favorable patient factors contributed to successful graft integration while optimizing aesthetic outcomes.

**Keywords:** Autologous skin graft, Non-meshed skin graft, Plastic surgery, Traumatic wound.

Skin grafts represent one of the most widely used reconstructive tools for restoring skin coverage, allowing the management of tissue defects resulting from a variety of etiologies, including burns, traumatic wounds, chronic ulcers, and oncologic resections [1]. These techniques involve the transfer of skin tissue from a donor site to an appropriate recipient bed and have evolved significantly over time, leading to improved functional and aesthetic outcomes. In reconstructive surgery, skin grafts play a fundamental role in the treatment of soft tissue defects, ranging from small wounds to extensive areas of skin loss [1].

Patients with complex or large wounds often experience physical, psychological, and social limitations that negatively affect their quality of life. In this context, split-thickness autologous skin grafts represent a widely used reconstructive option for achieving definitive wound coverage, promoting healing, and improving both functional and aesthetic outcomes [2].

The management of extensive acute and chronic wounds remains a challenge for wound care providers, frequently requiring multiple procedures, repeated dressing changes, and prolonged treatment courses, thereby imposing a significant burden on both patients and healthcare systems [3]. Among the available reconstructive options, split-thickness skin grafts may be applied in either meshed or non-meshed configurations. Although both techniques have proven effective, the choice depends on the characteristics of the defect, the quality of the recipient wound bed, and the reconstructive goals, particularly when optimizing aesthetic outcomes is a priority [1].

We present the case of a male patient with a traumatic lower-extremity wound secondary to a motorcycle accident who was successfully managed with a non-meshed split-thickness autologous skin graft, highlighting the reconstructive considerations that guided the selection of this technique.

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**Figure 1.** Preoperative view of the traumatic right lower extremity wound demonstrating a well-vascularized wound bed with healthy granulation tissue, minimal fibrin deposition, and no clinical evidence of infection prior to definitive coverage with a non-meshed split-thickness skin graft.

**Figura 2.** Postoperative day 5 following placement of a non-meshed split-thickness skin graft. The graft demonstrates satisfactory integration with less than 30% partial graft lysis localized to the distal portion of the grafted area and no evidence of infection.

## Case report

A 52-year-old male with no known medical comorbidities presented after sustaining a motorcycle-related traumatic injury to the right lower extremity. The accident resulted in an extensive soft tissue wound involving the right leg without exposure of deep structures such as muscle, tendon, bone, or neurovascular elements.

Upon admission, the patient was hemodynamically stable and showed no signs of systemic infection. Wound cultures obtained on two separate occasions were negative for bacterial growth. Intravenous antibiotic therapy consisting of clindamycin and levofloxacin was administered for seven days during hospitalization.

Physical examination revealed a 15 × 10 cm soft tissue defect on the right leg with healthy granulation tissue covering most of the wound bed, minimal fibrin deposition, and no purulent drainage or clinical signs of infection. Given the favorable wound characteristics and absence of deep tissue involvement, surgical reconstruction with a split-thickness skin graft was planned.

On September 8, surgical debridement and wound bed preparation were performed. Intraoperative findings demonstrated a clean wound with viable tissue and no evidence of necrosis or infection. Subsequent wound care promoted further granulation tissue formation.

By September 12, the wound bed showed greater than 95% healthy granulation tissue with minimal residual fibrin and no evidence of infection. Figure 1. Therefore, definitive coverage was achieved using a split-thickness skin graft harvested from the ipsilateral right thigh with an air-powered dermatome. The graft was secured in place and covered with a petrolatum dressing and tie-over bolster.

On postoperative day five, the tie-over dressing was removed. Examination demonstrated satisfactory graft integration with less than 30% partial graft lysis localized to the distal third of the grafted area. The remaining graft appeared viable and well adhered to the wound bed. Figure 2. Given the favorable clinical evolution, absence of infection, and


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adequate wound coverage, the patient was discharged with outpatient follow-up.

## Discussion

Traumatic wounds are defined as injuries caused by an external traumatic agent, resulting in lacerations, incised wounds, puncture wounds, contusions, abrasions, with or without associated fractures [4]. In particular, motorcycle accidents are a frequent cause of soft tissue defects that may require reconstructive procedures to restore both function and coverage [4].

Several reconstructive options are available for traumatic soft tissue defects, including primary closure, healing by secondary intention, skin grafts, and flap reconstruction. Given the small defect size, healthy granulation tissue, absence of infection, and lack of significant comorbidities, a non-meshed split-thickness skin graft was chosen.

Autografts are skin grafts harvested from the same patient. This approach is considered the gold standard in reconstructive surgery because of its high rate of successful integration with the recipient site. As the tissue originates from the same individual, the risk of immunologic rejection is eliminated, promoting more efficient wound healing [1].

Selection of an appropriate donor site is important to optimize cosmetic outcomes. Ideally, the donor skin should resemble the recipient area in thickness, texture, consistency, and pigmentation. Harvesting from facial regions or areas close to joints is generally discouraged [5]. A successful graft take depends not only on graft characteristics but also on the quality of the recipient wound bed. Recipient sites include any anatomical region with adequate microcirculatory supply. Skin grafts can successfully be placed over granulation tissue, dermis, adipose tissue, fascia, muscle, periosteum, perichondrium, and paratenon [5].

Skin grafts may be divided into split-thickness and full-thickness grafts according to the depth of tissue harvested. STSGs include the epidermis and a portion of the dermis, whereas FTSGs contain the full dermal thickness. The donor site of an STSG generally heals by re-epithelialization within two weeks [3]. In the present case, the wound bed demonstrated healthy granulation tissue and no evidence of active infection, creating favorable conditions for definitive graft coverage.

Once an adequate wound bed has been achieved, the surgeon must select the most appropriate graft configuration according to the characteristics of the defect and the reconstructive goals.

Meshed grafts are created using a specialized device that perforates the graft in a mesh-like pattern, allowing it to stretch and adapt to irregularly shaped or larger areas. This technique promotes better coverage and reduces the likelihood of graft failure. In contrast, unmeshed grafts are applied as whole sheets of skin without any perforations, typically used for smaller or cosmetically sensitive areas where appearance is a major concern [6].

Both meshed and non-meshed split-thickness skin grafts are effective options for wound coverage, although each technique has specific advantages and limitations. Non-meshed grafts generally provide superior aesthetic outcomes, with improved texture, pigmentation, and reduced scar contraction; however, they are associated with a higher risk of hematoma and seroma formation beneath the graft, which may compromise graft survival. In contrast, meshed grafts facilitate fluid drainage, improve conformity to irregular wound beds, and may reduce partial graft loss, although they can leave a characteristic mesh pattern and potentially less favorable cosmetic results [7].

Although meshed grafts facilitate drainage and may reduce the risk of hematoma or seroma formation, these advantages were not required in the present case. Given the small wound size, healthy wound bed, absence of infection, and favorable patient factors, a non-meshed split-thickness skin graft was preferred to maximize the aesthetic outcome while maintaining a high likelihood of successful graft take.

Following placement, graft survival depends on a series of biological processes that allow integration with the recipient site.

Early graft survival relies on plasmatic imbibition, followed by inosculation and the establishment of vascular connections with the recipient bed [3].

Skin graft survival depends on adequate graft selection, a well-vascularized and infection-free recipient bed, proper postoperative immobilization, and favorable patient factors. The absence of infection or necrotic tissue, together with good vascularity and the lack of significant comorbidities, are among the most important determinants of successful graft integration [1,7]. Postoperative infection represents the principal independent risk factor for graft failure. Gram-negative bacteria, particularly *Klebsiella* spp. and *Pseudomonas aeruginosa*, are the pathogens most commonly associated with this complication [8].

Our patient had none of the major risk factors associated with graft failure described in the literature, such as diabetes mellitus, peripheral arterial disease, immunosuppressive therapy, or chronic lower-extremity edema. Furthermore, the wound was secondary to trauma, an etiology that has been associated with lower graft failure rates and improved wound healing outcomes, which may have contributed to the successful graft integration observed in this case [2].


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Overall, the favorable outcome observed was likely multifactorial and related to meticulous wound bed preparation, negative wound cultures, adequate vascularization, appropriate graft selection, and careful postoperative immobilization, all of which are recognized determinants of successful graft take.

## Conclusion

The management of traumatic soft tissue defects requires an individualized reconstructive approach based on wound characteristics and patient factors. This case demonstrates that non-meshed split-thickness skin grafting can achieve reliable wound coverage and favorable aesthetic outcomes in appropriately selected patients. Adequate wound bed preparation, infection control, and meticulous postoperative care remain key determinants of successful graft integration.

## Conflicts of interests

The authors declare no conflicts of interests.

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## References

1. Ibero-American Journal of Health Science Research. Role of skin grafts in skin regeneration: comparison between dermatological and surgical approaches. Ibero Am J Health Sci Res. 2025;5(2):603-610. doi:10.56183/iberojhr.v5i2.863.
2. Kinnunen E, Raukola J, Paajanen P, et al. Baseline risk factors for split-thickness skin graft failure: a retrospective cohort study. Scand J Surg. 2026;115(2):194-202. doi:10.1177/14574969261416624.
3. Simman R, Phavixay L. Split-thickness skin grafts remain the gold standard for the closure of large acute and chronic wounds. J Am Coll Clin Wound Spec. 2012;3:99-103. doi:10.1016/j.jcws.2012.06.002.
4. Ameneiro-Romero L, Arantón-Areosa L, Sanmartín-Castrillón R. Clinical update on traumatic soft-tissue wounds. Enferm Dermatol. 2019;13(37):11-24. doi:10.5281/zenodo.3408557.
5. Beyuma-Mora HE, Díaz-Rosas G, Chávez-Suárez MA, de la Parra-Márquez ML. Cutem vivo in: skin autograft in the treatment of burned patients. Cir Plast. 2022;32(4):182-186. doi:10.35366/108773.
6. Samuel J, Gharde P, Surya D, et al. A comparative review of meshed versus unmeshed grafts in split-thickness skin grafting: clinical implications and outcomes. Cureus. 2024;16(9):e69606. doi:10.7759/cureus.69606.
7. Nikkhah D, Dickson WA, Dheansa BS, et al. Comparing outcomes of sheet grafting with 1:1 mesh grafting in patients with thermal burns: a randomized trial. Burns. 2015;41(2):257-264. doi:10.1016/j.burns.2014.07.023.
8. Abdulmughni A, et al. Split-thickness skin graft outcomes and associated risk factors in patients with skin defects at Al-Gumhouri Hospital, Sana'a, Yemen: a prospective observational study. BMC Surg. 2025;25:292. doi:10.1186/s12893-025-03021-5.

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