

# relationship between split- thickness skin graft

*by* Melia Bogari

---

**Submission date:** 08-Sep-2023 11:13AM (UTC+0800)

**Submission ID:** 2160409825

**File name:** relationship\_between\_split-thickness\_skin\_graft.pdf (757.85K)

**Word count:** 991

**Character count:** 5422

## Relationship between Split-thickness Skin Graft and Hemoglobin Level in Burn Patients

Melia Bogari, MD; Agus Santoso Budi, MD; Iswinarno Doso Saputro, MD, PhD

**B**urns are injuries to the skin or tissues that are primarily caused by heat, radiation, radioactivity, electricity, friction, or chemical contact. Burns are a major global public health issue.

The skin constitutes one of the five senses, touch, and is very important for humans to protect the structures underneath. Injuries to the skin, including burns, create a connection between the organs and the external environment, leading to various clinical manifestations, including infection and dehydration. Therefore, when treating wounds caused by burns, we are expected to restore anatomical and functional integrity. Not all wounds can be closed, primarily because the loss of skin is too extensive and requires ample covering tissue for repair. In these cases, split-thickness skin grafting is an option for wound closure.

Split-thickness skin grafting is a basic surgical procedure and is often used to close defects in wounds, including burns. Skin grafting transplants require part or all of the skin thickness from the donor area without vascularization, which is transferred to the recipient area and supplies blood to the graft. Skin grafts require sufficient vascularization to survive before establishing a close relationship with the recipient and after establishing a relationship with the recipient.

After the graft is affixed to the recipient, the graft color changes slowly to pink, indicating recirculation, which occurs owing to the passive transfer of free red blood cells into the graft capillaries. During the first 48 hours, the graft is engorged with plasmatic fluid by diffusion. A poorly vascularized bed requires a longer period of plasmatic imbibition before the graft becomes revascularized.<sup>1</sup>

It should also be noted that this grafting involves pre- and postsurgical aspects. Several problems arise during the healing period from using donor skin grafts, which affect the success of the procedure.

5

From the Department of Plastic and Reconstructive Surgery, Airlangga University School of Medicine, Dr. Soetomo General Academic Hospital Surabaya, East Java, Indonesia.

Received for publication December 22, 2022; accepted May 30, 2023.

Copyright © 2023 The Authors. Published by Wolters Kluwer Health, Inc. on behalf of The American Society of Plastic Surgeons. This is an open-access article distributed under the terms of the Creative Commons Attribution-Non Commercial-No Derivatives License 4.0 (CCBY-NC-ND), where it is permissible to download and share the work provided it is properly cited. The work cannot be changed in any way or used commercially without permission from the journal. *Plast Reconstr Surg Glob Open* 2023; 11:e5114; doi: 10.1097/GOX.00000000000005114; Published online 22 August 2023.



**Fig. 1.** Photograph of a 32-year-old man with severe burns involving upper extremities. The figure shows 5 days post-operative during graft evaluation. The patient had anemia after the surgery, with hemoglobin level less than 10 g/dL. The graft was compromised and only took less than 95% during day 5.



**Fig. 2.** Day-5 postoperative photograph of a 1-year-old male child with severe burns involving the thorax and abdomen. After split-thickness skin graft, the patient had an episode of anemia, and during evaluation at day 5 postoperative, the graft was jeopardized and showed a high risk of failure.

One of the factors that affect the success rate of split-thickness skin grafts is anemia. Anemia often results in poor wound healing because hemoglobin (Hb) is essential for maintaining proper oxygenation.<sup>2</sup>

Hb is an excellent transporter of oxygen molecules to tissues and has a huge impact on the wound healing process. Hb levels more than 10 g/dL are recommended for early wound healing. In major burn cases, the Hb levels may decrease owing to direct thermal injury to the red blood cells and vascular endothelium.<sup>3</sup>

Several split-thickness skin graft procedures for burn patients failed, and all failed cases had Hb levels less than 10 g/dL (Figs. 1 and 2). It is a general rule to maintain Hb levels above 10 g/dL to promote proper wound healing.

Disclosure statements are at the end of this article, following the correspondence information.

As a result, many surgeons advocate for blood transfusions to increase Hb levels and indirectly achieve better wound healing. The decision to transfuse blood either before or after surgery should be considered if the patient's Hb level is less than 10 g/dL.<sup>4</sup> Blood transfusion is an integral aspect of major burn management.<sup>5</sup> From our viewpoint, we recommend performing the transfusion in the first 12 hours after surgery. This is related to nutrition in skin grafts, which begins with a plasmatic circulation process where plasma/serum inhibition processes and oxygen in the graft occur.

**Iswinarno Doso Saputro, MD, PhD**

Department of Plastic and Reconstructive Surgery  
Airlangga University School of Medicine  
Dr. Soetomo General Academic Hospital Surabaya  
E-mail: iswinarno@yahoo.com

#### DISCLOSURE

All the authors have no financial interest to declare in relation to the content of this article.

#### REFERENCES

1. Seyhan T. *Split-thickness Skin Grafts*. 2010.
2. Mahajan NP, GS PK, Gadod L, et al. Study of influence of hemoglobin levels during healing of soft-tissue wounds of high energy trauma to the extremities. *Int J Sci Study*. 2021;8:106–112.
3. Priyankar KD, Chowdhury SR, Aravindan A, et al. Medical and surgical care of critical burn patients: a comprehensive review of current evidence and practice. *Curus*. 2022; 14:e31550.
4. Agarwal P, Prajapati B, Sharma D. Evaluation of skin graft take following post-burn raw area in normovolaemic anaemia. *Indian J Plast Surg*. 2009;42:195–198.
5. Tina L. Palmieri. Burn injury and blood transfusion. *Curr Opin Anesthesiol*. 2019;32:247–251.

# relationship between split-thickness skin graft

---

## ORIGINALITY REPORT

---

7%

SIMILARITY INDEX

3%

INTERNET SOURCES

6%

PUBLICATIONS

0%

STUDENT PAPERS

---

## PRIMARY SOURCES

---

- 1 "Multiple spinal extradural arachnoid cysts occurring in a child", Neurosurgical FOCUS, 02/2007  
Publication 1%
- 2 Mochammad Thaha. "Intravenous N-Acetylcysteine during Haemodialysis Reduces the Plasma Concentration of Homocysteine in Patients with End-Stage Renal Disease", Clinical Drug Investigation, 2006  
Publication 1%
- 3 Ali Solhpour, Siddharth Kumar, Matthew J. Koch, Sylvain Doré. "Impact of blood component transfusions, tranexamic acid and fluids on subarachnoid hemorrhage outcomes", Brain Hemorrhages, 2022  
Publication 1%
- 4 Jay T. Bishoff, Antonio Reyes, Ian M. Thompson, Michael J. Harris, Stephen R. St Clair, Leonard Gomella, Clifford A. Butzin. "Pelvic lymphadenectomy can be omitted in selected patients with carcinoma of the

prostate: development of a system of patient selection", Urology, 1995

Publication

5

R. Erkin Ünlü, A. Eksal Kargi, Selim Çelebioğlu, Bülent Erdoğan, Ömer Şensöz.

"Reconstruction of the upper extremity with a compound rib-latissimus dorsi osteomusculocutaneous flap", Scandinavian Journal of Plastic and Reconstructive Surgery and Hand Surgery, 2009

Publication

1 %

6

[link.springer.com](http://link.springer.com)

Internet Source

1 %

7

[www.ijps.org](http://www.ijps.org)

Internet Source

1 %

Exclude quotes  On

Exclude matches  Off

Exclude bibliography  On

# relationship between split-thickness skin graft

---

GRADEMARK REPORT

---

FINAL GRADE

GENERAL COMMENTS

**/100**

---

PAGE 1

---

PAGE 2

---