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VIEWPOINT
Burns

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

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Burns 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 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.[1]

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.

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



*Plast Reconstr Surg Glob Open 2023; 11:e5114; doi: 10.1097/GOX.0000000000005114; 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 postoperative 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.[2]

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.[3]

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.[4] Blood transfusion is an integral aspect of major burn management.[5] 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.

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## DISCLOSURE

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

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