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Skin Graft Failure in Reconstructive Surgery: A Descriptive Retrospective Study

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Abstract | **Original Research Article**

Skin grafting is a surgical procedure involving the harvesting of a skin fragment, either partial-thickness (split-thickness) or full-thickness, for transplantation onto an area lacking skin tissue, in order to provide coverage, promote healing, and restore function and appearance. Skin graft failure, manifested as partial or total graft loss, is a common complication in reconstructive and trauma surgery that may compromise wound healing and skin function. We conducted a retrospective study of 20 skin graft cases to analyze the risk factors associated with graft failure. The data collected included age, sex, medical history, type and location of lesions, type of graft, and complications. Analysis of these cases makes it possible to identify clinical and surgical factors that may influence graft success and optimize patient management. This study highlights the importance of careful patient selection and adequate preparation of the recipient bed to reduce the risk of graft loss and improve clinical outcomes.

Keywords: Skin graft, graft failure, risk factors, graft loss, retrospective study, reconstructive surgery.

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I. INTRODUCTION

Skin grafting is a surgical technique that involves harvesting a skin fragment from a donor site and transplanting it onto a tissue defect in order to achieve definitive skin coverage. It is widely used in reconstructive surgery, particularly for burns, trauma, and following tumor excision. Despite its apparent simplicity, skin grafting remains a delicate procedure, and failure may compromise wound healing, prolong hospitalization, and increase the burden of care.

II. MATERIALS AND METHODS

This was a descriptive retrospective study conducted in the Department of Reconstructive and Aesthetic Surgery over the period from August 2025 to January 2026.
The study included 20 patients who experienced skin graft failure.

1. Inclusion criteria

All adult and pediatric patients meeting the inclusion criteria who were admitted to the plastic surgery department during the study period (August 2025–January 2026), presenting with a skin defect treated with a skin graft that subsequently developed partial or total graft loss, were included in this study.

2. Data collection

Data were collected using a standardized data collection form created with Google Forms.

3. Study parameters

The analyzed parameters were divided into several categories:

Patient-related data
- Age
- Sex
- Comorbidities
- Postoperative hemoglobin level (assessment for anemia)

Data related to the tissue defect
- Etiology of the tissue defect
- Location
- Condition of the recipient bed

Data related to skin grafting
- Type of graft performed
- Graft bed conditions
- Fixation technique
- Immobilization

Data related to graft failure

- Compliance or non-compliance with the recommended postoperative position
- Occurrence of postoperative infection
- Type of failure (partial loss, total loss, or soggy graft)
- Time to graft failure

4. **Statistical analysis**

Statistical analysis was descriptive, with results expressed as numbers and percentages.

III. RESULTS

1. General patient characteristics

a. Age and sex

- Twenty patients were included in the study.
- The mean patient age was 37.8 years, ranging from 1 to 91 years (Figure 1).
- The study population comprised 11 men (55%) and 9 women (45%) (Figure 2).

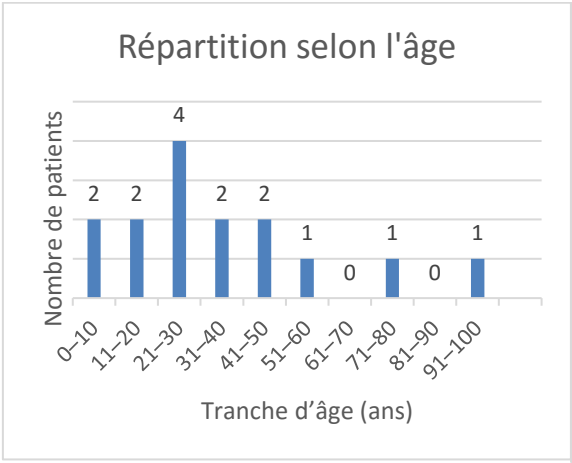


Figure 1: Distribution of patients by age

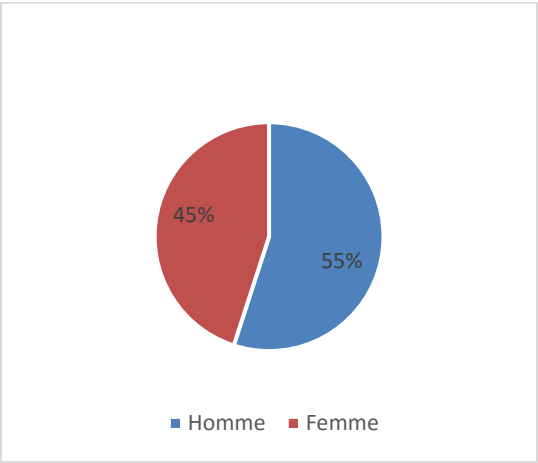


Figure 2: Distribution of patients by sex

b. Comorbidities and clinical background

Among the 20 patients included:

Eight patients (40%) had at least one comorbidity, whereas 12 patients (60%) had no associated comorbidity.

The most common comorbidities were diabetes (15%), hypertension (10%), and heart disease (10%) (Figure 3).

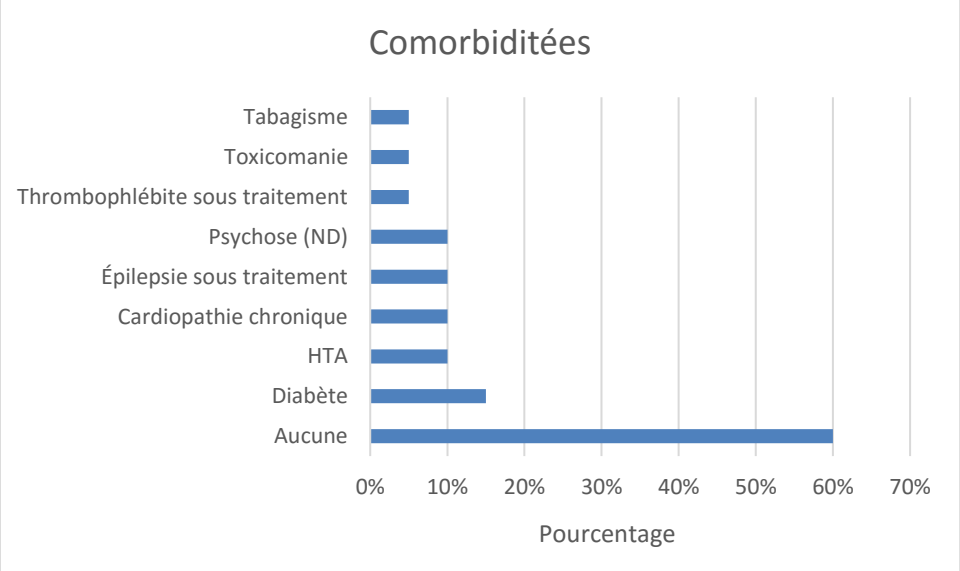


Figure 3: Distribution of patients according to comorbidities

2. Data-t-on the tissue defect

a. Etiology of the tissue defect

The main causes of skin defects in our 20 patients were:

Table 1: Etiologies of tissue defects

Etiology	Percentage
Burn	65 %
Tumor-related	15 %
Traumatic	15 %
Infectious	5 %

b. Location of the tissue defect

Regarding the location of the tissue defects:

The lower limb was the most frequent location (50%), followed by the trunk, upper limbs, and face/scalp (Table 2).

Table 2: Location of tissue defects

Location	Percentage
Lower limb	50 %
Trunk	20 %
Face / scalp	15 %
Upper limb	15 %
Perineum	5 %

c. Surface area of the tissue defect

The surface area of the tissue defects was expressed as a percentage of total body surface area (TBSA) (Figure 4).

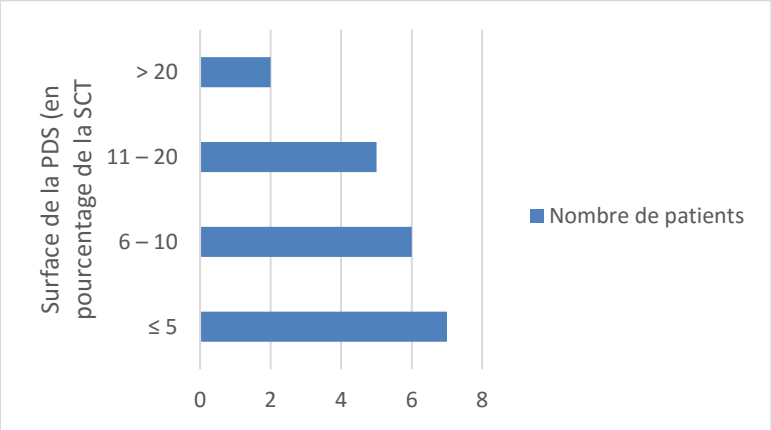


Figure 4: Distribution of patients according to tissue defect surface area

Most patients (65%) had a tissue defect involving 10% or less of total body surface area, corresponding to small- to medium-sized grafts.

d. Condition of the graft recipient bed

The condition of the recipient bed before skin grafting was assessed in all 20 patients (Table 3).

Table 3: Condition of the graft recipient bed

Granulation tissue type / recipient-bed condition	Percentage
Clean granulation tissue	55 %
Healthy granulation tissue or bleeding on contact	30 %
Hypertrophic or sclerotic granulation tissue, or tissue covered with fibrin	15 %

3. Data-on skin grafting

a. Interval between onset of the tissue defect and skin grafting

The interval between the onset of the tissue defect and skin grafting was calculated in months for each patient (Table 4):

Table 4: Interval between onset of the tissue defect and skin grafting

Interval (months)	Percentage
≤ 1 mois	20 %
1,1 – 2 mois	30 %
2,1 – 3 mois	25 %
> 3 mois	25 %

Most patients (50%) underwent grafting within the first 2 months after the onset of the tissue defect, whereas one-quarter of patients underwent grafting more than 3 months later.

b. Type of graft and fixation technique

All grafts that failed in our series were split-thickness skin grafts (100%).

Most grafts were secured using staples alone (95%); the remaining grafts were secured using sutures combined with staples (5%) in areas of the face or neck.

c. Dressing of the grafted area

All grafts were covered with a silver-impregnated interface dressing (Urgotul Silver), topical anti-inflammatory agents (Locatop, Agiderm), and a compressive bandage.

d. Immobilization of the grafted area

Immobilization of the grafted area was adapted to the location of the tissue defect. Depending on the case, it involved a tie-over bolster dressing, an immobilization splint, or a compressive dressing to ensure optimal graft fixation (Table 5):

Table 5: Type of immobilization of the grafted area

Type of immobilization	Percentage (%)
Dressing	40
Dressing + tie-over bolster	35
Dressing + splint	25

4. Risk factors studied

1. Non-compliance with the recommended position

Compliance with the postoperative positioning instructions intended to limit mechanical stress on the skin graft was analyzed in all patients.

Non-compliance with positioning instructions was observed in 45% of patients, whereas 55% complied with the postoperative recommendations.

Non-compliance with positioning instructions mainly concerned grafts located on the lower limbs and in mobile areas, where prolonged immobilization was more difficult to maintain.

2. Postoperative infection

The occurrence of infection at the graft site during the postoperative period was analyzed in all patients.

Local infection was observed in 25% of patients, whereas 75% showed no signs of postoperative infection.

Infection was clinically suspected in the presence of greenish wound dressings, foul odor, local inflammation, or delayed graft take, and was subsequently confirmed by bacteriological examination of local samples.

3. Timing of infection onset

Among the patients who developed a postoperative infection (n = 5), infection occurred early (within the first 5 postoperative days) in 4 patients and late (after 5 days) in 1 patient.

Table 6: Time to onset of infection

Time to onset of infection	Percentage (%)
≤ 5 days (early)	83,3 %
> 5 days (late)	16,7 %

4. Postoperative hemoglobin level

- Postoperative hemoglobin levels were analyzed in all 20 patients to assess the impact of possible anemia on skin graft take.
- Postoperative anemia (Hb < 12 g/dL) was found in most patients. Fifty percent had a hemoglobin level below 10 g/dL.
- Thirty-five percent of patients had a hemoglobin level between 10 and 11.9 g/dL.
- Only 15% had a hemoglobin level ≥ 12 g/dL.

Table 7: Postoperative anemia

Postoperative hemoglobin level	Percentage (%)
< 10 g/dL	50 %
10 – 11,9 g/dL	35 %
≥ 12 g/dL	15 %

5. Outcome

a. Type of graft failure

- The types of failure observed in the patients were distributed as follows:
- Partial graft loss: 70%
- Total graft loss: 20%
- Soggy graft: 10%
- Partial graft loss was therefore the most common type of failure in our series.

b. Time to detection of graft failure

The time to detection of graft failure refers to the time at which graft loss or poor graft take is clinically observed after removal of the dressing. In our series, most failures (85%) were detected early, within the first five postoperative days, while 15% were detected between the sixth and tenth days. No failures were detected after ten days.

Table 8: Time to detection of graft failure

Time to detection of graft failure	Percentage (%)
≤ 5 days (early)	85 %
6–10 days	15 %
> 10 days	0 %

c. Secondary management

Following the identification of graft failure, secondary management was instituted in all patients. Most patients (90%) underwent healing by secondary intention, whereas 10% required repeat skin grafting.

IV. DISCUSSION

1. Demographic characteristics and comorbidities

In our retrospective series of 20 patients, the mean age was 37.8 years, with a slight male predominance (55%). These characteristics are comparable to those reported by Echmili et al. in a retrospective study conducted in Tangier, Morocco, involving 63 patients (68 grafts), in which the median age was 41 years and men predominated, highlighting the relative homogeneity of the demographic profiles of patients undergoing skin grafting in the Maghreb countries [2].

Forty percent of patients had at least one comorbidity, mainly diabetes and hypertension. Although these comorbidities were not identified as independent risk factors for failure in our series, Abdulmughni et al. showed that a preoperative hemoglobin level ≤10 g/dL was associated with an increased risk of graft failure in univariate analysis ($p = 0.036$), highlighting the importance of the patient's general condition [1].

2. Etiologies and locations of tissue defects

Burns accounted for 65% of graft indications in our series, followed by tumor-related and traumatic etiologies (15% each). This distribution is very similar to that reported by Abdulmughni et al., in which burns were also the predominant etiology (65.2%) [1].

The lower limb was the most frequent location (50%). This predominance is consistent with several studies showing that lower-limb grafts have a higher risk of failure because of sometimes poor vascularity, dependent edema, and local mechanical stress [3,6,10].

3. Technical aspects of skin grafting

In our series, most patients had a clean or healthy granulating recipient bed before grafting. This observation is consistent with current recommendations, which consider a well-vascularized recipient bed, free of necrotic tissue and infection, to be essential for graft take [12,14].

Haris *et al.* showed that optimal preparation of the recipient bed significantly improves skin graft take rates, particularly in chronic wounds [13].

Furthermore, Pinho *et al.* demonstrated through Laser Speckle analysis that recipient-bed perfusion is directly correlated with graft survival: better vascularization is associated with a reduction in postoperative necrosis [11].

These data confirm that the quality of the recipient bed remains one of the main determinants of successful skin grafting.

4. Specific risk factors

a. Postoperative positioning

In our series, 45% of patients did not comply with postoperative immobilization instructions. Although few studies have quantitatively assessed this factor, several authors consider that early movement promotes shear forces between the graft and its recipient bed, thereby compromising initial revascularization [8,12].

b. Postoperative infection

Postoperative infection was observed in 25% of patients, most often during the first five days. Abdulmughni et al. identified postoperative infection as the main independent risk factor for graft failure in multivariate analysis [1]. Other studies confirm that

infection significantly increases the risk of graft loss by disrupting graft integration [6,8].

c. Postoperative hemoglobin level

In our study, 50% of patients had a hemoglobin level below 10 g/dL. This finding is consistent with the results of Abdulmughni *et al.,* who showed that severe anemia reduced the likelihood of graft survival because of impaired tissue oxygenation, although this variable did not remain significant after multivariate adjustment [1].

5. Type and timing of graft failure

Partial graft loss accounted for 70% of failures observed in our series. Most failures (85%) were diagnosed within the first five postoperative days. This course is comparable to that described by Abdulmughni *et al.,* in whose study complications responsible for graft failure occurred mainly during the first postoperative week [1].

These results highlight the importance of close clinical monitoring during the first few days following grafting.

6. Secondary management

In our series, healing by secondary intention was the standard treatment following graft failure, while surgical revision was performed in only a limited number of cases. This therapeutic approach is consistent with the observations reported by Abdulmughni *et al.,* and Echmili *et al.,* [1,2].

Current recommendations suggest reserving repeat grafting for large tissue defects, exposed tendons or bone, and situations in which infection is fully controlled [12,14].

7. Key messages

Our study confirms that skin graft failure results from a combination of local and systemic factors. The quality of the recipient bed, infection control, postoperative immobilization, and the patient's general condition appear to be the main determinants of graft take [1,11–14].

Most failures occur during the first five postoperative days, a period requiring particularly careful clinical monitoring. In the event of graft failure, healing by secondary intention remains the preferred therapeutic strategy, while repeat grafting should be reserved for carefully selected indications in accordance with current recommendations [12,14].

V. CONCLUSION

In conclusion, our study highlights that although skin graft failure remains relatively uncommon, it has a real impact on patient management. The key lies in optimizing local and systemic conditions before and after grafting. Careful monitoring during the first postoperative week makes it possible to identify problems promptly and adapt management, favoring healing by secondary intention and reserving repeat grafting for situations in which it is truly necessary.

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