Journal of Neonatal Surgery
ISSN(Online): 2226-0439
Vol. 14, Issue 30s (2025)
https://www.jneonatalsurg.com

OPEN ACCESS

Evaluation Of Factors That Affect Acceptance Of Split Thickness Skin Graft (STSG)

Dr. Jayrajsinh Mori[1], Dr. R. G. Naniwadekar[2], Dr. Dhara Dodia[3]

[1]M.B.B.S. Department of General Surgery, Krishna Institute Medical Sciences, KVV, Karad, Maharashtra, India

[2]Medical Administrator and Professor, Department of General Surgery,

Krishna Institute Medical Sciences, KVV, Karad, Maharashtra, India

[3] M.B.B.S. Department of Pathology, Krishna Institute Medical Sciences, KVV, Karad, Maharashtra, India

Cite this paper as: Dr. Jayrajsinh Mori, Dr. R. G. Naniwadekar, Dr. Dhara Dodia, (2025) Evaluation Of Factors That Affect Acceptance Of Split Thickness Skin Graft (STSG). *Journal of Neonatal Surgery*, 14 (30s), 1104-1110.

ABSTRACT

Background: Split thickness skin grafts (STSGs) remain a cornerstone in reconstructive and burn surgery due to their versatility and effectiveness. Despite their widespread application, variability in graft acceptance persists due to several patient and procedural factors.

Methods: A prospective observational study was conducted at Krishna Institute of Medical Sciences, Karad, from May 2023 to December 2024. Thirty-five patients undergoing STSG were evaluated based on pre- and postoperative variables including age, comorbidities, addictions, and fixation techniques. Statistical analysis was performed using SPSS v20.

Results: Patients under 35 years demonstrated the highest graft acceptance rates (p=0.033). Comorbidities, particularly diabetes mellitus, significantly reduced graft survival (p=0.027). Gender and addictions did not show statistically significant correlation with graft acceptance. Postoperative infection and fixation technique played substantial roles in graft outcomes.

Conclusion: Age and systemic comorbidities are critical predictors of STSG acceptance. Proper patient selection, preoperative optimization, and infection control can enhance graft survival and patient outcomes.

Keywords: *STSG, skin graft acceptance, graft rejection, comorbidities, postoperative infection, surgical outcomes*

1. INTRODUCTION

The skin, accounting for approximately 16% of total body weight, is the largest organ in the human body and serves multiple essential functions beyond physical protection, including thermoregulation, immunologic defence and vitamin D synthesis through its epidermal layer [1]. Its anatomical exposure makes it highly susceptible to injury, necessitating prompt and effective restoration techniques. Among these, Split Thickness Skin Grafts (STSGs) have emerged as a standard and reliable method of reconstructive surgery.

STSGs include the epidermis and a portion of the dermis, providing a versatile option for the coverage of wounds resulting from burns, trauma, infections, chronic ulcers, and surgical resections such as Modified Radical Mastectomy (MRM) [2]. Their ability to cover large surface areas with relatively quick recovery makes them particularly valuable when local flaps or primary closure are not feasible.

The biological integration of an STSG involves a sequence of events including imbibition, inosculation, and revascularization, all of which are dependent on recipient site conditions and the patient's overall systemic health [3]. Complications such as partial or complete graft loss, infection, or excessive scarring are influenced by a wide range of factors. These include patient-related variables such as age, nutritional status, presence of comorbidities like diabetes and peripheral vascular disease, immunologic competence, and lifestyle factors like smoking and alcohol consumption [4– 6]. Likewise, surgical and postoperative elements such as graft thickness, fixation technique (e.g., sutures or staples), wound bed preparation, and dressing protocol significantly affect outcomes [7].

Despite the widespread use of STSGs, there is no universal consensus regarding the precise determinants of graft acceptance or failure. Although various studies have attempted to isolate individual predictors, comprehensive analyses that integrate both preoperative and postoperative variables in a clinical setting remain limited [8]. In resource-constrained settings such as India, mesh skin grafting remains a vital modality for wound management; yet, scientific evaluations on its outcomes are sparse [9–11].

This study was conducted with the aim of evaluating the factors that affect the acceptance of split thickness skin grafts, using a prospective observational approach. By identifying key clinical, surgical, and systemic contributors to graft success or failure, this research intends to provide data that may guide more effective patient selection, operative techniques, and postoperative care strategies.

2. MATERIALS AND METHODS

This prospective observational study was conducted in the Department of General Surgery at Krishna Hospital & Medical Research Centre, Karad, from May 2023 to December 2024. A total of 35 patients undergoing split thickness skin grafting (STSG) were enrolled based on inclusion criteria, with ethical clearance and informed consent obtained prior to participation.

All patients underwent routine preoperative assessments including hemoglobin estimation, blood sugar, serum creatinine, serum protein levels, and wound swab culture. The STSG procedure involved harvesting skin grafts from suitable donor sites such as the thigh or back using a dermatome or Humby knife. Grafts were meshed when needed and secured using either sutures or staples, depending on the case.

Postoperative follow-up was conducted on post-operative day (POD) 3, 5, and 21. Graft acceptance was evaluated clinically by assessing adherence, colour and signs of infection. Pain levels were assessed using the Numerical Rating Scale (NRS) or Faces Rating Scale (FRS) and complications such as seroma, infection, or graft loss were recorded. Duration of hospital stay was also documented.

Data were analysed using SPSS version 20.0, applying Chi-square, t-tests, or Mann-Whitney U tests as appropriate, with $p<0.05$ considered statistically significant.

3. RESULTS

A total of 35 patients were enrolled in the study.

Table 1. Demographical Information

Characteristics	**Frequency(n)**	**Percentages (%)**
Age group		
<35	16	45.71%
36-50	8	22.86%
>51	11	31.43%
Gender		
Male	26	74.29%
Female	9	25.71%
Co-morbidities		
No	19	54.29%
Hypertension	6	17.14%
AKI, carcinoma, Hepatitis B	6	17.14%

Type II DM	4	11.43%
Addictions		
No	26	74.29%
Alcohol	3	8.57%
Mishri chewer	2	5.71%
Tobacco chewer	4	11.43%
Post operative infection		
Present	12	34.29%
Absent	23	65.71%
Graft Fixation technique		
Staples	17	48.57%
Sutures	18	51.43%

Out of the 35 patients, 26 (74.29%) were male and 09 (25.71%) were female, according to table no. 1 above. The study population ranged in age from 12 to 75 years old, with a mean age of 41.71±18.21 years. The majority of patients (45.71%) were under 35 years old.

54.29% of patients were having no comorbidities. 17.14% of patients were having hypertension and 17.14% of patients were having common comorbidities such as Hepatitis B, cancer, and acute kidney injury and 11.43% of patients had DM type 2.

26 patients (74.29%) did not exhibit any addictions while rest patients had addiction of mishri or alcohol or tobacco.

Patients with post-operative infections were absent in 23 cases (65.71%) and present in 12 cases (34.29%).

Graft attachment techniques such as the staples technique, which was used on 17 patients (48.57%), and the sutures technique, which was used on 18 patients (51.43%).

Table 2. Association of age group with Graft Acceptancy

Age group	**Total**	**Graft Acceptancy**		**chi-square test**	
		Accepted	**Partially/ completely rejected**	**t value**	**p value**
<35	16(45.71%)	14(40%)	2(5.71%)	**6.81**	**0.033(Significant)**
36-50	8(22.86%)	3(8.57%)	5(14.29%)		
>51	11(31.43%)	6(17.14%)	5(14.29%)		

According to table 2, the majority of patients are in the age category under 35 and out of these graft accepted in 14 (40%) patients and rejected in 2 (5.71%) patients. Graft accepted of 3 patients (8.57%) and rejected of 5 patients (14.29%) in the age category of 36 to 50 years. Graft rejected of 5 patients (14.29%) and accepted of 6 patients (17.14%) in the age range of 51 and more.

Table 3. Association of Gender with Graft Acceptancy

Gender	Total	Graft Acceptancy		chi-square test	
		Accepted	Partially/ completely rejected	t value	p value
Male	26(74.29%)	17(48.57%)	9(25.71%)	**0.0049**	**0.944(not Significant)**
Female	9(25.71%)	6(17.14%)	3(8.57%)		

Table 3 above. indicated that out of 26 male patients 17 (48.57%) patients

had grafts accepted and 9 (25.71%) patients had grafts rejected. 3 (8.57%) of the female patients had their graft rejected, while 6 (17.14%) had their graft accepted.

Table 4. Association of Co- morbidities with Graft Acceptancy

Co- morbidities	Total	Graft Acceptancy		chi-square test	
		Accepted	Partially/ completely rejected	t value	p value
No	19(54.29%)	15(42.86%)	4(11.43%)	**9.15**	**0.027(Significant)**
Hypertension	6(17.14%)	4(11.43%)	2(5.71%)		
AKI, carcinoma, Hepatitis B	6(17.14%)	4(11.43%)	2(5.71%)		
Type II DM	4(11.43%)	0	4(11.43%)		

Table 4 above indicating that the majority of patients 19(54.29%) had no comorbidities and out of these patients graft accepted in 15(42.86%) patients while rejected in 4(11.43%) patients. Patients with hypertension Graft rejected of 2 patients (5.71%) and accepted of 4 patients (11.43%). Graft

accepted of 4 patients (11.43%) and rejected of 2 patients (5.71%) with other comorbidities like AKI, carcinoma, hepatitis B, while patients having type II diabetes mellitus, graft rejected of 4 patients (11.43%) while no Graft accepted patients.

Table 5. Association of addictions with Graft Acceptancy

Addictions	Total	Graft Acceptancy		chi-square test	
		Accepted	Partially/ completely rejected	t value	p value
No	26(74.29%)	19(54.29%)	7(20%)	**3.789**	**0.285(not Significant)**
Alcohol	3(8.57%)	2(5.71%)	1(2.86%)		
Mishri chewer	2(5.71%)	1(2.86%)	1(2.86%)		
Tobacco chewer	4(11.43%)	1(2.86%)	3(8.57%)		

Table 5 above. showed that 26(74.29%) patients had no addictions and out of these 7 patients (20%) had graft rejection, while 19 patients (54.29%) had graft acceptance. Graft rejected of 1 (2.86%) and Graft accepted of 2 (5.71%) of the alcohol consumer patients. Graft acceptance and rejection for Mishri chewer patients was 1 (2.86%) for each. Graft rejected patients were 3 (8.57%) and Graft acceptable patients were 1 (2.86%) among tobacco chewers.

Table 6. Association of post operative infection with Graft Acceptancy

Post operative infection	Total	Graft Acceptancy		chi-square test	
		Accepted	Partially/ completely rejected	t value	p value
Present	12(34.29%)	2(5.71%)	10(28.57%)	**19.5**	**p<0.0001(Significant)**
Absent	23(65.71%)	21(60%)	2(5.71%)		

In table 6 above, which displays post-operative infection present patients, 2 (5.71%) had grafts accepted and 10 (28.57%) had grafts rejected. Graft rejection was seen in 2 individuals (5.71%), while Graft acceptance was found in 21 patients (60%) without post-operative infection.

Table 7. Association of Graft fixation technique with Graft Acceptancy

Graft Fixation technique	Total	Graft Acceptancy		chi-square test	
		Accepted	Partially/ completely rejected	t value	p value
Staples	17(48.57%)	13(37.14%)	4(11.43%)	**1.7**	**0.193(not Significant)**
Sutures	18(51.43%)	10(28.57%)	8(22.86%)		

In Table 7, graft fixation technique was displayed. Patients in whom graft fixation done using staples, graft accepted of 13(37.14%) patients and graft rejected of 4(11.43%) patients. While Patients in whom graft fixation done using sutures, graft accepted of 10(28.57%) patients and graft rejected of 8(22.86%) patients.

4. DISCUSSION

Split-thickness skin grafting (STSG) remains a vital reconstructive technique in modern surgical practice, especially for covering wounds caused by trauma, infection, burns, or surgical excisions. The success of STSG is influenced by several factors, including patient demographics, comorbidities, surgical technique, and post-operative care.

In this study, younger patients (under 35 years) demonstrated significantly higher graft acceptance. This may be attributed to better vascular supply, greater regenerative potential, and fewer systemic complications in younger individuals, all of which contribute to improved graft uptake.

A significant association was observed between the presence of comorbidities and graft rejection. Notably, patients with diabetes mellitus experienced complete graft failure. This can be explained by delayed wound healing due to microvascular changes, neuropathy, and impaired immune response. Other conditions such as hypertension and chronic infections may also negatively influence graft survival.

Post-operative infection was associated with an increased rate of graft rejection. Infection disrupts the process of revascularization and can lead to graft necrosis. This underscores the importance of strict aseptic surgical technique and effective infection control throughout the perioperative period.

Although not statistically significant, patients with addictions—particularly those using tobacco—had a higher incidence of graft rejection. The vasoconstrictive and hypoxic effects of nicotine likely impair the integration and survival of the graft.

There was no significant difference in graft acceptance between patients who had staples versus sutures for graft fixation. This suggests that the method of fixation is less critical than ensuring adequate immobilization during the early phases of graft healing.

Successful graft take requires a clean, well-vascularized wound bed. The biological process involves three key stages: imbibition, inosculation, and revascularization. These processes can be disrupted by hematoma, seroma, infection, or mechanical shear forces. Additionally, maintaining a moist wound environment and using proper dressing techniques can enhance graft adherence and epithelialization.

5. CONCLUSION

These findings collectively comes to a conclusion that younger patients without comorbidities and those without post-operative infections have a higher likelihood of successful graft acceptance.

These findings can guide surgical decision-making, patient counselling, and preoperative and postoperative management strategies to enhance graft success rates.

Further research with a larger cohort and longer follow-up periods is recommended to validate and expand upon these insights.

REFERENCES

[1] Johnson TM, Ratner D, Nelson BR. Skin and skin disorders. In: Goldman L, Schafer AI, editors. Goldman-Cecil Medicine. 24th ed. Philadelphia: Elsevier Saunders; 2011.

[2] Atiyeh BS, Hayek SN. Management of acute and chronic open wounds: the importance of moist environment in optimal wound healing. Curr Pharm Biotechnol. 2005;6(4):349–66.

[3] Brissett AE, Sherris DA. Skin grafts, flaps, and local tissue rearrangement. Otolaryngol Clin North Am. 2001;34(3):489–500.

[4] Cigna E, Buccheri EM, Monarca C, et al. Split-thickness skin grafts: Histological studies and clinical evaluation. J Cutan Aesthet Surg. 2009;2(2):68–72.

[5] Janzekovic Z. A new concept in the early excision and immediate grafting of burns. J Trauma. 1970;10(12):1103–8.

[6] Voineskos SH, Ayeni OA, McKnight L, et al. Systematic review of skin graft donor-site dressings. Plast Reconstr Surg. 2009;124(1):298–306.

[7] Winter GD. Formation of the scab and the rate of epithelialization of superficial wounds in the skin of the young domestic pig. Nature. 1962;193:293–4.

[8] Nischal KC, Khopkar U. Skin grafts. In: Valia RG, Valia AR, editors. IADVL Textbook of Dermatology. 3rd

ed. Mumbai: Bhalani Publishing House; 2008.

[9] Sinha R, Maitra S, Ray S, et al. Evaluation of wound bed preparation and its impact on acceptance of skin graft. Int Surg J. 2018;5(1):104–9.

[10] Rudraiah HGM, Honnungar RS, Shivamurthy MC. Factors affecting acceptance of split thickness skin graft in surgical wounds. MedPulse Int Med J. 2017;4(10):678–81.

[11] Subrahmanyam M. A prospective randomized clinical and histological study of superficial burn wound healing with honey and silver sulfadiazine. Burns. 1998;24(2):157–61.