Original Article

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Outcome of Full-Thickness Skin Graft in Post-Burn Finger Contractures

Wasi Ur Rahman[1*], Irfan ullah[1], Muhammad Moazzam Farooq[1], Muhammad Tariq[1], Umair Ali Shah[1]

[1] *Burns and Plastic Surgery Centre, MTI, Hayatabad Medical Complex, Peshawar- Pakistan*

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Corresponding Author
Wasi Ur Rehman
Burns and Plastic Surgery Centre, MTI, Hayatabad Medical Complex, Peshawar- Pakistan.
Email: wasidawar3@gmail.com

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Abstract

Objective: To determine the outcomes of full-thickness skin grafts in patients with post-burn finger contractures.

Methodology: This descriptive study from October--2025 to June-2026 was conducted at Department of Plastic surgery, Hayatabad Medical Complex. Study enrolled one hundred and twenty-nine patients aged 5 to 45 years with post-burn finger contractures. Patients with non-burn contractures, uncontrolled systemic diseases, active infection, and cognitive impairment were excluded. All the patients underwent full thickness skin graft procedure using aseptic technique. Graft take was assessed at the first dressing change on day 5 to 7. Functional outcomes were assessed at three months using range of motion and the Disabilities of the Arm, Shoulder and Hand (DASH) score. Data was analyzed using SPSS 27. Wilcoxon singed rank test was used, keeping p value ≤ 0.05 as significant.

Results: The median age of 129 patients was 24.00 years (IQR:14-34), with male patients 88 (68.2%) and 41 (31.8%) female patients. Excellent range of motion was observed in 41 (31.8%) cases, good in 45 (34.9%), fair in 28 (21.7%), and poor in 15 (11.6%) cases. Graft take was excellent in 79 (61.2%) cases, and good in 30 (23.3%) cases, The median DASH score improved significantly from preoperative to postoperative ($p < 0.001$).

Conclusion: Full thickness skin graft procedure demonstrated excellent to good range of motion in majority of the patients with post-burn finger contractures. Significant improvement in DASH score postoperatively was observed.

Keywords: DASH score, finger contracture, full thickness skin graft, post burn contracture, range of motion

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Introduction

Post-burn hand deformities pose a serious reconstructive challenge owing to the intricate anatomy of the hand and its crucial role in daily activities. Among these deformities, finger contractures are particularly disabling, as they restrict joint mobility and compromise the ability to perform essential tasks, including writing and grasping objects.[1,2] These contractures lead to aesthetic deformity and diminished quality of life. Despite advances in burn prevention and acute burn care, post-burn contractures remain a significant cause of long-term disability in low-income countries, where delayed presentation and inadequate rehabilitation remain common.[3] Burn scar contractures develop as a result of excessive wound contraction during the healing process. Deep burns are more prone to abnormal scar formation due to extensive destruction of the dermis.4 Fingers are particularly susceptible to contracture development due to their thin soft-tissue envelope and continuous movement.[4,5] Flexion contractures are more commonly encountered than extension deformities and may involve the proximal interphalangeal or metacarpophalangeal joints. If left untreated, progressive fibrosis can result in joint stiffness and secondary skeletal deformities, making subsequent reconstruction progressively more complex.[6,7]

Successful management of post-burn finger contractures necessitates the complete release of the contracted scar, followed by stable resurfacing of the resulting soft-tissue defect. The reconstructive approach selected should restore joint mobility, provide durable skin coverage, and achieve an acceptable cosmetic outcome.8 The choice of reconstruction is based on the size and location of the defect, the availability of donor tissue, and the functional demands of the patient. Full-thickness skin grafting has gained widespread acceptance for the treatment of post-burn finger contractures.9 A full-thickness skin graft comprises the complete epidermis and dermis, thereby preserving the normal dermal architecture, which results in improved elasticity and resistance to secondary contraction. Adequate release of scar tissue remains the foundation of successful surgical treatment.10 Complete excision of the contracture allows restoration of joint alignment and correction of soft-tissue tension prior to graft placement. Patient adherence to rehabilitation protocols plays a vital role in preserving the range of motion and maximising functional recovery.[10,11]

Post-burn finger contractures can significantly impair hand function and joint mobility. Full-thickness skin grafting provides the durable coverage and greater resistance to secondary contraction. Evidence regarding its functional outcomes in post-burn finger contractures remains limited. The findings will provide locally relevant evidence regarding the effectiveness of this technique and may assist in selecting appropriate reconstructive options. Successful treatment may improve hand function and cosmetic appearance while reducing the risk of recurrent contracture and further surgical intervention.

Methodology

This study was carried out in the department of Plastic surgery, Hayatabad Medical Complex, Peshawar. An ethical approval was taken from the Institution Research And Ethical Committee (Approval no. 2722). One hundred twenty nine patients were selected for this study using non-probability consecutive sampling. Sample size was calculated using openepi, keeping the following assumptions such as poor outcome 3.1% of full thickness skin graft in post burn finger contractures,12 margin of error 3% and confidence interval 95%.

Patients aged 5 to 45 years of either gender, presenting with post-burn finger contractures were included in this study. Diagnosis of post-burn finger contractures was performed on clinical evaluation recording all of the following such as visible deformity, restricted range of motion, and tethering/tightness of skin. Cases of Grade I and Grade II contractures, non-burn-related finger contractures, uncontrolled systemic diseases, active infection, or cognitive impairment were excluded from the study.

All patients gave their informed written consent, while patients < 18 years of age, their parents or guardians provided the consent. Demographics and clinical details of the patients were noted on a proforma, such as age, gender, laterality of hands, McCauley Grade (III and IV only), and etiology of burn (flame, scald, electric, chemical). An incision was made using an aseptic technique over the contracture site and extended laterally on both sides to create a fish-tail appearance. The contracted scar tissue was carefully released until the adequate correction of the deformity and restoration of joint movement were achieved. A FTSG was harvested from the groin or upper medial aspect of the arm depending on size of the defect. The graft was appropriately trimmed and applied to the recipient site to ensure complete coverage of the released wound. The donor site was primarily closed, while the graft was secured with suitable sutures and dressed appropriately. The affected finger was immobilised using a Kirschner wire introduced through the pulp and advanced across the interphalangeal joint before placement of the graft at the recipient site, maintaining the finger in the corrected position during healing. Change of dressing was done on day 5 to 7. Graft take was classified as excellent (100% survival=complete graft take), good (≥90% survival), fair (70-90% survival), or poor (<70% survival=partial graft loss or graft failure). Kirschner wires were then removed at three weeks, which was followed referral for physiotherapy, which included range of motion exercises, scar massage and night splinting. Functional outcomes were assessed at

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three months. Range of motion was measured using a goniometer and categorized as excellent (> 90% of normal), good (70-90%), fair (50-70%) and poor (< 50%). The DASH questionnaire was assessed preoperatively and at three months.

SPSS 27 was used to analyze the acquired data. Age, preoperative and postoperative DASH scores were presented as median with interquartile ranges, after checking for normality with Shapiro Wilk test. Functional outcome for range of motion, graft uptake, postoperative complications, laterality of hands, McCauley Grade, etiology of burn and gender were presented as frequency and percentages. Confidence intervals were calculated for range of motion and graft uptake functional outcomes. Preoperative and postoperative DASH scores were compared using Wilcoxon Signed Rank test. Keeping p value ≤ 0.05 as significant.

categorical data. t-tests for normally distributed data, Mann–Whitney U tests for non-normally distributed data, and Chi-square or Fisher's exact tests for categorical variables were conducted for comparative analyses. A p-value of less than 0.05 was set to define statistical significance.

Results

The present study enrolled 129 patients, their median age was 24.00 years with an interquartile range of 14.00 to 34.00 years. There were 88 (68.2%) male patients and 41 (31.8%) female patients.

Table I presents the etiology of burn, McCauley grading and laterality of hands.

Post-operative complications presented in table no II.

The functional outcome was assessed using range of motion at three months post-procedure and graft uptake presented in table III.

The median pre-operative DASH score improved significantly after three months postoperatively (p < 0.001) (Table IV)

Discussion

Our observations aligns with several and national and international studies.[14-16] Our findings of excellent-to-good range of motion in 66.7 % of patients and

Table 1. Clinical profile of the patients

Clinical profile		n	%
Burn etiology	Flame	68	52.7%
	Scald	43	33.3%
	Electric	12	9.3%
	Chemical	6	4.7%
McCauley Grade	McCauley Grade III	82	63.6%
	McCauley Grade IV	47	36.4%
Hand Affected	Right	77	59.7%
	Left	47	36.4%
		5	3.9%

Table 2. Postoperative complications

Postoperative complications		n	%	95.0% Confidence Interval
Infection	Yes	9	7.0%	0.034-0.122
	No	120	93.0%	
Hematoma	Yes	7	5.4%	0.024-0.102
	No	122	94.6%	
Hypertrophic Scarring	Yes	16	12.4%	0.075-0.188
	No	113	87.6%	

Table 3. Functional outcome

Functional outcome		n	%	95.0% Confidence Interval
ROM classification	Excellent	41	31.8%	24.2% to 40.2%
	Good	45	34.9%	27.1% to 43.4%
	Fair	28	21.7%	15.3% to 29.4%
	Poor	15	11.6%	7.0% to 18.0%
Graft take	Excellent	79	61.2%	52.7% to 69.3%
	Good	30	23.3%	16.6% to 31.1%
	Fair	14	10.9%	6.4% to 17.1%
	Poor	6	4.7%	2.0% to 9.3%

Table 4. Comparison of preoperative and postoperative DASH score

	N	Median	IQR	p value
Pre-op DASH score	129	60.00	54.00-66.00	< 0.001
Postop DASH score	129	23.00	16.00-45.00	
				Wilcoxon Signed Rank Test used

excellent-to-good graft take in 84.5 % are consistent with both national and international literature. Nationally, Fatima et al. reported excellent ROM in 49 % of paediatric cases treated with FTSG,[17] while Haider et al. and Saaiq et al. observed graft-uptake rates of 94 % and 95 % correspondingly.[18,19] Internationally, Liang et al. achieved a 90 % excellent-to-good graft take with abdominal FTSG in paediatric digital and palmar contractures and comparative study demonstrated superior functional outcomes and lower secondary contracture with FTSG versus STSG. Similarly, series from Western and Asian centres consistently favour FTSG over STSG for reduced recurrence and better long-term mobility supporting the reliability of our results across diverse populations.[20,21]

In this study observed that flame burns and scald burn were the predominant causes of burn injuries in the present study. Predominance of these burn mechanisms is likely due to high incidence of domestic and occupational accidents involving open flames, hot liquids and steam in low income countries where household safety measures may be inadequate. This consistency with existing literature supports the representativeness of the study population and highlights the continuing need for burn prevention strategies alongside effective reconstructive interventions.[15-17] The slightly lower excellent outcome rate in the present study can be attributed to the inclusion of adult patients up to 45 years of age who are often presenting with longer-standing contractures and established joint stiffness that limits the potential for full correction. Sabapathy et al. in their study mentioned that in paediatric burn contracture cases, full thickness graft can significantly decrease the recurrence rate of contractures and exhibits better functional outcomes.[22]

The DASH score in the present study demonstrated significant improvement from a median of 60.00 (Interquartile range 54 to 66) pre-operatively to 23.00 (Interquartile range 16 to 45) at three months post-procedure (p< 0.001). This improvement is clinically meaningful and shows significant restoration of hand function. The reduction in disability scores reflects the positive impact of contracture release and resurfacing on patients' ability to perform activities of daily living. Kumar et al. also reported significant DASH score improvement following full thickness skin graft management of post-burn hand deformities, further validating the effectiveness of this intervention.[21]

Post-operative complications in this study were observed in a small subset of patients. Hypertrophic scarring was the most frequently observed complication, followed by infection and haematoma. Patients with hypertrophic scarring were managed conservatively and through steroid injections. Infections were treated with antibiotics and no patient required surgical intervention. Haematoma was managed with pressure dressing.

This study has several limitations. The three-month follow-up period was short, it could not assess long-term outcomes, including late recurrence of contracture and final scar maturation. Longer follow-up is mandatory to determine and validate the durability of the results of this study. The study did not take into account potential

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confounding factor patient adherence with physiotherapy and patient's quality of life. The study was conducted in a single center, which may limit generalizability of the findings to other burn settings. These variables may influence outcomes and should be considered in future studies. The lack of a control group comparing full-thickness grafts with other reconstructive techniques limits the ability to draw definitive conclusions about the superiority of this technique.

Conclusion

FTG is associated with excellent to good range of motion in majority of the patients with post-burn finger contractures. The study also observed a significant improvement in DASH score postoperatively. Fewer complications were observed in this study, in which majority were managed conservatively.

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Authors' Contribution Statement

WUR contributed to the conception, design, acquisition, analysis, interpretation of data, drafting of the manuscript, and critical review of the manuscript. IU contributed to the conception, design, acquisition, critical review of the manuscript, and final approval of the version to be published. MMF contributed to the acquisition, analysis, interpretation of data, and drafting of the manuscript. MT contributed to the acquisition, analysis, interpretation of data, and drafting of the manuscript. UAS contributed to the acquisition, analysis, and interpretation of data. All authors are accountable for their work and ensure the accuracy and integrity of the study.

Conflict of Interest

Authors declared no conflict of interest

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None

Data Sharing Statement

The data that support the findings of this study are available from the corresponding author upon reasonable request.