

Original Research Article

CLINICAL OUTCOMES OF FULL-THICKNESS SKIN GRAFTING FOR FINGERTIP INJURIES

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ABSTRACT

Background: Fingertip injuries frequently result in loss of specialised glabrous skin, causing functional, sensory and aesthetic impairment. Full-thickness skin grafting (FTSG) offers a relatively simple, single-stage reconstructive option with the potential for durable coverage, limited contraction and satisfactory colour and texture match. This study evaluated the clinical, sensory, functional and aesthetic outcomes of FTSG for traumatic fingertip injuries and explored factors associated with incomplete graft take.

Materials and Methods: This prospective observational study included 67 patients with traumatic fingertip defects considered suitable for FTSG. Demographic and injury characteristics, Allen classification, defect size, bone and nail-bed involvement, graft source and operative timing were documented. Outcomes included percentage graft take, healing time, static two-point discrimination (2PD), pain visual analogue scale (VAS), distal interphalangeal (DIP) joint range of motion, QuickDASH score, return to routine activity, complications and patient satisfaction. Factors associated with incomplete graft take were analysed, with $p < 0.05$ considered statistically significant.

Results: The mean age was 34.1 ± 11.8 years, and 74.6% were male. Complete graft take occurred in 56/67 (83.6%), partial take in 9/67 (13.4%) and failure in 2/67 (3.0%), with a mean graft take of $93.1 \pm 12.8\%$. Mean healing time was 16.2 ± 4.4 days. At final follow-up, mean 2PD was 6.8 ± 1.8 mm, protective sensation was present in 95.5%, and 86.6% were satisfied/very satisfied. Complete graft take was associated with faster healing (15.1 vs 21.7 days; $p = 0.001$), better 2PD (6.5 vs 8.2 mm; $p = 0.020$), lower QuickDASH scores (6.1 vs 15.1; $p = 0.002$), and earlier return to activity (22.8 vs 33.6 days; $p = 0.001$). Smoking ($p = 0.031$), limited bone exposure ($p = 0.009$), defect size > 2 cm² ($p = 0.024$), and grafting after 24 hours ($p = 0.031$) were associated with incomplete graft take.

Conclusion: FTSG achieved high graft survival with satisfactory sensory, functional and aesthetic recovery in appropriately selected fingertip injuries. Careful selection of a well-vascularised recipient bed, appropriate defect size, early reconstruction and modification of patient-related risk factors may optimise graft survival and clinical recovery.

Keywords: Fingertip injury; Full-thickness skin graft; Fingertip reconstruction; Graft survival; Two-point discrimination.

INTRODUCTION

Fingertip injuries are among the most frequent traumatic injuries of the hand and encompass a spectrum ranging from pulp and nail-bed lacerations to tissue loss, exposed distal phalanx and complete amputation.^[1,2] Because the fingertip has a dense concentration of sensory receptors and contributes

substantially to precision pinch, tactile discrimination and hand aesthetics, reconstruction aims not merely at wound closure but at achieving a painless, durable, sensate and cosmetically acceptable tip while preserving maximum digit length.^[1,3] Indian epidemiological data underscore the clinical burden: in one series, 80% of paediatric injuries involved incomplete fingertip amputation with nail-bed injury,

while 50% of adult injuries were complete amputations at the nail-bed level.^[2]

Management depends on defect size and orientation, tissue viability, bone or tendon exposure, patient age and functional requirements. Options include healing by secondary intention, primary closure or revision amputation, skin grafting, local or regional flaps, and microsurgical reconstruction.^[1,3,4] Although secondary healing can provide satisfactory outcomes for selected small defects, larger defects may require prolonged wound care, whereas flap procedures involve additional donor-site morbidity, technical complexity and, occasionally, staged surgery.^[4,5]

Full-thickness skin grafting (FTSG) represents a relatively simple reconstructive alternative for appropriately selected fingertip defects. By transferring the entire epidermis and dermis, FTSGs provide durable coverage with less secondary contraction and potentially better texture and contour than thinner grafts.^[5-7] Hypothenar FTSGs are particularly attractive because of their thickness and colour similarity to digital skin. Schenck and Cheema reported protective coverage without ulceration and two-point discrimination ≤ 10 mm in 86% of evaluated fingertips reconstructed with hypothenar FTSGs.^[6] It is being demonstrated survival in 15 of 16 grafted finger defects despite limited bone or tendon exposure.^[7] Nevertheless, graft loss, sensory impairment, pigmentation, tenderness, scar contracture and donor-site morbidity remain important concerns.^[7-9] Evidence specifically evaluating functional, sensory, aesthetic and complication outcomes following FTSG for traumatic fingertip defects remains comparatively limited. Therefore, the present study was aimed to evaluate the clinical outcomes of full-thickness skin grafting for fingertip injuries, with particular emphasis on graft survival, wound healing, sensory and functional recovery, aesthetic outcome and procedure-related complications.

MATERIALS AND METHODS

Study design and setting: This prospective observational study was conducted in the Department of Plastic Surgery and Orthopaedics at a tertiary-care teaching hospital in Mumbai over a period of 2 years between July 2024 to June 2026. Consecutive patients presenting with traumatic fingertip injuries and undergoing reconstruction with a full-thickness skin graft (FTSG) were screened for eligibility. The study was designed to evaluate anatomical, functional, sensory and patient-reported outcomes following FTSG reconstruction. Fingertip injury was defined as traumatic tissue injury distal to the insertion of the flexor and extensor tendons at the distal phalanx.

Study participants and eligibility criteria: Patients aged ≥ 18 years with acute traumatic fingertip defects requiring soft-tissue coverage and considered suitable for FTSG were included. Grafting was

considered primarily for defects in which primary closure could not be achieved without excessive tension or shortening and where the wound bed was adequately vascularised. Patients with severely contaminated or infected wounds, extensive avascular exposed bone or tendon unsuitable for grafting, associated vascular compromise requiring revascularisation, injuries requiring revision amputation or flap reconstruction, uncontrolled diabetes or significant peripheral vascular disease, and those unwilling or unable to complete follow-up were excluded. Patients with multiple fingertip injuries were analysed on a patient basis for demographic variables and on an injured-digit basis for local outcomes, as appropriate.

Preoperative assessment: A detailed history was recorded regarding age, sex, occupation, hand dominance, mechanism of injury, interval between injury and treatment, and associated medical conditions. Each injury was evaluated for the affected hand and digit, dominant-hand involvement, defect location, wound dimensions, nail-bed involvement, distal phalangeal fracture, and exposure of bone or tendon. Fingertip injuries were categorised according to the Allen classification. Digital vascularity and preoperative sensory status were documented. Standard anteroposterior and lateral radiographs were obtained when fracture or bony involvement was suspected.

Surgical technique: All procedures were performed under digital block, regional anaesthesia or appropriate anaesthesia under tourniquet control. The wound was thoroughly irrigated and devitalised tissue was conservatively debrided while preserving maximum viable fingertip length. Haemostasis was meticulously achieved to prevent postoperative haematoma. When limited bone exposure was present, only sharp, nonviable or projecting bone was trimmed where necessary, avoiding unnecessary shortening of the distal phalanx.

The dimensions of the prepared defect were measured and an appropriately sized full-thickness graft was harvested, preferentially from the hypothenar region where feasible because of its relatively favourable thickness, texture and colour match for fingertip reconstruction. Alternative donor sites were selected according to defect size and availability. The graft was carefully defatted while preserving the dermis and inset without excessive tension using interrupted non-absorbable sutures. A non-adherent interface and secure tie-over/bolster dressing were applied to maintain close graft-recipient-bed contact. The donor site was closed primarily.

Postoperative care and follow-up: The operated digit was elevated and immobilised initially to minimise shear. Analgesics and antibiotics were administered according to institutional protocol and wound characteristics. The first graft inspection was generally performed between postoperative days 5 and 7, followed by regular assessment until complete epithelialisation. Patients were reviewed at approximately 2 weeks, 4–6 weeks, 3 months and 6

months. Finger mobilisation was initiated after adequate graft adherence and wound stability.

Outcome assessment: The primary outcome was graft survival, assessed clinically by the proportion of viable graft surface and classified as complete take ($\geq 90\%$), partial take (50–89%) or graft failure ($< 50\%$). Secondary outcomes included time to complete wound healing, infection, haematoma/seroma, partial graft necrosis, reoperation, donor-site complications and return to routine activities/work.

Functional and sensory outcomes were assessed after complete healing. Sensory recovery was evaluated using static two-point discrimination (2PD) at the reconstructed fingertip and compared, where feasible, with the corresponding contralateral digit. Pain and tenderness were assessed using a 10-point visual analogue scale (VAS), and the presence of hypersensitivity and cold intolerance was documented. Active range of motion of the distal and proximal interphalangeal joints was recorded. Late complications, including scar contracture, ulceration, hyperpigmentation, contour irregularity and nail deformity, were specifically assessed. Cosmetic appearance and overall patient satisfaction were graded using a predefined patient-reported scale.

Statistical analysis: Data were entered into Microsoft Excel, checked for completeness and consistency, and analysed using IBM SPSS Statistics, version 20.0. Continuous variables were assessed for distribution and summarised as mean $\pm$ standard deviation (SD) for approximately normally distributed data or median with interquartile range (IQR) for non-normally distributed data. Categorical variables were presented as frequencies and percentages. For outcome analyses, graft take was categorised as complete ($\geq 90\%$) or incomplete

($< 90\%$; comprising partial take and graft failure). Associations between graft-take status and categorical variables, including smoking, injury mechanism, Allen classification, fracture, bone exposure, defect size, timing of grafting and graft source, were evaluated using the chi-square test or Fisher's exact test when expected cell frequencies were small. Continuous outcomes, including healing time, two-point discrimination, pain score, distal interphalangeal joint range of motion, QuickDASH score and time to return to routine activity/work, were compared between complete and incomplete graft-take groups using the independent-samples t test or Mann–Whitney U test, as appropriate. All tests were two-sided, and a p value < 0.05 was considered statistically significant.

Ethical considerations: The study was conducted in accordance with the Declaration of Helsinki after approval from the Institutional Ethics Committee. Written informed consent was obtained from all participants for the surgical procedure, study participation, follow-up assessments and use of anonymised clinical photographs where applicable. Patient confidentiality was maintained throughout the study.

RESULTS

The mean age of participants was 34.1 ± 11.8 years, with 70.2% aged ≤ 40 years. Males predominated (74.6%), and 58.2% were manual/skilled workers. Most participants were right-hand dominant (92.5%), while the dominant hand was injured in 56.7%. Current smoking and diabetes mellitus were present in 19.4% and 7.5%, respectively. The median interval from injury to presentation was 4 (IQR: 2–9) hours [Table 1].

Table 1: Baseline sociodemographic and clinical characteristics of study participants (N=67).

Characteristic	Frequency (%) / mean $\pm$ SD / median (IQR)
Age, years	34.1 $\pm$ 11.8
Age group	
18–30 years	27 (40.3)
31–40 years	20 (29.9)
41–50 years	12 (17.9)
>50 years	8 (11.9)
Gender	
Male	50 (74.6)
Female	17 (25.4)
Occupation	
Manual/skilled worker	39 (58.2)
Office/business/service	16 (23.9)
Homemaker/student/other	12 (17.9)
Right-hand dominant, n (%)	62 (92.5)
Dominant hand injured	38 (56.7)
Current smoker	13 (19.4)
Diabetes mellitus	5 (7.5)
Time from injury to presentation, hours	4 (2–9)

The right hand was affected in 58.2% of patients, and the middle (29.9%) and index (25.4%) fingers were most frequently involved. Industrial/machine crush (25.4%), sharp-cut (22.4%), and two-wheeler-chain injuries (20.9%) were the leading mechanisms. Allen

type III injuries predominated (43.3%), followed by type II (35.8%). Nail-bed involvement occurred in 62.7%, distal phalangeal fracture in 31.3%, and limited bone exposure in 28.4%. The mean defect area was 1.78 ± 0.52 cm² [Table 2].

Table 2: Pattern and characteristics of fingertip injuries among study participants (N=67).

Injury characteristic	Frequency (%) / mean $\pm$ SD
Affected hand	
Right	39 (58.2)
Left	28 (41.8)
Affected digit	
Thumb	9 (13.4)
Index finger	17 (25.4)
Middle finger	20 (29.9)
Ring finger	13 (19.4)
Little finger	8 (11.9)
Mechanism of injury	
Industrial/machine crush	17 (25.4)
Two-wheeler chain injury	14 (20.9)
Sharp-cut injury	15 (22.4)
Door-crush injury	9 (13.4)
Avulsion/other mechanism	12 (17.9)
Allen classification	
Type II	24 (35.8)
Type III	29 (43.3)
Type IV	14 (20.9)
Nail-bed involvement	42 (62.7)
Distal phalangeal fracture	21 (31.3)
Limited bone exposure	19 (28.4)
Mean defect area, cm ²	1.78 $\pm$ 0.52
Defect area >2 cm ²	17 (25.4)

Allen classification was used to describe the level of fingertip injury.

The ulnar/hypothenar hand region was the principal graft source (82.1%), while usable skin from the amputated fingertip was utilised in 17.9%. Definitive grafting was performed within 24 hours in 80.6% of patients. Mean graft take was 93.1 $\pm$ 12.8%; complete take occurred in 83.6%, partial take in 13.4%, and

graft failure in only 3.0%. Mean complete healing time was 16.2 $\pm$ 4.4 days, and return to routine activity/work occurred after 24.6 $\pm$ 7.2 days. Only one patient (1.5%) required a secondary surgical procedure [Table 3, and Figure 1 to 5].

Table 3: Operative characteristics and early outcomes following full-thickness skin grafting (N=67).

Variable	Frequency (%) / mean $\pm$ SD
Source of full-thickness graft	
Ulnar/hypothenar border of hand	55 (82.1)
Usable skin from amputated fingertip	12 (17.9)
Graft area, cm ²	1.82 $\pm$ 0.54
Timing of definitive grafting	
Within 24 hours	54 (80.6)
>24–48 hours	13 (19.4)
Mean graft take, %	93.1 $\pm$ 12.8
Graft survival	
Complete take ($\geq$ 90%)	56 (83.6)
Partial take (50–89%)	9 (13.4)
Graft failure (<50%)	2 (3.0)
Complete wound-healing time, days	16.2 $\pm$ 4.4
Return to routine activity/work, days	24.6 $\pm$ 7.2
Secondary surgical procedure required	1 (1.5)

FTSG: full-thickness skin graft; SD: standard deviation. Complete graft take was defined as $\geq$ 90% viable graft, partial take as 50–89%, and graft failure as <50%.

Patients with complete graft take had significantly faster wound healing than those with incomplete take (15.1 $\pm$ 3.1 vs 21.7 $\pm$ 4.6 days; $p=0.001$). Complete take was also associated with better 2PD (6.5 $\pm$ 1.5 vs 8.2 $\pm$ 2.0 mm; $p=0.020$), lower pain VAS (0.6 $\pm$ 0.8 vs

1.7 $\pm$ 1.2; $p=0.013$), greater DIP ROM (66.0 $\pm$ 8.2° vs 58.1 $\pm$ 10.3°; $p=0.033$), lower QuickDASH disability (6.1 $\pm$ 4.6 vs 15.1 $\pm$ 7.4; $p=0.002$), and earlier return to routine activity/work (22.8 $\pm$ 5.6 vs 33.6 $\pm$ 7.8 days; $p=0.001$) [Table 4].

Table 4: Functional and sensory outcomes according to graft-take status.

Outcome	Complete graft take (n=56) mean $\pm$ SD	Incomplete graft take* (n=11)	p value
Time to complete healing, days	15.1 $\pm$ 3.1	21.7 $\pm$ 4.6	0.001
Static 2-point discrimination, mm	6.5 $\pm$ 1.5	8.2 $\pm$ 2.0	0.02
Pain VAS at final follow-up	0.6 $\pm$ 0.8	1.7 $\pm$ 1.2	0.013
DIP joint active ROM, degrees	66.0 $\pm$ 8.2	58.1 $\pm$ 10.3	0.033
QuickDASH score	6.1 $\pm$ 4.6	15.1 $\pm$ 7.4	0.002
Return to routine activity/work, days	22.8 $\pm$ 5.6	33.6 $\pm$ 7.8	0.001

*Incomplete graft take includes partial take and graft failure; VAS: visual analogue scale; DIP: distal interphalangeal; ROM: range of motion; QuickDASH: Quick Disabilities of the Arm, Shoulder and Hand.

At final follow-up, mean static 2PD was 6.8 ± 1.8 mm, with 92.5% achieving $2PD \leq 10$ mm and 95.5% demonstrating protective sensation. Residual pain was low (VAS 0.8 ± 0.9), while mean DIP ROM was $64.7 \pm 9.1^\circ$ and QuickDASH score was 7.6 ± 6.1 . Cold intolerance occurred in 11.9%, nail deformity in

10.4%, hypersensitivity in 7.5%, and scar contracture in 3.0%. Good/excellent colour and contour match was achieved in 83.6%, and 86.6% of patients were satisfied or very satisfied with the final result [Table 5].

Table 5: Final sensory, functional, aesthetic and complication outcomes following FTSG (N=67).

Outcome	Frequency (%) / mean $\pm$ SD
Static 2-point discrimination, mm	6.8 ± 1.8
2-point discrimination category	
≤ 6 mm	32 (47.8)
7–10 mm	30 (44.8)
>10 mm	5 (7.5)
Protective sensation present	64 (95.5)
Pain VAS	0.8 ± 0.9
DIP active ROM, degrees	64.7 ± 9.1
QuickDASH score	7.6 ± 6.1
Cold intolerance	8 (11.9)
Hypersensitivity/tenderness	5 (7.5)
Nail deformity	7 (10.4)
Hyperpigmentation/colour mismatch	6 (9.0)
Scar contracture	2 (3.0)
Recurrent ulceration	1 (1.5)
Clinically important donor-site problem	2 (3.0)
Good/excellent colour and contour match	56 (83.6)
Satisfied/very satisfied with final result	58 (86.6)

Complications were not mutually exclusive. VAS: visual analogue scale; DIP: distal interphalangeal; ROM: range of motion; QuickDASH: Quick Disabilities of the Arm, Shoulder and Hand.

Incomplete graft take was significantly more frequent among current smokers (45.5% vs 14.3%; $p=0.031$), patients with limited bone exposure (63.6% vs 21.4%; $p=0.009$), defects >2 cm² (54.5% vs 19.6%; $p=0.024$), and grafting performed >24 hours after

injury (45.5% vs 14.3%; $p=0.031$). Crush mechanism, Allen III/IV injury, distal phalangeal fracture, and graft source were not significantly associated with incomplete graft take (all $p>0.05$).

Table 6: Factors associated with incomplete graft take following full-thickness skin grafting.

Factor	Complete take (n=56)	Incomplete take (n=11)	p value
	Frequency (%)		
Current smoking	8 (14.3)	5 (45.5)	0.031
Crush mechanism	19 (33.9)	7 (63.6)	0.092
Allen type III/IV injury	33 (58.9)	10 (90.9)	0.082
Distal phalangeal fracture	15 (26.8)	6 (54.5)	0.086
Limited bone exposure	12 (21.4)	7 (63.6)	0.009
Defect area >2 cm ²	11 (19.6)	6 (54.5)	0.024
Grafting >24 hours after injury	8 (14.3)	5 (45.5)	0.031
Graft obtained from amputated fingertip	9 (16.1)	3 (27.3)	0.4

Incomplete take comprises partial graft take (n=9) and graft failure (n=2).



Figure 1: Full-thickness skin graft reconstruction of a traumatic little-finger fingertip defect.



Figure 2: Full-thickness skin graft reconstruction following fingertip soft-tissue loss.



Figure 3: Restoration of fingertip contour following full-thickness skin grafting.



Figure 4: Full-thickness skin graft reconstruction of multiple fingertip injuries.



Figure 5: Hypotenar/ulnar-palmar full-thickness skin grafting for traumatic fingertip loss.

DISCUSSION

The present study demonstrates that full-thickness skin grafting (FTSG) provides reliable wound

coverage with favourable sensory, functional and aesthetic outcomes in appropriately selected fingertip injuries. The cohort predominantly comprised young working-age males (74.6%; mean age 34.1 ± 11.8 years), with 58.2% engaged in manual/skilled occupations. Industrial/machine crush (25.4%), sharp-cut (22.4%) and two-wheeler-chain injuries (20.9%) predominated, consistent with the mechanically exposed working population commonly affected by fingertip trauma. Weichman et al., similarly identified crush injury as the commonest mechanism (46%), followed by laceration (30%) and avulsion (24%).^[10] Importantly, 64.2% of our patients had Allen III/IV injuries, 62.7% had nail-bed involvement and 28.4% had limited bone exposure, indicating that FTSG was used for clinically meaningful soft-tissue loss rather than only superficial wounds.

The principal finding was a mean graft take of $93.1 \pm 12.8\%$, with complete take in 83.6%, partial take in 13.4% and failure in only 3.0%; therefore, 97.0% demonstrated at least partial graft survival. Sohn et al., reported complete take in 13/16 (81.3%) fingertip pulp grafts, with partial necrosis in two and total necrosis in one.^[11] Hashem et al., also reported favourable outcomes using full-thickness grafts from the ulnar border of the palm.^[12] Although technically different, a systematic review by Regmi et al., demonstrated 98% survival of reverse-flow homodigital island flaps.^[13] The comparable overall tissue survival observed with FTSG is noteworthy because grafting is technically simpler, avoids neurovascular pedicle dissection and permits single-stage reconstruction. Nevertheless, Ma et al., in a prospective comparison of seven treatment methods involving 200 fingertip injuries, showed that outcomes vary substantially according to injury characteristics and reconstructive technique,^[14] reinforcing appropriate patient selection rather than universal application of FTSG.

Sensory recovery was particularly encouraging. Mean static two-point discrimination (2PD) was 6.8 ± 1.8 mm; 92.5% achieved $2PD \leq 10$ mm and 95.5% retained protective sensation. Hashem et al., reported mean 2PD of 5.5 mm in fingertip FTSGs,^[12] while Tuncali et al., reported 6.3 mm following hatchet-flap reconstruction.^[15] In comparison, Ozcanli et al., achieved mean 2PD of 3.5 mm with innervated digital artery perforator flaps.^[16] Thus, although an innervated flap may provide finer discrimination, the present findings demonstrate useful sensory recovery after FTSG. This presumably results from progressive reinnervation of the graft from peripheral and underlying recipient nerves, although recovery is unlikely to reproduce the organised sensory architecture of native pulp completely.

Successful graft take also translated into measurable functional benefit. Patients with complete take healed significantly faster than those with incomplete take (15.1 vs 21.7 days; $p=0.001$), had better 2PD (6.5 vs 8.2 mm; $p=0.020$), greater DIP range of motion

(66.0° vs 58.1°; $p=0.033$), lower QuickDASH disability (6.1 vs 15.1; $p=0.002$) and returned to activity earlier (22.8 vs 33.6 days; $p=0.001$). Fijan et al., similarly found faster healing with skin grafting than amniotic-membrane treatment, although sensory measures favoured the latter.^[17] Early stable epithelial coverage probably reduces pain and dressing requirements and permits earlier mobilisation, thereby limiting periarticular stiffness and disuse-related functional impairment.

Late morbidity was acceptable: cold intolerance occurred in 11.9%, nail deformity in 10.4%, hypersensitivity in 7.5%, scar contracture in only 3.0%, while 86.6% were satisfied/very satisfied and 83.6% achieved good/excellent colour and contour. These rates compare favourably with alternative reconstruction. Tuncali et al., reported cold intolerance in 22.2% after hatchet flaps,^[15] while Yuan et al., reported cold intolerance in 77% following revision amputation in their systematic review.^[18] Van den Berg et al., found cold intolerance in 84.7% and some nail distortion in nearly 90% of fingertips across different treatment modalities.^[19] Differences in injury severity, follow-up duration and case selection should, however, preclude direct comparison. The favourable colour/contour in our series probably reflects predominant use of glabrous hypothenar/ulnar-border skin, which more closely matches fingertip thickness and texture.

Incomplete graft take was significantly associated with smoking ($p=0.031$), limited bone exposure ($p=0.009$), defects $>2\text{ cm}^2$ ($p=0.024$) and grafting beyond 24 hours ($p=0.031$). Kuijpers et al., likewise identified smoking as a significant adverse factor for FTSG survival.^[20] Nicotine-mediated vasoconstriction, impaired tissue oxygenation and altered microvascular healing can interfere with plasmatic imbibition, inosculation and subsequent neovascularisation. Similarly, exposed cortical bone provides an avascular surface, while increasing defect size increases the area dependent on peripheral revascularisation. Weichman et al., found larger defects (3.28 vs 1.75 cm^2 ; $p<0.005$) and bone exposure (81.3% vs 35.3%; $p<0.005$) strongly associated with operative reconstruction.^[10] The adverse association with delayed grafting may reflect progressive oedema, contamination or marginal tissue devitalisation rather than time alone. Overall, these findings support FTSG as an effective, relatively simple, tissue-preserving option for carefully selected fingertip defects with an adequately vascularised recipient bed.

Limitations: This study has several limitations. The single-centre design and relatively small sample size may restrict generalisability. Absence of a comparator group treated with secondary healing or flap reconstruction prevents assessment of relative effectiveness. Follow-up may have been insufficient to capture late sensory or nail-related changes. Furthermore, graft selection was based on clinical suitability, introducing selection bias, and some

functional and aesthetic outcomes incorporated patient-reported assessments.

CONCLUSION

Full-thickness skin grafting provided reliable coverage and favourable functional, sensory and aesthetic outcomes for appropriately selected fingertip injuries. Complete graft take was achieved in 83.6% of patients, with only 3.0% graft failure, while 95.5% regained protective sensation and 86.6% reported satisfaction with the final outcome. Successful graft take was associated with faster healing, better sensory recovery, lower disability and earlier return to activity. Smoking, limited bone exposure, defects $>2\text{ cm}^2$ and delayed grafting were associated with incomplete graft take. FTSG therefore represents a simple, effective, single-stage reconstructive option when the defect is appropriately sized and supported by an adequately vascularised wound bed.

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