

Quantifying the Outcome of Glabrous Skin Grafts Applied on Palmer Surfaces of Hand and Fingers

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ABSTRACT

Aim: To study outcome of glabrous skin grafts in post burn palmer contractures of hand and fingers.

Study design: Quasi Experimental Study.

Place & duration of study: Jinnah Burn and Reconstructive Surgery Centre Lahore from 1st June 2015 to 31st May 2018.

Methods: Thirty five patients of both genders having age 02-60 years presenting with post burn palmer contractures were included in study. Contracture was released and defect was covered with glabrous skin grafts from planter surface.

Results: There were 18 (51.43%) patients having only palmer post burn contractures while 12 (34.29%) patients had both palmer as well as fingers contractures, and 5 (14.29%) patients had only finger contractures. Glabrous skin graft was taken with dermatome at 22-28/1000 of an inch depending on requirement of wound. Dressing was changed on 7 post operative day and patient was discharged and followed for 3 months. Out of 35 patients there was full graft take in 33 (94.29%) patients. Functional outcome and Vancouver score was 45.14% excellent, Good in 35.71%, satisfactory in 14.2%, and poor in 4.2%.

Conclusion: Glabrous skin graft has good survival like full thickness skin graft but with better aesthetic outcome.

Keywords: Glabrous, Palmar surface, Plantar Surfaces, Outcome

INTRODUCTION

Hands are more involved in performing daily activities thus rendering them to trauma or other injuries. Hand injuries are the most frequent, ranging up to 40% according to occupational injury statistics.¹ Injuries to hand are very frequent in routine surgical practice in developing countries. Limited specialist care is available for these injuries.² These injuries can be as trivial as minor cuts to more complex ones that encompass soft tissue defects, tendon cuts, fractures or even amputations.³ Detailed account of these injuries must be made before embarking on to their treatment in order to restore the anatomy and physiology of ingers.⁴ Various options exist for treating soft tissue defects of hand (palmar aspect). Skin grafts as well as skin substitutes are considered a useful option for reconstruction of certain defects.⁵ Skin graft is skin of varied thickness (full or split) that is removed from the donor site and is placed on the recipient site. Split thickness skin graft contains the epidermis and part of dermis. Advantages of split thickness grafts include its usage for larger defects, easy take and simple procedure. Grafts of any kind require vascularization from the bed onto which they are placed for survival⁶. Hands (palmar aspect) and the feet (plantar aspect) have glabrous skin which has special concerns. Glabrous skin is different from other skin present on the body. It has a thicker epidermis. Well defined stratum lucidum is present. Stratum corneum and

spinosum are also thickened. Merkel cells are abundant in stratum basale. Dermis is more compact with less elasticity. Due to all these features, glabrous skin can withstand greater shears, pressure and force. Glabrous skin lacks hair follicles and sebaceous glands. Sweat glands and dermal papillae are abundant. It has fewer melanocytes. These features make the glabrous skin different from the rest of the skin.⁷ The definition of glabrousness is a non hair bearing skin of palm and sole. Histologically both have thick epidermal layer with well defined stratum lucidum and solid stratum corneum. In glabrous areas connective tissue of the dermis is less elastic and more compact than the skin of the other body parts so it provides stability against pressure. Therefore the split thickness glabrous skin grafts from instep of foot after release of contracture have provide replacement via skin of similar characteristics. The sensibility and other characteristics of grafted glabrous skin have been studied. The non glabrous skin graft have significant disadvantages when used for reconstruction of palmer defects. These include craters, secondary contractures, hyperpigmentation and hypertrophy.⁸⁻¹⁰ Replacement of palmer and digital skin with skin graft from traditional donor areas of thigh, buttock and arm do not fulfill these demands and are usually complicated by hair growth, hyper pigmentation and these grafts stands out separate on surrounding healthy skin. Keeping in mind qualities of glabrous skin graft we used plantar skin to cover palmar surface of hand and fingers and it was assessed after 3 months for functional and aesthetic outcome.

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MATERIALS AND METHODS

This quasi experimental study was conducted at Jinnah Burn and Reconstructive Surgery Centre Lahore from 1st June 2015 to 31st May 2018. A total of 35 patients of both genders having age 2-60years presenting with post burn palmer contractures were included. Patient's detailed history was examined. Chronic uncontrolled diabetic patients and patients with peripheral vascular disease and Patients having bilateral post burn contractures were excluded from this study. Contracture was released and defect was covered with glabrous skin grafts from planter surface. Patients will be discharged when patients are haemodynamically fit after changing the dressing at seventh post-operative day. OPD follow-up visits will be done every fifteen days till the wound heals (Figs. 1-5). Regular physiotherapy will be advised. Patients will be followed-up at three months to get the final assessment for outcome of the procedure. The data was entered and analyzed through SPSS-20.

Fig. 1: Pre-operative flexion contracture of thumb, ring and little finger



Fig. 2: After flexion contracture release of thumb, ring and little fingers skin defects



Fig. 3: Post-operative split thickness glabrous skin graft after thumb, ring and little finger flexion contracture release



RESULTS

Out of 35 patients, 26 (74.29%) patients were males while 25.71% patients were females. 13 (37.14%) patients had ages <25 years and 22 (62.86%) patients were ages ≥25 years. 18 (51.43%) patients were having only palmer post burn contractures while 12 (34.29%) patients had both palmer as well as fingers contractures, and 5 (14.29%) patients had only finger contractures. Glabrous skin graft was taken with dermatome at 22-28/1000 of an inch depending on requirement of wound. Dressing was changed on 7 post operative day and patient was discharged and followed for 3 months. Out of 35 patients there was full graft take in 33 (94.29%) patients while in one patient there was partial graft loss that healed via secondary intension while in one patient required regrafting of wound that healed normally after second time glabrous graft.

Functional assessment and Vancouver scoring was done at 3 months post operatively by all three plastic surgeons. According to results functional gain compared to normal hand was excellent in 22 cases (62.8%), good in 10 cases (28.57%), satisfactory in 2 cases while was poor in 1 case (5.7%). Similarly Vancouver scoring shows outcome aesthetic gain was excellent in 10 cases (28.57%), good in 15 cases (42.85%), 8 cases (22.85) showed satisfactory response and 2 (5.7%) were with poor outcome. So mean of functional outcome and vancouver score was 45.14%excellent, good in 35.71%, satisfactory in 14.2%, and poor in 4.2%.

Table 1: Demographic information of the patients

Variable	No.	%
Gender		
Male	26	74.29
Female	9	25.71
Age (years)		
<25	13	37.14
≥25	22	62.86
Contractures		
Only Hand	18	51.43
Hand & Fingers	12	34.29
Only Fingers	5	14.29

Table 2: Results of functional gain compared to normal hand

Functional gain	No.	%
Excellent	22	62.8
Good	10	28.57
Satisfactory	2	5.71
Poor	1	2.86

Table 3: Vancouver scoring aesthetic outcomes

Aesthetic outcome	No.	%
Excellent	10	28.57
Good	15	42.85
Satisfactory	8	22.85
Poor	2	5.7

Table 4: Mean of functional outcome and Vancouver score

Functional outcome	Percentage
Excellent	45.14
Good	35.71
Satisfactory	14.2
Poor	4.2

Fig. 4: Post-burn flexion contracture of little finger



Fig. 5: Post-operative split thickness glabrous skin graft after little finger flexion contracture release



DISCUSSION

Glabrous skin is considered unique as it has specialized look and function.¹² Perception of sensations is better by glabrous skin as compared to other skin. Due to its thicker epidermis, it protects well. Its all functions are due to its specialized anatomy. Glabrous skin defects should be replaced with like tissue. Non glabrous skin has more pigmentation than glabrous skin. Whenever the reconstruction of hand defects (palmar aspect) is done by non glabrous skin grafts, a big disadvantage of poor cosmetic appearance results. Other significant

disadvantages include painful build ups at the edges of the skin grafts, tight subgraft fibrosis and contractures.¹³In our study, we included 35 patients with post burn palmer contractures. In which 26 (74.29%) patients were males while 25.71% patients were females. A study conducted by Mufassar et al¹⁴ regarding glabrous skin graft for defects of palmer aspects, in which 45 patients were included with 76% of males and 24% patients were females. Some other studies demonstrated that males patients population was high in numbers as compared to females.

In present study, we found that 62.86% patients were ages above 25 years and these results were comparable to some other studies regarding glabrous skin grafting.¹⁵ In our study, out of 35 patients there was full graft take in 33 (94.29%) patients while in one patient there was partial graft loss that healed via secondary intension while in one patient required regrafting of wound that healed normally after second time glabrous graft. Study by Legbo JN. showed that in 86.3% limbs, there was over 85% graft take. Excellent cosmetic outcome was observed.¹⁶

In current research, Functional assessment and Vancouver scoring was done at 3 months postoperatively. According to results functional gain compared to normal hand was excellent in 22 cases (62.8%), good in 10 cases (28.57%), satisfactory in 2 cases while was poor in 1 case (5.7%). Similarly Vancouver scoring shows outcome aesthetic gain was excellent in 10 cases (28.57%), good in 15 cases (42.85%), 8 cases (22.85) showed satisfactory response and 2 (5.7%) were with poor outcome. Some other studies shows similarity to our study in which according to functional assessment compared to normal hand was excellent in 60 to 65%.^{17,18} Another study shows glabrous skin (split thickness) was applied and a significant number of patients 88.9% showed complete graft take >85% with 100% normal colour match when compared to the surrounding area.¹⁹ In this study the overall functional outcome and vancouver score was 45.14%excellent, good in 35.71%, satisfactory in 14.2%, and poor in 4.2%.

CONCLUSION

It is concluded from study that this technique provides a single stage simple and effective solution for post burn contractures of palmer surface of hand and fingers with ultimately good to excellent results in majority of cases >80% cases approx . This study provides information about quantitative actual gain in soft tissue cover of palmer defects when cover by split thickness glabrous skin grafts. Furthermore it also quantifies the amount of functional restoration as well as improvement in appearance of the patients hand and fingers.

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