

## Pre-Operative Prediction of Skin Graft Take in Extensive Post Burn Raw Area by Mini Graft Test

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### ABSTRACT

Skin grafting is integral to burn wound management and is the only way of providing permanent wound closure of full thickness burn and deep partial thickness burn that fails to heal within 3 weeks. Successful auto-grafting is the key to patient survival. With periodic change in the team of surgical trainees working in the burn unit, it was considered necessary to develop a protocol for the skin grafting procedure. Implementation of this protocol was expected to yield uniform outcome despite change in the operating team.

Validation of this protocol was considered necessary to evaluate its efficacy. This study was carried out over a period of 12 months from 2014 to 2015.

**Key Words:** Skin graft – Post burn – Raw area– Mini graft test.

### INTRODUCTION

A meticulous surgical technique contributes greatly to the survival of a skin graft. Particular attention should be paid to ensuring atraumatic graft handling a well vascularized, scar free bed careful hemostasis.

The graft bed should be as clean as possible, free of dead tissue, and have an appropriate substrate (bone should have periosteum, tendon should have peritenon) [1].

The most common cause of autologous skin graft failure is hematoma. The clot isolates the undersurface of the graft from the endothelial buds of the recipient site so that revascularization cannot take place [1].

The second most common cause of graft loss is infection which can be avoided by carefully preparing the wound bed [1].

Fluid beneath the graft such as seromas can also cause graft necrosis which commonly seen in areas rich in lymphatics such as the supraclavicular, inguinal, and axillary regions.

Atraumatic tissue handling, cauterization of lymphatic vessels, limited use of electrocautery in the graft bed, and a light pressure dressing or VAC technique minimizes the risk of fluid accumulation under the graft [1].

Excessive pressure on a fresh graft may also cause graft necrosis. The applied pressure should never exceed 30mmHg. Tie-over dressings immobilize the graft, reduce dead space, and prevent hematoma formation [2].

Other causes of failure include gravitational dependency, inadequate immobilization of the area, arterial insufficiency, venous congestion, lymphatic stasis, and inexpert surgeon [3].

Clean wounds had low bacterial counts and showed no detectable plasmin activity. Dirty wounds had high bacterial counts and increased levels of active plasmin. High plasmin and proteolytic enzyme activity was seen in wounds contaminated with beta-hemolytic streptococci and various species of Pseudomonas resulting in eating of the graft [3].

The presence of fibrin under autografts was associated with successful grafts, while dissolution of fibrin by plasmin and proteolytic enzymes is the probable mechanism in graft failure secondary to microorganisms [3].

#### *Aim of study:*

To evaluate the efficacy of the protocol for skin grafting procedure after doing Minigraft test in patients with extensive post burn raw areas preoperatively under local anesthesia at the dressing room under proper aseptic condition.

### PATIENTS AND METHODS

Twenty patients with burn injury involved in this study from January, 2014 to December, 2016

were subjected to 44 procedures of meshed grafts (STSG) to extensive raw areas. The study was done at Oraby Burn and Oncology Hospital, All procedures were tested by application of small STSG 1cm sq. (Minigraft) harvested by scalpel knife 18 under local anesthesia by injection of 1cm xylocaine 2%, then test area at the raw area is anaesthetized by injection of 1 to 2cm xylocaine

2%, proper curettage to granulation tissue then application of minigraft and fixation by 2-4 stitches proline or silk (4-0), tie over is applied (Fig. 1).

First dressing was done after two days and according to the take of minigrafts two groups were categorized.

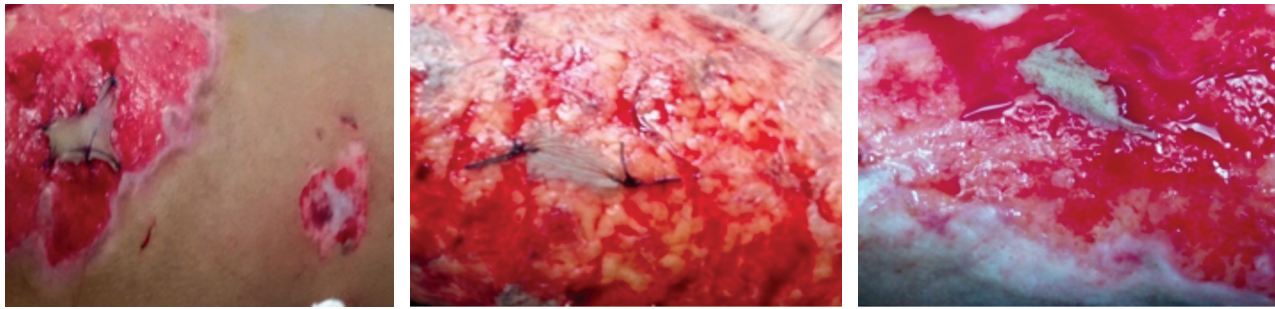


Fig. (1): Technique of mini graft.

#### Group 1:

Meshed STSG done after positive test (good take) of minigraft.

#### Group 2:

Meshed STSG done after negative test (no or week take) of minigraft.Graft.

*All skin grafting procedures were done if the following criteria were fulfilled:*

- Afebrile for at least 48 hours.
- Hemoglobin >10gm/dl.
- Serum albumin >3gm/dl.

No streptococcal or pseudomonas growth on wound culture.

#### Procedure protocol:

- Maximum of 5 to 10% total body surface area was grafted at one procedure.
- Curettage of hyper granulating tissue up to healthy tissue with punctuates bleeding using Humby's knife.
- Hemostasis with saline + adrenaline soaked pads and compression.
- Simultaneous harvesting of split thickness skin grafts from suitable donor site with second Humby's knife and expansion of graft by mesher 1 to 3.
- Application of skin grafts on recipient site.
- Pressing of skin graft with saline soaked gauze.

- Removal of all blood clots from skin grafts on recipient area.
- Covering the grafts with Vaseliene gauze.
- Cover with single layer of saline soaked gauze.
- Firm bandaging and application of plaster of paris splint for immobilization.
- First change of recipient site dressing at 48 hours.
- Donor site dressing change after 8 day.

## RESULTS

This study included 20 patients subjected to skin grafting procedure. Majority of the patients were adult females (76.2%). Adult males were 15.9% while children comprised 7.9% of the patients. Total extent of burn ranged from 5-60% TBSA.

A total of 44 skin grafting procedures were performed in these 20 patients divided into two groups; 1<sup>st</sup> group involving 22 grafts, 2<sup>nd</sup> group 22 grafts.

Deep partial thickness and full thickness burn wounds ranging from 4-20% TBSA were grafted during either a single or multiple procedures.

Donor area infection was found in only 6 patients.

Duration of donor area epithelization was 9-12 days with an average of 10 days.

*First group (Positive mini graft test):*

22 procedures were done in 10 patients. 4 patients required 3 procedures due to the extent of burn wound, 4 patients required 2 procedures and 2 patients required one procedures.

The average take of skin graft was 95% (range 85-100%) in positive mini graft test (Figs. 2,3).

*Second group (Negative mini graft test):*

22 procedures were done in 10 patients. Single procedure was done in 4 patients, 3 procedures in 4 patients and 3 patients required two procedures.

The average take was 40% (range 30-50%) in negative mini graft test (Figs. 4,5).

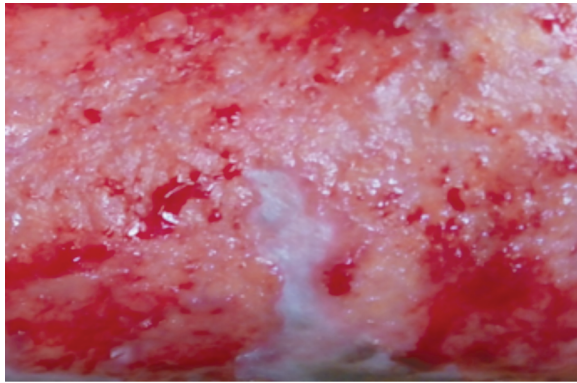


Fig. (2): Positive Mini graft test.



Fig. (3): Group 1 graft take.

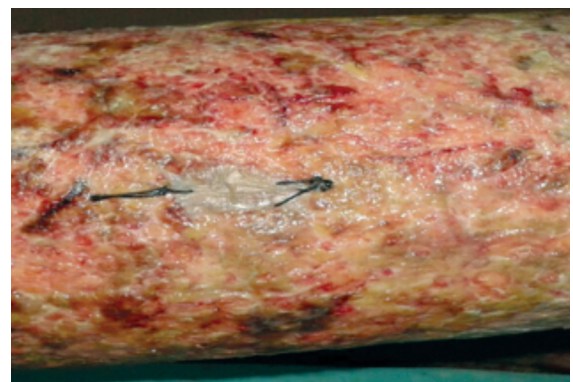


Fig. (4): Negative Mini graft test.





Fig. (5): Graft takes in group 2.

## DISCUSSION

Skin grafting is an integral part of burn wound management that provide permanent skin closure for full thickness and deep partial thickness burn wounds [4,5,6].

Despite of all precautions still there are some grafts fail to adhere to the recipient bed, so the patients with extensive raw areas may be in danger from graft failure and more complications may occur, so usage of minigraft to the bed preoperatively to evaluate the take of the graft was found to be beneficial to the patient as it decrease incidence of failed graft and its complications.

Literature search did not reveal much information to compare our observations. But with average 90% graft take, our protocol for skin grafting procedure can be considered effective.

### Conclusions:

*The results of our study suggest that:*

1- This protocol for skin grafting procedure is effective with average graft take of 85 to 100% in patients with positive test.

2- Skin grafting was 30 to 50% graft take in those patients with negative test.

3- We consider our protocol for skin grafting procedure can be considered effective.

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