

## Role of Conventional Suction Epidermal Bullae Grafting in Management of Non-Healing Ulcer: Case Report

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### Abstract

Ulcer is a discontinuity in the skin. It may be acute or chronic. Chronic wounds are associated with difficulty in healing and prolonged morbidity for the patient. There are different methods of wound coverage including flap coverage, skin grafting, temporary substitutes for dressing etc. In this article we have used SEBG for healing of wound and have found it to be useful.

**Keywords:** Conventional; Epidermal; Suction; Bullae; Grafting.

### INTRODUCTION

Non healing ulcers are a common challenge for the plastic surgeon. There is a delay in wound healing due to various factors including presence of foreign material, lack of growth factors, lack of nutrition, underlying infection etc. and coverage can be given to such chronic wound after adequate wound bed preparation (WBP) by using skin grafts. There are different types of skin grafts including split thickness skin grafts, full thickness skin grafts, meek grafting, pixel grafting. STSGs needs use of an anesthesia and an operating room, as there is significant amount of pain during harvesting the graft, as the dermatome harvester takes the graft

in the plane between the papillary (superficial) and reticular (deep) dermis, exposing the sensory nerves and dermal appendages which are essential for healing of donor site but causes post operative pain. In addition, healing is often delayed by donor site bleeding, infection, and pruritis.<sup>1</sup>

Epidermal skin grafting is used when epidermis is needed for superficial wounds. As the epidermal skin layer alone is harvested from the donor site, it avoids many of these donor site complications, doesn't need an operating theatre. In this article we share our experience in using conventional SEBG for treatment of non-healing ulcer.

### MATERIALS AND METHODS

This study was conducted in the department of Plastic Surgery at tertiary care center after getting the departmental ethical committee approval. Informed written consent was taken from the patient. The details of the patient in study are as follows: 37 year old female with no known co morbidities with h/o road traffic accident 4 months back and underwent right below knee amputation due to vascular injury and degloving injury of the left lower limb for which serial debridement was done in cardiothoracic and general surgery department. Now, the patient presented to plastic

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surgery department with extensive raw area over the left lower limb and non-healing ulcer over the right below knee amputation stump.

The regular dressing and skin grafting could not lead to wound healing and had left many raw areas which did not heal completely.

The SEBG was raised by attaching the rear end of 50 cc syringe (fig. 1) after removing the plunger to skin and attaching the needle hub to a suction of

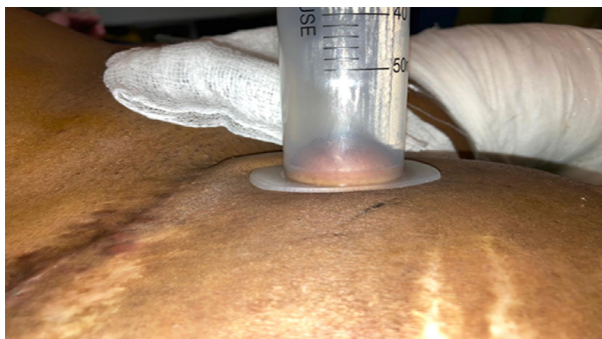


Fig. 1: Negative Pressure Applied Using 50 ml Syringe

about 300-500 mm Hg via the suction apparatus. The suction is applied for about 2 to 3 hours for raising a bleb (fig. 2) and the epidermis can be separated from the bleb created using a blade or scissors (fig. 3). The epidermal graft is placed on the ulcer (fig. 4) after debridement and dressings given. The donor area and the recipient area are dressed. Repeat dressings are done on post-operative day 5 and on the subsequent alternated days till 4 dressings.



Fig. 2: Suction Epidermal Bleb Raised



Fig. 3: Suction Epidermal Bullae Graft Excised

## RESULTS

There was good wound healing of the recipient areas (fig. 5) of the wound along with good healing of the donor areas. (fig. 6).



Fig. 4: SEBG applied to raw area



Fig. 5: Healed Raw Area



Fig. 6: Well healed donor area

## DISCUSSION

Epidermal grafting using suction blisters method in human skin was introduced by Kiistala and Mustakallio<sup>1</sup> in 1964, and used by Falabella<sup>2</sup> to treat the vitiligo. Autologous suction blister epidermal grafting (SBEG) has been used for treatment of recalcitrant, vitiligo and other secondary leucodermas, difficult to heal wounds, including burns and lower limb ulcers.<sup>3-7</sup> Since the dermis of the donor site is not damaged scarring does not develop although variable loss of pigmentation can occur. The upper thigh is the recommended site. As the dermal plexus is left undisturbed, bleeding does not occur so it is useful in patients on anticoagulants.

Suction blister epidermal grafting techniques cause division through the epidermis at the lamina lucida, and irregular hemidesmosome disruption as well as the formation of cytoplasmic vacuoles within keratinocytes.<sup>8</sup> The basic structure of the epidermis remains and the dermis remains unchanged.<sup>8</sup> Success depends upon separation at the dermalepidermal (DE) junction and transfer of the entire, intact basal layer to the recipient site.

The exact mechanisms of epidermal graft take is not known. Costanzo *et al*<sup>6</sup> suggested starting of epithelialization from the edge of the ulcer as the main method. Other authors<sup>9-11</sup> suggested that epidermal grafts does not “take” to the underlying granulation tissue, but, reepithelialisation occur from wound edges. Costanzo *et al*<sup>6</sup> opined this edge effect could be taking place by growth factors from grafted keratinocytes. A recent study of in vitro examination of the epidermal grafts obtained using the epidermal harvesting system has shown that migratory basal layer keratinocytes and melanocytes are proliferative in vivo. Study of intact microdome roofs derived from healthy human demonstrated viable basal cells produced key growth factors which are important for controlling wound healing responses, which include vascular endothelial growth factor (VEGF), hepatocyte growth factor (HGF), granulocyte colony stimulating factor (G-CSF), platelet-derived growth factor (PDGF), and transforming growth factor alpha (TGF-alpha).<sup>13</sup>

## CONCLUSION

Conventional suction epidermal bullae grafting

can be used as a method for harvesting epidermal grafts that are used in treatment of non-healing ulcers with minimal donor site morbidity.

## ACKNOWLEDGMENT

Authors' contributions

All authors made contributions to the article

Availability of data and materials

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