



EFFECT OF CUSTOM-MADE NEGATIVE-PRESSURE VACUUM DRESSINGS ON SKIN GRAFT UPTAKE IN WOUND MANAGEMENT: A RANDOMIZED CONTROLLED STUDY

Dr. I. Mugeshwaran*	Postgraduate Resident, Dept. of Plastic & Reconstructive Surgery, Osmania General Hospital, Hyderabad *Corresponding Author
Dr. Sree Sai Rekha	Assistant Professor, Dept. of Plastic & Reconstructive Surgery, Osmania General Hospital, Hyderabad.
Dr. Priyanka Olivia Pereira	Assistant Professor, Dept. of Plastic & Reconstructive Surgery, Osmania General Hospital, Hyderabad.
Dr. Rishitha. N	Postgraduate Resident, Dept. of Plastic & Reconstructive Surgery, Osmania General Hospital, Hyderabad
Dr. Raziya Sultana Begum	Postgraduate Resident, Dept. of Plastic & Reconstructive Surgery, Osmania General Hospital, Hyderabad
Dr. Palukuri Lakshmi	Professor & HOD, Dept. of Plastic & Reconstructive Surgery, Osmania General Hospital, Hyderabad

ABSTRACT **Background:** Split-skin grafts are a mainstay in plastic surgery but face issues of poor graft take in less-than-ideal wound beds. Negative-Pressure Wound Therapy (NPWT) has shown promise in improving graft uptake. **Objective:** To compare the effectiveness of custom-made negative-pressure vacuum dressings with conventional dressings on skin graft uptake. **Methods:** A randomized controlled study was conducted on 40 patients undergoing skin grafting. Group A (n=20) received custom NPWT; Group B (n=20) received conventional dressing. Graft take percentage, time to epithelialization, and complication rates were analyzed. **Results:** Graft take was significantly higher in the NPWT group (92.5% vs. 83.1%, $p=0.002$). Mean time to epithelialization was shorter in Group A (9.2 days vs. 12.5 days, $p=0.01$). Complication rates were also lower in the NPWT group. **Conclusion:** Custom-made NPWT significantly improves graft take and healing time and can be used effectively in settings with resource limitations.

KEYWORDS : Negative-Pressure Wound Therapy, Skin Grafting, Graft Uptake, Custom VAC, Randomized Study

INTRODUCTION

Split-skin grafting is a technique used extensively in plastic surgery for coverage of wounds as also as a part of various reconstructive procedures. Hence, it takes every available knowledge of the phenomenon of graft take and every possible refinement of the technique to ensure best possible results. The present day conventional techniques of skin grafting are fraught with adversaries of suboptimal graft take due to a less-than-ideal graft bed, difficulty in apposing the graft to the bed, shearing between the graft and the bed and seromas or hematomas under the graft.

Skin grafting is integral in reconstructive plastic surgery but faces limitations due to hematoma, infection, and poor contact with the graft bed. Negative-Pressure Wound Therapy (NPWT), originally described by Fleischmann et al., is known to improve wound healing through increased blood flow, reduced bacterial load, and mechanical stabilization. This study evaluates the efficacy of an economical, custom-made NPWT system in improving graft outcomes.

MATERIALS AND METHODS

Design: Prospective randomized controlled trial.

Setting: Department of Plastic & Reconstructive Surgery, Osmania Medical College, Hyderabad.

Sample Size: 40 patients undergoing skin grafting, divided into:

- Group A (n=20): Received custom-made NPWT
- Group B (n=20): Received conventional Vaseline gauze dressing

Inclusion Criteria: All consenting patients requiring split-skin grafts.

Exclusion Criteria: Patients with bleeding disorders or non-consenting.

Intervention: NPWT involved polyurethane foam with embedded drainage tubing, sealed with Opsite, connected to wall suction (80 mmHg).

Outcome Measures:

- Graft take percentage at day 4 and 14
- Time to epithelialization

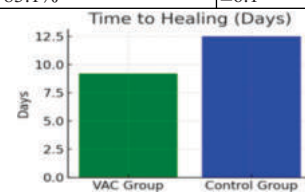
- Complications (infection, seroma, hematoma)

Statistical Analysis: Independent t-test and chi-square tests were used. Significance was set at $p<0.05$.

RESULTS

Graft take was significantly higher in the NPWT group (92.5% $\pm$ 4.3) compared to the control group (83.1% $\pm$ 6.1), with $p=0.002$. Mean days to epithelialization were 9.2 in Group A and 12.5 in Group B ($p=0.01$).

Group	Mean graft uptake (%)	Std. deviation	p-value
Vac group	92.5%	$\pm$ 4.3	0.002
Control group	83.1%	$\pm$ 6.1	



Complication Rates:

- Hematoma: 5% (Group A) vs 20% (Group B)
- Infection: 0% (Group A) vs 15% (Group B)
- Seroma: 10% (Group A) vs 25% (Group B)

DISCUSSION

This study demonstrates superior graft take and reduced healing time with NPWT, consistent with findings from Morykwas et al., Moisisidis et al., and Lianos et al. The mechanism includes enhanced angiogenesis, reduced edema, and firm graft fixation. Notably, this study utilized an affordable, custom-made system, making it ideal for low-resource settings. The cost of the negative pressure dressing has been a matter of concern as the commercially available set-up is not always affordable to many patients in a developing country like India. In our study, we have used locally available materials to create a negative pressure dressing and demonstrated that the treatment can be made less expensive and more cost-effective.

CONCLUSION

Custom NPWT significantly enhances graft take and accelerates healing, proving to be a cost-effective alternative to commercial devices in resource-limited hospitals.

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