Positive clinical outcomes of 10 consecutive cases using a portable NPWT on single-stage biomatrix and skin graft

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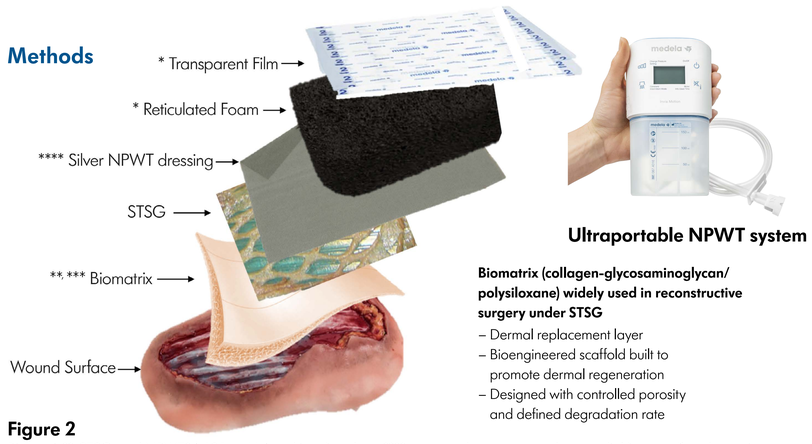
Introduction & Aim

This study highlights the efficacy of using a single patient, portable NPWT* device over an advanced biomatrix and split thickness skin graft (STSG) in a single-stage. NPWT is a clinically proven therapy to assist in the healing of a STSG or a bi-layer biomatrix***.

The biomatrix (collagen-glycosaminoglycan/poly-siloxane) adds dermal thickness and provides a scaffold for dermal cells under the STSG and has become a standard in complex wounds/burns.

STSG or biomatrix is normally placed on a wound in separate stages; however, this study elucidates the efficacy of using NPWT over both biological layers in a single stage(1 operation) over a large surgical wound.

Methods



Ultraportable NPWT system

Biomatrix (collagen-glycosaminoglycan/ polysiloxane) widely used in reconstructive surgery under STSG

– Dermal replacement layer
– Bioengineered scaffold built to promote dermal regeneration
– Designed with controlled porosity and defined degradation rate

Figure 2

Biomatrix**, STSG, and NPWT* (–125mmHg) and interface layer**** were used to reconstruct large radial forearm flap donor sites. Wound and Graft Size, STSG/biomatrix take, therapy duration, hospital length of stay (LOS), and infection rate were assessed on a series of 10 consecutive patients.

Dynamic Pressure Management System intelligently controls prescribed pressure at the wound site

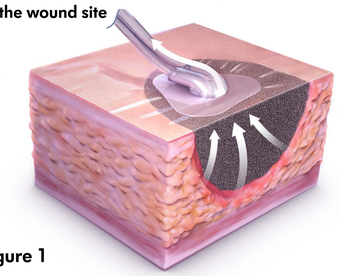
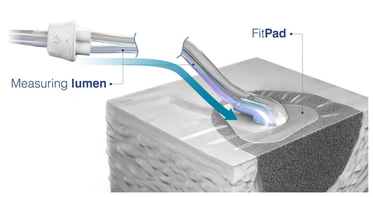
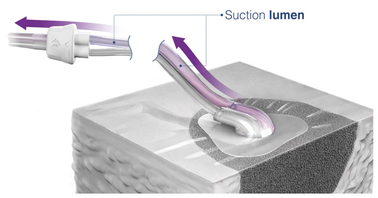


Figure 1

Additional safety features of the NPWT system* utilized in this study include the management of negative pressure at wound site to maintain set pressure. The pump actively helps prevent blockages with airflow cycles that dynamically adapt to volume and viscosity of exudate to optimize system performance from the pump to the dressing (Fig. 1).





Unique NPWT System*

Small footprint & light weight without sacrificing full NPWT features

Other disposable NPWT pumps currently available has limited functionality:
– single predefined pressure setting
– limited exudate removal capacity
– minimal safety notifications
– limited pump run times

The use of a full featured pump* that can last for up to 15 days

Mobility and reliability and ease of use of the device facilitated patient compliance

One device through entire duration of NPWT:
OR > Inpatient > Outpatient (Home care)

Figure 3

100% STSG take + Biomatrix, immediately after removal of ultra portable NPWT, POD 14

Figure 4

Follow up after 3 months Biomatrix/STSG show improved cosmesis and function.

Figure 5

Ultra portable device and NPWT dressing

Results

Table 1. Radial Forearm Donor Site Management Comparison

	Standard Protocol	New Protocol
Operating Room	Biomatrix + NPWT	Biomatrix + STSG + NPWT
LOS (days)	5	5
5th day Post Op discharge home with NPWT	Yes	Yes
Outpatient STSG surgery	POD 14 days	No
Operations	2 separate	1
Total NPWT (days)	21	10–14 (mean 12)
Results	Good	Good
Added benefits	– – – –	*No painful removal of NPWT *Uninterrupted NPWT *Patient satisfaction +++ *Significant cost savings

Table 2. Patient characteristics and Results

Patient characteristics Standard Protocol	
Patients	n = 10
Age	29.4 ± 6.8 years
Gender	
Male	10
Female	0
Hospital Stay	
Inpatient (days)	5
Outpatient (days)	10–14

Study results	
Wound	
Skin graft donor site	150 cm^2
STSGS/Biomatrix take range	98% mean (range 90–100%)
Infections	0
Re-operations/Complications	0
Therapy Duration	
Length of time NPWT	12 days (range 10–14 days)
Length of time hospital	5 days

Conclusion

Figure 6

Patient follow up

Portable NPWT positively affects the take of single-stage STSG and biomatrix. The success of this technique provides strong evidence that is can become a powerful tool for reconstructive surgery for complex, acute wounds for radial forearm donor sites. Additional benefits include: shortening LOS, decreased costs, improved clinical outcomes and patient satisfaction.

Notes:

Product notation:
* Invia® Motion™ NPWT system,
** Integra® Mono Layer (Thin) Wound Matrix,
*** Integra Bi Layer Wound Matrix,
**** Invia Silverlon

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Although the manufacturer's instructions for use with the NPWT system* recommends a dressing change every 48–72 hours, the primary researcher in this study has been investigating extended times between NPWT dressing changes in the management of wounds and has experience with extended dressing change times together with an antimicrobial wound contact layer**** and therefore applied extended dressing change times commensurate with this experience.

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