

A Single-Stage Application of Biomatrix with Skin Graft under a Personal Negative Pressure Wound Therapy (NPWT) device decreases Hospital Costs

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Introduction & Aim

We assess the economic impact on total cost of therapy when using a single-stage, personal NPWT* system over an advanced biomatrix**/** (collagen-glycosaminoglycan/polysiloxane) and skin graft. A single stage procedure can accelerate the wound healing process by avoiding a second operation and ease the transition from inpatient to outpatient status. Advanced biomatrix**/** under NPWT is normally performed as a 2-stage procedure. One operation is traditionally used to place the biomatrix**/** under NPWT followed in three weeks by a second operation for the Split Thickness Skin Graft (STSG) under NPWT.

We demonstrate our technique and results in 10 consecutive patients.

Unique NPWT System

Biomatrix**/, STSG, and NPWT* (-125 mmHg) were utilized in patients for complex radial forearm free flap donor site reconstruction in a single-stage procedure. We assessed the cost stemming from the single stage-procedure versus the standard 2-stage procedure.

Radial Forearm Donor Site

Advantages

Aesthetics

Thin Skin
Color

Function

Tendon Gliding
Protection over RSN
Take of STSG/Wounds

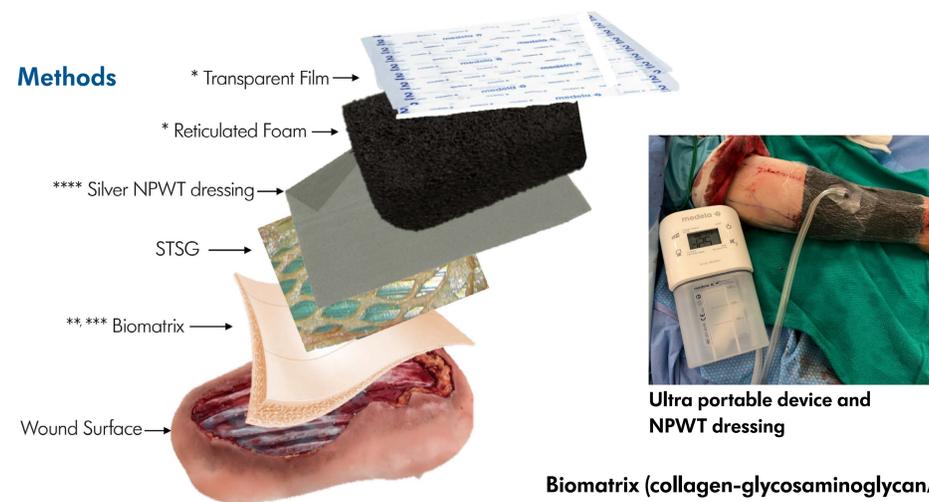


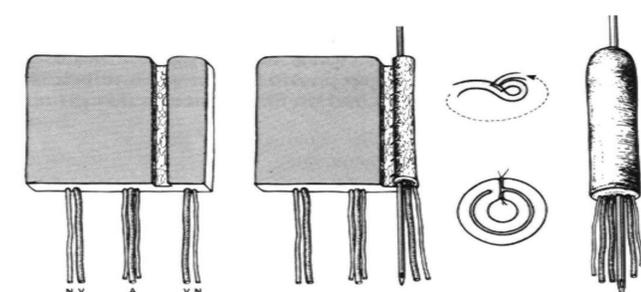
Figure 1

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.

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

RADIAL FOREARM PHALLOPLASTY: TUBE WITHIN A TUBE



A large skin surface area was needed for phalloplasty, taken from the forearm (Figure 2A and 2B). This was used to construct a "Tube within a Tube".



Figure 2 (A-D)

Table 1. Study Results

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

Results: Improved cosmesis and function



Figure 3 (A-D)

Table 2. Radial Forearm Donor Site Management Cost Comparison

	Standard Protocol	New Protocol
Operation 1	Biomatrix + NPWT	Biomatrix + STSG + NPWT
LOS (days)	5–7(\$)	5
Cost of Hospital stay	\$ 1,500 x 5days = \$ 7,500	\$ 1,500 x 5days = \$ 7,500
(S) Potential Cost of delay in discharge of patient to obtain home NPWT (1–2 days)	Estimated Cost \$ 1,500/day	No delay: patient discharged with the Single Use, Portable NPWT applied in the hospital
Outpatient STSG surgery	POD 14 days	No
Operations	2 separate	1
Costs of Additional Outpatient Surgery, Hospital, Surgeon & Anesthesia Fees	\$ 10,000	No second surgery required
Total NPWT (days)	21	10–14 (mean 12)
Results	Good	Good
Total Costs	\$ 17,500–\$ 20,500	\$ 7,500
Added benefits	-	* No painful removal of NPWT * Uninterrupted NPWT * Patient satisfaction +++ * Significant cost savings (\$10,000–\$13,000)

Results and Conclusion

Cost savings between \$10,000–\$13,000 per patient is obtained by avoiding: a second surgery, second hospitalization and second recovery. Patient satisfaction was found to dramatically increase.

The clinical outcome provided improved cosmesis by utilizing a single stage procedure over a two stage/procedure application of biomatrix/** and subsequent skin graft under NPWT.**

In summary, a single stage application of biomatrix/** and skin graft, improved cosmesis, reduced length of hospital stay, reduced complications, reduced pain, improved patient satisfaction and reduced costs. The unique personal NPWT system capabilities supported the goal of therapy and clinical strategy.**

Notes:

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

Acknowledgements: The support of Medela AG (Laetlichstrasse 4b, 6340 Baar, Switzerland) for this project is gratefully acknowledged.

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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Presented at the Virtual WOCNext 2020 Reimagined, June 5–7, 2020.