Results: Granulation: In the day 13 group, there was a significant difference (p<0.0441) in granulation tissue thickness between ROCF + interfacial layer (ROCF + IFL) (5.33 mm ± 0.14) as compared to CPUF (7.43 mm ± 0.33). No significant difference were seen between ROCF + IFL (5.33 mm ± 0.14) and GM (5.80 mm ± 0.22). Moreover, each treatment group (ROCF + IFL, CPUF, and GM) demonstrated a significant increase in granulation tissue deposition over time (p<0.04).

Genomics: The novel GM dressing at Day 13, relative to Day 7, demonstrated greater upregulation in cell binding and catalytic activity which included Matrix metallopeptidase 1 (6.58), Matrix metallopeptidase 3 (8.83) and Decorin (2.15). These are important epithelial markers and known for collagen binding. Novel CPUF dressing at Day 13, as compared at Day 7, demonstrated similar results. There was in increase in MMP1 (10.30) and MMP3 (13.46), both of which are important in keratinocyte migration and endothelial cell activity. There was an increase in Catenin (2.29), which may be responsible for the inhibition signal that causes cells to stop dividing once the epithelial sheet is complete. In addition, cell adhesion genes (Integrins: ITGA2, ITGB3 and ITGB6) were all up regulated (2.01, 2.62, 6.90 respectively).

Peel Force: Regardless of group or timepoint, ROCF required significantly greater average force for removal. A dressing change at day 4 did not statistically affect the amount of peel force required to remove ROCF for the groups with a day 7 end of in-life/termination. The use of the interfacial layer with GF brought the force required for removal as low as the other novel dressings.

Conclusions: This preclinical study illustrates that the tested novel dressings induced more granulation tissue formation with less peel force, and interesting genomic responses than the controls. Following 13 days of treatment in a porcine model, the novel NPWT dressings have been shown to increase genes involved in epithelization while increasing granulation tissue and decreasing dressing removal force, which might lead to better wound healing outcomes.

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#GM dressing (NPWT novel dressing 1)
*CPUF dressing (NPWT novel dressing 2)

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Effect Of Nitric Oxide Releasing Gel On Excisional Wound Healing

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Purpose: Nitric Oxide (NO) plays a pivotal role as a messenger molecule that signals to cells during wound repair. The amount of NO secreted changes during the three classic stages of wound healing: inflammation, proliferation and regeneration. NO levels normally increase rapidly after skin injury in the inflammatory phase and gradually decrease as wound healing proceeds toward the proliferation and regeneration. However, although NO is known to impact proliferation, differentiation and migration of keratinocytes, the molecular mechanisms of how increased NO concentration affects wound healing and leads to re-epithelialization and wound closure is far from completely understood. Here we reveal that local continuous administration of NO-releasing gel on excisional wound healing accelerates overall wound healing despite an initial delay in wound closure.

Methods: Murine excisional wound model was studied to investigate the effects of NO releasing gel on angiogenesis and re-epithelialization. NO gel was created by adding cellulose derivatives to sodium nitrate solution.1) Mouse model: 15-week-old C57BL/6 mice were randomized into treatment groups: Nitric Oxide or PBS control (N=5 mice per group). A full-thickness wound was excised using a sterile 6-mm punch biopsy tool on each side of the dorsal midline. An NO- releasing gel was locally applied to the wound site twice daily until wound closure on D21.2) Tissue analyses: Wounds were harvested on day 2 and 7 after wounding and upon closure. The presence of epidermis, dermal integrity, vasculature and inflammatory cells were visualized by histology and immunofluorescent techniques.

Results: In the murine excisional model, NO-treated wounds healed completely four days earlier than PBS-treated wounds (Wound closure Day 15.6±0.7 vs. Day 19.4±0.5). However, initially NO-treated wounds closure was slower than PBS-treated wounds. Wounds harvester from the NO treatment group exhibited a more robust dermal layer, collagen deposition, and neovascularization.
was evaluated using CD31 immunofluorescent staining. NO treated wounds exhibited significantly higher CD31 stain compared to the PBS control group.

**Conclusion:** The molecular mechanisms by which the amount of NO impacts wound healing and restores re-epithelialization leading to wound closure has not been identified previously. Physiological NO expression usually peaks after a few days. With NO gel treatment, NO levels are elevated immediately after skin injury. We used NO-releasing gel to demonstrate that daily application of NO gel immediately after a wound injury can accelerate overall wound healing, and the inflammatory phase may be activated early and enhance healing progression with early re-epithelialization. However, NO-treated wounds closure is initially slower. The continuous local NO treatment on excisional wound healing may be vary in its role on proliferation, differentiation and migration of keratinocytes. Therefore, this NO gel for excisional wound healing model will be valuable contribution to advance the field of wound healing.

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**Long Term Outcomes Of Lower Extremity Salvage With Free Tissue Transfer In The Chronic Wound Population**

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**Purpose:** Prior to advances in microsurgery, chronic lower extremity wounds required amputation, known to be associated with five-year mortality rates as high as 70%.

Advanced limb salvage techniques are possible. However, there remains a paucity of literature on long term mortality benefit of this approach. The purpose of this study is to examine long term limb salvage rates and mortality of LE FTT at a single institution.

**Methods:** Retrospective review of lower extremity FTT at our institution from 2011-2019 was performed. Data collected included demographics, comorbidities, and FTT characteristics. Mortality was determined from obituary data and chart review. Primary outcomes of limb salvage and mortality were estimated using Kaplan-Meier analyses.

**Results:** Of 144 FTT procedures performed for lower extremity salvage in the chronic wound population, 142 occurred in unique limbs and in 139 unique patients. Average age was 56.4±14.0 years. Average BMI was 28.5±5.9 kg/m². Mean Charlson Comorbidity Index was 3.2±2.3. Common comorbidities included osteomyelitis 62.4% and diabetes 45.1%. Most common flap types were anterolateral thigh or anteromedial thigh 51.1%, vastus lateralis 28.4%, and gracilis 6.4%. Flap survival occurred in 93.8%. Rate of amputation was 88.5%. Estimated five-year limb salvage rate was 73.6% while five-year mortality was 17.1%.

**Conclusions:** We present the largest long-term study of FTT for lower extremity salvage in the chronic wound population to date. Our data demonstrates that a high rate of limb salvage is sustained over time. In the minority of cases with failure of salvage, progression to amputation most often occurs within the first year. Long term mortality is also excellent supporting an aggressive approach to limb salvage in this highly comorbid population.

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**Deferoxamine Treatment Decreases Levels Of Reactive Oxygen Species And Cellular Apoptosis In Irradiated Skin**

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**Purpose:** Radiation therapy is a cornerstone of oncologic treatment. Unfortunately, radiation can lead to pain and