3M | V.A.C.® Therapy

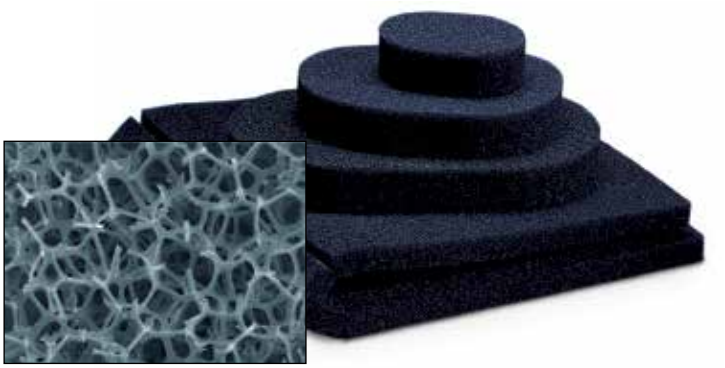
A comparison of NPWT dressings

3M™ V.A.C.® Granufoam™ Dressings vs. Gauze

The science needed to help promote wound healing

The mechanisms of action for 3M™ V.A.C.® Therapy include drawing together of the wound edges and the promotion of granulation tissue formation, which are facilitated through the application of macrostrain and microstrain.

V.A.C.® Granufoam™ Dressings



Micrograph of V.A.C.® Granufoam™ Dressing

Gauze dressings used with NPWT

Microscopic enlargement of gauze

Macrostrain

Macrostrain is the visible alteration that occurs when applied negative pressure contracts the hydrophobic, reticulated, open-cell foam, which manifolds pressure and provides direct and complete wound bed contact.

Macrostrain and compression efficiency

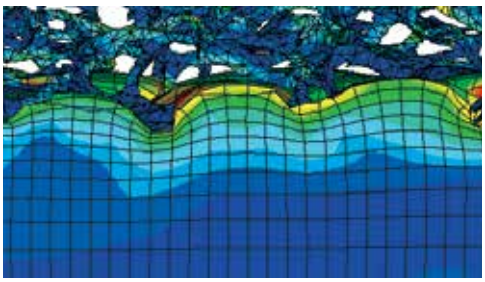
When comparing the structural makeup of V.A.C.® Granufoam™ Dressings to dry gauze and how each compresses, only V.A.C.® Granufoam™ Dressings demonstrate higher levels of macrostrain during application of Negative Pressure Wound Therapy.[1]

Because it can be contracted smaller than its original size, the unique structure of V.A.C.® Granufoam™ Dressings allows for effective macrostrain.

Microstrain

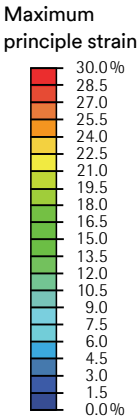
The effects of microstrain occur at the cellular level when the foam comes in contact with the wound surfaces, causing tissue deformation leading to cell stretch[2], which has been shown to stimulate cell migration and proliferation.

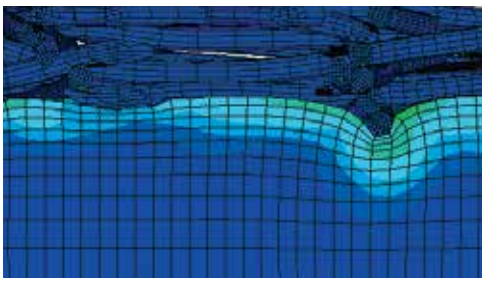
Comparing dressings through tissue interaction



Computer modeling of V.A.C.® Granufoam™ at 125 mmHg negative pressure.*

The open-cell, reticulated characteristics of 3M™ V.A.C.® Granufoam™ Dressings allow for conformation to the wound surface for maximum tissue interaction.[3]



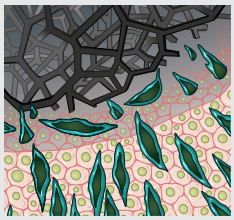


Computer modeling of gauze at 70 mmHg negative pressure.*

The large size of gauze fibers may contribute to reduced microstrain magnitude and distribution when compared to V.A.C.® Granufoam™ Dressings.[3]

Effects of microstrain on wound healing

To determine the efficacy of V.A.C.® Granufoam™ Dressings and gauze dressings under negative pressure, an in vitro fibrin matrix was used to examine two components of wound healing on a cellular level.

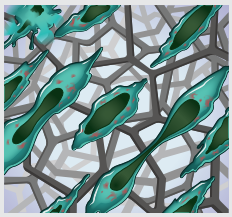


Fibroblast migration with V.A.C.® Granufoam™ Dressing.**

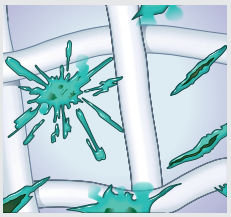
Fibroblast migration with gauze dressing.**

Fibroblast migration

V.A.C.® Granufoam™ Dressings demonstrated a **3X greater** fibroblast migration than gauze.[4]



Mitosis with V.A.C.® Granufoam™ Dressing.**



Cell death with gauze dressing.**

Mitosis and cell death

Cell death was **2.4X greater** with gauze dressings than with V.A.C.® Granufoam™ Dressings.

Additionally, cells exposed to V.A.C.® Granufoam™ Dressings showed increased proliferation through mitosis (cell division).[4]

For more information about the 3M™ V.A.C.® Therapy System and 3M™ V.A.C.® Dressings, contact your 3M representative.

*Based on manufacturer's published recommended settings.

**This is an artist's rendering for illustration purposes only. Individual results may vary.

References

1. Morykwas, M.J., et al. Vacuum-Assisted Closure: State of Basic Research and Physiologic Foundation, Plastic & Reconstructive Surgery. 1117 Supplement: 121S-126, 2006.
2. Greene, A.K., et al. Microdeformational Wound Therapy, Effects on Angiogenesis and Matrix Metalloproteinases in Chronic Wounds of Three Debilitated Patients, Annals of Plastic Surgery, April 2006. Vo. 56, No.4; p 418-22.
3. Wilkes, R. et al. Effects of Dressing Type on 3D Tissue Mirodeformations During Negative Pressure Wound Therapy. Journal of Biomechanical Engineering, March 2009, Vol 131.
4. McNulty, A. et al. Effects of negative pressure wound therapy on fibroblast viability, chemotactic signaling, and proliferation in a provisional wound (fibrin) matrix. Wound Repair and Regeneration, 2007; p 1-9.

Note: Specific indications, contraindications, warnings, precautions and safety information exist for these products and therapies. Please consult a clinician and product instructions for use prior to application. This material is intended for healthcare professionals.