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Title:

Elastic Compression of Bioengineered Skin Substitute Improves Chronic Stasis Ulcer Healing: Fuzzy Yarn Elastic Compression Controls Wound Bed Edema

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Introduction:

Lymphatic insufficiency accompanies Chronic Stasis Ulcers (CSU), creating a hostile edematous wound surface. CSU respond to bioengineered skin substitute (BeSS) (*) in spite of a wound bed hostile to a split thickness skin graft. We observe CSU BeSS grafts appear waterlogged, thickened and gelatinous at POD 14. We believe BeSS anasarca results from diffusion of wound edema fluid. Multiple reports show that negative wound pressure therapy (NWPT) speeds healing of hostile wounds treated with BeSS, probably by controlling wound surface pathological edema.(1)

Yarn Focused Compression (YFC) textile creates cornrow furrows in the skin. YFC represents a physiological improvement in elastic compression stasis. (2) Three and four layer dressings are attempts to deliver compression directly to the healing wound surface. Landon delivered yarn focused elastic compression, with YFC resting directly on granulating CSU surface and showed increased healing.(3) Maloley reported improved split thickness skin graft healing when yarn focused elastic compression is applied after the first dressing change.(4)

This study answers two questions about BeSS therapy.: Is YFC textile a feasible and safe primary dressing for CSU treated with BeSS? Does the control of healing wound surface edema with Yarn Focused Compression improve BeSS healing?

Methods:

Four CSU patients were treated with BeSS(*) held in place with nano particle hydrogel(**), a thin silver ion eluting polyester mesh(***) and YFC textile(****) as a fuzzy compressive first layer of a three layer dressing.

Results:

YFC compression textile was well tolerated. Ulcer healing is documented in photos. Dislodgement of the dressing protecting the BeSS was a complication.

Conclusions:

Elastic compression of BeSS grafted stasis ulcers with Yarn Focused Compression textile appears to be well tolerated and safe. Controlling BeSS edema that accompanies stasis ulcers with Yarn Focused Compression appears to improve ulcer healing.

References:

- 1 Espensen, EH, et al. "Use of subatmospheric (VAC) therapy to improve bioengineered tissue grafting in diabetic foot wounds." Journal of the American Podiatr. Med. Assoc. 92(7): 395-397, 2002.
- 2 Kozeny, D., Stott, K. "Longitudinal yarn compression textile: An innovative treatment for leg swelling." Journal of Vascular Nursing, Volume 25, Issue 3, Pages 62-62, September 2007.
- 3 Landon, Laura, et al. "Controlling wound edema with fuzzy yarn focused elastic compression in direct contact with granulation tissue speeds healing." Clinical Symposium on Advances in Skin & Wound Care Abstract October 2009, in Press.
- 4 Maloley, Brittney J., et al. "Improved skin graft maturation and cosmesis with yarn focused elastic compression." American College of Surgeons Abstract October 2009, in Press.

* Apligraf®, Organogenesis, Canton, MA

** Altrazeal™, HEMA Nanoparticle Gel, Uluru Corporation, Addison, TX

*** Restore® Contact Layer Silver Triact™, Hollister Wound Care, Libertyville, IL

**** EdemaWear®, Compression Dynamics, LLC, Omaha, NE