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Novel Four Layer Dressing Enhances Leg Ulcer Healing: Longitudinal Yarn Compression in direct contact with wound surface delivers effective elastic compression.

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Background:

Control of wound exudates, lymphorrhea and minimal wound pain from elastic compression are major advantages of layered dressings. Four layer compression dressings are standard therapy for leg ulcers resulting from lymphedema and venous insufficiency.(1, 2)

Kozeny reported a novel textile stockinet, Longitudinal Yarn Compression* (LYC) for edema in 2006.(3) LYC stockinet delivers compression via fuzzy yarn to one fifth of the skin surface, leaving four fifths of the subcutaneous fat uncompressed. Conceptually, patent lymphangions (micro-anatomic term for a lymph vessel with smooth muscle and tissue valves) in noncompressed subdermal fat provide effective lymph fluid drainage from zones of elastic compression.

Fuzzy yarn contact with the skin has advantages that are poorly understood. Fuzzy skin nexus may down regulate skin nociceptive reflex arcs to decrease pain and increase skin oxygen content by reflex control of cutaneous microcirculation.

Patent lymphangions and “fuzzy skin nexus” are physiologic advantages. This first human use study asks two questions: *Is LYC textile comfortable and safe as the compression generating first layer of a four layer dressing? Is LYC textile superior to ACE type elastic wraps as the elastic compression generating engine of a four layer dressing?*

Methods:

Four patients were treated with four layer dressings. Layer #1: LYC elastic textile, #2: A “therapeutic” layer of foam, alginate, powders, etc above layer #1 but in contact with

the granulation tissue, #3: Cast padding, #4: Cobam. Photos document treatment and healing.

Results:

Patients reported the dressing was “comfortable” (pain free) within 2 hours of application. All wounds healed.

Conclusions:

1. Delivering elastic compression with fuzzy yarns (“fuzzy skin nexus”) down regulates nociceptive reflex arcs in the skin and appears to decrease wound pain due to compression dressings.
2. Fuzzy longitudinal yarn elastic textile, as the compression engine of a multilayered dressing appears more effective for wound healing than ACE type elastic wraps.

References:

1. Nicky Cullum, Trevor A Sheldon. A systematic review of compression treatment for venous leg ulcers. *BMJ* 1997;315:576-580.
2. E. A. Nelson, C. P. Iglesias, N. Cullum, D. J. Torgerson. Randomized clinical trial of four-layer and short-stretch compression bandages for venous leg ulcer. *BMJ* 1997;315:576-580.
3. Longitudinal yarn compression textile: An innovative treatment for leg swelling. *Journal of Vascular Nursing*, Volume 25, Issue 3, Pages 62-62, D. Kozeny, K. Stott, 2006.

*EdemaWear®, Compression Dynamics LLC, Omaha, Nebraska