Protocol to Deploy Longitudinal Elastic Textile Compression Appears to Prevent Skin Tears in Patients with Senile Skin at Risk for Shear injury; Control of Edema is the Probable Mechanism

Problem

- Shear injury resulting in a hematoma
- Anticoagulated
- Mild peripheral arterial disease
- Senile skin
- Mild venous insufficiency

Day #0. Probable wheelchair pressure injury to L posterior thigh with skin shear injury, observe the erythemia on skin of R thigh. Patient has CHF with edema and thin senile postmenopausal skin.

Day #9. A blood filled blister on the weight bearing surface of the posterior thigh.

Treatment

- Aspiration of bloody fluid
- Fuzzy wale lite elastic compression stockinet* + cast padding + crepe wrapping

Day #14. New problems are seen in this photo; edema of the right ankle due to CHF and arterial insufficiency, and three new patches of skin breakdown, attributed to trivial trauma and senile skin. Patient subsequently referred to hospice and was lost to follow up (died of organ failure).

Day #14. Posterior thigh wound is healing. Layered foam based elastic compression dressing was poorly tolerated. Patient tolerated fuzzy wale light elastic compression.*, ***

Outcome

- 60% healing of posterior thigh wound with fuzzy wale elastic compression at time of death ~day #50
- This patient, with wheelchair shear/pressure injury, prompted us to use fuzzy wale stockinet to protect skin in contact with wheelchairs

Clinical Problem

Skin tears, due to shear, in institutionalized octogenarians with senile skin occur 1.5 million annually.[1,2] We are testing preliminary protocols to prevent skin shear injury using an inexpensive longitudinal elastic compression stockinet* to replace past management protocols calling for expensive skin protection textiles including gauntlets, TED hose and ACE wraps.[3]

Current Approach

Fuzzy wale longitudinal elastic compression stockinet, developed at the University of Nebraska, has been extensively studied for control of edema in subcutaneous fat, the treatment of venous leg ulcers, and to stabilize and compress split thickness skin grafts and large skin flaps after shear injury.[1,2] Experience with elastic compression led us to ask, Does fuzzy wale elastic compression, by protocol, prevent shear injury in at risk senile skin?

Patient Outcomes

Preliminary observations to date with ad hoc elastic compression protocols for inpatient, rehab and chronic care patients appear promising to prevent shear injury in at risk senile skin. Photographs document:
1. the effectiveness of compression stockinet in treating skin flaps created by shear injury, 2. improvement in the appearance and ßtrengthCbf senile skin after months of elastic fuzzy wale compression, and 3. control of skin edema by fuzzy wale compression.

Conclusion

Fuzzy wale longitudinal elastic compression protocols for inpatient, rehab and chronic care patients appear promising and inexpensive to prevent shear injury in at risk senile skin. Control of edema and patient compliance may be important. Formal research is indicated.

References:

1. Gerlach G, How to prevent and manage skin tears. Adv Skin Wound Care 2003;16:288-92.
2. Thomas Hess C, Skin IQ. Adv Skin Wound Care 2004;17:277.
3. Edwards H, Gaskill D, Nash R. Treating skin tears in nursing home residents: a pilot study comparing four types of dressings. Int J Nurs Pract 1998;4(1):25-32.
4. D. Kozemy, K. Stott Longitudinal fuzzy wale compression textile: An innovative treatment for leg swelling; Journal of Vascular Nursing, Volume 25, Issue 3, Pages 62-62
5. Karla A. Manzel, BSN, MS, CWON, FCN; Lindsay Manzel, BS, RN; Laura A. Schwarzer, RN, CWS; Longitudinal Fuzzy Wale Compression Stockinet May Improve Senile Skin Tensile Strength, Symposium of Advanced Wound Care, April 2010; Science Poster Orlando, http://www.compressiondynamics.com/compress_links/Abstract_EdemaWear_Prevents_Skin_Shear_Injury_in_Elderly_Patients_2010.pdf

* EdemaWear® and EdemaWear® LITE™ Stockinets, Compression Dynamics LLC, Omaha, NE 68102

**Anasept® brand sodium hypochlorite solution, Anacapa Technologies Inc, San Dimas, CA 91773

*** Staytex™ Stockinet, Anacapa Technologies Inc, San Dimas, CA 91773

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Problem

- Blunt pretibial shear trauma in 70 y/o female
- Comorbid venous insufficiency
- Comorbid senile skin

Day #0. Post Trauma Day #10. Patient was wearing shorts and bumped into a high steel rail resting on a wall. Observe necrotic blue, dusky skin edges, and mucus slime over the poorly granulation surface.

Treatment

- Soft debridement
- Fuzzy wale elastic compression

Day #0. Post Trauma Day #10. A "soft debridement" using the dry terrycloth towel seen in the photograph, technique was used to completely debride this wound with minimal discomfort. The wound was pretreated with Lidocaine gel for 15 minutes, then topical sodium hypochlorite solution** for 10 minutes. A dry terrycloth, seen in the photograph with blood and exudate, was used with a gauze and thumb technique to remove the slough and necrotic tissue. This technique is easy for nonphysician wound technicians, nurses and physical therapists to master and it is comfortable for the patients.

Day #0. Post Trauma Day #10. Observe how effective the soft debridement technique can be. Soft debridement owes it success in part to pretreatment to soften the eschar via reactive oxygen species with sodium hypochlorite, Dakin@ solution as we did in this case, or hypochlorous acid (HOCl). Reactive oxygen species breaks down bonds between the amino acids in protein to make debridement easier.

Day #36. Post Trauma Day #36. The skin furrows are the result of a fuzzy wale compression dressing + a thin wound veil on the wound + gauze to absorb exudate on top of the compression stockinet.

Day #36 . The white material is a sacrificial collagen substrate that will be digested by wound host enzymes, such as collagenase, one of nine matrix metalloproteinases .

Day #36. The white stockinet with orange stripe is LITE size medium fuzzy wale elastic compression stockinet*, ***. The stockinet does double duty, providing effective comfortable elastic compression and holding the dressing in place.

Day #42. Patient showers daily, washes the wound and replaces stockinet, laundering her stockinets as needed. Observe corrrrow furrows resulting from compression with fuzzy wale compression stockinet in the skin and granulation tissue of the healing wound. Observe how healthy the surrounding skin appears as stasis dermatitis resolves under fuzzy wale elastic compression therapy. Patient was discharged from clinic with a supply of stockinet as a skin shear protection garment.

Outcome

- Healing in 49 days

Problem

- Skin shear injury on 3 limbs
- Senile skin
- COPD on Prednisone
- CHF with edema
- Anticoagulated

Day #0. Patient lives at home, presented with shear injuries on three limbs. This wound brought he to Alegent Creighton Mercy Wound Clinic. Initial treatment: wash with topical Hypochlorous acid and terrycloth, reapproximate skin flap with sterile strips and transparent polyethylene film, and dress with fuzzy wale lite elastic compression*,*** + Robert Jones type cotton batting dressing.

Day #0. Left forearm shear injury is several months old.

Day #0. Right forearm shear injury is several months old.

Treatment

- Fuzzy wale elastic compression stockinet*, ***
- Robert Jones type dressing with cotton batting
- Bedside sterile strip closure of skin flap

Rx Day #7. With a layered Robert Jones compression dressing, the L arm injury is healing nicely!

Outcome

- Two clinic visits referred to home care
- 3 shear injuries healed with visiting RN Rx at home
- Fuzzy wale compression stockinet to prevent shear injury recurrence

Rx Day #7. Patient discharged from wound clinic to home care from visiting nurse association. All wounds healed. Patient now wears fuzzy wale compression textile on 4 limbs and has had no skin shear injury recurrences.