Aggressive Mechanical Bioburden Control Improves Wound Healing: Liberal 22.5 KHz Ultrasonic Debridement Reduces Bioburden

Refactory Ischemic Ulcers

Problems:
- Presence of L. SMA
- Periwound with lieve contractures
- Profound arterial ischemia (ABR 0.0)
- Concurrent tobacco use
- Pressure on Frank from mobility chair
- Little progress with 10 months of advanced wound care
- Refused R.B.A.

Procedures:
- Induction time: 3 minutes
- Time to incision: 3.2 minutes
- Time to wound closure: 4 minutes

Treatment:
- Three ultrasonic® debridements (22.5 KHz) to control bioburden at 7-day intervals
- HEMA nanoparticle powder
- FemtoFocussed Compression stockings® directly on the granulating surface to control edema
- Bioengineered Skin Substitute grafting

Outcome:
- 100% healing of 5th metatarsal head ulcer
- 80% healing of ankle wound area in 5 weeks
- Three ultrasonic debridements reversed 10 months of delayed healing and expansion.
- Rutile case: Three-week-old debridement controlled bioburden in granulation tissue allowing BeSS graft to heal on a refractory ischemic ulcer

Idiopathic Diabetic Ulcers

Problems:
- Lateral ankle ulcers treated in community wound center for 7 months
- Ulcers with uncertain origin. Thus “diabetic ulcers” by exclusion
- Palpable pedal pulses
- Ulcers are painful. Sharp debridement excruciatingly painful
- Diabetic - Insulin x 14 years

Procedures:
- Two debridements, 2.5 KHz ultrasonic hand piece®, at weekly intervals
- Wounds grafted with Bioengineered human Skin Substitute

Treatment:
- Four layer dressing with Longitudinal Yarn Compression® as first layer of a four layer dressing before grafting
- Acute debridement with the ultrasonic powered hand piece® cleaned up the wound (presumably dramatically lowered bioburden) enough to support skin graft
- Two weeks after ultrasonic debridement, Bioengineered human Skin Substitute grafting

Outcome:
- Wound healed 9 weeks after BeSS grafting
- Debridement of bioburden with 22.5 KHz ultrasonic energy hand piece x 2, jumpstarted healing in a wound stalled (getting deeper, not granulating) for 7 months
- Ultrasonic debridement was “comfortable” for the patient who had endured multiple sharp debridements

Recurrent Venous Stasis Ulcers

Problems:
- Recurrent painful 2nd calf stasis ulcerations
- Chronic skin fibrosis and massive edema

Procedures:
- Two debridements, 2.5 KHz ultrasonic hand piece®, at weekly intervals
- Wounds grafted with Bioengineered human Skin Substitute

Treatment:
- Six weeks after initial ultrasonic debridement wound healing by contraction and epithelial ingrowth

Outcome:
- Six weeks after initial ultrasonic debridement wound healing by contraction and epithelial ingrowth

Stasis Ulcers with Ischemia on Steroids

Problems:
- Painful stasis ulcers present for 13 months
- Steroid-dependent COPD
- Perfusion myocardial disease

Procedures:
- Induction time: 3 minutes
- Time to incision: 3.2 minutes
- Time to wound closure: 4 minutes

Treatment:
- Four layer dressing with Longitudinal Yarn Compression® as first layer of a four layer dressing before grafting
- Acute debridement with the ultrasonic powered hand piece® cleaned up the wound (presumably dramatically lowered bioburden) enough to support skin graft
- A second graft of Bioengineered human Skin Substitute® accomplished complete healing

Outcome:
- After ultrasonic debridement x 3, which presumably controlled bioburden, a second graft of Bioengineered human Skin Substitute accomplished complete healing

Stasis Ulcer, CHF and Senile Skin

Problems:
- Classic 1st medial calf stasis ulcer
- CHF with edema x 2
- Senile skin with healing pretibial shear wound

Procedures:
- Induction time: 3 minutes
- Time to incision: 3.2 minutes
- Time to wound closure: 4 minutes

Treatment:
- Six weeks after initial ultrasonic debridement wound healing by contraction and epithelial ingrowth

Outcome:
- Wound nearly healed in six weeks with three weekly ultrasonic debridements and elastic longitudinal yarn compression