

ABSTRACT: The Symposium on Advanced Wound Care (SAWC), Orlando, FL, April 2010

Title:

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

Martin J. Winkler, MD, FACS
Steven L. Clinch, MD, FACS
Laura A. Landon, RN, CWS
Karla A. Manzel, BSN, MS, CWON, FCN

Problem:

Wound centers staffed by surgeons have aggressive policies for debridement of necrotic tissue. Bioburden, containing bacterial biofilms are endemic in granulation tissue of chronic wounds. Bacteria, including MRSA, exploits bioburden and leads to expensive, futile antibiotic treatment. Bioburden bacteria inhibit healing via multiple mechanisms.(1) Current research suggests mechanical bioburden control speeds healing.(2)(3)

Why is wound bioburden control a challenge for surgeons aggressive with curette, scalpel and ronguer? Biofilm is invisible. "Looking great..." wounds can carry heavy bacterial bioburden. Granulation bioburden is impossible to debride sharply to an 85% reduction level without disrupting healthy tissue below the healing interface. Sharp debridement is dreaded, painful and bloody.

When ultrasonic debridement is (at 22.5 kHz) used in wound debridement, the effects of vibration and cavitation on the tissue surface allows for the necrotic tissue to be removed, while allowing the clinician to spare the tissue at the healing surface.(*). Patient comfort, ease of use (ancillary staff easily master the technique) and brevity of treatment time makes ultrasonic debridement for biofilm reduction practical.

This study answers two questions. (1) Do wound clinic surgeons in the "learning curve" of ultrasonic debridement impact healing statistics? (2) Using cost to healed wound as the end point, is 22.5 kHz ultrasonic debridement for bioburden control feasible and effective?

Methods:

Seventy-three consecutive "learning curve" patients were treated with 22.5 kHz ultrasonic debridements at weekly intervals to control bioburden. Photos document healing.

Results:

Total costs, time to healing and patient discomfort appear to decrease with liberal ultrasonic debridement vs. historic controls in a community wound center. Reimbursement is discussed.

Conclusion:

Liberal utilization of 22.5 kHz ultrasound wound debridement at a clinic systems level: 1) appears to improve wound healing rates as a result to enhanced mechanical control of bacterial bioburden, and 2) appears to decrease total costs.

References:

1 James, Garth A. PhD et al. "Biofilms in chronic wounds." Wound Repair and Regeneration, Volume 16, Issue 1, Pages 37 – 44,

2 Ennis, W.J. et al. "Ultrasound therapy for recalcitrant diabetic foot ulcers: results of a randomized, double-blind, controlled, multicenter study." Ostomy Wound Management. 2005 Aug; 51(8):24-39.

3 Stanistic, Margaret McCarty, et al. "Wound Debridement with 25 kHz Ultrasound." Advances in Skin & Wound Care: November/December 2005 - Volume 18 - Issue 9 - pp 484-490

* SonicOne®, Misonix Inc., Farmingdale, NY 11735