

# Ultrasonic-Assisted Wound Treatment (SONOCA) vs MRSA, VRE and other Pathogens

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## Introduction

Multiple drug resistant bacteria, highly virulent bacteria and the emergence of new bacterial strains related to the overuse/misuse of systemic and topical antibiotics for soft tissue infections is a growing concern. The costs in health-care dollars and human suffering are enormous. New treatments must be sought to reduce the need for systemic and topical antibiotic utilization. Primary prevention and effective early intervention for infection are critical. The use of ultrasound to debride and treat wounds provides these necessary elements.

Low frequency ultrasonic wound treatment (UAW-SONOCA) is an alternative method for wound debridement and cleansing. The UAW procedure has been utilized and its effects studied on patients with recalcitrant chronic wounds colonized and or infected with multiple drug resistant and/or virulent strains of bacteria. It has been found that patients' wounds previously cultured positive for MRSA and VRE and other pathogens culture negative or prove to have a logarithmic reduction in the population of the previously cultured organisms post ultrasonic treatment. It is this effect that is documented in a case series of patients with chronic wound infections.

## Case Studies

**Case #1** C.K. a 53 yr. old female with a 30 year history of Multiple Sclerosis. She has significant disability with motor and a cognitive deficit, diffuse lower extremity weakness and spasm, and is confined to a wheelchair. She was referred for comprehensive wound care evaluation and treatment of a stage III right ischial pressure ulcer that developed during an acute care hospitalization (07/2002). The wound was deteriorating despite offloading efforts and aggressive topical wound care interventions. Swab cultures of the wound bed revealed Vancomycin Resistant Enterococcus (VRE). Enzymatic debridement was discontinued and a course of ultrasonic assisted wound debridement initiated. Pre-ultrasonic treatment culture status, positive, post-ultrasonic culture status, negative for VRE. The patient progressed to complete resolution without surgical intervention or complications related to infection.



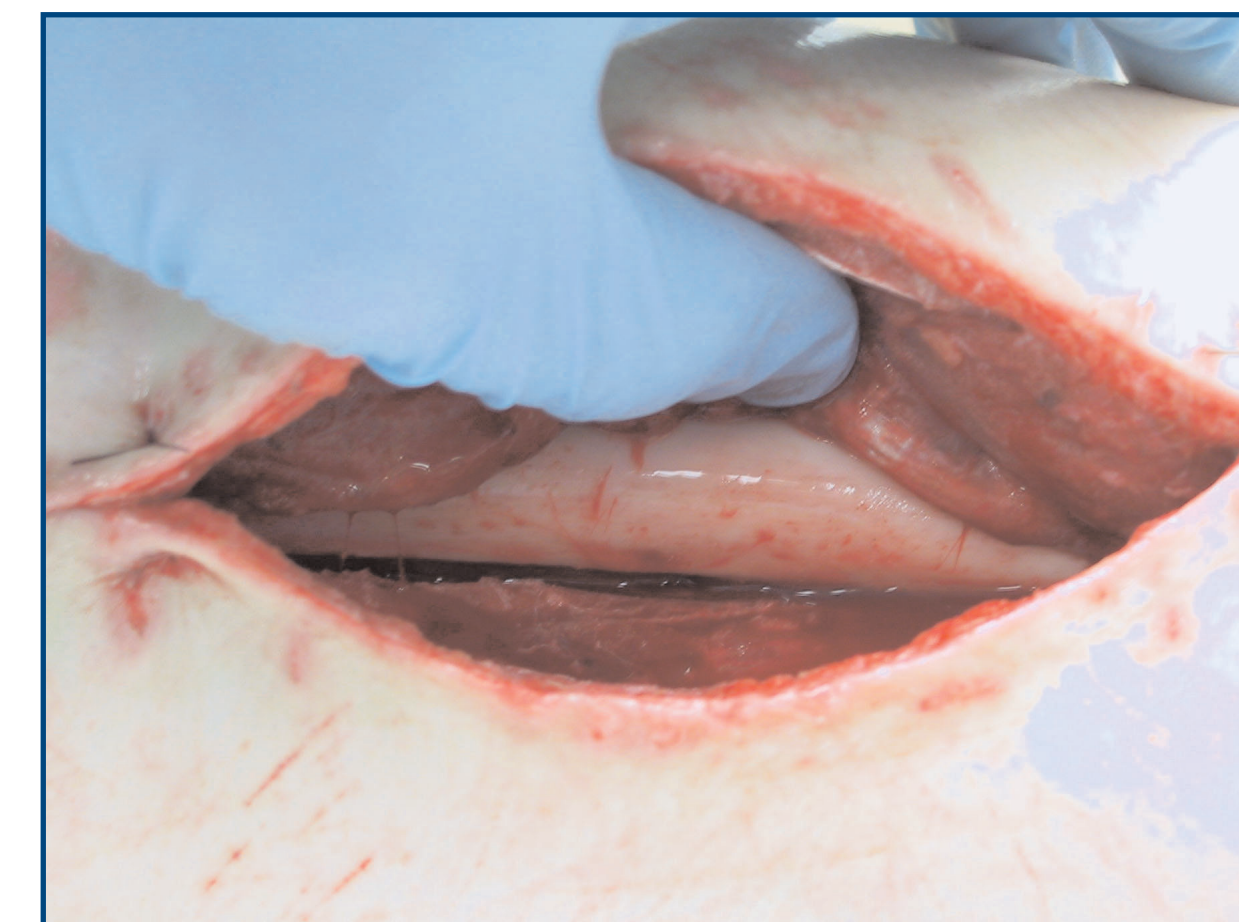
Case #1

**Case #2** N.L. is a 69 year old male with Type II Diabetes Mellitus and an infected right diabetic foot ulcer. Per the referring physician, without surgical revascularization and aggressive wound care, the risk of below-knee amputation was very high. At the time of initial wound care consultation visit a swab culture of the wound bed after cleansing was obtained. The wound was then debrided with the Soring Sonoca 180, ultrasonic device, for 4 minutes at 80%. Pre-treatment culture results revealed moderate growth of Staphylococcus Aureus, Methicillin resistant, many diptheroids, moderate enterococcus, and many Enterobacter Cloacae. Post treatment culture revealed no Staphylococcus Aureus isolated. Additional risks related to systemic infection stemming from the diabetic ulcer were eliminated.



Case #2

**Case #3** A.H. a 5 year old female with Acute Lymphoblastic Leukemia was transferred to our facility for hyperbaric oxygen therapy after she showed progression of necrotizing fasciitis involving her left thigh. Cultures dated Jan. 24, 2003 confirmed Methicillin Resistant Staphylococcus Aureus and Clostridium Septicum. Despite aggressive surgical débridements on 1/24, 1/28, 1/31, and 2/03 tissue necrosis continued and operative cultures persistently grew Clostridium Septicum, and MRSA. On the day of transfer, 02/06/3 the patient again underwent debridement. Under general anesthesia the wound was unpacked and Ultrasonic Assisted Wound Therapy was utilized to débride and irrigate the wound. Involved tissues included muscle, tendon, and periosteum. Post-procedure, intraoperative cultures revealed no organisms seen on gram stain, and no growth at 4 days. The wound was closed successfully with delayed surgical technique.



Case #3

**Case #4** J.M. a 73 yr. old male with Type II insulin dependent Diabetes Mellitus 3 ½ weeks post coronary bypass graft developed a post-operative sternal infection. Bone biopsy confirmed Clostridium Perfringens, a gas forming anaerobic bacterial infection.

The patient was transferred to the cardiac intensive care unit, placed under isolation precautions, evaluated for hyperbaric treatment and an aggressive wound care plan was formulated. Ultrasonic Assisted Wound Treatment was initiated at the bedside, the sternal border, omental flap, and multiple tunnels and areas of undermining were debrided and irrigated. In addition to the ultrasonic treatments, VAC and hyperbaric therapy were instituted. Post-treatment cultures throughout remainder of hospitalization proved to be negative for Clostridium species.



Case #4

## Conclusion

This case series illustrates the effectiveness of UAW in the management of complicated wounds in the compromised host. These outcomes are both interesting and exciting in regard to virulent and multiple drug resistant bacterial infections treated with UAW and provide an excellent basis for further research and clinical trials. UAW is an advanced technology that provides an alternative method to or augmentation of surgical sharp debridement techniques. Ultrasonic debridement is a valuable tool in the armamentarium for infection control of the advanced wound care practitioner.

## Reference

Young SR, Dyson M. Effect of therapeutic ultrasound on the healing of full thickness excised skin lesions. Ultrasonics 1990;28:175-80.