

# Healing of Surgical and Burn Wounds with Noncontact, Low-Frequency Ultrasound Therapy\*

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## Background

According to published studies, noncontact, low-frequency ultrasound\* (hereafter, noncontact ultrasound) speeds wound healing in lower extremity wounds of diabetic, ischemic venous, and multifactorial origin.<sup>1-3</sup> Published data on the use of this therapy in burns and traumatic wounds are limited.

## Case Series

This case series reports on clinical experience using noncontact ultrasound to promote healing in 3 consenting patients. All three patients reported noticeable reductions in pain scores after starting noncontact ultrasound therapy.

## Discussion

In this case series, noncontact ultrasound therapy appears to have stimulated the healing process and alleviated pain in surgical trauma and burn wounds.

## References

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- Kavros SJ, Schenck EC. Use of noncontact low-frequency ultrasound in the treatment of chronic foot and leg ulcerations: a 51-patient analysis. *J Am Podiatr Med Assoc.* 2007;97(2):95-101.

\* MIST Therapy® System, Celleration, Eden Prairie Minnesota  
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## Patient #1: Transmetatarsal Amputation

**History:** 81-year-old woman with left transmetatarsal amputation wound unresponsive to conventional care for 1 year. Diabetes, peripheral artery disease, peripheral neuropathy, venous insufficiency, right below-the-knee amputation, femoral-popliteal bypass (both). Medications: insulin, antihypertensive, hydrocodone-acetaminophen.

**Prognosis:** Heavy yellow slough (80%); further amputation expected.

**Previous therapies:** Negative pressure wound therapy, collagenase, hydrogels.

**Treatment:** Noncontact ultrasound started Aug. 14 (8 min, 2-3 times/wk). Dressing: clostridium collagenase w/ gauze and foam.

**Outcomes:** 50% granulation, 45% scar tissue at 8.5 months. Currently 90% scar tissue, 8% granulation and awaiting Apligraf to achieve complete closure. Reduced pain and increased mobility (with walker).

### Aug. 14, 2006

Area: 12.48 cm<sup>2</sup>  
 Slough: 80%  
 Granulation: 20%  
 Pain: 4 (rest) 6 (debridement, dressing change, activity)



### Sept. 7, 2007

Area: 1.26 cm<sup>2</sup>  
 Scar tissue: 80%  
 Granulation: 18%  
 Pain: 0 (all)



### May 30, 2008

Area: 0.32 cm<sup>2</sup>  
 Scar tissue: 90%  
 Granulation: 8%  
 Pain: 0 (all)



## Patient #2: Scalded Right Hand

**History:** 72-year-old man with a second degree burn on the right hand from scalding tea kettle water. Cardiovascular disease, prior CABG. Medications: warfarin, antihypertensive, cephalexin.

**Treatment:** Noncontact ultrasound initiated on Aug. 22 (9 min, 3 times/wk). Dressing: silver sulfadiazine and gauze.

**Prognosis:** Complete healing in less than 3 weeks with almost no scarring and substantial pain reduction at rest and during treatments. Anticipated need for occupational therapy to maintain function of dominant hand was unnecessary because healing occurred quickly without loss of function. Patient was able to continue ADLs and participate in family outings.

### Aug. 22

Area: 16.50 cm<sup>2</sup>  
 Edema: +2  
 Pain: 7 (rest), 8 (debridement, activity)



### Aug. 31

Area: 14.85 cm<sup>2</sup>  
 Edema: +1  
 Pain: 4 (all)



### Sept. 6

Area: 0 cm<sup>2</sup>  
 Edema: 0  
 Pain: 0 (all)



## Patient #3: Scalded Torso

**History:** 49-year-old woman with a second degree burn on her anterior torso resulting from scalding water spill. After 1-week of silver sulfadiazine, hydrophilic polyurethane membrane matrix with compression bandage, and 250 mg/day cephalexin, the wound had developed thick oozing slough.

**Treatment:** Noncontact ultrasound started Jun. 15 (9 min, 3 times/wk). Dressing: hydrophor ointment, initially with foam; changed to contact layer on Jun. 18.

**Outcomes:** After 1 week of noncontact ultrasound, slough resolved and 90% granulation achieved. Five days later, wound was near full closure with very little scarring. Patient was very anxious about treatment and fearful of debridement. Noncontact ultrasound provided quick pain relief and made debridement of slough non-painful. Patient returned to work sooner due to pain management and ability to wear appropriate clothing.

### Jun. 15

Area: 178.6 cm<sup>2</sup>  
 Granulation: 50%  
 Slough: 50%  
 Pain: 6 (rest), 8 (activity, debridement)



### Jun. 22

Area: 178.6 cm<sup>2</sup>  
 Granulation: 90%  
 Slough: 10%  
 Pain: 2 (rest, debridement, dressing change), 3 (activity)



### Jun. 27

Area: 15.39 cm<sup>2</sup>  
 Granulation: 60%  
 Pain: 0 (all)

