



Ultrasound Wound Therapy

How low frequency ultrasound can be used to promote wound healing

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While ultrasound has been used to provide wound therapy or cut tissue like a scalpel, using low frequency to promote wound healing has only come into its own in the last decade or so. But with several different flavors of this technology available, how does the modern clinician sort through, evaluate, and select the right choice for their patients, for their practice? A key factor is how Ultrasound Wound Therapy (UWT) will play a role in better patient experience, flexible modalities, and successful outcomes.

Let us break this down further that for active wound care, two factors contribute significantly to keeping the wound healing trajectory moving forward: (1) surgical/excisional (or sharp) debridement and (2) wound therapy (sometimes termed as maintenance debridement). The rationale, benefits, and results for sharp debridement have been well established in clinical literature, and using ultrasound wound therapy to accomplish sharp debridement just makes sense – like using a power tool, if for nothing else, to do the job of a manual tool more efficiently and effectively. But wound therapy (or maintenance debridement) is being understood more as the complementary approach to keep the wound healing and/or from falling into a chronic state and stalling out.

UWT devices should provide wound debridement and/or therapy that utilizes low frequency continuous or pulsed ultrasound directed to the wound surface and surrounding tissues via its various available contact applicator probe shapes; some probe shapes focus the energy towards the wound surface. Wound irrigation fluid (typically sterile saline) flows through the probe and exits through an opening within its specially shaped probe tip, minimizing splatter yet still serving as a coupling medium, coolant, wound lavage or flush, and topically treating the wound base.

Then ideally, Ultrasound Wound Therapy (UWT) should produce and deliver low frequency ultrasound used to promote wound healing via:

1. **Selective and non-selective dissection and fragmentation of soft and/or hard tissue:** This is an essential aspect of debridement in general.
2. **Surgical, excisional or sharp-edge wound debridement (acute and chronic wounds, burns) for the removal of nonviable tissue including but not limited to diseased tissue, necrotic tissue, slough and eschar, fibrin, tissue exudates, bacteria and other matter:** This is also an essential aspect of debridement in general.
3. **Cleansing irrigation and lavage of wound tissue (acute and chronic wounds, burns, diseased or necrotic tissue):** Irrigating the wound site serves to provide a coupling medium to more efficiently deliver ultrasound energy, cool tissue resulting from local endemic inflammation or exposed to motion and action of contact ultrasound, and wound lavage or flush to remove the remnants dissected and fragmented.
4. **Contact and/or non-contact maintenance debridement for the removal of debris, exudates, fragments, bacteria, slough, fibrin, excised or**

fragmented tissue, and other matter: UWT is topically dispersing therapeutic ultrasonic energy throughout the wound base to accomplish this.

5. Preparing the wound bed for graft or other subsequent procedures using contact and/or non-contact techniques to achieve wound debridement:

One cannot say enough about advocating the benefit of accomplishing superior debridement and/or wound bed preparation as a precursor to skin graft application (or even other adjunctive treatment modalities), as it does little good for the patient if the skin graft is applied with less than optimal preparation of the tissue in the target area and may lead to one or more reapplications of skin graft(s)

Clinically, UWT should be specifically designed to maintain sufficient momentum throughout the wound management process for optimal healing and be the ideal choice for treating a variety of wounds, including:

- Pressure Ulcers
- Arterial Wounds
- Chronic Wounds
- Diabetic Foot Ulcers
- Compromised Surgical Wounds
- Infected, Eczematous, Ulcerated or Devitalized Skin
- Fistulas
- Burns
- Biofilm
- Osteomyelitis
- Venous Insufficiency Ulcers

In clinical use, the following types of irrigating solutions should be prescribed when using UWT:

- a. Sterile 0.9% saline (which is widely available for purchase from medical suppliers)
- b. Sterile de-ionized water
- c. Other solutions approved for wound therapy or debridement

UWT should allow the clinician to debride wounds and manage wound care for patient population of any age with one or more wounds and/or that may also exhibit Diabetes Mellitus (DM).

Furthermore, UWT treatments have demonstrated results such as vasodilation and resolution of vasospasm resulting in increased blood flow (thermal effect), fibrolytic separation and debridement of denatured proteins, decreased bioburden (e.g. bacterial colonization) of adjacent peri-wound tissue as a result of the effects of cavitation, and stimulation of fibroblasts, macrophages and endothelial cells which augment healing.



Looking at just the economical side and not just the patient benefit or improvement in the level of standard-of-care, the increased scrutiny into the costs associated with providing affordable care as well as how effective that care is in terms of efficacy and efficiency belies that providers should be rigorously reviewing devices, processes, and methodologies in order to remain viable, let alone competitive, in the very near future. The increased proliferation of competitive sites providing care, i.e. from specialized clinics, express diagnosis sites, long term acute centers, and so on, coupled and/or enabled by social media and blogging, will only create highly contentious market forces driving patients to the best providers.

With all these factors and characteristics to consider, one obvious choice is Arobella Medical's Qoustic Wound Therapy System®, which has a well-established history of providing superior debriding process with its unique, patented, domed-shaped, sharp-edged Qoustic Qurette® probes. The Qoustic Qurette® probes give clinicians more control for gentle and selective volumetric removal of necrotic tissue while also providing therapeutic maintenance debridement by targeting focused low frequency ultrasonic energy through saline to the wound bed. It is this unique dual delivery of low frequency ultrasonic energy that optimizes the wound management process to successfully heal even the most difficult and challenging wounds; this is an especially important requirement for patients with chronic wounds that resist closure and/or healing under current standard-of-care.

In summary, Ultrasound Wound Therapy (UWT) definitely plays a role in better patient experience, flexible modalities, and successful outcomes, as well as identifying and evaluating the key factors for selecting the right choice of UWT for their patients and for their practice. While competing devices provide a sole source of action, i.e. either contact delivery of ultrasonic vibrations or non-contact delivery of ultrasonic energy, only the Qoustic Wound Therapy System® provides the dual action of contact delivery of ultrasonic vibrations and the noncontact and/or focused delivery of ultrasonic energy through its unique patented, dome-shaped, sharp-edged Qoustic Qurette® probes provides the dual treatment modalities of active wound care - (1) surgical/excisional (or sharp) debridement and (2) wound therapy. **Ω W**

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