

WESTERN METHODS FOR WOUND HEALING

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VAC – VACUUM ASSISTED CLOSURE OR NEGATIVE – PRESSURE WOUND THERAPY uses a sub-atmospheric pressure technique to assist in the treatment of acute, subacute and chronic wounds. Vac is used to assist in wound closure by application of localized negative pressure, which helps remove fluid from the wound, increase blood flow, decrease bacterial colonization and stimulate growth of granulation tissue to promote wound closure. **Healing rate can be from one to eight months.** So far, this is the best choice and most widely used method for both surgical and non – surgical healing of wounds. Healthy tissue can be seen to develop within 4 days but complete healing of a surgical wound varies greatly.

TENS- is an acronym for *Transcutaneous Electrical Nerve Stimulation*. Developed in the late 1960's, the TENS stimulator is a battery-powered device which transmits an electrical impulse through lead wires and surface electrodes to underlying nerves. The stimulator converts the direct current of the battery into pulses of stimulation. Most stimulators feature adjustable settings to control amplitude (intensity) of stimulation by controlling voltage, current, and pulse width (duration) of each pulse. When used as directed; TENS is a safe, non-invasive, drug-free method of pain management and wound healing. TENS has been used for wound healing in the past but it is not very effective with infected wounds and healing time is quite long with this method

Electrical Stimulation mimics the body's own bioelectric system that influences wound healing by attracting repair cells, changing the permeability of cell membranes, and therefore affecting secretions and orienting cell structures. A current is generated between the skin and inner tissues when a break in the skin occurs. This current is enhanced by a moist wound environment and can be mimicked by electrical stimulation which is believed to accelerate the healing process. Electrical stimulation uses electrodes that are positioned around the wound area. It can be used on most wounds during all three stages to support, speed, and even improve wound healing. Use of this therapy results in a smoother, thinner scar. E Stim goes deeper in the tissue than TENS but with TENS, this method is very slow to help healing of wounds.

Ultrasound treatment uses mechanical vibration delivered at a frequency above the range of human hearing. Physical therapists report that covering the wound area with a hydrogel film and applying ultrasound during the inflammatory and proliferative stages stimulates the cells involved in wound healing and also warms the tissue, enhancing healing by improving circulation. Efficacy of this method is fair.

Whirlpool Therapy is used by physical therapists once or twice daily for about 20 minutes during the inflammatory stage of healing to enhance circulation and bring more oxygen into the wound area. The whirlpool also softens and loosens dead tissue and cleanses the wound. Some patients find that whirlpool therapy relieves wound pain. Whirlpool therapy should not be used on wounds that are in the proliferative

stage of healing because it will damage the fragile skin cells. It should not be used on venous [ulcers](#) which result from too much blood in the area. Efficacy of this method is fair.

Here are two cases that was my patient when I was a physical therapist working in a nursing home.

Case 1

Patient: Male

Age: 70

Patient had had a right forefoot amputation secondary to frost bite, patient had a dime sized ulcer on the heel of his foot for one year due to pressure from wearing a prosthetic device. Treatment involved placing his foot in a whirlpool with E – Stim using high intensity pulsed current (Polarity – negative, Pulse rate- 100pps, Intensity – 150 volts) electrodes on his foot near the wound. Patient received these treatments for 60 minutes on a daily basis. Following the whirlpool treatment, patient received debridement of wound followed by sterile dry bandaging. Polarity was changed to alternate to positive for three days and 3 days negative and pulse was lowered to 6pps when he started to heal, intensity remained the same. Despite treatments, patient continued to have purulent discharge every time he came down for treatment. After about one year of treatment, wound was completely healed.

Case 2

Patient: Female

Age: 67

Patient had post surgical wound from an ORIF of the right hip (Open reduction Internal Fixation – used to stabilize a broken neck of the femur) that became infected with pseudomonas bacteria. Patient came down to therapy twice a day to PT and placed into the hubbard tank to have wound cleansed with water jets, betadine solution was added to the water. Debridement of wound (which was approximately 4 inches long and deep into the muscle layers of the hip) was performed following each whirlpool treatment. Wound was then packed with sterile gauze and betadine gel. Patient continued with treatments for 5 months, and had to have surgical intervention to have deeper debridement of wound. Despite all efforts, patient developed systemic infections and ended up with a hip disarticulation in order to save her life.