

## **Response of Chronic Venous Leg Ulcer Depth to Different Physical Therapy Modalities**

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**Abstract : Introduction:** Ulcers are wounds or open sores that will not heal or keep returning. **Aims & Objectives:** Purpose of the study was to compare between the effects of Honey therapy and Negative pressure therapy on wound healing of lower limb venous ulcers. **Methodology:** Forty five patients who had lower limb venous ulcer and their ages ranged between 30 to 40 years were included. Patients who suffered from diabetes, skin diseases, and sensory impairment, also patient with recent therapy with immunosuppressant were excluded. Subjects were randomly distributed into three groups A, B and C. Group A- received the Honey therapy, Group B- received the Negative Pressure therapy while Group C received only the usual care. Pre and Post ulcer depth (UUD) was recorded. **Results:** The results of this study showed that both Honey therapy and Negative pressure therapy were effective in enhancing healing of the lower limb venous ulcers as manifested by ultrasonography ulcer depth (UUD). The Honey therapy was more fruitful and significant in decreasing the UUD ( $P < 0.0001$ ). **Conclusion:** It can be concluded from the present study that both the Honey therapy and the Negative pressure therapy are effective in enhancing healing of the wound in patients with ulcer in their lower limb as manifested by the highly decreased UUD. But Honey therapy is more effective than the Negative pressure therapy. **Key Words :** Honey therapy, Negative pressure, Ulcers, Ultrasonography.

### **Introduction**

There are many types of lower-limb ulceration. These include venous, arterial, neurotrophic, lymphatic, malignant, infectious, medicinal drug brought about, and inflammatory. The traits of the categories of ulcers are venous in maximum leg ulcers are resulting from venous disease (72%). 95% of venous ulcers have been predominately restricted in the gaiter vicinity above the medial malleolus, 3.2% inside the calf, and 1.8 within the dorsum of the foot<sup>1</sup>.

Venous ulcers are wounds which might be thought to occur because of improper functioning of valves in the veins commonly of the legs. They are the primary reason of continual wounds, happening in 70% to 90% of persistent wound cases. Many compound factors make a contribution to venous ulcer formation; however the number one motive is venous insufficiency, which reason stress in deep veins falls much less than normal, so called venous high blood pressure which leads eventually to venous ulceration. Venous ulcers occur in soft tissue also as a result of non-stop, unrelieved microcirculatory adjustments leading to tissue necrosis. Over time prolonged occlusion of the capillaries constrained alternate of vitamins and oxygen main to ischemia, cell death and tissue ulceration<sup>2</sup>.

Venous ulcers are expensive to deal with, and there's a great hazard that they may reoccur, after recovery; up to 48% of venous ulcers had recurred by means of the 5th year after healing. it could or might not

be painful. The patient usually has a swollen leg and can experience burning or itching. There may also be a rash, redness, brown discoloration or dry, scaly skin<sup>3</sup>. Venous skin ulcers generally increase on either aspect of the lower leg, above the ankle and below the calf as this is wherein the ankle vessels perforate, domestically growing the venous stress. Immobility, abnormality of the calf muscle pump, or valvular disorder of the venous machine because of thrombotic harm, trauma or congenital absence reasons venous insufficiency. Venous ulcers normally fashioned whilst those factors combine causing occlusion or distortion of capillary network<sup>4</sup>.

Honey is a popular sweetener and a commonplace house preserve product at some point of the arena. Honey has been used as a conventional remedy for centuries via extraordinary cultures for the treatment of diverse issues and is a promising agent for neighborhood treatment of complicated wound. It's non-irritant, nontoxic, without problems available and cheap. It has been used from ancient instances as a method of accelerating wound recovery. Using honey as wound dressing, cause fast restoration by using stimulation of restoration system, clearance of infection, cleansing motion of wound, stimulation of tissue law, reduction of inflammation and non-adhesive tissue dressing. Numerous tips are made regarding appropriate wound dressing with honey .The form of wound and degree of severity will affect efficacy<sup>5</sup>

The effect of honey on wound healing is the end result of the blended impact of chemical debridement of useless and devitalized tissues from wounds by using catalase; absorption of edema by using the hygroscopic properties of honey, the enhancing of granulation from wound edges, the bactericidal and fungicidal properties of honey, its nutritional properties and the production of hydrogen peroxide. Honey contains 40% glucose, 35% fructose, 20% water, with natural acids, nutrients, enzymes and minerals. The treatment with honey is straightforward and cheaper; honey does not want to be sterilized because it already possesses bactericidal houses; because of its excessive viscosity it forms a physical barrier, growing a moist environment which seems to be helpful in accelerating wound closure<sup>6</sup>.

The Topical Negative pressure therapy equipment consists of reticulated foam dressing that is inserted inside the wound and sealed in region with the usage of an adhesive dressing. A suction force is then carried out by means of a VAC (Vacuum Assisted Closure, advanced Therapy gadget, KCI Whitney, Oxon, uk) device across the wound surface<sup>7</sup>.

The forces of macrostrain and microstrain as a result of negative pressure are the muse of vacuum wound remedies. Macrostrain is the stretching that occurs whilst negative strain pulls the dressing as a vacuum. Bodily, this pulls the rims of the wound together, inflicting a lower in wound extent, and allows faster healing. The vacuum distributes strain flippantly across the wound and stops bacterial contamination via bringing the rims of skin closer collectively beneath an airtight environment. Microstrain happens on the cellular degree, causing stretching, or microdeformations on the cell floor. This incites a reaction within the cells that increases metabolic interest, fibroblast migration, and extracellular matrix production. by way of wound therapy gadget reduces edema and promotes perfusion and the formation of granulation (connective) tissue that replaces fibrin clots in restoration wounds. The granulation tissue engenderment is facilitated by using the microstrain's advertising of mobile migration and proliferation<sup>8</sup>.

## Materials & Methods

This experimental observe was carried out at Cairo college Hospitals. The randomized clinical trial was performed between March 2015 and October 2015. 45 topics (both males and females) their a while ranged among 30to 40 years were decided on with a scientific prognosis of lower limb venous ulcers and convenient sampling method used for three group distribution. The sufferers participated after signing an knowledgeable consent form prior to records collection. Patients had been referred from the overall surgeon. Within the first touch with the patients, they were allowed to finish the assessment form. Ulcer depth evaluated for all sufferers.

Group A was treated with Honey therapy, Honey prepared and measured by using syringe to fit three quarters volume of ulcer wound, Then wound covered by dressing in the form of clean sterilized gauze and well fitted to the skin through silk adhesive plaster, Honey therapy was applied every other day for 12 weeks<sup>9</sup> ,in addition patients received ciprobay 500 and papaphyl cream and traditional wound care as the following (Cleaning, debridement, dressing and compression).

Group B was treated with Negative Pressure therapy, the wound was cleaned at first followed by hydrogen peroxide, saline rinse and betadine. Then Negative Pressure applied via a vacuum assisted closure (VAC) system by using intermittent (5min on, 2min off) mode for 20 minutes. Negative Pressure Therapy will be applied every other day for 12 weeks<sup>10</sup>, in addition patients received ciprofloxacin 500 and papapophyl cream and traditional wound care as the following (Cleaning, debridement, dressing and compression).

While group C acquired best with their medical remedy as ciprofloxacin 500 and papapophyl cream and conventional wound care as the subsequent (cleaning, debridement, dressing and compression). Pre and post treatment local Ultrasonography examination for measuring the ulcer depth, a special jelly is located at the vicinity being examined whilst a wand like device called a transducer is exceeded gently over the skin of the ulcer. Internal photographs of the ulcers are shown on a display, recorded as a video or printed as a photo<sup>11</sup>.

### Assessment was done before the treatment and after 12 weeks of treatment

In this study, the mean, the standard deviation and the standard error were calculated for each group in the study. The mean, the standard deviation and range were used as a primary source of connecting facts about each parameter to measure central tendency. Paired t-test was used to compare within each group and to detect level of significance in each group. Unpaired t-test to compare the variable between groups was used to detect significance level between two groups (comparison). The statistical package for social science (SPSS) was utilized for data analysis and the level of significance was set at the 0.05 level.

### Results

The results of this study showed that both Honey therapy and Negative pressure therapy were effective in enhancing healing of the lower limb venous ulcers as manifested by ultrasonography ulcer depth (UUD). The Honey therapy was more fruitful and significant in decreasing the UUD ( $P < 0.0001$ ).

### Results and Statistical Analysis of Ulcer depth (mm):

#### The first pre-treatment records of UUD on the three groups:

	Second study group (B)	First study group (A)	Control group (C)	Second study group (B)	Control group (C)	First study group (A)
Mean in mm	7.560	7.493	7.427	7.560	7.427	7.493
Standard deviation	1.142	1.717	0.890	1.142	0.890	1.717
Standard error	0.295	0.443	0.230	0.295	0.230	0.443
Mean difference	0.067000		-0.133000		-0.066000	
t. value	0.13		-0.36		-0.13	
p. value	0.901		0.725		0.896	
Level of significance	Non significant		Non Significant		Non Significant	

**The second records of UUD in three groups:**

	Second study group (B)	First study group (A)	Control group (C)	Second study group (B)	Control group (C)	First study group (A)
Mean in mm	2.487	1.440	7.373	2.487	7.373	1.440
Standard deviation	1.124	0.853	0.840	1.124	0.840	0.853
Standard error	0.290	0.220	0.217	0.290	0.217	0.220
Mean difference	1.04700		4.88600		5.93300	
t. value	2.87		13.49		19.19	
p. value	0.05		0.0001		0.0001	
Level of significance	Significant decrease		Highly significant decrease		Highly significant decrease	

**Discussion**

The aim of the study was to compare the effects of Honey therapy and Negative pressure therapy in treatment of venous leg ulcer. Results of study showed that there was significant decrease in ulcer depth measurement in both groups A and B post treatment. But Honey therapy was more effective.

The findings of this observe concerning the efficacy of Honey in healing of lower limb ulcers are in regular with many medical studies that proved that honey accelerates wound healing extra than traditional therapy. Honey's anti inflammatory action is concept to reduce the harm resulting from the free radicals arising from irritation, accordingly stopping further necrosis<sup>12</sup>.

Moghazy et al., 2010 said that Honey impregnated gauze had swiftly wiped clean the wounds from particles with out the need for enzymatic, chemical or huge mechanical debridement. Wounds had been fully debrided as early as the tenth day in 8 patients. by way of the third week, all wounds have been grossly debrided. Similarly, honey impregnated gauze was smooth to prepare (even via the sufferers or their relatives) and to apply. It peeled off without problems without ache or harm to the newly forming granulation tissue<sup>13</sup>.

By means of the use of Honey on nine babies with massive open inflamed surgical wounds that didn't heal with the traditional remedy for 14 days of intravenous antibiotic cleansing wounds with aqueous chlorhexidine solution and fusidic acid ointment. those wounds had been still open, oozing pus and swab cultures have been positive. Marked clinical improvement seen in all babies after 5 days of remedy with topical application of 5- 10ml of honey two times every day. Wounds had been closed, smooth and sterile in all babies after 21 days of the honey application<sup>9</sup>.

Honey heals usually due to a hydrogen peroxide antibacterial hobby. While honey comes into contact with body moisture the glucose oxidase enzyme brought to the honey via the bee slowly releases the antiseptic hydrogen peroxide. This is released at sufficient stages to be effective towards microorganism but not tissue damaging<sup>14</sup>.

In a comparative study among Honey and silver sulfadiazine-impregnated gauze for efficacy as a dressing for superficial burn injury the study done with a complete of 104 sufferers. Inside the 52 patients handled with honey, 91% of wounds were rendered sterile inside 7 days. in the 52 sufferers dealt with with silver sulfadiazine, 7% showed control of contamination within 7 days. Healthful granulation tissue determined in advance in sufferers handled with honey (approach were 7.4 versus 13.4 days)<sup>15</sup>.

Additionally the outcomes of this study at concerning the efficacy of Negative pressure on recovery of lower limb venous ulcers became in consistence with (Hyun-Joo et al., 2009) whose proved Negative Pressure Wound therapy is a treatment that aids within the healing of wound injuries with the aid of increasing blood go with the flow to the target location and enhancing the formation of granulation tissue .It also features in disposing of and draining fluid and leakage, diminishing the amount of contamination and bacterial boom, helping in closure, and offering safety from the surrounding environment<sup>16</sup>.

Negative pressure therapy resulted in elimination of fluids and infectious materials, assisted profusion, decreased bacterial colonisation and better formation of granulation tissue. It includes rapid cellular division, increase in nearby blood float, discount in bacteria ranges and elimination of harmful proteases<sup>17</sup>.

### Limitations

A lot of efforts become exerted with each affected person to reduce impact of viable errors inherent within the study. This examine turned into constrained with the aid of the subsequent factors: bodily and mental situation of the affected person all through length of remedy, viable human error in application of measurement or therapeutic procedures, Cooperation of the affected person, affected person lifestyles fashion& practising physical games, and variability among patients and their response consequences of recovery.

### Conclusion

It can be concluded from the present study that both the Honey therapy and the Negative pressure therapy are effective in enhancing healing of the wound in patients with ulcer in their lower limb as manifested by the highly decreased UUD. But Honey therapy is more effective than the Negative pressure therapy.

### Future Recommendations

More extensive studies assigning the efficacy of Honey therapy and the Negative pressure therapy in ulcer wound healing are needed with a larger sample and for a longer period of treatment.

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