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What You Need to Know About Vacuum - Assisted Wound Closure (VAC)

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Abstract: ***Delayed wound healing particularly in difficult wounds and in elderly with co morbidities is a major concern. It leads to the pain, morbidity, prolonged treatment, and require major reconstructive surgery which imposes enormous social and financial burden. Vacuum - assisted closure (VAC) can be used as an alternative to the conventional methods of wound management. Use of negative pressure optimizes the wound for spontaneous healing or by lesser reconstructive options. Vacuum - assisted closure (VAC) is also known as negative pressure wound therapy (NPWT). This approach involves the use of a defined, controlled negative pressure over a polyurethane or polyvinyl sponge placed in the wound. The wound effluent is evacuated continuously. The result is an improvement of microcirculation, and wound healing is enhanced. Animal experiments have confirmed an increase in cell growth. The basis for surgical wound management continues to be appropriate debridement. In this connection, Negative pressure therapy stabilizes the wound environment, reduces wound edema/bacterial load, improves tissue perfusion, and stimulates granulation tissue and angiogenesis. All this improves the possibility of primary closure of wounds.***

Keywords: VAC (Vacuum assisted wound healing), NPWT (Negative pressure wound therapy), Subatmospheric pressure, Difficult wounds, vacuum sealing, foam/gauze, cost effective.

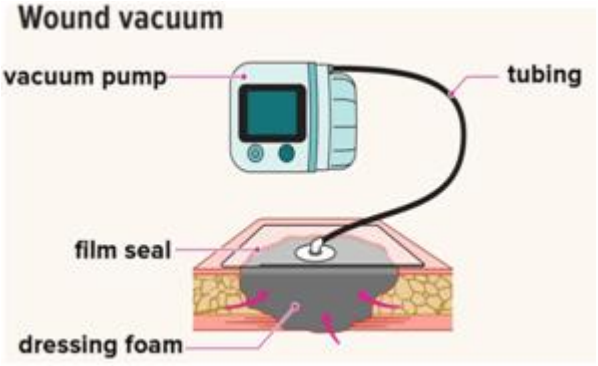
1. Introduction

The vacuum - assisted closure is a non - pharmacologic/nonsurgical means for modulating wound healing; it was first proposed by Argenta and Morykwas in 1997. The V. A. C Therapy system is a medical device that promote wound healing by applying negative pressure (a vacuum) around a wound to assist healing. Most clinical trials trusted Source on people and animals have found that VAC for wound healing is equally or more effective than conventional wound closing techniques. VAC therapy can help healing in several ways, such as reducing swelling, stimulating the growth of new tissue and preventing infections. VAC is a good alternative/adjunct to standard wound care especially for difficult wounds with an aim to decrease morbidity, cost, duration of hospitalization and increase patient comfort. It reduces the extent of reconstructive procedures. The optimum pressure setting is 125 mm of Hg.

How wound VAC therapy works

V. A. C. ® Therapy creates an environment that promotes wound healing by delivering negative pressure (a vacuum) at the wound site through a proprietary foam dressing, drawing the wound edges together, removing infectious materials, reducing edema, and promoting granulation tissue formation. When sealed and placed under negative pressure, the dressing confirms to the wound bed. Your wound is covered by a dressing that protects the injured area, and a vacuum pump creates negative pressure around the wound. This means the pressure over the wound is lower than the pressure in the atmosphere. The pressure pulls the edges of the wound together.

A VAC therapy system includes a vacuum pump, a special bandage, a canister to collect fluid, and tubing.



A healthcare provider first fits a layer of foam dressing over the wound, which is sealed with a thin layer of film. The film has an opening that rubber tubing can fit through to connect to a vacuum pump. Once connected, the vacuum pump can remove fluids and infections from the wound while helping to pull the edges of the wound together. A person undergoing VAC therapy wears the device for close to 24 hours per day while they're healing. The optimal level of negative pressure seems to be about 125 mmHg for a duration of 5 minutes on and 2 minutes off.

Wound VAC benefits

Wound VAC has the potential to be a cost - effective treatment option to help treat various types of wounds. Potential benefits include:

- Decreased swelling and inflammation and provision of a closed moist wound healing environment.
- Decreased risk of bacterial infection, improved skin perfusion,
- Increased blood flow to the wound
- Decreased overall discomfort
- Less changing of wound dressings compared with other treatments
- Gentle pulling together of the wound's edges.
- Reduced hospital stay

Who needs to use a wound VAC?
Indications of VAC includes diabetic foot ulcers, bed sores, skin graft fixation, flap salvage, burns, crush injuries, sternal/abdominal wound dehiscence, fasciotomy wounds, extravasation wounds and animal bites/frostbite.

Vacuum therapy is **contraindicated** in patients with malignant wound, untreated osteomyelitis, fistulae to organs or body cavities, presence of necrotic tissue and those with exposed arteries/nerves/anastomotic site/organs. Relative contraindications include patients with blood dyscrasias, patients on anticoagulants or with actively bleeding wounds.

Types of wounds not suitable for VAC
VAC is suitable for a wide range of wounds. However, some types of wounds aren't suitable for VAC. These include:
wounds near joints that may reopen with limb movement
Cancer Tissue
Infected Wounds
Exposed Organs or Blood Vessels
Fragile Skin
Areas With Poor Blood Flow

How does V. A. C. ® Therapy feel?
Most patients describe V. A. C. ® Therapy as a non - painful, mild pulling sensation that, in most cases, is not noticeable after a few minutes. Wound comfort may vary by individual person. The wound may become tender or itch as it heals; this is usually a good sign. If itching or discomfort persists, please contact your doctor.

Can I move around while on V. A. C. ® Therapy?
Yes. The V. A. C. Therapy System is lightweight and was specifically designed to provide flexibility and freedom of mobility, your ability to move around depends on your condition, the wound location and the treatment your doctor has prescribed.

Can you shower with a wound VAC?
It's possible to shower with a wound VAC by disconnecting the VAC system. The clear V. A. C. ® Drape is waterproof. You can wash or shower with the dressings in place and with the tube clamped (closed off). Turn off the unit and unplug it from the electrical outlet. Warning: Do not take the therapy unit into the bathtub or shower. (Note that you shouldn't leave your VAC system unplugged for more than 2 hours per day.)

What does the foam dressing look like when therapy is on?
Your doctor may prescribe a V. A. C. GRANUFOAM™ or V. A. C. WHITEFOAM™ dressing for your wound type. The V. A. C. GRANUFOAM™ Dressing will shrink down and wrinkle like a raisin when V. A. C. ® Therapy is working. The V. A. C. WHITEFOAM™ Dressing may only have a few wrinkles.

How do I know the V. A. C. ® Therapy device is working?
If negative pressure is being applied the foam dressing will be collapsed. You may also see wound fluid moving in the tubing.

Does using a wound VAC cause pain?
When VAC therapy starts, you may feel stretching and pulling around your wound. VAC therapy shouldn't hurt, and if it does it can indicate a complication. Many people experience discomfort when VAC bandages are changed. In some cases, a medical professional might administer pain medication 30 to 60 minutes before changing the bandages.

Where is wound VAC therapy performed?
VAC therapy can be performed in a doctor's office or in a medical facility. You may also be able to have VAC therapy at home depending on the size and location of a wound. Your surgeon will determine if it's suitable for you to continue VAC therapy at home.

How long do I need to wear the V. A. C. ® Therapy Unit each day?
Keep V. A. C. ® Therapy on for at least 22 hours a day.

Wound VAC therapy duration
The length of time the procedure takes varies widely on the size and location of your wound. Your doctor should be able to give you an estimate for how long you'll undergo VAC therapy based on your wound.

Should wound vac run continuously?
Avoid keeping the wound vac dressing on without suction for more than 2 hours as it can lead to infection. If the dressing is not repaired or replaced within 2 hours, make sure to remove the entire dressing and consider gauze dressing over the wound.

Wound VAC dressing change frequency?
For a non - infected wound: KCI recommends the V. A. C. ® Dressings be changed every 48 to 72 hours, but **no less than 3 times per week**. For infected wounds: These wounds must be monitored often and very closely. Infected wounds dressing changes may need to be changed more often than 48 to 72 hours.

Who changes the VAC dressing?
Usually, a healthcare provider will change your bandages. In some cases, a family member or a caregiver can be trained to change your dressing

When to discontinue wound VAC use
VAC therapy should be stopped after the clinical endpoint is achieved (e. g. an appropriate reduction in volume or adequate wound bed preparation for subsequent skin grafting).

Potential wound VAC therapy complications
- **During VAC therapy red flag signs** include active or excessive bleeding, surrounding invasive sepsis, increased pain, signs of infection, such as fever, pus or foul - smelling drainage and allergic reaction to the adhesive.
- **Complications of VAC therapy** include failure of the VAC system (loss of seal, power failure, and blockage of the drainage system), wound infection, pain, bleeding, allergies to the adhesive drape, excoriation of the skin, adherence of the tissues to the foam, lack of patient compliance and skin necrosis.

What happens after wound vac therapy?
Wound VAC therapy helps the body by removing some of the bacteria. This lowers your risk of wound infection and allows healing to move forward. Encourages growth of repair tissue. To heal the wound, the body creates new tissue that binds the edges of the wound together and fills any gaps.

Key points
The optimum pressure setting is 125 mm of Hg.

VAC is a good alternative/adjunct to standard wound care especially for difficult wounds.

It reduces the extent of reconstructive procedures

Intermittent suction is better than continuous suction.

There are logistic benefits of VAC over conventional wound care methods.

Cost of VAC is comparable to standard wound care methods and in long term it has a cost benefits.

2. Conclusions

VAC/NPWT stabilize the wound, reduce edema, reduces the bacterial load, improve tissue perfusion, and stimulate granulation tissue. It will improve the possibility of spontaneous wound healing and reduce the need for major plastic surgical procedures. VAC therapy is simple and effective substitute for the management of various wounds than conventional dressings in terms of reduction in wound size, treatment duration and cost.

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