V.A.C.® Therapy Skills Orientation: V.A.C.® Therapy Introduction

Level 1
Learning Objectives

1. Briefly summarize the Wound Healing Cascade
2. Discuss the V.A.C.® Therapy Mechanisms of Action
3. Describe basic V.A.C.® Therapy System settings and operation
4. State how to perform V.A.C.® Therapy basic dressing applications
5. Discuss how to troubleshoot (remove V.A.C.® Therapy System) potential problems with wound therapy.
Phases of acute wound healing

Hemostasis
Clinical Goal: Stop bleeding

Inflammation
Clinical Goals: Manage excessive inflammation and assist wound progression

Proliferation
Clinical Goals: Reduce wound volume, assist wound progression, and prepare wound for closure

Remodeling
Clinical Goals: Increase tissue tensile strength
What affects wound healing?\textsuperscript{1,2,3}

- **Intrinsic factors**
  - Health status
  - Inadequate tissue perfusion
  - Immune function
  - Nutritional status
  - Diabetes
  - Body build
  - Age

- **Extrinsic factors**
  - Mechanical stress
  - Bacterial burden/infection
  - Devitalized tissue/debris
  - Chemical stress
  - Temperature
  - Moisture imbalance
  - Lifestyle
  - Medication

1. Sussman G. Wound management: wound types and the healing process Aus Doc Nov 2001;S1-8
2. Robert H. Demling, MD, and Leslie DeSanti, RN, Protein-energy malnutrition and the nonhealing cutaneous wound, CME Medscape July 9, 2003
V.A.C.® Therapy Creates an Environment That Promotes Wound Healing

The application of uniform negative pressure delivered by V.A.C.® Therapy induces a physical response (Macrostrain) and a biological response (Microstrain).

**Macrostrain** draws wound edges together, removes exudate and infectious material, reduces edema, and promotes perfusion.

**Microstrain** creates tissue microdeformation, causing cells to stretch. Cell stretch leads to cell migration and proliferation that result in the formation of granulation tissue.

1. Draws wound edges together
2. Removes infectious material
3. Reduces edema
4. Promotes perfusion
5. In vitro/in vivo studies show that foam contact with tissue under negative pressure creates tissue micro-deformation that leads to cell stretch\(^1,3\)
6. In vitro studies show that cell stretch under negative pressure that results in granulation tissue formation\(^2\)

What are the Components?

The **V.A.C.® Therapy Unit** provides software-controlled negative pressure wound therapy.

The **V.A.C.® Canister** collects the wound exudate.

**SensaT.R.A.C.™ Technology** monitors and maintains pressure at the wound site to provide delivery of prescribed negative pressure settings.

The **V.A.C.® Drape** helps provide a moist wound healing environment.

**V.A.C.® GranuFoam™ Dressings** contract under negative pressure, providing direct and complete contact with the wound bed.

The 400-600 micron reticulated pores help distribute pressure through the wound bed.

Facilitate fluid removal.
What is SensaT.R.A.C.™ Technology?

**SensaT.R.A.C.™ Pad**
- Distributes negative pressure to individual sensing lumens
- Helps reduce tubing blocks and false alarms through enhanced fluid dynamics
- Enhances patient comfort with a low profile design

**SensaT.R.A.C.™ Tubing**
- Efficiently draws exudate away from the wound through the large inner lumen
- Independently monitors target pressure at the wound through the outer sensing lumens
- Allows for secure and convenient tubing connections

**Monitoring Software**
- Continuously regulates negative pressure feedback
- Maintains prescribed negative pressure at the wound site by adjusting pump output
- Safety alarms alert caregivers if target pressure is not met or therapy is interrupted
V.A.C.® GranuFoam™ Dressing

- Open-celled reticulated black polyurethane foam pores to help evenly distribute negative pressure across the wound bed
- Assists in tissue granulation formation in wounds
- Aids wound contraction
- Hydrophobic (moisture repelling) to enhance exudate removal
V.A.C.® WhiteFoam Dressing

• White polyvinyl alcohol, hydrophilic (moisture retaining) foam which is pre-moistened with sterile water
• Dense open pore foam
• Higher tensile strength than V.A.C.® GranuFoam™ Dressing
• Characteristics help reduce the likelihood of adherence to the wound base, reducing the need for additional interposing materials
• Used in tunnels and undermined areas
• Used to assist in minimizing discomfort
• Used over fresh split-thickness skin grafts (STSG)
• Used in situations where hypergranulation response is likely
• Minimum pressure setting of 125mmHg, due to higher density
V.A.C. GranuFoam Silver® Dressing

• Open-celled reticulated polyurethane foam that has been microbonded with metallic silver via a proprietary metallization process
• Reticulated pores to help evenly distribute negative pressure across the wound bed
• Exposure of the dressing to wound fluid results in oxidation of metallic silver to ionic silver
• This allows continuous sustained release of silver ions
• Acts as an effective barrier to bacterial penetration
V.A.C.® Therapy System indicated for acute, chronic and sub-acute wounds*

*V.A.C.® Therapy is indicated for acute, sub-acute and chronic wounds.
V.A.C.® Therapy Contraindications

DO NOT place any V.A.C.® Foam Dressings (V.A.C.® GranuFoam™, V.A.C. GranuFoam Silver®, V.A.C.® WhiteFoam, V.A.C. VeraFlo™ and V.A.C. VeraFlo Cleanse™ Dressings) in direct contact with exposed blood vessels, anastomotic sites, organs or nerves.

DO NOT use V.A.C.® Therapy:
when there is malignancy in the wound
with untreated osteomyelitis
with non-enteric and unexplored fistulas
with necrotic tissue with eschar present

DO NOT use the V.A.C. GranuFoam Silver® Dressing on a patient with a known sensitivity to silver
V.A.C.® Therapy
Safety Information
V.A.C.® Therapy Warning Categories

Bleeding

To decrease bleeding risks:
Protect vessels and organs
Infected vessels are at risk of complications and must be carefully noted and protected.
Cover or eliminate sharp edges
Ensure adequate wound hemostasis

Increase patient monitoring when:
Anticoagulants, platelet aggregation inhibitors, aspirin, etc. are prescribed
Wounds are related to vascular surgical procedures
Infection is present in the wound
Infected wounds should be monitored closely and may require more frequent dressing changes than non-infected wounds.

If there are any signs of the onset of systemic infection or advancing infection at the wound site, contact a physician immediately to determine if V.A.C.® Therapy should be continued.

In the event of a clinical infection, V.A.C. GranuFoam Silver® is not intended to replace the use of systemic therapy or other infection treating regimens.

V.A.C.® Therapy should NOT be initiated on a wound with untreated osteomyelitis.

If the V.A.C.® Dressing is in place, but therapy is OFF for more than 2 consecutive hours, the patient’s risk for infection may increase; either change V.A.C.® Dressing and reinitiate therapy, or apply alternative dressing.
V.A.C.® Therapy Warning Categories
Foam Dressings

► Do not place foam dressings into blind or unexplored tunnels

► Help prevent foam dressing complications by:

- Documenting number and type of materials placed in the wound

- Maintaining a 48-72 hour dressing change schedule (no less than 3x week unless on a skin or skin substitute graft)

- Using a non-adherent layer between wound bed and foam (when appropriate).

- Using appropriate dressing in appropriate area of the wound, e.g, V.A.C.® WhiteFoam Dressings only in tunnels
Considerations for V.A.C.® Therapy
Patients at Increased Risk for Retained Foam

Foam left in the wound for greater than the recommended time period may:
- Foster ingrowth of tissue into the wound,
- Create difficulty in removing foam, or
- Lead to infection or other adverse events.

V.A.C.® Dressings are radiolucent; they are not detectable by X-ray or other radiological methods. Document on the drape or the V.A.C.® foam quantity label or ruler (if provided) and in patient's medical chart:
- Date, number and type of foam pieces placed in the wound
- Always count the total number of pieces removed and ensure the same number of foam pieces was removed as was placed

   **Visualize the wound bed completely**

   Patient positioning should be consistent for each V.A.C.® Dressing change
   Move redundant tissue to allow wound bed visualization if needed
   Careful inspection of the wound to ensure all foam is removed is essential

   **In the absence of infection, change V.A.C.® Dressings at least every 48-72 hours; no less than 3 times a week**

   Rapid granulation formation in some wounds/patients may increase risk for foam adherence
V.A.C.® Therapy Warning Categories
Canister Size • Allergy • Resuscitation • Use in Altered Environment

► 1000 mL canister is not recommended for use on patients in the outpatient setting.
  ▪ At high risk of bleeding or
  ▪ Unable to tolerate a large loss of fluid volume

► V.A.C.® Therapy products are latex-free

► Patients with a known allergy to acrylic adhesives may react adversely to the V.A.C.® Drape (different adhesive types).

► The foam dressing, if in the thoracic area, may interfere with defibrillation efforts
  ▪ Joules may need to be adjusted to compensate or the dressing may need to be removed

V.A.C.® Therapy Units should not be taken into a Magnetic Resonance Imaging (MRI) environment as they are MRI unsafe
  ▪ V.A.C.® Dressings, including V.A.C. GranuFoam Silver® Dressings, may be used safely in the MRI suite
    ▪ However, foam may interfere with quality of image

V.A.C.® Therapy Units should not be taken into a Hyperbaric Oxygen Therapy (HBO) chamber as they are HBO unsafe
  ▪ V.A.C.® GranuFoam™ and V.A.C.® WhiteFoam Dressings have been used safely in the HBO chamber
  ▪ The V.A.C.® GranuFoam™ Bridge Dressing contains additional synthetic materials which may pose a risk during HBO Therapy
V.A.C.® Therapy Pressure Settings*

The therapy settings in this presentation are general recommendations. You may wish to vary the pressure settings to optimize V.A.C.® Therapy based on individual patient need upon physician order.

Adjusting the pressure settings
For recommended pressure settings for specific wound types, refer to the wound-specific recommendation sections of the V.A.C.® Therapy Clinical Guidelines*.

The pressure setting for the V.A.C.® Therapy System ranges from -25 to -200 mmHg, depending on the unit model. The default setting for V.A.C.® Therapy is -125 mmHg on a continuous setting, but these settings may be individualized to the patient’s needs based upon physician order.

*Refer to the V.A.C.® Therapy Clinical Guidelines for recommended therapy settings by wound type.
V.A.C.® Therapy Pressure Settings

Consider titrating the V.A.C.® Therapy System pressure up by 25mmHg increments for the following conditions:

- Excessive drainage
- Large wound volume
- Use of V.A.C.® WhiteFoam Dressing; tenuous seal

The V.A.C.® Therapy System pressure setting may be titrated down by 25 mmHg increments for the following situations:

- Extremes of age
- Compromised nutrition
- Risk of excessive bleeding (e.g., patients on anticoagulation therapy)
- Circulatory compromise (e.g., peripheral vascular disease)
- Excessive granulation tissue growth
- Pain or discomfort not relieved by appropriate analgesia
- Peri-wound or wound bed ecchymosis
Continuous vs. Intermittent Therapy

Continuous therapy is recommended for the first 48 hours in all wounds. Intermittent therapy may be used following this 48 hour period. Some patients may be better served on continuous therapy for the duration of the treatment.

Continuous therapy after the first 48 hours is indicated where:

► Patients are at increased risk of bleeding.
► Patients experience significant discomfort during intermittent therapy
► It is difficult to maintain an airtight seal (e.g., perianal or toe wounds)
► When white foam is being used in tracts or undermined spaced.
► There are high levels of drainage from the wound after the first 48 hours (it is better to wait until the amount of drainage tapers off before switching to intermittent mode)
► There are grafts or flaps with the need to prevent shear
► A splinting effect is desired (e.g., sternal or abdominal wounds)

Refer to the V.A.C.® Therapy Clinical Guidelines for guidelines on indications for continuous and intermittent therapy.
Goal of Therapy Achieved

- What is the desired endpoint for V.A.C.® Therapy?
  - Prepare for Split Thickness Skin Graft
    o Notify physician when wound is granulated to the level of surrounding skin so patient evaluation for procedure can be scheduled.
  - Prepare for delayed primary closure
    o Notify physician when entire wound surface is beefy red so patient evaluation for closure can be scheduled.
  - Prepare for flap procedure
    o Notify physician when entire wound surface is beefy red so patient evaluation for procedure can be scheduled.
  - Fully granulated wound bed
    o Notify physician when wound is fully granulated to the level of the surrounding skin and secure order for next step in the plan of care such as:
      - moisture retentive dressings
      - biologic use
      - Epidermal grafting
Patient & Wound Considerations

• Change in patient medical status with noted stalled progress or wound deterioration
  – e.g. nutrition, blood pressure, blood glucose, fluid balance, onset of infection

• Persistent wound infection, wound deterioration or no clinical progress toward healing
  – Perform a thorough patient and wound reassessment
  – Consider the need for debridement, wound cleansing and/or systemic antibiotics

• Patient is not able to be adherent with V.A.C.® Therapy treatment

V.A.C.® Therapy System
Basic Dressing Application

1. Cut V.A.C.® GranuFoam™ Dressing to dimensions that will allow the foam to be placed gently into the wound without overlapping intact skin.

2. Trim and place the V.A.C.® Drape to cover the V.A.C.® GranuFoam Dressing and an additional 3-5 cm border of intact periwound tissue.

3. Pinch the drape and cut a 2.5 cm hole through the drape and apply the SensaT.R.A.C.™ Pad.
Basic Dressing Change

Step 1: Assess the wound. Protect peri-wound skin with V.A.C.® Drape

Step 2: Trim the V.A.C.® GranuFoam™ Dressing to fit the wound, away from the wound brush edges to remove loose pieces, and place inside the wound.

Step 3: Apply V.A.C.® Drape over the V.A.C.® GranuFoam™ Dressing, approximately 2-3 cms past granufoam for a good seal.

Step 4: Cut a hole approximately 2.5 cm (quarter size) in diameter into the granufoam and center the SensaT.R.A.C.™ Pad over the hole.

Step 5: Attach the V.A.C.® Therapy Unit and turn ON.
Bridging Multiple Wounds
“Y-connect”
Tunneling using V.A.C.® WhiteFoam and GranuFoam™
Undermining using V.A.C.® WhiteFoam and V.A.C.® GranuFoam™ Dressings
“Frame” wounds with small openings
Potentially Compromised Suture Lines
Training Module Completion

Congratulations!!

Now that you have successfully completed this V.A.C.® Training module, you will receive a Certificate of Completion.
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