PROCEDURE

136 Negative-Pressure Wound Therapy

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PURPOSE: The purpose of negative-pressure wound therapy is to apply controlled subatmospheric (negative) pressure to the wound bed for stimulation of granulation tissue and edema reduction, and thus enhancement of wound healing.

PREREQUISITE NURSING KNOWLEDGE

- Negative-pressure wound therapy (NPWT) is an advanced wound care therapy that uses a wound filler dressing, a transparent device-specific semiocclusive or occlusive dressing, tubing, and powered vacuum unit with a collection canister.[15]
- Other terms found in the literature for NPWT include topical negative pressure, vacuum-assisted closure (VAC), and subatmospheric pressure therapy.
- Many different U.S. Food and Drug Administration (FDA)–approved vacuum units are on the market for NPWT.[8,12,15] The Agency for Healthcare Research and Quality (AHRQ) provides a review of current NPWT manufacturers.[20] The most common devices seen in the acute-care practice setting are ActiV.A.C. and InfoV.A.C. Therapy Systems (KCI Licensing, Inc., San Antonio, TX; Fig. 136-1). ActiV.A.C. and InfoV.A.C.[21] use a patented open-cell foam wound contact dressing, and other units on the market use either an open-cell foam or the vacuum-pack method with an antimicrobial gauze packing dressing. The use of a moistened gauze wound interface has also been reported in the literature as an effective dressing for NPWT.[1,6]
- Most randomized controlled studies and case studies on NPWT have been conducted with the VAC therapy. A few small, randomized controlled trials have compared alternate NPWT systems to the VAC therapy and found them to be comparable.[1,5,16] Further clinical research to evaluate wound closure outcomes with the different NPWT units is needed.[6,8,12]
- NPWT assists with wound closure by applying a controlled subatmospheric (negative) pressure evenly over a wound bed. This mechanical stress creates a noncompressive force on the wound bed that dilates the arterioles, increasing the effectiveness of local circulation and enhancing the proliferation of granulation tissue.[2,6,8,10,13,22] NPWT enhances lymphatic flow and removal of excessive fluid, decreasing wound edema, and bacterial load at the wound site, further aiding wound healing (Fig. 136-2).[2,3,6,8,10,12,22]
- Wound healing is best achieved through adequate cleansing, débridement, and dressing of the wound bed on the basis of patient and wound characteristics.[10]
- Wounds heal by either primary or secondary intention. Most clean surgical wounds heal by primary intention. Suturing each layer of tissue approximates the wound edges. These wounds typically heal quickly and require minimal wound care. Contaminated surgical or traumatic wounds (open wounds) heal by secondary intention. Wounds that heal by secondary intention granulate from the base of the wound to the skin surfaces; care must be taken to allow for uniform granulation and prevention of open pockets or tunneling.
- Openly granulating wounds heal more slowly and must remain moist to enhance tissue granulation. Wound care for these wounds focuses on maintaining a moist environment free of necrotic tissue and decreasing pain.
- Open wounds may have excessive wound drainage that necessitates application of absorptive dressings, protection of periwound skin, and more frequent dressing changes to facilitate healing. NPWT provides wound drainage management and decreased frequency of dressing changes (most NPWT dressing changes are three times per week) with improved pain management.
- NPWT has been approved by the U.S. FDA for the following wounds:
  - Acute wounds (orthopedic trauma wounds, partial-thickness burns, abdominal wounds, surgical dehisced wounds, flaps, and grafts)
  - Chronic wounds (diabetic wounds, pressure ulcers, leg ulcers)[7]
- Goals of NPWT in the management of wounds may include wound bed preparation for skin grafts, full wound closure, decrease in wound size, removal of wound edema for delayed primary closure, and increased perfusion to marginally viable flaps.[6]
- The effectiveness of NPWT should be evaluated with each dressing change to include a comprehensive wound assessment and weekly wound measurements. If wound measurements have not improved at least 15% after 2 weeks of therapy, reevaluate the continuation of NPWT with reassessment of wound healing variables.[9,21]

Figure 136-1 Components of the Vacuum-Assisted Closure System: ActiV.A.C. Therapy System and InfoV.A.C. Therapy System. *(Used with permission. Courtesy of KCI, an Acelity Company.)*

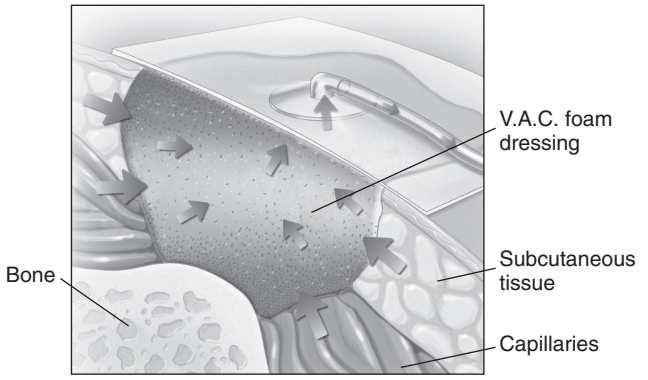

Figure 136-2 V.A.C. Therapy System Illustration. Fluid, exudate, and debris removed from wound bed. *(Used with permission. Courtesy of KCI, an Acelity Company.)*

- Wounds with infections should have systemic antibiotic treatment before initiation of NPWT. If continued deterioration of the wound or infection persists, consider discontinuation of NPWT with possible evaluation for surgical drainage of infection per the physician, advanced practice nurse, or other healthcare professional.
- Wounds treated with NPWT develop a characteristic, beefy red granulation bed. A pale wound bed or friable granulation tissue is a secondary sign of infection and may be more reliable than the traditional indicators of infection.[19]
- Dehisced infected sternal wounds with use of NPWT require effective débridement of infected bone and a specific nonadherent wound contact layer before a NPWT dressing is placed.[6]
- Successful management of enteric fistulae with NPWT with use of special application techniques has been reported in case studies but no clinical trials at this time. See NPWT device manuals for specific techniques in the management of fistulae.
- Rapid formation of granulation tissue with NPWT can lead to the development of abscesses. The surgically dehisced wound with NPWT should be monitored closely for abscess formation, particularly in patients with large irregular wounds with undermining present.
- Transcutaneous oxygen pressure ($Tcpo_2$) evaluation should be considered before initiation of NPWT to lower extremity or toe wounds because of vascular flow requirements that are needed for optimal wound healing with NPWT.
- Contraindications to the use of NPWT include malignancy disease in the wound, untreated osteomyelitis, nonenteric and unexplored fistulae, and necrotic tissue with eschar present.[6,12,21] See the manufacturer's NPWT manual for special precautions required with exposed blood vessels, organs, tendons, and nerves. Precautions should be used for wounds with active bleeding, for difficult wound hemostasis, and for patients undergoing anticoagulation therapy.[10]
- For significant bleeding, NPWT should be stopped immediately and measures taken to stop bleeding. The dressing should be left in place and the treating physician or surgeon consulted.[21]
- For optimal NPWT with the VAC device, at least 22 hours of daily uninterrupted therapy should be delivered.[21] The newer vacuum units do not have research evidence at this time for the required time duration of uninterrupted therapy for wound healing. NPWT dressings are usually changed every 48 to 72 hours, 2 or 3 times weekly.[12,21] However, infected wound beds may require more frequent dressing changes (every 12 hours), and dressings over grafts may be changed less frequently (every 3 to 7 days).[11,17,21] The wound bed should be free of necrotic tissue and debris before application of the NPWT dressing.
- In highly exudative wounds, drainage from the wound bed may be significant in the first 24 to 48 hours of therapy. Additional fluids may need to be provided for individuals with heavily draining wounds.[14]
- Nutritional requirements for wound healing are great. These needs must be assessed, met, and monitored frequently because poor nutrition can impede successful NPWT wound healing.
- The NPWT units discussed previously (ActiV.A.C. and InfoV.A.C. Therapy Systems) offer home units with increased portability. Smaller size and increased battery life allow for continuation of therapy outside of the acute hospital setting.

EQUIPMENT

The following is generic equipment used for most NPWT units. Device- and wound-specific variations may need to be considered by the physician, advanced practice nurse, or other healthcare professional.

- Sterile and nonsterile gloves, gown, as indicated per institutional policy
- Normal saline or wound cleanser with appropriate psi delivery device (see Procedure 132)
- Protective barrier film/wipe for periwound protection
- NPWT dressing with tubing/transparent drape kit (device specific)

- NPWT vacuum unit/collection chamber (device specific)
- Sterile scissors

PATIENT AND FAMILY EDUCATION

- Assess patient and family readiness to learn and any factors that may affect learning. Identification of the patient's preferred learning strategies (auditory, visualization, return demonstration) is also important. ***Rationale:*** The nurse can develop the most appropriate teaching strategy for each patient.
- Provide information about NPWT, the procedure, anticipated duration of therapy, and the equipment. ***Rationale:*** Information may decrease or alleviate anxiety by assisting patient and family to understand the procedure, why it is needed, and the preferred outcomes.
- Explain the procedure and the reason for changing the wound dressing. ***Rationale:*** May decrease patient anxiety.
- Discuss the patient's role during the dressing change procedure and in maintaining the NPWT system. ***Rationale:*** Patient cooperation is elicited; the patient is prepared for wound management on discharge.

PATIENT ASSESSMENT AND PREPARATION

Patient Assessment

- Fully assess the wound with documentation of wound measurements, characteristics, and appropriateness for the procedure. ***Rationale:*** Assessment ensures that use of NPWT is not contraindicated. Data are provided for comparison at successive dressing changes.
- Assess for signs and symptoms of wound infection, including the following.[18] ***Rationale:*** Although NPWT assists with removal of excessive fluid, thus reducing the potential of bacteria in the wound bed, assessment for signs and symptoms of wound infection is necessary, especially in patients with compromised conditions.
  - Periwound erythema
  - Increased periwound warmth
  - Wound edema
  - Increased pain associated with the wound
  - Increased odor and amount of wound exudate
  - Elevated temperature, white blood cell count, or chills
- Determine baseline pain assessment. ***Rationale:*** Data are provided for comparison with postprocedure assessment data. The nurse can plan for preprocedure and intraprocedure analgesia.
- Determine baseline nutritional and fluid volume status. ***Rationale:*** Adequate fluids and protein are necessary for optimal wound healing with NPWT.
- Assess medical history, especially related to bleeding problems, fistula formation, malignant disease, or vascular status. ***Rationale:*** NPWT may be contraindicated in these conditions.
- Assess current medications specifically related to anticoagulant use. ***Rationale:*** Possible areas of caution that should be monitored with NPWT use are identified.
- Assess current laboratory values, especially coagulation studies. ***Rationale:*** Abnormalities possibly associated with risks related to NPWT use are identified.

Patient Preparation

- Verify that the patient is the correct patient using two identifiers. ***Rationale:*** Before performing a procedure, the nurse should ensure the correct identification of the patient for the intended intervention.
- Ensure patient and family understanding of the procedure. Reinforce teaching points as needed. ***Rationale:*** Understanding of previously taught information is evaluated, and a conduit for questions is provided.
- Validate the presence of patent intravenous access. ***Rationale:*** Access may be needed for administration of intravenous analgesic medications.
- Position the patient in a manner that will ensure patient comfort and privacy, and facilitate dressing application. ***Rationale:*** The patient is prepared to undergo the procedure.
- Administer prescribed analgesics if needed. ***Rationale:*** Analgesics improve comfort level and tolerance of the procedure and decrease patient anxiety and discomfort.

Procedure for Negative-Pressure Wound Therapy

Steps	Rationale	Special Considerations
Procedure for KCI VAC Therapy for Wounds; VAC Application		
1. Obtain and prepare equipment.	Prepares for the procedure.	General principles of NPWT are consistent across devices; however, wound-specific and device-specific guidelines need to be reviewed before NPWT. **Steps 1–8** are generic to all NPWT applications. This procedure uses a clean technique; however, sterile techniques may be desired per wound characteristics or clinician preference.[21]
2. HH		
3. PE		
4. Prepare a clean field for a dressing change, then remove gloves. Repeat HH and PE.	Prevents contamination of supplies and materials.	
5. Position the patient to facilitate wound cleansing with dressing application.	Provides for patient's comfort and allows for visualization and access to the wound.	
6. Assess, measure wound, and assemble supplies as indicated.[5,8,9] **(Level D*)**	Select NPWT dressing type with appropriate size approximating the wound size. Multiple types of VAC-specialty size dressings are available (refer to the manufacturer's manual).	The black VAC dressing does not hold moisture but allows exudates to pass through the dressing and be removed. Its design results in rapid growth of new granulation.
	VAC-specific dressings:	The white VAC dressing holds moisture but also allows exudate to be removed through it. It is nonadherent and can be used in tunnels and shallow undermining because of its higher tensile strength.
	A. Black polyurethane foam (GranuFoam) has larger pores and is considered to be more effective in stimulating granulation tissue formation and wound contraction. It is the most frequently used.	Additional precautions must be taken when using Granufoam Silver™. Please refer to specific product instructions when using Granufoam Silver™. It should not be used as a replacement for systemic therapy for infection.[5]
	B. White polyvinyl chloride foam (WhiteFoam) is more dense, is premoistened, and has increased tensile strength. Because of its higher density, it requires higher pressure to obtain the same granulation rate as black foam.	
	C. Black polyurethane foam, GranuFoam Silver, has antimicrobial silver and may reduce infections in wounds.[5,21]	
7. Cleanse the wound according to orders (see Procedure 132) or institutional protocol.[19]	Wound bed cleansing and irrigation prepare the wound bed for the application of the dressing.[10]	

*Level D: Peer-reviewed professional and organizational standards with the support of clinical study recommendations.

Procedure continues on following page

Procedure **for Negative-Pressure Wound Therapy—*Continued***

Steps	Rationale	Special Considerations
8. The physician, advanced practice nurse, or other healthcare professional may debride (see Procedure 133) necrotic tissue or eschar if applicable.	NPWT assists with autolytic and mechanical débridement of surface slough; it should not be used as a primary means of débridement. Sharp débridement of necrotic tissue should be performed before initiation of therapy for optimal healing with NPWT.[9,10]	If extensive débridement is needed, surgical débridement in the operative suite may be necessary.
9. Prepare the periwound by cleansing with warm solution. Clip the hair around the wound. Dry the skin and prepare the periwound tissue with a barrier protective film.[4,9,14] **(Level D*)**	Moisture from perspiration, oil, or body fluids may interfere with the drape's adherence. Barrier films act as a protectant against periwound maceration.	Multiple removals of transparent drape may irritate hair follicles and result in folliculitis.
10. Remove gloves.		
11. HH		
12. Apply nonsterile gloves.		
13. Open an intact package and cut the VAC foam with sterile scissors; do not cut the foam directly over the wound.[12,21] **(Level E*)**	Prevents small particles of dressing from falling into the wound. The dressing should be cut to fit the size and shape of the wound, including tunnels and undermined areas. Tunneling can result in a cyst or abscess when vacuum pressure or granulation closes the entrance to the tunnel. Bacterial invasion and impaired healing result from unfilled dead space.[18]	Any exposed sutures, tendons, ligaments or nerves should be protected with placement of a layer of nonadherent dressing over them. Foam dressings should not be placed in direct contact with exposed blood vessels, anastomotic sites, organs, or nerves. Any exposed vessels or organs in or near the wound must be fully protected before NPWT is applied.[21] See manufacturer NPWT manual for special precautions required.
14. Gently place foam into the wound, ensuring contact with all wound surfaces. Do not allow foam to overlap onto intact skin. Do not force foam dressing into any area of the wound. Always note total number of foam pieces used with notation on transparent drape and in the patient's chart.[17] **(Level E*)**	Capillaries can be compressed if dressings are packed too tightly, and pressure on newly formed granulation tissue may prevent or delay healing.[12] Foam that is placed directly on intact skin may cause skin breakdown.	More than one dressing may be used to fill the wound bed. Foam pieces should be in contact with but not overlapping each other to allow equalization of negative pressure applied to the wound bed by the suction device.[2,21] For small wounds, a larger piece of foam may need to be placed on top of the wound filler foam to provide an adequate surface for the Therapeutic Regulated Accurate Care T.R.A.C. Pad. Protect intact periwound skin with skin prep and drape under the foam.[21]
15. Trim and place the VAC transparent drape to cover the foam dressing and an additional 3–5 cm of intact periwound skin. Avoid stretching the drape over the wound.[21] **(Level M*)**	Avoids tension and shearing forces on the surrounding tissue.	Bridging of wounds can be done for more than one wound of similar pathology in close proximity with one vacuum pump. See manufacturer-specific instructions.

*Level D: Peer-reviewed professional and organizational standards with the support of clinical study recommendations.
*Level E: Multiple case reports, theory-based evidence from expert opinions, or peer-reviewed professional organizational standards without clinical studies to support recommendations.
*Level M: Manufacturer's recommendations only.

Procedure for Negative-Pressure Wound Therapy—*Continued*

Steps	Rationale	Special Considerations
16. Cut a 2.5-cm hole in the transparent drape, for fluid to pass through. Cut a hole rather than a slit because a slit may self-seal during therapy. Apply the T.R.A.C. pad with tubing directly over the hole in the transparent drape. Apply gentle pressure around the pad to ensure complete adhesion.[21] **(Level M*)**	The vacuum does not function without an occlusive seal. The drape may also help maintain a moist wound environment. The drape is vapor permeable and allows for gas exchange. It also protects the wound from external contamination.	The foam contracts into the wound bed if seal is obtained. If foam does not contract, reassess the outer dressing for possible leaks in the system or dressing seal.[2,9]
17. Ensure the position of the T.R.A.C. tubing is not over bony prominences.[9,21] **(Level E*)**	Minimizes the risk of pressure related to tubing placement.	Extra foams with drape can be used under the tubing to reduce pressure and stabilize the tubing.
18. Remove the VAC canister from the packaging and insert into the vacuum unit. Connect T.R.A.C. pad tubing to canister tubing and ensure clamps are open.	Closed clamps prevent activation of the negative therapy.	
19. Turn the power on to the vacuum unit and select prescribed therapy setting. Assess the dressing to ensure seal integrity. The dressing should collapse with a wrinkled appearance and no hissing sounds.[21] **(Level M*)**	Setting options include continuous or intermittent negative-pressure therapy. The settings are determined by type of wound, exudate, and goals as ordered by the physician (Table 136-1).	If the dressing does not collapse, check tubing and transparent drape for leaks. Use an additional drape to seal leaks as necessary.
20. Discard used supplies; remove gloves.		
21. HH		

*Level E: Multiple case reports, theory-based evidence from expert opinions, or peer-reviewed professional organizational standards without clinical studies to support recommendations.
*Level M: Manufacturer's recommendations only.

Procedure continues on following page

TABLE 136-1 Recommended Therapy Setting for KCI VAC Therapy

Wound Characteristics	Continuous Therapy	Intermittent Therapy
Difficult dressing application	X	
Flap	X	
Highly exuding	X	
Grafts	X	
Painful wounds	X	
Tunnels or undermining	X	
Unstable structures	X	
Minimally exuding	X	X
Large wounds	X	X
Small wounds	X	X
Stalled wound healing progress	X	X
VAC white foam dressing	X	X

Responsible physician or advanced practice nurse should be consulted for individual patient conditions. Consult device user manual and manufacturer's recommended guidelines before use.
(Adapted from 2014 V.A.C. Therapy Clinical Guidelines, page 20, Table 1-1: Recommended Therapy Settings. Used with permission. Courtesy of KCI, an Acelity Company.)

Procedure for Negative-Pressure Wound Therapy—*Continued*

Steps	Rationale	Special Considerations
VAC Dressing Removal Procedure		
1. Provide analgesia as appropriate for the patient's condition before the procedure.	Patients may experience discomfort during dressing changes or removal.[21]	
2. HH		
3. PE		
4. To remove the dressing, raise the tubing connector above the level of the vacuum unit and tighten clamps on the dressing tubing. Disconnect the two tubings at the connection point.	Removes any remaining fluid from the tubing for purposes of infection control, preventing leakage.	
5. Allow the vacuum unit to pull the exudate through the canister tubing into the canister, then tighten the clamp on the canister tube. Turn off the vacuum unit. Remove the canister from the vacuum unit and discard.	Allows exudate to be contained; the canister should be discarded per institutional policy.	
6. Allow foam to decompress. Gently stretch the transparent drape horizontally to release adhesive from the skin. Do not peel vertically. Gently remove foam dressing from wound.[21] **(Level M*)**	Decreases patient discomfort and potential for skin and wound trauma.	
7. Discard used supplies; remove gloves.		
8. HH		

*Level M: Manufacturer's recommendations only.

Expected Outcomes

- Wound healing or granulation enhanced by consistent negative-pressure therapy; early signs of contraction of wound margins
- Decreased volume of wound exudate (over time) and absence of foul odor or color
- Enhanced wound healing because of effective wound fluid or edema removal
- Decrease in the size of the wound with ability for surgical closure with flap/graft or skin graft; complete healing of the wound
- Decreased time to satisfactory healing (may decrease hospital length of stay and cost)

Unexpected Outcomes

- Infection
- Bleeding
- Fistula formation
- Disruption of underlying tissue or structures
- Pain
- Misplacement over exposed vessel, ligaments, other structures
- Lack of improvement in wound after 1–2 weeks of therapy
- Tissue loss
- Ischemia and necrosis
- Periwound maceration

Patient Monitoring and Care

Steps	Rationale	Reportable Conditions
		These conditions should be reported if they persist despite nursing interventions.
1. Assess location of VAC T.R.A.C. tubing to avoid excessive pressure on surrounding tissue or structures.	Excessive pressure may result in tissue breakdown from tubing over bony prominences.	• Tissue breakdown
2. Assess patency of VAC system; drape has an occlusive seal, tubing is patent, and foam is compressed.	The VAC dressing should be collapsed when the seal is maintained and negative pressure is being delivered in a consistent manner. Alarms on the device indicate loss of seal; raised foam dressing indicates loss of negative-pressure therapy. See manufacturer's clinical guidelines for troubleshooting difficulties with NPWT dressings.	• Loss of seal • Raised foam dressing • Wound drainage suddenly decreasing in amount or stopping
3. Assess the amount and type of the drainage.	Color of drainage can suggest bleeding, and the rate of canister filling can alert the caregiver to wound problems.	• Bright red blood or rapid filling of the canister
4. Monitor condition of the wound bed and periwound skin with dressing changes; observe for signs of wound infection.	Identifies any evidence of wound healing or any changes or abnormalities indicative of complications.	• Periwound erythema • Heat, edema, pain • Elevated temperature and white blood cell count • Cloudy or foul-smelling wound drainage • Increased wound drainage • Excess bleeding • Changes in tissue color within the wound bed • Macerated, broken, or discolored periwound skin • New tunneling or undermining • Stool in the wound bed
5. Change the dressing every 48–72 hours, 2 or 3 times weekly. If infection is present, increase the frequency of dressing change to every 12–24 hours.[17,21] **(Level D*)**	Removes exudate from the wound bed. If the dressing adheres to the wound base, consider interfacing a single layer of nonadherent porous material (e.g., meshed silicone, meshed petroleum impregnated dressings and meshed oil emulsion impregnated dressings),[21] also known as a contact layer, between the dressing and the wound when reapplying the dressing. If previous dressings were difficult to remove and painful, consider instillation into the tubing or dressing of a topical anesthetic agent such as 1% lidocaine without epinephrine ordered by the physician or advanced practice nurse.[5]	• Signs or symptoms of infection

*Level D: Peer-reviewed professional and organizational standards with the support of clinical study recommendations.

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Patient Monitoring and Care —*Continued*

Steps	Rationale	Reportable Conditions
6. Monitor the mode (continuous or intermittent) and level of suction.[4] (**Level E***)	Removal of edema and debris alleviates compressive forces, thus improving perfusion. Suctioning fluid from within the wound may remove wound fluid factors that inhibit healing.[6] Application and release of negative pressure on the wound bed stimulate cell proliferation and protein synthesis.[6] Mechanical stretch on the tissue by the negative pressure draws the wound toward the center, closing the defect.[8,21]	• Patient discomfort • Excess granulation tissue overgrowth into the dressing with removal • Continued edema within wound bed
7. Maintain an airtight seal.[9,21] **(Level E*)**	Loss of an airtight seal can result in a decreased amount of drainage removal and in desiccation of the wound.[9] See the manufacturer's clinical guidelines for troubleshooting difficulties with maintaining a seal.	• Problems maintaining an airtight seal
8. Label the dressing with the date and time of application and amount of foam pieces placed in wound.	VAC foam dressings are not bioabsorbable. Ensure all pieces of foam are removed from the wound with each dressing change.	• Foam left in the wound for greater than the recommended time period may foster ingrowth of tissue into the foam and create difficulty in removal of foam pieces from the wound or lead to infection[10,21]
9. Change the canister when full, or at least weekly. Keep canister position level.	Controls odor.	• Increased drainage amounts
10. Monitor the amount of wound drainage.[14] (**Level D***)	If a wound produces excessive fluid, the patient may experience a fluid imbalance, requiring intravenous replacement. Excess drainage may also result in increased protein loss. A nutritional consultation to replace protein loss from wound exudates may be indicated.	• Increased drainage amounts • Wound drainage that is foul-smelling and cloudy
11. Follow institutional standards for assessing pain. Administer analgesia as prescribed. Pain can be associated with application of dressing, initiation of initial therapy, intermittent cycling, or removal of the dressing.	Identifies the need for pain interventions. Use of analgesics at dressing changes can reduce the pain. The use of a wound contact layer may also decrease pain with dressing changes.[5,6] Additionally, lowering the initial amount of negative pressure or maintaining the pressure at continual versus intermittent levels can assist in pain control.[5,21] Some evidence has shown decreased pain with dressing changes when using gauze as a wound filler.[5,6] Pain during treatment may be alleviated through the use of the WhiteFoam rather than black foam.[21] See manufacturer-specific instructions.	• Continued pain despite pain interventions

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*Level E: Multiple case reports, theory-based evidence from expert opinions, or peer-reviewed professional organizational standards without clinical studies to support recommendations.

Patient Monitoring and Care —*Continued*

Steps	Rationale	Reportable Conditions
12. See the manufacturer's guidelines for discharge considerations for patients with NPWT, and consult appropriate healthcare personnel for assistance when discharging patients with NPWT.	Obtaining NPWT for home use can be complex and there are important safety concerns.	

Documentation

Documentation should include the following:

- Patient and family education
- Patient tolerance of the procedure
- Condition of the wound bed and periwound skin description
- Characteristics of wound drainage
- Mode (continuous or intermittent) and degree (mm Hg) of suction
- Nursing interventions
- Pain medication given and patient's response to the pain medication
- Wound débridement procedure (if applicable); wound cleansing procedure completed, dated, and timed
- Size of the wound measured by length, width, and depth (consider obtaining a photograph of the wound, depending on institutional policy)
- Size and type of foam dressing applied, and **total number of foam pieces placed in the wound**
- Unexpected outcomes, reportable conditions

References and Additional Readings

For a complete list of references and additional readings for this procedure, scan this QR code with any freely available smartphone code reader app, or visit http://booksite.elsevier.com/9780323376624.