University Hospitals of Derby and Burton
NHS Foundation Trust

TRUST GUIDELINE FOR NEGATIVE PRESSURE WOUND THERAPY

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	4.0.0	March 2023	Tissue Viability	Updated: *Discharge Procedures *Accessing NPWT pumps Removed: Criteria for Outreach Nurses for vascular patients as these are now managed by Tissue viability.
	Intended Recipients: all registered staff within the Trust who are undertaking Negative Pressure Wound Therapy			
	Training and Dissemination: Bespoke training as required to health professionals applying the therapy. Neti.			
	Development of Guideline: **Job Title:** Karren Gourley Lead Nurse for Tissue Viability and TV team.			
	Consultation with: Surgical division. Tissue Viability Team			
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	Contact for Review		Karren Gourley, Lead Nurse for Tissue Viability 87043	

1. Introduction

Negative pressure wound therapy (NPWT) is a broad term used to describe a unique and versatile system that aids the optimization of wound healing through the application of sub-atmospheric pressure to help reduce inflammatory exudate and promote granulation tissue. It can be utilized to manage acute and chronic wounds, ranging from open fasciotomy wounds and diabetic foot ulcers to closed surgical incisions. (Zaver and Kankanalu, 2022).
Termed Vacuum-Assisted Closure (often abbreviated to “VAC”), this system is only effective if applied correctly by health care professionals with specific training in the procedure: it should be done in accordance with the manufacturer's instructions when commercial products are used (NICE, 2013).

It is a relatively simple mode of treatment, and rarely will complications linked to NPWT occur, but special care must be taken to prevent events such as toxic shock syndrome, fistulisation, bleeding, and pain (Normandin et all, 2021).
Numerous studies have investigated the effectiveness of NPWT in wound healing, including several Cochrane Reviews. In one Cochrane Review (Gill et all, 2020) critique compared NPWT with standard dressings and concluded that NPWT probably reduces the incidence of surgical site infection (SSI) in surgical wounds healing by primary closure – this is moderate-certainty evidence and new studies could change this finding. It is not clear what effect NPWT has on reopening of the wound ("dehiscence") and risk of death - this is low-certainty evidence. Results for other complications also show no clear difference with NPWT treatment. NPWT is probably cost-effective for caesarean section wounds in obese women and probably not cost-effective for fracture surgery wounds. Evidence for the cost-effectiveness of NPWT in other surgical wounds is less certain.

Examples of NPWT currently used in the Trust include the Acelity (KCI) V.A.C ULTA, Smith and Nephew Renasys Go/Touch, and Smith and Nephew PICO therapy.

A consensus report on the use of NPWT by wound care experts stated that they would use the system on chronic, acute, and complex wounds as well as an adjunct to surgery to prepare the wound bed for split-thickness grafts or rotational flaps. **They also however, concluded that NPWT should not be considered the panacea for all wounds – health care professionals therefore need to evaluate all options for the management of individual patients**. It is therefore recommended that patients need to be assessed by a wound care specialist in order to evaluate each of the components of delayed healing, and work towards treating the cause, dealing with patient–centered concerns, and initiating appropriate wound care, prior to implementing TNP therapy. (Sibbald 2003).
Overall, NPWT is a valuable tool in the management of wounds and has been shown to be effective in promoting wound healing in a wide range of wound types. With appropriate use NPWT can help to improve outcomes for patients with wounds (Zever and Kankanalu, 2022).

2. Aim and Purpose

These guidelines are intended for use by health care practitioners to provide evidence-based guidance in the use of NPWT and the management of patients receiving the therapy.

These guidelines aim to ensure patients undergoing NPWT receive consistent practice across the Trust.

3. Definitions

UHDB	University Hospitals of Derby and Burton NHS Foundation Trust
CTVN	Community Tissue Viability Nurse
NPWT	Negative Pressure Wound Therapy
RDH	Royal Derby Hospital
TNP	Topical Negative Pressure (The terms Negative Pressure Wound Therapy (NPWT) and Topical Negative Pressure (TNP) are interchangeable TNP was the original term used by Acelity (KCI) however NPWT covers all dressing and pump types.)
TVN	Tissue Viability Nurse
QHB	Queens Hospital Burton
V.A.C	Vacuum Assisted Closure

4. The Use and Management of NPWT

The Trust currently has three types of NPWT in use. Acelity (KCI) V.A.C ULTA, Smith and Nephew's Renasys Go/Touch and PICO

- Acelity (KCI) VAC ULTA pump is available in theatres at RDH and held on a standby hire basis. This can be utilised with an ABThera open abdomen wound management kit (open abdomen - bowel or fascia exposed and likely to fistulate to the bowel if conventional NPWT is applied). Pumps are not portable but will manage large amounts of exudate and can use either gauze or foam contact mediums.

  The pump can also be used in conjunction with V.A.C VERAFLO therapy with automated topical wound solution distribution and removal. This allows the installation of topical wound cleansers, antimicrobials, and antiseptic wound solutions.

  For guidelines on the application of these therapies please see the Acelity KCI (website: www.acelity.com).

  They should only be applied by appropriately trained and competent surgeons or a TVN.

- Smith and Nephew Renasys Go and Touch are portable devices which use either gauze or foam contact mediums.

- The PICO, by Smith and Nephew, is a single use negative pressure wound systems are available in a variety of sizes. These pumps are very small and lightweight and designed to manage low exudate only, no canister is required as the exudate is held within the dressing and evaporates through the permeable dressing.

  Please see appendix (1) accessing NPWT pumps @ UHDB

Assessment for Therapy

Patients should be referred to the Tissue Viability Specialist Nurse (TVN) for assessment of the appropriateness and suitability of this treatment (See appendix 2 for flowchart guidelines for the use of NPWT).

The exception to this is within Trauma and Orthopedics where this is managed locally at the discretion of the treating consultant.

When assessing for the appropriateness of NPWT, the following should be considered/carried out-

- The effectiveness of the NPWT unit will be compromised in the presence of more than 30% thick slough. Where possible the wound should be debrided prior to treatment.

- Underlying structures such as bone and tendon, nerves and blood vessels should be observed and protected, NPWT therapy should not be used if this isn't possible.

- Patients who have developed osteomyelitis should be given the appropriate treatment such as debridement of the bone and/or antibiotics prior to treating with NPWT.

- The wound size, depth and location should be considered, and whether the wound could be managed by conventional dressings.

- There must be a minimum of 2cm intact skin around the wound to maintain a seal. A seal may not be achievable in very wet areas.

- The patient must have undergone a full nutritional assessment, and appropriate action taken.

- For treatment of pressure ulcers, the patient should be assessed as to their pressure ulcer risk (Waterlow Score, 1994), and appropriate interventions taken to minimise risk.

- Informed verbal consent must be gained from the patient following a full explanation of the risks and interventions required to apply/maintain NPWT.

- A risk assessment should be made for patients whose mobility is impaired or where there is an increased risk of falls as a result of NPWT, due to physical or cognitive impairment. The type of pump should also be considered.

- The decision for any continuation of NPWT therapy will be made following holistic assessment of the patient's condition and progress.

- Assessment of clinical staff's capabilities to maintaining the dressing/ device and ensuring they have sufficient knowledge and competence. Extra education and training should be considered if necessary.

- Nurses using NPWT will have the knowledge, ability, and skills to perform safe delivery of NPWT using the ward assessment of clinical skills form (Appendix 3)

Indications for use of NPWT

Negative Pressure Wound Therapy should only be used in appropriate situations. NPWT is most beneficial for complex difficult to heal wounds such as:

- Pressure ulcers
- Traumatic tissue loss
- Extensive tissue loss due to Necrotising fasciitis
- Diabetic /Neuropathic wounds
- Dehisced / Open surgical wounds
- Explored sinus drainage and management
- Burns
- Skin/Muscle flaps
- Grafts

Contraindications to the use of NPWT

The following circumstances or wound types are not considered to be suitable for Negative Pressure Wound Therapy

- The patient refuses
- Osteomyelitis that has not been debrided or treated with the appropriate antibiotic.
- Known malignancy within the wound.
- Necrotic tissue with eschar present.
- Exposed blood vessels and organs.
- Non- Enteric or unexplored fistulae

Cautions to Practice

In the following circumstances NPWT should not be used ***unless*** the Tissue Viability Nurse is involved in the care of the patient:

- Wounds with fistulas into a body cavity.
- Patients on anticoagulant therapy.
- Active bleeding at the wound site and difficult wound haemostasis.
- Patients with Peripheral Vascular Disease (Wallin 2009).
- Where loose bone fragments or sharp edges are present.
- Greater care should be taken with respect to weakened, irradiated or sutured blood vessels or organs.
- Acute enteric fistulae must be referred to a specialist centre where an experienced surgeon can be involved in treatment.
- A chronic enteric fistula requires skills in segregation of the fistula from the abdominal wall.

Negative Pressure Wound Therapy Applied in Theatres

Surgical Consultants should alert Tissue Viability Team at least 24-48 hours prior to planned surgery where NPWT may be required in theatres.

If surgeons decide to apply the treatment in theatres, they must liaise with ward staff to ensure that they have adequate resources in terms of equipment, dressings as well as ensuring that there are competent theatre and ward staff to care for the patient post operatively.

Patients with NPWT dressings should not leave theatre without the vacuum being applied and the seal checked. Patients should also be advised that this treatment might be necessary when obtaining consent for their surgery.

If the Tissue Viability team is required to follow up the therapy post operatively then the theatre team should ensure that the patient is referred on the day the therapy is initially applied.

Theatres do have one Acelity (KCI) VAC ULTA pump specifically for use with the ABThera open abdomen negative pressure dressing. This is not for general use and is used under the instruction of the surgical team. The hire of this pump is the direct responsibility of theatre staff.

Commencement and ongoing care of NPWT treatment

The TVN will assess the patient holistically and commence NPWT if appropriate. The exceptions to this will be if surgeons commence the therapy in theatre or if commenced by the orthopaedic team.

Appendix 4 indicates the procedure for application of NPWT.

Core care plans are available for both NPWT and PICO therapies (Appendix 5).

Dressings changes will be determined by the assessing health care professional and depending on wound type. The frequency of canister change will depend on exudate levels; however, this will be at least every seven days.
At RDH, the TV Team will supply the consumables and cross-charge the ward when treatment is completed. Orthopaedics will have their own supply of consumables.
At QHB, the equipment library holds the pumps and consumables and are responsible for cross charging the individual clinical areas. In clinical areas where there is high usage of NPWT the area is responsible for purchasing ongoing dressings and canisters via logistics.

Ward nurses will observe the NPWT and report any problems back to the TVN or orthopaedic team as necessary. NPWT systems should be checked at least every 8 hours by ward staff using the NPWT checklist form in Appendix 6.

IF the KCI VAC ULTA is commenced by the TVN, they will ensure the rental has been activated.

Continuation of Treatment

Therapy should be continued if:

- The wound is improving but not covering surgical repairs to vital structures such as abdominal wall, tendons, and muscles,
- The wound is improving, and tissue is covering vital structures, there is contracture of wound edges but very high exudates levels above 500mls in 24hrs,
- The wound is improving but there is a high risk of infection due to extensive size of wound in relation to location and tissue structures involved.
- Major surgery or treatment is being delayed until wound with healing potential has closed so as to minimise risks of complications.
- Conventional therapy has been tried, but deterioration is noted and only improves on recommencement of NPWT.
- Quick reference guide for ongoing treatment is available in Appendix 7

Discontinuation of Treatment

Treatment should be discontinued:

- If any of the contraindications to the use of NPWT arise during treatment.
- If there is no improvement to the wound after 2 to 3 weeks of therapy. Unless being solely used for palliative management or exudate management then it can be used

more long term with no improvement in the wound measurement however if deterioration is noted then therapy should be discontinued.

- If circulation cannot be improved to sustain healing
- If there are persistent problems maintaining a sealed vacuum? Consider conventional treatment.
- When the treatment aims are achieved. i.e. the wound is ready for further surgery, such as split- skin grafting, or if it can be managed with conventional dressings**.**
- If the patient is non concordant with recommended treatment plan, or the pump history indicates that the treatment has been turned off at frequent or prolonged intervals.
- If there is failure to tolerate treatment modality by the patient

Negative Pressure wound Therapy on Discharge from UHDB

Prior to discharging a patient on NPWT, the following should also be considered/carried out-

- The decision for continuation of NPWT therapy will be made following a holistic assessment of the patient's condition and progress made.
- The patient's ability to use the pump, change the canister and tolerate treatment, their compliance to treatment, wishes and understanding of continued treatment at home should be considered.
- The individual patient's lifestyle, work, family commitments as well as home environment including the ownership of animals that may potentially cause damage to the pump needs to be explored.
- The patient must have undergone a full nutritional assessment, and appropriate action taken.
- The patient should have a full physiotherapy assessment to ensure that there is no risk of falls caused by the pump and that the patient can manage the pump on the stairs.
- For treatment of pressure ulcers, the patient should be assessed as to their pressure ulcer risk and appropriate action taken.
- There must be a minimum of 2cm intact skin around the wound to maintain a seal.
- The community team must also agree to the therapy being carried out at home in partnership with the CTVN or on occasions within the outpatient clinic or Orthopaedic Outreach team where the wound will be reviewed by the prescribing Consultant.
- Discharge into Staffordshire - NPWT must be stopped, if possible, prior to discharge. Please see appendix 8 for this process
- Patients in receipt of NPWT must be referred to the CTVN prior to discharge by the acute Tissue Viability team. The ward staff caring for the patient on the ward will also

refer the patient to the DN team covering their locality. Please see Appendix 8 for discharge guidance.

- The orthopaedic outreach team are responsible for the ongoing care of orthopaedic patients requiring ongoing wound care, particularly NPWT. The therapy is instigated by the orthopaedic surgeon and the orthopaedic outreach team will manage all aspects of NPWT whilst the patient still requires the treatment.

- The orthopaedic outreach team will take referrals for patients discharging into Staffordshire however this is dependent on capacity and needs to be negotiated on a need's basis with the team.

- Patients being discharged with ongoing NPWT should receive the appropriate patient information leaflet (Appendix 9).

With the exception of Orthopaedic Outreach team patients, the Tissue Viability Team has the responsibility for co-ordinating and facilitating the discharge of patients receiving NPWT. They will assess for its appropriateness and arrange contact with the relevant Community Tissue Viability team. Arrangements should be made with the District Nursing service to take over the day-to-day dressing changes and management of the therapy. The CTVN will take over the responsibility for the therapy following consultation with the initiating TVN.
The CTVN may wish to attend hospital to review the wound before accepting the patient into the community.

The initiating TVN is responsible for completing the appropriate Pro forma and liaising with the area CTVN to form the best plan for the patient. This may impact on discharge plans; therefore, ward staff are to ensure that the TVN involved is made aware of any expected discharge dates in advance. The TVN is also responsible for keeping the patient and ward informed of any issues that may delay discharge.

Any patient to be discharged with NPWT should have the pump swapped on to a discharge only or Orthopaedic outreach pump prior to leaving the Trust.

Monitoring Compliance and Effectiveness

The Tissue Viability Team will monitor and investigate any untoward incidents associated with the use of NPWT. The immediate consequences of any untoward incident will be dealt with by the Registered Nurse and reported to the Senior Nurse. If consumables are involved and a particular batch is at fault, report to risk management with a Datix incident form (IR1). All incidents or near misses should be reported to the Trust Risk Management Department. Guidelines for faulty equipment should be followed if the pump is hired the company should be alerted, photograph where possible and the pump number documented. Tissue viability should be informed as soon as possible if a fault is identified so that wound management can be continued effectively.

The Tissue Viability Team will also monitor adherence of staff to the guidelines, clinical outcomes, healing rates and patient satisfaction. They will help arrange suitable training according to identified educational needs. Staff should inform the Tissue Viability team of specific needs.

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5 Documentation Controls

Development of Guideline:	Tissue Viability
Consultation with:	Divisional Governance, Tissue Viability Meeting Business unit Matrons
Approved By:	Trustwide Clinical Guidelines Group - Sept 23
Review Date:	2025
Key Contact:	Karen Gourley, Lead Tissue Viability Specialist Nurse

Appendix 1

ACCESSING NPWT PUMPs @ UHDB

Derby

Access Medical Equipment Library (MEL) - information required. For the PUMP

- Patient name
- Ward/area collecting the pump.
- Hospital number
- If known where the patient/pump will be sent to post op.

Theatre staff to ensure there are dressings/canisters available if none these can be requested from Ward 204 or TVN off (in office hours)

Non-orthopaedic areas to access dressings/cannisters from TVN office.

Ward Staff responsibilities -

- ensure the pump, case and cables remain together.
- ensure that the pump is connected and plugged in on admission to the ward.
- Once discontinued ensure they are all returned to the MEL.

Burton

Access Medical Equipment Library (MEL) - information required. For the PUMP

- Patient name
- Ward/area collecting the pump.
- Hospital number
- If known where the patient/pump will be sent to post op.

Dressings and Canisters can be accessed from MEL.

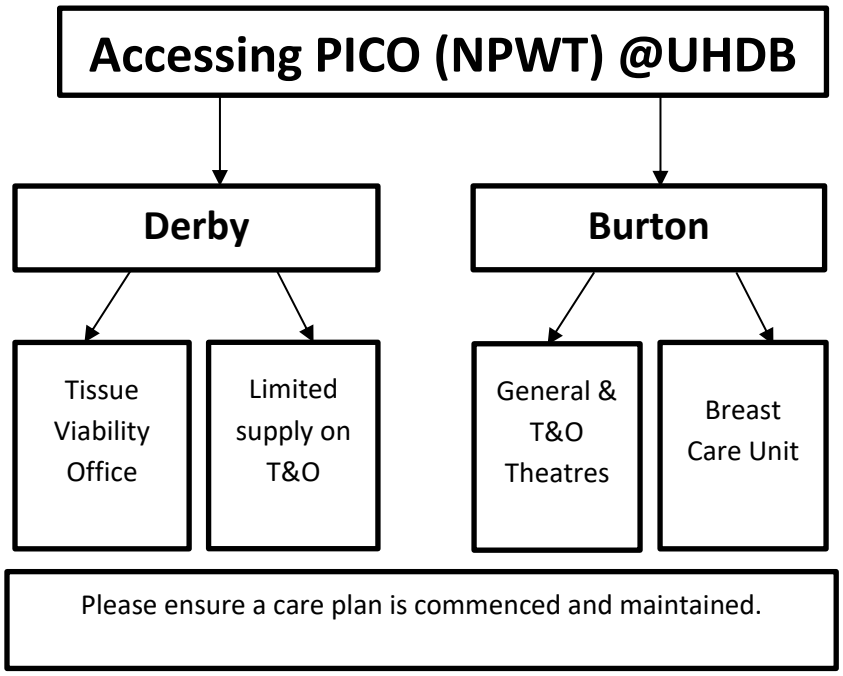
Ward Staff responsibilities -

- ensure the pump, case and cables remain together.
- ensure that the pump is connected and plugged in on admission to the ward.
- Once discontinued ensure they are all returned to the MEL.

Decision to initiate NPWT in Theatres or by surgical teams not by the TVN's

Any lost or damaged equipment will be charged to the area they were booked out to

No pump should leave the Trust without the knowledge of the TV team or Orthopaedic Outreach who will change them to discharge devices.


Accessing PICO (NPWT) @UHDB
Derby
Burton
Tissue Viability Office
Limited supply on T&O
General & T&O Theatres
Breast Care Unit
Please ensure a care plan is commenced and maintained.

Appendix 2

University Hospitals of Derby and Burton NHS Foundation Trust
Flowchart Guidelines for the use of Negative Pressure Wound Therapy (NPWT) Secondary Care

Patient with complex, difficult to manage or none healing wound.

Is the patient and wound type suitable for NPWT? (having considered the assessment criteria within the clinical guideline)

YES

NO

Consider alternative treatments and Seek advice from TVN's on other management options.

Other Divisions (infrequent users of NPWT)

Contact Tissue Viability Nurse, who will undertake initial assessment and dressing, leaving instructions with patient and staff on its management.

T & O, (Local Guidelines)

Nurses who have undergone competency training on NPWT management may assess and initiate/ discontinue NPWP on request from Orthopaedic or plastic surgeon.

T & O. Outreach Service, continue to monitor and review patients continuing TNP following discharge.

TVN Responsibilities

- TVN will maintain and monitor patients ongoing treatment
- TVN will supply pump and dressings.
- TVN will monitor use and cross charge costs to the ward area.
- TVN will liaise with DN teams to support discharge.
- TVN will complete discharge proforma and send to appropriate community team.
- TVN will educate and support Staff and patient with NPWT
- TVN to supply any relevant documentation.
- Supply patient information leaflet for inpatient and on discharge. (appendix9)

All Staff Responsibilities

- To ensure they are competent to undertake dressings changes additional training where appropriate (Clinical skill assessment appendix 2) in case of dressings failure. (Unable to reseal vacuum)
- To ensure they are competent at trouble shooting any issues with pump and dressings.
- Dressings to be applied in accordance with TVN if pump/dressing fails and staff not competent to reapply NPWT dressings or patient experience unforeseen problems i.e., pain
- Wound characteristics are recorded in the Wound management care pathway.
- To ensure that agreed therapy pressure is maintained in accordance with manufactures guidelines.
- Staff to ensure daily safety checks are done and recorded on NPWT wound therapy checklist. (Appendix 5)
- Adhere to NPWT core care plan (appendix 4)

Appendix 3

WARD ASSESSMENT OF CLINICAL SKILLS

Wound Care: Negative Pressure Wound Therapy

Name: **Date:**

OUTCOME:

The practitioner will have the knowledge, ability and skill to performing safe delivery of TNP therapy

Date of assessment:
Enter details of type of wound to be treated using NPWT:
Performance criteria:

Practitioner can discuss & demonstrate:	**Tick**
Knowledge of theory of NPWT therapy	
Knowledge of indications and contraindications of therapy	
Knowledge of patient and condition	
Knowledge of different types of NPWT Systems	
Awareness of appropriate medical device usage implications	
Able to Obtain and prepare equipment	
Preparation of patient and provision of suitable information/education	
Accurate wound assessment	
Attention to privacy & dignity throughout procedure	
Principles of asepsis and demonstration of ANTT procedure	
The ability to apply the dressing and set the therapy on appropriate settings	
The ability to remove the dressing as indicated	
Discuss/demonstrate the safe disconnection of the therapy to allow patient to mobilise	
Safe disposal of equipment and clinical waste	
Ensuring patient comfort during the procedure and upon completion	
Recording and reporting of relevant information	
Adjustments to care plans if necessary	
Recognition of adverse effects, or reasons why NPWT is not facilitating healing in specific wound types and individuals	
Confidence and competence to discontinue treatment and choose appropriate conventional dressing to manage wound whilst waiting review of wound from surgical team or specialist.	

Assessment successfully completed? Yes / No Enter any additional learning needs identified:	
Print Practitioner's name:	
Signature:	
Print Assessor's name:	
Signature:	

Appendix 4

Procedure for the application of NPWT Therapy

Equipment required	Rationale
• Power unit	• Appropriate to the patient's needs.
• Canister	• the canister size will be determined by the amount of exudates.
• Appropriate dressing type depending on wound type/size and tissue.	
• Sterile Dressing Pack	
• Sterile saline/ water/ Prontosan	
• Sterile blade or scissors	
• Skin protector *Tube sealant (usually found in the NPWT dressings packs)	• To ensure a seal around the tube based NPWT systems. *Optional for flat or channel drains only
• Low adherent wound contact layer for protection of tendons / blood vessels	
• Extra Kerlix gauze to fill deeper or larger areas.	
• Extra occlusive drape or film	• For larger wounds to ensure a seal
• Extra sealants and fillers to enable a seal	• To fill in any dips and creases to ensure a seal

Application of Therapy

Before the application of NPWT the patient should understand the aims of treatment, the procedure and give verbal consent. Analgesia should be administered according to individual requirement. The wound should be assessed and documented using The Wound Management Care Pathway. There is little difference in the effectiveness of either contact mediums, however gauze can be less painful to remove, and it can be beneficial for use in deep undermined cavities and where large areas need to be

covered. Different drainage tubes will assist in the management of exudate. In all cases dressing changes should be carried out every 2-4 days.

Technique for the Application of Foam Dressings

Technique for Foam System NPWT	Rationale
• Using an aseptic technique, the wound should be cleansed, and the surrounding skin protected with a barrier such as Cavilon	• Extra foam wedges can be used to fill undermined area: - these should be counted and recorded to ensure their retrieval.
• Cut the foam to fit the wound trying to keep in one piece. Place lightly with the wound	• This will ensure retrieval is easy and less painful.
• Protect underlying delicate structures by using either white foam (from KCI) or low adherent dressing supplied in the NPWT dressing pack (from Smith and Nephew) An alternative such as Atrauman or Mepitel can be used.	
• Ensure foam is within the margins of the wound.	• This is to ensure a seal.
• Apply Drape/film dressing over the foam and ensure at least a 2cm margin of intact skin.	• Careful positioning to ensure there is no pressure from the pad and allow movement of the patient.
• Cut a hole in the film dressing/ Drape and secure the adhesive “Trac pad”, “Port” or “Soft port” directly over.	
• Connect to canister and pump as per manufactures instructions.	• Pressures vary between 80-150mmhg dependent on the device, foam used and wound type.
• Switch on the pump and apply negative pressure. The pressure is determined by the TVN and is recorded in the nursing documentation	• Follow manufactures instructions or seek specialist advice.

Technique for the Application of Gauze Dressings

Technique for Gauze system NPWT	Rationale
• Using an aseptic technique, the wound should be cleansed, and the surrounding skin protected with a barrier film. • Lightly pack any undermining and cavity with dampened Kerlix gauze, try to keep a single piece.	• Gauze doesn't retract or flatten like foam. Moistening it with sterile normal saline or water makes it easier to apply. This will also ensure retrieval is easy and less painful. Also, this allows the margins to retract.
(1) Flat drains • Before filling the wound with gauze cut the drain to fit the wound at its longest length, leaving 1cm gap at either end, cover with remaining gauze.	• To be used if exudates is purulent and or the wound is excessively deep, and pooling might be an issue.
(2) Channel drains • Apply directly on to the wound bed into undermined areas and blind sinuses. Gauze is then packed into the remaining cavity to fill.	• This can be used to drain abscesses or wounds with small apertures. • Care should be taken that underlying structures are covered. • Us for excessive exudates in large cavities
(3) Round drains • Apply in the same way as a Flat drain. • Gauze should be kept within the margins. • Secure the drain with the sealant provide in the dressing pack. • Some gauze systems also use an adhesive Port for applying the vacuum this is applied as for foam dressings. • Apply Drape/film dressing over the foam and ensure at least a 2cm margin of intact skin. • Ensure that the drain is secure, and sealant is covered. • Connect to canister and pump as per manufactures instructions. • Switch on the pump and apply negative pressure.	• To prevent maceration of the surrounding skin • This is to ensure a seal. • Careful positioning to ensure no pressure and allow movement of the patient. • Pressures vary between 80-100mmhg dependent on the device, foam used and wound type. Follow manufactures instructions or seek specialist advice.

Ongoing Care and Changing the Dressing

1. **Care should be given in line with the care plan** (Appendix 5).

2. **Dressing changes should be carried out every 2-4 days.** This is dependent on keeping a seal more frequent changes may be needed in hard to seal areas this should be determined by the clinical practitioner who initiates and assesses the wound.

3. **Equality and Diversity** issues arise with darkly pigmented skin as erythema is not always easy to identify, and present as either lighter or darker pigmentation around the margins, as well as heat swelling and pain.

4. **Ensure that the patient, the carers, or staff have sufficient knowledge** to enable them to manage the system and are aware of how to contact the company, Document who this information is handed over to in the relevant care plan.

5. **Staff need to inspect the wound at least once every 8hrs** to ensure the foam or gauze is collapsed, and a seal is being maintained. A hissing noise from the wound site may indicate that there is a leak, so the vacuum is not being maintained. This is easily resolved by application of additional adhesive strips.

6. **Wet or lifting film should be removed** with sterile scissors the skin dried and new film applied.

7. **If any untoward incidence does occur then it should be reported** on Datix and or as a serious untoward incident, this should be investigated by the senior nurse on duty, who should also report to the TVN.

Changes in the Wound Bed

If the wound bed suddenly reveals dark discoloration assess for mechanical trauma causing bleeding. Relieve wound of any excess pressure. Ensure that there is not excess foam within the wound bed and that drape is rolled over the foam as opposed to being stretched over the foam, decrease pressure by 20-25mmhg. Check clotting times and assess anticoagulants.

If the wound appears white, excessively moist or macerated, check pump has been in continuous use for 22 of 24 hours each day, explore reasons for therapy deficit and reinforce the need for 22 hours therapy per day, support to patient and staff with practical advice and awareness training on maintaining a vacuum.

If the edges of the wound are starting to curl under, check that the dressing is being packed into the undermined area. If staff are unable to pack sufficiently refer to TVN for advice re alternative solutions. If edges are already curled, please refer to appropriate surgeons for revision of wound edges.

Points to consider.

- A therapy rest of 2-3 days is sometimes required to re-initiate healing.
- The therapy should not be switched off for longer than 30 minutes and 4 times in 24 hours.
- If ward staff are unable to resume treatment, **they should remove the dressing and change to a conventional dressing** until further advised by Tissue Viability Specialist nurse
- The patient's clinical condition should be continually assessed to determine the appropriateness of continuing the TNP Therapy.
- Full documentation of the therapy should be recorded. If possible, photographs should be obtained to allow ongoing assessment.

Discontinue Treatment

- Treatment should be discontinued if any of the contraindications to the use of TNP/NPWT arise during treatment.
- The therapy should be reviewed and possibly discontinued if there is no improvement to the wound after 2-3 weeks of therapy or if an actual deterioration is noted.
- Staff should consider conventional management or/ and further surgery if there is no increase in granulation tissue over metal prostheses after 6 weeks.
- Staff should consider conventional treatment if having persistent problems maintaining a sealed vacuum, or where patient' mental capacity alters and the TNP unit and tubing increasing the risk of falls for the patient.
- The therapy should be discontinued when the treatment aims are achieved. I.e. the wound is ready for further surgery, such as split- skin grafting, or if it can be managed with conventional dressings.
- Treatment should also be discontinued if the patient is non- compliant and refuses to accept the recommended treatment time.

On Completion of Therapy

- Discontinuation should be authorised by a member of the Tissue Viability team.
- An appropriate wound management plan should be discussed with the patient and cares and recorded in the relevant nursing documentation. If planed withdrawal of treatment a supply of conventional dressings should be supplied.
- All boxes, power units and plugs must be cleaned as per infection control policy, and they need to be gathered together for collection either by the TVN/Medical equipment library. Additional charges will be made for lost items.

- Cancellation and arrangement for collection of hired units should be arranged on the same day that treatment ends. This will prevent charges for unused days.

Appendix 5

MANAGEMENT OF PATIENTS RECEIVING NEGATIVE PRESSURE WOUND (NPWT)

AFFIX PATIENT LABEL HERE	**Date/Time Commenced: .....** **Initiated By: .....** **Continuous therapy……☐** **Intermittent therapy ……....☐** **Pressure ……**mmhg

1. Negative Pressure Wound Therapy (NPWT) therapy is used to promote wound healing, and/or manage excessive quantities of wound exudate.

2. Holistic assessment indicates NPWT would be suitable for the management of this persons wound without compromising his/her mobility status.

3. Give the patient a Negative Pressure Wound Therapy Information Leaflet (Appendix 9) and explain the aim of the dressings, the dressing procedure and ongoing care to the patient and gain verbal consent.

4. Identify the wound site to receive this therapy _____

5. The Objective of NPWT in the management of identified wound is to:

   - Increase granulation tissue of open wound bed ☐
   - Manage excess exudate ☐
   - Minimise risks of cross contamination ☐
   - Drain pus from abscess site/s ☐
   - Prepare wound bed for plastic surgery ☐
   - Medical/surgical treatments are delayed because of the presence of a wound. There is an urgency for wound closure ☐

6. Discuss management with ward team and demonstrate how NPWT unit works and advise them of what to look out for.
   Troubleshooting discussed with Qualified Nurse
   Name:_____

7. Assess and document the appearance of the wound at each dressing change, including dimensions, tissue type and amount of exudate in the Open Wound Management Care Pathway.

8. Arrange photography of the wound if appropriate (Medical Illustration Ext: 86066). Consent must be obtained from patient/family or Specialist or Doctor.

9. Redress the wound at appropriate timescales as per guidelines, using an aseptic technique. Ensure appropriate equipment and consumables are available.

10. Monitor the wound dressing, the canister contents and pump unit settings at appropriate intervals, throughout each shift, and document findings on Negative Pressure Wound Therapy /Trouble-Shooting Check List.

11. Assess and monitor the patient's pain and/or discomfort and administer appropriate analgesia and involve appropriate specialists/ disciplines to help manage effectively.

12. The wound bed is lined with ……. in an effort to help reduce risks of trauma on removal of dressings.

13. If dressing loses its vacuum, staff to try to maintain seal by applying film drape to any areas where leakage occurs.

14. If it is not possible to maintain a vacuum seal, **the therapy should be <u>discontinued</u> and conventional dressings used**, until expert advice is obtained from the Tissue Viability Team.
    Recommended Conventional dressing is ……
    …….

15. During therapy, the patient may be disconnected and/ or if appropriate shown how to disconnect themselves from the VAC power unit for short periods of time (30 minutes maximum) such as for mobilising or personal hygiene. A suitable method for securing the pump should be found to keep it safe and allow mobility**.** If patient is having a shower, remove canister from pump and clamp tubing. **Do not take pump into the shower.**

16. Review the wound at regular intervals to determine whether management objectives are being achieved with the therapy.

17. Wound objectives achieved / not achieved, TNP discontinued on:_____

    Wound redressed with _____Wound dressing prescribed on Open Wound Assessment and Management form.

18. Requires ongoing management on discharge by Outreach Team □ or
    Requires referral to Community Tissue Viability Team for ongoing management □

19. Application for Funding □ Consultant letter □
    Joint Tissue Viability Assessment □ Patient Information □
    Funding Secured □ District Nurse Training □
    Equipment and dressings ordered □

20. Date/Time Resolved_____ Signature _____

Ensure the patient's privacy and dignity are maintained at all time

MANAGEMENT OF PATIENTS RECEIVING PICO NEGATIVE PRESSURE WOUND (NPWT)

AFFIX PATIENT LABEL HERE	Date/Time Commenced:…… Initiated By:……

Assessment of the wound indicates NPWT would be suitable for the management of this persons wound.

Due to the size, site, and depth of the wound it is manageable with a PICO NPWT dressing.

1. Ensure surrounding skin is intact and isn't excessively hairy (this will prevent a good seal; it may be necessary to trim the hairs).

2. Ensure there is adequate skin surrounding the wound to accommodate the dressing at least 3-4cm from the dressing pad margin is needed to achieve a good seal.

3. The dressing should contain the exudates if there is leakage under the seal other NPWT types should be considered.

4. As with other types of NPWT the patient should be supplied with a Negative Pressure Wound Therapy Information leaflet.

5. Dressings should be checked at least every 4hrs.

    a. Check that the dressing is firm to touch.
    b. The exudate is contained with the margins of the dressing.
    c. There isn't excessive bleeding, if the dressing is full of fresh blood stop the pump keep dressing in place and apply pressure. Seek Medical advice immediately.

Management discussed with ward team and PICO demonstrated to Qualified Nurse.
Name: _____

Application guide:

- Cleanse wound with Normal saline or sterile water.
- Protect surrounding skin with a barrier.

- Fill wounds deeper than 0.5cm with alginate, if deeper than 2cm consider alternative dressings.

- The pack contains 2 dressings for first dressing application open the dressing pack that contains the pump and batteries, the pump and batteries will last 7days and is used again with the second pack.
- Apply the dressing pad with the port at the topmost position.
- Secure the edges with the extra film provided.
- Connect the tubing to the pump and switch on with the orange button.
- The light should be green. Initially there be an intermittent buzzing. sound this should settle as the air is removed from the dressing.
- If the light turns **orange,** there is a leak and the margins should be checked for the seal.

For additional information visit the Smith and Nephew web site wound management site search Smith & Nephew PICO NPWT

Ensure the patient's privacy and dignity are maintained at all time.

Appendix 6

NEGATIVE PRESSURE WOUND THERAPY CHECKLIST

AFFIX PATIENT LABEL HERE	System used _____ Pressure setting_____

Pump	Date	Date	Date	Date	Date	Date
Is the Pump switched on						
Is the pump on the correct pressure setting?						
Is the pump plugged in? is there adequate battery reserves?						
Tubing and Connections	Date	Date	Date	Date	Date	Date
Is tubing secured and well fitted?						
Are all canister secured and well fitted?						
Are all clamps in the open position?						
Check for traction or kinks in the tubing?						
Dressing / Peri-Wound Skin	Date	Date	Date	Date	Date	Date
Does the dressing have a seal?						
Is the dressing hard to the touch and collapsed into the wound?						
Check for signs of irritation, redness or maceration to surrounding skin?						
Drainage	Date	Date	Date	Date	Date	Date
Check exudates levels and record on fluid chart						
Document nature of exudates						
Drainage type: S= serous FB=Frank Blood HS =haemo serous P= Pus						
Signature/ initials						

If the dressing cannot be resealed with 2hrs of breach the WHOLE dressing should be removed and redressed with conventional dressings. The initiator of the treatment should be contacted ASAP
REMOVE WHOLE DRESSING IF FRANK BLEEDING NOTED

Appendix 7

Quick Reference Guide For Ongoing Treatment

Continue Treatment Criteria

• Wound improved, reduced size, granulation tissue increasing but not covering surgical repairs to vital structures such as tendons and muscles	Needs further TNP therapy
• Wound improved, reduced size, granulation tissue covering vital structures, contracture of wound edges but very high exudates levels above 500mls in 24hrs,	Needs further TNP therapy
• Wound improved, reduced size, granulation tissue covering vital structures, contracture of wound edges, reducing exudate levels, but high risk of infection due to extensive size of wound in relation to location and tissue structures involve	Needs further TNP therapy
• Wound improved, reduced size, granulation tissue covering vital structures, contracture of wound edges, reducing exudate levels, have tried appropriate conventional therapy and holistic reassessment and interventions, but deterioration noted and only improves or recommencement of TNP	Needs further TNP therapy

Discontinue Treatment Criteria

• Wound improved, reduced size, granulation tissue covering vital structures, contracture of wound edges, reducing exudate levels**.**	Discontinue TNP and try conventional absorbent dressings
• Patient unable (too painful or increased potential for falls) or unwilling to tolerate treatment/ vacuum seal not maintaining longer than 24hrs.	Discontinue TNP and try conventional absorbent dressings
• Wound has remained static or has deteriorated, failure to cover metal prostheses re- refer for further surgical / vascular intervention.	Discontinue TNP and try conventional absorbent dressings
• Frank bleeding occurs	Discontinue TNP and pack with Kaltostat or Sorbsan

Appendix 8

Patient assessed and is appropriate to commence NPWT or ongoing NPWT deemed necessary post discharge		
Acute TVN to complete discharge proforma to send to CTVN at least 72 hours prior to discharge.		
Derbyshire (DCHS)	**Staffordshire (MPFT)**	**Leicestershire**
Await approval from CTVN to take over care. Aim to discharge early to mid-week. On day of discharge *Acute TVN will exchange capital TNP pump for a rental device (RENASYS Go/Touch) and activate this device and transfer rental to DCHS *The acute TVN will supply all the discharge consumables required for two (2) dressing changes. The acute TVN will also supply two (2) days of conventional dressings should any issues arise. *The ward staff (where the patient is currently being nursed) will refer the patient to the DN team	Await approval from CTVN to take over care. On day of discharge *NPWT insitu must be discontinued and conventional therapy instituted. *****Pump to be returned to the medical equipment library. *The patient will be discharged home and await review by CTVN team for review and application of NPWT *On the day of discharge the ward staff (where the patient is currently being nursed) will refer the patient to the DN team *The patient will be supplied with two (2) days supply of conventional dressings on discharge	Await approval from CTVN to take over care. On day of discharge *NPWT insitu must be discontinued and conventional therapy instituted. *****Pump to be returned to the medical equipment library. *The patient will be discharged home and await review by CTVN team for review and application of NPWT *On the day of discharge the ward staff (where the patient is currently being nursed) will refer the patient to the DN team *The patient will be supplied with two (2) days supply of conventional dressings on discharge

****No pump should leave the Trust without the knowledge of the TV team or Orthopaedic Outreach who will change them to discharge devices****

Any patient that is out of area please contact the relevant CTVN team to establish their discharge process.

Appendix 9

Using Topical Negative Pressure Wound Management therapy to help manage your wound in hospital

What is a NPWT dressing?

NPWT stands for Negative Pressure Wound Therapy. This promotes wound healing by applying a vacuum or negative pressure to your wound, through a soft piece of foam or gauze dressing. The dressing is held over the wound by a clear sticky see through dressing. A plastic tube is inserted into or on top of the dressing and then attached to the pump which creates the vacuum, collects the excess fluid from your wound and drains it into a canister.

What are the benefits?

This therapy promotes moist wound healing and improves blood flow and circulation which increases the rate of tissue repair/ re-growth. It also helps to clean a wound by removing any debris and infection if present. It removes excess fluid from the tissues, which helps reduce swelling and wound leakage. This will keep your skin and clothes dry.

Is this treatment painful?

You may feel a slight sucking / drawing sensation, and the wound may sometimes itch. If you are experiencing pain and you have any concerns please speak to your nurse or doctor, who may consider a variation in your painkillers. They may also decide to alter the frequency of your dressing changes or they may line your wound so as to prevent the dressing sticking to the wound bed.

How often is the dressing changed, and will this be painful?

This is normally between 2- 4 days, but may vary depending on your wound. The nursing staff will follow a plan of care that includes specific written instructions for your particular wound and this will be discussed with you by your nurse. You may feel slight discomfort during the dressing change depending on the type and location of wound, but pain relief will be discussed and offered to you.

What if the nurse cannot solve the problem?

The dressing should be removed from your wound and a standard conventional dressing should be applied as prescribed in your care plan by the nurse initiating the NPWT therapy.

How long will I need this treatment?

Wound healing can be complex and is determined by a wide range of influences such as your age, your nutritional status, your circulation, deep tissue or prosthetic infection, the size and location of your wound, and any underlying disease processes of treatments that affect cell growth. The majority of patients respond to this treatment

usually within 2-6 weeks. By this time, the wound bed is usually cleaned out and starts to fill with healthy granulation tissue. Once this is established your wound can normally be managed with normal conventional dressings or for some patients skin grafting may be more appropriate.

In some cases where there may be deep infection involving bone or metalwork, the objective of the treatment will be to help draw off the bacteria whilst you receive appropriate antibiotics and the bone knits together. However it is unlikely that your wound will develop new tissue over the infected site. Once your bones are knitted and stable, the metalwork is usually removed and your wound will usually go on to heal. This can take between 6-12 weeks depending on other influencing factors.

Can I move around with the NPWT dressing on?

It is possible to run the pump on a battery and therefore you can continue to be as mobile as possible, however the pump must be connected to the mains whenever you are resting. The machine can be disconnected for hygiene needs but it should not be disconnected for any longer than a 30 minute period and no longer than a total of 2 hours in one day, otherwise you will not receive the full benefit of the treatment.

What if the pump alarms?

Do not worry if the pump alarms, this is an aid to inform nurses that a minor problem has occurred, such as a full canister or a low battery and can easily be solved. Your nurse will attend to this when the alarm sounds.

Will I have to stay in hospital all this time?

If you are considered to be medically fit for discharge, it is not necessary for all patients to remain in hospital for the duration of the treatment. Your wound and your ability to cope with the NPWT unit will be assessed for ongoing management at home. It can take some time to organise funding and arrange appropriate services to support and help manage your wound at home, but your nurse will be able to advise you of a likely discharge date.

What if I cannot cope with the therapy?

If you find the use of the therapy stressful and that it is impacting too much on your day to day activities. Please discuss your concerns with your nurse or doctor as stress can have a negative impact on wound healing. The therapy will help reduce the healing time of your wound, but your wound will also continue to heal with conventional dressings.

If you and/or your relatives/carers have any other questions, please do not hesitate to speak to the ward nurse or Tissue Viability Nurse Specialist.

Going Home from Hospital with a Negative Pressure Wound Management System

Ongoing NPWT on discharge from Trauma and Orthopaedics

Your Consultant or Tissue Viability Specialist Nurse feels your wound would benefit from ongoing management with the Negative Pressure Wound Therapy (NPWT) on discharge from hospital.
If you have been an inpatient on the Trauma and Orthopaedic wards, arrangements will be made to ensure your wound is reviewed either at home or back on the ward by the hospital Outreach Nurses. They may discontinue the therapy if the wound objectives have been reached, or they may arrange a review with your Consultant as an outpatient. They will arrange the hire of a portable pump to allow you to mobilise independently and they will apply the appropriate dressing prior to your discharge.

Ongoing NPWT on Discharge from Any other Directorate

The community TVN may visit you in hospital with the community nursing team to observe the dressing change and trouble-shoot any problems that may arise. The District Nurse teams will continue ongoing day to day management of the therapy. They will liaise with the community TVN regarding the continuation with your dressings.

The Hospital TVN team will no longer be responsible for your dressing changes or wound management after discharge.

When therapy has reached its wound management objectives or your wound can be easily managed with conventional dressings. The community TVN will make recommendations for ongoing management with conventional wound dressings and arrange collection of the hired therapy unit. Where further intervention is required (example a skin graft) you will need to be reviewed by the either your Consultant, or the Plastic Surgery Team. You will be advised of any arrangements to be made for such a review.

Home Safety Requirements

- Three pronged electrical outlet
- Avoid extension cords
- The therapy unit must remain dry, do not spill liquids on it or take into the shower room or the bath.
- Do not attempt to service or repair the unit,
- If a problem occurs contact your District Nurse
- Ensure family pets do not play or interfere with the unit or cables as some can chew through cables potentially causing an electric hazard

Patient Safety Information

- Do not change the settings on the unit unless directed by your nurse.
- If the unit alarm indicates a leakage, or you can hear air escaping try to repair leak

with drape provided by your nurse.

- Never leave a dressing in place without the unit being active. If therapy remains off for longer than 2 hours, contact your nurse or remove the dressing, and cover with protective dressing as directed by your nurse. However dressings may be left in situ but the pump should not be restarted.
- If you are on anticoagulants, you are at a higher risk of bleeding. If you see a sudden increase or large amount of blood in the tubing or canister, please follow the instructions below:
    - TURN PUMP OFF
    - PUT PRESSURE OVER THE AREA
    - DO NOT REMOVE THE DRESSING
    - CONTACT YOUR NURSE/DOCTOR STRAIGHT AWAY

Your nurse will remove your dressing and apply an alginate dressing to help stop bleeding. If bleeding persists you may need to go to hospital

Recommendations

Negative Pressure Wound Therapy is recommended to remain active for at least 22 hours per day. You should not be disconnected for longer than 2 hours per day. If you are having difficulties maintaining this time on therapy please discuss with your nurse/ doctor, as it may be safer for you to return to conventional modern wound management.

You should check frequently that your dressing is collapsed into your wound as this indicates that the wound is maintaining its vacuum.

If you have any problems that you cannot resolve yourself, please contact your District Nurse or community TVN.

Decision to Discontinue Therapy

When a decision has been made to discontinue therapy, your nurse will contact the hire company to stop hire charges and arrange collection of hired pump.

Trouble Shooting Alarm Sounds

Look on the display panel on the unit as it will indicate possible cause of alarms.
If it indicates that the canister is full or not engaged or that the tubing is kinked or blocked. Check the tubing for kinks, or blockages. Straighten tubing. Ensure canister is properly installed or replace full canister as shown by your nurse

If it indicates that a leak is detected or there is a dressing/ tubing leakage. Pat around the dressing drape or around tubing to check for leaks. Try to repair leaks by applying drape over possible leakage sites. If unable to maintain a vacuum, contact your nurse

It may indicate that the Battery is low. Recharge the battery by plugging the system into wall unit. It is recommended to use the mains when you have inactive periods

If it states therapy not activated the unit may have been accidentally turned off
Press on/off button or Press Power to turn off and then press again to turn unit on.

The alarm will usually come on 15 minutes after you have turned the therapy off. This is to remind you that you have turned it off and will need to go back on therapy as soon as possible. Press alarm delay to give yourself a little more time to finish whatever you are doing.

Discharge check list

	Tick
Risk Assessment including trip hazard	
Community team agree to discharge with NPWT	
Patient able to change cannister	
Patient understands safety information	