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VERSAJET
Hydrosurgery System

# VERSAJET Workbook

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# Introduction

VERSAJET® is an effective means of achieving precise wound debridement. Like other treatment modalities, it is the responsibility of the user in the ward, clinic or community setting to ensure competent, effective and safe practice.

This workbook has been designed for practitioners with little or no experience with VERSAJET. It can also be used to update and refresh skills and knowledge. It is not intended as a stand-alone module and should be used in conjunction with support from an appropriate trainer.

## Guide to completing the workbook

The workbook is individual for each practitioner and represents a record of personal learning. Practitioners should read the learning outcomes below and then describe what they hope to achieve and identify their learning needs. They should then work through the sections and get the most out of the exercises by completing all the timeout activities.

At the end of the workbook is an opportunity to record procedures observed or performed. It is important that practitioners take time to reflect on practice and think about any learning points from these procedures. This will help to determine what the practitioner could do to improve patient care.

In addition, utilisation of the workbook with the accompanying competencies should assist practitioners in developing their learning needs and devising action plans to develop their clinical skills. They should work with a suitably trained assessor.

## Learning Outcomes

At the end of this workbook the practitioner should be able to:

- Discuss methods of debridement
- Understand relevant underlying structures and how to identify them
- State and understand the concept of VERSAJET debridement
- Understand how to set up and operate the VERSAJET
- Identify the indications and precautions to be considered when using VERSAJET
- Identify how to trouble shoot VERSAJET
- Recognise their limitations in personal knowledge, skill and competence
- Acknowledge personal accountability
- Understand the importance of informed consent and be able to undertake it appropriately
- Document the wound assessment and VERSAJET procedures

# Contents

Section 1 – Debridement

Section 2 – VERSAJET®

Section 3 – Precautions

Section 4 – Troubleshooting

Section 5 – Patient Assessment and competencies

Section 6 – Self Awareness and Accountability

Section 7 – Patient information and informed consent

Section 8 – Procedure Record

Section 9 – References and Further Reading

# Section 1 – Debridement

## Why Debride?

Debridement is seen as essential to promote wound healing. Debridement is the 'removal of devitalised or infected tissue or foreign material from a wound' (National Institute for Clinical Excellence NICE 2001). Although research is lacking to state categorically that debridement is necessary for wound healing, a wealth of clinical experience over many years exists to indicate that in many cases healing progresses much more rapidly following debridement and it is accepted practice in good wound care (NICE 2001).

Dead or devitalised tissue is known to inhibit wound healing by inhibiting the migration of epithelial cells across the wound and therefore epithelialisation (Poston 1996). Wound assessment is difficult to undertake when slough or necrotic tissue is present as the extent of the wound cannot be determined and any undermining of the wound is not apparent. Debridement may also be necessary to prevent wound or systemic infection, as moist devitalised tissue acts as a culture medium, promoting bacterial growth and inhibiting leukocyte phagocytosis of bacteria.

Once bacteria have colonised dead or foreign materials, they may be less susceptible to host defence mechanisms and antibiotic therapy (Fowler 1995). Poston (1996) suggests that there are a number of varieties of bacteria that thrive in devitalised tissue, but colonisation rarely leads to clinical infection. They are more likely to cause exudate and odour. The exceptions to this are Staphylococcal and Streptococcal colonisation, which do usually lead to clinical infection (Burton 1994).

Devitalised tissue is tissue that has been deprived of nutrients and oxygen for a period of time (Tong 1999). It ranges from hard, dry black necrotic tissue to soft, stringy, yellow or green slough. It is important that practitioners are able to identify the type of tissue present in the wound. A useful tool is the Red, Black & Yellow colour system developed by Cuzzell in 1988. This system relates colour to tissue type. Red is related to granulation tissue, Black to necrotic tissue and Yellow to slough. Removal of slough will enhance healing, eliminate the potential for infection and reduce odour and exudate production (Tong 1999).

### Tissues

| | |
|---|---|
| Subcutaneous Tissue | This is mostly yellow fat; there are some blood vessels but generally there is poor vascularity |
| Fascia | Shiny/gleaming white. It is the 'tough' covering of muscles. Infection can spread along the plane (necrotising fasciitis) |
| Muscle | Dull red in colour, highly vascular and tears easily protects bones, joints, nerves and vessels |
| Bone | Hard, bright white. Desiccates rapidly if exposed and turns yellow. |
| Joints | No vascular flow to the joint, fluid will leak if entry into joint. |
| Cartilage | Connective tissue with poor vascularity. Covers the bone at the joint. |
| Ligaments | Type 1 – White fibrous, inelastic, Type 2 – Yellow elastic tissue |
| Tendons | Strong, gleaming white, shiny elastic fibrous tissue. They attach muscle to bone, poor vascularity |
| Blood vessels | Observe for pulsation |

***(Edwards 2000)***

### Time Out 1

List the different approaches to debriding a wound

## Surgical/Sharp

Surgical or sharp debridement is a fast method of debriding hard necrotic wounds. There are two methods of sharp debridement, the first is excision or wide resection of all dead or devitalised tissue, possibly including excision of the viable wound margin. This is usually carried out in theatre under anaesthetic by a surgeon. It is sometimes referred to as "Surgical toilet". The second is the removal of dead or foreign material just above the level of viable tissue, and is carried out without anaesthetic by a doctor or a nurse (Poston 1996). The method used can depend on the anatomical position of the wound and amount of tissue requiring debridement (Bale 1997). Debridement is one area of overlap between nursing and medicine.

## Enzymatic debridement

Enzymatic debridement involves the use of proteolytic enzymes. These enzymes are said to digest slough and necrosis whilst leaving healthy tissue intact (Bale, 1997). It works by breaking down fibrin, denatured collagen and elastin.

## Chemical debridement

This is the debridement of soft necrosis and slough by the application of certain chemicals. The most commonly used chemicals include hypochlorite solutions, hydrogen peroxide and iodine solutions.

This was a common method of debridement in the past, however, evidence supporting their use is poor and there is some evidence that these preparations damage healthy granulation tissue (Vowden 1999).

## Autolytic debridement

Autolysis is the process by which the body is facilitated to break down dead tissue using its own enzymes. In moist conditions it has been demonstrated that enzymes soften and liquefy dead tissue which then separates spontaneously from the healthy tissue (Bale, 1997).

Many modern dressing products support the body in this process and assist in the removal of waste products from this process. In order for this to occur the wound must be sealed or occluded which promotes fluid retention, which in turn re-hydrates the desiccated devitalised tissue and aids its separation from the healthy tissue (Tong, 1999).

This process obviously takes longer than sharp debridement and therefore there is a potential for toxins to continue to be produced and for infection to occur. However, Bale (1997) contends that it is a gentle, non-traumatic and easy to use method of wound debridement. It is non-invasive and can be utilised by any practising nurse. It also causes minimal pain and discomfort to the patient.

## Biological debridement

Larval therapy has become a popular method of debridement in the UK in the past four years. The larvae have the ability to internally and externally digest large amounts of necrotic tissue and are an extremely effective form of wound debridement. Vowden & Vowden (1999) suggest that debridement is rapid and selective and is a means of debriding both large and small wounds. Larvae may also have a role in preventing or controlling infection (Bale, 1997).

# Section 2 – VERSAJET◇

## Time Out 2

Write down your understanding of how VERSAJET achieves wound debridement and why this helps the wound as it progresses to healing

VERSAJET is a powered instrument for debridement of wounds. It utilises a high-speed stream of saline to create a localised vacuum which simultaneously holds, cuts and removes tissue. This allows for a highly controlled means of removing sloughy, infected or devitalised tissue debris and foreign matter from acute, chronic and traumatic wounds. It facilitates the ideal balance between effective debridement and tissue preservation.

This is a close up diagram of the tip of the device. Saline is travelling parallel across the operating window and back into the evacuation tube. This creates a vacuum via the Venturi Effect which brings tissue and contaminants up into the stream of saline. The fluid stream then ablates the tissue which the jet and vacuum carry into the evacuation tube and from there to the waste collection pot.

**The VERSAJET Hydrosurgery System consists of three main components:**

1. Hand piece - The hand piece is a sterile, disposable unit that can be used to debride and clean wounds. The hand pieces come with operating windows in two sizes, either 8mm or 14 mm in length.
2. Power Console - This creates the fluid jet that enables the hand piece to work.
3. Pedal - A pedal switch allows single-handed usage.


The innovative VERSAJET Hydrosurgery system is a specialised powered surgical tool designed to improve care for patients undergoing wound debridement. This unique system can reduce the number of procedures some patients may have to undergo (Granick 2006). This is not only better for the patient and clinician it can also reduce the cost of debridement.

It is also possible to use the 45° hand pieces outside of the theatre environment allowing the benefits of VERSAJET to be experienced outside of theatre. This allows for surgical debridement to be carried out by experienced clinicians of all levels in the ward, outpatient or community setting (Smith and Nephew Wound Management).

**Operating the System**

- The unit is activated by using the pedal
- Sterile saline flows through low-pressure tubing to the power console where it is pressurised
- Pressurised saline is forced under very high pressure through a tiny jet nozzle at the end of the hand piece as described previously
- This saline stream is directed backwards across the operating window and into the evacuation collector tube in the hand piece, which also collects any debris or contaminants created by the procedure

# Application set up

Before inserting pump cartridge, move the console knob to the open position (4 o'clock) as shown. Insert the pump cartridge fully into the user interface being sure to align the orange post on the pump cartridge with the receiving hole on the interface.

To lock the pump cartridge, user must move the console knob to the closed position. DO NOT push pump cartridge while closing the console knob

VERSAJET® pump cartridge is in locked position as verified by a click. Console knob is in the 6 o'clock position

Connect hand piece waste line to a gravity feed waste container.
Ensure at least one part is left open for ventilation. If using a vacuum container do not connect to vacuum. If using a container with a filtered port, ensure you do not connect the tube to this port.

Insert footswitch plug by aligning red dot on plug with red dot on console. Turn console on using power switch. If door and/or pedal light are illuminated, refer to product manual

Spike saline bag and release white clip. To prime the system, increase the power to setting 10, depress foot pedal and listen for the change in sound as the saline reaches the tip. Once system is primed, lift foot from pedal and turn console back down to power level 1.

**The system is now ready to use**

## Technique

- Position hand piece over area to be debrided (hold like a pen)
- Ensure that the hand piece is in contact with the tissue and move rapidly across the tissue
- Start on a low setting and increase as appropriate
- Raise tip of hand piece before taking foot off pedal to prevent dripping

Additional design attributes allow the user to finely control excision. Orienting the operating window parallel to the tissue optimises the VERSAJET© performance for tissue excision. Alternatively, orienting the operating window obliquely (at an angle) to the tissue optimises the VERSAJET's performance for fluid removal.
Care should always be taken when using near sensitive tissues at all settings

## Power Settings

The system is highly controllable and has 10 power settings. In addition pressure can be modified by adjusting the hand piece direction and pressure.

- At the lowest power levels (1-3), VERSAJET will function mainly as a vacuum and removes little tissue with each pass. At this level the main action is suction, irrigation and scrubbing
- As the power is increased, tissue ablation increases, as does the ability to remove harder, tougher tissue types
- At the highest power levels (7- 10), the VERSAJET system will remove nonviable tissue very rapidly and cut all but the hardest tissues including bone

## Disconnecting and cleaning the equipment

**Equipment:**

- Hard surface medical wipe (as per Trust Guidelines)
- Disposable gloves

**Procedure:**

- Disconnect console from mains and remove power cord and foot pedal cable
- Put on disposable gloves
- Dispose of hand piece as per Trust Guidelines
- Extract a hard surface medical wipe from container
- Wipe over all surfaces with the wipe ensuring all surfaces have been wetted
- Dispose of the wipe and gloves via the hospital clinical waste system
- The foot pedal and cables should also be cleaned in a similar manner

## Equipment required to use VERSAJET

- VERSAJET Console
- VERSAJET Hand piece
- Saline (both Intravenous saline and Saline for Irrigation are suitable)
- Waste canister for collection of fluid (Suction pots are useful for this)
- Protective equipment as per Trust procedure

The unique properties of VERSAJET enable clinicians to debride traumatic wounds, chronic wounds, or other soft tissue lesions or remove contaminants from a wound quickly and efficiently.

- Effective in debriding damaged and necrotic tissue in traumatic wounds, chronic wounds, surgical incisions and burns
- Cleaning debris and foreign matter from acute and traumatic wounds

## Use on infected wounds

VERSAJET can be used on infected wounds and clinical evidence shows that VERSAJET can dramatically reduce the bacterial burden on the wound (Mosti 2005)

## Benefits

- Clean wounds promote more rapid wound healing
- VERSAJET can be used by all suitably experienced clinicians to debride wounds
- The ability to debride outside of theatre means significant saving in materials and personnel costs
- Being able to carry out procedures in the ward or outpatient setting has significant benefits for patients
- Ability to precisely target damaged tissue and avoid viable tissue
- Enables rapid debridement, likely resulting in shorter procedure times
- Single step technique combining debridement, cleansing and aspiration

# Section 3 – Precautions

### Time Out 3

Given that VERSAJET® is able to debride a wound to achieve punctate (pin-prick) bleeding, list any indications or situations where caution should be taken during use.

## Precautions

Care should be taken around vessels, organs and other anatomical structures that do not need debriding

Care should be taken if using VERSAJET on patients who are on anticoagulant therapy or have clotting disorders

### Time Out 4

Some patients may have a lower pain threshold and it may be appropriate to consider anaesthesia of some kind when treating their wound. List the possible approaches to pain management in this situation.

It is important to prepare the patient carefully before any debridement procedure as explanations are more likely to result in a relaxed patient, which makes sharp procedures much acceptable. Some practitioners don't use any analgesia until they are through the necrotic or sloughy tissue as there is little or no pain until viable tissue is reached. Also, by dropping the power setting when the wound is almost debrided and angling the hand piece, the wound can often be debrided to viable tissue with minimal discomfort. If any pain is experienced the procedure should be stopped immediately and analgesia reviewed before re-commencement, if appropriate. A number of options are available.

# Section 4 – Troubleshooting

| Symptom | Cause | Remedy |
|---|---|---|
| Excessive spray | Obstruction of evacuation tube (grit, stick, wire, or other foreign material) | Remove hand piece from surgical field, take foot off foot pedal and remove obstruction from instrument tip |
| | Waste evacuation tube is not draining properly | Raise waste evacuation tube so collector end of waste tubing is at lowest point of entire tube |
| | Waste evacuation tube is:<br>Obstructed<br>Kinked<br>Pinched | Remove obstruction<br><br>Straighten tube<br>Remove object causing pinch |
| | Waste evacuation tube is incorrectly connected to waste container | Connect waste evacuation tube to “PATIENT” port on waste container |
| | Waste container is sealed | Open large drain port on waste container |
| | Misaligned jet (striking edge of tube or shooting outside instrument) | Stop! Do not use<br>Replace hand piece |
| Console is running, no fluidjet is visible in hand piece | No fluid supply | Attach saline bag or replace saline bag if empty |
| | Air in supply tube | Pump fluid on high setting until system is purged of all air in supply tube |
| Console does not run, power indicator light is off | Power cord not attached | Ensure power cord is attached to back of console and wall outlet |
| | Power switch in off position | Turn on |
| Console does not run, power indicator light is on, **Pedal** light is on | Foot pedal is not attached | Attach footswitch securely |
| | Footswitch is damaged | Replace footswitch |

# Section 5 – Patient Assessment and Competencies

Delivering the Modernisation Agenda within the Health Service requires clinical staff to deliver care based on patient need. Rethinking the patient journey gives nurses the opportunity to break down professional boundaries and speed the delivery of care to patients. However, a number of areas of law should be considered when making decisions to undertake new roles

## The Law

Obligations and liabilities arise from three key areas and underpin how any new role is developed and managed:

- Professional Regulation of the appropriate regulatory body, e.g., The Nursing and Midwifery Council. The professional who is undertaking the new role must be fully conversant with the requirements of registration and work within these confines. In summary, in taking on new work, nurses (for example) must acknowledge any limits in their competence and decline duties unless able to perform them in a safe and skilled manner. New service protocols must acknowledge this principle, and therefore ensure practitioners can practice in a safe manner.
- The law on civil wrongs to patients. The areas of concern are those relating to negligence and battery. Although civil action would normally be directed against the NHS employer rather than the individual professional, and the Trust would normally be responsible for paying any damages, a finding of negligence against a nurse or other professional is harmful professionally and personally.
  The nurse or other professional undertaking the activity could be held, for the purposes of negligence, to the standard of the performance of a doctor for that task.
- Employment law covering the relationship between employers and employees. While employees must be prepared to adapt to new practices, an employer should provide the means for this, including the necessary training, professional and managerial support.

Significantly the Scope of Professional Practice document (UKCC 1992) appeared at the same time that the hours of junior doctors were reduced by the 'New Deal'. The scope made it possible to take on tasks and competencies that were generally thought to be 'medical'. More recently, the NMC has supported government led initiatives, within the modernisation of the NHS that have placed nurses at the centre of care delivery. This has led to nurses undertaking many roles that traditionally have been seen as outside their remit. Therefore in order to undertake these roles there needs to be evidence of appropriate training and assessment.

The Tissue Viability Nurses Association (TVNA) suggest that ideally nurses wishing to undertake any form of debridement should take into consideration the following:

- Recommendations outlined within the UKCC, Midwifery and Health Visiting document 'The Scope of Professional Practice' (1992) and the NMC, Code of Professional Conduct: Standards for Conduct Performance and Ethics (2004).
- Accepting responsibility only if he/she is confident that the appropriate level of knowledge and understanding of the procedure has been achieved (UKCC 1992, NMC 2004)
- Being anatomically aware of the underlying structures within the area to be debrided
- Having the ability to stop if they become uncomfortable, uneasy or uncertain at any time during the procedure
- Awareness of local policies and guidelines relating to wound management (e.g. infection control, wound care)
- Having approval from their employers to perform the task
- Undertake the task as part of a treatment plan agreed with the multidisciplinary team managing the patients care

### Time Out 5

What do you expect you will need to know about the patient and the wound before considering the use of VERSAJET®?

In addition to considering the use of VERSAJET® to benefit the patient and the wound, the practitioner must first undertake a holistic assessment of the patient and consider the following points:

- Is the therapy appropriate for the wound and also for the patient? The practitioner should consider the general wellbeing, product indications and precautions, concomitant therapies/medication and the psychological state of the patient
- What type of wound is to be treated, where is the wound located and what type of tissue is present? These assessments will affect the power setting chosen, the decision on whether to use anaesthesia and the appropriate hand piece to select.
- Does the practitioner fully understand the capabilities of the VERSAJET Hydrosurgery System and its abilities to achieve the desired outcome?
- Does the practitioner have an understanding of sharp debridement and the underlying structures in the skin? Does the practitioner feel competent to use a sharp instrument and the power settings to carefully debride tissue in this area?
- Is the practitioner able to fully communicate with the patient, their family and with the multi-disciplinary team about their decision to use the VERSAJET system?

# Section 6 – Self awareness and accountability

UKCC's Code of Professional Conduct, [1992] states that practitioners are personally accountable for their practice and the Scope of Professional Practice document [UKCC 1992] reiterates that they must recognise and honour personal accountability borne for aspects of professional practice. According to the UKCC, professional accountability rests on the two interrelated concepts of ability and competence. Ability is understanding the relevant knowledge, skills and values to make decisions and act upon them. Competence is described as the ability to perform a task with appropriate knowledge and skill.

There is now clear support for the individual practitioner to make decisions to widen her role within the context of the changing environment. The UKCC states that practice "must be sensitive, relevant and responsive to the needs of individual patients or clients and have the capacity to adjust, where and when appropriate, to changing circumstances". This approach has been endorsed by the Department of Health who state that "each practitioner is personally accountable for his/her own practice and for maintenance and development of her knowledge and competence".

As accountable practitioners, nurses retain responsibility for all actions and omissions.

### Time Out 6

Why do you think accountability is important when considering the use of an advanced therapy?

In addition, record keeping is of paramount importance when taking on an expanded skill. Documentation must consist of patient consent, tissues debrided and appearance of wound pre and post debridement. In addition the handset used, power setting and label from the handset should all be documented in the patient's case notes.

# Section 7 – Patient information and informed consent

Nurses in the UK have a professional responsibility to ensure that patients in their care are given information about their conditions and understand the risks and implications of any interventions given (NMC 2004). They also have a responsibility to gain the consent of patients for whom they have a duty of care, before they carry out any procedure or intervention.

It is vital that the patient understands what he or she has consented to, and it is an important role of the nurse to check and ensure that this happens. (Cable 2003). Effective communication is vital in gaining consent. The nurse needs to be able to provide information in a form that is appropriate to each individual.

Patients have a right to know exactly what it is they are consenting to, and information should enable and empower them to make a decision about a proposed intervention. This requires that the nurse gives a balanced perspective on whatever the patient is asked to consent to.

## Time Out 7

What information should you provide to the patient and their family to help them to make an informed decision about the use of VERSAJET® for wound debridement

As has been demonstrated, there are many methods of debriding wounds and it is important that patients are involved in the decision so that they are able to give
informed consent. To make effective clinical decisions and ensure patients are fully informed it is essential that nurses are aware of the different methods of debriding wounds. The nurse should also be aware of the professional requirements for competence and the risks and benefits of each method.

**In order to make an informed decision, the patient should know:**

- What equipment is proposed for use
- How the equipment works
- What the objective of the treatment is
- The likely impact on the progression to wound healing
- The likely outcome if the treatment is not given
- What alternatives are available
- Any possible side effects (including pain) and how these will be managed
- Any possible impact of the therapy on the patient's quality of life, length of stay etc.
- How long the procedure is likely to take

Some patients may be particularly interested in the mode of action of the treatment and how their wound is progressing. Patients should be encouraged to be as involved as possible in their treatment and the journey to wound healing.

Nurses are accountable for their actions. Nurses should always therefore ensure that they are competent to obtain consent. This entails ensuring that they have the appropriate skills to undertake an assessment of the person's capacity to give consent and the communications skills to ensure that the person is informed.

# Section 8 – Procedure record

This section is for you to keep a record of VERSAJET® uses in the clinical setting and to note any learning points or necessary actions.

| Date | Wound type | Clinical setting | Power setting | Observed/ performed | Learning points | Supervisor |
|---|---|---|---|---|---|---|
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |

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# Notes

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