Assessment and management of surgical wounds in clinical practice


Summary
Successful nursing care of surgical wounds is dependent on the nurse’s knowledge and understanding of normal wound healing physiology, the type of surgery performed, the method of closure and the optimal treatment of the resultant wound. Using this knowledge, nurses can provide a systematic and holistic patient assessment, and consider any potential wound-related complications.

Author
Julie Caroline Vuolo is lecturer, tissue viability, University of Hertfordshire, Hatfield, Hertfordshire. Email: j.c.vuolo@herts.ac.uk

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Aim and intended learning outcomes
The aim of this article is to present the principles of surgical wound assessment and management and to consider their application in clinical practice.
After reading this article you should be able to:
- Define the term ‘surgical wound’.
- State at least three different materials used for surgical wound closure.
- Understand the link between a systematic approach to wound assessment and the development of an effective care plan.
- Describe potential complications of surgical wounds and the implications for the patient.

Introduction
Modern surgical procedures result in a range of wounds, from the substantial vertical incision created during a laparotomy to the small entry wound made by keyhole surgery. Regardless of size, effective healing of surgical wounds is integral to the success of surgery. Optimal patient recovery is reliant on the delivery of timely and clinically effective care from all healthcare professionals involved.

Classification of surgical wounds
Wounds that are closed surgically heal by primary intention. Surgical closure facilitates healing by joining the wound edges and minimising the need for new tissue formation. Surgical closure also serves functional and aesthetic purposes, for example, the elimination of dead space by approximating the subcutaneous tissues; careful epidermal alignment resulting in minimisation of scar formation; and avoidance of a depressed scar by precise eversion of skin edges (Doud Galli and Constantinides 2004).

Wounds that are left open to heal do so by secondary intention. This relies on granulation tissue arising from the base of the wound to fill the tissue deficit created by the surgery. Although wound healing takes longer this way, it may be necessary for a number of reasons, including the presence of infection (Taylor and Bayat 2003a). Infected wounds, for example, are unlikely to heal if sutured because the high bacterial burden in the wound prevents healthy granulation tissue developing. Infected wounds that are closed by primary intention therefore tend to break down again quickly. Some wounds may be closed by delayed primary closure, where non-viable tissue
is removed and the wound is initially left open for four to six days, after which it is surgically closed. This technique is used when wound edges cannot be fully opposed (Taylor and Bayat 2003a) or after traumatic injury or bowel surgery (Gottrup et al 2005).

Surgical wounds can be classified as follows: clean, clean-contaminated, contaminated or dirty (Box 1). Classification of a wound gives an indication of whether the wound will heal by primary or secondary intention, for example, clean incisional wounds have edges that can be brought together neatly and are suitable for surgical closure; however, dirty or infected wounds are not. Wounds may also be described as infected, dehisced (Figures 1, 2 and 3) or ruptured.

**Wound closure**

**Suture** Suturing is the oldest wound closure technique, although products have changed considerably since the use of materials such as flax and hemp more than 3,000 years ago (Taylor and Bayat 2003b). Modern sutures (Figure 4) are most easily categorised as non-absorbable or absorbable. Non-absorbable sutures stay in place until they are removed, that is, they are not absorbed into the body. Nylon polypropylene (for example, Prolene™), nylon (for example, Ethilon™ and Dermilon™), braided polyester (for example, Ethibond™ and Dacron™), polybutester (for example, Novafil™) and silk (rarely used now) are examples of non-absorbable sutures (surgical-tutor.org.uk 2006). They are most likely to be used for superficial skin closure where temporary and minimal support are required.

Non-absorbable sutures should be removed carefully to minimise pain and tissue trauma. Different suturing techniques require different removal techniques, with the emphasis on minimising the amount of external suture material being pulled through the skin layers (Morison 1992).

Absorbable sutures are left in place to be fully absorbed by the body between 90 and 210 days post-closure, although they lose much of their tensile strength before the final stages of absorption (Taylor and Bayat 2003b). They are usually used for dermal or buried skin closure. Examples of absorbable sutures include polyglycolic acid (for example, Dexon™), polyglycolate (for example, Maxon™) and polyglactic acid (for example, Vicryl™), which are all made from synthetic materials (surgical-tutor.org.uk 2006).

**Box 1**

**Surgical wound classifications**

Clean Elective, not emergency, non-traumatic, primarily closed; no acute inflammation; no break in technique; respiratory, gastrointestinal, biliary and genitourinary tracts not entered.

Clean-contaminated Urgent or emergency case that is otherwise clean; elective opening of respiratory, gastrointestinal, biliary or genitourinary tract with minimal spillage – for example, appendicectomy – not encountering infected urine or bile; minor technique break.

Contaminated Non-purulent inflammation; gross spillage from gastrointestinal tract; entry into biliary or genitourinary tract in the presence of infected bile or urine; major break in technique; penetrating trauma less than four hours old; chronic open wounds to be grafted or covered.

Dirty Purulent inflammation; for example, an abscess; pre-operative perforation of respiratory, gastrointestinal, biliary or genitourinary tract; penetrating trauma more than four hours old.

(Time out 1)

List the different methods of wound closure and identify the possible advantages and disadvantages of each. Would the advantages and disadvantages be the same from the patient’s perspective as from the nursing and surgical teams’ perspective?

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**FIGURE 1**

Partially dehisced inguinal hernia wound

**FIGURE 2**

Dehisced laparotomy wound with necrosed stoma to the right
Sutures should be skillfully placed to avoid complications of overcrowding or undue tightness. Poor suture technique can result in unsightly scarring, tissue oedema and tissue ischaemia. Sutures left in place too long can result in pinpoint scarring (Bryant 1992). A poorly sited incision line can also result in a high visibility scar line which could cause further distress for the patient.

**Staples** Stapling is a common alternative to suturing, where wound edges are held together by metal staples (Figure 5). Stapling requires minimal skin penetration and, therefore, possibly fewer micro-organisms are carried into the lower skin layers thereby decreasing the risk of secondary infection. Advantages to the patient are reduced infection rates and faster recovery times (Benbow 2005).

**Tissue adhesives** While sutures and staples provide a secure and lasting means of closure, there are times when an alternative approach is necessary. This may arise in certain clinical situations, for example, sutures or staples are difficult to place in some scalp and facial injuries. Also difficulties with suture or staple removal may be anticipated in children or in patients with mental health problems. Tissue adhesives, such as cyanoacrylate, can be a useful alternative in these cases. Tissue adhesives, sometimes known as tissue glue, can be used alone to close superficial wounds, or in conjunction with subcutaneous sutures to close dermal wounds where deeper wound stability is necessary. They may also minimise some of the problems associated with sutures, such as premature absorption or reactivity. Tissue adhesives can also improve cosmetic outcome.

**Adhesive strips** The use of adhesive paper strips, such as Steri-strips™, can help to reduce suture-related complications although they are only suitable for relatively superficial wounds where superficial tension is required. They are placed across the wound to hold the wound edges together in apposition. They do not compromise tissue viability in the way that sutures and staples can because they only adhere to the skin surface. Short, wide strips are used as they produce fewer shearing forces (Figure 6) (Dunkin et al 2003).

Adhesive paper strips can be used in conjunction with deep sutures to give greater overall closure strength. Removal is usually easy and mostly painless; however, the skin should be kept dry while in use or the adhesive strips will lift.

**Wound healing**

Surgical wounds, like all wounds, must progress through the vascular, inflammatory, proliferation (granulation) and maturation stages of healing before healing is complete. Nurses should have a thorough understanding of how surgical wounds heal to improve their wound assessment and decision-making skills in relation to wound management (Moore and Foster 1998).

Wounds healing by primary intention and without complication will do so more quickly than those healing by secondary intention. However, the apparent simplicity of a closed surgical incision obscures the complex nature of the wounded tissue beneath. For example, to remove the appendix means breaching the skin, superficial fascia, fat, external oblique aponeurosis, internal oblique muscle, transversus abdominis, parietal perineum and
Visceral perineum (Burkitt and Quick 2006). Each of these layers must be repaired in reverse until finally the surface layers are pulled together and closed. Because there is relatively little tissue loss during incision, and because the wound has been surgically closed, the surface edges of an incisional wound are thought to seal together in 24-48 hours (Benbow 2005). However, the depth of injury and the involvement of deep muscle layers result in a prolonged period of healing under the skin surface. This final stage of healing, known as the maturation phase, is when re-modelling and strengthening of the repaired skin tissue occur, and can last for up to one year (Moore and Foster 1998). Numerous factors can delay the healing process (Burton 2006):

- Infection.
- Haematoma, foreign body or necrosis.
- Low albumin level.
- Poor vascular supply, anaemia.
- Poor nutritional intake.
- Chronic medical conditions, for example, diabetes.
- Mechanical stress on the wound.

It is important to consider the lengthy nature of the healing process when talking to patients about life after surgery. Discharge advice should include information on nutrition, exercise, moving and handling, rest, returning to work, management of pain and what to do if complications occur.

**Wound assessment**

As most surgical wounds are clean and are made on healthy tissue, healing is not usually compromised in the same way as in chronic wounds, where underlying pathologies and a high bacterial burden can adversely affect the healing process (Watret and White 2001). Nevertheless, there are many factors that have the potential to delay the healing process. These factors should be identified as early as possible (pre-operatively) to optimise post-operative wound care (NICE 2001). Post-operatively, accurate assessment and continuity of care between multidisciplinary team members are enhanced by a sound understanding of wound healing physiology. A structured wound assessment tool also helps to identify key assessment criteria, such as wound classification, type of surgery, position of the wound and method of closure (Box 2).

When assessing open surgical wounds it is necessary to consider criteria such as wound bed appearance and level and type of exudate. A photograph taken with the patient’s consent will illustrate the wound status at the time of assessment. When taking photographs, careful consideration should be given to:

**BOX 2**

**Wound assessment criteria**

<table>
<thead>
<tr>
<th>Patient identification details</th>
<th>Type of surgery (for example, left hemi-arthroplasty)</th>
<th>Date of surgery</th>
</tr>
</thead>
<tbody>
<tr>
<td>Location of wound</td>
<td>Type of wound (for example, open, closed, drain site)</td>
<td>Size of wound (length or surface area)</td>
</tr>
<tr>
<td>Undermining present</td>
<td>Due date for removal</td>
<td>Undermining present</td>
</tr>
<tr>
<td>Discharge/exudate (for example, haemoserous)</td>
<td>Amount of discharge</td>
<td>Condition of surrounding skin</td>
</tr>
<tr>
<td>Presence of infection</td>
<td>Fluid or nutritional deficit</td>
<td>Pain</td>
</tr>
<tr>
<td>Odour</td>
<td>Wound bed, for example, approximate percentage of slough, granulation, epithelial or necrotic tissue</td>
<td>Wound-related anxieties or concerns (for example, altered body image)</td>
</tr>
</tbody>
</table>
| Photograph or diagram of wound | Factors that are delaying healing, for example, lack of sleep, pain, anxiety, malnutrition, medication | }

**Time out 2**

Write down everything you know about the wound healing process starting from the point of skin injury (vascular stage) and ending with the final stages of healing (maturation stage). Identify and fill any gaps in your knowledge.
learning zone — wound care focus

- What the photograph will be used for.
- How permission for this use will be sought from the patient.
- Where and how the photograph will be stored.
- How tampering of digital images will be prevented.
- How the identity of the patient in the photograph will be protected.

Photographs, when used properly, can give a quick and reasonably accurate picture of wound status. A poor quality picture can be misleading, for example, if the colouring is inaccurate or the full extent of the wound is not seen. When taking a series of photographs, inconsistencies in patient position, camera angle and distance from patient can further restrict their value in the assessment process (Thomas and Wysocki 1990). Care should be taken when considering photography of ‘private body areas’, such as breast or genitalia, because some patients may find this invasive or embarrassing (Collier 2000); a medical photographer can give valuable advice in these situations. The patient’s choice, privacy and dignity should be respected at all times when taking photographs.

With or without photographs, a well-labelled diagram with various tissue types identified alongside the estimated wound dimensions can also be useful in the assessment process. Many clinical areas develop their own wound assessment tools to suit their needs. It is important to ensure continuity in the assessment process between clinical areas and between different healthcare providers. Standardised documentation may have some advantage.

**Time out 3**

Compare the criteria on your wound assessment documentation to the list of assessment criteria given in Box 2. Make a list of which criteria you think are essential, which are desirable and which are non-essential. Ask a group of colleagues to do the same and then compare and discuss your answers. Did you all agree?

**Wound complications**

**Wound dehiscence** Deposition of collagen in the wound begins in the early stage of the inflammatory phase of healing, and continues into the proliferative phase and beyond. The accumulation of new tissue beneath the incision line is known as the healing ridge (Hunt 1979) and is an important indicator of healing. Absence of the healing ridge at this stage can forewarn of dehiscence, that is, wound rupture. Dehiscence is characterised by the falling open of the wound, something that happens when the two opposing sides of the wound fail to ‘knit’ together properly. This tends to happen between five and eight days post-operatively (Hunt 1979). Dehiscence is more likely to occur if wound infection is present (Doughty 2003).

Successful wound healing requires oxygen (Silverstein 1992) and nutrients (Landsdown 2004). The levels of oxygen and nutrients delivered to the wound bed are dependent on good tissue perfusion, the level of oedema present, nutritional intake and normal oxygenation. Failure in any of these areas will affect the healing process and may contribute to delayed wound healing (Moore and Foster 1998) and an increased potential for dehiscence.

Nutritional depletion has an inhibitory effect on wound healing (Mandal 2006). Protein deficiency, for example, can lead to lowered wound tensile strength and an increased risk of dehiscence (Lindblad 1998). Patients with malnourishment are also at increased risk of wound infection, as the available sources of energy essential for cellular repair and effective immunity are depleted (Myers 2004).

Other factors known to compromise healing and leave the wound vulnerable to dehiscence include long-term glucocorticoid or corticosteroid use (Benbow 1995, Anstead 1998) and diabetes mellitus (Dealey 2005), because of their effect on skin condition and the healing process. Benbow (2005) suggests that the inflammatory response is weaker in the presence of diabetes, resulting in an impaired immune response and increased risk of infection. Collagen synthesis and deposition are also reduced, affecting wound closure and strength.

Mechanical stress is also a risk factor and may be caused by putting undue strain on the wound site by lifting heavy loads, coughing or as a result of obesity. Preventive measures can be initiated at pre, peri and post-operative stages. For post-operative wound healing, it is thought that the effect of recent food intake is more beneficial than food intake in the weeks or months before surgery. Prompt provision of appropriate nutritional support post-operatively can help to reverse the damage caused by a previously poor nutritional status (Myers 2004). With as many as 60 per cent of hospital inpatients at risk of malnutrition...
Surgical site infection (SSI) (Lindblad 1998). The skin is vulnerable to damage from mechanical stressors after surgery. If the skin only ever regains up to 80% of its original tensile strength, leaving it unable to heal fully, the skin only ever regains up to 80% of its original tensile strength, leaving it unable to heal fully. Other measures to prevent dehiscence include the maintenance of blood flow through adequate fluid replacement and the provision of effective pain relief; both are necessary during and after surgery to prevent local vasoconstriction and ensure optimal tissue perfusion.

Patients should be asked to stop smoking preoperatively, if clinically possible, to promote haemostasis and tissue oxygenation (Doughty 2005). However, the clinical evidence for this is unclear and the consequences of taking such actions should be carefully considered by the clinicians involved.

Measures such as the use of support garments and the employment of safe moving and handling techniques will minimise the mechanical stress on the healing tissues, further reducing the risk of wound breakdown. Even when the wound has fully healed, the skin only ever regains up to 80% of its original tensile strength, leaving it vulnerable to damage from mechanical stressors. Therefore, it is important to assess patients for the risk of wound breakdown.

Surgical site infection (SSI) is infection related to a surgical procedure that affects the wound or deeper tissues handled during the procedure (Department of Health 2005). As one of the four major groups of healthcare-associated infections (HCAIs), SSI is known to be a significant problem for patients with a reported incidence of at least 10% per cent (Reilly 2002). The potential impact of SSI on patients includes increased pain, frequent dressing changes, restricted movement and prolonged hospital care. The greatest impact on care organisations is financial, with a suggested increase in hospital costs of more than £2,000 per patient with a surgical wound infection in 1999 (Plowman et al 1999). It would be reasonable to assume these costs will have risen in recent years alongside the increasing problem of antimicrobial resistance and the increased use of expensive antimicrobial dressings, such as those which incorporate silver.

Early recognition of the signs of infection is important for successful SSI management. Cooper (2005) states that the acquisition of microbial species by wounds can lead to three outcomes: contamination, colonisation and infection. Contamination All wounds may acquire micro-organisms. If suitable nutritive and physical conditions are not available for each microbial species, or they are not able to successfully evade host defences, they will not multiply or persist. The presence of micro-organisms is transient and wound healing is not delayed. Colonisation Microbial species grow and divide but do not cause damage to the host or initiate wound infection. Infection Microbial growth, multiplication and invasion into host tissue lead to cellular injury and overt host immunological reactions. Wound healing is interrupted. Local factors can increase the risk of infection.

One further outcome, critical colonisation, has been suggested as the point of transition from colonisation to overt infection (Kingsley 2001). Cooper (2005) suggests this outcome has yet to be definitively defined. However, if the point of transition to overt infection can be accurately identified, the use of a topical antimicrobial could prevent the development of wound infection. This in turn could prevent a delay in healing, additional patient discomfort and/or prolonged hospital stay.

In the early 1990s the use of traditional indicators of infection, such as abscess, cellulitis, discharge (serous exudate with inflammation, seropurulent, haemopurulent and pus) and elevated temperature were seen to pose some limitations in clinical practice, particularly in the response of chronic wounds to infection (Cutting and Harding 1994). This prompted the development of additional criteria to use alongside the traditional criteria, which are friable tissue, pocketing at the base of the wound, abnormal smell and wound breakdown (Cutting and Harding 1994). These criteria have been validated in several studies (Cutting 1998, Gardner et al 2001), and have enhanced the infection assessment process in clinical practice. Recently it has been recognised that different wound types exhibit their own sets of criteria to indicate infection (Cutting et al 2005). This finding prompted a study which used expert opinion to generate a consensus (known as the Delphi approach) on further categories of indicators directly related to six different wound types (Cutting et al 2005). Indicators for acute primary and acute secondary wounds, with clarification of definitions, can be used in assessment to aid identification of surgical wound infection (Box 3).
Hand hygiene.

Use of face masks, gloves, aprons and scrubs.

Use of pre-operative and intraoperative skin antiseptics.

Peri-operative warming and oxygenation.

Closure methods.

Length of surgery.

Wound cleansing and dressing materials.

Environmental cleanliness.

Length of pre-operative stay.

Awareness of how each of these factors can influence SSI risk is important when determining how best to minimise risk. Effective hand washing, for example, may be one of the most important factors in reducing HCAIs (Bandolier 2006). It is the responsibility of all healthcare staff to use an effective and timely hand-washing technique.

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Wound swabs taken for microbiological examination can also help in the identification of the infective organism. However, with the exception of *Staphylococcus aureus*, superficial flora are not necessarily representative of the flora deep inside a wound, therefore cultures should be interpreted with care (Health Protection Agency (HPA) 2005). Samples of pus are preferred to swabs. If swabs are used, sample the deepest part of the wound not devitalised tissue. If pus is present, soak the swab in it to provide the optimal specimen for the laboratory staff to culture (HPA 2005). Ensure the swabs used have a transport medium or charcoal base.

**Preventing surgical site infection**

Intrinsic and extrinsic factors are associated with the development of SSI. Intrinsic factors include the presence of foreign bodies in the wound, the presence of necrotic tissue and the use of vasoconstricting drugs (Gilchrist 1999). Extrinsic factors include many aspects of care relating to the patient’s surgical ‘journey’ and are determined by a number of conditions (Reilly 2002):

- Pre-operative showering and hair removal (should be as close to operation time as possible).
- Pre-operative nutritional status.

**Infection criteria for acute primary and secondary wounds**

<table>
<thead>
<tr>
<th>Primary wounds</th>
<th>Secondary wounds</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cellulitis</td>
<td>Cellulitis</td>
</tr>
<tr>
<td>Pus/abscess</td>
<td>Pus/abscess</td>
</tr>
<tr>
<td>Delayed healing</td>
<td>Delayed healing</td>
</tr>
<tr>
<td>Erythema with or without induration</td>
<td>Erythema with or without induration</td>
</tr>
<tr>
<td>Haemopurulent exudate</td>
<td>Haemopurulent exudate</td>
</tr>
<tr>
<td>Malodour</td>
<td>Increase in exudate volume</td>
</tr>
<tr>
<td>Seropurulent exudate</td>
<td>Malodour</td>
</tr>
<tr>
<td>Wound breakdown or enlargement</td>
<td>Pocketing</td>
</tr>
<tr>
<td>Increase in local skin temperature</td>
<td>Seropurulent exudate</td>
</tr>
<tr>
<td>Oedema</td>
<td>Wound breakdown or enlargement</td>
</tr>
<tr>
<td>Serous exudate with erythema</td>
<td>Discolouration</td>
</tr>
<tr>
<td>Swelling with increase in exudate</td>
<td>Friable granulation tissue that bleeds easily</td>
</tr>
<tr>
<td>volume</td>
<td>Increase in local skin temperature</td>
</tr>
<tr>
<td>Unexpected pain or tenderness</td>
<td>Oedema</td>
</tr>
<tr>
<td></td>
<td>Unexpected pain or tenderness</td>
</tr>
</tbody>
</table>

(Cutting et al 2005)

**Wound care**

**Wound cleansing**

Closed surgical wounds may require cleansing to remove blood or exudate from the surrounding skin or to remove dressing residue: both are potential sources of infection. Open wounds may require cleansing to remove wound debris, excess exudate or dressing remnants from the wound bed, although care should be taken as cleansing has been identified as a key contributory factor in procedure-related wound pain (Moffatt et al 2002). Mechanical cleansing of the wound bed, by wiping with gauze, should be avoided as bleeding caused by over-zealous mechanical cleansing can elicit a new inflammatory response and delay healing (Gunnewicht and Dunford 2004).

To minimise pain and tissue trauma, cleansing around the wound can be done by gently using saline-moistened sterile gauze swabs. Gentle cleansing of the wound bed can be achieved by using a saline-filled syringe and irrigation. Optimal pressure for wound irrigation has been suggested as 4-15 pounds per square inch (Morison et al 2004). However, achieving safe, effective irrigation is difficult given that syringe size, volume of saline, distance from...
patient and the pressure applied all affect the pressure received.

The use of needles when irrigating should be avoided to minimise the risk of needlestick injury to healthcare professionals and patients. When wound cleansing, whether by mechanical or irrigation means, the priority should be to cleanse the wound effectively while minimising pain and wound-bed trauma. If the wound is clean with minimal exudate, cleansing should be avoided altogether as it serves no purpose and may cause unnecessary pain.

Wounds may be cleansed with water (run from a mains drinking supply) or sterile 0.9% sodium chloride (normal saline), according to the needs of the individual patient. Factors such as the age, type of surgery, wound classification, patient’s immune status, size and position of the wound, presence of infection or debris and the quality of the water supply should be taken into account.

There is no evidence to suggest that infection rates are increased by using water from a fresh drinking water supply. The practice of allowing surgical patients to shower post-operatively with tap water is not. The addition of water to skin cells can result in cell rupture (Lawrence 1997) and wound pain (Glide 1992). Again, it may be prudent to use normal saline for cleansing open surgical wounds unless excessive wound size and the presence of gross contamination mean that practical considerations outweigh all others.

As well as the type of fluid, the effect of cleansing on the exposed wound tissue should also be considered. Normal saline is physiologically compatible with living cells but water is not. The addition of water to skin cells can result in cell rupture (Lawrence 1997) and wound pain (Glide 1992). Again, it may be prudent to use normal saline for cleansing open surgical wounds to minimise the possibility of tissue trauma and pain.

**Wound dressings for closed wounds**

Surgical wound dressings should be sterile, easy to apply, painless and should not cause pain on removal. For an open wound, additional requirements are lifting excess wound fluid from the wound bed and surrounding tissues while maintaining the warm, moist wound interface necessary for optimal healing (Winter 1962). In wounds where there is slough or necrotic tissue, the dressing should also be capable of debridement (NICE 2001). Although there is no single dressing or dressing type which is best for all wounds, modern wound dressings are generally formulated using the above principles. It is important to note that no dressing can counteract the effects of factors which delay healing or compensate for uncorrected co-morbidities, such as impaired vascular supply and diabetes.

Dressings applied to closed wounds in theatre are usually simple, low-adherent island dressings with a semi-permeable film backing (for example, Tegaderm™ or OpSite™ Post-Op). The absorbent pad at the centre, or island, of the dressing absorbs a small amount of wound fluid, the adhesive outer edge keeps the dressing securely in place and the film backing reduces the risk of cross-infection.

Wound leakage of serous or haemoserous fluid is usually minimal and stops 24-48 hours post-operatively when the dressing can then be removed. Dressings can remain off until suture or staple removal, although some patients with sures feel them catching on their clothes and may prefer to have them covered by a dressing. Other patients may prefer not to see their wound at all in the early stages. In these cases, re-cover the wound after showering with a new sterile dressing.

The wound site should be inspected regularly and patients asked to report any changes they observe in the wound, for example, redness, increased pain or discharge. If a small part of the incision line becomes open, the priority for wound management is to prevent ingress of infection and promote rapid re-closure. This can usually be done through the provision of a warm, moist wound environment and by identifying and correcting factors that may be affecting the healing process.

There are a number of dressing types that are suitable for this kind of wound, for example, an adhesive or non-adhesive foam dressing. The dressing can be renewed every one to three days, depending on wound exudate levels. It is important to ensure that the multidisciplinary team is kept informed of wound changes and that decisions about wound care are recorded fully (Foster and Moore 1999). If the wound starts to dehisce, early removal of clips or sutures is usual. Decisions about early suture or clip removal should always be discussed with the multidisciplinary team.

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**NURSING STANDARD**

**Time out 5**

Consider how you would teach patients or carers to look after a surgical wound. List what you think they need to know and any equipment needed. Devise a simple teaching session to inform them what to do. Try it out on a colleague and ask for constructive feedback.

Drain sites can be managed by the use of keyhole dressings cut to fit around the drain. Sterile foam or a purpose-made dressing can be used for this.

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**learning zone wound care focus**

On removal of the drain, an absorbent dressing with a semi-permeable backing should be secured firmly over the drain site and left in place until drainage has ceased. If the dressing becomes saturated, it should be renewed. Record and report any excess fluid loss.

**Wound dressings for open wounds**

The management of open surgical wounds is dependent on a detailed patient assessment, from which an appropriate plan of care can be developed to promote wound healing. For healing to take place, the wound bed must be properly prepared. This involves creating an optimal healing environment by producing a well-vascularised, stable wound bed with minimal exudate (Dowsett 2002).

The term ‘wound bed preparation’, coined by Falanga (2000) and Sibbald et al (2000), has developed into a concept which is used to provide a systematic approach to wound assessment (Fletcher 2005). Schultz et al (2003) promoted this concept by developing the acronym ‘TIME’ based on the observable characteristics of non-healing wounds: 

- **T**issue, non-viable or deficient; 
- **I**nfection or inflammation; 
- **M**oisture imbalance; 
- **E**dge of wound, non-advancing or undermined.

Each of these factors plays a role in the delay of wound healing. Addressing these factors helps to achieve optimal use of modern wound care products/modalities by ensuring the wound bed is in the best possible condition for healing (Box 4).

Selection of wound interventions and dressings should be based on their ability to deal with the specific challenges of wound healing, not on what is available in the dressing cupboard. Box 5 summarises key factors about the most common dressing categories. Advanced modalities, such as vacuum-assisted closure (VAC®) should also be considered where appropriate. This is a closed negative pressure system which reduces local tissue congestion, improves wound-bed perfusion and stimulates granulation tissue. It can greatly assist in speeding up the proliferative stage of healing (Thomas 2001). Other advanced products, such as Promogran™, are designed to inactivate matrix metalloproteinases (MMPs). MMPs are a type of proteinase, an enzyme which breaks down proteins. MMPs specifically break down extra cellular proteins such as collagen and elastin (Fletcher 2005). They have an important role in clearing debris from acute wounds but in wounds with impaired healing they can proliferate unrestrained, resulting in healthy tissue destruction.

**Pain assessment and management**

Pain assessment is an integral part of caring for surgical patients and should be incorporated into the overall assessment and care planning process. Pain may relate to the surgery or to wound dressing-related procedures, such as cleansing or dressing removal (Moffatt et al 2002).

Assessment aims to determine the cause of the pain, frequency, intensity and effect on the patient. The World Union of Wound Healing Societies (WUWHS) (2004) suggests the use of pain scales to measure pain intensity.

Well known scales for adult use include the visual analogue scale (VAS), the Faces scale, the

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**BOX 4**

**TIME mnemonic for assessment of non-healing wounds**

| Tissue | If necrotic tissue or slough is present, debridement is needed to minimise the risk of infection and to promote healing (Benbow 2005). |
| Infection or inflammation | Removal of infected foci and appropriate use of antimicrobials, anti-inflammatory and protease inhibitors will restore bacterial balance and reduce inflammation. Infection must be resolved to prevent further wound breakdown and promote healing (Cutting and White 2004). |
| Moisture imbalance | Exudate should be lifted away from the wound bed and surrounding skin to prevent maceration and skin breakdown (Vuolo 2004). With good moisture balance, epithelial cell migration is restored and desiccation (drying) avoided. |
| Edge of wound, non-advancing or undermined | If the wound edges are failing to advance or are undermined, the cause should be identified and corrective therapies considered, for example, debridement or skin grafts. (Schultz et al 2005) |

**BOX 5**

**Types of wound dressing**

- Alginates absorb exudate and can be used on flat wounds or cavities, for example, Sorbsan™.
- Hydrofibres absorb wound exudate, promote autolytic debridement, hold their shape on removal and minimise wound pain, for example, Aqualon™.
- Foam/hydrocellular dressings absorb exudate, keep the wound warm and are conformable, for example, Allevyn™.
- Non-adherent wound contact layers reduce wound-bed adherence and minimise tissue trauma on dressing removal, for example, Mepitel™.
- Hydrocolloids stay in place well, are impermeable to bacteria and provide a warm, moist environment for autolysis (self-debridement) and granulation, for example, Granuflex™.
- Hydrogels donate fluid to the wound bed and promote autolysis, for example, Intrisite™.
- Silver and iodine-based dressings can effectively reduce the wound bacterial burden thereby assisting in the resolution of local wound infection, for example, Contreet Foam®.

Note that not all dressing types are included. It is important to read the manufacturers’ instructions to find out how and when products should be used.
Pain relief (WUWHS 2004). Pain relief can be assessed by talking to patients and discreetly observing their behaviour. Other aspects of pain can be assessed by talking to patients and discreetly observing their behaviour. The WUWHS states that if a patient has severe pain during a dressing-related procedure, it is negligent to repeat the procedure without any pain relief (WUWHS 2004). Pain relief can be obtained through analgesic means, distraction therapy and use of appropriate dressings.

Modern dressings, such as hydrofibres, hydrogels, silicones, foams and hydrocolloids, minimise wound pain when used correctly. The moist environment that modern dressings promote bathes nerve endings and aids ease of removal (Briggs and Torra i Bou 2002). Avoid dressings with adhesives if there is concern about fragile surrounding skin. If adhesive dressings are used, avoid frequent removal as this can cause trauma and pain. The use of non-sting barrier sprays and keyhole dressings can protect fragile skin from adhesive/exudate damage and prevent tissue damage and pain on removal. The selection of any wound care procedure or product should always include consideration of pain.

Patient support Management of different tissue types, levels of exudate and infection pose particular challenges. Failure to provide effective care can have serious consequences, including wound infection, wound dehiscence and prolonged immobility.

References

Betts J (2003) Review: wound cleansing with water does not differ from no cleansing or cleansing with other solutions for rates of wound infection or healing. Evidence-Based Nursing. 6, 3, BI.
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From the patients’ perspective it is often the psychological effects of having a wound, such as loss of self-esteem and altered body image, that are of greatest concern (Drench 1994). An important part of the nurse’s role is to provide emotional support to patients throughout their surgical journey.

The provision of relevant and timely information and taking time to listen and sympathise with patients’ concerns can help to reduce anxieties. The involvement of the multidisciplinary team, particularly those with wound care expertise such as the tissue viability nurse specialist, can ensure that care is optimal and that patient anxiety is minimised.

Conclusion

Successful nursing care of surgical wounds is dependent on a solid understanding of normal wound healing and factors that can delay wound healing. A comprehensive assessment of patients’ needs is also required for successful care. This knowledge, when combined with an understanding of the multiplicity of options available for wound care, ensures the development of an effective, patient-focused plan NS

References continued


