

BEST PRACTICE OVERVIEW: SURGICAL AND TRAUMA WOUNDS

Although most surgical and traumatic wounds heal within a short period of time and require very few interventions, some become more complicated and require a plan of care to manage symptoms such as infection, pain, exudate or odour. This article provides an overview of the assessments and interventions a nurse should consider when caring for a patient with a surgical or traumatic wound.

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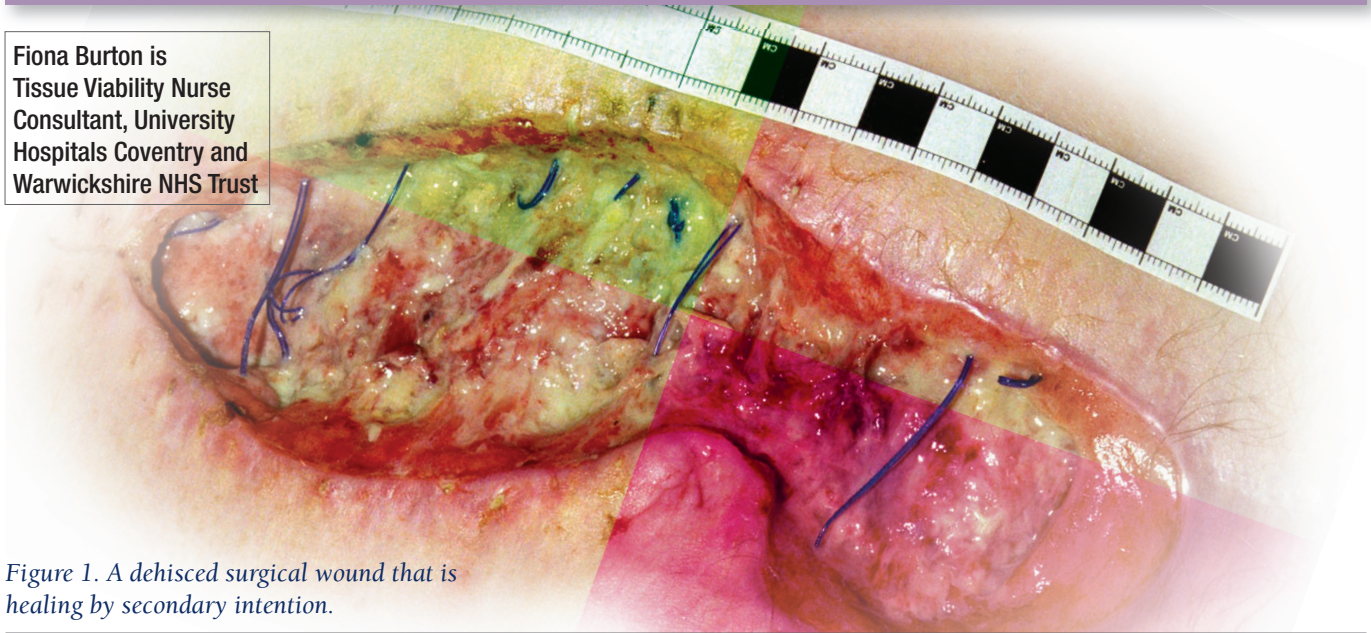


Figure 1. A dehiscent surgical wound that is healing by secondary intention.

Surgical and traumatic wounds can present as life-threatening injuries or as minor problems. In order to treat such wounds the practitioner must understand the nature of the surgery or accident, how it occurred, and whether there were any complications. This information will help the practitioner to prioritise care for the patient and to develop some expectation as to the probable size and nature of the wound.

The majority of clean, acute surgical wounds and some traumatic injuries are managed by primary closure. This means that the wound edges will have been closed using sutures, staples, wound adhesives or paper adhesive strips (Moore and

Foster, 2002). However, some wounds are left open to heal by secondary intention (Figure 1) because it would be detrimental to close them. Secondary intention healing would be employed for abscesses, pilonidal sinuses or

Wounds that heal by primary intention will normally seal and dry out within 24 to 48 hours.

large wounds, such as abrasions, where closure is impossible (Moore and Foster, 2002). Other surgical wounds accidentally open up or dehisce to reveal the wound cavity after they were originally closed (Dealey, 2005) and these are usually left to heal by secondary intention.

Wound assessment

Wounds that heal by primary intention will normally seal and dry out within the first 24 to 48 hours (Dealey, 2005) and heal during the next seven to 14 days. This normal pattern of events can be used to chart the progress of a wound and whether it is healing normally.

Any complications that arise will result in deviation from this path. Information relating to the wound's appearance and symptoms should also be collected at the first assessment (Morison, 2004).

An assessment for a wound that is healing by primary intention should include:

A detailed history

- ▶▶ When the surgery or accident happened
- ▶▶ What type of surgery it was or what caused the skin damage
- ▶▶ Whether the patient has acute or chronic illness
- ▶▶ Details of any complications during the surgery or accident.

Wound healing potential

- ▶▶ A medical, social and psychological history and how the wound affects the patient's life
- ▶▶ Nutritional status of the patient using a recognised nutritional screening tool such as the Malnutrition Universal Screening Tool (MUST) (British Association for Parenteral and Enteral Nutrition, 2005)
- ▶▶ The patient's own priorities/objectives regarding their wound care.

Wound assessment

- ▶▶ The approximate length of the wound
- ▶▶ What material has been used to close it
- ▶▶ Pain levels using a recognised pain assessment tool such as a numerical or visual scoring system
- ▶▶ Exudate level and type
- ▶▶ Condition of the skin surrounding the wound
- ▶▶ Whether there are any signs of complications such as infection (*Table 1*) or wound breakdown (dehiscence).

If the wound is healing by secondary intention additional information should be collected, including:

- ▶▶ The width and depth of tissue damage
- ▶▶ The different types of tissue within the wound bed

- ▶▶ The presence of any odour
- ▶▶ The likelihood of foreign bodies within the wound.

This assessment will provide information that will help the nurse develop and prioritise a management plan and should be documented in the patient's healthcare records or on a wound assessment form.

Wound management

It is important to include the patient when formulating a care plan because their objectives can often be different to those of the healthcare professional.

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The management of any wound depends on its cause and symptoms. When developing a wound management plan the practitioner should consider the information that was collected during the patient and wound assessment and use this to develop a list of priorities. One of the most important of these priorities will be to prevent complications and improve the patient's wound healing potential. The nurse can do this by recognising the normal healing process and addressing any factors that may cause complications or wound breakdown.

Most surgical or traumatic wounds healing by primary intention will not develop complications and will heal within

Table 1

Clinical signs of wound infection (White et al, 2002)

Abscess
Cellulitis (<i>Figure 3</i>)
Discharge
Delayed healing
Discolouration
Friable, bleeding, granulation tissue
Unexpected pain/tenderness
Pocketing/bridging at base of the wound
Abnormal smell
Wound breakdown (<i>Figure 3</i>)

two weeks. The wound needs to be kept clean and dry until it has sealed over. However, wounds healing by secondary intention will take longer, depending on size, and should be kept moist to encourage healing. If the wound is not healing normally then there are a number of possible causes, the most common being:

- ▶▶ Infection or heavy contamination
- ▶▶ Poor nutritional intake
- ▶▶ Foreign bodies, haematomas or necrosis in the wound bed
- ▶▶ Poor vascular supply, anaemia or a low blood albumin level of less than 30 that is not considered to be a short-term response to surgery or trauma
- ▶▶ Long-term chronic medical conditions such as diabetes, cardiac, renal or respiratory disorders
- ▶▶ Mechanical stress such as pressure or tension placed on the wound because of the wound's position as would occur in abdominal wounds, the sole of the foot or the sacral area (Dealey, 2005; Ennis et al, 2004).



Figure 2. An infected traumatic injury caused by a human tooth puncturing the skin during a fight. The wound shows classic signs of infection — redness and swelling with cellulitis extending from the puncture site up to the patient's wrist.

Managing common causes of abnormal healing

Infection

If the wound is infected or heavily contaminated then wound healing is likely to be slower and further tissue damage may be caused. Infection is more likely to develop if the wound:

- ▶ Occurred during the opening of the gut or respiratory tract during surgery
- ▶ Was infected before surgery
- ▶ Has large amounts of dead tissue present
- ▶ Is dirty, e.g. contains grass, dirt or mud from an accident
- ▶ Was left untreated for more than six hours
- ▶ Was caused by a human or animal bite (Figure 2).

Antibiotics are sometimes prescribed and administered prophylactically especially if the patient has a compromised immune system. The clinical indications of a wound infection are shown in Table 1.

If a wound infection is suspected then a wound swab or aspirate of pus should also be taken to

identify which organisms are causing the infection. Systemic antibiotics should then be prescribed. Topical antibiotics

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should be avoided in wound management because they can increase the likelihood of developing resistant strains of bacteria and can cause allergic reactions on the surrounding skin (Ovington and Eisenbud, 2004). Antiseptic dressings such as those impregnated with silver or iodine can be used if there are clinical signs of infection or if the wound is heavily contaminated (White et al, 2002).

Patients with traumatic skin injuries should also be assessed for their tetanus status by checking when they last had a tetanus booster. If they are not covered, a tetanus immunoglobulin and/or a tetanus toxoid immunisation should be given. The practitioner should consult their local infection

control policies regarding the dose and type of tetanus immunisation needed.

Poor nutritional intake

Patients with wounds should have their nutritional status assessed because malnutrition can cause impaired wound healing and poor clinical outcomes (Russell, 2001; Lobo and Allison, 2000). The practitioner should determine if the patient has a healthy, balanced diet with enough calories, protein, vitamins and minerals to optimise healing. The nutritional factors that can influence wound healing are summarised in Table 2.

A patient's nutritional intake and requirements should be assessed using a recognised nutritional screening tool, such as the MUST (BAPEN, 2005), and should include a discussion with the patient regarding their food preferences and the reasons for the lack of nutritional intake if this is appropriate. This will provide the basis on which to build a nutritional management plan that should be tailored to the patient's individual requirements and should include patient education. Patients who need individual dietary advice or specialist assessment should be referred to a dietician.

Wound cleansing and removal of foreign bodies, haematomas or necrosis

Wounds that heal normally by primary intention will not need to be cleaned in the first few days unless there is excessive leakage (Pudner, 1997) which can be gently wiped away from the surrounding skin using gauze and normal saline. Once the wound is

Table 2**Function and sources of nutrients in wound healing**

Nutrient and food sources	Function
Protein Meat, fish, eggs, milk, yoghurts, cheese, pulses and lentils, baked beans, build-up shakes and soups, nutritional supplements*	The formation of granulation tissue, collagen synthesis and immune response
Carbohydrates Bread, potatoes, cereals, biscuits, build-up shakes and soups, refined carbohydrates e.g. sugar, jam, sweets and puddings nutritional supplements*	Energy for cell function
Fats Butter, margarine, cheese, cream, full-fat milk	Formation of new cells
Vitamin C Fruit and fruit juices, vegetables, salad	Collagen synthesis and white blood cell function
Vitamin A, E and K A: Eggs, milk, liver Beta carotene: Carrots, broccoli, spinach E: Margarine, nuts, eggs K: Cabbage, cauliflower, peas	Enhances epithelialisation, collagen synthesis, antioxidant defence
Vitamin B complex Wholegrain cereals, fortified cereals, meat, fish, eggs, dairy products	Helps strengthen collagen
Iron Red meat, leafy green vegetables, eggs, fortified cereals	Transporting oxygen to the wound site and collagen formation
Zinc Meat, cheese, wholegrain cereals, bread	Enhances cell proliferation, increases epithelialisation and improves collagen strength
Manganese, copper, magnesium Meat, tea, nuts, bread	Increases collagen tensile strength
Fluid Water and other fluids excluding tea, coffee and alcohol	Prevents dehydration and loss of tissue elasticity

* A dietician or doctor should prescribe nutritional supplements

sealed (normally after 48 hours) the patient can shower or bathe without a wound dressing over the incision line (Mangram et al, 1999). However, there is some evidence to suggest patients experience less pain when a dressing is left on for longer (Briggs, 1996).

If the wound is healing by secondary intention then it will need to be cleaned if there is exudate, foreign bodies or debris on the wound bed that could increase the likelihood of infection, prevent an accurate wound assessment being

obtained and increase the risk of damage to the surrounding skin (White et al, 2002). An acute surgical wound should be cleansed using an aseptic technique and low-pressure irrigation with normal saline from a syringe, ampoule or aerosol canister (Ovington and Eisenbud, 2004). Traumatic injuries can be cleansed with tap water without an increased risk of infection (Angeras et al, 1992). Large abrasions are often heavily contaminated with soil and grit and it is important to meticulously clean these wounds to remove as much foreign material as possible to prevent traumatic 'tattooing' (permanent staining of the skin) and infection (Morris, 2005; Niazi and Sacks, 2005). Irrigation with antiseptics is controversial and is generally not advocated (Dealey, 2005).

Debridement

Debridement is the removal of dead or infected tissue, blood clots or foreign material from a wound (National Institute for Clinical Excellence, 2001). Wound debridement will be necessary in surgical or traumatic wounds if there are large blood clots, necrosis or excessive slough present. This will encourage wound healing by reducing the likelihood of a wound infection (NICE, 2001). Debridement can be achieved most rapidly by surgical or conservative sharp debridement but should only be performed by an appropriately skilled and competent practitioner (Fairbairn et al, 2002). Rapid debridement will be a priority if the wound or area of necrotic tissue is extensive and therefore the patient is at high risk of developing an



Figure 3. An infected wound following cardiac surgery. The wound shows signs of cellulitis and wound breakdown.

infection. Alternatively, autolytic debridement is the breakdown of the devitalised tissue by the patient's own enzymes and this can be promoted by maintaining a moist environment at the wound bed. Enzymatic debridement involves the topical use of enzymes such as streptokinase that digest or degrade necrotic tissue. There are many dressing materials on the market that facilitate autolytic or enzymatic debridement such as hydrocolloids, hydrogels, polysaccharide pastes, foams, alginate and sterile maggots.

A nurse can use these products to facilitate wound debridement as long as they are working within their competence and knowledge base. However, if the wound or the area of necrosis is extensive or the patient is acutely unwell then a referral to a tissue viability nurse or a surgeon should be considered.

Long-term chronic medical conditions

Any long-term medical condition that affects the patient's immune system, the quantity or quality of the blood flow, and the nutrient or oxygen supply to the wound will affect the healing process (Figure 4). The practitioner's role is to attempt to control and stabilise these conditions to improve the patient's potential for successful wound healing. Patient education and involvement is important to ensure that the patient understands their condition, agrees with their care plan and is provided with support to make any necessary lifestyle changes.

Wound symptoms

Once the nurse has managed any systemic issues that may be causing wound breakdown or preventing healing, the next priority is to manage the local wound symptoms to ensure the patient is comfortable and to

prevent localised complications. These symptoms include exudate, odour, pain and problems associated with the surrounding skin.

Controlling exudate

The nurse should control wound exudate by first determining if the quantity that is exuding is a normal healing response or if something is causing abnormal amounts of exudate to be produced. If an abnormality is suspected then the nurse should find out what the cause is (Vowden and Vowden, 2004). Unusually high quantities of exudate can indicate that the wound has a sinus (a blind pocket or track) or fistula (a track that connects the wound to a body cavity such as the bowel), oedema or an inflammatory process caused by an infection or a foreign body (Dealey, 2005; White et al, 2001). These problems should be investigated and managed appropriately to ensure the underlying cause of the excessive exudate is treated and a nurse should consider referring the patient to a wound care specialist for their assessment and advice (Vowden and Vowden, 2004). Conversely, lower levels of exudate than one would expect, can also indicate complications, such as ischaemia, which will impair wound healing and will need to be treated for the wound to heal.

Large levels of exudate should be controlled to promote patient comfort, prevent deterioration of the surrounding skin condition and encourage wound healing by creating a moist rather than wet environment (White and

Gray, 2005; Gray et al, 2005). Wound dressings such as alginates, hydrofibres, foams, vacuum assisted closure (KCI Medical, Oxfordshire) and wound manager bags can be used to control exudates. The choice of treatment depends on the amount of exudate being produced and the patient's preference. A detailed overview of the different types of wound dressings available can be found on p.178–83.

Controlling odour

Managing and controlling wound odour is often a priority because it can cause a lot of anxiety and embarrassment to the patient. The nurse should first find out the cause of the odour and plan to manage this, and second choose interventions that will help mask the odour.

There are a number of causes of wound odour in surgical or traumatic wounds, the most common being infection or critical colonisation particularly with anaerobic bacteria and the presence of necrosis or ischaemia in the wound bed. Management options include treating the infection, debriding the necrosis if appropriate or changing the method of cleansing the wound. The use of charcoal dressings, air fresheners, good ventilation of the room and appropriately absorbent dressings can also help to control the odour.

Controlling pain

Pain in acute wounds such as surgical or traumatic wounds can be caused by a number of different factors, the most common being:

- ▶▶ The normal inflammatory process

- ▶▶ The removal of adherent or dehydrated dressings
- ▶▶ Cleansing with cold solutions
- ▶▶ Topical preparations such as antiseptics and dressings
- ▶▶ Cleansing products moving across the wound bed and causing friction.

This pain can also be exacerbated by anxiety (McNaughton and Nimmo, 2004). The nurse should assess the patient's pain by asking what precipitates and then reduces the wound pain, the location, the intensity, the pattern of the pain and also how it affects the patient's life (McNaughton and Nimmo, 2004). The severity of wound pain should be recorded using a recognised pain assessment tool according to local policy. The most commonly used are either visual or verbal analogue scores where the patient is asked to describe his pain on a score from 0 to 10; between no pain, to severe pain or from sad to happy faces (Emflorgo, 1999). The patient

should always be involved in the assessment and management of their pain to ensure an accurate assessment is made, to reduce anxiety, and facilitate patient empowerment.

Pain management should be devised to consider the causes of wound pain, as listed above, as well as using pharmaceutical remedies. Pain can be reduced by cleansing the wound with warm solutions rather than cold and not touching the wound unless absolutely necessary. When choosing dressings for a wound healing by secondary intention, the dressings should keep the wound bed moist. If a dressing has dried out and stuck to the wound bed this will need to be soaked off rather than removed while dry as this could cause unnecessary pain and trauma.

Adherent dressing such as films, hydrocolloids or foams that adhere to the surrounding skin but not the wound bed



Figure 4. A surgical wound that is not healing because of ischaemia and infection. The diabetic patient has necrosis of the fifth toe and the amputation site of the third and fourth toe. The red and swollen skin around the wound indicates cellulitis

Key Points

- ▶ In order to treat surgical and traumatic wounds the nurse must understand how and why the wound was caused
- ▶ A detailed wound assessment is vital to plan and prioritise care
- ▶ It is important to try and prevent complications that will slow down the healing process
- ▶ Factors that contribute to abnormal healing include infection; poor nutrition; the presence of foreign bodies, large blood clots, necrosis or excessive slough; and long-term medical conditions
- ▶ The nurse must attend to systemic issues that will cause wound breakdown and then manage local wound symptoms such as exudate, odour, pain and problems with the surrounding skin.

can help reduce wound pain in superficial injuries such as abrasions, particularly if pain is being exacerbated by dressings or clothing moving against the wound bed and causing friction. Conversely, adherent dressings can sometimes cause wound pain if they continue to stick to the surrounding skin even when attempting to remove them. If dressings are stuck then they should be soaked off in a bowl of water, bath or shower to aid their removal.

Most adherent dressings are designed to remain in place for a number of days because the adherent properties decrease over time. This should be taken into account when choosing dressings and the adherent dressings only used when the

wound is at a suitable stage to be left dressed for a number of days.

Other strategies that should be used to reduce pain include reducing anxiety, developing a good nurse-patient relationship and ensuring that the patient is well informed and feels empowered (Briggs and Torra I Bou, 2002).

A deterioration of the skin surrounding a surgical or traumatic wound can often decline further and become macerated or excoriated if exudate is not controlled effectively.

Analgesics should also be used on a routine basis and as boluses prior to dressings being changed if necessary. Opioids, non-steroidal anti-inflammatory drugs, paracetamol and Entonox are all useful and commonly used pharmaceutical agents for wound pain (McNaughton and Nimmo, 2004).

Care of the surrounding skin

A deterioration of the skin surrounding a surgical or traumatic wound can often decline further and become macerated or excoriated if exudate is not controlled effectively. Maceration is caused by the saturation of the wound bed and peri-wound area and can result in delayed healing (White and Cutting, 2003). It appears as white, waterlogged tissue that develops on the wound bed or edges.

Excoriation is an inflammatory reaction to irritants such as

bacteria or body fluids and is often associated with chronic wound exudate (Hampton and Stephen-Haynes, 2005). Both maceration and excoriation caused by ineffective exudate management can cause enlargement of the wound, wound pain, increased risk of infection, prolonged healing time and reduced quality of life (Vowden and Vowden, 2004).

Exudate should be managed by the use of wound dressings and systemic measures including the treatment of infection, the control of oedema or the management of a wound fistula. The surrounding skin can also be protected from the effects of excessive exudate with the use of Cavilon cream (3M) or non-sting barrier film, both of which do not interfere with dressing function (Cameron et al, 2005; Williams, 2001; 1998).

Conclusion

Surgical and traumatic wounds can be simple or complex to manage depending on the cause, extent and nature of the wound. Effective wound management must begin with an accurate and holistic assessment of the patient's ability to heal, the likelihood of complications and the wound symptoms, and it should involve discussions with the patient to ascertain their priorities and concerns.

This will then provide the nurse with all the information that is required to devise and implement an effective wound management plan that the patient is happy with. This plan should be tailored to the patient's and nurse's objectives

and include the management of the cause of the wound or wound complications and the management and control of the wound symptoms. **WE**

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Glossary

Dehiscence: wound breakdown

To dehisce: to open up a wound that was previously closed

Fistula: a track that extends from the wound into a body cavity, such as the bowel

Primary intention: the healing of a wound that has been closed using sutures, staples, wound adhesives or paper adhesive strips

Secondary intention: the healing of a wound that has been left open or has broken open which involves the formation of granulation and epithelial tissue that should be visible in the wound bed

Sinus: a blind pocket or track that extends from the base of a wound