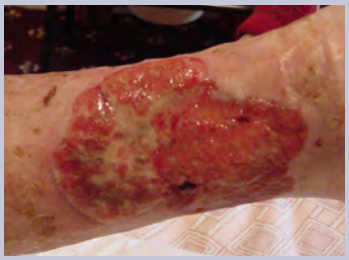
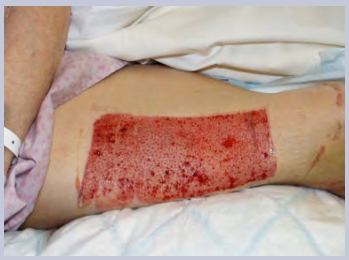
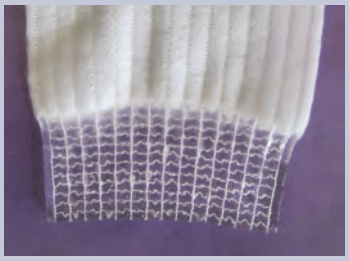
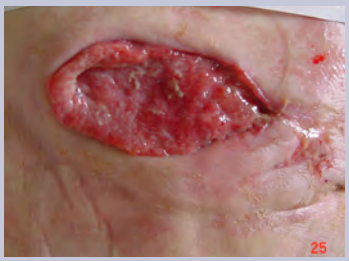
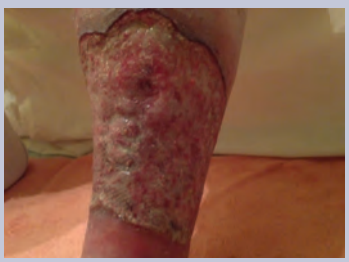
VOLUME 9(1) • 2014

Wound Essentials

Providing wound care knowledge for the everyday clinician

ACUTE WOUNDS

How does hypergranulation tissue work?
Ten top tips for patient management of surgical wounds
Pain management in acute wounds — ten top tips
Skin grafts — the surgical help in wound healing
Choosing the appropriate dressing: Alginate and Hydrofiber®

CHRONIC WOUNDS

Flexion contractures in the older person
Pressure ulcers: avoidable versus unavoidable in primary care — an update for 2014
When is a leg ulcer not a leg ulcer?

SKIN CARE

Root cause analysis related to pressure damage
Using continence assessment and actions to preserve skin integrity

GENERAL WOUND CARE

Nutritional assessment of people with wounds
Pressure-redistributing mattresses: when and where are they appropriate?
Collaborative working in the community setting to reduce pressure ulcers
Four case studies examining the use of ADERMA™ and the impact it has on patient wellbeing

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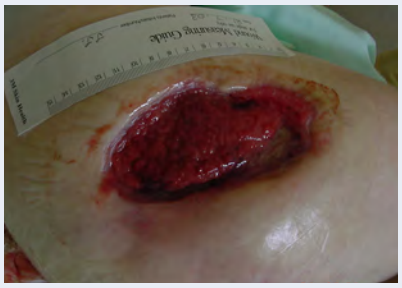
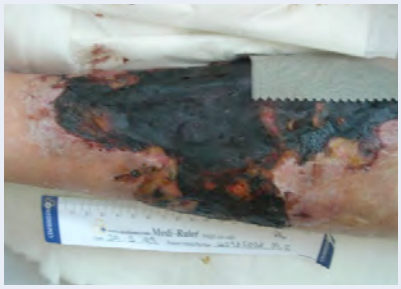
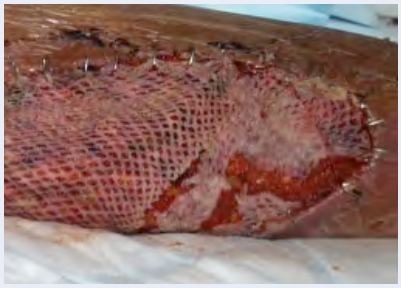
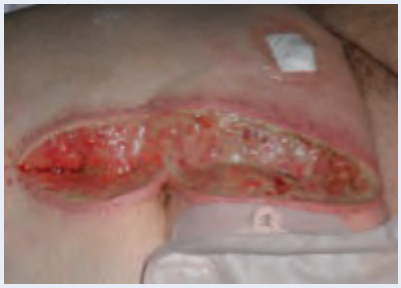
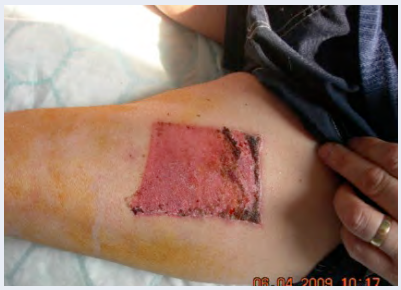
Wound Essentials











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Editorial board

The importance of being proactive in your professional development

PAULINE BELDON
Editor, Wound Essentials
Tissue Viability Nurse Consultant, Epsom and St Helier University Hospitals NHS Trust, Carshalton

Regulation of nursing practice is currently under the spotlight as never before. Following on from the Mid Staffordshire enquiry and the resulting Francis Report, questions have been raised regarding whether some nurses at Mid Staffordshire NHS Foundation Trust were competent to practice. This has resulted in a period of consultation by the Nursing Midwifery Council (NMC), and will, this year, lead to a tightening in the regulation process for registered nurses.

Registered nurses can expect to be required to provide evidence of their ongoing professional development. This can take the form of attending conferences, study days and learning modules, but can also include evidence of learning from reading journals, taking part in reflective discussion groups and making overt changes in practice — all of which can only lead to better nursing care.

In addition, Robert Francis QC called for the registration and regulation of healthcare assistants (HCA), to ensure that high standards of care can be assured for patients.

So it's time to ask yourself, "How proactive have you been in your own professional development?" Can you provide assurance of your continued post-registration education and practice? This has been part of the NMC conditions for continued registration for many years and it would seem that the NMC is now waking up to its responsibility as regulator of nursing practice standards and will be active in the future to audit individuals before continuing their registration. It could be argued that had they been more active in this area previously, nursing would not currently be facing its lowest ebb in public opinion.

Hopefully, because you are reading this editorial, you are one of those nurses or HCAs who is keen to continue their professional development and regard *Wound Essentials* as a means to do so. The time you spend reading this journal and considering your practice in relation to its articles does count towards your professional development, provided you keep a written, dated reflection in your portfolio. If you don't have one, now is the time to start!

Wound Essentials prides itself on being a no-nonsense journal, which brings basic information in an easily understood format for all to read and then use as a springboard to access more in-depth reading. We all have to start somewhere!

In addition, it's important that we all recognise the boundaries of our knowledge and when we have reached our limitation in caring for a patient or when another healthcare professional — whether a specialist nurse or a more senior colleague — would be able to help. We don't have to know it all or be able to do it all; no nurse is an island, that's why there are multidisciplinary teams from whom we can seek help.

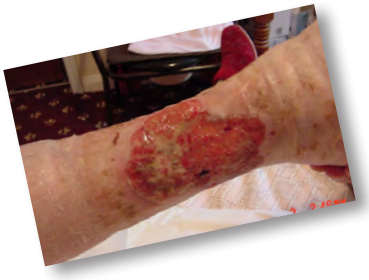
So, I hope you enjoy reading this issue of *Wound Essentials* and as you do so, be conscious that you are active in your professional development! We

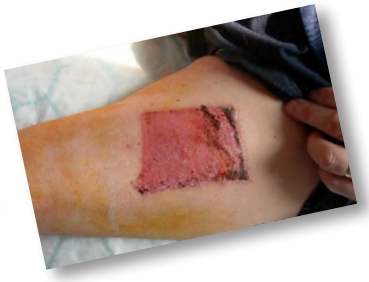
If you would like to contribute to a future issue of *Wound Essentials*, please contact: Adam Bushby, Editor, via email at adam.bushby@woundsgroup.com

ACUTE WOUNDS

Key points

- In normal healing, the granulation tissue grows from the base of the wound upwards, until it reaches the surface of the wound. Epithelial cells then migrate across the surface of the wound from the wound edges or from the base of any remnant hair follicles. In some cases, the granulation continues to grow until it rises above skin level, preventing the migration of epithelial tissue across the wound bed. This is referred to as hypergranulation, overgranulation, 'proud flesh' or exuberant granulation tissue.
- The development of healthcare-associated infection (HCAI) results in a potentially significant financial cost for both the patient and the health service, and surgical site infections (SSI) are one of the most common types of HCAI. At least 5% of patients undergoing surgery will develop an SSI, the majority of which are preventable.
- Pain is a multidimensional experience, which is not static. It should be considered that patients' subjective perception of their pain, beliefs and coping strategies will vary according to many factors, including their personality, their culture, their levels of anxiety and their previous experiences.
- A skin graft is a section of epidermis and dermis that has been completely separated from its blood supply in one part of the body — the donor site — before being transplanted to another area of the body; its recipient site.
- Alginates and Hydrofibers are manufactured in various ways, but are available in similar presentations: from ropes and ribbons for packing, or flat sheet dressings.





How does hypergranulation tissue work?

Wounds, such as pressure ulcers or leg ulcers, involve extensive tissue loss, which means it is impossible for the edges of these wounds to be apposed (brought together) and sutured or glued. They are, therefore, left to heal by secondary intention. Wounds left to heal by secondary intention fill with granulation tissue, which is a complex combination of newly formed capillaries with collagen laid down over them. For the majority of people, wound healing by secondary intention will be uneventful, however, for others, it will be delayed. One of the most common factors that can delay healing is hypergranulation. The aim of this article is to discuss how granulation tissue is formed and when, why and where hypergranulation can occur, as well as possible management options that can be used.

"Hypergranulation is one of the most common complications that can cause a delay in the wound healing process."

MENNA LLOYD JONES
Independent Tissue Viability Nurse

There are two mechanisms by which the body heals — regeneration or repair. In regeneration, damaged cells are replaced by identical cells, however, this only occurs in nerve cells, the liver or epithelial tissue. Any other damage heals by repair, where the damaged tissue is replaced by connective tissue, which then forms a scar (Flanagan, 1999).

Wounds repair by either primary or secondary intention. In primary intention, the edges of the wound are approximated and are held in place by sutures, skin glue or adhesive strips. As there is no tissue loss and a low risk of infection, these wounds usually heal quickly — within 4 to 21 days — with minimal scarring (Vuolo, 2009).

Where approximation of the wound edges is not possible due to the amount of tissue loss, healing occurs by secondary intention. This healing process takes much longer, resulting in scarring, and there is also a higher incidence of complications (Collins et al, 2002; Vuolo, 2009). Hypergranulation is one of the most common complications that can cause a delay in the wound healing process (Vuolo, 2010).

To better understand the occurrence of hypergranulation tissue, it is important to first understand how granulation is formed.

Granulation tissue

Granulation tissue is the wound filler that is a transitional replacement for the dermis (*Figure 1*). It consists of new blood vessels, fibroblasts, inflammatory cells, endothelial cells, myofibroblasts and the components of the new, provisional, extracellular matrix (Johnson, 2009; Vuolo, 2010). Healthy granulation tissue is pinky-red in colour, is highly vascular and the tops of the capillary loops give

the tissue a granular appearance (Dealey, 1999).

In normal healing, the granulation tissue grows from the base of the wound upwards, until it reaches the surface of the wound. Epithelial cells then migrate across the surface of the wound from the wound edges or from the base of any remnant hair follicles (Vuolo, 2010). In some cases, the granulation continues to grow until it rises above skin level, preventing the migration of epithelial tissue across the wound bed (Collins et al, 2002). This is referred to as hypergranulation (*Figure 2*), overgranulation, 'proud flesh' or exuberant granulation tissue (Dealey, 1999).

Hypergranulation

Hypergranulation is defined as an excess of granulation tissue beyond the amount required to replace the tissue deficit incurred as a result of skin injury (Vuolo, 2010). Hypergranulation tissue is vascular and friable and, therefore, prone to injury. It also produces exudate, which can cause damage, such as maceration and excoriation, to the surrounding periwound skin, thus increasing the risk of wound infection and delaying healing by physically preventing the migration of epithelial tissue (Mustafah and Chung, 2014).

Hypergranulation occurs in a wide range of wounds that heal by secondary intention, e.g. pressure ulcers, leg ulcers and burns (Vuolo, 2010). It is also a recognised complication in patients who have a percutaneous endoscopic gastrostomy (PEG) tube and/or tracheostomy (Best, 2004; Russell, 2005).

Although there is no definitive cause of hypergranulation, several have been suggested. These are:

- Chronic inflammation
- Wound hypoxia
- High bacterial burden
- Increased moisture
- Excessive angiogenesis
- Trauma or friction on wound surface
- Foreign bodies.

(Vuolo, 2009; Mustafah and Chung, 2014).

Malignancy

Occasionally, malignancies can be mistaken for hypergranulation (*Figure 3*). Where malignancy is suspected, patients should be referred as soon as possible for further investigation. Signs and symptoms suggestive of a malignancy, rather than hypergranulation, are

- The hypergranulation has been present for many months
- The hypergranulation has a cauliflower appearance or is hard to the touch
- It is growing outward beyond the wound margins
- It does not respond to any of the recommended treatments for hypergranulation.

(Stephen-Haynes and Hampton, 2010).

Management of hypergranulation

There are currently several options that can be employed to resolve hypergranulation. However, as different management choices are dependent on different causes, a holistic assessment of the patient, including a wound history and, where necessary, appropriate investigations must precede any management choices (Vuolo, 2009; Mustafah and Chung, 2014).

Vuolo (2010) suggested that hypergranulation can be grouped under three headings that can then provide a basis for different treatment pathways. These were type 1 — hypergranulation that is inflammatory in nature; type 2 — hypergranulation that is related to an occluded wound environment; and type 3 — hypergranulation that is caused by a cellular imbalance.

Treatment options for hypergranulation include:

- Non-occlusive dressings
- Steroids
- Topical antimicrobials
- Silver nitrate
- Wait and see — do nothing because, although hypergranulation is seen as an abnormality, it is often a temporary situation that will resolve without treatment as the wound contracts during healing. However, it is advisable to eliminate malignancy and infection before selecting this option.

(Adapted from Dealey, 1999; Vuolo, 2010).

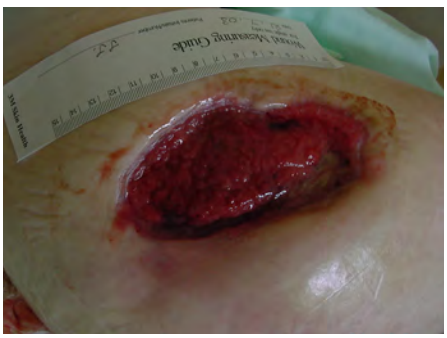


***Figure 1.** Example of granulation tissue.*

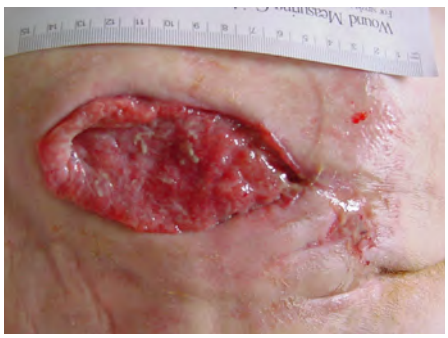


***Figure 2.** Example of hypergranulation tissue.*

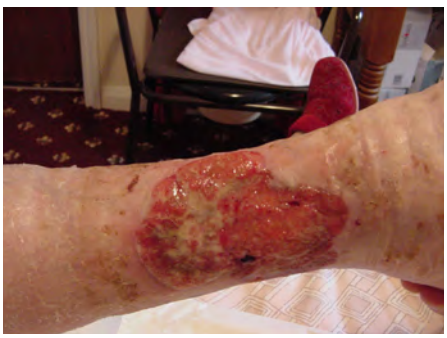


***Figure 3.** Example of a malignancy that could be mistaken for hypergranulation*

Treatment options for type 1 hypergranulation

Vuolo (2010) suggested that inflammatory hypergranulation should be treated in a way that would resolve the inflammation by identifying and removing the irritant causing the inflammation, such as dressing fibres. Infection is a key cause of inflammation and, therefore, it is important to identify wound infection and treat the infection with a topical antimicrobial, for example, silver, iodine, honey or polyhexamethylene biguanide (PHMB) dressings (Stephen-Haynes and Hampton, 2010; Vuolo, 2010; Warriner and Spruce, 2012).

Healthcare practitioners (HCPs) must ensure they always follow local formularies and polices with regards to the use of topical antimicrobials. They should seek advice from the tissue viability service if there are doubts about any aspect of treatment.

Systemic infection should be treated with oral or intravenous antibiotics according to the guidance recommended by the European Wound Management Association (EWMA) position document (EWMA, 2006). Where required, the selection of the secondary dressing is made on the basis of the level of exudate, avoiding occlusive dressing (Vuolo, 2010).

If there is no resolution of type 1 hypergranulation following the suggested treatment regimen, topical steroids should be used (Vuolo, 2010). Although some steroids are not licensed or indicated for use on either hypergranulation or open wounds (Warriner and Spruce, 2012), Haelen® tape (Typharm) impregnated with an appropriate steroid agent is recommended for the treatment of hypergranulation. This tape is used at the discretion of the clinician and the manufacturer's instructions should always be followed with regards to application and duration (Vuolo, 2010; Warriner and Spruce, 2012).

Treatment options for type 2 hypergranulation

Vuolo (2010) suggested that the cause of type two hypergranulation is due to an occluded wound environment. Changing from an occlusive dressing, such as a hydrocolloid, to a flat foam dressing can be effective in resolving the hypergranulation (Dealey, 1999; Vuolo, 2010). It is suggested that the pressure of the foam reduces the oedema and flattens the hypergranulation. Some studies, therefore, suggest applying two pieces of foam to increase the pressure on the tissue (Stephen-Haynes and Hampton, 2010).

Treatment options for type 3 hypergranulation

Vuolo (2010) claimed that the cause of type 3 hypergranulation is due to cellular imbalance. The imbalance may be due to an external factor and therefore suggests that both inflammation and occlusion be excluded. However, if the cause is internal, Vuolo suggested that until the causative mechanisms are better understood, little can be done to reverse the cause of this type of hypergranulation. Effective management is, therefore, dependent on using the recommendations cited for types 1 and 2 hypergranulation.

The use of silver nitrate

Silver nitrate used to be the standard treatment for hypergranulation and it has been used since 1829 (Dealey, 1999; Johnson, 2009). However, today it is not used as a first-line treatment and is indeed discouraged for all but the most experienced HCPs (Johnson, 2009; Warriner and Spruce, 2012). This is due to silver nitrate being caustic — it can cause chemical burns, especially when used frequently on a wound. It can cause further trauma to the wound and contribute to a delay in healing by promoting increased inflammation and increasing the risk of infection. Its use can also be painful and cause distress to the patient (Warriner and Spruce, 2012).

Hypergranulation in exit sites

Hypergranulation is a recognised and relatively common complication in the management of any exit site where a tube has been inserted. PEGs and tracheostomy exit sites are examples where hypergranulation is a common complication (Russell, 2005; Warriner and Spruce, 2012).

PEGs are often used for patients who require long-term nutritional support. Using PEGs allows liquid food supplements to be administered through a small device directly into the stomach. They are held in place at each end by an internal and external fixator that is designed to hold the device in place (Warriner and Spruce, 2012).

Hypergranulation can be caused by friction, trauma and/or infection. Therefore, the risk of hypergranulation can be reduced by ensuring correct positioning of the external fixation device (Best, 2004) and maintaining good hygiene around the site, thus preventing infection (Warriner and Spruce, 2012).

A tracheostomy is the surgical creation of an opening in the anterior wall of the trachea, below the cricoid cartilage which is kept open with a tracheostomy tube (Russell, 2005). The four main indications for tracheostomy are:

- To maintain the airway.
- To protect the airway.
- To provide access for the

clearance of respiratory secretions.
- For long-term mechanical ventilation.

(Adapted from Dougherty and Lister, 2012).

The risk of developing hypergranulation with a tracheostomy is similar to PEG sites and the same preventative strategies should be employed. Exposure to friction, therefore, should be kept to a minimum and good hygiene technique should be maintained around the site to prevent infection. To reduce the risk of fibres from any cleansing material stimulating an inflammatory reaction, non-woven gauze or wipes should be used.

Dressings should be changed daily or more frequently if they become soiled, especially in the postoperative period or if there are large amounts of secretions. Two nurses are always required when changing dressings and the tube cotton/Velcro® tapes. The selected dressing should be thin so as not to displace the tube; absorbent to manage the secretions; and pre-cut to prevent any fibres from entering the airway (Russell, 2005; Dougherty and Lister, 2012).

In the event of the patient developing hypergranulation around exit sites, the same management options as described by Vuolo (2012) are appropriate for both PEGs and tracheostomies (Russell, 2005; Johnson, 2007; Warriner and Spruce, 2012). However, the selected dressings need to be conformable, appropriate and not cause any unnecessary disturbance to the appliance *in situ*, as well as be comfortable for the patient.

Conclusion

It is estimated that chronic wound care costs the NHS between £2.3 billion and £3.1 billion per annum (Posnett and Franks, 2007). Hypergranulation is one of the most common factors that contributes to delayed healing and, therefore, the number of chronic wounds.

There is no standard treatment for hypergranulation and HCPs must decide what dressing or treatment option should be selected following assessment. Examining the different locations for the development of hypergranulation and relating them to the three groups and treatment options recommended by Vuolo (2010) is a potential way of rationally assessing hypergranulation and, therefore, deciding on the most appropriate treatment regimen available. However, any treatment option selected should be appropriate for the specific wound, as well as for the patient. WE

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Ten top tips for patient management of surgical wounds

Surgical site infections are one of the most common healthcare-associated infections affecting patients. As these wounds have been intentionally created by clinicians, it is their responsibility to provide the patient with verbal and written information both pre-operatively and postoperatively to prepare them as much as possible for potential outcomes. This article provides clinicians with some evidence-based advice for the effective management of surgical wounds.

"Patients, relatives and carers should be given as much verbal and written information as possible pre-operatively to allow them to prepare physically and psychologically for undergoing a surgical procedure."

AMY VERDON
Tissue Viability Clinical Nurse Specialist, University Hospitals Coventry and Warwickshire NHS Trust, Coventry

In the UK, approximately 11 million surgical procedures — including investigative or corrective surgery, excisions or incisions, and open or laparoscopic surgery — are undertaken each year resulting in an intentionally created wound for the patient (Cooper, 2005).

In addition, more people are being considered as suitable candidates for surgery than ever before. This is, in part, due to advances in healthcare and also a greater awareness of those patients who may be at higher risk of complications. This increased awareness allows patients to be optimised (i.e improving their nutrition and hydration, diabetes control, smoking cessation), where possible, in advance of surgery to reduce their risk of complications, such as infection or poor nutritional intake, and offers them the option of surgery to improve their health.

Patients, relatives and carers should be given as much verbal and written information as possible pre-operatively, to allow them to prepare physically and psychologically for undergoing a surgical procedure. They should understand the risks of undergoing surgery and the alternative options, if there are any, as well as the advantages and disadvantages of these options to allow them to make an informed choice. They should be given the opportunity where possible to discuss the procedure and ask questions of those who will be caring for them.

Given that these wounds have been intentionally created by healthcare professionals (HCPs), it is their responsibility to provide standardised, evidence-based care for these patients to facilitate timely wound healing and reduce their risks of complications and to involve patients in their care.

Surgical site infections

The development of healthcare-associated infection (HCAI) results in a potentially significant financial cost for both the patient and the health service, and surgical site infections (SSI) are one of the most common types of HCAI (Plowman et al, 2000). At least 5% of patients undergoing surgery will develop an SSI, the majority of which are preventable.

An SSI can range from a small amount of purulent discharge from a wound to

life-threatening complications, such as complete wound dehiscence, exposing vessels and internal organs. Either could result in a poorer quality of life for the patient, an increased length of stay in hospital, delayed rehabilitation and increased healthcare costs borne by the health service and the patient, i.e. prescription charges, dressing costs, and time away from employment.

Increasingly, SSIs are being identified in the community setting, as patients are allowed home much earlier after surgery (National Institute for Health and Care Excellence [NICE], 2008).

Guidelines for the prevention and treatment of SSI (Department of Health [DH], 2005; NICE 2008) are being implemented partially or fully in organisations across the UK, although there is still a significant amount of work to do to fully embed these guidelines into practice.

During the pre-, peri- and postoperative phases, the NICE (2008) SSI guidelines advocate that a number of actions be implemented by healthcare staff to promote wound healing and reduce the risk of potential complications. These are:

Pre-operative prevention

- Screening for MRSA — elective screening programme and decolonisation for MRSA-positive patients
- Minimising length of stay, pre-operatively — where possible admitting patients on the day of surgery to minimise the risks of other HCAIs
- Excellent hand decontamination — during all phases of surgical care by all HCPs
- Prophylactic antibiotics — for clean-contaminated, contaminated and dirty surgery, given within an hour of induction of anaesthesia, or earlier for surgery where a tourniquet is going to be used to stop blood flow
- Hair removal — use of clippers not razors if hair removal is required, because razors can cause microscopic wounds in the skin, creating a portal of entry and a potential route of infection
- Promotion of nutrition and hydration — optimising patients pre-operatively if possible ensures that they are adequately nourished and hydrated to promote wound healing.

Peri-operative prevention

- Excellent hand decontamination — during all phases of surgical care by all HCPs
- Excellent theatre discipline — removal of jewellery, nail varnish and artificial nails; surgical scrub technique including nail care, gloves, gowns, hats; minimising personnel in theatre; tented theatres
- Alcoholic skin preparation — to

minimise skin flora over the site of the proposed incision
- Maintenance of temperature above 36°C peri-operatively — decreases the risks of postoperative complications including, wound infection
- Maintenance of normal blood glucose peri-operatively — decreases the risks of post operative complications including wound infection
- Maintenance of oxygenation during surgery — utilising supplementary oxygen if required, hypoxia can increase the risks of postoperative complications, including wound infection.

Postoperative prevention

- Excellent hand decontamination — during all phases of surgical care by all HCPs
- Use of dressings — changed using aseptic technique to minimise cross contamination and maintain a moist, warm wound healing environment to promote epithelialisation
- Debridement of open wounds — to remove devitalised tissue and minimise the tissue with potentially high bacterial load
- Recognition of wound infection and appropriate use of antibiotics — identification of the classic and more subtle signs of wound infection including redness, warmth, pain, swelling, increased exudate, increased odour, pain, presence of purulent exudate, pyrexia, raised systemic signs, such as C-reactive protein and white cell count.

Alongside the guidelines for staff responsibilities, there is an element of the guidelines that involves patient education related to preventing SSI, managing their surgical wound and recognising complications. It is essential the patient play an active part in their care where possible To do this they require knowledge about how they can help from a HCP and what they should and should not be doing when they undergo surgery. This is likely to become increasingly important as more patients have day surgery or short-stay care; as such the majority of the postoperative care is provided in the community and the patient is more responsible for early recognition of complications.

Here are 10 tips for advice that healthcare staff should provide patients undergoing surgery.

1 HOW DOES THE WOUND HEAL?

Surgical wounds will, in most cases, heal by primary intention. Patients should be informed that once the wound's edges are opposed, it will be a linear wound with a method of wound closure, such as suturing, clips, surgical glue or steristrips, in place. This will minimise the scarring once the wound is healed and results in the quickest method of healing.

Occasionally, wounds may be left open to heal by secondary intention when, for example, infection has been an issue and the purulent exudate needs to drain from the wound or when there is not enough tissue to cover the wound completely. Additionally, a wound may dehisce (open up) postoperatively due to infection, poor blood supply, haematoma formation, poor nutrition, oedema or mechanical stress on the wound. These patients require a holistic assessment that includes factors that could cause delay in healing, the likely cause of the dehiscence, the size, depth, tissue type, exudate level, odour, pain and surrounding skin margins of the wound. An evidence-based care plan can be implemented by a competent HCP following this assessment.

2 WHAT CAN THE PATIENT DO TO ASSIST WITH WOUND HEALING?

Pre-operatively — Patients should be advised to shower or bathe before their operation, using soap, either the day before or on the day. If a patient is unable to do this independently, then they should be helped to have a shower, bath or bed bath. They should be advised to eat a well-balanced diet pre-operatively if they are being admitted for elective surgery They should be provided with clean bed linen and a clean theatre gown to wear for the surgery. While waiting for surgery they should be advised to keep warm using blankets, dressing gowns, slippers or, if required, a method of artificial warming, such as forced air warming (i.e. using a Bair Hugger™ [3M]) should be implemented by staff to maintain their temperature above 36°C.

Postoperatively — patients should be advised that to promote healing, the wound and dressing should be left alone and not interfered with. They should be advised that the wound requires a healthy balanced diet to assist the body in healing and, if they require additional information and support in meeting their nutritional requirements, staff should advise them appropriately or refer for specialist input.

3 WHAT ARE THE RISKS ASSOCIATED WITH UNDERGOING SURGERY AND WHAT CAN THE PATIENT DO TO REDUCE THESE RISKS?

Infection — at least 5% of patients undergoing surgery will go on to develop a SSI postoperatively. Patients should be adequately informed of the risks of developing a wound infection and the actions that will be taken to minimise this risk.

Haematoma — development of a postoperative haematoma is a potential risk when haemostasis has been difficult to achieve. These are a potential source of infection and should be evacuated/debrided to minimise this risk.

Wound dehiscence — surgical wounds can dehisce for a variety of reasons. Patients should be warned of this potential complication and educated about actions they can take, such as optimising their nutritional intake, minimising heavy lifting postoperatively and maintaining good hygiene. There are also negative pressure dressing systems on the market now that can assist in preventing wound dehiscence, such as PICO™ (Smith & Nephew) or Prevena™ (KCI).

Scarring — the most cosmetically acceptable scarring for patients will be wounds healed by primary intention as these result in neater, smaller wounds for the patients and are quick to heal. Massage of healed incisions with an emollient can assist in flattening scar tissue and improving the cosmetic appearance of scars. For wounds healing by secondary intention, patients could be referred on to a plastic surgeon if the potential scarring is a cosmetic or functional problem for the patient.

Pain — many patients believe it is necessary to experience some pain after surgery. This may affect the amount of analgesia that they use postoperatively. Up to 82% of patients report pain from their surgical wounds for up to 2 weeks after they have left hospital (Apfelbaum et al, 2003).

Unrelieved postoperative pain can increase mortality and morbidities, including poor wound healing (Carr and Goudas, 1999). Depending on the patient's individual response to painful stimuli, the extent of the tissue loss, the nature of the wound bed and location of the wound, the patient's pain tolerance will differ. Actions such as appropriate use of analgesics, as well as non-pharmaceutical methods (i.e. distraction techniques, such as music and play therapy) should be employed to assist in pain control.

Pain at dressing changes can cause patient distress and increase non-compliance with treatment. Patients may avoid dressing changes in particular if they are at home and are responsible for their wound care (Gould, 1999).

4 NUTRITION AND HYDRATION

Intake of a well-balanced diet pre-operatively, where possible, will ensure patients have adequate reserves for the postoperative period when protein and calorie requirements are higher due to wound healing requirements. If a patient is identified as being at high risk of nutritional complications (i.e. through screening using a risk assessment tool or their oral intake is insufficient to maintain weight/health requirements despite interventions from HCPs), then they should be referred to a dietitian for specialist advice.

5 HOW TO RECOGNISE SIGNS OF A WOUND INFECTION/ COMPLICATIONS AND REPORTING TO A HEALTHCARE PROFESSIONAL

Patients should be educated about how wounds heal and the normal process of wound healing. Therefore, they will recognise when healing is abnormal and what they should do in this situation.

Patients should be made aware of the signs of infection they should look for around the site of the wound after they

have been discharged from hospital. They need to be informed of who to contact should any of these signs become apparent.

If an SSI is suspected due to contamination during the operation or because the wound has failed to heal, then a wound swab should be taken for culture and sensitivity, and antibiotics should be prescribed. Choose an antibiotics that is effective for the micro-organisms most likely to have caused the infection, based on wound culture results where possible. Patients should be advised by the HCP to complete the course of antibiotics to minimise development of resistant bacteria. In addition, antimicrobial dressings containing silver, iodine or honey may be prescribed to assist in reducing bacterial load at the wound site.

6 WHEN TO SHOWER

If the patient has a semi-permeable film dressing applied postoperatively, then showering is possible immediately after as these are waterproof. If a fabric dressing has been used, advise the patient to wait for 48–72 hours until the wound has epithlialised and will be suitable to have either dressing removed completely and the wound left exposed.

7 SMOKING CESSATION

Patients who are identified as being smokers pre- or postoperatively should be advised against this practice due to the effects smoking has on delayed wound healing, and provided with the necessary support through smoking cessation services if they wish.

8 HYGIENE AND PATIENT INTERFERENCE

Maintenance of good hygiene is as important for the patient as the HCP. Wounds located in areas of potential high contamination, such as the perineal region, axilla and groin are all potentially higher risk sites for infection. Therefore, maintenance of hygiene in these sites is essential and patients should be assisted to achieve this if unable to maintain this themselves. Patients should be discouraged from interfering with their surgical wounds to minimise the risk of cross contamination from their hands into a susceptible site. If interference is a potential problem, leaving a dressing in place for a longer period of time than normal may be beneficial.

9 DRESSINGS

A surgical wound with the wound edges neatly opposed epithlialises in approximately 48–72 hours (Winter, 1962; Dealey, 1999). However, the epithelial cells are delicate, easily damaged and need protecting, and postoperative dressings should be allowed to remain intact until the second or third day postoperatively.

NICE (2008) recommends that surgical wounds be covered by an interactive postoperative dressing at the end of a procedure. Dressings should be changed using an aseptic technique that ensures excellent standards of hand hygiene and minimises touching of the wound and the surface of the clean dressing that will be in contact with the wound to reduce the risk of cross contamination.

For wounds healing by secondary intention, an interactive dressing should be used to facilitate wound healing. Patients should be provided with adequate supplies of dressings and referred to a competent HCP in the community setting to ensure continuity of wound care.

10 HAIR REMOVAL

Traditionally, patients undergoing surgery will have hair removed from the site of the incision. However, it is not always necessary and, if required, should be undertaken as close to the time of the surgery as possible. If hair has to be removed to facilitate surgery or the application of adhesive dressings, using clippers with a disposable head, rather than shaving, appears to result in fewer SSIs (NICE, 2008; Tanner et al, 2011). Patients should therefore be advised at pre-operative assessment clinics to not remove hair before being admitted to hospital.

Conclusion

With more patients being discharged home from hospital shortly after undergoing surgery, it is essential that patients are aware of potential wound complications and the role they personally play in wound healing. Patients should feel fully informed of signs and symptoms of normal and abnormal wound healing and who to contact should they feel they are developing complications. WE

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Pain management in acute wounds — ten top tips

Many patients with acute wounds will report a degree of pain, the degree of which will depend on the type of wound and perhaps how complex it is. Appropriate, safe and effective pain management is a core part of the care that healthcare practitioners are responsible for delivering and the aim of this article is to help readers develop their skills to implement effective pain management for patients with acute wounds.

The pain experienced by an acute wound is likely to be a mixed pain with both nociceptive and neuropathic elements, and a number of physiological mechanisms that will contribute to the pain. Nociceptive pain occurs in response to actual or potential damage to tissues and is the initial sharp and stabbing pain that the individual will experience, such as that at the site of a surgical wound.

The nerves involved in nociceptive pain are called 'nociceptors.' These are small nerves that respond rapidly to a painful stimulus. Tissue damage initiates the inflammatory process, with the release of chemicals, which will cause nociceptors to become even more sensitive at the site of the wound. This means that the level at which these fibres will then respond (their threshold) is lowered.

Neuropathic pain is due to abnormalities in the nervous system, which can be due to damage or a lesion within the system. Patients who have a neuropathic element to their pain may describe shooting, burning, stabbing pain or unusual skin sensations, including 'pins and needles.'

Accurate pain assessment is the key factor in achieving the best possible standard of pain management. All registered nurses should be able to carry out a systematic pain assessment that will give an in-depth picture of the pain experienced by the patient.

It is often useful to precede the assessment with a simple question, such as: "Tell me in your own words about the pain you are experiencing from your wound." Taking the time to be a compassionate listener, opening therapeutic dialogue and allowing patients to tell their story should help them feel they are being listened to and that they are part of the decision-making process in their own care.

Pain is a multidimensional experience, which is not static. It should be considered that patients' subjective perception of their pain, beliefs and coping strategies will vary according to many factors, including their personality, their culture, their levels of anxiety and their previous experiences.

Systematic pain assessment

Although any assessment focuses on the pain at its current stage, a key question is to find out how long the

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individual has had pain in a wound and whether this has changed. Cutting et al (2005) suggested that any unexpected pain, new pain or a change in pain descriptors may indicate that a wound has become infected. This should, therefore, be investigated without delay. Wound pain may also be due to underlying disease processes, such as vascular problems or neuropathies, or the physical position of the wound, that can make daily activities or even resting very uncomfortable.

Pain severity

It is important to establish whether a patient has a wound that is always painful or whether it is painful with interventions, such as dressing changes, because this information will guide the analgesic plan. In an acute pain situation, the severity or intensity of the pain is the most important initial measure to establish. A simple pain severity tool can be used, the most common ones using a scale of either 0–3 or 0–10, with 3 or 10 being severe pain on these respective tools. For patients with painful acute wounds, the pain must be scored at rest and also with intervention. Even if the patient has not reported pain at rest before, it should be assumed that the pain can change on a daily basis.

Radiation

Can the individual pinpoint where the pain is, or does it radiate elsewhere? Ongoing inflammation or infection can lead to pain that spreads around the wound site, and neuropathic pain can also lead to pain extending away from the actual wound.

Pain descriptors

This is an important part of the pain assessment. Painful wounds are likely to have a number of different sensations that the patient can describe. The different descriptors will guide the assessor towards the type of pain and hence towards the appropriate treatment. So the simplest question to ask the patient is: "How would you describe your pain to me?" The nurse will then look for clues to help assess whether the patient has nociceptive pain, neuropathic pain or both. Descriptors for nociceptive pain will include sharp, stinging, stabbing, aching or throbbing. If a patient also has a neuropathic element to their pain, they may describe sensations including:

- Burning or shooting pain.
- Numbness.
- Paresthesia (altered sensation).
- Allodynia (usually a non-painful stimulus that feels painful).
- Hyperalgesia (a heightened response to a painful stimulus).

Neuropathic pain experienced with a wound can be dependent on stimulation such as dressing changes; this is called 'evoked' neuropathic pain. It can also be spontaneous in that it occurs without an obvious stimulation; spontaneous neuropathic pain can be identified through the presence of intermittent. Spontaneous episodes, which are called 'paroxysms'.

Aggravating factors — what makes the pain worse?

Most patients will report that any intervention with their wound is painful and many dread having dressings changed. The complexity of some wounds seen both in primary and secondary care means that the patient may require prolonged daily dressing procedures, often using mechanical systems, such negative pressure wound therapy with vacuum dressings, which can themselves be painful. Patients for whom frequent dressings are the norm, may experience hypersensitivity and hyperalgesia as the constant interruption of the wound can prolong the inflammatory response.

What helps to reduce the pain?

Patients need to be asked about their current analgesics and whether they feel these are working. The patient's primary team is responsible for optimising the analgesic plan and evaluating this with the patient regularly, to ensure timely and appropriate review. A referral to a pain service should only be made if this approach is not working.

Top tips to managing pain in an acute wound

1 Compassion should always be shown towards the patient. A painful wound is debilitating for the patient, who may be exhausted, fearful, anxious and frustrated. Time should be taken by the healthcare practitioner (HCP) to listen to the patient and to build a relationship that will reduce anxiety and build trust. Meanwhile, HCPs should always explain what steps they plan to take and gain verbal consent.

2 Use systematic pain assessment. This process, as described above, will guide the HCP towards the analgesic plan for the patient in terms of whether the patient requires a regular regimen for constant pain or whether their main requirement is for the management of procedural pain involving a wound. Patients with procedural pain may wish to only have analgesia when they need it but this still needs to be planned in order to have the most significant effect. Conversely, patients with continuous pain need a constant, longer-acting approach, which may still need to be 'topped up' with extra analgesia for dressings.

3 Remember multimodal analgesia. Combinations of analgesics (such as paracetamol, non-steroidal anti-inflammatories [NSAIDs] and opioids) will provide more

effective pain relief as they will have a synergistic effect on each other. Nurses should have a basic understanding of what groups of analgesics are likely to have the best effect in conjunction with one another and they must be able to articulate this to the patient.

In addition, all nurses should understand the basic actions of the medicines that they give their patients and they must be able to assess the effect and seek a review as appropriate (i.e. if the patient does not respond, if the patient experiences intolerable side-effects, or if other comorbidities mean that the prescribed drug is no longer suitable for that patient). Nociceptive pain generally responds to opioids ,whereas neuropathic pain is unlikely to respond. Therefore, if patients are reporting the descriptors that indicate neuropathic pain and is having increasing amounts of opioids with no improvement in their pain levels, it is likely that an anti-neuropathic agent will be more helpful.

4 Don't forget ENTONOX®. ENTONOX (British Oxygen Company) is a simple and accessible medicine that can be used for short-lived, procedural pain in secondary care. It is an equal mixture of oxygen and nitrous oxide, which is inhaled by the patient during a painful procedure, allowing the patient to have complete control over its use. ENTONOX has a fast 'onset' and 'offset' which means that it works quickly but the effect wears off as soon as the patients stops breathing the gas (British Oxygen Company, 2014). The use of ENTONOX also provides a degree of distraction for the patient, which can be a helpful addition in managing pain.

5 The core plan must include administering simple, regular analgesia. This will provide the basis of an effective pain management strategy to which other more potent analgesics can be added in a logical way (World Health Organization, 1986). Unless contraindicated, all patients with a painful wound should be prescribed regular paracetamol as this is more efficacious than when taken 'as required'.

In addition, if a patient is taking an opioid, the concurrent administration of regular paracetamol will produce a synergy between the two medicines, making the opioid more efficient with smaller doses. It should also be established whether the patient could be prescribed an NSAID, such as ibuprofen or naproxen.

There are many contraindications relating to the prescribing of these medicines and any clinical decision relating to prescribing them must consider whether the benefits outweigh the potential risks.

6 With careful assessment, opioids can be very helpful. The most simple way to administer an opioid is by the oral route, which should always be used if possible. Oral morphine solution in the 10 mg/5 ml formula is not a controlled drug and can quickly be administered straight from the drug trolley by a nurse. Most patients can tolerate morphine, although the dose should be reduced for older patients and for patients with hepatic or renal insufficiency as the metabolism and clearance of the drug may be reduced which increases the risk of side-effects. For patients with severe renal insufficiency, it may be more appropriate for them be prescribed an alternative opioid, such as oral oxycodone, which is an opioid with twice the potency of morphine. But what can be given to patients for whom an oral opioid is not an option, such as those who remain nil by mouth or who are not absorbing enterally for any reason? If patients have patient-controlled analgesia (PCA), they should be encouraged to use it pre-emptively and during the procedure. For other patients who cannot tolerate the oral route and if the pain is procedural rather than constant, it may be acceptable to have subcutaneous or intramuscular injections.

Alternatively, they may find that the use of a fast-acting opioids, such as fentanyl, in the form of a lozenge on a stick is helpful and gives the patient control of their analgesia. It is important for the patient to be told that this is an 'off-label' use of this medicine, meaning that it is being used outside of its intended drug licence. This advice must be documented in addition to documented evidence of the patient's consent for the off-label use. Another off-label use for opioids is the topical route. This is generally used for the management of uncontrolled wound pain in palliative or chronic wounds where pain is the primary concern, rather than the healing process.

7 Remember that a painful wound may involve mixed pain. Many wounds will manifest in both a nociceptive and neuropathic element which, in addition to opioids, will require the use of anti-neuropathic agents, such as gabapentin or pregabalin, or adjuvant medicines, such as amitriptyline, which is a tricyclic antidepressant medicine. Recent national guidance (National Institute for Health and Care Excellence [NICE], 2013) recommends that amitriptyline or pregabalin be used as first-line treatments for neuropathic pain.

Although the use of amitriptyline in this context is widespread, it is an 'off-label' usage. Pregabalin may have a faster action than gabapentin and, unlike gabapentin, it does not require a gradual increase in dosing, which may produce better patient concordance. Oral ketamine is also used in some centres, but this should not be considered as part of an acute pain management plan without the support of a specialist pain service.

8 Some medicines can help both nociceptive and neuropathic pain. Medicines such as tramadol and tapentadol may be useful as background analgesics, taken on a regular basis in addition to simple analgesics. Tramadol

has two actions; it acts on opioid receptors and it also enhances the effect of serotonin and noradrenaline, which are neurotransmitters. Tapentadol is a relatively new opioid analgesic that also enhances the action of the neurotransmitter noradrenaline.

9 Take responsibility for reviewing analgesia. An analgesic plan is not static and the nurse must work in partnership with the patient to ensure that the analgesic plan continues to be effective. If it is no longer working well, then the nurse should seek a review. Similarly, nurses should never administer a medicine if they are not familiar with a particular analgesic or if they feel that it is not appropriate for the patient. The safety of the patient is paramount and nursing staff must always question an instruction to commence a complex analgesic plan when advice from a specialist pain service has not been sought. Most acute hospitals will have direct access to an inpatient pain service, most of whom are also happy to give telephone advice to community-based teams.

10 Effective pain management begins and ends with compassion. Managing a painful, acute wound requires more than pharmacological knowledge. Patients may have wounds that take months to heal and the overall management of these requires many skills in order to help patients get the best possible physical and psychological outcomes.

Patients need to feel confident about the skills of those caring for them and in addition to ensuring the best possible analgesic regimen, nurses must ensure patients are treated with kindness, care and compassion. WE

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Skin grafts — the surgical help in wound healing

Wounds are managed in a multitude of care settings and there will be occasions when a patient's wound would benefit from the surgical intervention of a skin graft to aid healing. It is important the healthcare practitioner (HCP) is able to assess when it is appropriate for an individual's wound to be referred to a surgeon and when it is in the individual's best interests for them to be managed conservatively with wound dressings. Skin grafting is an invaluable technique, which can more rapidly aid wound healing. The HCP needs to assess the individual, taking into consideration their age, comorbidities, lifestyle and the wound itself. The HCP must understand what is involved in the procedure of skin grafting to keep the patient informed and aid in decision-making.

"Skin grafts may be classified as partial or full thickness grafts, depending on how much of the dermis has been harvested by the surgeon."

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As the number of older people in the UK rises, the incidence of dermal injuries, such as skin tears, haematoma, pretibial lacerations and other injuries, is also likely to rise. Consequently, appropriate wound management is important and healthcare practitioners (HCPs) have a duty to provide cost-effective clinical care.

For the older person with an extensive dermal injury, conservative wound management using dressings may take several weeks or even months. Therefore skin grafting should be considered — provided it is appropriate for that individual.

Skin grafting has been used for many years to provide rapid skin coverage of a wound. This has the advantage of sealing the wound, reducing pain and discomfort, and instigating rapid healing (Beldon, 2003).

Skin grafts may be classified as partial or full-thickness grafts, depending on how much of the dermis has been harvested by the surgeon. A split-skin or partial-dermal skin graft involves excision of the epidermis and part of the dermis, but leaves behind enough dermal tissue to enable to skin to spontaneously regenerate. The most common donor site areas for split-skin grafts include thigh, buttock, back, upper arm, forearm and abdominal wall (Coull, 1991).

A skin graft is a section of epidermis and dermis that has been completely separated from its blood supply in one part of the body — the donor site — before being transplanted to another area of the body; its recipient site (Grabb and Smith, 1991).

Assessing the individual for a skin graft

Considerations will include:

- Whether the individual is medically well enough to have a

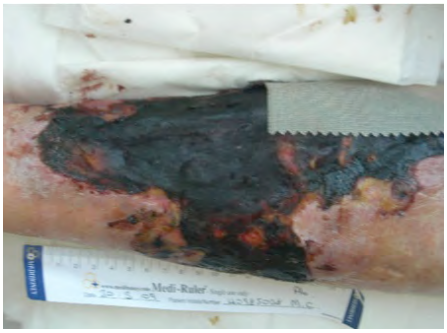

Figure 1. ***Example of haematoma to the lower leg.***

Figure 2. ***Newly applied meshed skin graft to a wound.***

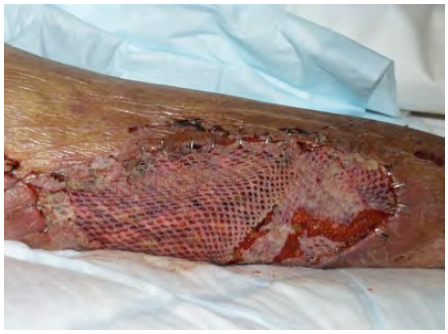

Figure 3. ***Example of skin graft sutured in place.***

general anaesthetic
- Any comorbidities that would complicate surgical wound healing
- Would the short period of immobilisation required immediately following a skin graft procedure, cause problems for the individual in regaining mobility
- Continence problems — since the skin graft is usually harvested from the thigh, a donor site dressing saturated with urine could lead to infection
- The individual must understand they will have two wounds; a donor site and the skin graft site
- Is the wound infected? If so, this will need to be eradicated; any infection would compromise the success of the skin graft.

As an example, Mrs D had sustained a haematoma (*Figure 1*) to her lower leg, which was likely to take several months to heal. Mrs D had no comorbidities that would contraindicate anaesthesia or surgery and is fully continent. She understood she will have a second wound on her thigh, which will be donating the skin to her lower leg wound and was happy to proceed.

Once the patient and their wound have been assessed by a HCP who is both proficient in wound management and with knowledge of skin grafting, and the patient is happy to proceed, the patient can be referred to a surgeon experienced in skin grafting. It is now commonplace for surgeons of various backgrounds to have expertise in skin grafting, such as orthopaedic, vascular and general surgeons, in addition to plastic surgeons.

Meshed skin grafts

If a patient has an extensive injury the surgeon may decide to use a meshed skin graft. The donor skin is passed through a meshing device, which inserts multiple fenestrations (holes), into the skin graft, allowing the surface area to be dramatically increased (*Figure 2*). Therefore, a graft that originally measured 5 × 5 cm may be doubled or tripled in size, avoiding the need to harvest large areas of skin, and sparing the patient a large donor site wound. This is especially useful in the older person, where reduction of donor site wound size is important to reduce pain and discomfort and enable quicker healing.

Meshed skin grafts also enable any blood or exudate to pass through and into the dressing, preventing the development of haematoma or seroma under the graft, which could cause it to fail. The fenestrated graft rapidly epithelialises to provide complete skin cover. Meshed skin grafts are useful on lower limbs or unexposed areas of the body, but as the graft retains the meshed appearance it would be unsightly on the hands, neck or face (McGregor and McGregor, 1995).

Application of the skin graft to the recipient site

For a skin graft to successfully adhere to the wound bed, it must be clean from devitalised tissue and infection, and be held in close proximity to the wound bed and immobilised. This is achieved by suturing or stapling the graft in place (*Figure 3*), and using a firm dressing to ensure that shearing does not occur, moving the graft against the wound bed.

Adherence of the skin graft to the wound bed

Soon after application of the skin graft, a fibrin network, acts as a biological 'glue' and adheres the graft to the wound bed. This network is then infiltrated by fibroblasts, leucocytes and phagocyte cells from the wound bed and is converted into a fibrous tissue attachment between the skin graft and wound bed. Innosculation occurs when severed blood vessels in the skin graft anastomose or unite with the severed ends of vessels of approximately the same diameter in the wound bed. This occurs between 24–72 hours after application of the graft. The fibrin network acts as a supportive frame along which endothelial buds from blood vessels in the wound bed grow to meet the skin graft blood vessels.

Blood flow through the anastomoses into the graft vessels

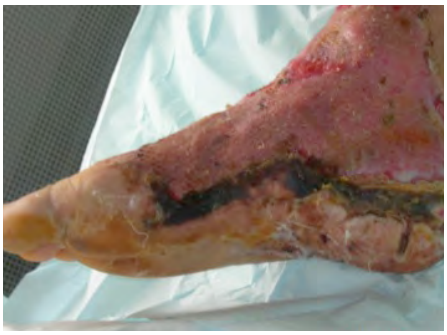

Figure 4. ***Mature area of skin grafting has taken on the pink hue of underlying tissue. The edges are dark and require trimming away to ensure new skin continues to cover the wound bed.***

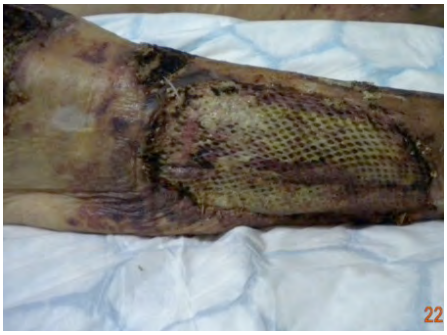

Figure 5. ***Mature meshed skin graft applied to a leg wound.***

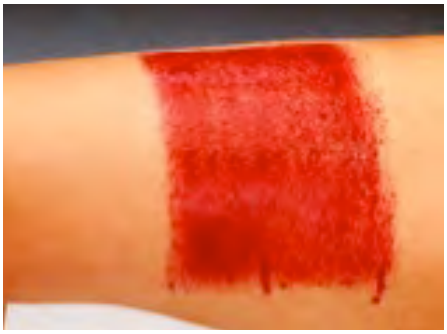

Figure 6. ***Newly created donor site wound following harvest of skin graft.***

occurs on day 3–4 and is sluggish until day 5 or 6 (Converse et al, 1975). The skin graft begins to develop its own system of blood vessels (Pope, 1988) and lymphatic vessels (Swaim, 1990). Initially, the skin graft appears pale, but takes on a red/purple colour as the new blood vessels mature within the graft site (*Figure 4*).

As the graft continues to mature in its new site, it regains partial sensation from the sensory nerves of the wound bed. Scar contracture then occurs gradually over the next 6 months to 1 year. The thicker the graft, the less contracture occurs (Branham and Thomas, 1990).

First inspection of the skin graft

The first postoperative inspection of the skin graft is usually performed between 2–5 days (Young and Fowler, 1998). Timing of the first inspection is dependant on a range of factors, including the wound site, the thickness of the skin graft, how the skin graft has been immobilised, the age of the patient and the existence of any underlying medical conditions which could delay healing.

The first inspection may take place in hospital, a clinic or in the community — provided the HCP has the necessary expertise to assess the skin graft adherence and determine further management of the wound. Patients are understandably anxious prior to the first inspection. It is important they understand the skin graft will not appear the same colour as their uninjured skin, but rather is likely to appear red/mauve in colour due to revascularisation. If a large amount of devitalised tissue or a lesion has been removed, there may be a significant depression to the normal outline, which will dismay the patient. If the presence of infection is suspected, the patient should be warned that none of the skin graft may have survived (Beldon, 2003).

On first inspection of a skin graft site, it is important to remove the overlying dressings with care. Occasionally these are firmly adhered to the graft by dried blood or exudate and may need to be soaked away. It is possible to traumatise the new vascularity of the graft by clumsy removal of the dressing. Successful adherence of the skin graft to the wound bed is determined by colour and immobility. A partial or split-skin graft should be pink/red due to successful inosculation and revascularisation, whereas a full-thickness graft will be slightly paler.

On placing a gloved finger onto the skin graft, it should not be mobile, but firmly adhered to the underlying wound bed. The percentage of skin graft which has adhered successfully to the wound bed is estimated. A completely covered wound with an immobile, vascularised graft is deemed to have 100% coverage.

Whether or not the skin graft has adhered to the wound bed, all sutures, staples or glue should be removed. Their purpose has been served. There is nothing to be gained from leaving dissolvable sutures *in situ*, because they may act as an irritant and detract from the aesthetic result. In addition, any graft overlapping the edges of the wound should be trimmed away using sterile scissors.

Dressings for skin graft sites

If a skin graft has completely covered a wound bed and is well adhered, it may require no further dressings, unless it is in an area of the body that may be subjected to mechanical stress (i.e. clothing rubbing), in which case the wound may require a simple silicone dressing (i.e. Mepitel® [Mölnlycke Health Care] or Adaptic Touch® [Systagenix], 1–2 times per week until the whole wound is completely covered with skin).

Following this, the patient should be advised to gently wash and pat dry the area. Gentle, regular massage with a non-perfumed emollient will help the graft become supple.

If the skin graft has only been

partially successful in covering a wound area (*Figure 5*), or it is a meshed skin graft, it will require dressings to encourage epithelialisation of the whole wound. Again, a simple silicone dressing with supportive bandaging to a lower limb is sufficient and the healing continues via the skin graft.

If infection is present, an antimicrobial dressing is appropriate to reduce the bacterial load of the wound. The choice of antimicrobial dressing is dictated by the bacteria causing the infection (e.g. if *Pseudomonas aeruginosa* is present, causing a typical fluorescent green exudate, then a silver dressing is useful to eradicate that bacteria).

If the skin graft has been successful, the patient should now be able to mobilise. It is important that the older person should only have their mobility curtailed for a short period of time to avoid protracted rehabilitation.

Donor site wounds

There tends to be great importance placed on the success of the skin graft by the patient and the HCP. However, a second wound — the donor site wound — is created in order to gain a skin graft. The surgeon chooses the donor site wound according to the closest match in skin tone, colour and texture, how large a skin graft is required and how visible the donor site scar will be in public.

It is of vital importance that the patient is aware that to heal the original wound, a second wound must be created, which will also produce a scar. The patient should also be warned the donor site wound may be more uncomfortable than the graft site wound, due to the exposure of sensory nerve endings. Regular analgesia will be required (Voineskos et al, 2009; *Figure 6*)

Healing of donor site wounds

The healing of donor site wounds occurs through re-epithelialisation. Epithelial cells migrate from the remnants of hair follicles, sebaceous and sweat glands remaining in the reticular (deep) dermis of the skin and spread across the wound bed until full skin integrity is restored. This usually occurs within 7–10 days, but may take as long as 21 days, depending on the age and nutritional status of the patient.

"In order to minimise discomfort for the patient it is vital to use an appropriate dressing."

Wound healing in older people may quicken if the surgeon uses a small amount of the skin graft and widely fenestrates it, applying it as a dressing to the donor site (Fatah and Ward, 1984). In the first 3–4 days post-surgery, the donor site wound produces moderate to heavy amounts of exudate (*Figure 7*), depending on the size of the wound area. Following this exudate levels diminish as re-epithelialisation progresses.

In order to minimise discomfort for the patient it is vital to use an appropriate dressing. Removal of an inappropriate dressing can cause a great deal of pain and discomfort, and may even delay wound healing (European Wound Management Association, 2002). One dressing that could be applied to the donor site and left *in situ* until the wound is healed would be ideal. However, this is unlikely, due to the variability of patient, skin texture and wound site. Surgeons usually apply a silicone-based dressing, which will not adhere to the donor site as it heals.

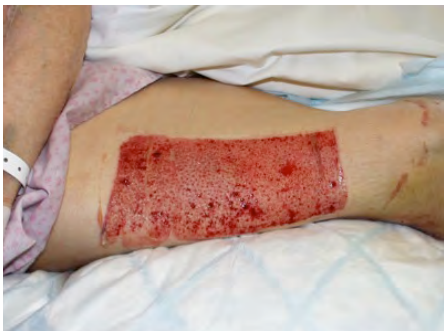

Figure 7. ***Partially healed donor site wound to upper thigh.***

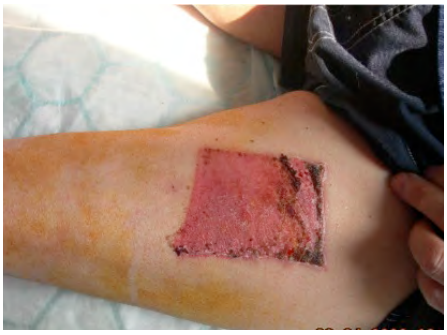

Figure 8. ***Newly healed donor site wound. Initially bright pink, this will fade over several months until the area is paler than the surrounding skin.***

Initially, the donor site wound will produce copious amounts of exudate, so an absorbent dressing, such as a foam, alginate or Hydrofiber® (ConvaTec), is the most appropriate to apply over the silicone dressing and will manage the exudate at this time. This dressing will need to be replaced when saturated.

The exudate levels fall dramatically after 5–6 days. The wound bed becomes dry, at which time the non-adherent silicone dressing alone would remain *in situ* and could remain undisturbed for several days or until the wound is healed without adhering to the wound bed (*Figure 8*).

Dempsey and Fowler (1998) described the care of donor site wounds thus:

- Administer analgesia regularly

- Aid pain management by elevation and/or immobilisation of the donor site area
- Observe and act upon signs of excess bleeding, infection pain unrelieved by analgesia and pyrexia
- Reassure the patient regarding wound odour, which may cause embarrassment
- Remove the dressing before the agreed date only if it is contaminated. Review the initial primary dressing choice and change to antimicrobial dressing if appropriate
- Ensure choice of dressing is practical and appropriate to that patient
- Allow primary wound contact layer to separate spontaneously
- Classify a donor site as healed only if the primary contact layer is removed without pain leaving a dry, re-epithelialised surface
- Ensure the patient has appropriate advice regarding aftercare.

Patient advice following healing of donor site wound

Patients are generally anxious regarding their wounds and need reassurance that once the wound is healed, it is appropriate for them to conduct their own aftercare. The donor site wound will appear dry, pink and possibly itchy on initial healing. Because it does not look the same as the rest of their skin, patients are understandably wary when told this is normal and the wound is 'healed'.

Patients should be given the following advice:

- Although itchy, please do not scratch. The new skin is fragile and may be broken by scratching. Regular application of emollients may help
- Wash the skin using a non-perfumed soap and pat dry, do not rub
- Avoid sunbathing and apply a total sun block cream for the first year to avoid burning (Dempsey and Fowler, 1998).

Conclusion

The use of skin grafts to aid wound healing is a useful adjuvant for the management of pretibial lacerations, haematoma and large dermal injuries. Such injuries are debilitating to the patient, reducing both mobility and quality of life. If they can be resolved sooner by the use of a skin graft it should be considered, provided it is appropriate and in the best interests of the patient.

Movement of skin from one area of the body to another can be daunting to many patients. Therefore, they require explanations regarding procedures and expected progress of both the skin graft and donor site wounds. Care of these wounds demands knowledge, expertise and confidence by the HCP. WE

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Choosing the appropriate dressing: Alginate and Hydrofiber®

Forming part of our ongoing dressing series, this article examines the modes of action and benefits of both alginate and Hydrofiber® dressings in wound management. Alginate and Hydrofiber dressings are soft, highly absorbent and pliable dressings, making them easily acceptable by both patients and clinicians. These dressings can be used in the management of highly exuding wounds, such as pressure ulcers, leg ulcers and pilonidal sinuses.

Choosing a dressing for a wound to aid healing has become more complex due to the ever-increasing number of products on the market, leading to a plethora of choice. As companies continue to develop the 'ideal' dressing, clinicians must remember that wound healing is physiological and there is an underlying cause to any wound. It is easy to focus on the huge range available and then merely trying one at random, but for any dressing to be effective, a comprehensive assessment of the wound is required to identify why it has occurred in the first instance and why it is failing to heal.

Prior to selecting the appropriate dressing, the clinician needs to understand how bodies heal and why wounds occur so that all aspects of wound healing can be addressed to ensure successful outcomes for the patient. Most dressings should not be changed frequently; using an appropriate dressing for the correct time period will help to obtain the desired effects. Modern dressings are generally designed to be able to stay on wounds for at least 3 days and for up to 7 days (depending on exudate levels), and leaving the dressing on for as long as possible will allow maximum effectiveness as long as the choice was suitable in the first instance! If a wound is not progressing, the clinician should reassess and re-examine the patient, and try not to allow the wound to become too large or chronic before seeking the help of a specialist.

Formularies

Most healthcare organisations provide a wound care formulary. Formularies can assist clinicians in selecting the appropriate products, while helping organisations to manage their prescribing budgets and use resources wisely.

Formularies will often provide essential information on the rationale for use of products. Patients can have high expectations and often believe that it is the dressing that is healing their wound and they have no part to play in

"Prior to selecting the appropriate dressing, the clinician needs to understand how bodies heal and why wounds occur so that all aspects of wound healing can be addressed to ensure successful outcomes for the patient."

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the healing process. Education is vital to ensure patients understand their part in wound healing. They can do so by keeping active, eating nutritious meals, taking their medication, sleeping well and having good skin hygiene.

There are many categories of dressings, such as:

- Alginates
- Antimicrobials
- Foams
- Honey
- Hydrocolloids
- Hydrofibers® (ConvaTec)
- Hydrogels.

This article is part of an ongoing series on choosing the appropriate dressing. You can find an article on hydrocolloids in *Wound Essentials* 7(2), hydrogels and sheets in 8(1) and honey in 8(2).

Alginate and Hydrofiber dressings

Alginates are produced from brown seaweed and their use dates back to the 1800s where it was discovered to be effective in treating sailors' wounds and was known as the 'Mariner's Cure' (Morris, 2008). Sailors used the seaweed because it was absorbent and biodegradable.

Alginates were not used again until 150 years later when they began to be used in wound care. Alginates are well known for their haemostatic properties and are used to control minor bleeding, although not all alginate products are licensed for haemostatic use. Alginates are soft, conformable and biodegradable dressings.

Hydrofibers are dressings made from the Hydrofiber® technology, which is trademarked, as there are no other dressings on the market manufactured in the same way. They are composed of sodium carboxymethylcellulose and were first produced in 1997. Hydrofibers are produced as a textile fibre, which is held together by a needle bonding process that strengthens the construction when wet, allowing it to be removed in one piece (Thomas, 2006). The brand name is Aquacel® (ConvaTec). These dressings are known for their absorbency in managing wound exudate and they have no haemostatic properties.

Alginates and Hydrofibers are manufactured in various ways, but are available in similar presentations: from ropes and ribbons for packing, or flat sheet dressings. Some manufacturers include a probe to measure the wound depth and for inserting the product into the wound. The dressings come in different sizes and different preparations for levels of absorbency (*Figure 1*). These are all primary dressings and most will also require a secondary dressing to secure.

Some common examples include alginate dressings — Sorbsan® (Aspen Medical), Kaltostat®(ConvaTec), Tegaderm Alginate™ (3M), SeaSorb® (Coloplast). Common examples of Hydrofiber dressings include Aquacel, Aquacel® Extra™, Versiva®, Aquacel Foam (all ConvaTec).

Mode of action

Alginates are used for moderate to heavily exuding wounds where they maintain a warm moist environment that promotes healing and the formation of granulation tissue (Heenan, 2007). They form a soft, amorphous (shapeless) gel when they absorb exudate (*Figure 3*).

Alginate dressings are derived from calcium and sodium salts of alginic acid obtained by different types of seaweed. Alginic acid contains mannuronic and guluronic acid and the different proportions

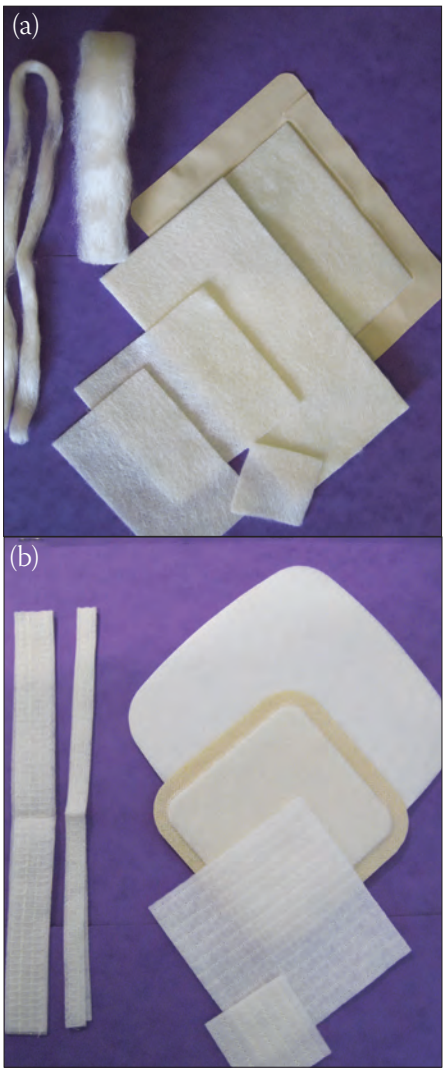

Figure 1. ***(a) Examples of alginate dressings. (b) Examples of Hydrofiber dressings.***

of each within the product will affect how the alginate gels, as well as the speed of gelling as exudate is trapped around their fibres. Different brands of alginate dressings, therefore, will vary at the rate they gel within the wound bed (Pudner, 2001).

Hydrofibers are also used in managing moderate to heavily exuding wounds, where they work by absorbing the exudate vertically into the dressing, keeping the shape of the wound. This prevents maceration of the periwound skin. Hydrofiber dressings conform to the wound bed and trap bacteria into the gel (Thomas, 2006). When the soft, woven textile fibre

material comes in contact with exudate or moisture, the material turns to a gel (*Figure 4*). The Hydrofiber locks the exudate into the gel where there is little release of fluid back to the wound surface (Chen, 1998).

Hydrofibers and alginates are also available with silver as an antimicrobial dressing to reduce the bioburden of the wound bed, e.g. Sorbsan Silver (Aspen Medical) and Aquacel Ag (ConvaTec).

Clinical indications

Both alginates and Hydrofibers are chosen for their ability to absorb exudate, creating a gel for ease of removal without damaging the wound bed. They can be used on sloughy wounds to aid and facilitate autolytic debridement by creating a warm, moist environment as they both form a gel within the wound bed on contact with exudate.

"Alginates and Hydrofibers can be used on granulating wounds where there is enough moisture present to create the gelling effect."

Alginates and Hydrofibers can be used on granulating wounds where there is enough moisture present to create the gelling effect. They are no longer indicated when they adhere to the wound bed. Alginates rich in mannuronic acid can be removed with warm saline solution, the alginate fibres react with the calcium ions forming a gel (Thomas, 2010) and any fibres left in the wound need to be irrigated away with saline as they may cause an inflammatory response (Pudner, 2001).

Hydrofibers can be removed with warm water or saline if adhered to the wound bed. Both these dressings are soft and pliable and can be applied to wounds on all areas of the body.

Alginates are chosen for their ability to control exudate and aid the formation of granulation tissue (Heenan, 2007). Due to the haemostatic properties of certain alginates, they are effective in wounds that have a tendency to bleed (Pudner, 2001).

Hydrofibers are often chosen for their increased absorbency which increases dressing wear time, therefore, reducing the amount of dressing changes and preventing maceration.

Alginates and Hydrofibers can be left in place for a maximum of 7 days or changed when saturated.

Wound types that alginate and Hydrofiber dressings are suitable for are:

- Pressure ulcers
- Leg ulcers
- Pilonidal sinuses
- Burns
- Surgical wounds
- Donor sites
- Diabetic ulcer
- Trauma wounds.

These dressings can be applied into cavity and sinus wounds, such as deep pressure ulcers or pilonidal sinus wounds.

Considerations and contraindications

When using alginates and Hydrofibers, the following contraindications must be considered:

- Neither alginates or Hydrofibers are suitable to be used on dry or necrotic wounds, as there will be no action from the dressing without exudate
- The periwound skin must be protected to prevent maceration
- Alginates can adhere when used as a haemostat and could cause trauma on removal if not soaked off with saline
- Both alginates and Hydrofibers can be used on infected wounds. When using on infected wounds, clinicians should consider choosing an alginate or Hydrofiber that has an antimicrobial added to reduce the bioburden in the wound bed. If a systemic raised temperature is present with the clinical signs of infection, the patient should be prescribed antibiotics.
- Allergy to seaweed
- Ensure all cavity wounds are

Figure 3. Example of gelling in an alginate dressing.

Figure 4. Example of gelling in a Hydrofiber dressing.

probed to establish depth, probe in all directions to identify the wound bed diameters. Do not pack dressings into wounds where the wound bed cannot be established as a dressing could be lost into deep tissues.

Method of use

Applying alginates

When applying alginates, the clinician should:

- Apply direct to wound
- Consider that some alginates need to be cut to the size of the wound to prevent macerating the surrounding skin, while others can overlap the surrounding skin. Check manufacturer's instructions
- Be aware that if vertical wicking products are used, these can overlap the wound by 1 cm
- Lay flat dressings onto wounds, however, these can be applied into cavity wounds
- Consider that ribbon alginates can be applied into cavity and sinus wounds using a probe. Do not pack tightly but try to ensure the dressing conforms to the wound beds
- Protect surrounding skin with a skin protector preparation
- Apply a secondary dressing where indicated
- Remember that alginates can be left up to maximum of 7 days, however, change when dressing has reached maximum saturation
- Ensure you choose the most appropriate form of alginate as they come in various forms for level of absorbency
- Remove alginate dressing with warm saline solution; as it forms a gel this should be pain free.

Applying Hydrofibers

The following steps/considerations should be taken when applying Hydrofibers:

- Apply direct to wound
- There is no need to cut to shape and can be overlapping the wound by 1 cm
- Skin protectors can be used dependent on skin condition
- Flat dressings are laid onto the wound and can be used in cavities
- Ribbon Hydrofibers can be applied into cavity and sinus wounds using a probe. Do not pack tightly but try to ensure the dressing conforms to the wound bed
- A secondary dressing is then required
- When wet, Hydrofibers retain their shape and can be removed easily, however, if adhered to the wound bed these can be removed with warm water for a pain-free removal
- These dressings can be left *in situ* for a maximum of 7 days or changed when they have reached maximum absorbency.

"As the wound progresses to the granulation and epithelialising stages of wound healing and exudate reduces, the clinician should reassess the wound for appropriateness of alginate and Hydrofiber dressings."

As the wound progresses to the granulation and epithelialising stages of wound healing and exudate reduces, the clinician should reassess the wound for appropriateness of alginate and Hydrofiber dressings.

Conclusion

Understanding and using dressings appropriately continues to be a challenge for clinicians. For wound care to be successful, knowledge of wound healing, wound types and wound presentation is essential before choosing an appropriate dressing. Both alginate and Hydrofiber dressings are valuable tools in the management of the exudating and sloughy wounds.

As with the selection of any dressing, there are other interventions to consider to maximise wound healing. A holistic assessment will identify any underlying medical and physical conditions or patient behaviours that may impact on wound healing, and by addressing as many of these factors as possible, the wound has the best possible chance of healing. WE

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CHRONIC WOUNDS

Flexion contractures in the older person

Fania Pagnamenta

Pressure ulcers: avoidable versus unavoidable in primary care — an update for 2014

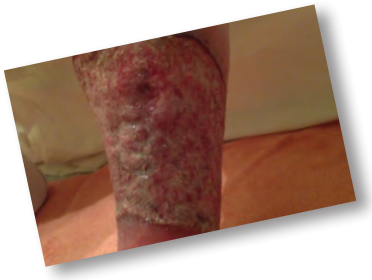
Jackie Stephen-Haynes

When is a leg ulcer not a leg ulcer?

Heather Newton

Key points

- In the older person, once a flexion contracture has formed, it is often irreversible once muscle atrophy occurs. The joint that is mostly affected is the knee, as the leg can no longer be straightened; this has significant impact on the ability to turn patients to prevent pressure ulcers.
- The National Patient Safety Agency has set the agenda for NHS organisations across England and Wales to achieve the prevention of all avoidable PUs. High-impact actions were launched in 2010 as an acknowledgement that the elimination of PUs requires input from the multidisciplinary team with a focus on developing processes that, when followed and used every time for every patient, will reduce avoidable PUs.
- Squamous cell carcinomas (SCCs) usually remain confined to the epidermis for some time, however, as they grow larger they can penetrate the underlying tissues. SCC is the second most common skin cancer with approximately 10,000 people per year being affected in England and Wales



Flexion contractures in the older person

Prolonged immobility in older people can cause contractions to the legs. Once the legs are contracted, it becomes difficult to position patients in order to prevent pressure damage to the hips, shoulders and outer aspect of the ankles, as well as in between the knees and ankles. This article describes some simple tips for preventing such damage.

Patients who are chronically ill, aged or disabled are particularly susceptible to the adverse effects of prolonged bed rest, immobilisation and inactivity. Immobility causes a host of diseases and problems in the older person that can, in turn, produce further disability. The effects of immobility are rarely confined to only one bodily system and may later cause a wide range of complications, such as constipation, muscle pain, osteoporosis, hypothermia, aspiration pneumonia, incontinence, deep vein thrombosis, muscle atrophy and contractures.

From a psychological point of view, immobility can cause isolation, loss of independence, sensory deprivation, depression and dementia. While immobility in older people often cannot be prevented, many of its adverse effects can be. Improvements in mobility are possible for immobile older adults and relatively small improvements in mobility can decrease the incidence and severity of complications, and improve the wellbeing of the older person. This article will concentrate on the increased risk of developing pressure ulcers in the patient with flexion contractures.

Flexion contractures

Flexion contractures (or flexion deformity) are particularly common among the older population with senile dementia, those who have had a poor recovery from a cerebral vascular accident (Sackley et al, 2008) and those who have lost sensation in lower limbs for a variety of neurological pathologies, such as multiple sclerosis, Parkinson's disease and post cerebrovascular accident (CVA).

Flexion contractures are defined as a shortening of the connective tissue, which causes the joint to stiffen (Chitnavis, 1997). The process starts with loss of muscle mass (called amyotrophy): the muscle contracts and, at the same time, the ligaments and tendons start to weaken and retract, resulting in the limb becoming more and more contracted. Fibrous tissue starts to develop and the joint can no longer be straightened.

In the older person, once a flexion contracture has formed, it is often irreversible once muscle atrophy occurs (Beldon, 2009). The joint that is mostly affected is the knee, as the leg can no longer be straightened (*Figures 1 and 2*); this has significant impact on the ability to turn patients to prevent pressure ulcers. The patient becomes extremely vulnerable to pressure damage, especially if their nutritional status is compromised and they suffer from

"The joint that is mostly affected by flexion contractures is the knee, as the leg can no longer be straightened; this has significant impact on the ability to turn patients to prevent pressure ulcers."

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sarcopenia (extreme muscle wasting; Beldon, 2009).

Contractures can be prevented by splinting, range-of-motion exercises, and proper positioning (Clay, 2004). Prevention of contractures development is based on the simple rule of limiting the period of bed rest with regular limb exercise and limiting any periods of bedrest to maintain joint flexibility and avoid muscle shortening. Such prevention is necessary not only because of the loss of strength and function that contractures cause, but also because they may compromise the blood supply to that limb and, therefore, put the patient at more risk of developing pressure ulcers to the heel and foot.

Pressure ulcers

Patients who are bed bound or confined to a chair are often affected by pressure ulcers. These are painful and reduce the patient's ability to journey towards rehabilitation. The impact of pressure ulcers on patients is highly significant, causing prolonged immobilisation, loss of independence and poor rehabilitation prospects. Flexion contractures are frequently reported as a common complication of immobility but they are easily preventable using simple methods.

Pressure ulcers develop when bony prominences form 'protrusions' that put pressure on the skin and flesh between the bone and a hard surface, such as beds and chairs. The first sign, which is a warning sign of an impending pressure ulcer, is reddened skin (or erythema) that occurs on bony areas. At this stage, a pressure ulcer can still be avoided if pressure is immediately relieved.

If pressure is unrelieved, the 'skin redness stage' moves to persistent erythema; redness that is described as unblanching (category I pressure ulcer, using National Pressure Ulcer Advisory Panel/European Pressure Ulcer Advisory Panel NPUAP/EPUAP 2009 categorisation). If the pressure continues to be unrelieved, deeper pressure ulcers can form (category II, III or IV; NPUAP/EPUAP, 2009). Pressure ulcers are the result of the death of the affected tissues due to local deprivation of blood supply and oxygen. Pressure ulcers may lead to fatality if untreated, but should never progress further than the stage of reddened skin if preventative measures are taken.

How to prevent pressure ulcers in the contracted patient

The first consideration when preventing pressure ulcers is the assessment of the patient and the areas that are especially susceptible to pressure. When the contracted joint is the knee, areas such as the hips, the shoulders and the outside of the ankles are most at risk as the patient is difficult to position to the 30° angle, described below. Areas such as in between the knees and the inner ankles are equally at greater risk of developing ulcers.

Thirty-degree turning

Frequent repositioning of the patients is recommended. Using the 'rule of 30' when repositioning residents offers effective pressure ulcer prevention. This rule indicates that the head of the bed should be elevated to 30° or less and that the body, when repositioned to either side, be placed in a 30° laterally inclined position. In this position, the individual's hips and shoulders are tilted 30° from the supine position, which prevents pressure over the trochanter and sacrum. If the head of the bed is elevated beyond 30°, the patient should not be left in that position for long periods of time to minimise shears forces and pressure.

Positioning aids

Pillows, pads, or foam wedges should be used to keep bony prominences from direct contact with one another. This will help to maintain proper body alignment and reduce the potential of pressure-ulcer formation from bone-to-bone contact.

Some patients have to wear splints or boots in bed to stop contractures from developing or to slow down the process of the limb contracting further. Additional attention should be paid to these patients because these devices could create significant pressure should they come in contact with an unprotected opposing limb.

Figure 1. ***Knee contracted to 90° angle.***

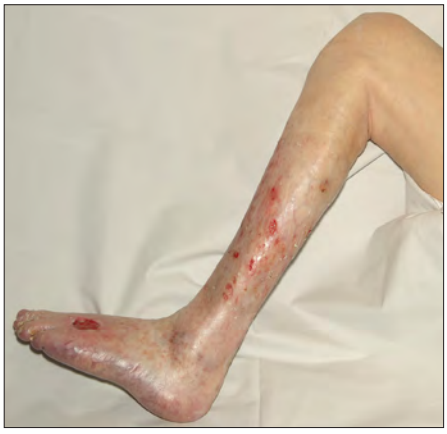
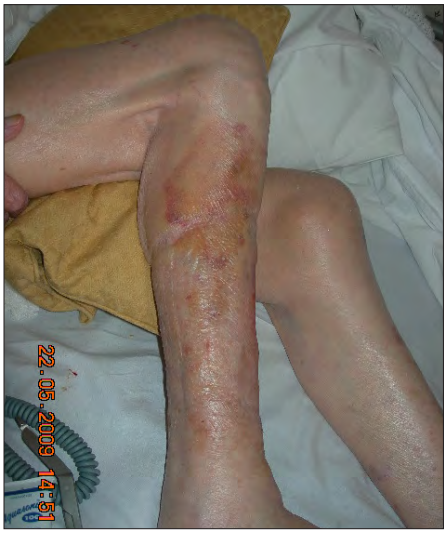


Figure 2. ***A further example of knee contraction.***



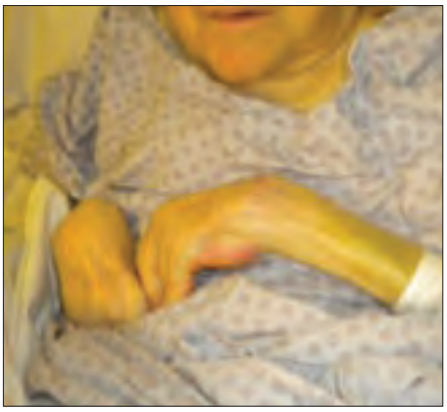
Using gel pads

Gel pads are helpful in the prevention of pressure damage caused by contractures, such as in between the knee. They are washable and easy to place in position and remove, thereby enabling frequent skin inspections. These can be used over red skin but the skin must be intact, otherwise it will change the shape of the limb and may cause further pressure to the area it is aimed to protect.

Contractures of the hand

Another fairly common part of the body prone to develop flexion contractures are the hands, especially after CVA, where the fingers contract, claw like, into the

Figure 3. ***Flexion deformity to the upper limbs.***



palm of the hands (*Figure 3*). Fingernails must be kept short when the hand is contracted to prevent damage because nails can dig into the palm of the hands. Gel pads can be useful in preventing this from happening.

Passive exercises

At least twice per day, passive exercises of all limbs should be undertaken to prevent the affected limb from becoming more contracted or the unaffected ones becoming contracted. An example of a passive exercise is to straighten and bend the affected limb gently.

Engaging family members and carers to do passive exercises with their loved one, while they are visiting, for example, will not only offer key preventative care but also offer the patient a therapeutic touch. Nursing staff should remember to do a few passive exercises every time they undertake personal care.

Conclusion

Preventing flexion contractures is simple, if the onus is placed on good limb positioning and repositioning, encouraging the patient to do gentle exercises or offering passive movements of the limbs in cases where the patient is unable to conduct this themselves. Reducing immobility and, thus, the risk of contractures is also the best prevention for pressure ulcer development. Where prevention of flexion contractures has failed, care of the contracted limbs, especially the leg, involves careful repositioning (using the 30° turning technique) with pillows, foams and possibly gel pads to prevent further damage. WE

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Pressure ulcers: avoidable versus unavoidable in primary care — an update for 2014

This article considers the current pressure ulcer (PU) agenda across the UK for the elimination of avoidable PUs, and identifies the definitions of 'avoidable' and 'unavoidable'. The implication for PUs within the primary care setting is discussed and a Decision Against Tissue Advice (DATA) tool that is used when an individual seeks to take a decision against tissue viability advice is examined. The focus on PU prevention requires responsibilities at a personal, professional and political level, all of which are emphasised in this article.

"The clinician should be mindful the elimination of pressure ulcers (PUs) is a national agenda of significant importance and an area of clinical practice that requires all staff to be aware of and up to date in their knowledge of PU prevention."

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Pressure ulcers (PUs) are a significant outcome indicator and have appeared on the national and political radars due to the high number of people who develop them, as well as the clinical (Gerick et al, 2009) and financial outcomes (Department of Health [DH], 2010a) of PU development. PUs significantly affect quality of care and are estimated to cost between £363,000 and £543,000 for a category III PU and between £447,000 and £668,000 for a category IV PU (DH, 2010a).

The prevention of PUs is an essential aspect of healthcare and the involvement of the multiprofessional team is important. The DH (2010a) reported 42,995 episodes of PUs in 2007/8.

Drew et al (2007) reported that the majority of these wounds are chronic and are cared for in the community setting by GPs and nurses. The estimated overall cost of PU management is £2.3 billion–£3.1 billion per year in the UK; this equates to 3% of the annual NHS expenditure at 2005/6 levels (Posnett and Franks, 2007). This is a high percentage of the overall budget spent on an area that is considered largely avoidable. PUs are also a significant cause of morbidity and mortality (Posnett et al, 2009).

The National Patient Safety Agency (NPSA, 2010a; 2010b) has set the agenda for NHS organisations across England and Wales to achieve the prevention of all avoidable PUs. High-impact actions were launched in 2010 (DH, 2010b) as an acknowledgement that the elimination of PUs requires input from the multidisciplinary team with a focus on developing processes that, when followed and used every time for every patient, will reduce avoidable PUs (DH, 2010b).

This has been incorporated into the NHS Improving Quality's Patient Safety programme (NHS, 2014). Therefore, the clinician should be mindful this is a national agenda of significant

importance and an area of clinical practice that requires all staff to be aware of and up to date in their knowledge and implementation of PU prevention.

NHS Midlands and East (2011; 2012) set the agenda for the elimination of avoidable PUs across four strategic health authorities across England. McIntyre (2013) reported a 45% reduction in grade II, III and IV PUs with NHS Safety Thermometer data (Health & Social Care Information Centre, 2014) . However, the collection of data and consensus in PU reporting was discussed by the Tissue Viability Society ([TVS], 2012), and the use of prevalence data was found to be an inferior way of examining PU occurrence. One recommendation is that incidence studies be used for this purpose (Harrison et al, 2013).

PU reduction has risen on political agendas in recent years due to the increasing recognition of and emphasis on preventative healthcare, as well as an increasing acceptance that PUs are preventable (NHS, 2012), and an important contribution to reducing mortality and saving lives (5 Million Lives Campaign, 2008). Although Toner et al (2010) observed the need for an appropriate level of tissue viability staff to support this agenda, this remains a variable across the UK.

Pressure ulceration

A PU is defined by the European Pressure Ulcer Advisory Panel ([EPUAP], 2009) as: "A localized injury to the skin and/or the underlying tissue, usually over a bony prominence, as a result of pressure or pressure in combination with shear." The intrinsic and extrinsic factors that contribute to PU development include sensory impairment, immobility, age, incontinence, poor nutrition and chronic illness (National Institute for Health and Care Excellence [NICE], 2014). The extrinsic factors include pressure, shear, friction and incontinence (EPUAP, 2009; NICE, 2014).

The term 'pressure ulcer' has encouraged clinicians to consider pressure to be the most significant physical force responsible in the development of pressure ulceration. The pressure over a bony prominence compresses the capillaries, preventing essential nutrients and oxygen accessing the skin. However, it is important to keep in mind that shear, friction and microclimate are major causes of tissue damage (International Review, 2010).

As the amount of shear/friction increases, the amount of pressure required to cause ulceration is reduced (Conner and Clack, 1993). Unrelieved pressure leads to tissue ischaemia and metabolic waste to accumulate in the interstitial tissue, which can result in hypoxia and cell death.

Hypoxia can lead to an increase in bacterial loading, as demonstrated with sample biopsies from tissues reddened through pressure (Sugama et al, 2005). The cause of pressure damage and the rate at which this occurs is important and clinicians need to be aware of the decreased time for pressure damage to occur when shear/friction is a consideration (International Review, 2010).

Additionally, clinicians must be aware of the differentiation between PUs and moisture lesions (Evans and Stephen-Haynes, 2007) and reporting methods within their organisation.

Avoidable and unavoidable

A significant development in assessing patients with pressure ulceration is the consideration of whether the PU is avoidable or unavoidable. The provision of quality care is paramount and there is a recognition that 'harm' should be avoided during the delivery of care. This is of increasing importance with clinical commissioning groups, which can implement financial penalties if targets are not met.

The definition of avoidable/unavoidable for clinical implementation was developed by NHS Midlands and East (2012b): "Unavoidable means that the individual developed a PU even though the individuals condition and PU risk had been evaluated; goals and recognised standards of practice that are consistent with the individual has been implemented; the impact of these interventions have been monitored, evaluated and recorded; and the approaches revised as appropriate.

"'Avoidable' means that the person receiving care developed a pressure ulcer and the provider of care did not do one of the following: evaluate the person's clinical condition and pressure ulcer risk factors; plan and implement interventions that are consistent with the persons needs and goals, and recognised standards of practice; monitor and evaluate the impact of the interventions; or revise the interventions as appropriate."

Examples where unavoidable PUs can occur include:

- Critical illness with haemodynamic or spinal instability that may preclude turning or repositioning.
- Patients who refuse to be repositioned or to maintain a position change.
- Terminally ill patients who are not able to tolerate frequency of optimum repositioning or whose skin fails as an organ.
- If the patient has not previously been seen by a healthcare professional.
- If the patient has mental capacity and refuses assessment or does not comply with the agreed plan of care.
- Where a patient is known to a healthcare professional, but has an acute/critical event affecting mobility or the ability to reposition. This may include the patient being discovered following a fall or loss of consciousness.

SKINS bundles

Once the level of PU risk has been ascertained, the focus should be on delivering care in a systematic way focusing on preventative care

and developing, implementing and reviewing treatment plans (NICE, 2014). It is increasingly recognised that this needs to be done in a structured way to improve patient outcomes (Institute for Healthcare Improvement, 2011).

Bundles of care were introduced to reduce ventilator-associated pneumonia (Resar et al, 2005). The crucial aspect of a successful care bundle is ensuring that every identified intervention is performed sequentially and no component is eliminated (McCarron, 2011).

There is an important difference between a SKINS (Skin care, Keep the patient moving, Incontinence, Nutrition and Support surfaces) bundle and a traditional care plan; the bundle is an essential set of steps in a process followed for every patient, every time, and the potential for a complication is high if a single aspect is missed (Institute for Healthcare Improvement, 2011).

The objective of a bundle is to make a process more reliable by improving motivation, compliance and implementation of a strategy for care (Stephen-Haynes, 2011). Bundles are therefore now advocated as a structured method for preventing pressure ulceration (Lloyd Jones, 2012).

SKINS is an acronym for a bundle of care, developed in the USA as a patient safety initiative that identifies the elements are considered central to PU prevention (Gibbons et al, 2006). SKINS care bundles are essential in the prevention of PUs and should be implemented for every at-risk patient to achieve the elimination of avoidable PUs.

After the successful implementation of the SKINS care bundle in Wales, it was implemented in Scotland in 2011 and is supported by Healthcare Improvement Scotland (2013). After the successful implementation of the SKINS bundle, the NHS England Midlands and East Trust has reduced the incidence of PUs by 36% in 6 months (Ford, 2012) and the current agenda is to roll the bundle out across the UK.

Decision Against Tissue Advice

There are several challenges to providing care within the community. These include:

- Restricted access to health and social care (as these are not available 24 hours a day).
- There may be limited access to pressure-reducing resources, including pressure area prevention and management of equipment. Community healthcare includes a wide range of clinical areas, including community hospitals, patient's own homes, care homes, hospices and prisons. Not all areas will be subject to the same provision of equipment and resources.
- Patients in their own homes have increased responsibility for their own behaviour and decisions.

Importantly, the completion of a Decision Against Tissue Advice (DATA) form should be completed only once an assessment of a patient's mental capacity specific to the intended intervention has been established. The importance of a therapeutic relationship should also be considered, as this is likely to lead to greater concordance.

Therefore, the form should be completed when a patient makes an informed decision against advice and is capable of making that decision. This could include medication, dressings, bandaging, hosiery, repositioning or equipment that has been prescribed for PU prevention or care. Importantly, this should be reviewed regularly and a decision against advice and the options available should be re-explored with the patient.

Since its introduction within one health and care trust, staff have expressed that they have offered clearer explanations and staff are able to evidence that the patient has made the decision against TV advice and that the development of a PU may have been unavoidable.

Conclusion

The maintenance of healthy skin integrity and the prevention of PUs is a significant clinical challenge for healthcare professionals and carers, and is high on the UK government's agenda. The increasing number of older people in the UK and the changes seen in the population (e.g. mobility issues, continence status, skin changes and an increasing array of chronic illnesses) will be important for efforts to prevent PUs.

PU prevention and management are of particular concern for all nurses and allied health professionals, and building a sound knowledge base regarding prevention and treatment processes is essential for effective care delivery.

Ensuring fundamental nursing is delivered and the SKINS care bundle is implemented every time for every patient is essential in the prevention of PUs. Where the individual declines to adhere to preventative strategies, in spite of being made aware of the consequences of non adherence, the DATA tool may be used. WE

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When is a leg ulcer not a leg ulcer?

It is estimated that one in 300 leg ulcers is diagnosed as a carcinoma (Voisard et al, 2001). However, an accurate incidence of malignancy in leg ulcers is difficult to determine. That said, there does appear to be a direct relationship between the duration of a chronic non-healing leg ulcer and the changes of a malignant transformation. The longer the ulcer duration, the higher the chances of a malignant change (Smith et al 2001). If an ulcer on the lower limb fails to heal, a malignancy should be considered right away, to confirm the diagnosis and reduce the risk of metastatic spread (Enoch and Lefemine, 2007). This article aims to explore the differences between venous leg ulceration and cancerous skin lesions, namely squamous cell carcinomas. The authors will also discuss the malignant skin changes that can occur in chronic non-healing ulcers – known as Marjolin's ulcers; the clinical presentation of the ulceration and the referral processes that form the assessment and management pathway.

"If an ulcer on the lower limb fails to heal, a malignancy should be considered right away."

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Venous leg ulcers are the most common type of leg ulceration, accounting for approximately 70% of those diagnosed (Callum et al, 1985) They are caused by sustained venous hypertension in the lower legs, often as a result of:

- Deep vein thrombosis
- Direct injury
- Congenital abnormality
- Calf muscle pump failure
- Multiple pregnancies
- Superficial vein inflammation.

Underlying venous disease is the cause of venous ulcer development. This, in turn, leads to skin changes as a result of venous pressure (Newton 2011). The tissues become oedematous as a result of increased pressure in the capilliaries and become fibrosed over time. This leads to poor oxygenation of the skin and eventual skin breakdown (*Figure 1*). Venous ulcers are most commonly found in the gaitor region of the lower leg between the ankle and the calf, often on the medial aspect. If an ulcerated area develops in this site, most clinicians would usually suspect a venous ulcer. However, in the case of the ulcer failing to heal or reduce in size following an appropriate treatment plan, the healthcare professional should suspect malignancy as a possible diagnosis.

In a consensus document, the World Union of Wound Healing Societies (WUWHS, 2008) suggests that if there is no reduction in ulcer size at one month, or an ulcer is unhealed at three months, a specialist referral should be made. It was suggested in a study published by Senet et al (2012), that chronic leg ulcers that do not heal after three months of appropriate treatment have an overall skin cancer frequency of 10.4%.

Squamous cell carcinoma

Squamous cell carcinoma (SCC) is an invasive malignant neoplasm of epidermal keratinocytes (Khalyl-Mawad, 2013). Keratinocytes begin their life

Table 1. Management pathway for an uncomplicated venous ulcer (WUWHS, 2008)

Diagnosis	Goals	Treatment	Outcomes
VLU - uncomplicated	Control chronic venous insufficiency and oedema	**Treatment options:** ▸▸ Strong compression ▸▸ Inelastic / elastic hosiery. **Additional points:** ▸▸ Venous investigation / surgery ▸▸ Exercise and rehabilitation ▸▸ Smoking cessation ▸▸ Leg elevation ▸▸ Appropriate dressings.	**Ulcer heals:** ▸▸ Hosiery ▸▸ Education ▸▸ Consider vein surgery. **No decrease in ulcer size in one month or unhealed in three months:** ▸▸ Re assess ▸▸ Specialist referral ▸▸ Surgery or advanced therapies.

Therefore, accurate assessment, imaging and measurement of healing throughout the treatment pathway must be in place to identify a failure to heal.

Differential diagnosis

When a patient presents with a non-healing ulceration of the lower leg a full clinical history should be taken to identify the potential cause. NICE (2012) suggests that venous leg ulcers can be diagnosed using history and examination findings following a Doppler assessment, and that the assessment should be carried out by a healthcare professional trained in leg ulcer management.

Patients with venous leg ulcers often complain of aching and heaviness in the lower legs, which is alleviated with rest and elevation. There are often skin changes, all of which are signs of venous hypertension. These include:

- Brown/ red skin staining
- Induration
- Oedema
- Itching
- Eczema.

In a patient with an SCC, the skin changes are unlikely to be present unless the patient also has a degree of underlying venous disease – or in the case of a Marjolin's ulcer, a venous ulcer that has become chronic and is failing to heal.

Venous ulcers are often found on the medial or lateral aspects of the lower leg between the mid calf and the knee, whereas SCCs can be found on any sun-exposed area, rather than just the lower legs. SCCs are often larger than 1cm in diameter with a documented expansion over 8 weeks according to NICE (2005), whereas venous leg ulcers slowly increase in size, hence they are categorised as chronic ulcers because they can be present for many years if left untreated.

Motley et al (2009) found that older age, abnormal excessive granulation tissue at the wound edges and a high clinical suspicion of malignancy were key factors in aiding the diagnosis of a SCC or Marjolin's ulcer.

Diagnostic Interventions

Venous leg ulcers are usually diagnosed following accurate history taking and limb and ulcer assessment. A venous duplex ultrasound can be undertaken to detect obstruction or reflux in chronic venous insufficiency(Kalodiki et al 1993).

If a SCC is suspected, an urgent referral should be made to a team specialising in skin cancer treatment (NICE 2005). The patient should be seen within two weeks, whereby a skin biopsy or excision is taken and sent to a laboratory for histological examination and confirmation of the diagnosis. This is deemed to be the gold standard for diagnosing malignancy (Enoch and Lefemine 2007).

Treatment options

The treatment for a venous leg ulcer, SCC and a Marjolin's ulcer are very different, so accurate assessment and diagnosis is essential.

The main stay of treatment for venous leg ulcers is compression bandaging. This view is supported by a Cochrane review (O'Meara et al, 2009) which found that using compression increased venous leg ulcer healing rates compared with ulcers treatments that did not use compression. If the patient is able to tolerate the highest level of compression it is anticipated that a venous leg ulcer will be healed within three months (WUWHS 2008). The treatment pathway is described in *Table 1*.

If a patient has a confirmed diagnosis following histological examination of a SCC or Marjolin's ulcer on their lower leg, pathology reports should include the following:

- Skin cancer type
- Degree of differentiation, such as well differentiated, moderately or poorly differentiated
- Histological grades
- Tumour depth
- Level of dermal invasion

(Motley et al, 2009).

in the deeper basal skin layer and as they migrate upwards towards the skin surface they change into squamous cells, hence the name squamous cell carninoma (DiChiara 2009).

SCCs usually remain confined to the epidermis for some time, however, as they grow larger they can penetrate the underlying tissues. SCC is the second most common skin cancer with approximately 10,000 people per year being affected in England and Wales (Motley et al, 2009). About 20% of all skin cancers diagnosed are SCCs (Cancer Research UK, 2014) and the incidence is rising worldwide (Foo et al, 2007).

SCCs present as a non-healing ulcer in a sun exposed area of the skin hence it can be mistaken for a leg ulcer as lower legs are classed as sun exposed areas (*Figure 2*). They can also develop if the area skin has been sunburnt in the past, ulcerated for a long time or if it there is scarring (Cancer Research UK, 2014). SCCs are often indurated and nodular in appearance with crusting or keratinisation, which is an overgrowth of keratin, on the surface. However, they can also present as ulceration without crusting (Motley et al, 2009). The incidence of SCCs rises with age (Foo et al, 2007), whereas venous leg ulcers are predominantly a condition affecting the elderly population (Newton, 2011).

Marjolin's ulcer:

Marjolin's ulcer refers to the development of an SCC from long-standing chronic non-healing ulcers (Enoch and Lefemine, 2007) (*Figure 3*). Chong and Klein (2005) suggest that SCCs arising in chronic venous leg ulcers have been shown to be more aggressive in nature and develop metastases more frequently than primary SCCs where there is no underlying chronic ulceration. SCCs commonly metastisise to regional lymph nodes, lungs and liver, although the rate at which this happens can be as low as 3% (Reynolds and Strayer, 2003). Malignant changes in a venous leg ulcer can initially be subtle.

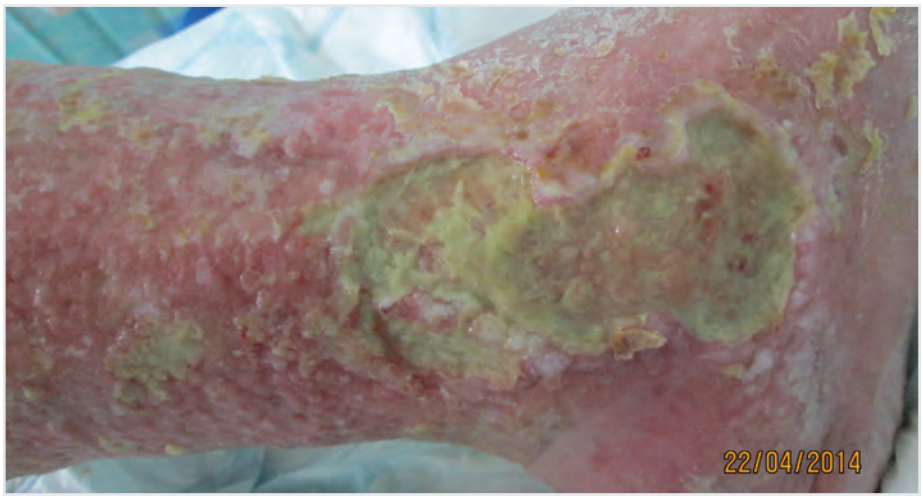

Figure 1. ***Venous leg ulcer: chronic ulcer in patient with deep vein incompletence.***

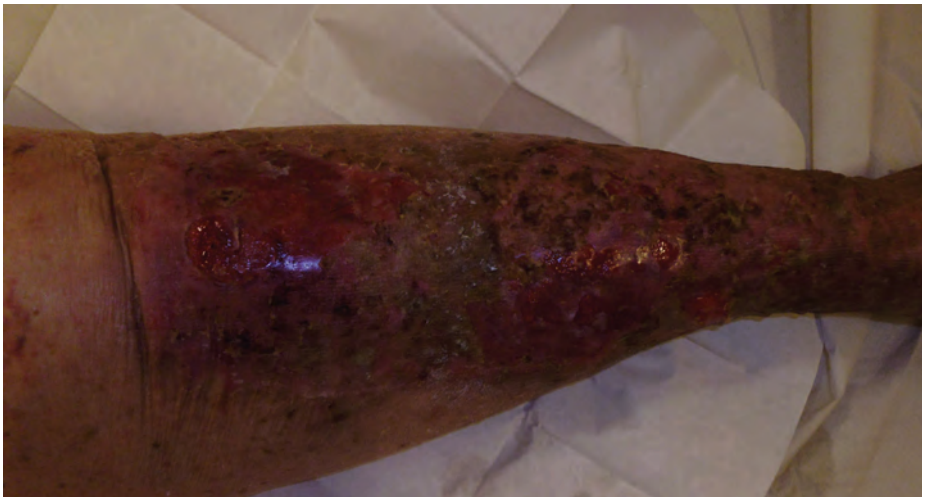

Figure 2. ***Skin cancer: Note two separate areas of skin cancer below the knee, an unusual site for venous ulcer, and near the ankle. Traumatic injury to lower leg made diagnosis difficult. The patient was treated with compression bandaging with no reduction in ulcer size.***

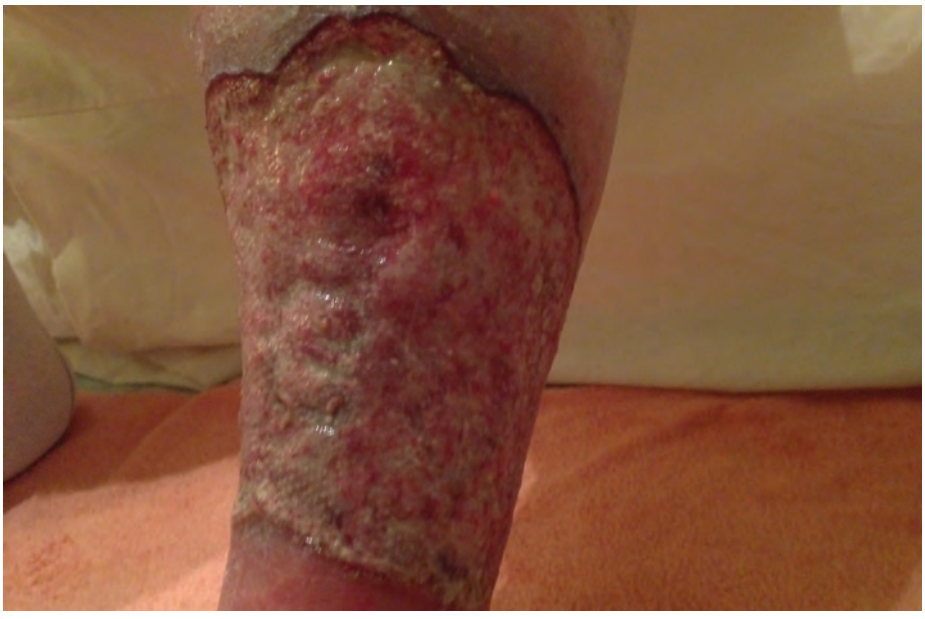

Figure 3. ***Possible Marjolin's ulceration: note the uneven surface of the granulation tissue in a chronic leg ulcer.***

Table 2. Management pathway for a Primary SCC (Adapted from Motley et al, 2009)

Diagnosis	Goals	Treatment	Outcomes
Primary SCC	To obtain a diagnosis	**Treatment options:** ▸▸ Punch biopsy or excision to confirm diagnosis ▸▸ Lymph node biopsy if indicated in high risk tumours . **Once diagnosed:** ▸▸ Multi-disiplinary team review ▸▸ Complete excision of the SCC **or** ▸▸ Mohs micrographic surgery for high-risk tumours ▸▸ Radiotherapy for non resectable tumours ▸▸ Curretage for small. Well defined/ differentiated tumours ▸▸ Skin grafting where appropriate to facilitate healing ▸▸ Compression bandaging if venous hypertension also present .	**Complete healing:** ▸▸ Ongoing management by a multi professional team experienced in skin cancers. **For low risk tumours:** ▸▸ Skin examination every six to 12 months. For high risk tumours skin and lymph examination every three to six months for two to five years. Regional and Local protocols may vary.

Such a report would enable the dermatologist or specialist practitioner to treat the lesion appropriately (*Table 3*).

High risk SCC's are defined as having one or more risk factors for recurrence or metastasis. Risk factors include tumours that are poorly differentiated; recurrent; greater than 2cm across; greater than 4mm deep; in scars or on sites of chronic inflammation and in patients that are immunosuppressed or have had transplants.

Low risk tumours are classed as those that are well or moderately differentiated with no risk factors (Motley et al, 2009).

Many lesions are completely removed under a local anaesthetic, however, the larger tumours may require a general anaesthetic, especially if skin grafts are needed. A margin of 4mm is recommended for low risk SCCs, which would be expected to remove the primary tumour mass in 95% of cases (Brodland and Zitelli, 1992). For high risk SCCs, a margin of 6mm is suggested.

Mohs micrographic surgery is a specialist surgical technique, which involves removing the visible tumor along with a very thin layer of tissue surrounding it. This is checked under a microscope and, if tumor is still present in the depths or edges of this surrounding tissue, the procedure is repeated until the last layer viewed under the microscope is tumor-free. Mohs surgery appears to reduce the rate of local recurrence, and has the highest overall cure rate; about 94-99% of any treatment for squamous cell carcinoma (Skin Cancer Foundation, 2014).

Table 3. Treatment options for SCC (Enoch and Lefemine, 2007)

Medical options	Surgical options
▸▸ Topical chemotherapy ▸▸ Topical immune response modifier such as Imiquimod – not for invasive SCC ▸▸ Photodynamic therapy – SCC in situ ▸▸ Radiotherapy ▸▸ Systemic chemotherapy All of these options are considered in relation to the grade and depth of the tumour and the patients general health condition.	▸▸ Excision with adequate margins – followed by direct closure, skin grafting or reconstructive surgery ▸▸ Mohs micrographic surgery ▸▸ Cryotherapy ▸▸ Electrodesiccation and curretage Options considered in relation to site and size, primary or recurrent tumour, histological grade, age and health of the patient.

For very small SCCs, cryotherapy is a treatment option, although the majority of SCCs found on the lower legs are not suitable for this therapy modality, especially Marjolin's ulcers, because of their size. Radiotherapy can also play a role in the treatment of SCCs. It is useful where patients cannot or prefer not to have surgery and cure rates exceed 90% for most skin lesions (Tidy, 2011). Radiotherapy also has a role in the palliative management of large

inoperable SCCs where it is used to control their spread.

The management pathway for a Primary SCC is described in *Table 2*.

Ongoing follow up and support

The patient should receive information regarding their diagnosis and receive advice and support from a skin cancer specialist nurse throughout their treatment journey.

If the SCC is of a low grade, patients are followed up every six to 12 months, although in some centres, such as in the author's own Trust, low-risk SCCs are not routinely followed up. All patients with low-risk SSCs are discussed at the MDT meeting where any follow up plans are put in place, should they be required.

For high-risk tumours, follow up is recommended every three to six months for the first two years. Follow up for five years post-diagnosis is undertaken in many centres, as 95% of metastisies can be detected within this timeframe (Motley el al, 2009).

Healing is usually by secondary intention unless the wound is large and skin grafting would need to be considered. This may be undertaken by a plastic surgeon depending on organisational referral pathways.

Summary

Management of patients with ulceration for the lower leg is generally seen as a primary care service and healthcare professionals need to be vigilant in their assessment and ongoing review of these patients. Any patient with a chronic ulcer that does not respond to conventional therapy should be viewed with suspicion (Enoch and Lefemine, 2007).

Any patient with a suspected SCC diagnosis should be seen within two weeks of the referral being made to a specialist centre so as to reduce the risk of spread to other parts of the body.

It is important to recognise that skin cancers can arise on the lower leg both as a primary diagnosis or as a manifestation of a chronic leg ulcer. If in doubt it is best to seek advice from a dermatologist to exclude a skin cancer, particularly when all other investigations and treatment options have been considered. WE

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SKIN CARE

Root cause analysis related to pressure damage

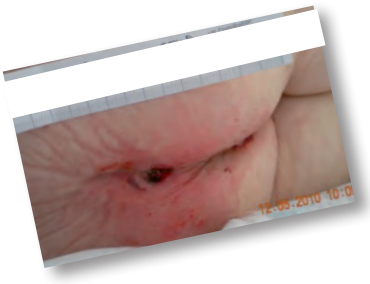
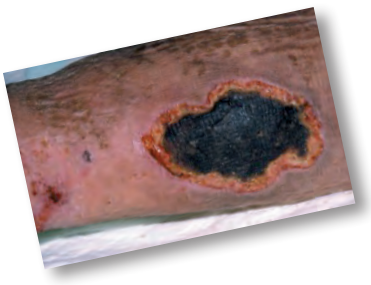
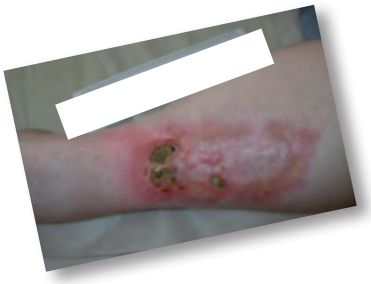
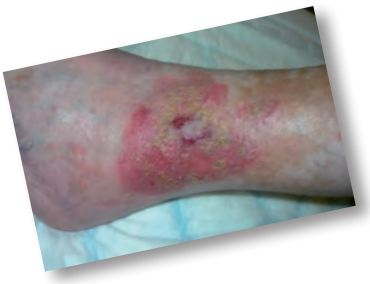
Jeanette Milne

Using continence assessment and actions to preserve skin integrity

Daphne Colpman

Key points

- The main focus of any root cause analysis (RCA) investigation is to identify key themes and events that contributed to the incident. All RCA tools examine the facts of the individual case and the investigation seeks to remain impartial. Completed reports offer an insight into the scope and level of investigation, and should allow the reader to see a chronology of events.
- Incontinence is frequently accepted as simply being a part of ill health and a consequence of ageing. It is, therefore managed, rather than its cause investigated and treatment plans initiated. Incontinence is, however, a symptom and there may be many causes. Therefore the incontinence itself should be assessed to determine the type of incontinence so that the correct treatment can be started.

Root cause analysis related to pressure damage

The current focus on pressure ulcer (PU) prevention, as opposed to management, has been welcomed by UK healthcare providers. It has, however, created a need for clarity and a deeper understanding around what constitutes a PU — and what does not — as well as a need to define when PU development may be unavoidable. The NHS requires organisations to investigate all category III and IV ulcers developed during episodes of care. The favoured method of investigation is often the completion of a root cause analysis (RCA). This article seeks to explore RCA as a reliable tool for the investigation of PU incidence.

"Risk assessment, patient education and the adoption of appropriate preventative measures to reduce pressure ulcer development is the cornerstone of tissue viability practice."

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Pressure ulcer (PU) prevention is seen as a core requisite care package offered to all NHS patients. The National Institute for Health and Care Excellence (NICE) guidelines (NICE, 2005) require that organisations use risk assessment as an aid to allocate resources in a timely and appropriate way. In fiscal terms, these preventative packages have seen significant investment year on year, since the introduction of targets to reduce the incidence of category II, III and IV (National Pressure Ulcer Advisory Panel/ European Pressure Ulcer Advisory Panel [NPUAP/EPUAP], 2009) healthcare-acquired PUs.

Risk assessment, patient education and the adoption of appropriate preventative measures to reduce PU development are the cornerstone of tissue viability practice. In the UK, around 400,000 individuals develop a new PU annually (Bennett et al, 2004). The cost to the NHS is high, primarily because prolonged hospital treatment is needed in serious cases and those at risk must be protected. The annual cost is in the region of £1.8bn–£2.6bn (Posnett and Franks, 2008) and this figure does not account for the human costs in relation to the impact on patient-reported quality of life.

In 2010, the National Patient Safety Agency (NPSA) adopted a zero tolerance approach to PUs (NPSA, 2010a). The agency urged all NHS organisations in England and Wales to work towards preventing all healthcare-acquired PUs. The reporting of PUs as clinical incidents has been encouraged since the introduction of clinical guideline 29 (NICE, 2005), which has now been replaced by clinical guideline 179 (NICE, 2014).

The zero tolerance campaign was introduced by the NPSA to significantly reduce levels of harm within the NHS (NPSA, 2010a). The campaign encouraged organisations to work together to reduce instances of harm to all patient using NHS services. National and international

campaigns — such as 'Your Turn 2012' and 'Stop Pressure Ulcer Day' (EPUAP, 2013) also introduced in 2012 — have been used to help raise staff and patient awareness. In addition, the introduction of care bundles, such as SSKIN — surface, skin inspection, keep moving, incontinence and nutrition — (Health Care Improvement Scotland, 2011) have enabled organisations to focus training and education.

Some of these initiatives have been driven as a result of local targets. For instance, in the author's Trust, CQUIN targets have been set to reduce the number of healthcare-acquired PUs by 5–7%, depending on locality. This is measured via monthly prevalence audits using the Safety Thermometer (NHS, 2013) and has a financial incentive attached, which is paid by the commissioners on achievement of goals.

The Commissioning for Quality and Innovation (CQUIN) payment framework enabled commissioners to reward excellence by linking a proportion of provider service income to the achievement of local quality improvement goals. Most UK Trusts have been challenged to reduce the incidence of category II, III and IV healthcare-acquired PUs. In addition, Trusts must report all health care-acquired category III and IV PUs as a serious incident that requires investigation and most are investigated by means of root cause analysis (RCA).

What is root cause analysis?

An RCA is simply a structured investigation tool; its results depend on the knowledge and skill of the investigator to apply the tool in a fair and consistent way. There are three levels of RCA investigation. Patient safety RCA investigations should be conducted at a level appropriate and proportionate to the incident under review. The NPSA's RCA tool kit (NPSA, 2008) provides guidelines for what might be considered appropriate and proportionate. Level 1 is described as a 'concise' investigation, level 2 is a 'comprehensive' investigation and level 3 is usually an 'independent' investigation carried out by a third party. It is recommended that all healthcare-acquired category III and IV PUs undergo a level 1 RCA.

The main focus of any RCA investigation is to identify key themes and events that contributed to the incident. All RCA tools examine the facts of the individual case and the investigation seeks to remain impartial. Completed reports offer an insight into the scope and level of investigation, and should allow the reader to see a chronology of events. Most tools use chronology by way of simple timelines (i.e. date, time and event). Reports should also detail the involvement and support of patients and their relatives, and how the incident was detected (i.e. identified by count/audit/query/review). The RCA should also look at care and service-delivery problems, as well as any contributory factors. For example:

- Lack of guidance, protocols or procedures
- Staffing issues
- Availability of equipment
- Training needs identified.

Once the facts are established, the investigating officer then looks at the emerging themes/triggers and identifies any gaps in practice, establishing the root cause of the event. This crucial step seeks to determine the lessons that can be learnt by the team involved and, in turn, leads to recommendations that, when implemented, are designed to offer assurances that the multidisciplinary team has done all they can to avoid similar events occurring in the future. Arrangements for sharing and learning at an organisational level are also recommended.

Investigations into PUs also seek to determine if the pressure ulcer was avoidable or unavoidable. The principal focus of any investigation should be that of improving patient outcomes by sharing the lessons learnt in an open and honest culture, and not focus on blame.

It is widely accepted that the pathophysiology of pressure ulceration is multifaceted, as is alluded to by one of the most commonly used descriptions, which suggests: "A pressure ulcer is a localized injury to the skin and/or underlying tissue usually over a bony prominence, as a result of pressure, or pressure in combination with shear. A number of contributing or compounding factors are also associated with pressure ulcers; the significance of these factors is yet to be elucidated" (NPUAP/EPUAP, 2009).

This definition reflects the fact that to date, experts have been unable to fully understand how and why pressure ulcers develop in some patients and not others despite access to similar interventions and equipment. This adds complexity to any PU RCA investigation as, while it is easy to establish a timeline of events, it is not always easy to identify a single key element that led to PU development. In keeping with the aetiology, the series of events that leads to the development of PU is complex with numerous contributory factors have been identified in reported RCAs as leading to the development of reported ulcers (Milne, 2012).

On the other hand, it is relatively easy to identify cause and effect in device-related cases (Wounds UK, 2012), e.g. PU as a result of incorrectly applied compression bandaging, oxygen tubing/masks, incorrectly fitted compression stockings or total contact casting. Patients should be encouraged to report discomfort and treatments that apply pressure monitored to ensure early warning signs of skin damage, such as blanching erythema, are heeded to prevent deeper tissue damage.

Patient concordance

A commonly identified theme emerging from recent RCAs is that

of patient concordance, largely associated with those patients with chronic debilitating conditions such as multiple sclerosis, spinal injury, morbid obesity and Parkinson's disease. These patients commonly have mental capacity and are aware of the risks as they have often suffered ulcers in the past. However, despite being made aware of the current and potential risks, they decide to make an informed choice to decline interventions and/or advice regarding offloading, for example.

In these cases, the healthcare provider has to respect the patient's right to decline treatment, while ensuring discussions are documented in a timely, appropriate and contemporaneous manner. Collaboration and consultation should be encouraged, while continuous reassessment and access to treatment, as and when circumstances change, should also be ensured.

In addition, PU prevention in a community setting is fraught with not only the complex nature of the underlying problems and their associated cumulative effect, but also the complexities associated with shared care provision. A large percentage of patients with community-acquired PUs have elements of their care delivered by informal or formal care arrangements.

The issue with the same PU being counted twice has been identified by clinicians as a problem due to some patients with community-acquired damage having been found to have developed the damage on earlier hospital admissions and vice versa. Repetition of the lengthy RCA process has resource implications and is of limited benefit as, in theory, both investigations should arrive at the same end point.

Conclusion

PU rates are now used as a quality indicator for nursing and healthcare services. It is recognised that some patients develop PUs despite the provision of the best possible care, while in other situations, standards may have been less than optimal.

It is important to remember that every day a million people are treated safely and successfully in the NHS. However, when incidents do happen, it is vital that lessons are learned across the NHS to prevent the same incident occurring elsewhere. Undeniably, RCA investigations take time (an average investigation taking approximately 20 hours to complete), however, the outcome of the investigation and organisational commitment to the process has led to positive changes in practice.

It is essential that tissue viability nurses continue to work collaboratively to ensure standard setting is fair and equitable to avoid variances and allow data comparison. To avoid duplication, a central patient record of investigations is needed that enables all organisations to work collectively to reduce the incidence of PUs. It is clear, however, there is still more to be done to put PUs at the forefront of people's minds. WE

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Using continence assessment and actions to preserve skin integrity

Urinary and faecal incontinence have a detrimental impact on patients' quality of life because they affect daily living and the individual's ability to function in society. Clinicians play an important role in preventing skin damage and, therefore, in reducing patients' exposure to the factors that cause it. This article looks at the ways in which skin integrity can be preserved in patients with urinary and faecal incontinence.

"Both urinary and faecal incontinence can limit activities of daily living, restrict the individual's ability to function in society and, as a consequence, affect quality of life."

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Urinary and faecal incontinence remain common afflictions associated with significant social and psychological disability (Foxley, 2008). Although largely under-reported, it is estimated that urinary incontinence can affect up to 30% of the older population (Nazarko, 2008). Both types of incontinence can limit activities of daily living, restrict the individual's ability to function in society and, as a consequence, affect quality of life.

Those with other comorbidities are more at risk. For example in those with an acute stroke, it is estimated that urinary incontinence affects 40–60% of those admitted to hospital (Barrett, 2002). Faecal incontinence is common in the acutely unwell, with most individuals admitted to critical care experiencing at least one episode of faecal incontinence during their stay (Beitz, 2006).

The incidence of urinary incontinence in institutionalised care is high and is estimated to be:

- One in three in residential homes
- Nearly two in three in nursing homes
- One in two to two in three in wards for older people and older people that are mentally infirm.

The prevalence of regular faecal incontinence in institutionalised care is about one in four (Department of Health, 2000).

Despite this high prevalence, all too often continence care is neglected. The report of the care at the Mid Staffordshire NHS Foundation Trust (Francis, 2010) highlighted that 22 of the 33 cases of oral evidence presented raised significant concerns about continence, and bladder and bowel management.

There is a well-recognised association between urinary and faecal incontinence and skin breakdown. All the commonly used risk assessment tools for pressure ulcers (Norton et al, 1975; Bergstrom et al, 1987; Waterlow 1988) incorporate an assessment of the patient's continence status.

Incontinence-associated dermatitis, also known as moisture lesions or perineal dermatitis, is painful, causing distress to patients and is also difficult to manage. It can prove hard to diagnose and is often confused with

category II pressure damage. These lesions are distinct and differ from pressure ulcers and skin tears (Gray et al, 2012), but may coexist in the same patient.

Why is assessment important?

Incontinence is frequently accepted as simply being a part of ill health and a consequence of ageing. It is, therefore managed, rather than its cause investigated and treatment plans initiated. Incontinence is, however, a symptom and there may be many causes. Therefore the incontinence itself should be assessed to determine the type of incontinence so that the correct treatment can be started.

In their study into whether nurses actively promote continence in older people, Dingwall and McLafferty (2006) found that nurses working in acute care had low expectations of cure. In particular, this occurs where urinary incontinence was seen as long-standing or could not be attributed to urinary tract infection. The same study found that many nurses assumed that incontinence was inevitable in old age.

Dingwall and McLafferty (2006) also demonstrated that management strategies were used in preference to continence promotion, and that incontinence was managed to suit the ward routine, rather than as a result of individual assessment. Absorbent pads were frequently viewed as an intervention for incontinence and following their use, patients were viewed as being 'clean and dry', and required no further invention for their incontinence. The nurses interviewed identified their own lack of education, particularly around unifying approaches to promoting continence.

Other factors highlighted in the study that were found to influence the tendency to manage incontinence, rather than promote continence, was lack of staffing, which resulted in nurses being delayed in attending to patients' needs and not being present to pick up on non-verbal clues that an individual needed to use the toilet.

Poor nursing assessment of bowel dysfunction can also lead to poor management, resulting in further disruption and complications to the patient's illness (Koch and Hudson, 2000). For example, the individual presenting with acute diarrhoea may have a gastrointestinal infection or faecal impaction. Both are common in the hospitalised population, with 52% of institutionalised patients and 42% of those in geriatric wards having faecal impaction. The treatment for these two causes is completely different, with gastrointestinal infection normally managed conservatively and impaction with laxative therapy and enemas (Chatoor et al, 2007).

Continence issues are rarely due to one problem alone and often result from a combination of factors (*Tables 1 and 2*). For example, the person with an overactive bladder can usually remain continent, however, if patients develop problems with their mobility and can no longer rush to the toilet, they may become incontinent. Therefore, it is important that any assessment is holistic and does not concentrate exclusively on bladder and bowel symptoms, but should also include a wider assessment of the individual.

Nurses are in a unique position to be able to undertake a holistic assessment of the patient. This may be recorded using a *pro forma*.

Nazarko (2008) described how a level 1 assessment can be conducted by anyone caring for a patient and that it aims to identify those with bladder or bowel dysfunction. Trigger or screening questions should be open, such as "Do you have any problems with your bowels or bladder?" or "Are you bothered by your bladder

Table 1: Causes and exacerbating factors for faecal incontinence (FI) — National Institute for Health and Care Excellence, 2007.

Causes of FI in general population	Factors that predispose to FI
▸▸ Structural changes to anus and rectum, e.g. rectal prolapsed or 4th degree tear in childbirth ▸▸ Neurological disease ▸▸ Constipation and faecal impaction ▸▸ Cognitive and/or behavioural problems, e.g. dementia ▸▸ Loose stool ▸▸ Disability and frailty ▸▸ Unknown	▸▸ Medication eg antibiotic therapy ▸▸ Nasogastric feeding ▸▸ Age ▸▸ Disease processes affecting gastrointestinal function eg tumours ▸▸ Infection, e.g. food poisoning, *Clostridium difficile* or norovirus ▸▸ Sedation ▸▸ Immobility or the inability to communicate need

Table 2: Causes and exacerbating factors for urinary incontinence (UI).

Causes of UI in general population	Factors that predispose to UI
▸▸ Structural changes to sphincter mechanism, e.g. pelvic floor dysfunction following childbirth ▸▸ Neurological disease ▸▸ Bladder overactivity ▸▸ Incomplete bladder emptying ▸▸ Disability and frailty ▸▸ Unknown	▸▸ Urinary tract infection ▸▸ Medication, e.g. diuretic therapy ▸▸ Age ▸▸ Disease processes affecting bladder function ▸▸ Sedation ▸▸ Immobility or the inability to communicate need

Table 3: Levels of continence assessment (Nazarko, 2007).	
Level 1	This consists of a few simple questions to identify those with continence problems, and can be carried out by someone with no specific training
Level 2	This comprises taking a history, undertaking some basic investigations and a simple physical examination. This should be undertaken by a healthcare professional with basic continence training
Level 3	This consists of taking a more detailed history and physical examination and investigations and may be undertaken by a healthcare professional who has been trained in specialist continence care
Level 4	This involves a highly specialised assessment and is usually undertaken by a physician or nurse who are specialised in urology or gynaecology or colorectal function

or bowel?" Such questions should avoid the word incontinence, which many patients do not like to use, preferring terms like accidents, leakage or weak bladder.

Nazarko (2008) argued that those who respond positively to level 1 assessment should then be offered a level 2 assessment.

This should cover the following:

- The patient's history, such as the length of time symptoms have been present, how frequently the person visits the toilet, whether there is any urgency associated with voiding/defecation or incontinence, and activities that cause leakage (e.g. coughing or movement). Symptoms related to difficulties in passing urine or stool should be explored and obstetric history should be reviewed.
- Investigations to exclude the presence of urinary tract or gastrointestinal infection, which may exacerbate any incontinence. A post-void bladder scan should also be performed to measure residual urine. A 3-day bladder/bowel diary to include times and volumes of urine voided and whether there was any incontinence, provides helpful information to determine the nature of the incontinence and also acts as a baseline tool to determine the effectiveness of treatments.
- Physical examination should include a rectal examination to ensure the person is not constipated, and the inspection of the perineal area to determine for the presence of prolapse and to determine whether skin is broken or infected.
- Activities of daily living should be assessed to determine any other contributory factors that may influence a person's ability to maintain continence, for example impaired mobility and decreased manual dexterity can prevent an individual from accessing a toilet if they have coexisting urgency. It is essential that nurses do not view urinary or faecal incontinence in isolation; other health problems can cause of exacerbate the symptoms.
- A drug history should be taken, as medication can affect continence both directly and indirectly. For example, diuretics increase urine output and may worsen urgency and sedative agents can worsen constipation, which may lead to faecal impaction and incontinence.

Once the assessment has been completed, it is normally possible to give the patient a 'diagnosis', and plan interventions accordingly. *Table 3* outlines the key types of urinary and faecal incontinence and the key interventions employed to treat them:

In acute care, there is often an imperative to manage the patient's incontinence with pads, appliances and catheters; actions that merely address the symptoms, rather than the underlying cause. Wherever possible, treatment should be instigated, however, there are certain situations when the condition of the patient's skin means that the use of such aids is essential to prevent further damage.

For urinary incontinence, drainage via a urinary sheath for a man is preferable to the use of an indwelling catheter, except where there is a large residual urine (Wagg, 2007).

Pads should be worn correctly, with an appropriate fixation system used to secure them in place. Barrier creams should be used sparingly with pads, as they may impair the ability of the super absorbent material within the pad to draw the urine away from the skin, resulting in skin remaining wet. Barrier creams must be removed regularly to avoid their build-up on the skin (Beldon, 2008).

If a patient is passing large amounts of loose stools throughout the day, the epidermis is likely to be overwhelmed by moisture, digestive enzymes and bacterial load, making the skin vulnerable. In this instance, the use of a faecal management system should be considered. These are temporary containment devices consisting of a soft, flexible silicone catheter with a low-pressure balloon, which sits within the rectum. They help prevent cross-infection, for example where *Clostridium difficile* is present (Rees and Sharpe, 2009). This may mean its use has important cost implications

Table 4: The key types of urinary and faecal incontinence and the key interventions.		
Type and description	**Key signs and symptoms**	**Interventions**
Stress: The involuntary loss of urine with increased abdominal pressure	▸▸ Loss of urine associated with coughing/sneezing/sudden movement (rarely leak at night or when sitting) ▸▸ Often volumes lost are small	▸▸ Pelvic floor exercise
Urge: Sudden loss of urine associated with a strong desire to void	▸▸ Recognise need to void ▸▸ Unable to suppress urge ▸▸ Leakage of moderate or large volumes of urine	▸▸ Bladder retraining or prompted voiding ▸▸ Lifestyle changes, e.g. reduction of caffeine intake ▸▸ Medication
Mixed: Loss of urine associated with both leakage with raised abdominal pressure and the sudden urge to void	▸▸ Need to hurry to the toilet ▸▸ Leakage on movement	▸▸ Pelvic floor exercises ▸▸ Bladder retraining
Overflow: involuntary passive leakage	▸▸ Voids small amounts frequently ▸▸ Flow is decreased ▸▸ Leakage may be passive and not associated with urge ▸▸ Feels full after voiding	▸▸ Treat any underlying impaction ▸▸ Intermittent catheterisation by self or carer/indwelling catheter
Functional: Leakage is associated with factors outside the lower urinary tract or gastrointestinal system, including the inability to toilet because of impairment of cognitive function, mobility difficulties, or environmental factors	▸▸ Recognises need to urinate/empty bowel ▸▸ Unable to make it to the bathroom before bladder or bowel empties ▸▸ No problem with genitourinary/gastrointestinal system	▸▸ Provide needed assistance ▸▸ Modification of environment/clothing ▸▸ Interventions to assist mobility
Passive faecal incontinence	▸▸ No awareness of need to empty bowel ▸▸ Leakage of stool without awareness	▸▸ Planned evacuation programmes
Faecal incontinence associated with faecal urgency	▸▸ Awareness of need to evacuate is sudden and urgent ▸▸ Urge incontinence	▸▸ Pelvic floor exercises ▸▸ Dietary manipulation ▸▸ Use of constipating agents, such as loperamide
Overflow faecal incontinence	▸▸ Passive faecal leakage	▸▸ Oral laxative therapy ▸▸ Enemas

on reducing hospital-related infections (Ferrie and East, 2007).

Contraindications to the use of such devices include faecal impaction, recent large bowel surgery and suspected or confirmed rectal mucosa impairment (Rees and Sharpe, 2009) and, therefore, they should always be prescribed by a doctor or an experienced nurse with a rectal examination undertaken before insertion.

Conclusion

Nurses play an important role in preventing the development of skin damage and, therefore, in reducing exposure to the factors that cause it. Just as skin and wound care should be evidence based, so should the care extended to those with urinary and/or faecal incontinence, and every effort should be made to determine the cause of any incontinence in order to effectively treat it. If this is not possible, then incontinence should be managed in such a way as to minimise the impact it has on a individual's dignity, as well as on their skin. WE

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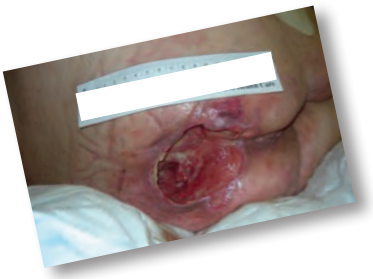
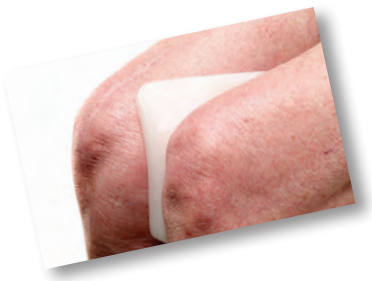
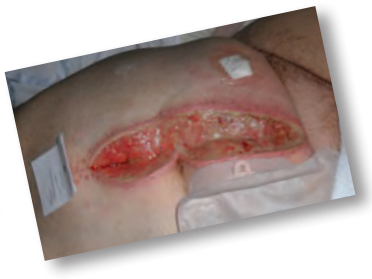
GENERAL WOUND CARE

Key points

- Nutritional screening plays a big part in the holistic assessment of patients with wounds. It is the first step in identifying patients who may be at nutritional risk and who may benefit from appropriate intervention.
- The amount of pressure needed to cause damage will vary according to an individual's weight, time spent in one position, and the surface they are lying or sitting on. Pressure-redistributing mattresses work by redistributing the pressure over a larger surface area.
- To promote effective collaborative working, there needs to be reinforcement of the urgency of identifying the early stages of skin damage as well as education for all, including the patient, family and informal carers.
- Pressure ulcers have a significant impact upon patient wellbeing, affecting not only physical aspects, but also psychological and social functions. Despite this, they remain prevalent within the healthcare setting. In the UK, approximately 412,000 people are likely to develop a pressure ulcer each year



Nutritional assessment of people with wounds

Nutrition plays an essential role in wound healing and, therefore, nutritional assessment and support must be considered a fundamental part of wound management and wound prevention. This article looks at the various ways that a patient's diet can be improved in order to enhance the wound healing process.

"Nutritional screening plays a big part in the holistic assessment of patients with wounds and is the first step in identifying patients who may be at nutritional risk and who may benefit from appropriate intervention."

JILL THORPE
Senior Dietitian, Sutton and Merton Community Services

Poor nutrition before or during the healing process may delay healing and impair wound strength, making the wound more prone to breakdown (Thomas and Bishop, 2007). Neglecting the nutritional health of an individual with a wound can therefore compromise the entire wound management process.

The term 'wound' can be used to describe a whole spectrum of skin breakdown from a small laparoscopic incision to extensive pressure ulceration, or an open wound following major surgery. Wound type and size both impact on the potential healing rate. This wide variation in presentation makes it difficult to estimate the absolute nutritional requirement for wound healing, but the principles remain the same regardless of size or type of wound.

Nutritional screening

Nutritional screening plays a big part in the holistic assessment of patients with wounds. It is the first step in identifying patients who may be at nutritional risk and who may benefit from appropriate intervention. Nutritional screening refers to a rapid, general, often initial evaluation undertaken by nurses, medical or other staff. Following screening, a clear plan of action can be implemented, such as simple dietary measures or referral for expert advice. Screening precedes nutritional assessment, which is a more in-depth and specific evaluation of an individual, typically undertaken by a dietitian.

In terms of wound care, nutritional screening aims to identify people who are malnourished or at risk of malnutrition. Malnutrition can be defined as a state of nutrition in which a deficiency, excess or imbalance of energy, protein and other nutrients causes measurable adverse effects on tissue/body structure, function and clinical outcome (Elia, 2000).

Malnutrition can increase the risk of developing certain wounds, such as pressure ulcers, and if a wound does develop, malnutrition can impair immune function and delay healing. It must be remembered that overweight and underweight patients can both be malnourished.

The National Institute for Health and Care Excellence (NICE, 2006) defined those at risk of

malnutrition as:

- Having eaten little or nothing for the past 5 days or likely not to be eating for the next 5 days or longer.
- Poor absorptive capacity and/or high nutrient losses and/or have increased nutritional needs from causes such as catabolism.

Those who are malnourished are described by NICE (2006) as having:

- Body mass index (BMI) of less than 18.5 kg/m^2.
- More than 10% unintentional weight loss within the last 3–6 months.
- BMI less than 20 kg/m^2 and unintentional weight loss.

Guidelines on nutritional support (NICE, 2006) state that screening for malnutrition or risk of malnutrition should be carried out by healthcare professionals with appropriate skills and training. This is because while completing a nutritional screening tool can be straightforward, an element of interpretation may be needed alongside the simple measurements to decide if someone is at risk.

Nutritional screening must include a simple observation of the patient alongside taking simple measurements that can help provide an indication of their nutritional status. It is important to consider subjective criteria, such as whether the person looks thin, is of acceptable weight or is overweight. Emaciation, pale complexion and hair loss can all be indicative of long-term undernutrition, as can loose clothing or rings, and ill-fitting dentures.

NICE (2006) advised all hospital inpatients should be nutritionally screened on admission and screening repeated weekly with an appropriate care plan followed on the basis of the score. Patients in an outpatient setting should be screened at their first appointment, regularly within care homes, on registration with a GP and where there is clinical concern.

Clinical concern

Clinical concern should include:

- Unintentional weight loss
- Fragile skin
- Poor wound healing
- Apathy
- Wasted muscles
- Poor appetite
- Altered taste sensation
- Impaired swallowing
- Altered bowel habit
- Loose fitting clothes
- Prolonged intercurrent illness (NICE, 2006).

People with large wounds (either category III or IV pressure ulcers) would fit into the category of 'clinical concern' and there would need to be local agreement about screening these patients more regularly; possibly weekly in an outpatient setting.

Screening tools

One such screening tool that is commonly in use in the UK is the Malnutrition Universal Screening Tool (MUST). The MUST tool was developed by the British Association for Parenteral and Enteral Nutrition (BAPEN) in 2003. The MUST tool is validated for use in both inpatient and outpatient settings, and has been found to be reliable and easy to use (BAPEN, 2003).

A number of screening tools are available but any that are used should address current weight status (under- or overweight), as well as recent past and likely future change in weight — both of which are related to food intake and disease severity. These are seen in the first three steps of the MUST tool.

Weighing patients can be the easiest way to work out BMI and identify weight loss. If a patient cannot stand on a set of weighing scales, seated scales or hoist scales should be considered if they are available. If a patient cannot be weighed another useful measure is mid upper arm circumference (MUAC), which can help give a likely BMI range. MUAC is a quick and simple measurement to take, but does not give you an accurate weight or BMI; it merely provides a likely range and does not help generate a screening score. It is useful in conjunction with subjective criteria listed above to support identification of an individual's overall risk category.

MUAC involves taking a measurement with a tape measure around the arm at the mid-point between the shoulder and elbow and if the measurement is less than 23.5 cm, BMI is likely to be less than 20 kg/m^2 (i.e. underweight). MUAC can also be used to monitor weight as any reduction in the MUAC measurement is likely to relate to a change in overall body weight.

Screening needs to be repeated regularly as a patient's clinical condition and nutritional problems can change. It should be conducted on a weekly basis within an inpatient setting where individuals are more acutely unwell and there are likely to be more rapid changes in their nutritional status. It can be done less regularly, for example, on a monthly basis in a community setting, where individuals are generally more stable and changes in nutritional status happen at a slower pace.

If malnourished patients with a pressure ulcer are admitted to hospital, they would score 'high risk of malnutrition' on the screening tool. They would then be monitored closely with nutritional

strategies put in place. If well-nourished people enter hospital for routine surgery and their nutritional intake deteriorates post surgery, they will soon become at risk of malnutrition, leading to poor wound healing (*Figure 1*).

Nutritional screening is also important in wound prevention as being either over- or underweight can contribute to the formation of pressure damage. Nutritional screening should, therefore, form part of any assessment of risk of pressure damage (*Figure 2*).

Nutritional assessment is usually carried out by a dietitian. It involves taking the information collected through screening and building on this to form a more detailed assessment of an individual. The assessment will often involve a detailed examination of an individual's nutritional intake and compare it with their nutritional requirements, taking into account the needs of their specific clinical condition. In general, if an individual's nutritional requirements are greater than their intake they will be malnourished or at risk of malnutrition should this continue over a prolonged period of time.

Diets and wound healing

In practice, there can often be conflicting nutritional goals for patients that impede with their goals for wound healing. Specialised diets can be a risk for wound healing, particularly those that are restrictive. It is not appropriate for those with large wounds to follow diets that limit the intake of energy and protein, such as diets to reduce cholesterol or weight, or diets that avoid entire food groups, such as carbohydrates.

In these situations, any dietary restrictions should be relaxed for individuals with a healing wound, where possible. If an individual is overweight they should aim for weight maintenance during wound healing and a person who is underweight should aim for weight gain.

Fluid

Hydration is also an important consideration in both wound development and healing. An individuals fluid balance should therefore be considered alongside nutritional screening. Dehydrated skin becomes inelastic, fragile and more susceptible to breakdown. Dehydration can also reduce tissue perfusion at a wound site by reducing the blood volume, limiting the supply of oxygen and nutrients.

It is important to be able to recognise the signs of dehydration as part of an overall assessment of a patient; sunken eyes, dry mouth and fragile skin can all be indicative of dehydration.

In general, people require 1,500–2000 ml of fluid per day, which is about 8–10 cups or glasses, but this should be based on a person's age and weight. Individuals should consume 30–35 ml/kg/day of fluid to maintain adequate hydration (Thomas and Bishop, 2007). This needs to be adjusted for individual clinical conditions, for example, a heavily exuding wound or pyrexia would require additional fluid. The monitoring of fluid balance and hydration status is essential.

Tips to improve oral fluid intake include:

- Ensuring drinks are within easy reach.
- Offering drinks frequently.
- Providing a straw if appropriate.
- Offering chilled drinks.
- Offering a variety of drinks, including water.
- Checking for signs of dysphagia.

Nutritional support to aid wound healing

Optimising nutrition is important in best practice care for wound healing. This can be achieved by providing the individual with a balanced diet supplying adequate energy, protein and vitamins and minerals to promote wound healing based on the 'eatwell' plate (NHS, 2013; *Figure 3*).

Nutritional support should be considered in people who are malnourished or who are at risk of malnutrition as already defined (NICE, 2006). Nutritional support should be considered in a step wise approach and may involve more than one approach. If a patient is capable of eating and drinking, optimising their oral intake is the primary route of nutritional support. If this is not possible, for example, due to a poor appetite or dysphagia then enteral feeding (nutrition delivered via a tube into the gastrointestinal tract) to support their oral intake or as a sole source of nutrition should be considered. If a patient's gastrointestinal tract is not functioning or not accessible,

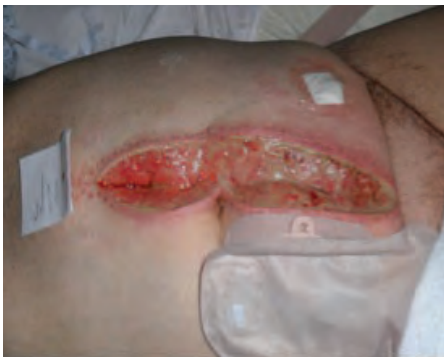


Figure 1. ***A dehisced surgical wound.***

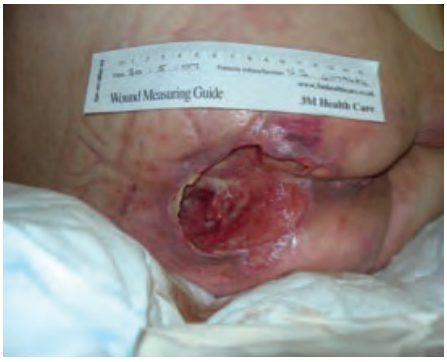


Figure 2. ***Extensive pressure ulcer increasing nutritional demands to enable healing.***

Figure 4. ***The eatwell plate (NHS, 2013).***

parenteral nutrition (nutrition provided intravenously) should be considered.

Practical tips

The following suggestions can help increase dietary energy and protein intake, without the need for prescribed products:

- Encourage the consumption of a pint of full cream milk daily.
- Encourage full fat yogurts.
- Encourage snacks between meals that are high in energy and protein, such as biscuits, cheese and crackers, cake.
- Add butter to mashed potato, vegetables.
- Add grated cheese to mashed potato, soups and vegetables.
- Encourage eating a pudding after each meal
- Add ice-cream, custard or double cream on top of puddings
- Aim for three small meals daily plus two–three snacks each day.
- Avoid low-fat or low-sugar products
- Offer foods and fluids in a variety of textures and consistencies
- Offer assistance and allow sufficient time for meals
- Enlist family members to help.
- Provide encouragement without pressuring.

Fortifying food and drink is a means of increasing the energy and protein content of the diet without significantly increasing the volume consumed. For extra energy, ingredients such as cream, butter, sugar, honey, jam or full-fat milk can be added to foods and beverages. For extra protein, cheese, full-fat milk or milk powder can be added to foods and beverages.

There are various forms of nutritional supplements available on prescription to treat malnutrition and promote wound healing. Following a full assessment of nutritional intake by a dietitian, a particular supplement or combination of supplements that best meet the patients needs will be recommended. Supplements can be milk-based, juice-based, yogurt-style, dessert-style, soups or powders to add to food or drinks. They come in a variety of flavours and forms and can be taken on their own or added to food.

Monitoring

Nutritional intervention should be reviewed as part of an individual's overall care plan and success can be measured by outcomes such as

- Increased weight
- Improved functional ability
- Enhanced health-related quality of life
- Reduced incidence of new wounds and healing of chronic wounds.

Regular ongoing monitoring and repeated nutrition screening is necessary, especially as the benefits of nutritional support may take time to be seen in those who are malnourished and have chronic wounds.

Conclusion

Nutritional assessment and support are a fundamental, but somtimes overlooked, part of effective wound care. It is important that clinicians get this aspect of care right to support other interventions and improve patient outcomes. WE

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Pressure-redistributing mattresses: when and where are they appropriate?

There is a large range of pressure-redistributing mattresses available to healthcare practitioners today and selecting the appropriate mattress can be confusing. The correct choice relies on an understanding of the properties of the particular piece of equipment, as well as knowledge of the individual patient's health and circumstances. Provision of a pressure-redistributing mattress should be considered as one part of a wider prevention strategy and not as a sole intervention. This article will discuss some of the considerations that need to be made when selecting a mattress.

"It is vital that every effort is made to identify those most at risk of developing pressure ulcers and implement interventions to reduce risk, of which provision of pressure-redistributing equipment is a critical element."

ELIZABETH NICHOLS
Tissue Viability Nurse Specialist, Your Healthcare CIC, Kingston, Surrey

With the large range of pressure-redistributing mattresses available, there is an onus on the healthcare practitioner (HCP) to make the correct choice. Equipment is expensive and, for this reason, most NHS Trusts and organisations will have an equipment contract with one or more manufacturers or community equipment provider, which narrows the range available to a number of selected products chosen after an evaluation of local patient population needs, and clinical and cost effectiveness. This will assist staff in selecting appropriate equipment and help manage costs.

Pressure ulcers affect an estimated 30% of patients in the community and 4–10% of patients admitted to hospital (NHS Institute for Innovation and Improvement, 2013). Pressure ulcers cost £1.8bn–£2.6bn per year to manage – equivalent to around 4% of total NHS expenditure (Posnett and Franks, 2007). Emotional costs to the individual and their family, however, are immeasurable. Therefore, it is vital that every effort is made to identify those most at risk of developing a pressure ulcer and implement interventions to reduce risk, of which provision of pressure-redistributing equipment is a critical element.

Why are pressure-redistributing mattresses needed?

Pressure is a major cause of skin damage in vulnerable patients and pressure ulcers occur when tissues between a bony prominence and a surface are compressed for a sufficient period of time to cut off the capillary blood supply to the tissues, causing ischaemia and cell death (Wound Essentials, 2012). In healthy individuals, prolonged pressure on the tissues will cause discomfort, prompting the person to move and change position. However, in older

people, or those unable to move themselves, or with reduced sensation, this pressure can go unrelieved and the reduced blood flow to the skin will result in cell death and tissue breakdown, presenting as pressure ulcers.

The amount of pressure needed to cause damage will vary according to an individual's weight, time spent in one position, and the surface they are lying or sitting on (Phillips, 2010). Pressure-redistributing mattresses work by redistributing the pressure over a larger surface area.

Mattresses can be grouped by one of two modes of action: 'reactive' (previously known as 'static') or 'active' (previously known as 'dynamic'; European Pressure Ulcer Advisory Panel/National Pressure Ulcer Advisory Panel [EPUAP/NPUAP, 2009). Examples of the different types of pressure-relieving mattress are detailed in *Table 1*.

Reactive mattresses

These mattresses do not completely relieve pressure but redistribute it over a larger surface area. In doing so, they are lowering the pressure over high-risk bony prominences. As the individual sinks into the mattress, the area of skin in contact with the surface is increased (Phillips, 2010). Examples of this type of mattress include high-specification foam, air or gel filled, low air loss and air fluidised.

Definitions of each of these types are provided here:

- High specification foam. Foam may be cut into smaller blocks (known as castellated foam), which provide greater contouring with the body. Visco-elastic foam conforms to the patient's body weight, shape and temperature. Visco-elastic foam responds slower than standard foam due to its the cellular structure and it is sometimes referred to as memory foam (NPUAP, 2007). Some models will have a firm border around the foam mattress to assist patients when transferring in and out of bed.
- Air or gel-filled. The mattress is made up of cells or compartments filled with air or gel. Gel provides excellent immersion for high-risk

Table 1: Examples of pressure-relieving mattresses by type.

Type		Examples	Properties
Reactive	High specification foam	Carefree® (Ultimate Healthcare; *Figure 1*), Permaflex Plus Advance (Park House Healthcare; Figure 2)	Castellated foam
		Trinity Plus® (Ultimate Healthcare; *Figure 3*)	Visco-elastic foam
		E4000 (Renray Healthcare)	Engineered/castellated foam
		E5000 (Renray Healthcare)	Visco-elastic foam
	Air filled	Roho® Dry Floatation® (Sumed; *Figure 4*)	Cells or compartments filled with static air
	Low air loss	TheraKair Visio™ (ArjoHuntleigh), Ambience (Park House Healthcare; *Figure 5*)	Constant low pressure as air passes through tiny holes in the surface
	Air fluidised		Air is forced through a suspension of tiny silica beads. Very heavy and used mainly in critical care units
Active	Alternating cell	Alpha Active™ 3 and 4 (ArjoHuntleigh), Phase III (Park House Healthcare)	Overlay
		Tamora Plus® (Ultimate Healthcare; *Figure 6*)	Two-cell cycle
		Nimbus™ 4 (ArjoHuntleigh)	Three-cell cycle
		Quattro® (Talley)	Four-cell cycle
		Autologic™ 200 (ArjoHuntleigh)	Self-adjusts to individual's weight and position
		Diamond (Squirrel Medical)	Ultra-low profile, two-cell cycle, stacked cell technology
Dual mode	Alternating cell layer sandwiches between layers of foam	Softform Premier Active® (Invacare)	Cost-effective option for stepping up/down as patient's risk changes

areas of the body, such as heels. Air and gel can have a cooling effect on the skin, which may be beneficial for some patients who have excessive skin moisture, but may be uncomfortable for others.

- Low air loss. Warm air circulates through the mattress, drawing moisture away from the skin, and escapes through tiny holes in the mattress surface. These can be particularly useful for patients who have excessive moisture at their skin surface, from exuding wounds, incontinence, sweating or burns for example. They are also often preferred by patients who cannot tolerate alternating mattresses.
- Air-fluidised. Air is forced through a suspension of tiny silicon-coated beads, causing them to behave like a fluid and the patient is immersed in the floating beads. They are usually reserved for critically ill patients who cannot be moved, or for patients who have heavily exuding wounds or burns as body fluids can drain into the bed and be filtered (Wound Essentials, 2012). They require a heavy bed frame, are expensive, and are not suitable for use in the community.

Active mattresses

Active mattresses are driven by a motorised pump and they actively remove pressure from specific areas of the body for selected short periods of time. They are made up of a series of air cells, which alternately inflate/deflate on a cycle – typically 6–8 times per hour – a rate similar to spontaneous movement during sleep (Phillips, 2010).

Models vary from two-cell cycles up to four-cell cycles. Newer models can incorporate options for isolating and deflating or removing complete cells underneath specific high-risk areas, such as the heels, to ensure complete pressure relief, while still supporting the rest of the body. The pump dials vary from model to model and it is essential that staff using these mattresses have an understanding of the correct settings for their patients. Some pumps have a weight range requiring manual adjustment according to the patient's weight, while others are digital and require the weight to be entered.

Some newer models automatically adjust to the patient's weight and position by the use of sensors that detect movement. Active mattresses with small cells (≤10cm diameter) should not be used as they cannot be inflated sufficiently to provide pressure relief over the deflated cells (EPUAP/NPUAP, 2009).

Hybrids/dual mode

New technology is now making it possible to combine both active and reactive therapies into one mattress by combining a high specification foam with an alternating cell layer. This is particularly useful for stepping up/down according to changes in a patient's risk status, or comfort, without the need to remove and replace the entire mattress. This may prove to be a cost-effective option particularly for community services, as it removes the associated delivery costs incurred when mattresses need to be changed.

Figure 1. Example of castellated foam mattress (Carefree; Ultimate Healthcare).

Figure 2. Example of castellated foam mattress (Permaflex Plus Advance; Park House Healthcare).

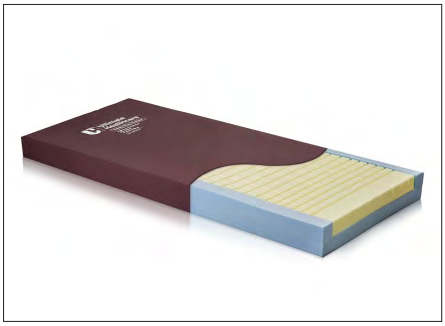

Figure 3. Example of visco-elastic foam mattress (Trinity Plus; Ultimate Healthcare).

Figure 4. Example of air-filled mattress (Roho Dry Floatation; Sumed).

Figure 5. Example of low air-loss mattress (Ambience; Park House Healthcare).

Figure 6. Example of an alternating cell mattress (Tamora Plus; Ultimate Healthcare).

Does the patient need a pressure-redistributing mattress?

The decision as to whether a patient requires a pressure-redistributing mattress or not should be made on the basis of the clinician's clinical judgement of the patient's overall risk status, alongside a recognised risk assessment tool, such as Waterlow (1985) or Braden (Bergstrom et al, 1998). If the patient has existing skin damage, it is important to confirm the cause is due to pressure, shear or friction and not any other source. For example, moisture lesions on the buttocks, or natal cleft caused by incontinence, will not heal until the source of the problem is addressed (in this case, correct incontinence assessment and containment strategies, skin care and barrier protection).

Provision of a pressure-redistributing mattress in this case would be ineffective, as well as costly. However, incontinence is a risk factor for pressure ulcer development and, therefore, this demonstrates the need for a holistic patient assessment.

The location of pressure ulcers should be noted and consideration given to the likely cause, thereby facilitating prevention strategies. If the patient has pressure damage on the heels – for example, caused by ill-fitting footwear, or positioning on wheelchair footplates or recliner chairs – then specific interventions to manage the heels will need to be considered (eg seating/footwear reassessments, use of heel devices and other off-loading interventions), rather than an entire mattress replacement. This is particularly relevant in the community when a profiling bed is often ordered in conjunction with a mattress, with repercussions for both the patient's home circumstances and the organisation's budget.

Understanding the particular risk factors for each patient is important in deciding whether equipment is needed. If a patient is able to mobilise independently or requires limited assistance, they may simply need reminders and encouragement to move and reposition more often and this may be sufficient to reduce their risk.

How to decide which mattress to use

The choice of mattress should not be made solely on the basis of a risk assessment score or on the category of skin damage (EPUAP/NPUAP, 2009; NICE, 2014).

All patients at risk of developing a pressure ulcer should be cared for on a high specification foam mattress (EPUAP/NPUAP, 2009; NICE, 2014). However, evidence to date has not shown any high specification foam mattress to be superior to another. Those at higher risk who cannot be repositioned frequently should be cared for on an active support surface (EPAUP/NPUAP, 2009). Those with category III or IV pressure ulcers should, as a minimum, be cared for on an alternating cell mattress or sophisticated continuous low-pressure system (NICE, 2014). Additionally, both active alternating pressure overlays and mattress replacements have been shown to have similar efficacy in terms of pressure ulcer incidence (EPUAP/NPUAP, 2009). There is no clear evidence to determine which type of products are best for any particular situation (Cullum et al, 2001), therefore, clinical judgement and regular patient evaluation is essential in choosing support surfaces.

Choice of pressure redistributing mattress should take into account the following:

- Patient's weight and build. Active mattresses will have various weight limits so it is important to check these before ordering. Small, light-framed patients may not sink sufficiently into a foam mattress to receive enough pressure reduction. Bariatric patients will have specific requirements as the larger width mattress will necessitate a wider-framed bed. In a patient's home it will be necessary to consider the width of door frames and the positioning of the bed, whether the weight of the bed frame plus mattress will not be too great for the floor, and whether there will be sufficient room for care staff to access both sides of the bed. Children will need smaller cell active mattresses to ensure adequate relief of pressure when the cells are deflated.
- Height. Both static and active mattresses are available as full mattress replacements or as overlays. An overlay is designed to lie on top of a base mattress. The type and quality of this base mattress is important to ensure the overlay is able to function effectively. The overall height of the bed needs to be considered, as an overlay on top of a standard mattress may make the bed too high and hinder the patient from getting in and out independently. This could make the patient unsafe and at risk of falls. If bed rails are required, then the extra height could make these unsafe. Using an ultra-low profile alternating mattress replacement can help prevent this safety issue and assist with compliance to IEC60601-2-52 — the current medical bed standard. A risk assessment should always be carried out if supplying bed rails, and it is advisable to use a half-depth foam mattress as the base when using an overlay. For this reason, overlays may be less cost effective than a full replacement mattress. In the community, it is important to consider the bed frame onto which the mattress is to be placed. Sprung bases are not recommended because of the risk of puncturing the mattress. In addition, the mattress needs to be secured safely to the base and while it may be possible to use a patient's own bed with a pressure-redistributing mattress, in reality the fixation straps are

often not long enough to secure it adequately. It may, therefore, be safer to supply a profiling bed frame with every mattress, but local policy/guidance should be consulted.

- Patient comfort/acceptance. HCPs can make recommendations for equipment based on clinical assessment but unless the patient is comfortable they will be unwilling to accept it. It is not uncommon for some patients to find active mattresses noisy, especially at night, while some patients find the movement of the alternating cells can cause them to experience feelings of motion sickness. When suggesting equipment for patients in the community, consideration must be given to the potential adjustments they might be required to make in their home to accommodate a profiling bed and mattress. While some static mattresses are available for double beds, if a higher specification active mattress is needed, it may necessitate an individual sleeping in a separate bed from their partner. Recognition of the impact on patients and their families while providing a clear explanation of the benefits and risks will be more likely to result in acceptance of some form of pressure relief, even if compromise might be required. Visco-elastic foam mattresses may feel firm, as well as cold at first, especially when new, and patients need to be informed that they will be more comfortable as they warm up. For other patients, foam mattresses may feel too warm, increasing sweating and moisture at the skin surface. Microclimate is recognised as having an influence on the risk of pressure ulcer development, and the choice of mattress can affect this so should be considered by the HCP (International Review, 2010).
- Repositioning. Provision of a pressure-redistributing mattress does not remove the need for regular repositioning of patients. Patients still require turning, but the frequency may be influenced by the use of a mattress (EPUAP/NPUAP, 2009). Frequency of repositioning should be determined from individual assessment of the patient's needs and skin response (Wounds UK, 2012). Encouraging patients to maintain independence in repositioning themselves in bed is important as this is the most effective way of preventing skin damage. The impact of an alternating cell mattress on this should be considered before supplying one, as many patients who can turn themselves on a static mattress are unable to do this so easily on an alternating surface. This is why individual patient assessment is so important – rather than reliance simply on a risk assessment score – in determining which type of mattress to use.

Conclusion

The use of pressure-redistributing mattresses is just one arm of a comprehensive pressure redistributing strategy (Wounds UK, 2012). They should be considered alongside the patient's ability to self-care, positioning and repositioning regimens, nutrition and hydration, and seating surfaces (NICE, 2012). The acronym SSKIN is widely used across organisations as a reminder of the five key elements of good pressure ulcer prevention: skin inspection, surface (including pressure redistributing mattresses and cushions), keep moving, incontinence (or moisture), and nutrition (NHS Midlands and East, 2012). With this in mind, mattresses are seen in their rightful context as an important, pressure ulcer prevention measure. WE

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Collaborative working in the community setting to reduce pressure ulcers

One patient can have multiple healthcare providers in the community. This requires collaborative working for that journey to be smooth and effective. This article will explore how effective communication, documentation and education can facilitate joint working in the shared goal of pressure ulcer prevention.

"The fundamental PUs prevention strategy should always include all five elements of the SSKIN bundle"

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The community is a complex place with a number of services providing care for the same individual with a shared goal of pressure ulcer (PU) prevention.

Community nurses cannot be in a patient's home on a 24-hour basis and rely on individuals, such as patients themselves, relatives, informal and formal carers, as well as other members of the multidisciplinary team (MDT) to assist in the prevention of PU. For this to be effective, there needs to be a facilitator of this care, which tends to be the community nurse and relies on effective communication and collaborative working.

Community strategies for combating pus

PUs are currently high on the national agenda with the Harm Free Care campaign and a drive from the Department of Health (DH) to eliminate avoidable PUs, (NHS Institute of Innovation and Improvement 2010; 2012).

To drive this forward, Birmingham Community Healthcare Trust (BCHC) developed a strategy in April 2012 to bring the focus away from treatment and management of PUs on to prevention.

The four key areas of focus were:
- Policy development
- Documentation
- Education
- Data collection.

Utilising data collection from safety thermometer and clinical incidents provided transparent figures for a baseline to monitor improvement through the strategies implemented.

For any strategy to work, there has to be an element of change management to engage staff in the ownership of the transformation.

Risk assessment

Risk assessment is the first part of any clinical prevention strategy. The Best Practice Statement ([BPS], 2013) recommends that all individuals admitted onto a caseload have a risk assessment completed on the first visit and at regular intervals thereafter, dependent on clinical need and as a minimum of every 3 months.

It is important to include the MDT in the assessment of individual risk with

the knowledge that not all individuals are known to a community nurse.

The tool of choice needs to be appropriate to the population. The BPS (2013) recommends the Walsall Community Pressure Sore risk calculator (Chaloner and Franks, 2000) as the appropriate risk assessment tool for community adults.

SSKIN bundles

Once risk has been identified, The BPS (2013) states "The fundamental PUs prevention strategy should always include all five elements of the SSKIN bundle."

To implement the SSKIN bundle, a colourful visual logo can be helpful in cementing the idea and promoting sustainability. A logo can promote collaborative working by having shared documentation that is branded and easily identifiable (*Figure 1*).

Surface

It is important to use a suitable support surface such as a high specification foam mattress/cushion or an alternating air mattress replacement system to assist in the prevention of PUs (NICE, 2014). However, community nurses face different challenges with equipment installation and patients will make decisions based on the aesthetics of the equipment rather than the functionality.

Figure 1. ***SSKIN bundles were developed in Wales based on the premise of bringing together elements of care into a bundle to develop a process for prevention (NHS Wales, 2010).***

To overcome this, as well as having accessible equipment (i.e. 365 days per year, 24 hours per day), there needs to be a range of equipment to meet the needs of the population including low weight and bariatric.

A buffer stock of targeted pressure relief should be available at team bases, some of which can be stored in car boots (Repose® – Frontier therapeutics, Dermal pads – Smith & Nephew, Crawford Healthcare) to ensure accessibility.

There needs to be effective communication between the individual and the nurse to promote appropriate use of the equipment such as:

- Ensuring inflation of equipment
- Ensuring the equipment is fit for purpose with no holes, scuffs or tears and is appropriate to meet clinical need.

The introduction of equipment often evokes a negative response and may result in the individual being labelled as non concordant. Availability of a range of equipment choices allow the nurse to offer alternatives for the individual to consider, increasing the likelihood of concordance.

Skin inspection

Skin inspection is an essential part of the assessment process and will instigate the other four elements of the SSKIN bundle. NICE guidance (2014) and the BPS (2013) state that skin inspection should be based on vulnerability of the patient. However, to be effective in the prevention of PUs, skin inspection should be completed at every clinical opportunity. The responsibility for skin inspection does not fall solely on the community nurse and must be shared among all healthcare providers, as well as the patient and any informal carers.

To promote effective collaborative working, there needs to be reinforcement of the urgency of identifying the early stages of skin damage as well as education for all, including the patient, family and informal carers.

Key messages such as 'React to Red and/or Redness' can be used to reinforce the importance of skin inspection, but should not solely be relied on. Redness means danger — but only on non-pigmented skin. The clinician must look for purple/blue tones as an indicator of pressure damage on pigmented skin.

In addition, the community environment is not always conducive to full head-to-toe skin inspections. Therefore, a handheld/pocket mirror is a useful aid for inspecting hard-to-see areas.

Keep moving

Movement of patients in the community can be a challenge due to the lack of carer availability. A community nurse may not be available on a daily basis and there is a reliance on carer input to address the formal repositioning regimens that a patient may have planned in their care. It is a rare occurrence that carers are available 24 hours a day. Therefore, there needs to be collaboration between the patient, informal and formal carers and the community nurse with each person working to one plan of care to meet the needs of the individual.

Informal movements that many patients can undertake themselves, such as side to side, tilting their

bottoms, sitting forward and shuffling in a chair will go a long way to supplement the more formal repositioning that a professional may do (*Figure 2*).

Shared documentation that all staff completes can assist with this collaborative approach, with reinforcement of training and communication on the importance of repositioning.

Incontinence

The key to managing incontinence is education, giving clear advice for individuals and carers to follow.

The clinician must ensure the skin is cleaned with a pH neutral soap and water or a skin cleanser. While the national guidance on skin care is to use a skin cleanser (BPS, 2012; 2013), this is not always achievable in the community and where skin is intact, a pH neutral soap could be used. Skin should always be dried by patting, no rubbing as it causes friction on the surface of the skin (BPS, 2013) and the application of a barrier product based on clinical appropriateness (BPS, 2012).

A barrier product should be applied proactively to prevent skin breakdown from urinary and faecal incontinence (BPS, 2012)

Joint working with the continence team can give a strategic overview in managing incontinent individuals.

Figure 2. ***(a and b) By moving side to side and lifting the bottom, pressure is relieved temporarily.***

(c) Good posture helps to spread the weight of the person and reduces pressure on bony areas. (d) Lift the bottom regularly to relieve pressure.

Nutrition and hydration

Completion of a nutritional risk assessment tool such as the Malnutrition Universal Screening Tool (MUST; National Collaborating Centre for Acute Care, 2006) is essential to ensure early intervention for individuals with a potentially impaired nutritional status.

Education of patients, carers and community staff on the importance of nutrition in maintaining fatty padding and keeping skin and tissues hydrated is vital and is the body's natural defence against pressure forces.

Traditionally, education around wound care concentrates on treatment and healing of wounds and not prevention. Collaborative working with the dietetics team needs to take place to ensure all training and education includes this preventative element of the SSKIN bundle.

Documentation

To promote consistency with all care providers working towards the same goal there needs to be a uniform approach to documentation to ensure a shared purpose. The BPS (2013) states "Any PU prevention management strategy needs to involve staff, patient, family and carers at its inception and at each evaluation." Documentation used should include:

- A shared plan of care individualised to the patients needs, facilitated by the community nurse
- SSKIN bundle
- Repositioning chart
- Skin inspection chart
- Decisions against advice form.

Community staff can sometimes be faced with individuals who are not concordant/compliant with elements of care. This can be related to equipment, skin inspections, repositioning or other elements of the care plan. In BCHC, the term 'decision against advice' is used, rather than non-concordance or non-compliance.

Collaborative working with the individual is vital in assessing the factors that can affect concordance with PU prevention. A concordant relationship can aid PU prevention by collaboration and respecting the patient's views. Community staff must have an awareness of issues that can impact on concordance and ensure individuals have been given the right information to enable them to make an informed choice. Gold standard care is not always achievable and alternatives must be explored. A non-concordance or decision against advice form may prompt a community nurse to think of other options and provide evidence that this has been done.

Staff education

Formal training does not always engage staff particularly if they have not chosen to attend. While mandatory training delivers the foundations of prevention, education needs to be delivered in a variety of styles to connect with staff.

This can include:

- Large-scale events
- Workshops
- Individualised community team training
- Clinical rounds.

This, alongside appropriate change management: utilising staff that are engaged and passionate about prevention of PUs can embed messages on the frontline and allow for the development of PU change champions in each clinical area (Niederhauser et al, 2012). A key part of a champions role is to complete the safety cross on a daily basis, monitor PU development; looking for themes and trends in their own team, and to produce and update a PU prevention board of information for staff.

Your Turn

Collaborative working across all health sectors can be a challenge, with different care providers having their own agenda. However, to establish PU prevention as a shared goal, there needs to be joint working.

The 'Your Turn' campaign (Your Turn, 2014) is a national movement aiming to reduce the number of PUs in the UK. They will work alongside Trusts and put together a bespoke package of education and tools dependent on need. Within BCHC, Your Turn has been instrumental in driving the PU prevention campaign forward with care providers outside of the organisation.

Conclusion

The community environment can be a challenging one and it requires collaboration from all healthcare providers to ensure all staff and patients are working towards one shared goal. There needs to be a facilitator of care for this approach to work; this may be the community nurse.

It should not be automatically assumed that all care providers are aware of each others roles and responsibilities, good communication and documentation is the foundations of which PU prevention is built on. WE

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Four case studies examining the use of ADERMA™ and the impact it has on patient wellbeing

Four case studies detailing the use of ADERMA on patients that presented with a variety of pressure ulcer prevention challenges. The patients were cared for in a variety of care settings and the impact the use of ADERMA had on patient wellbeing was captured. Four patients were identified who were either at risk of pressure damage, had previous of pressure damage or active category 1 pressure damage. All four case studies highlight how ADERMA can be beneficial at maintaining skin integrity and preventing tissue damage in a variety of care settings whilst having a positive impact upon patient wellbeing, while illustrating positive experiences for both patient and clinician.

"In addition to the detrimental effects on patient wellbeing, pressure ulcers are undoubtedly a huge financial drain on NHS resources."

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Pressure ulcers have a significant impact upon patient wellbeing, affecting not only physical aspects, but also psychological and social functions. Despite this, they remain prevalent within the healthcare setting. In the UK, approximately 412,000 people are likely to develop a pressure ulcer each year (Bennett et al, 2004). In addition to the detrimental effects on patient wellbeing, pressure ulcers are undoubtedly a huge financial drain on NHS resources. It is estimated the costs of treating a pressure ulcer is between £1,241 and £14,410 per patient episode, dependent on the severity of the ulcer (Dealey et al, 2012).

A pressure ulcer is defined by the European Pressure Ulcer Advisory Panel (2009) as: "A localized injury to the skin and/or underlying tissue usually over a bony prominence, as a result of pressure, or pressure in combination with shear." It was suggested by Large (2011) that pressure ulcers are more likely to occur within the older population or an 'at risk' group who have ageing vulnerable skin and may have reduced blood supply, indicating that two out of three pressure ulcers develop in people who are aged over 60 years old. Other contributing factors to pressure ulcer development may also include poor nutrition and hydration status, reduced mobility and compromised circulation.

Although there are many factors that can influence pressure ulcer development, pressure ulcers are often preventable (EPUAP, 2009). Over the past few years, there has been an intense focus on the prevention of pressure ulcers, and an

ambition to eliminate all avoidable pressure ulcers across NHS-provided care (Wounds UK, 2013). In 2010, the National Pressure Ulcer Advisory Panel (NPUAP) held a consensus conference to discuss pressure ulcer avoidability in an effort to define clinical situations in a variety of care settings relating to pressure ulcer development. The group reached a consensus that most pressure ulcers are avoidable, however, unavoidable pressure ulcers may occur in situations such as haemodynamic instability, in the terminally ill, the non-concordant and when nutrition and hydration status is unable to be maintained or the patient is unable to be repositioned. Research continues to be prevalent in this field (Black et al, 2011).

Hibbs (1998) suggested that 95% of pressure ulcers were avoidable, however, there has been no evidence to support this hypothesis. Downie et al (2010) suggested that, over the years, this hypothesis has worked its way into many discussions and publications as 'fact', however, there is limited research to present a reasonable argument underpinning this claim.

The remainder of this article will discuss how pressure ulcers impact upon patient wellbeing. Four case studies are presented detailing the use of a dermal gel pad called ADERMA™ (Smith & Nephew), which was used on patients with a variety of pressure ulcer prevention challenges, as well as the difficulties faced when aiming to relieve pressure in hard-to-reach anatomical areas of the body. The patients were cared for in a variety of care settings and ADERMA's impact on patient wellbeing was recorded.

An expert working group examined the impact a wound could potentially have on a patient and their caregivers, defining the concept of 'patient wellbeing' as a dynamic combination of factors, incorporating four domains. These were: the physical, psychological, social and spiritual needs of the patient.

The World Health Organization first defined health in 1948 as: "A state of complete physical, mental and social wellbeing and not merely the absence of disease or infirmity." The concept of wellbeing is subjective and will vary over time, according to the individual's needs. Optimising an individual's wellbeing has to be the result of partnerships and interactions between clinicians, patients, their families and carers, the healthcare system and industry (International Consensus, 2012).

Ascertaining the exact wellbeing needs of a patient can be difficult to achieve. The International Consensus (2012) highlights the need for wellbeing to be assessed in wound care. Clinicians must assess the patient as an individual with idiosyncratic goals and experiences. The patient's priorities regarding wound management may not match the healthcare practitioner (HCP)'s. HCPs need to empathise with the patient and develop good communication skills to ensure the holistic needs of the patient are addressed to enable empowerment and choice. When considering pressure ulcers in relation to wellbeing, patients report feelings of frustration, anxiety, guilt, loneliness, odour, pain, stigma and fear. Therefore, pressure-ulcer prevention is a vital component in reducing these implications to patients.

There is, however, a simple solution to this ever-increasing problem of pressure ulceration and that is to prevent them in the first instance. In order for this to be achieved, it is vital HCPs complete a full and comprehensive holistic assessment of each patient and structuring a care plan specific to each individual's needs relevant to pressure ulcer prevention. This should be undertaken on an ongoing basis and reassessment carried out regularly.

What is ADERMA and how can it aid patient wellbeing?

ADERMA is a dermal pad made up of a unique polymer gel, which works by redistributing the pressure over a larger area to reduce the peak pressure at any one point, whilst redistributing pressure ADERMA also protects bony prominences. ADERMA is available in different shapes and sizes, and can be used over different anatomical areas, such as the head, ears, nose, elbows, heels and sacrum. The pads are non-adhesive and allow for regular skin inspection. They are indicated for single patient use but can be stored away and reused. It is recommended that ADERMA is washed on a daily basis using mild soap and water, and both the ADERMA and the patient's skin is dried before reapplication (Hampton et al, 2012).

ADERMA can be used successfully to aid in the patient's pressure ulcer prevention plan and incorporated into any existing care plan or bundle. ADERMA is intended to be used for patients identified at risk of developing a pressure ulcer or for individuals with early signs of pressure damage to reduce skin breakdown. ADERMA can also be used over recently healed pressure ulcers to protect this fragile area of tissue and it works effectively underneath medical devices, such as oxygen masks, tubing and catheters, to reduce the pressure. (Hampton et al, 2012).

The clinical challenge

Four patients who were being nursed in the community setting were identified to be either at risk of pressure damage, had previous history of pressure damage or active category I pressure damage. In all four cases, the wellbeing of the patient and carer was assessed, highlighted and addressed as necessary.

Case report 1

A man in his late seventies (Patient A) who lived alone was receiving end of life care for chronic obstructive pulmonary disease, which required continuous oxygen therapy. Pressure ulcers developed at the tops of both ears due to friction and pressure from nasal cannula tubing. Both pressure ulcers were painful, resulting in ineffective oxygen therapy and increasing shortness of breath.

Hydrocolloid dressings were used to manage Patient A's pressure ulcers, which healed within 17 days. However, during this period, pain and discomfort affected his sleep pattern, appetite and negatively affected his mood. Once his pressure ulcers had healed, a solution was required to prevent further pressure damage in these vulnerable areas.

Following epithelialisation, ADERMA strips were used on top of both ears to prevent repeated pressure damage (Figure 1). Patient A found the nasal cannula around the ears to be more comfortable with the ADERMA strips in place, which resulted in him receiving and benefiting from continuous oxygen therapy and, in turn, enabling him to have undisturbed sleep.

Through using ADERMA for pressure-ulcer prevention, Patient A reported feeling relieved and reassured that through the use of ADERMA strips the risk of deterioration or recurrence of ulceration was reduced. The patient also reported enhanced social interaction and increased mood. Independence was maintained and the patient was able to remain cared for at home.

Family members also reported an increase in his social interaction and a heightened mood. No further pressure damage occurred while using ADERMA strips.

Case report 2

A woman in her late eighties (Patient B) who lived with her daughter and son-in-law was receiving end-of-life care for cancer. Pressure relieving equipment was installed but, at the patient's request, effective repositioning was limited and restricted to only lying on her left side. The patient was unable to communicate verbally and used facial expressions to convey pain and discomfort. Category I pressure damage developed to the left shoulder. With Patient B unable to tolerate repositioning onto other body parts, however, a solution to prevent further deterioration was required.

An ADERMA sacral shape was positioned underneath the left shoulder, which the patient tolerated well (Figure 2). No further deterioration of the category I pressure ulcer was reported. A change in facial expressions suggested less discomfort and less sleep disturbance while lying on her preferred left side. Her family were also less anxious as they noticed their relative appeared more comfortable and the category I pressure ulcer was not deteriorating.

A reduction in active nursing intervention also resulted in an increase in quality time spent with the family during the end stages of her life. ADERMA aided quality of life for the patient in the final stages of life, aiding privacy, dignity and comfort.

Case report 3

A woman in her early nineties (Patient C) lived in a care home and was receiving end-of-life care. Previous medical history included a cerebral vascular accident and she was very frail and unable to communicate verbally. Despite having appropriate pressure-relieving equipment, her carers were concerned about potential pressure damage between her contracted knees and used a pillow as a preventative measure, however, skin changes were noted. The carers needed a solution for her to be comfortable, as well as free from pressure damage during the end stages of her life and to have undisturbed rest and sleep.

An ADERMA Sheet was placed between Patient C's contracted knees to aid effective pressure relief and also to prevent any further deterioration, while ensuring patient comfort (Figure 3). The patient's facial expressions of pain and discomfort were reduced and she was able to achieve quality sleep and rest. The use of ADERMA facilitated the delivery of care, while ensuring dignity and comfort in the end stages of life.

Case report 4

A woman in her late seventies (Patient D) lived in a care home and had a Dupuytren's contracture of both hands. She had also previously experienced a CVA. The pressure from the contracted hands was painful and created soreness on both palms, which developed into category I pressure damage. The patient was feeling increasingly low in mood due to the pain and carers were keen to find a solution to resolve the discomfort and prevent further pressure damage.

An ADERMA Sheet (10cm x 10cm) was placed between the contracted fingers and palms with no further pressure damage occurring and resolution of category I damage achieved (Figure 4). Overall, Patient D's sleep pattern improved with expressions of comfort while using ADERMA and a resolution of pain. The patient's mood also improved and she reported feeling relieved and reassured that by using ADERMA the risk of deterioration or recurrence was reduced. Socially, the patient began reattending church and she became more encouraged to participate in activities with other care home residents and staff.

Discussion

All four case reports illustrate positive experiences and outcomes for the patient, family and HCPs involved.

Patient experience

All four patients reported being more comfortable with ADERMA *in situ*. The use of ADERMA aided in the maintenance of skin integrity and inspection, and the achievement of

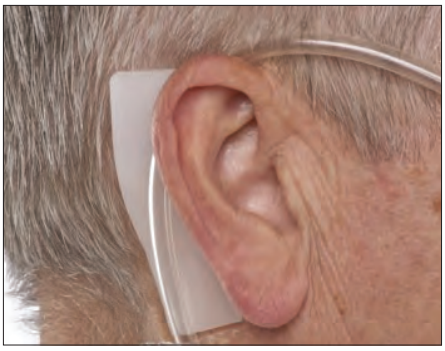

Figure 1. ***ADERMA strips under nasal cannula tubing.***

Figure 2. ***ADERMA sacrum over the shoulder.***

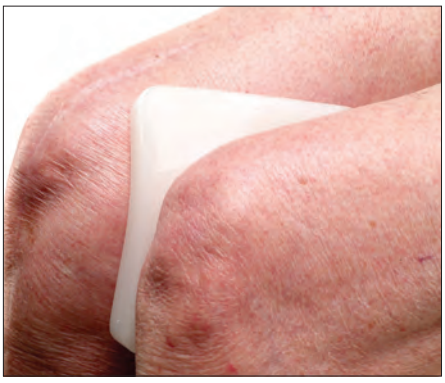

Figure 3. ***ADERMA sheet between contracted knees.***

Figure 4. ***ADERMA sheet with hand contracture.***

effective pressure relief. In all four cases, any further or subsequent pressure damage was successfully prevented. All patients were able to maintain good hygiene throughout and one individual benefited from pain-free oxygen therapy. The use of ADERMA had a positive impact on patient wellbeing in all four cases.

Clinician experience

All carers and clinicians found the ADERMA variants easy to use, easy to secure and were easily cleaned with regular and easy removal for skin inspection. All caregivers were satisfied that ADERMA maintained effective pressure relief with no further deterioration in skin conditions. The HCP involved with case report 1 recommends the use of ADERMA strips as a first-line measure for patients with a nasal cannula to prevent risk of pressure damage and on recently healed wounds in these areas.

Conclusion

These case reports highlight the importance of patient wellbeing and demonstrate the use of ADERMA as a simple yet effective solution to pressure ulcer prevention. All four case studies highlight how ADERMA can be beneficial at maintaining skin integrity and preventing tissue damage in a variety of care situations whilst having a positive impact upon patient wellbeing. For individuals living with or who are at risk of developing a pressure ulcer, they face major changes in their day to day lives and the integration of treatment – related procedures may be challenging for them to adapt to (International consensus, 2012) hence the necessity of clinicians acknowledging wellbeing in the assessments of pressure ulcer prevention and management in all such individuals. WE

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