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Making Sense of Wound Assessment

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Abstract

Wounds have become a significant public health challenge and consume a large amount of annual healthcare resources. Wounds can impact seriously on a patient's quality of life causing psychological and social distress and account for significant periods of lost employment resulting in financial loss. If nurses are to achieve effective wound healing they must be competent in assessing the patient as a whole as well as the wound itself. This article seeks to explain holistic wound assessment and also clarify some of the issues associated that are prevalent in wound assessment and offers strategies to assist the nurse in improving their capacity to competently assess wounds.

Keywords: To be drawn from Nursing Standard taxonomy by editorial team

Aims and Intended Learning Outcomes:

The aim of this article is to enable nurses to consider their role in holistic wound assessment, the associated risks for patients developing wounds and potential wound deterioration. After reading this article and completing the time out activities you should be able to:

- Understand the psychological, social and physical factors that are important when carrying out wound assessment and work collaboratively with patients

- Understand the principles of wound aetiology and the difference between acute and chronic wounds to minimise risk of patient harm
- Identify the local factors that impact wound healing and how nurses can endeavour to practise effectively and use the best available evidence
- Understand the importance of communicating assessment findings within the healthcare team to ensure clear and accurate records relating to wound care

Wounds are becoming a significant public health challenge and consume a vast amount of annual healthcare resources. With an ageing population and an increase in co-morbidities, such as diabetes mellitus, the prevalence of chronic wounds has been predicted to increase at a rate of 12% per year (Guest, *et al*, 2017). Whatever field or setting a nurse works in, they will encounter wounds during their career and there is potentially a bewildering array of terminology and knowledge required.

A recent systematic review and meta-analysis reported a global prevalence of chronic wounds as 2.21 per 1000 population (Martinengo, *et al*, 2019). Perhaps more pertinently, a wound can impact seriously on a patient's quality of life and can be a major disruption both in terms of lost days in employment and the associated financial loss. A wound that fails to heal may have a deleterious and exponential impact on a patient's psychology and social dynamics with many patients reporting and alluding to depression, negative self-image, reduction in self-worth and difficulty engaging in normal day to day social activities, due to embarrassment and humiliation (Murray, 2019, Coleman, *et al*, 2017).

If nurses are to aid wound healing then they must be competent in assessment. In recent years the care of patients and their wounds has become the responsibility of nurses in many if not all cases and doctors and consultants will often seek guidance from nurses in regards to wound healing. In order to heal the wound a nurse will need to make a diagnosis to inform their decision making in regards to treatment and this may involve dressing choice, the use of compression or topical negative pressure, a review of medication and many lifestyle and psychosocial factors. Recent research suggests that 30% of wounds are missing a recorded differential diagnosis and this is important in regards to chronic wounds such as leg ulcers where the wrong treatment can result in severe iatrogenic harm, including infection, sepsis,

amputation and potentially death (Guest, *et al*, 2018). Wounds can be caused by many factors including traumatic injuries where the cause is obvious but also underlying factors and conditions that may result in a spontaneous wound.

Holistic Assessment:

It is important that all wound assessments involve the patient, not only to ascertain the history of the wound which will influence management, but in shared decision-making in subsequent care. The patient can then ideally be an active partner in the wound management process. Due in part to the reprioritisation of health care resources and economic burden of wounds, patients are being encouraged to take a more active role in the management of their wounds. This involves focusing on what matters to the patient as opposed to what matters to the healthcare professional thereby making care more person centred. Consequently, the patient should gain a greater sense of control over their treatment, leading to increased concordance. In practical terms, this may be achieved through providing patients with information that increases health literacy. Clinicians can discuss options with patients and ask questions, prompting them to make choices and decisions. Communications skills are therefore important to this approach but a number of decision making aids can also help to foster concordance, such as evaluations and questionnaires that focus on symptom management (Wounds International, 2016)

A holistic assessment requires the nurse to consider the psychological, social, cultural, economic as well as physical dimensions of health. Nurses in the UK work with a multicultural population and therefore need to consider and engage with the patient's range of experiences, ideas, beliefs and values to increase understanding and therefore facilitate wound healing (Wounds UK, 2018a).

Some patients may be anxious or experience depression and stress and may engage in smoking, alcohol or drug use as a coping mechanism as opposed to positive health behaviours such as exercise (Eagle, 2009). Some patients may also live in poverty and poorly maintained housing and living environments, with some living in extreme states of deprivation and these may exacerbate mental health. These patients may also prioritise their spending and a well - balanced diet, for instance, may not be a primary concern. Many patients, especially older patients and perhaps those with mental health conditions, may have reduced or absence of

social networks and may even be homeless. The nurse may be their main or only form of social contact and patients may initiate actions and behaviours that encourage the nurse's continued involvement. In many instances the nurse may need to refer patients to appropriate health care professionals / agencies to provide further support and in some cases urgent safeguarding concerns, such as abuse or self-neglect would need to be escalated immediately as per local policy.

There are a number of nursing factors that may hinder a holistic assessment. These can include a lack of knowledge and experience on the nurse's behalf, as well as insufficient time that prevents a comprehensive assessment. Nurses also need to be self – aware so that their own reactions to wounds do not appear negative. Patients will often be aware that their wounds may smell or appear offensive and identify staff attitudes and body language that confirms this and may disengage. Additionally, patients may have long established routines and wound management may compromise daily activities. Wound management, especially bandaging regimes and dressing changes may interfere with aspects of personal hygiene such as washing and dressing. In addition, patient allergies and sensitives, as well as medication, should all be assessed (Coleman, *et al*, 2017).

Organisational tendencies may also play a part, where the wound is the primary focus or indeed where a wound may not be the primary concern, such as in the emergency department. An absence of standardised assessment tools and critical equipment, such as a Doppler and unclear referral pathways, especially in relation to more complex wounds add further complication to the assessment (Wounds UK, 2018a).

Time out 1.

Review the wound assessment documentation in your clinical setting. Does the documentation incorporate a holistic assessment? Does it allude to factors relating to a patient's cultural, psychological and socioeconomic background?

Aetiology

Acute Wounds

Aetiology refers to the cause of the wound and is an important consideration when determining how long a wound will take to heal and how it is managed. Most people will experience a wound at some point in their lives and they may not even necessarily need any nursing or medical intervention with the wound progressing to healing within a period of 4 weeks (Coleman, *et al*, 2017). These types of wounds are often referred to acute wounds and may be attributable to grazes, puncture wounds, lacerations and cuts. However, other acute wounds such as surgical incisions including hip or knee replacement and abdominal surgery will require assistance to progress to healing. These wounds may require staples, clips or sutures to bring the wound edges together and hold in place but in most cases will also heal within 4 weeks. Virtually any wound where the patient does not have any co-morbidities would be expected to follow the 4 week trajectory (Frykberg and Banks, 2015).

How, when and where did the wound occur?

In order to manage and heal a wound successfully and mitigate against potential infection it is also essential to establish how, when and where the wound occurred. Nurses may be confronted with wounds such as bites, knife or gunshot wounds, garden injuries or wounds caused by glass. Any debris such as gunpowder, glass or virulent pathogens left in the wound may prolong the inflammatory phase of healing. These types of wounds need to be investigated and / or cleaned and the patient's medical history would need to be consulted to check for date of last tetanus, for instance. Patients who present with a haematoma may need to have their clotting levels reviewed or it may be necessary to establish if they are taking their medication as prescribed. Patients also need to be informed as to how much physical activity to undertake following, for instance, abdominal surgery, to prevent the risk of dehiscence (this is where a wound can break down). It is therefore essential to assess the patient holistically because if these factors are not identified, the wound has the potential to become chronic.

Chronic Wounds

Nurses will most likely encounter chronic wounds in their clinical setting and these wounds may deteriorate a number of times before they heal, and some may never heal (Brown, 2019). All chronic wounds will have an underlying aetiology and may also arise spontaneously. Chronic wounds are often referred to as 'ulcers' and these may comprise pressure ulcers, leg ulcers and diabetic foot ulcers, sinus tracts and cavities (Johnson, 2015). In this mode of healing the tissue defect is too wide for the edges to be brought together and granulation tissue needs to fill the defect, effectively healing from the base or bottom of the wound (Chetter *et al*, 2017; Chetter *et al*, 2019; McCaughan *et al* 2018).

In chronic wounds, the process of wound healing is more complicated. Chronic wounds are frequently described as being 'stuck in the inflammatory phase of wound healing' which can be attributable to a number of factors (Frykberg and Banks, 2015, Gupta, *et al*, 2017). Medication, such as steroids, anti-inflammatories and immunosuppressive agents, may inhibit the inflammation process. Older age may also be a crucial factor and although the impact of age on wound healing is not fully understood, it is thought that angiogenesis or tissue regeneration relating to the proliferative phase of wound healing is slower, while the production of white blood cells such as macrophages, again crucial in the inflammatory phase of wound healing, is less pronounced. Smoking can also slow wound healing due to vasoconstriction and impediment of blood flow. In order to problem solve the delay in healing, knowledge of the stages of wound healing as well as holistic assessment are therefore necessary.

Chronic wounds are often categorised as 'ulcers' and there are again distinct types of ulcers with different causes or aetiologies. Leg ulcers are broadly categorised into those of venous or arterial origin accounting for 40% – 85% and 5% – 30% respectively. Mixed aetiology accounts for 10% - 20%. Other causes of leg ulcers, such as rheumatoid ulcers or of diabetic aetiology account for 5%-20% (Harding, *et al*, 2015, SIGN, 2010).

TIME OUT 2

Reflect on the wounds that you have encountered in your clinical setting. Can you identify which wounds could reliably be categorised as chronic wounds and would take longer than 4 weeks to heal?

Venous aetiology

There are a set of clinical factors that aid the identification of wounds of venous aetiology. These include the presence of varicose veins, hemosiderin staining (an iron-storage complex causing brownish discolouration on the lower legs), venous dermatitis and atrophie blanche (white scar tissue with red discolouration), inverted champagne bottle shaped leg(s), lipodermatosclerosis (inflammation of fat under the skin) which is sometimes mistaken for cellulitis, as well as venous associated oedema (SIGN 2010, Meyer, *et al*, 2011). Aching and throbbing are also descriptors that may coincide with venous stasis, although this is not conclusive (Closs, *et al*, 2006).



Atrophie Blanche



Ankle flare and hemosiderin staining

A patient's medical history would also help to support the diagnosis, including varicose veins, previous deep vein thrombosis, lower limb surgery, especially of an orthopaedic nature, multiple pregnancies, which can raise venous pressure in the lower limbs, and occupations that require standing or sitting for prolonged periods of time. The position of the wound is also

important and venous ulcers tends to occur, although but not exclusively, around the medial malleolus and gaiter area (Michael and Maier, 2016).



Typical position of venous leg ulcer

Arterial aetiology

Conversely, arterial ulcers are usually harder to manage and arterial disease needs to be ruled out or confirmed before the wound can be managed appropriately. Patients may present with intermittent claudication, a cramping pain in the legs due to insufficient blood flow, on exercise which can be observed when walking. Patients may also have a history of cardiovascular disease and/or myocardial infarction.

Wounds tend to present on the forefoot and medial - anterior tibia and have a punched-out appearance (Grey, et al, 2006, Meyer, et al, 2011). Clinical features of a leg with arterial insufficiency include an absence of hair, while the limb will also feel cool or cold to the touch and may appear dusky in colour (Michael and Maier, 2016). There is also likely to be reduced blood perfusion and there may be an absence of pedal pulses, although bounding pulses can also be a feature of arterial disease. The capillary refill time may be greater than 3 seconds. This is tested by pressing on the limb for 5 seconds to blanch the skin, the flush of colour should return briskly in less than 2 seconds in adults with an unimpaired blood supply.

Patients may also complain of 'sharp' pain which tends to decrease with dependency of the limb but increase with elevation, sometimes referred to as night pain when the patient retires to bed and may experience sleep disturbance (Closs, et al, 2006, Hellstrom, et al, 2016). A Doppler assessment would provide a differential diagnosis between venous and arterial disease, effectively ruling out or confirming the presence of arterial disease.



Arterial ulcer

Diabetic aetiology (foot ulcers)

Similar to arterial ulcers, diabetic foot ulcers are complex wounds. Diabetic peripheral neuropathy, and often combined with peripheral vascular disease, is thought to be the common factor in almost 90% of diabetic foot ulcers (Alexiadou and Doupis, 2012). It is characterised by degeneration of, or damage to, the peripheral nerves, resulting in a loss of sensation and autonomic dysfunction (Jarrett 2013, Howarth 2019). Motor neuropathy results in muscle weakness, atrophy, and paresis. Sensory neuropathy results in the loss of sensation of pain, pressure and heat and predisposes patients to ulceration. Autonomic dysfunction causes vasodilation and decreased sweating, impairing skin integrity and leaves the patient at risk of infection (Alexiadou and Doupis, 2012). Diabetic foot ulcers usually occur on the bony prominences of the foot, including toes and heels. These often appear as necrotic and may be gangrenous and ultimately the foot may also require amputation. Due to the absence of sensation, many patients may not notice wounds on their feet (which may arise through poorly fitting shoes, or unnoticed trauma) and they may often have developed into ulcers by the time they become apparent.

Patients with diabetes should be under the care of a podiatrist and will have their feet assessed regularly with a monofilament, a device that detects changes in sensation. Patients are also encouraged to check their feet regularly and often daily to prevent complications (Howarth 2019). This includes the use of a small mirror to access the underside of the foot where visualisation can be difficult, especially if inspecting independently.



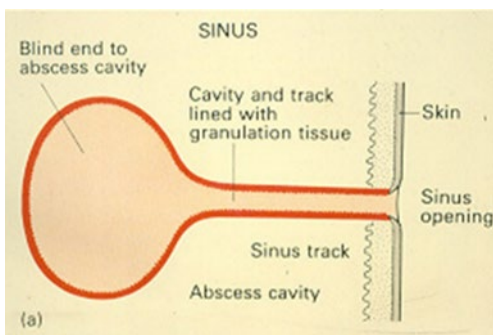
Diabetic foot ulcer



Monofilament testing

Sinus tract wounds

Sinus tract wounds, perhaps the most common of which is pilonidal disease / sinus are caused by hair in the natal cleft or coccyx area that penetrates the skin causing an abscess or cyst which may extend deeply. Although not fully understood, aetiology relates to familial disposition, sedentary employment, such as bus or heavy goods vehicle drivers and was first described as 'jeep seat disease'. It typically affects young males, although not exclusively, with 'wiry' or 'coarse' hair and may also be complicated by obesity and potentially poor hygiene (Bradley, 2010, Bosche, *et al*, 2018, Harris, *et al*, 2016)



Sinus

TIME OUT 3.

Consider the ulcers you encounter in your clinical practice or reflect on leg ulcers that you have previously encountered. Do you think they are of a venous, arterial or diabetic aetiology or are they a combination of these aetiologies? What further steps would you take to confirm the aetiology? Is there a protocol to refer to the TVN for further support in relation to diagnosis?

Pressure ulcers

Pressure ulcers are a distinct type of ulcer in themselves and have become a key quality issue for the NHS in the UK and are largely preventable (Wounds UK 2013). Although pressure ulcers are an indicator of care quality, in some situations, they are unavoidable, such as end of life or terminal care, where vital body systems begin to shut down and compromise skin integrity (Sibbald, *et al*, 2009) Pressure ulcers arise from a combination of sustained pressure and shearing forces and potentially further complicated by friction (NHS Improvement, 2018). Shearing occurs during movement, such as sliding down a bed where the skin and immediate subcutaneous tissue remains stationary but the deeper tissues move against them, causing a rupture of blood vessels but not necessarily any damage to the epidermis. This may also occur due to poor manual handling techniques.

Although friction is not cited as a primary cause of pressure ulceration, repeated rubbing and damage to the epithelium render the patient susceptible to ulceration. Pressure ulcers will manifest when pressure exceeds the counter capillary pressure within blood vessels resulting in their occlusion and tearing. This leads to reduced tissue perfusion and ischaemic necrosis (the death of tissue from a reduced blood supply). In a hospital / ward setting patients should be assessed within 6 hours of admission (Wounds UK, 2013). In England, patients admitted onto a caseload in the community setting require an assessment on their first visit and at regular intervals thereafter (Wounds UK, 2013). A validated pressure ulcer risk assessment tool such as Waterlow or Braden should be used to ascertain level of risk and should be

available in all clinical settings (CQUIN, 2020). Once pressure ulcer risk has been established, the SSKIN bundle acronym is advocated for preventing and managing pressure ulcers.

S: Surface - assess for need of pressure relieving or redistributing equipment

S: Skin - assess skin for signs of pressure damage

K: Keep moving - reposition as needed

I: Incontinence and moisture - assess risk in relation to skin damage

N: Nutrition and hydration - ensure nutritional assessment and regular review

The intrinsic and extrinsic factors that may predispose patients to pressure ulcers are shown in table 1.

Table 1. Risk factors that predispose patients to pressure ulcers (Adapted from Barry and Nugent, 2015)

Intrinsic Factors	Extrinsic Factors
Reduced mobility	Pressure
Poor nutrition and hydration	Shearing forces
Extremes of age	Friction
Neurological deficits	Moisture
Poor oxygen perfusion of tissues	Medical devices
Incontinence terminal illness	
Acute illness	

More recently, the PURPOSE T (Pressure Ulcer Risk Primary or Secondary Evaluation Tool) has gained traction. This tool shares similarities with Waterlow and Braden but crucially, incorporates a colour coded, detailed skin assessment that focuses on vulnerable areas and bony prominences.



Pressure Ulcer

TIME OUT 4

Consider a patient in your clinical area or reflect on a patient you have encountered with a pressure ulcer. How many of the extrinsic and / or intrinsic factors do you think contributed to that pressure ulcer?

TIME OUT 5

Investigate your clinical area in regards to managing patients who are at high risk of pressure ulceration or have already developed pressure ulcers? What protocol does your area follow? Does your area follow the SSKIN bundle protocol for preventing and managing pressure ulcers?

Wound Assessment:

Following the completion of a holistic assessment, it necessarily follows that the wound(s) itself is assessed. Wound assessment requires all of the nurse's senses including listening as well as touching, smell and looking (Flanagan, 2013). Pain should be assessed including frequency and severity, and it should be noted that the perception and expression of pain is influenced by a person's culture (Brown, 2015, Coleman, *et al*, 2017). The nurse should be alert to non – verbal as well as verbal indications of pain such as grimacing (Brown, 2015).

Depth, size and extent of tissue damage

The size of the wound is important to assess and can help determine the wound's progression or, indeed, deterioration and its subsequent management. In order to establish the size, clinical settings may use a variety or combination of approaches. Measuring tape can be used and a drawing can be made of the wound detailing these measurements. It is important to

measure the length and width from the maximum point. Many clinical areas use tracing on acetate to measure the wound which provides a more accurate record. Additionally, photography is used frequently now and is considered part of the minimum data set (Coleman, *et al*, 2017). A measuring tape or ruled placed alongside the wound will negate difficulties in perspective. Probes can be used to establish the depth of wounds and some ribbon wound dressings may also come prepacked with a probe.

Pressure ulcers usually occur over bony prominences with the heels and sacrum being perhaps the most vulnerable but other sites of risk include elbows, ischium, occiput, ears and hips. Pressure ulcers are categorised from 1 to 4. Category 1 pressure ulcers involve non-blanching erythema. When an area of red / inflamed skin is observed and pressure is applied the area will not blanch or turn white which indicates pressure damage. In darker skin, the skin tone may appear red, blue or purple. With category 2 pressure ulcers, there is a break in the skin involving the epidermis and potentially the dermis. No slough is present. Category 3 pressure ulcers involve damage to the subcutaneous tissue and may also appear as necrotic. Bone, tendon or muscle is not exposed. Category 4 pressure ulcers involve extensive destruction, including full tissue necrosis and may include damage to bone, muscle and supporting structure. Deep tissue injuries manifest as purple or maroon localised area of skin or a blood filled blister where depth is unknown. Unstageable pressure ulcers involve full thickness tissue loss but the depth is unknown due to the presence of eschar or slough (NPUAP, 2014, Fletcher and Hall, 2018)

Type of Tissue:

Necrotic Tissue:

Necrotic tissue is dead or devitalised tissue, adheres to the wound bed, and is generally of a dark brown or blackish colour. Necrosis occurs due to ischaemia and may be caused by pressure and occlusion of the blood vessels such as in pressure ulcers or reduced tissue perfusion due to arteriosclerosis or peripheral neuropathy. Necrotic tissue cannot be salvaged and presents a further challenge since it obscures the true depth of the wound and a full assessment cannot be undertaken until it has been removed. Necrotic tissue can also harbour bacteria. It is noted that in the case of diabetic foot ulcers and ischaemic ulcers, some caution

should be exercised when being removed since this is undertaken by donating fluid to the tissue to soften it and this may increase the risk of infection (Lloyd Jones, 2015).

Haematomas, can present with a similar problem but they can ultimately develop into an ulcer, especially if located on the leg. The depth of damage will not be established until the haematoma has been removed through natural processes or debridement. Medications such as anticoagulants and steroids, especially in older people, will render them more vulnerable to these types of injuries.



Necrotic tissue

Slough:

Slough is the yellow, brown and or grey / black substance that adheres to the wound bed although sometimes stringy in appearance. It cannot be removed through irrigation or normal cleansing. It is comprised of dead white cells and bacteria, rehydrated necrotic tissue and fibrous tissue (Bateman, 2015). Wounds can continue to heal with the presence of slough but it is classified as non-viable tissue, and may prolong the inflammatory process so that new cellular growth and granulation is slowed (Cook, 2012).



Slough

Granulation Tissue

Granulation tissue is bright red or pink in colour, corresponds with the proliferative phase of wound healing and indicates that new capillary networks are being formed. This is referred to as angiogenesis. Granulation tissue that bleeds easily may be indicative of infection (Grey, *et al*, 2006)



Granulation tissue

The TIME acronym (Falanga, 2000, Schultz, *et al*, 2004, Sibbald, 2011) is a recognised tool used to help healthcare practitioners manage acute and chronic wounds and also serves as an aid to assessment. It incorporates the above identified features encountered in acute and especially wounds. TIME stands for:

T: Tissue management

I: Inflammation and infection control

M: Moisture balance

E: Epithelial (Edge) advancement

Exudate:

Another key factor in assessing wounds relate to exudate, sometimes also referred to as 'drainage', which is an essential component of the wound healing process and can provide vital information in relation to the wound's status. Exudate is a fluid produced by the circulatory system that contains and transports cellular elements and proteins including leukocytes, matrix metalloproteinase (MMPs), macrophages, fibrinogen and fibrin as well as nutrients for epithelial cells across the wound bed (Cutting, 2004, White and Cutting, 2006,

Brown, 2019). Normal or healthy exudate is straw / amber in colour. This exudate is vital for maintaining a moist wound environment which is also crucial to wound healing.

Various descriptors are used to ascertain the amount of exudate a wound produces and in some instances ‘light’, ‘moderate’ and ‘heavy’ are used. However, it may be more beneficial to describe exudate amount in terms of the dressing’s appearance and an assessment tool that incorporates the descriptors of dry, moist, wet and saturated) can be used to facilitate this. Dry indicates no visible moisture and is not an ideal environment for healing. Moist is ideal, with surrounding skin intact and looking healthy, and some absorption of exudate by the dressing. Wet is not ideal, indicating that the dressing is having difficulty coping with the exudate with potential risk for surrounding skin. Saturated is a cause for concern and there is strikethrough, with the dressing being unable to cope with exudate and the likelihood of deteriorating surrounding skin (Tickle, 2016).

A change in appearance, such as consistency and colour are, as previously mentioned, also indicators that something may be wrong. A standardised tool, such as the wound exudate continuum (Gray, *et al*, 2005, Tickle, 2015) combines a combination of volume and consistency. This allows assessment of the exudate over the time. If for example, the score is rising, created by increasing volume and viscosity scores, this may indicate the wound is not healing and infection may be present. As with all tools, staff need adequate training, time and support from experienced colleagues to ensure they are applied well in practice.

	Viscosity		
Volume	High (5)	Medium (3)	Low (1)
High (5)			
Medium (3)			
Low (1)			
High (10–8)		Medium (6)	Low (4–2)

(Gray, *et al*, 2005, Tickle, 2015) PERMISSION MAY BE NEEDED

TIME OUT 6

Consider the wounds that you encounter in your clinical area and establish how exudate is assessed. Does your clinical area assess exudate in relation to the dressing condition or the appearance and consistency of the exudate or both? Is there a standardised assessment tool used, such as the wound exudate continuum?

Surrounding Skin

In chronic wounds, exudate is detrimental in nature and has been found to be composed of excessive amount of MMPs and an absence of the tissue inhibitors of matrix metalloproteinase (TIMPS) that moderate MMPs (Greener, *et al*, 2005). Chronic exudate also contains other destructive compounds which degrade and prevent angiogenesis and are also detrimental to the surrounding skin. Wounds are also thought to heal with a wound bed that is slightly acidic in nature and chronic exudate is more alkaline (Greener, *et al*, 2009).

Since chronic exudate is corrosive, the observation of the peri-wound area may provide further insight into levels of exudate and its management. For instance, maceration, where the affected skin turns whitish and breaks down due to excessive exposure to moisture, is not desirable and this indicates heavy amounts of exudate.



Maceration

TIME OUT 7

Investigate how your clinical setting manages maceration. Is there any protocol to prevent or minimise the risk of maceration?

Wound Infection:

Wound infection can usually be determined through the overt and classic signs of: (erythema, delayed healing, new or increasing pain, warmth, tenderness, swelling, pyrexia and pus purulent discharge and malodour (Brown, 2018). This process becomes more difficult when assessing chronic wounds. It is well established that chronic wounds and indeed all wounds are colonised by bacteria and it is the host response that determines the likelihood of infection at a local and systemic level. It is also acknowledged that chronic wounds can tolerate significant bacterial loads but still continue to heal (Rhoads, *et al*, 2008). This relates to wounds that may be stuck in the inflammatory phase of healing and patients will not necessarily be able to mount the sufficient inflammatory response to fight the bacteria (Rhoads, *et al*, 2008). It is also acknowledged that wound swabs cannot establish if there is an infection (wound swabs can establish sensitivity which may be useful if suspected infection is not responding to antibiotics) and that infection should initially be determined by clinical judgement (Dowset, *et al*, 2019).



Infected wound

Critical colonisation and Biofilms:

The concept of critical colonisation (Cutting and Harding, 1994, Sibbald, *et al*, 2000, Kingsley, 2001,) is variously described as localised infection and should be diagnosed to ensure appropriate treatment and healing and prevent systemic infection (Dissemond, *et al*, 2010, Miller, *et al*, 2011, Wounds UK, 2018c). Biofilms are thought to play a significant role in critical colonisation and are posited to be present of at least 60% of chronic wounds, if not all (Di Domenico, *et al*, 2017, Schultz, *et al*, 2017). In chronic wounds, single or multiple species of bacteria work synergistically to exude extracellular polymeric substances composed of proteins, lipids, and polysaccharides to establish a matrix that prevents healing and is highly

resistant to antimicrobial dressings and systemic antibiotics (Percival, *et al*, 2012, Schultz, *et al*, 2017, Chung and Khanum, 2016). Staphylococcus Aureus and Pseudomonas Aeruginosa are the most common isolate and considered strong biofilm producers. Although it is suggested that biofilms have a shiny and slimy appearance, the visualisation and subsequent diagnosis of biofilms remains subjective, and may be confused with slough, debris or exudate (Chung and Khanum, 2016, Schultz *et al*, 2017, Brown, 2018). Biofilms may be present at the surface of the wound but they can be located deeper in the wound (Schultz, *et al*, 2017).

Consequently, it is more beneficial to observe for the clinical signs of biofilm presence. Clinical indicators of biofilms include: resistance to treatment, with antibiotics or antiseptics, delayed healing, repeated cycles of infection, excessive exudate and low levels of chronic inflammation (Schultz, *et al*, 2017). The list below further elaborates on covert / subtle indicators that may signify localised wound infections and should alert the nurse:

- Hypergranulation
- Epithelial bridging and pocketing in granulation tissue
- Friable granulation tissue (bleeds easily)
- Delayed healing and / or deterioration of the wound
- Purulent exudate
- Increase in malodour
- Increase in or new pain

(Cutting and White, 2004, Dissemond, *et al*, 2010, Miller, *et al*, 2011, Brown, 2018, Dowset, *et al*, 2019)

TIME OUT 8:

Investigate the wound assessment documentation in your clinical area in relation to the above covert clinical signs of infection. Are there clear guidelines to diagnose the covert clinical signs of infection? Are there strategies / guidelines in place directing what to do if infection is diagnosed?

Conclusion

This article has highlighted the varied types and complexity of wounds encountered in clinical nursing practice, emphasising the importance of holistic wound assessment. The article has also raised the importance of assessing the aetiology of wounds and how wounds are classified according to their chronic or acute status. It argues that for effective management the nurse needs to undertake a detailed assessment using, as appropriate, structured and standardised tools. Assessment needs to be patient-centred, involving the patient in shared decision-making, as part of a wider holistic approach to identify predisposing factors to wound development and those factors which may hinder effective management, and can therefore be modified or eliminated.

Permission not granted to anything

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