

Introducing a new superabsorbent dressing to manage wound exudate

ABSTRACT

The production of wound exudate is a natural and normal consequence of healing. However, when the constituents, volume and consistency of the exudate alter, problems can occur. This article discusses the different types of exudate and its impact on both the patient and the clinician and outlines appropriate exudate assessment and effective management and dressing selection. If these are performed appropriately, this can improve quality of life for the patient and save time and money for healthcare providers.

Key words: Exudate ■ Debridement ■ Social isolation ■ Quality of life

One of the key challenges in wound care is the effective management of exudate. Inappropriately managed exudate can have a devastating impact on the patient's quality of life, resulting in social isolation and depression. For the clinician it can result in increased cost both in resources and in time. It is imperative that the clinician accurately and effectively assesses wound exudate and has the knowledge and skills to select appropriate treatment options and correct wound dressings to allow optimal wound management (Tickle, 2016). This article considers how Vliwasorb® Pro (L&R) can assist clinicians in managing wound exudate effectively and aid the wound healing process.

Exudate and the role it plays in wound healing

Exudate, when associated with wound healing, is frequently perceived in a negative light. Excoriated peri-wound skin, deteriorating wound bed and increase in wound size can all occur as a result of exudate. In addition, exudate can have an impact on health economics as failure to control exudate can lead to increased wound management costs, often resulting in daily or even twice-daily dressing changes; thus increasing costs and patient morbidity (Wounds UK, 2013; Tickle, 2016).

In principle it is the poor management of exudate and failure to correct the underlying cause that can cause problems with wound healing. Exudate itself plays a crucial part in the wound healing process. It is generated as part of the natural wound inflammatory and proliferative stages of the healing and reparative process. It encourages wound healing by:

- Providing essential nutrients for cell metabolism
- Promoting cell proliferation

- Facilitating the diffusion of vital healing factors (growth and immune factors) within the wound bed
- Aiding autolysis of dead and damaged tissue (World Union of Wound Healing Societies (WUWHS), 2007; Romanelli et al, 2010).

Problems can occur when exudate levels increase and viscosity changes. Excessive exudate can impede growth factor availability, delay or even prevent cell proliferation and cause increased proteolytic activity (the breakdown of healthy tissue) (WUWHS, 2007). If not addressed and managed effectively, the wound bed can become over-hydrated leading to excessive moisture to the peri-wound skin. This moisture can lead to skin maceration and possible tissue damage (Drewery, 2015). In addition, skin stripping and excoriation may occur, owing to the harmful effect of the proteolytic enzymes and waste products within the exudate (Drewery, 2015).

Mismanagement of excessive wound exudate can lead to increased levels of certain matrix metalloproteinases (MMPs). These break down healthy tissue, as well as prolonging the inflammatory response, and thus result in delayed wound healing (WUWHS, 2007).

Poorly managed exudate is also associated with the escalation of the bacterial burden, increasing the risk of local infection (Vowden et al, 2015). It can also contribute to the formation of wound biofilms. Biofilms are surface-attached communities of microorganisms that are encased in a strong extracellular matrix formed of carbohydrates, proteins and/or DNA, which form an extremely effective protective barrier against antibodies, antibiotics and antimicrobials (Schultz and Dowsett, 2012). Mature biofilm colonies are formed in 2–4 days and can perpetuate an inflammatory response, and this can result in an even higher exudate production (Davies, 2012). In addition to the exudate and biofilm formation, there may also be the presence of devitalised tissue. This tissue can also harbour bacteria and increase the risk of wound infection and, if unmanaged, lead to patient sepsis (Davies, 2012).

In order to manage these risks effectively, it is essential that clinicians address the factors that may act as a barrier to wound healing. The TIMES checklist may assist clinicians when assessing and managing these barriers (Table 2). The acronym stands for: non-viable Tissue, Inflammation and infection, uncontrolled Moisture balance and any changes to the wound Edge and Surrounding skin (Wounds UK, 2016). Health professionals should conduct accurate and frequent wound assessments based on this checklist to ensure an optimal wound-healing environment.

When preparing the wound bed for healing, debridement

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Table 1. TIMES checklist				
T	I	M	E	S
Tissue non-viable	Inflammation and/or infection	Moisture balance	Epithelial edge advancement	Surrounding skin

Source: Wounds UK, 2016

Table 2. Barriers to wound healing	
Dry	<ul style="list-style-type: none"> ■ No visible moisture. Not an ideal wound-bed environment ■ Surrounding skin may also be dry
Moist	<ul style="list-style-type: none"> ■ Ideal wound environment ■ Primary dressing may have absorbed low amount of exudate ■ Surrounding skin may be healthy and intact
Wet	<ul style="list-style-type: none"> ■ Potential for peri-wound maceration/excoriation ■ Primary dressing may have absorbed large amounts of exudate
Saturated	<ul style="list-style-type: none"> ■ Primary dressing may be saturated and leakage may be present on secondary dressing. Exudate may be visible on peri-wound skin

Source: World Union of Wound Healing Societies, 2007

Table 3. Exudate odour assessment tool	
Very strong	Odour is evident on entering the room (6–10 feet or 2–3 metres from the patient) with the dressing intact
Strong	Odour is evident on entering the room (6–10 feet or 2–3 metres from the patient) with the dressing removed
Moderate	Odour is evident at close proximity to the patient when the dressing is intact
Slight	Odour is evident at close proximity to the patient when the dressing is removed
No odour	No odour is evident, even at the patient's bedside with the dressing removed

Source: Haughton and Young, 1995

of the wound and peri-wound skin is essential at each dressing change and the method/s chosen must be safe, effective, available and acceptable to the patient. Wound-bed preparation may also require more than one debridement technique, either within the initial phase of debridement or for maintenance debridement.

There are several methods of debridement:

- Sharp
- Surgical
- Larval
- Autolytic
- Mechanical
- Enzymatic.

The introduction of mechanical debridement tools with monofilament fibre technology (Debrisoft® and Debrisoft® Lolly, L&R) will assist in the breakdown of devitalised tissue/skin and trap slough, bacteria and harmful waste products in its fibres. The benefit of this for the patient and the clinician is that it is a quick, safe, effective and gentle method of debridement that is readily available and not reliant on advanced clinical skills. It promotes wound healing progression and has been recommended as a safe,

cost-effective method of debridement by the National Institute for Health and Care Excellence (2014).

The impact of poorly managed exudate On the patient

An increase in exudate production and bacterial burden will have a negative impact on the patient's quality of life. As a result he or she may experience increased pain and discomfort, and increased anxiety and stress owing to the harmful effect of the exudate and the need for increased dressing changes (Edwards, 2013). There may also be other psychosocial challenges such as embarrassment and a loss of dignity. As a result patients may opt to wear oversized clothes/footwear to accommodate wound dressings and disguise any leakage (Persoon et al, 2004). Leakage may also increase the amount of laundry required and change personal hygiene needs, which may be physically challenging for some patients (Tickle, 2016).

On the clinician

Excessive exudate and poor management will also have a negative impact on the clinician, often resulting in increased clinical visits and dressing changes, something that is difficult to manage in today's already stretched healthcare environment.

Exudate assessment

Comprehensive assessment underpins effective exudate management and should be integrated into a holistic patient and wound assessment. The assessment should identify any patient comorbidities, wound-related problems and psychosocial factors that may be contributing to exudate-related problems (Romanelli et al, 2010). Factors may include infection, oedema or underlying medical conditions such as heart failure or lymphoedema. It is important to assess the patient's health status, both physically and psychologically, and the impact of the wound on his or her quality of life.

Wound exudate and how to assess and manage it is a clinical challenge in wound care. Clinicians need to be skilled in recognising the different types of exudate and wound assessment charts must include the assessment of the four characteristics of exudate: volume, viscosity, colour and odour. This will accurately ascertain if there are any indicators of potential harmful wound agents such as bacteria, or contaminants that may delay the wound-healing process (Dowsett, 2012). Information about the type of exudate is also gained from examination of the soiled dressing, wound bed and peri-wound skin at each dressing change (WUWHS, 2007). Effective assessment and management of wound exudate can promote wound healing and reduce the negative impact on the patient's quality of life.

Assessment of exudate volume

The volume of exudate produced may vary not only at different stages of the healing continuum but will also alter between different wound types, depending on their origin, location and in relation to wound size/depth (Tickle, 2012). It can be difficult to measure as different descriptors such as 'light' and 'heavy' are often subjective and may mean different thing to different clinicians. A clear gauge of exudate volume would be to use a standardised assessment tool (Table 2).

Assessment of exudate viscosity

Viscosity can vary between thick and viscous to thin and watery. When assessing the viscosity of exudate, consider other possible factors such as residue from dressings, material from an enteric fistulas or the presence of liquefying necrotic material (WUWHS, 2007). The assessment tool in *Figure 1* allocates a score to exudate volume and viscosity, highlighting potential risk to the wound healing process (WUWHS, 2007).

Assessment of exudate colour

Exudate is normally straw or amber in colour (Davies, 2012). Colour may indicate an increase in the bacteria within the wound bed or wound bed trauma, or be due to the constituents of a wound dressing. For example, a green-coloured exudate may be indicative of the presence of *Pseudomonas aeruginosa* bacteria (Wounds UK, 2013). Red-coloured exudate may indicate local wound bed trauma and a grey or brown-stained exudate may be owing to the constituents released into the wound bed from the use of dressings containing silver or iodine (WUWHS, 2007).

Assessment of exudate odour

Wound odour, also referred to as malodour, is typically the result of devitalised tissue or bacterial colonisation in the wound bed. It is often indicative of bioburden or other barriers to wound healing (Holloway, 2004; Jones et al, 2008). An increase in exudate malodour can be extremely distressing and embarrassing for the patient, and may lead to social isolation and depression (Faucher et al, 2012). An odour assessment tool (*Table 3*) can guide clinicians in the appropriate treatment.

Exudate management and dressing selection

An ideal wound dressing should prevent wound-bed desiccation or over-hydration by maintaining effective wound-bed moisture, and prevent peri-wound skin maceration and/or excoriation (Thomas, 2008).

Moist wound healing is an essential part of wound healing, so it is necessary to maintain a balance between excessive moisture and the wound bed becoming dry (White and Cutting, 2006). Dressings are the mainstay and most accessible option for managing wound exudate. Effective dressing selection and availability is important to both the progress of the wound and patient comfort and quality of life. Many factors influence the choice of wound dressing, but choice should be based on a holistic patient assessment. Important attributes of an effective dressing are shown in *Figure 2*.

Regular exudate assessment and the use of effective absorbent dressings will assist in the removal of harmful bacteria and enzymes from the wound bed, thus reducing the risk of local infection and delayed healing (WUWHS, 2007). It is crucial that clinicians consider the components of the dressing and are aware of its ability to manage all types of exudate. It is also important to consider whether the dressing can be used successfully in a wide range of wound types and locations and alongside other treatment interventions, such as compression therapy (Davies, 2012).

Simple absorbent wound dressings can absorb exudate into the dressing material spaces. The exudate can wick

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

Figure 1. Wound exudate continuum. Reproduced with permission from Gray et al (2005)

laterally or vertically across the dressing. The exudate absorption will also be aided by moisture vapour transmission (evaporation) (Tickle, 2016). Other dressing materials may absorb the exudate and form a gel using fibres. This will lock in the exudate (WUWHS, 2007). Frequently dressings may combine various materials in order to offer a range of absorbent dressings. This allows the clinician to match the dressing's fluid-handling capability to the volume and type of exudate produced from the patient's wound (Romanelli et al, 2010).

Appropriate dressing selection is vital if an effective wound bed moisture balance is to be maintained (Adderley, 2010). It should always be tailored to the condition of the wound and the type and amount of exudate being produced (Dowsett, 2012); something that can be overlooked given the variety and number of dressings available. In order to achieve these goals, clinicians need to have a detailed knowledge of the fluid-handling properties of wound dressings and their recommended wear time

Vliwasorb Pro

A new superabsorbent dressing, Vliwasorb Pro (*Figure 3*), has been designed to address the issues clinicians face when managing wound exudate. Vliwasorb Pro is an effective, conformable superabsorbent dressing that can act as a primary

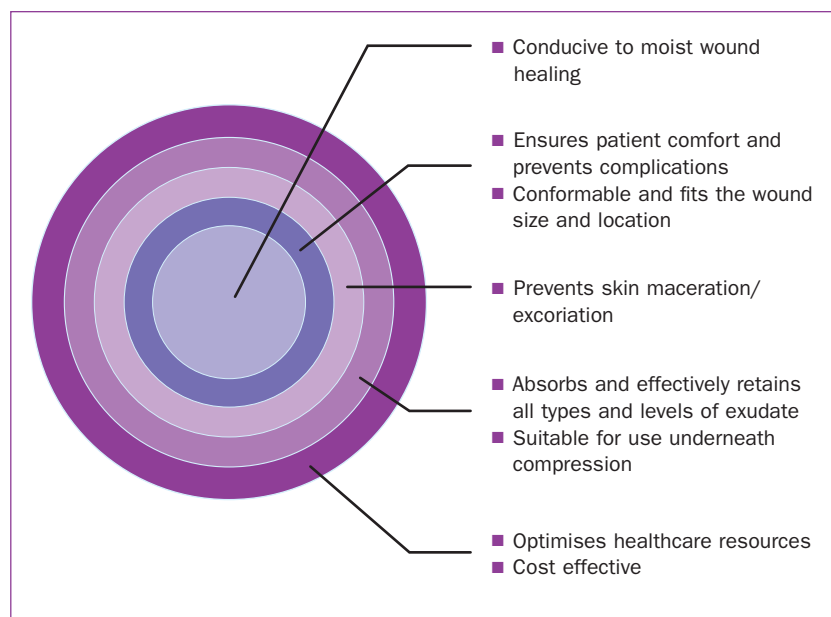


Figure 2. Characteristics of an ideal absorbent dressing

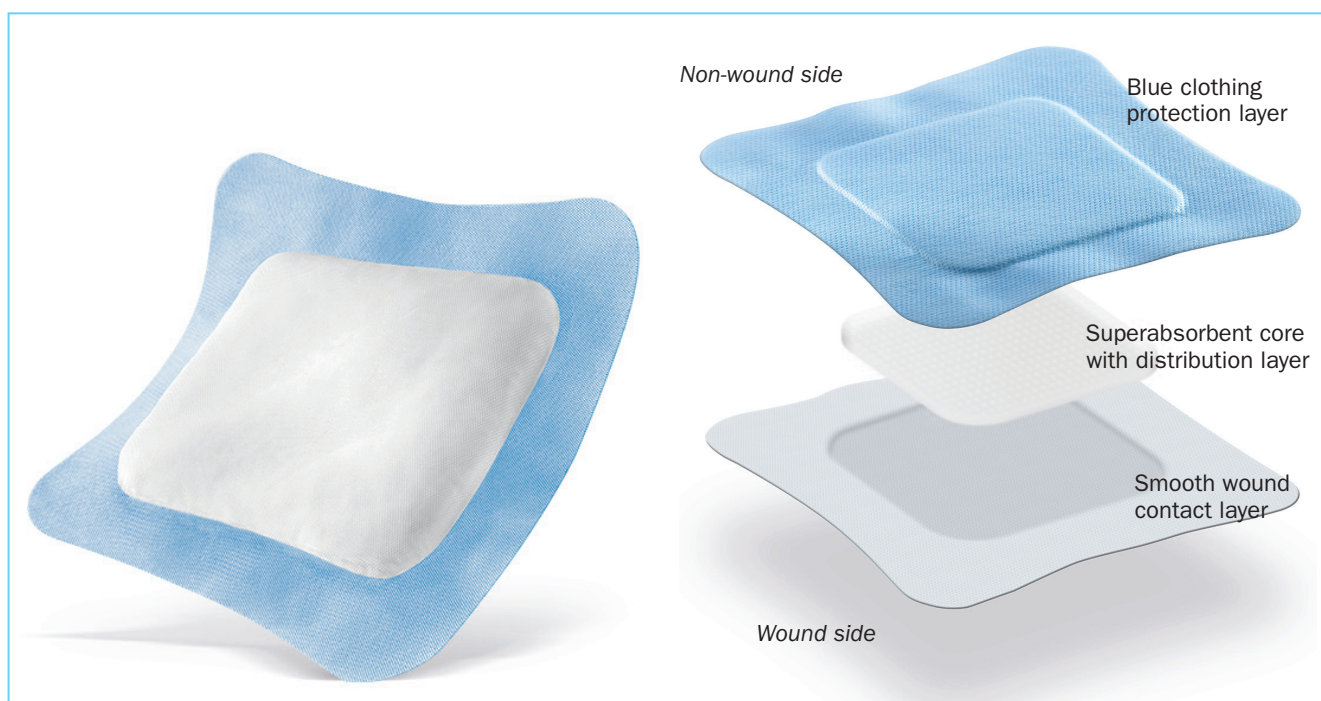


Figure 3. The structure of Vliwasorb Pro

dressing for the management of moderate to heavily exuding superficial wounds. It is an evolution of the Flivasorb dressing and is indicated for use in the following wound types:

- Chronic wounds, for example: leg ulcers, pressure ulcers, diabetic ulcers, oncological wounds
 - Acute wounds, e.g. partial-thickness burns, postoperative wounds, trauma wounds, skin-graft donor sites.
- The dressing has the additional benefits of:
- Wider border and a more ergonomic shape, making it easy to retain and safe to use, even on difficult-to-treat areas of the body.
 - New structure to the superabsorbent polymers (SAPs), making the wound pad (absorbent core) both softer and more absorbent, which, in combination with the improved border/shape, not only increases conformability and comfort, but also enhances the dressing's fluid-handling capability. It offers a reduced risk of leakage, and maceration/excoriation to the peri-wound skin and increased comfort and confidence for the patient. This capturing of exudate also locks away protease enzymes that can delay wound healing.

In addition to these new benefits, Vliwasorb Pro retains many of the existing features of Flivasorb, including:

- The same tried and tested product materials of Flivasorb
- Non-woven, breathable outer protection layer to prevent exudate from leaking through the dressing and causing discomfort, or potential infection
- Smooth, integrated wound contact layer, which is flexible and skin friendly, to ensure atraumatic dressing changes and removing the need to use an additional wound contact layer, which incurs increased dressing costs
- Distribution layer to ensure that exudate is evenly distributed throughout the dressing, maximising absorbency potential and maintaining comfort. (Verrall et

al, 2010; Faucher et al, 2012).

Vliwasorb Pro can be used effectively underneath compression therapy due to its soft bevelled edge and its ability to retain exudate under pressure, meaning it can be combined with adjunct therapies in effective exudate management pathways. This, in combination with the other benefits provided by the dressing, means that Vliwasorb Pro not only promotes an optimal wound healing environment, but can also improve quality of life for patients with highly exuding wounds. Vliwasorb Pro is the same price as Flivasorb, meaning it provides additional benefits to the health professional and patient at no extra cost.

The following case studies demonstrate the efficacy of Vliwasorb Pro in practice.

Case study 1

Mrs G had a 12-month history of lower limb ulceration following trauma to her leg. Her comorbidity was pernicious anaemia. On vascular assessment she had an ankle brachial pressure index (ABPI) of 1.1 and was deemed suitable for compression therapy. The wound bed had no evidence of granulation tissue and consisted of 100% dark red/black devitalised tissue. The wound produced high volumes of high-viscosity (thick) haemorrhagic exudate that was malodorous and caused the patient distress, pain and embarrassment (*Figure 4*).

Previous treatment

Initially the wound was dressed with an antimicrobial primary dressing and an absorbent pad. Unfortunately this did not manage the exudate successfully and resulted in leakage, soiling of the peri-wound skin and increased frequency of dressing changes to daily. This caused additional distress and discomfort for the patient.

New treatment

In view of these factors, a clinical decision was made to debride the wound bed and peri-wound skin at each dressing change using a Debrisoft pad. An antimicrobial dressing was then applied and the Vliwasorb Pro superabsorbent dressing was used alongside Actico2C (L&R) compression bandaging. This was chosen as inelastic bandages are recommended to reduce oedema (Knowles et al, 2013; Fletcher et al, 2016). It was felt that the proactive cleansing effect and anti-inflammatory properties of Vliwasorb Pro would help to reduce microbial burden, and reduce odour by binding the bacteria within the dressing.

Results

Following 3 weeks of treatment, the level of devitalised tissue was significantly thinner and less tenacious and the bacterial burden reduced. The haemopurulent exudate and 100% devitalised tissue had been significantly improved and the wound had reduced in width, length and depth. Although there was presence of yellow exudate there was a significant improvement from the previous devitalised wound bed. (Figure 5). There was no wound dressing leakage and the peri-wound skin was no longer macerated. This resulted in alternate-day dressing changes, which helped reduce the patient's pain and distress. This also meant that she had increased confidence when socialising and felt more positive as she could see that the wound was improving. Vliwasorb Pro was used for 4 weeks and successfully managed the high volume and thick viscosity exudate owing to its ability to absorb and retain this type of exudate. This allowed the wound to move along the healing continuum. It also promoted patient comfort, because of its absorbent properties, and the prevention of exudate leakage.

Case study 2

Mr R, a 21-year-old man, sustained a crush injury to his heel.

Previous treatment

Following surgery it was agreed by the consultant that negative pressure wound therapy (NPWT) would be applied. This assisted in managing the high volumes of exudate and encouraged granulation tissue within the wound bed (Figure 6). However, on discharge from hospital, Mr R voiced his distress that he felt very isolated at home with the use of the NPWT and wanted to have what he called 'normal dressings'.

New treatment

A decision was made that a superabsorbent dressing that would conform to the area of his wound was necessary. Wound dressing changes were performed three times a week using Vliwasorb Pro. The dressing was used to promote effective exudate management which in turn would help to protect the wound and the surrounding skin from maceration and promote a moist wound healing environment, thus reducing the frequency of dressing change.



Figure 4. Case study 1 at presentation



Figure 5. After 3 weeks the wound had improved



Figure 6. Case study 2 following NPWT



Figure 7. Exudate and wound size reduced

Results

The dressing maintained a moist wound environment and protected the granulation tissue while absorbing excessive exudate away from the wound bed and skin. The patient's quality of life improved as he could now happily socialise and no longer felt embarrassed as the dressing was discreet. It conformed well to the ankle and its protective contact layer and superabsorbent properties gave the clinician and the patient the confidence that the exudate was contained within the dressing. Vliwasorb Pro was used for 4 weeks, until the exudate levels were minimal and wound size small (Figure 7).



Figure 8. Case study 3



Figure 9. Exudate and viscosity reduced

Case study 3

Mrs C underwent a coronary artery bypass graft. Following surgery she had a dehiscence of her surgical wound. The wound bed was 100% granulation tissue, however, exudate levels were high (Figure 8).

Previous treatment

Because of the location of the wound, a foam adhesive dressing was applied. Unfortunately, exudate levels were not contained and the frequency of dressing change had to be increased from alternate days to daily. In addition, the patient developed skin sensitivity to the adhesive border. Both these factors led to increased distress to the patient and increased demand on the clinician's time and resources.

New treatment

It was agreed that a superabsorbent dressing was required that could protect the granulation tissue, manage the high levels of exudate and be conformable to fit the wound location. Vliwasorb Pro was chosen, due to its ergonomic shape, flexible design and ease of retention.

Results

Following its implementation, the wound exudate was successfully managed and contained within the dressing. The effective management of the exudate also helped the wound to successfully move along the healing continuum. It

held the exudate away from the peri-wound skin effectively, preventing maceration and/or excoriation and enabled the dressing regimen to be performed on alternate days. This assisted with the reduction of the patient's pain on dressing change as well as reducing clinical nursing time. The dressing frequency was reduced to three times per week as the dressing managed the exudate volume and viscosity effectively (Figure 9). The patient's skin sensitivity also resolved. The wound continued to granulate and reduce in size and depth and the patient reported the dressing 'felt more comfortable and her skin less sore'. The wound improved significantly after 10 days.

Conclusion

The impact on a patient's daily life of living with an exuding wound is significant and this can lead to increased pain, anxiety, stress, social isolation and loss of independence. To prevent serious complications for patients, it is imperative that clinicians fully understand the consequences of living with a wound. In addition to this, it is crucial that they also have the knowledge and skills to undertake a comprehensive patient and wound/exudate assessment and have a clear understanding of the mode of action of wound dressings. Appropriate wound dressing selection will assist with successful wound healing and, most importantly, improve quality of life for patients.

The case studies demonstrate that Vliwasorb Pro has the potential to assist the clinician in achieving this. The use of Vliwasorb Pro in the cases presented here enhanced exudate control, maintained healthy peri-wound skin, reduced nursing time and increased comfort and confidence for the patients. **BJN**

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KEY POINTS

- As well as having cost and resource implications for clinicians, if not managed appropriately, exudate can have a negative impact on patients' quality of life
- To manage exudate effectively, clinicians should be able to assess exudate appropriately and this involves looking at volume, viscosity, colour and odour
- Appropriate dressing selection is important and should be based on a holistic patient assessment
- Patients may experience pain, stress, anxiety or social isolation owing to embarrassment because of highly exuding wounds

CPD reflective questions

- How does the management of patients with heavily exuding wounds impact your working day?
- Does your current wound assessment tool include all aspects of exudate assessment? How could it be improved?
- Think about the impact of poorly managed wound exudate on patient quality of life; why is this important to address?
- What further knowledge and information do you need around management of wound exudate?
- How much do you know about current exudate management pathways; do they include appropriate debridement to prepare the wound to heal, and reduce the body's own need to produce moisture to remove devitalised tissue?

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