

# Xtrasorb<sup>®</sup> dressings

PRODUCTS FOR PRACTICE

made  
easy

## Introduction

**Moist wound healing is a growing specialty with the potential to address multiple factors that affect a wound's ability to heal. It involves maintaining a balanced wound environment that is not too moist or too dry. Dressings that can help to optimally manage wound exudate and promote a balanced environment are key to improving wound and patient outcomes. This made easy describes the Xtrasorb<sup>®</sup> range of dressings, how they work and the clinical benefits provided by the superabsorbent polymer (SAP) technology incorporated in the dressings.**

*Authors: Greenwood M, Grothier L*

## ROLE OF DRESSINGS IN MOIST WOUND HEALING

All wounds produce fluid although the volume will vary depending on the wound, and levels within an individual wound will vary over time (usually decreasing as the wound heals) (Adderley, 2008). Some fluid is necessary for moist wound healing: a moist wound bed promotes healing by supplying the essential nutrients that allow cells to metabolise, helping tissue-repairing cells to migrate to where they are needed, and allowing dead or damaged tissue to separate from viable tissue (autolysis) (WUWHS, 2007). However, too much exudate can cause maceration of the periwound skin and lead to strikethrough, which can increase the risk that the wound will be breached by microbes, increase the risk of infection, and negatively impact the patient's comfort and quality of life (Adderley, 2008). A dry wound bed can cause adherence of dressings, disruption to granulation tissue and discomfort for the patient (WUWHS, 2004).

Practitioners must manage the wound environment so that moisture levels are optimal for healing. The challenge is to maintain optimum moisture in an ever-changing wound environment with minimum interference to the wound bed, ie least number of dressing changes, while removing exudate from the surrounding skin (Bale, 1997; Adderley, 2008). Dressings play a key role in achieving

this (WUWHS, 2007), but are often designed to either absorb fluid (highly exuding wounds), maintain fluid levels (moderately exuding wounds) or hydrate (donate moisture to dry wounds).

Traditionally, foam dressings have been considered best suited to moderately to heavily exuding wounds, but current thinking suggests that foams are better for wounds with low to moderate volumes of exudate (White et al, 2012). Foams are non-abrasive and comfortable to wear. However, some foams are criticised for their inability to retain absorbed fluid, and can be associated with skin maceration and high unit cost (White et al, 2012). They are not all suitable for use under compression.

Superabsorbent dressings were subsequently developed that are able to absorb more fluid, retain the fluid they absorb, and are associated with a reduced dressing change frequency (Gardner, 2012), which can result in lower costs.

Dressing choice is important for wound and patient outcomes. Assessment of the patient's overall medical status and history, together with a comprehensive wound assessment will determine dressing choice (Romanelli et al, 2010; WUWHS, 2007; Cutting and White, 2006).

## WHAT IS XTRASORB<sup>®</sup>?

Xtrasorb<sup>®</sup> is a range of absorbent dressings that incorporates superabsorbent polymer (SAP) technology to achieve a wound bed with optimal moisture levels for healing. There are two Xtrasorb<sup>®</sup> dressings in the range which can be used to maintain the necessary moisture balance in wounds with various levels of exudate.

### Xtrasorb<sup>®</sup> HCS

This is a hydrogel colloidal sheet dressing designed to donate moisture to dry and sensitive wound conditions while simultaneously absorbing up to moderate amounts of wound exudate and retaining it within the dressing.

### Xtrasorb<sup>®</sup> Foam

This incorporates a SAP gel sheet fused to the back of a traditional hydrophilic foam to offer increased absorption and fluid handling for moderate to heavily exuding wounds (Table 1).

Both are available as adhesive or non-adhesive dressings and can be used under compression bandaging. Exudate levels should be observed and assessed by a competent practitioner to ensure the correct Xtrasorb<sup>®</sup> dressing is selected.

**Table 1 Properties of Xtrasorb® dressings**

	Xtrasorb® HCS	Xtrasorb® Foam
		
Exudate level	Light to moderate	Moderate to heavy
Use under compression	✓	✓
Locks fluid within dressing	✓	✓
Creates osmotic pull of fluid	✓	✓
Available with or without adhesive border	✓	✓
Non-adhesive dressings can be cut to size or windowed	✓	✓
Donates moisture	✓	✗
Absorbs moisture	✓	✓
Gelatin free	✓	✓
Highly conformable	✓	✓

**WHAT IS POLYMER TECHNOLOGY?**

Superabsorbent polymers are compounds that can absorb and retain large volumes of liquid relevant to their mass.

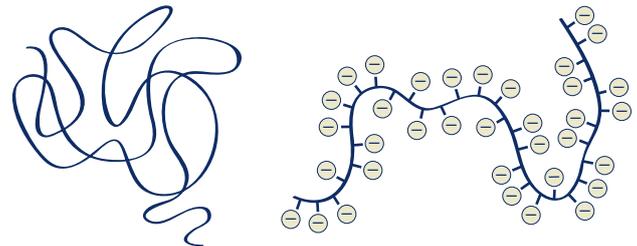
Polymers are classified as **non-ionic**, without electrical charge (eg polyurethane foam dressings), or **ionic polymers**, with electrical charge.

Non-ionic polymer chains are linked closely together or coiled and do not have much capacity for absorbing fluid. Dressings containing non-ionic polymers, such as polyurethane foams, are used for wounds with low volumes of exudate (White et al, 2012).

Ionic polymers have negatively charged side arms that repel the linking polymer chains away from each other (Figure 1). The repelling ions cause the ionic polymers to stay spread apart, thus creating more space in the polymer chain and allowing for extremely high absorption rates (Pytlík et al, 2005).

Dressings containing ionic polymers with increased absorption capacity, such as calcium alginate dressings, are suited to use in wounds with moderate to high levels of exudate (Walker and Parsons, 2010). However, these dressings can sometimes lose structural integrity and disintegrate due to the large volumes of liquid absorbed.

**Figure 1:** An illustration of the structure and form of polymers and their absorption capabilities



A tightly coiled non-ionic polymer. Eg:  
• polyurethane foam

An ionic polymer expands because the negatively charged side arms repel each other. Eg:  
• High absorption - carboxymethylcellulose and calcium alginate  
• Very high absorption - polyacrylates

**XTRASORB® AND SAP TECHNOLOGY**

**Benefits of superabsorbent polymers**

Superabsorbent polymers provide considerable benefits in wound dressings through their:

- very high absorptive capacity
- gel-forming action that retains absorbed fluid within the structure of the polymer
- ability to create an osmotic gradient
- ability to sequester and retain potentially harmful exudate components (Vachon and Yager, 2006; Wiegand et al, 2011)
- protease modulating activity resulting from modification of the wound environment (Tarlton and Munro, 2013).

Xtrasorb® dressings contain cross-linked ionic SAPs that enable them to have enhanced absorptive capabilities and remain intact despite the high volume of fluid uptake (Wiegand et al, 2011). This is in contrast to, for example, alginates, which are ionic polymers but are not cross-linked polymers.

As fluid is absorbed into the material, a gel is formed locking within the dressing the fluid, which contains bacteria, matrix metalloproteinases (MMPs) and other enzymes (Vachon and Yager, 2006; Wiegand et al, 2011). In chronic wounds, healing may be disrupted by a number of factors including excessive levels of enzymes, such as MMPs (Liu et al, 2009), and/or high levels of bacteria. In this way, the superabsorbent polymer may improve the chronic wound environment by reducing the impediments to healing (Tarlton and Munro, 2013).

Additionally, *in vitro* studies of Xtrasorb® HCS and Xtrasorb® Foam have shown that the Xtrasorb® polymer sheet technology helps to reduce MMP activity through two mechanisms: by direct absorption of the proteases and by reducing co-factors essential for their function, such as metal ions (Tarlton and Munro, 2013).

## WHAT IS XTRASORB® HCS?

Xtrasorb® HCS is composed of 45% SAP, 50% hydrogel (a glycerin/water mix) and 5% sodium carboxymethylcellulose (a hydrocolloid component).

It is a versatile dressing designed to help manage varying wound conditions by donating moisture to a dry wound environment while optimally handling the fluid associated with light to moderately exuding wounds.

### How does it work?

Xtrasorb® HCS is able to absorb up to four times more liquid than other hydrocolloid dressings by taking fluid up vertically into the dressing and preventing sideways or lateral spread of fluid onto the periwound area (data on file). This helps prepare the wound bed by removing excess moisture while devitalised tissue is removed by autolysis, decreasing the risk of periwound maceration (Welber et al, 2012).

This is sometimes a consequence of using hydrogels under compression (see Case Report 1).

Xtrasorb® HCS has a cooling and soothing effect (see Case Report 1) on dry and sensitive skin conditions and on the wound bed. The dressing provides an atraumatic wound contact layer that is highly conformable and non-adherent to wound tissue (see Case Report 1).

In addition, Xtrasorb® HCS is transparent, allowing clinicians to view the wound and identify early signs of infection or cues that the dressing needs changing earlier than planned.

### When is Xtrasorb® HCS indicated?

Xtrasorb® HCS is indicated for light to moderately exuding wounds including:

- pressure ulcers
- venous leg ulcers
- arterial ulcers
- diabetic foot ulcers
- postoperative wounds
- traumatic wounds
- first and second degree burns
- donor sites.

### Contraindications and precautions

Xtrasorb® HCS should not be used on heavily bleeding wounds or third degree burns, or in patients with known hypersensitivity to the product itself or to any of its components (including glycerin or sodium carboxymethylcellulose).

### How to apply Xtrasorb® HCS

- Cleanse the wound and surrounding area according to local protocol, and ensure the surrounding skin is dry.
- Select a dressing of a size that will allow the dressing pad to

## Case report 1: Application of Xtrasorb® HCS to a leg ulcer in conjunction with hosiery



Figure 1: The wound at presentation showing devitalised tissue



Figure 2: The dressing in place enables the wound to be clearly monitored



Figure 3: The wound has reduced in size and the condition of the periwound skin has improved

### Background

An 82-year-old gentleman with a four-year history of multiple episodes of leg ulceration and episodes of varicose eczema presented to the tissue viability clinic with a re-ulceration to the left medial malleolus. He had a history of varicose eczema. The open wound, which measured 0.5cm x 0.5cm, was dehydrated and the majority of the wound was covered with superficial devitalised tissue. There was a low level of exudate. The condition of the surrounding skin was poor. Previous treatments had been unsuccessful at removing the hard devitalised tissue and the varicose eczema had caused irritation to the surrounding skin.

### Treatment

Xtrasorb® HCS was used to rehydrate the tissue. The dressing was changed twice weekly. Inelastic cohesive bandaging was applied and a course of steroid ointment was prescribed for the skin irritation. After 11 days of treatment the dehydrated tissue had reduced significantly and a simple non-adherent dressing was applied. The wound and surrounding skin responded well to Xtrasorb® HCS. At week 11, as the wound was considered well-managed and care could be provided in part by a practice nurse, the patient progressed on to a made-to-measure 40mmHg hosiery kit.

### Outcome

The wound went on to heal completely within nine weeks of assessment. Tissue viability staff reported that Xtrasorb® HCS was easy to apply and remove, did not adhere to the skin and was conformable to the patient's limb. The patient reported that he found it extremely comfortable and that the dressing had had a 'soothing effect' throughout wearing it. Overall, the dressing was evaluated as a cost-effective clinical solution for autolytically debriding devitalised tissue and preparing the wound bed for healing.

completely cover the wound and extend onto healthy skin by approximately 10–15mm.

- Remove a corner of the white plastic liner to expose the tacky portion of the dressing.
- Position the dressing and smooth into place while removing the second portion of the white plastic liner.
- When using the non-adhesive non-bordered version of Xtrasorb® HCS, secure in place with tape or a secondary dressing, eg a conforming bandage.
- When using the adhesive bordered version of Xtrasorb® HCS, peel away the top liner from the dressing once the dressing is in place.

### WHAT IS XTRASORB® FOAM?

Xtrasorb® Foam consists of a SAP gel sheet fused to the back of a polyurethane foam wound contact layer for use in moderately to highly exuding wounds. Because of its polymer technology, is able to absorb approximately two to four times more fluid than other foam dressings. It is suitable for use under compression therapy as it absorbs and retains fluid under pressure (data on file).

### How does it work?

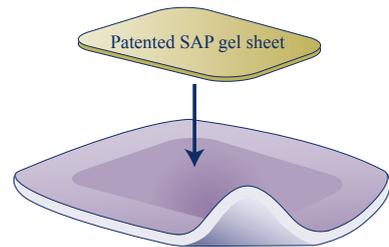
Exudate is absorbed into the polyurethane foam layer and pulled up into the SAP sheet. When the fluid comes into contact with the SAP layer it is drawn by osmosis into the gel sheet where it converts to a gel (Figure 2). The gel holds the exudate and its harmful components securely away from the wound surface and surrounding skin.

### When is Xtrasorb® Foam indicated?

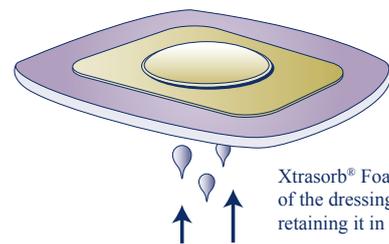
Xtrasorb® Foam is indicated for moderate to heavily exuding wounds, including:

- diabetic foot ulcers
- leg ulcers – including venous leg ulcers, arterial ulcers and ulcers of mixed aetiology

**Figure 2: Structure of Xtrasorb® Foam and mechanism of action**



- Two to four times more absorption than standard foam dressings
- Locks wound fluid away from the wound and surrounding skin
- Fewer dressing changes
- SAP layer provides additional cushioning and pressure redistribution



- pressure ulcers
- first and second degree partial thickness burns
- postoperative wounds
- donor sites
- traumatic wounds.

### Contraindications and precautions

Xtrasorb® Foam should not be used on heavily bleeding wounds or third degree burns, and not with oxidising agents such as Dakin's (hypochlorite solution) or hydrogen peroxide. However, it can be used with honey dressings that produce hydrogen peroxide ions (Welber et al, 2012).

## Case report 2: Application of Xtrasorb® Foam to a skin tear that had failed to progress

### Background

An 83-year-old male was admitted to hospital after falling down a step at home. He had extremely fragile, tissue-paper skin and had sustained a skin tear on his right forearm near the elbow during the fall. He was admitted to hospital with a fractured pelvis, signs of heart failure and some consolidation to the left lung. Oral antibiotics were commenced. The patient became unwell on the ward and pseudo-obstruction of the bowel was diagnosed. He had a history of diabetes, hypertension, heart disease and cardiac obstructive pulmonary disease. He was partially blind, had diverticular disease and prostatic hypertrophy. He was referred to tissue viability because the wound had not improved since admission. The wound measured 8cm x 2.5cm and had moderate levels of haemoserous exudate. Bruising to the surrounding skin was evident. The patient experienced high levels of pain during dressing changes. He described the previous dressing used as 'uncomfortable to wear' and difficult to remove from his fragile skin.

### Treatment

Xtrasorb® Foam adhesive was applied to absorb exudate, prevent maceration and encourage healing. The dressing was changed after two days and then every third day, following reassessment of the wound and exudate levels.

### Outcome

The wound epithelialised without complications within two weeks, despite the patient's comorbidities. The tissue viability nurse found the dressing to be conformable and easy to apply. The dressing prevented strikethough and the patient found the dressing extremely comfortable to wear and 'not too difficult to remove'.

Figure 1: Skin tear on outer elbow, day 1



Figure 2: The wound progressed to healing, day 13



## How to apply Xtrasorb<sup>®</sup> Foam

- Cleanse the wound and surrounding area according to local protocols. As with other polyurethane foam dressings, oxidising solutions should be avoided.
- Select a dressing that will overlap onto healthy tissue by approximately 25mm.
- A secondary film dressing or conforming bandage should be used to secure the dressing in place.
- Before applying the adhesive dressing, remove one half of the white plastic liner to expose the adhesive border. Position the dressing and smooth it into place while removing the second half of the liner. Ensure good contact between the adhesive border and periwound skin by smoothing the edge of the dressing.
- Once the dressing is in place, remove the backing material from the slit in the centre of the top of the dressing.

## FREQUENCY OF DRESSING CHANGES

The frequency of dressing change should be guided by the condition of the wound, the patient and the level of exudate. Dressings containing large volumes of fluid can become bulky and cause discomfort to the patient.

As a guide, Xtrasorb<sup>®</sup> HCS should be replaced after three to seven days. In the case of a moderately exuding wound the dressing may need to be replaced more frequently.

## When should Xtrasorb<sup>®</sup> be discontinued?

The dressing can be discontinued once the wound has reached full closure (healed) and/or the key objective for the dressing choice has been achieved, in line with the wound management goals.

## Removing Xtrasorb<sup>®</sup> HCS and Foam

### Non-adhesive borderless Xtrasorb<sup>®</sup> dressings

Gently lift the corners of the dressing and remove from the wound.

### Adhesive bordered Xtrasorb<sup>®</sup> dressings

Loosen the adhesive film border before lifting the dressing

away from the wound. Saline or water may be used to irrigate the Xtrasorb<sup>®</sup> dressings if necessary.

## CLINICAL BENEFITS OF XTRASORB<sup>®</sup> DRESSINGS

Both Xtrasorb<sup>®</sup> HCS and Xtrasorb<sup>®</sup> Foam can be used to aid healing in a wide range of wound types. The SAP technology incorporated into the dressing allows for optimal fluid handling and the sequestration of bacteria and harmful components found within wound fluid, helping to keep the wound clear (Wiegand et al, 2011; Turkos and Stallo, 2008). Both dressings incorporate SAP technology that helps to overcome some of the issues faced by patients and clinicians when using other dressings. They can be used as primary or secondary dressings. By converting fluid into a gel Xtrasorb<sup>®</sup> offers a number of distinct advantages.

### Fewer dressing changes

Xtrasorb<sup>®</sup> dressings can be left in place for up to seven days depending on the wound exudate levels. The high absorbency of the dressings allows for dressing changes to be less frequent, which offers the potential to reduce overall wound management costs (Stille, 2012; Peters et al, 2007).

### Reduced risk of strikethrough

The SAP mechanism of gel formation holds absorbed liquid within the dressing reducing the risk of strikethrough. Because fluid does not need to evaporate from Xtrasorb<sup>®</sup> dressings like it does in dressings that rely on moisture vapour transmission rate (MVTR) (Peters et al, 2007), a film layer covers the back of the dressings rendering them water resistant. Strip washing is preferred to showering.

### Reduced risk of maceration

The high absorbency of the dressings and gel formation, along with lack of lateral wicking (Turkos and Stallo, 2008; Peters, 2007) mean that wound exudate is absorbed into and retained within the dressings. This prevents potentially damaging exudate from coming into contact with periwound skin. A case series examining the use of Xtrasorb<sup>®</sup> HCS in

## Case report 3: Application of Xtrasorb<sup>®</sup> Foam to a heavily exuding pressure ulcer

### Background

A 53-year-old female with a venous leg ulcer and multiple comorbidities, including morbid obesity and chronic venous insufficiency, was being treated in the community. The wound was dressed with thick gauze and absorbent cotton/cellulose pads, and compression therapy was applied. Large amounts of exudate had led to strikethrough, maceration of periwound tissue and excoriation of the surrounding skin. The dressing had required changing daily.

### Treatment

It was decided to dress the wound with Xtrasorb<sup>®</sup> Foam, to manage the volume of exudate more effectively. Compression therapy was also continued.

### Outcome

Dressing changes were reduced from daily to three times a week after 13 days. Strikethrough was eliminated and the dressing held exudate under compression therapy. The patient's self-image and mobility increased. The maceration and skin excoriation resolved and the wound's surface area decreased by 52% in 34 days.



Figure 1: Wound on presentation



Figure 2: Wound 34 days later

lower extremity wounds reported a reduction or elimination of maceration in all cases (Welber et al, 2012).

### Use under compression

The gelling action of the SAP in the Xtrasorb® dressings prevents absorbed fluid from being squeezed out of the dressing when pressure is applied, which may be a benefit over conventional foam dressings that are unable to lock fluid within them under compression. The dressings are therefore suitable for use under compression bandaging or hosiery (Welber et al, 2012).

### Additional clinical benefits

Xtrasorb® HCS and Xtrasorb® Foam both have high tensile strength which allows the non-adhesive dressings to be cut to size (Stille, 2012) or windows cut into them, and for the dressings to maintain their integrity even when at their full absorptive capacity.

In addition, Xtrasorb® HCS is gelatin free and does not produce the characteristic odour associated with some dressings such as hydrocolloids. It provides a useful alternative for patients who prefer products that do not contain gelatin.

## Summary

Xtrasorb® HCS and Xtrasorb® Foam have been designed to help clinicians manage the varying levels of moisture present in chronic and healing wounds. The SAP technology incorporated by the dressings enables them to absorb and retain greater levels of fluid without losing structural integrity. Xtrasorb® HCS is able to donate moisture to wounds and maintain optimal fluid levels at the wound bed. Key benefits include protease modulation, reduced incidence of skin maceration and strikethrough, less frequent dressing changes and the ability to use both dressings under compression.

### REFERENCES

Adderley U (2008) Wound exudate: what is it and how to manage it. *Wounds Essentials* 3: 8-13

Bale S (1997) In: *A Colour Guide to the Nursing Management of Chronic Wounds* (2nd edn). Eds: Morison M et al. Mosby, London

White R, Cutting K (2006) Modern exudate management: a review of wound treatments. <http://www.worldwidewounds.com/2006/september/White/Modern-Exudate-Mgt.html>

Dowsett and Newton (2005) Wound bed preparation: TIME in practice. *Wounds UK* 1(3): 58-70. Available at: [www.wounds-uk.com](http://www.wounds-uk.com)

Gardner S (2012) Managing high exudate wounds. *Wounds Essentials* 7(1). Available from: [www.wounds-uk.com/pdf/content\\_10474.pdf](http://www.wounds-uk.com/pdf/content_10474.pdf)

Liu Y, Min D, Bolton T, et al (2009) Increased matrix metalloproteinase-9 predicts poor wound healing in diabetic foot ulcers. *Diabetes Care* 32(1): 117-19

Peters KL, Liguori PA, Bowers JM (2007) An evaluation of a new super-absorbent foam dressing's exudate management capabilities. Poster, Symposium on Advanced Wound Care (SAWC), Tampa, FL, USA

Pytlik E, Molino D, Moritz J (2005) Superabsorbent polymers. UB Engineering, University at Buffalo. Available at: <http://www.eng.buffalo.edu/courses/ce435/Diapers.html>

Romanelli M, Vowden K, Weir D (2010) Exudate Management Made Easy. *Wounds International* 1(2): Available from <http://www.woundsinternational.com>

Stille S (2012) A novel approach to the effective management of a non-healing peristomal wound. Poster, Symposium on Advanced Wound Care (SAWC), Atlanta, GA, USA

Tarlton JF, Munro HS (2013) Use of superabsorbent polymer dressings for protease modulation in improved chronic wound care. *Wounds* 25(2): 51-57

Turkos M, Stallo K (2011) Protease modification by absorbent polymer dressings. Poster presented at: Symposium on Advanced Wound Care (SAWC), Dallas, TX, USA

Turner TD (1979) Hospital usage of absorbent dressings. *Pharmaceutical J* 222: 421-26

Vachon DJ, Yager DR (2006) Novel sulfonated hydrogel composite with the ability to inhibit proteases and bacterial growth. *J Biomed Mater Res A* 76(1): 35-43

Walker M, Parsons D (2010) Hydrofibre® technology: its role in wound management. *Wounds UK* 6(2): 31-38

Welber A, Celestin C, Mehrdad F, et al (2012) The effectiveness of *Leptospermum* honey and a novel super-absorbent hydrogel-colloidal sheet in managing challenging lower extremity wounds: a case study series. Poster, Wound Ostomy and Continence Nurse (WOCN) Annual Conference, Charlotte, NC, USA

White R, Gardner S, Cutting K, et al (2012) What is the current status of foam dressings? WUK Debate. *Wounds UK* 8(3): 21-24. Available from: [www.wounds-uk.com/pdf/content\\_10557.pdf](http://www.wounds-uk.com/pdf/content_10557.pdf)

Wiegand C, Abel M, Ruth P, et al (2011) Superabsorbent polymer-containing wound dressings have a beneficial effect on wound healing by reducing PMN elastase concentration and inhibiting microbial growth. *J Mater Sci Mater Med* 22(11): 2583-90

World Union of Wound Healing Societies (WUWHS) (2007) *Wound Exudate and the Role of Dressings, A Consensus Document*. London, MEP Ltd. Available from: [www.woundsinternational.com](http://www.woundsinternational.com)

World Union of Wound Healing Societies (WUWHS) (2004) *Minimising Pain at Wound Dressing-related Procedures, a Consensus document*. London, MEP Ltd. Available from: [www.woundsinternational.com](http://www.woundsinternational.com)

### AUTHOR DETAILS

#### Greenwood M<sup>1</sup>, Lorraine Grothier<sup>2</sup>

1. Lead Nurse Tissue Viability, Walsall Healthcare NHS Trust
2. Clinical Nurse Specialist Tissue Viability, Central Essex Community Services

Supported by



DERMA SCIENCES