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Management of highly exuding leg ulcers: A focus on Mextra[®] Superabsorbent dressing

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FOREWORD

Absorbent dressings play an important role in the management of wounds associated with excessive exudation. One such product is Mextra® Superabsorbent, a multi-layered dressing designed for use on moderately to highly exuding wounds. Laboratory studies undertaken to evaluate the fluid handling capacity of Mextra Superabsorbent demonstrated that the dressing has strong absorptive and fluid retention properties. In other laboratory tests, Mextra Superabsorbent compared favourably to other so-called superabsorbent dressings in terms of its ability to trap bacteria within its structure. These findings suggest that, when used in the clinical setting, Mextra Superabsorbent can be expected to effectively manage exuding wounds, such as venous leg ulcers that are typically associated with high levels of bacteria-containing exudate.

In the field of wound care, case studies are often undertaken to demonstrate the use of dressings and therapies in both routine and unusual situations. Often, they will focus on particularly challenging cases that are typically not included in larger clinical studies, because of the stringent inclusion/exclusion criteria built into their design. Case studies, therefore, provide 'real-world' feedback on the use of products such as wound dressings. This case study series focuses on the use of Mextra Superabsorbent dressings in the management of highly exuding leg ulcers. The case reports highlight the ability of Mextra Superabsorbent to manage exudate effectively, thereby contributing to the successful clinical outcomes reported. Both clinicians and patients reported highly positive experiences with Mextra Superabsorbent.

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INTRODUCTION

WOUND EXUDATE

Inflammation following injury increases the permeability of capillaries, which allows fluid, known as wound exudate, to leak into tissue and the wound bed. Wound exudate is composed of water, nutrients, inflammatory mediators, electrolytes, white blood cells, enzymes (e.g. proteases) and growth factors. It plays an important role in the wound healing process. Generally, as a wound heals, exudate levels reduce. However, exudate may become a problem when the quantity produced and/or its composition (e.g. increased levels of certain metalloproteinases [MMPs]) lead to delayed/protracted wound healing (Table 1). As well as causing physical and psychological morbidity, delays in healing typically increase the demand on health care resources (World Union of Wound Healing Societies [WUWHS], 2019).

Table 1. Wound exudate

Exudate assists wound healing by:	Excessive exudate causes problems such as:
<ul style="list-style-type: none">• Helping to maintain a moist wound bed• Helping tissue-repairing cells to migrate• Providing essential nutrients for cell metabolism• Helping immune factors/growth factors to diffuse• Assisting autolysis	<ul style="list-style-type: none">• Maceration/excoriation of the periwound skin• Malodour• Protein loss• Fluid/electrolyte imbalance• Soiling of clothes and bed linen

The quantity of exudate produced varies between different wound types. Heightened exudate production is often related to factors that cause inflammation (e.g. infection) or oedema (e.g. venous insufficiency). This explains why venous leg ulcers are typically associated with high levels of exudate (WUWHS, 2019).

WOUND DRESSINGS

Wound dressings play an important role in exudate management; ideally, dressing regimens should be able to absorb and retain exudate, keep harmful exudate away from the skin, and function effectively under devices such as those used to provide compression and offloading (WUWHS, 2007).

A number of commercially available dressings incorporate superabsorbent polymers (SAP) in their design. These superabsorbent dressings can typically absorb several times their own weight in fluid. As wound exudate is absorbed into these dressings, it binds to the SAP, forming a complex network structure that permanently retains the fluid within the dressing (Rogers and Rippon, 2017). Consequently, potentially damaging inflammatory mediators and activated MMPs contained within wound exudate are also 'locked in', helping to restore the wound to a more physiological environment (Eming et al, 2008; Wiegand et al, 2011; Rogers and Rippon, 2017). The relatively high capacity to absorb and retain exudate, compared to some other dressing types, means that superabsorbent dressings have the potential to reduce the frequency of dressing changes and the number of times the wound is disturbed, while still protecting the periwound skin from moisture-related damage (Ousey et al, 2013). Using products that can be left in place for extended periods has the potential to reduce overall costs, provider visits and the risk of complications (e.g. infection) (Brindle and Farmer, 2019).

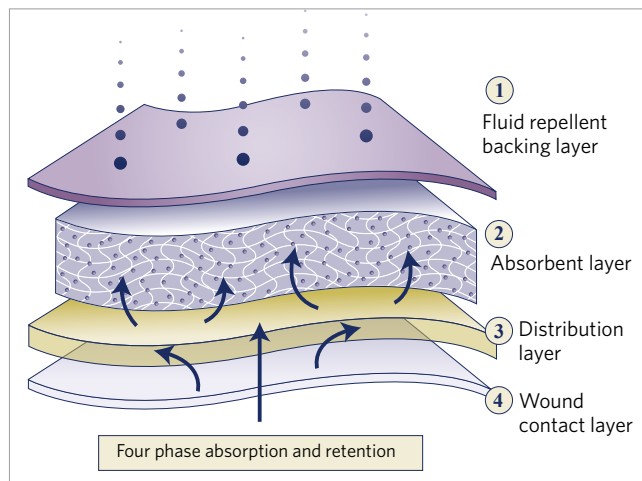
In vitro research has also revealed a number of other wound healing-relevant properties of SAPs including bioburden reduction (Wiegand et al, 2013), protease modulation (e.g. reducing MMP-2, MMP-9, and bacterial collagenase activity) (Wiegand and Hipler, 2013; Wiegand and White, 2013), binding of elastase and antioxidant potential (Wiegand et al, 2011).

MEXTRA SUPERABSORBENT

With a unique four-layer construction that works in a precise sequence to manage exudate, Mextra Superabsorbent is intended for use on moderately to highly exuding wounds (Tickle and Fletcher, 2012). It absorbs exudate through the wound contact layer and then the distribution layer rapidly, and evenly, distributes the exudate upwards into an absorbent core layer, composed of cotton fibres, soft cellulose fibres and SAP, thereby reducing the risk of leakage and maceration of the surrounding skin. Exudate is retained within the absorbent core layer. A fluid-repellent vapour-permeable non-woven backing layer acts as a barrier, preventing exudate strikethrough (Figure 1). The dressing does not become bulky or disintegrate upon absorption of the exudate. It can remain *in situ* for several days with dressing changes determined according to the condition of the wound and the degree of saturation of the dressing (Tickle and Fletcher, 2012). It has also been reported that Mextra Superabsorbent has a soft feel, a property that is important for patient comfort (Tickle and Fletcher, 2012).

Mextra Superabsorbent can be used together with primary dressings such as gelling fibres (e.g. Exufiber®), alginates (e.g. Melgisorb® Plus) and wound contact layers (e.g. Mepitel® One). It can also be used in conjunction with compression therapy (Tickle and Fletcher, 2012).

Figure 1. Structure of the Mextra Superabsorbent dressing



PRE-CLINICAL STUDIES OF MEXTRA SUPERABSORBENT

FLUID HANDLING

In a study undertaken to evaluate the initial absorptive properties of Mextra Superabsorbent, the dressing was applied to a horizontal plane (alone or with a primary dressing) and a predetermined amount of liquid was pumped at a high flow rate into the underside of the dressing. The proportion of liquid absorbed was presented as the initial absorption capacity. The study simulated clinical use when the dressing creates pressure against the wound as it absorbs fluid. Mextra Superabsorbent demonstrated high initial absorption of 98.9% when tested alone or in combination with other (primary) dressings (Mölnlycke Health Care, data on file).

Box 1. Colony forming units

- A colony-forming unit (CFU) is a term used to describe a colony of microorganisms that grow from a single microorganism (e.g. on a petri dish). It is a unit used in microbiology to estimate the number of viable (i.e. able to multiply under the controlled conditions) bacteria or fungal cells in a sample
- The number of CFUs is normally given in relation to the number of grams (g) or millilitres (ml) of test material that is put on the petri dish, e.g. 100 CFUs for 1ml of sample would be written as 100 cfu/ml
- Large numbers of CFUs are often expressed as logarithms ('logs') with each log being equivalent to a multiple of 10, e.g.
log 1 = 10
log 2 = 100
log 3 = 1000.
In laboratory reports, it's common to see results such as 4.2×10^3 cfu/ml. To turn this into an actual number of CFUs per ml, remember that a log of 3 is 1000, and then multiply 4.2 by 1000 to get to 4,200 cfu/ml.

An important property for a dressing that is designed for use on highly exuding wounds is its maximal absorption capacity. When measured *in vitro*, the maximal absorption capacity gives an indication as to how much wound fluid a dressing can absorb. In a study in which the dressing was allowed to freely absorb the test fluid, Mextra Superabsorbent was able to absorb 1.67 g/cm^2 of fluid. In the clinical setting, dressings are not usually left *in situ* to the point at which they reach their maximum absorption capacity. However, the results are relevant in terms of demonstrating that Mextra Superabsorbent possesses a strong absorptive capacity, which is undoubtedly beneficial for managing high levels of exudate (Mölnlycke Health Care, data on file).

In addition to being able to effectively absorb exudate, it is essential that a dressing can retain the absorbed wound fluid, even when subjected to compressive forces. This property is referred to as retention capacity. It can be measured *in vitro* by adding a predetermined amount of test fluid to a dressing (based on its maximal absorption capacity) before exposing it to a static pressure of 40mmHg. The amount of fluid retained in the dressing represents its retention capacity. When Mextra Superabsorbent was evaluated according to this method, it was able to retain 1.06 g/cm^2 of test fluid. This finding suggests that, when used in a clinical setting, Mextra Superabsorbent can prevent absorbed exudate from leaking back to the wound, even when used in conjunction with compression therapy, thereby minimising leakage and moisture-related periwound skin damage (Mölnlycke Health Care, data on file).

The breathability of a dressing is also an important property that contributes to its overall fluid handling capacity. It can be demonstrated *in vitro* by measuring the moisture vapour transmission in a simulated leg wound model. The dressing is allowed to absorb simulated wound fluid (protein and salt solution) under compression (40mmHg) over a predetermined period of time, during which the absorbed and evaporated fluid is measured. In a study during which the dressing was tested over a 24-hour period, Mextra Superabsorbent was associated with a moisture vapour transmission value of 0.32 g/cm^2 , which corresponded to more than 50% of the absorbed fluid being evaporated. The test results indicate that Mextra Superabsorbent has high breathability, which is key for handling wound exudate (Mölnlycke Health Care, data on file).

In summary, the results of the laboratory tests described above highlight the high fluid handling capacity of Mextra Superabsorbent, an important property for dressings that are designed to manage large volumes of exudate and minimise the risk of exudate leaking onto the periwound skin where it could cause moisture-related damage (e.g. maceration).

BACTERIA TRAPPING

An *in vitro* test method has been developed to evaluate the ability of superabsorbent dressings to retain (trap) bacteria within their structures (Bibic et al, 2021a). The suggested clinical relevance of this particular dressing property is that, by transporting and trapping bacteria-containing exudate away from wounds, it will reduce the amount of bacteria re-entering the wound. The method involves the injection of test fluid (containing approximately 8×10^4 colony forming units [CFU] per ml of *Staphylococcus aureus* ATCC 6538) into the dressings; the volumes of fluid injected correspond to 60% of the maximum absorption capacity of each test dressing. The dressings are then placed on filters with weights on top. After incubation, the amount of released bacteria (measured as log CFU) is determined (See Box 1 for an explanation of log CFU).

In a series of tests (based on the method described above) on 10 superabsorbent dressings (Bibic et al, 2021b), two superabsorbent polymer-based dressings (one of which was Mextra

Box 2. Summary of pre-clinical research findings relating to Mextra Superabsorbent

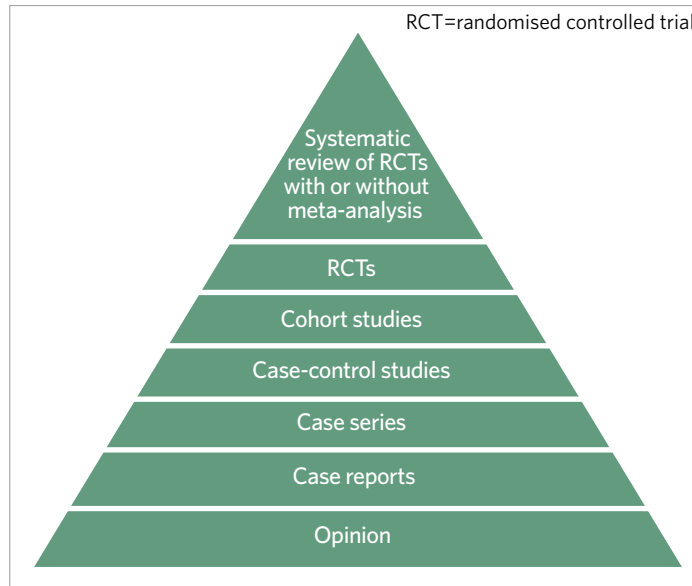
- High (98.9%) initial absorption (alone and in combination with primary dressing)
- High maximum absorption capacity: 1.67 g/cm²
- High fluid retention: 1.06 g/cm²
- High breathability: moisture transmission (24 hours) 0.32 g/cm²
- Greater ability to trap bacteria than other dressings tested.

Superabsorbent) were associated with the lowest release of bacteria (approximately 6x10² – 1.3x10³ CFU/filter). Two cellulose core-based dressings were associated with a 3-fold and 10-fold greater release of bacteria than Mextra Superabsorbent. A dressing with hydration response technology (containing gel forming polymers) and a dressing with a superabsorbent core and heat-sealed border were associated with 10-fold and 100-fold greater releases of bacteria, respectively. Some dressings released relatively large proportions of the bioburden under pressure; this was not the case with Mextra Superabsorbent. In conclusion, the study findings indicate that Mextra Superabsorbent is capable of trapping bacteria. However, the findings also indicate that the ability to retain bacteria within their structures is an underdeveloped feature for some other superabsorbent dressings, with large differences between the test dressings in terms of their ability to minimise the release of bacteria. See Box 2 for a summary of pre-clinical research findings relating to Mextra Superabsorbent.

HIERARCHY OF CLINICAL EVIDENCE

When making decisions about clinical interventions, it is common practice to consider the relative weight of the available research data, according to the type and quality of studies from which they originate. In this so-called hierarchy of clinical evidence (Figure 2), randomised controlled trials (RCTs) and systematic reviews are considered to be the ‘gold standards’ for judging the benefits of interventions (Barton, 2000; Akobeng, 2005).

Figure 2. Hierarchy of clinical evidence (adapted from Akobeng, 2005)



While the conventional approach to evidence-based medicine is to use data from RCTs, many practitioners question their relevance in the field of wound area. Practice-based medicine is favoured and allows flexibility as the choice of intervention is based on the individual patient (Sacket et al, 1996; Gottrup, 2007; White et al, 2010; White and Jeffery, 2010; Kaplan et al, 2011). While this does not mean that all research data are equally valid, it does signify that all available evidence should be considered and evaluated.

This document presents a series of case studies in which Mextra Superabsorbent was used as a key component of the dressing regimens in the management of leg ulcers.

CASE STUDY REPORTS

The case study reports have been prepared by Mölnlycke's Global Medical Affairs & Safety team, based on information and photographs kindly supplied by Paulo Alves and Manuel Cruz who have also confirmed and given Mölnlycke permission to distribute the reports.

CASE STUDY 1

PATIENT HISTORY

- A 74-year-old male presented with a venous leg ulcer (VLU) (Figure 3a)
- The patient had a current medical history of venous insufficiency, atrial fibrillation, and suspected dementia
- Ankle brachial pressure index of 1 was measured.

WOUND HISTORY

- The VLU, located on the medial lower left leg, measured 87.5cm² with a depth of 0.2cm, and had been present for 2 years
- The wound bed was composed of 50% granulating and 50% sloughy tissue
- Clinical signs of oedema, increased pain and increased exudation were indicative of a wound infection
- Exudate levels were moderate; non-viscous and green/yellow in appearance
- Maceration of the periwound skin was recorded, with several satellite lesions in the affected area
- The wound had previously been treated with a povidone iodine-impregnated dressing and compression (short stretch bandages) 3–4 days per week
- At baseline, pain prior to dressing removal and during dressing removal was rated as 8 and 9, respectively, as measured on a visual analogue scale (VAS) ranging from 0 (no pain) to 10 (maximum pain ever). After Mextra Superabsorbent was applied, a VAS score of 7 was recorded.

TREATMENT REGIMEN

- At each visit, sharp debridement was performed, and the wound cleansed with a wound irrigation solution containing hypochlorous acid (Granudacyn®)
- The ulcer was dressed with a silver-containing alginate; primary dressing and Mextra Superabsorbent (secondary dressing) (Figure 3b). Short-stretch bandages provided compression therapy
- The patient attended four follow-up clinic visits and at each follow-up visit, the dressings were changed according to local clinical practice
- A total of four Mextra Superabsorbent dressings were used during the study period; the median dressing change frequency was 3.5 days (range 3–4 days).



Figure 3a. Start of evaluation (day 1). Two-year-old VLU with moderate levels of green/yellow, non-viscous exudate. The periwound skin exhibited maceration.



Figure 3b. Application of Mextra Superabsorbent as a secondary dressing.

FOLLOW-UP ASSESSMENTS

- Over the study period, the size of the wound and the composition of the wound bed tissue remained unchanged
- After 3 days of treatment, increased exudation was indicative of ongoing wound infection
- Wound exudation was unchanged throughout the study period (non-viscous, moderate, yellow/green exudate)
- After 3 days of treatment, maceration of the periwound skin had resolved. The periwound skin remained healthy and intact thereafter (Figure 3c)
- Over the study period, pain prior to dressing change decreased; a VAS score of 3 was recorded at the final assessment. Removal of Mextra Superabsorbent was pain-free throughout the study. Removal of the primary dressing was associated with VAS scores decreasing from 6 to 5 over the study period. Following application of the new dressings, pain steadily reduced, with a VAS score of 3 recorded at the final assessment.

CLINICAL OUTCOME

- At the final evaluation, the condition of the wound had improved (Figure 3d)
- The overall impression of Mextra Superabsorbent was rated by the clinicians as 'very good'. Its ease of handling at application, ease of application and repositioning, conformability, comfort during wear, exudate handling capability, ability to minimise the risk of maceration, performance when used under compression, ability to be used in conjunction with gels, ability to maintain its integrity (during wear and on removal) and ease of removal were all rated 'very good'
- The clinicians commented that Mextra Superabsorbent was associated with atraumatic removal, leaving the primary dressing in place.



Figure 3c. Second follow-up visit (day 8). Periwound skin condition improved.



Figure 3d. End of evaluation (day 15). At the final follow-up visit, the size of the wound and the composition of the wound bed tissue was unchanged. Wound exudation was stable.

CASE STUDY 2

PATIENT HISTORY

- A 72-year-old female presented with a venous leg ulcer (VLU) (Figure 4a)
- The patient had a current medical history of venous insufficiency
- Ankle brachial pressure index of 1.1 was measured.

WOUND HISTORY

- The VLU, located on the posterior lower right leg, measured 150cm² with a depth of 0.1cm, and had been present for 3 years
- The wound bed was composed of 30% granulating, 60% sloughy and 10% epithelialising tissue
- Clinical signs of increased pain and increased exudation were indicative of wound infection
- Exudate levels were high; non-viscous and green/yellow in appearance
- The periwound skin was dry and excoriated
- The wound had previously been treated with a silver-containing alginate dressing and gauze, in conjunction with systemic antibiotics. Upon removal of the primary dressing, localised areas of argyria caused by contact with topical silver were visible. Treatment was performed 2-3 times per week
- At baseline, pain prior to dressing removal and during dressing removal was rated as 5 and 7, respectively, as measured on a visual analogue scale (VAS) ranging from 0 (no pain) to 10 (maximum pain ever). After Mextra Superabsorbent was applied, a VAS score of 5 was recorded.

TREATMENT REGIMEN

- At each visit, sharp debridement of the VLU was performed, and the wound cleansed with water and Granudacyn
- The VLU was dressed with a silver-containing alginate (primary dressing) for the first 7 days of treatment, after which it was replaced with Exufiber, a gelling fibre dressing. Mextra Superabsorbent was used as the secondary dressing throughout. Short-stretch bandages provided compression
- The patient attended four follow-up clinic visits and at each follow-up visit, the dressings were changed according to local clinical practice (Figure 4b)
- A total of four Mextra Superabsorbent dressings were used during the study period; the median dressing change frequency was 3.5 days (range 3-4 days).



Figure 4a. Start of evaluation (day 1). Three-year-old VLU with high levels of green/yellow, non-viscous exudate. The periwound skin was dry and excoriated.



Figure 4b. First follow-up visit — Mextra Superabsorbent *in situ* prior to dressing change. After 4 days of wear time, Mextra Superabsorbent maintained its integrity, with minimal exudate visible on the back of the dressing.

FOLLOW-UP ASSESSMENTS

- Over the study period, wound area steadily reduced, and at the final follow-up assessment had reduced by 37%, to 94.5cm²; wound depth was unchanged
- Over the study period, the composition of the wound bed tissue improved and at the final assessment composed of 30% granulating, 30% sloughy, and 40% epithelialising tissue
- Argyria resolved when the primary dressing was changed to Exufiber. At the second follow-up visit, all clinical signs of wound infection had resolved (Figure 4c)
- Wound exudate levels were reduced to moderate by treatment day 11, and at the final follow-up visit, the exudate was clear and serous in appearance. It remained non-viscous throughout
- Initially the periwound skin improved slightly as the excoriation was resolved. At day 11 of treatment, maceration was recorded (attributed to primary dressing strikethrough); at the final study assessment, erythema of the periwound skin was observed
- Over the study period, pain recorded at each point in the dressing procedure, i.e. prior to dressing change, during dressing removal and following the application of the new dressings, steadily decreased, with VAS scores of 2, 3 and 3 recorded, respectively.

CLINICAL OUTCOME

- At the final evaluation, the condition of the wound had improved (Figure 4d)
- The overall impression of Mextra Superabsorbent was rated by the clinicians as 'very good'. Its ease of handling at application, ease of application and repositioning, conformability, comfort during wear, performance when used under compression, ability to maintain its integrity (during wear and on removal) and ease of removal were all rated 'very good'. Exudate handling capability (ability to absorb and retain exudate, and minimise exudate strikethrough), and its ability to minimise the risk of maceration were rated 'good'
- The clinicians commented that Mextra Superabsorbent provided excellent exudate management, leading to a good healing trajectory.



Figure 4c. Second follow-up visit (day 7). After 1 week of treatment with Mextra Superabsorbent, all clinical signs of wound infection had resolved. Exudate levels had reduced to moderate.



Figure 4d. End of evaluation (day 14). At the final follow-up visit, the wound area had decreased by 37% and the composition of the wound bed tissue had improved. Wound exudate was clear/serous, and levels had reduced. The periwound skin exhibited erythema.

CASE STUDY 3

PATIENT HISTORY

- An 82-year-old female presented with a mixed aetiology (arterial and venous) ulcer (Figure 5a)
- The patient had a current medical history of hypertension and recurrent leg ulceration. An ankle brachial pressure index of 0.64 was measured.

WOUND HISTORY

- The ulcer, located on the outer lower left leg, measured 80cm² with a depth of 0.3cm, and had been present for a duration of 9 months
- The wound bed was composed of 10% granulating and 90% sloughy tissue
- The clinical sign of increased exudation was indicative of a wound infection
- Exudate levels were high: non-viscous and green/yellow in appearance
- Maceration of the periwound skin was recorded, with several satellite lesions located close by
- The wound had previously been treated with a silver-containing fibre dressing and gauze, secured with retention bandages. Treatment was performed 3 times per week
- At baseline, pain prior to dressing removal and during dressing removal was rated as 7 and 8, respectively, as measured on a visual analogue scale (VAS) ranging from 0 (no pain) to 10 (maximum pain ever). After Mextra Superabsorbent was applied, a VAS score of 7 was recorded.

TREATMENT REGIMEN

- At each visit, sharp debridement of the ulcer was performed, and the wound cleansed with Granudacyn
- The ulcer was dressed with Exufiber (gelling fibre; primary dressing) and Mextra Superabsorbent (secondary dressing) and secured with medical adhesive tape. Low compression therapy (20mmHg) was provided
- The patient attended four follow-up clinic visits and at each follow-up visit, the dressings were changed according to local clinical practice (Figure 5b)
- A total of four Mextra Superabsorbent dressings were used during the study period; the median dressing change frequency was 3.5 days (range 2–4 days).



Figure 5a. Start of evaluation (day 1). Nine-month-old mixed aetiology (arterial and venous) ulcer with high levels of green/yellow, non-viscous exudate. The periwound skin was macerated.



Figure 5b. Mextra Superabsorbent *in situ* prior to dressing change. After 4 days of wear time, Mextra Superabsorbent maintained its integrity, with minimal exudate strikethrough.

FOLLOW-UP ASSESSMENTS

- After 9 days of treatment, the wound area and wound depth had reduced by 10% to 72cm² and 0.2cm, respectively. The size of the wound was unchanged at the final study assessment
- Over the study period, the composition of the wound bed tissue improved and at the final assessment composed of 25% granulating and 75% sloughy tissue
- After 9 days of treatment, all clinical signs of wound infection had resolved
- Wound exudate levels remained high: yellow/green in appearance and non-viscous
- After 6 days of treatment, the periwound skin was healthy and intact (Figure 5c)
- Over the study period, pain recorded at each point in the dressing procedure, i.e. prior to dressing change, during dressing removal and following the application of the new dressings, steadily decreased, with VAS scores of 3, 3 and 3, respectively.

CLINICAL OUTCOME

- At the final evaluation, the condition of the wound had improved (Figure 5d)
- The overall impression of Mextra Superabsorbent was rated by the clinicians as 'very good'. Its ease of handling at application, ease of application and repositioning, conformability, comfort during wear, ability to maintain its integrity (during wear and on removal) and ease of removal were all rated 'very good'. The exudate handling capability (ability to absorb and retain exudate, and minimise exudate strikethrough), and performance when used under compression were rated 'good'. Its ability to minimise the risk of maceration and the ability to be used in conjunction with gels were both rated 'adequate'
- The clinicians commented that Mextra Superabsorbent performed very well when used under compression therapy.



Figure 5c. Second follow-up visit (day 6). After 6 days of treatment with Mextra Superabsorbent, the periwound skin was healthy and intact. Wound exudation was unchanged.



Figure 5d. End of evaluation (day 13). At the final follow-up visit, the size of the wound had reduced by 10% to 72cm², with a depth of 0.2cm. Wound exudation was stable.

CASE STUDY 4

PATIENT HISTORY

- A 54-year-old female, remote access patient, presented with a leg ulcer (Figure 6a)
- The patient had a current medical history of hypertension and rheumatoid arthritis. An unsuccessful skin graft procedure had been performed prior to baseline.

WOUND HISTORY

- The ulcer, located on the lower right leg, measured 225cm² with a depth of 0.2cm, and had been present for 6 years
- The wound bed was composed of 30% granulating, 60% sloughy, and 10% epithelialising tissue
- The clinical signs of increased pain and increased exudation were indicative of a wound infection
- Exudate levels were high: non-viscous and green/yellow in appearance
- The periwound skin was healthy and intact
- The wound had previously been treated with negative pressure wound therapy (NPWT), a silver-containing fibre dressing and compression therapy. Antibiotics had been prescribed
- At baseline, pain prior to and during dressing removal was rated as 3 and 6, respectively, as measured on a visual analogue scale (VAS) ranging from 0 (no pain) to 10 (maximum pain ever). After Mextra Superabsorbent was applied a VAS score of 3 was recorded.

TREATMENT REGIMEN

- At each visit, sharp debridement (curette) was performed, and the wound was cleansed with water and Granudacyn
- Throughout the study period, the wound was dressed with a povidone iodine-impregnated dressing (primary dressing) and Mextra Superabsorbent (secondary dressing) (Figure 6b). A tubular retention bandage (Tubifast®) was used for fixation
- The patient attended four follow-up clinic visits and at each follow-up visit, the dressings were changed according to local clinical practice
- A total of four Mextra Superabsorbent dressings were used during the study period; the dressing change frequency was 3 days.



Figure 6a. Start of evaluation (day 1). Six-year-old leg ulcer with high levels of green/yellow, non-viscous exudate. The periwound skin was macerated.



Figure 6b. Mextra Superabsorbent *in situ*. Mextra Superabsorbent was used as the secondary dressing.

FOLLOW-UP ASSESSMENTS

- Over the study period, wound area steadily reduced. After 12 days of treatment, the wound had reduced by 31.6%, to 154cm²; wound depth was unchanged
- Over the study period, the composition of the wound bed tissue improved and at the final assessment composed of 65% granulating, 15% sloughy, and 20% epithelialising tissue
- Increased wound exudation remained throughout the study period indicating wound infection
- Wound exudate levels remained high and non-viscous throughout; after 3 days of treatment and thereafter, the exudate was serosanguinous/bloody in appearance (Figure 6c)
- The periwound skin remained healthy and intact throughout the study period
- Over the study period, pain recorded at each point in the dressing procedure, i.e. prior to dressing change, during dressing removal and following the application of the new dressings, decreased, with VAS scores of 2, 1 and 1, respectively.

CLINICAL OUTCOME

- At the final evaluation, the condition of the wound had improved (Figure 6d)
- The overall impression of Mextra Superabsorbent was rated by the clinicians as 'very good'. Its ease of handling at application, ease of application and repositioning, conformability, comfort during wear, exudate handling capability (ability to absorb and retain exudate, and minimise exudate strikethrough), ability to minimise the risk of maceration, performance when used under compression, ability to maintain its integrity (during wear and on removal) and ease of removal were all rated 'very good'
- The clinicians commented that, due to the unavailability of Mextra Superabsorbent at the end of the study period, an alternative superabsorbent dressing was used, which coincided with a deterioration in the condition of the wound. This deterioration was successfully managed with the use of Mepilex® Ag (soft silicone silver-containing foam dressing).



Figure 6c. Second follow-up visit (day 6). After 6 days of treatment with Mextra Superabsorbent, non-viscous wound exudation remained high but was serosanguinous/bloody in nature.



Figure 6d. End of evaluation (day 12). At the final follow-up visit, the size of the wound had reduced by 31.6%. Granulation and epithelial tissue had increased in the wound bed. Wound exudation remained high.

CASE STUDY 5

PATIENT HISTORY

- A 75-year-old female presented with a venous leg ulcer (VLU) (Figure 7a)
- The patient had a history of leg ulcers, and was medicated for hypertension, dyslipidemia, and depression
- Ankle brachial pressure index of 1 was measured.

WOUND HISTORY

- The leg ulcer, located on the posterior lower left leg, measured 30cm² with a depth of 0.1cm, and had been present for 3 weeks
- The wound bed was composed of 10% granulating and 90% sloughy tissue
- Oedema around the wound was indicative of wound infection
- Exudate levels were moderate and non-viscous and green/yellow in appearance
- The periwound skin was macerated
- The wound had previously been treated with a silver-containing hydrofibre dressing; treatment was performed twice weekly. Antibiotic therapy was prescribed to manage infection
- At baseline, pain prior to dressing removal and during dressing removal was rated as 6 and 8, respectively, as measured on a visual analogue scale (VAS) ranging from 0 (no pain) to 10 (maximum pain ever). After Mextra Superabsorbent was applied, a VAS score of 6 was recorded.

TREATMENT REGIMEN

- At each follow-up visit, sharp debridement of the ulcer was performed, and the wound was cleansed with Granudacyn
- The ulcer was dressed with Mextra Superabsorbent and short-stretch bandages provided compression
- The patient attended two follow-up clinic visits and at each follow-up visit, the dressings were changed according to local clinical practice (Figure 7b)
- A total of two Mextra Superabsorbent dressings were used during the study period; the median dressing change frequency was 6 days (range 5-7 days).



Figure 7a. Start of evaluation (day 1). Three-week-old leg ulcer with moderate levels of green/yellow, non-viscous exudate. The periwound skin was macerated.



Figure 7b. Mextra Superabsorbent *in situ* prior to dressing change. Mextra Superabsorbent maintained its integrity, with no exudate strikethrough after a wear time of 5 days.

FOLLOW-UP ASSESSMENTS

- After 12 days of treatment, the wound had healed (Figure 7c)
- Over the study period, the composition of the wound bed tissue improved and at the final assessment composed entirely of epithelialising tissue
- After 5 days of treatment, the level of non-viscous wound exudate was reduced, but remained yellow/green in appearance. At the final assessment, exudation was absent
- At the initial follow-up visit, oedema surrounding the wound was reduced
- The condition of the periwound skin improved during the study period, and at the final assessment was healthy and intact
- Over the study period, pain recorded at each point in the dressing procedure (i.e. prior to dressing change, during dressing removal and following the application of the new dressings), decreased, and at the final follow-up visit the patient was pain-free.

CLINICAL OUTCOME

- At the final evaluation, the wound was healed
- The overall impression of Mextra Superabsorbent was rated by the clinicians as 'very good'. Its ease of handling at application, ease of application and repositioning, conformability, comfort during wear, exudate handling capability (ability to absorb and retain exudate, and minimise exudate strikethrough), ability to minimise the risk of maceration, performance when used under compression, ability to maintain its integrity (during wear and on removal) and ease of removal were all rated 'very good'
- The clinicians commented that Mextra Superabsorbent had a very good capacity for exudate management, especially under compression.



Figure 7c. Second follow-up visit (day 12). After 12 days of treatment with Mextra Superabsorbent, the ulcer had healed.

CONCLUSION

The case studies describe the management of challenging wounds using dressing regimens, all of which included Mextra Superabsorbent being applied as either a primary or secondary dressing. Overall, Mextra Superabsorbent performed well, particularly in relation to exudate management, and contributed to successful clinical outcomes, such as good wound healing progression. Both clinicians and patients reported highly positive experiences with Mextra Superabsorbent.

REFERENCES

- Akobeng AK (2005) Understanding randomised controlled trials. *Arch Dis Child* 90(8): 840-44
- Barton S (2000) Which clinical studies provide the best evidence? The best RCT still trumps the best observational study. *Br Med J* 321(7256): 255-56
- Bibic A, Hagskold F, Wellner E (2021a) Development of a novel method for determining the ability of wound dressings to trap bacteria. Submitted abstract: European Wound Management Association Conference, Paris, France
- Bibic A, Hagskold F, Wellner E (2021b) Superabsorbent wound dressings: ability to trap bacteria. Submitted abstract: European Wound Management Association Conference, Paris, France
- Brindle T, Farmer P (2019) Understanding wound healing: a narrative review of the literature and clinical considerations. *Wounds UK* 10(2): 1-9
- Eming S, Smola H, Hartmann B et al (2008) The inhibition of matrix metalloproteinase activity in chronic wounds by a polyacrylate superabsorber. *Biomaterials* 29(19): 2932-40
- Gottrup F (2007) Rapid response to Dressings for venous leg ulcers: systematic review and meta-analysis. *Br Med J* 335: 244
- Kaplan BJ, Giesbrecht G, Shannon S, McLeod K (2011) Evaluating treatments in health care: the instability of a one-legged stool. *BMC Med Res Methodol* 11: 65
- Mölnlycke Health Care (data on file)
- Ousey K, Atkin L, White R (2013) Superabsorbent wound dressings: a literature review. *Wounds UK* 9(3): 52-60
- Rogers AA, Rippon MG (2017) Describing the rinsing, cleansing and absorbing actions of hydrated superabsorbent polyacrylate polymer dressings. *Wounds UK; EWMA Special*: 48-53
- Sackett DL, Rosenberg WM, Gray JA (1996) Evidence-based medicine: what it is and what it isn't. *Br Med J* 312(7023): 71-72
- Tickle J, Fletcher J (2012) Mextra Superabsorbent Made Easy. *Wounds UK* 8(4): 1-4
- White R, Jeffery S (2010) The evidence debate in wound care. *Wounds UK* 6(3): 10
- White R, Maylor M, Iverson C (2010) Evidence is 'in', ignorance is 'out': a dilemma for wound care products. *Wounds UK* 6(3): 114-16
- Wiegand C, Abel M, Ruth P, Hipler UC (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
- Wiegand C, Abel M, Muldoon J (2013) SAP-containing dressings exhibit sustained antimicrobial effects of 7 days in vitro. *J Wound Care* 22(3): 120-27
- Wiegand C, Hipler UC (2013) A superabsorbent polymer-containing wound dressing efficiently sequesters MMPs and inhibits collagenase activity in vitro. *J Mater Sci Mater Med* 24: 2473-78
- Wiegand C, White R (2013) Binding and inhibition of protease enzymes, including MMPS, by superabsorbent dressings in vitro. *J Wound Care* 22(5): 221-29
- World Union of Wound Healing Societies (WUWHS) (2007) *Principles of best practice: wound exudate and the role of dressings. A consensus document*. Wounds International, London, United Kingdom
- World Union of Wound Healing Societies (WUWHS) (2019) *Consensus Document. Wound exudate: effective assessment and management*. Wounds International, London, United Kingdom



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