

Pressure ulcers

A guide to prevention and management



Preventing and pressure ulcers

The prevention and treatment of pressure ulcers (PU) can be a challenge to clinicians in all health care settings.

Pressure ulcers are a significant health issue and one of the biggest challenges organisations face on a day-to-day basis. Hospital-acquired pressure ulcers and injuries (HAPU/I) can result in patient harm, including pain and premature mortality. Treatment can also be expensive for hospitals and the overall healthcare system¹.

How big is the problem?

Internationally, pressure ulcers are a major health care adverse event. The prevalence of pressure ulcers in health care settings has been reported to range from 0% to 75% with large variations between countries and clinical settings. Average prevalence rates are reported to approach 10% overall¹.

MORE THAN
2.5M

Patients in U.S. acute-care facilities suffer from pressure ulcers²

60,000

Die from complications each year²

\$26.8B

Annual treatment cost of pressure ulcers in the U.S. **70,000\$** for one facility²



managing

Who is at risk?

Individuals with activity/mobility limitations are at risk of developing pressure ulcers. The challenge in clinical practice is to identify individuals with characteristics that increase the probability of pressure ulcer development*.

Examples of high risk individuals include:

- Older adults
- Trauma and/or prolonged surgery
- Those with spinal-cord injuries (SCI)
- Those who have sustained a fractured hip
- Those in long-term homes or community care
- The acutely ill
- Diabetes mellitus
- Those in critical care settings
- Those that have chronic neurological conditions

General recommendations for structured risk assessment should include the following:

- Conduct a pressure ulcer risk screening as soon as possible after admission and periodically thereafter to identify individuals at risk
- Conduct a full pressure ulcer risk assessment as guided by the screening outcome after admission and after any change in status
- Develop and implement a risk-based prevention plan for individuals identified as at risk
- When conducting a pressure ulcer risk assessment:
 - Use a structured approach
 - Include a comprehensive skin assessment
 - Supplement use of a risk assessment tool with assessment of additional risk factors
 - Interpret the outcomes using clinical judgement
 - Document all findings

Prevention is the first step

The accurate assessment of patient risk for the development of a pressure ulcer is the critical first step in pressure ulcer prevention. It is a central component of clinical practice aimed at identifying individuals susceptible to pressure ulcers in order to target appropriate interventions and prevent pressure ulcer development. International guidelines indicate that patient risk assessment should be carried out as soon as possible after admission.

Did you know?

Mepilex Border Sacrum and Heel dressings have significant evidence to support prophylactic use³, and Mepilex Border Sacrum dressing is the ONLY one to have 5 RCT's⁴⁻⁸ demonstrating the isolated effect of dressings in preventing pressure ulcers.

* National Pressure Ulcer Advisory Panel, European Pressure Ulcer Advisory Panel and Pan Pacific Pressure Injury Alliance. Prevention and Treatment of Pressure Ulcers: Clinical Practice Guideline. Emily Haesler (Ed.). Cambridge Media: Osborne Park, Western Australia; 2014

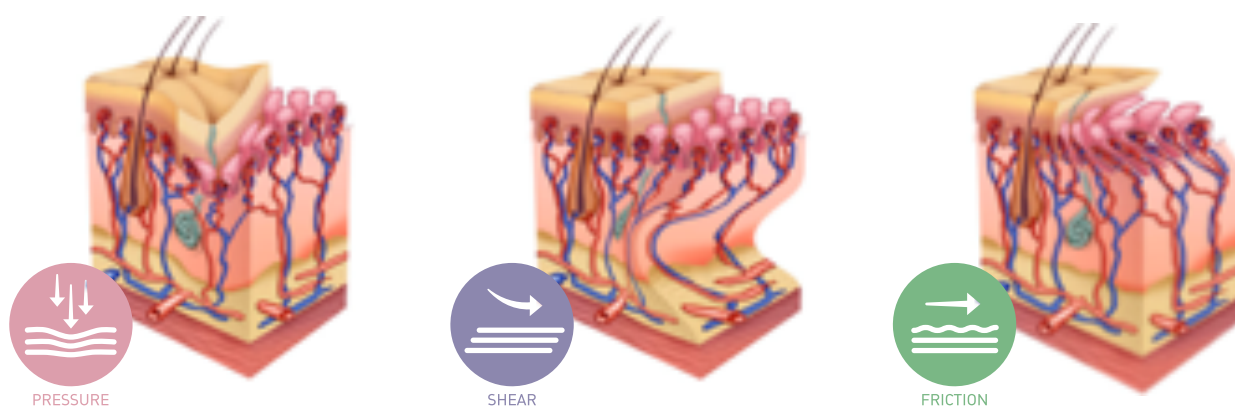
Aetiology of pressure ulcers*

Tissue Deformation

The development of a pressure ulcer is a complex interaction between extrinsic factors (environment) and intrinsic factors (patient related). A pressure ulcer is defined as tissue damage caused by unrelieved pressure, friction, shear forces to tissue between a surface and a bony prominence. To understand the mechanism of this injury one must consider the effects of these forces at a cellular level. Pressure, friction and shear forces are interlinked and can exert sufficient deformational force

on cells to cause damage to cellular components such as the cytoskeleton of the cell. This damage may result in the failure of the cell membrane to maintain its function of regulating the transport of ions from the extracellular environment.

The failure of the cell membrane rapidly leads to cell death. The death of multiple tissue cells results, ultimately, to the formation of areas of tissue necrosis.



Ischemia

In parallel to this cell level damage one must also consider the effects of pressure, friction and shear forces to the vasculature of compromised tissue. These forces combine in certain instances to deform and compromise the ability of blood vessels to supply adequate oxygen levels to tissues (ischaemia) and ultimately cells which leads to the accumulation of waste products, changes in cellular pH and eventually cell death.

This process is commonly believed to develop over a period of hours as opposed to that of cellular deformation which is a more rapid process.

Microclimate

An important additional factor in the development of pressure ulcer is that of microclimate which constitutes the temperature and the degree of moisture at the skin/surface interface. Raised skin temperature combined with high moisture levels from sweat, urine or wound exudate can combine to raise the risk of pressure ulcer through increasing metabolic needs of the skin, decreasing the skin's mechanical resistance to external forces and to increasing the frictional forces between the skin and a support surface.

An individual's risk of developing a pressure ulcer is further influenced by intrinsic factors such as their age, ability to reposition, mental status, nutritional status, level of tissue perfusion and a range of comorbidities which may be present.

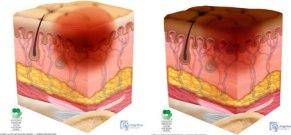
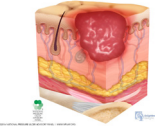

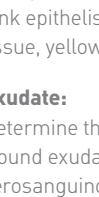
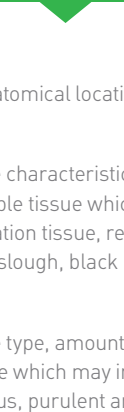
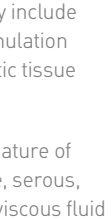


* World Union of Wound Healing Societies (WUWHS) Consensus Document. *Role of dressings in pressure ulcer prevention*. Wounds International, 2016

Pressure ulcer wound assessment and staging*

Pressure ulcer severity assessment is based on the International NPIAP/EPUAP pressure ulcer classification system and requires the clinician to determine the depth of the injury based on visual inspection of the wound and in the case of a stage I injury the presence or absence of non-blanching erythema. It should be noted that in most cases a pressure injury will develop over a bony prominence such as the heel or the sacrum (most common sites for

pressure ulcers). Following initial staging of the pressure ulcer the clinician needs to ascertain the history of the wound in terms of how and when it was developed and the patient's understanding of the wound and its causation. Note should be made of the degree of pain experienced by the patient related to the wound as well as any systemic signs of infection.





STAGING	ASSESSMENT FOR ALL STAGES
<p>Category/stage 1 – Non-blanchable Erythema May be painful, firm, soft, warmer or cooler as compared to adjacent tissue.</p> 	<p>Location: Document anatomical location of PI</p> <p>Tissue Type: Determine the characteristics of wound bed, noting the visible tissue which may include pink epithelisation tissue, red granulation tissue, yellow slough, black necrotic tissue</p> <p>Exudate: Determine the type, amount and nature of wound exudate which may include, serous, serosanguinous, purulent and or viscous fluid</p> <p>Odor: Note the presence of malodour from the wound</p> <p>Wound Edge: Observe for undermining of the wound edges or any tunnelling which may be present</p> <p>Periwound: Describe the condition of the skin surrounding the wound and observe for maceration and inflammation</p> <p>Infection: Assess for overt signs of wound infection</p> <p>Document findings in individuals medical record (EMR)</p>
<p>Category/stage 2 – Partial Thickness Skin Loss Presenting as a shallow open ulcer with a red pink wound bed, without slough. May also present as an intact or open/ruptured serum-filled blister.</p> 	
<p>Category/stage 3 – Full Thickness Skin Loss Subcutaneous fat may be visible but bone, tendon or muscle are not exposed. Slough may be present but does not obscure the depth of tissue loss. May include undermining and tunneling</p> 	
<p>Category/stage 4 – Full Thickness Tissue Loss Exposed bone, tendon or muscle. Slough or eschar may be present on some parts of the wound bed. Often include undermining and tunneling.</p> 	
<p>Suspected Deep Tissue – Depth unknown Purple or maroon localised area of discolored intact skin or blood-filled blister due to damage of underlying soft tissue from pressure and/or shear. The area may be preceded by tissue that is painful, firm, mushy, boggy, warmer or cooler as compared to adjacent tissue.</p> 	
<p>Unstageable – Depth unknown Full thickness tissue loss in which the base of the ulcer is covered by slough (yellow, tan, gray, green or brown) and/or eschar (tan, brown or black) in the wound bed.</p> 	

* National Pressure Ulcer Advisory Panel, European Pressure Ulcer Advisory Panel and Pan Pacific Pressure Injury Alliance. Prevention and Treatment of Pressure Ulcers: Clinical Practice Guideline. Emily Haesler (Ed.). Cambridge Media: Osborne Park, Western Australia; 2014

From proven prevention to effective treatment solution for your pressure ulcer needs*

Preventing a pressure ulcer

Treating a pressure ulcer

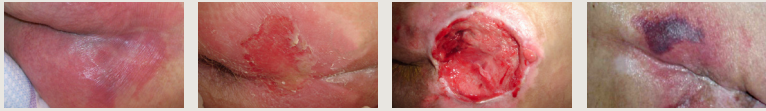
Anatomic Location	Protect	Offload
Sacrum	 <p>Mepilex® Border Sacrum</p>	 <p>Mölnlycke® Tortoise™ Turning & positioning system and/or Mölnlycke® Z-Flo™ Fluidized positioner</p>
Heel	 <p>Mepilex® Border Heel</p>	 <p>Mölnlycke® Z-Flo™ Fluidized positioner or Mölnlycke® Z-flex™ Heel boot</p>
Occiput	 <p>Mepilex® Border Flex</p>  <p>Mepilex® Border</p>	 <p>Mölnlycke® Z-Flo™ Fluidized positioner</p>
Other locations	 <p>Mepilex® Border Flex</p>  <p>Mepilex® Border Lite</p>	
MDRPU Medical Device Related pressure ulcer	 <p>Mepilex® Border Flex</p>  <p>Mepilex® Border</p>  <p>Mepilex® Lite</p>	

* National Pressure Ulcer Advisory Panel, European Pressure Ulcer Advisory Panel and Pan Pacific Pressure Injury Alliance. Prevention and Treatment of Pressure Ulcers: Clinical Practice Guideline. Emily Haesler (Ed.). Cambridge Media: Osborne Park, Western Australia; 2014

reatment, a comprehensive

ssure ulcer – Product selection guide

No – No antimicrobial dressings required



Stage 1 Stage 2 Superficial Stage 3 or 4 Cavity Deep Tissue

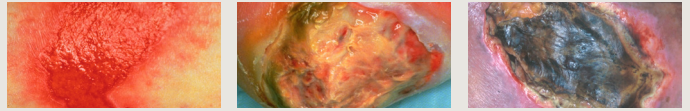
<p>Mepilex® Border Heel</p> <p>Mepilex® Border Sacrum</p> <p>Mepilex® Border Flex</p>	<p>Need surgical/autolytic debridement and wound cleansing - Granudacyn®</p>
	<p>Topical therapy - Granulox®</p>

<p>Mepilex® Border Heel</p> <p>Mepilex® Border Sacrum</p> <p>Mepilex® Border Flex</p>	<p>Exufiber®</p> <p>+</p> <p>Mepilex® Border Heel</p> <p>Mepilex® Border Sacrum</p> <p>Mepilex® Border Flex</p>
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<p>Exufiber®</p> <p>+</p> <p>Mepilex® Border Heel</p> <p>Mepilex® Border Sacrum</p> <p>Mepilex® Border Flex</p>

<p>Exufiber®</p> <p>Mextra® Superabsorbent</p>
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Yes – Consider using antimicrobial dressings



Stage 2 Superficial Stage 3 or 4 Cavity Deep Tissue

	<p>Need surgical/autolytic debridement and wound cleansing - Granudacyn®</p>
	<p>Topical therapy - Granulox®</p>

<p>Mepilex® Border Ag</p> <p>Mepilex® Border Sacrum Ag</p> <p>OR</p> <p>Mepilex® Heel Ag</p> <p>Mepilex® Ag</p>

<p>Exufiber® Ag+</p> <p>+</p> <p>Mepilex® Border Heel</p> <p>Mepilex® Border Sacrum</p> <p>Mepilex® Border Flex</p>

<p>Mepilex® Border Ag</p> <p>Mepilex® Border Sacrum Ag</p>
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<p>Exufiber® Ag+</p> <p>+</p> <p>Mepilex® Border Heel</p> <p>Mepilex® Border Sacrum</p> <p>Mepilex® Border Flex</p>

<p>Mepilex® Transfer Ag</p> <p>Mextra® Superabsorbent</p>

<p>Exufiber® Ag+</p> <p>Mextra® Superabsorbent</p>
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Introducing Mölnlycke® Pressure Ulcer Therapy Program

✓ A portfolio of products where the primary principals for development are innovation, evidenced clinical excellence and cost effectiveness such as:

- Mepilex® Border Sacrum dressing that have been shown to reduce pressure ulcer development by 88% in one RCT.⁴
- Mepilex® Border Flex dressing offers longer wear time and fewer dressing changes, resulting in 74% lower cost per patient in one study.⁹
- Exufiber® gelling fiber locks in up to 23% more of the exudate absorbed than Aquacel® Extra, reducing the risk of leaks and maceration.^{10, 20}

✓ Professional education program to give insights and the training solutions that may be needed to drive change and advance patient outcomes within your healthcare organization.

✓ Streamlined protocols that are easy to implement since they are centered around a few products versatile enough to be used for both prevention and on a variety of wounds.

Mölnlycke provides a program of proven products and clinical team support that can positively impact pressure injury prevention and treatment.

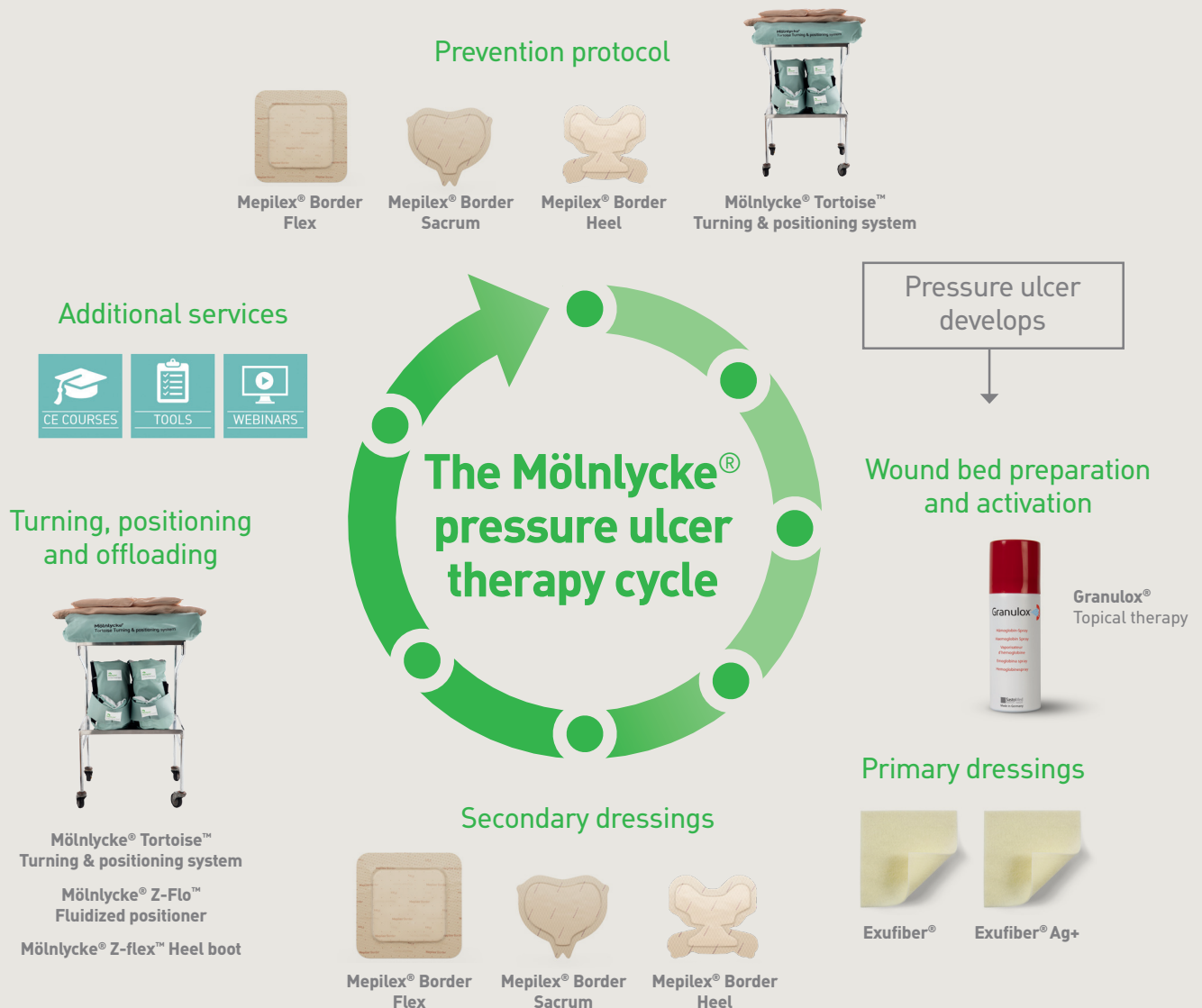
Management of pressure ulcers



It is essential that for a patient with a pressure ulcer, a pressure ulcer risk assessment must be undertaken using a validated risk assessment scale. This should be done on an ongoing basis.

All routine pressure ulcer preventative actions must be continued in addition to the treatment requirements of the wound. These include; offloading, appropriate surfaces based on risk assessment, repositioning, moisture management and nutritional assessment. Particular relevance are other anatomical sites that may be prone to pressure injury.

The treatment of an existing pressure ulcer is based on the severity of the pressure ulcer (stage) and on the specific characteristics of the wound (infection, exudate, sough and the degree of undermining). Regardless of the severity and characteristics of the pressure ulcer, it is essential that offloading of the wound is maintained and that the wound is protected from pressure, friction and shear forces.



Treatment of pressure ulcers – A clinical protocol*

Classification of pressure ulcers	Use the international NPIAP/EPUAP pressure ulcer classification system to classify and document
Assessment and monitoring	Assess patient and pressure ulcer, monitor healing at least weekly, select a consistent method for measuring PU size and surface area for meaningful comparisons
Pain assessment and treatment	Perform pain assessment on individual and then use: non-pharmacological pain management as first line, repositioning techniques and equipment, moist wound healing, and administer analgesia regularly to manage pain.
Cleansing and debridement	Cleanse the pressure ulcer and surrounding skin, debride devitalized tissue and suspected or confirmed biofilm and perform maintenance until covered with granulation tissue
Assessment and treatment of infection and biofilms	Assess high risk individuals with pressure ulcers for infection, determine bacterial bioburden. 1. Antimicrobial dressings and topical biofilm reduction products may be helpful 2. Consult provider for Rx systemic antibiotics if appropriate
Wound dressings	Select a wound dressing based on wound bed moisture, bioburden, exudate, depth and location, tunneling, and pain

*National Pressure Ulcer Advisory Panel, European Pressure Ulcer Advisory Panel and Pan Pacific Pressure Injury Alliance. Prevention and Treatment of Pressure Ulcers: Clinical Practice Guideline. Emily Haesler (Ed.). Cambridge Media: Osborne Park, Western Australia; 2014

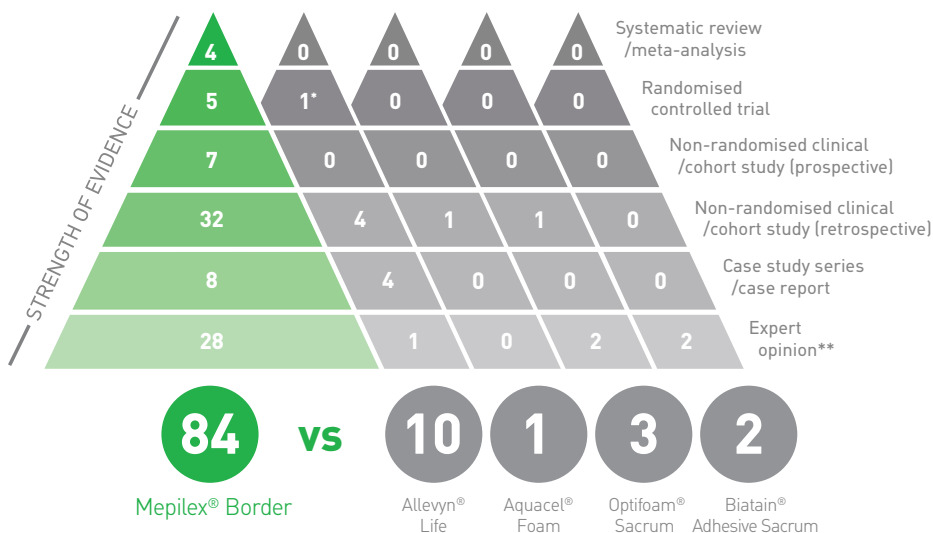
Mölnlycke® product offering

The clinical effectiveness of Mepilex® Border Sacrum and Mepilex® Border Heel dressings for prevention

There now exists over 80 pieces of high-quality scientific and clinical evidence that demonstrates the clinical effectiveness of the Mepilex® Border Sacrum and Heel dressings for the prevention of hospital acquired pressure ulcers³⁴.

Laboratory evidence based on Finite Element Analysis has clearly demonstrated the efficacy of the Mepilex® Border dressing in minimising tissue deformation in both sacral and heel tissue, whilst maintaining an optimal microclimate³⁵⁻³⁶. The proprietary Deep Defense™ technology of the Mepilex Border dressing closely mimics the natural anatomical movement of the sacral tissue thereby allowing natural lateral movement of the buttocks whilst providing longitudinal splinting to the sacrum to minimise shearing forces, particularly when the patient is in the semi-recumbent position³⁶. Additionally, the smooth low friction outer surface of the dressing also helps to minimise shearing forces being transferred to underlying tissues.

Numerous high-quality published randomised controlled trials (RCTs) have demonstrated the clinical effectiveness of these dressings in ICU patients, general hospital patients and nursing home residents. These clinical trials have also demonstrated the cost-effectiveness of the use of these dressings³⁴.



* Currently 1 RCT exists on Allevyn Life Quadrilobe dressing used for pressure ulcer prevention in orthopaedic surgery patients. However this dressing is different in construction to the Allevyn Life Sacrum dressing in the coccyx region where the sacrum dressing is only 3-layer construction and therefore this evidence is not transferrable to the sacrum dressing.

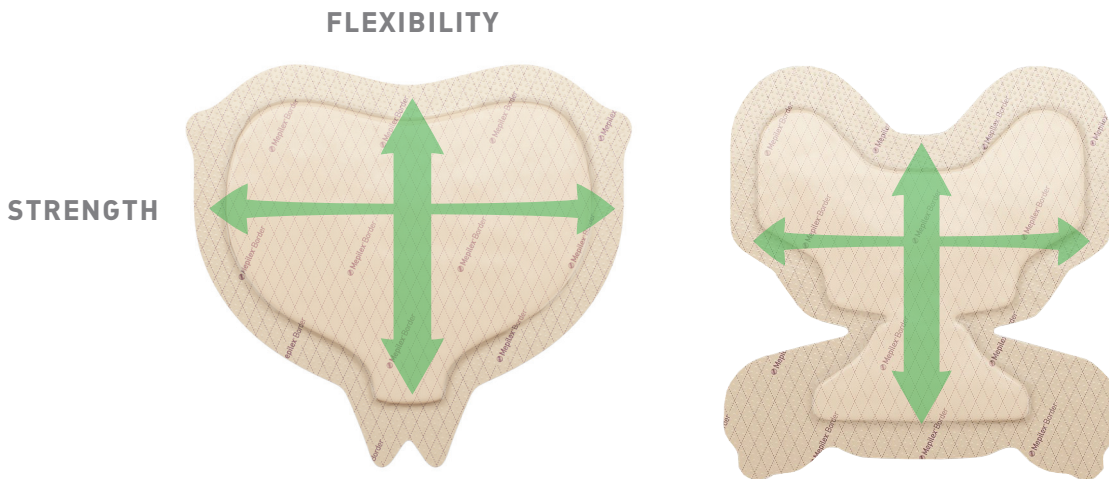
** Includes three international clinical guideline documents which incorporate recommendations based on available research and expert opinion. Although the guidelines are not brand specific, the underlying clinical evidence identifies only Mepilex Border and not Allevyn Life, Optifoam, Aquacel Foam.

Mepilex® Border Sacrum and Mepilex® Border Heel

With proprietary Deep Defense™ technology

Proprietary Deep Defense™ technology provides optimal protection against shear in combination with other extrinsic factors, while maintaining the dressing's protective properties over time. This not only helps to prevent pressure ulcers, but also protects existing pressure ulcers from further deterioration¹⁴.

- Demonstrating up to 88% reduction in development of sacral pressure ulcers incidence in a recent US RCT⁴
- Demonstrating a cost savings of 77USD per patient treatment cost in a cohort of 1.03 million patients¹⁵
- 90.6% of suspected DTIs were prevented from deterioration in a US Study using Mepilex Border Sacrum and Mepilex Border Heel dressings¹⁴



88%

Reduction in pressure ulcers development in a recent RCT⁴

\$77

Reduction in per patient treatment cost¹⁵

Prevented progression of

90.6%

of suspected DTIs¹⁴

Mölnlycke® product offering

Mepilex® Border Flex

With proprietary Flex Technology

Our proprietary Flex technology uniquely conforms, allowing it to adapt to the shape and movement of the patient.¹⁶ Smart exudate management gives you the confidence to leave the dressing on for longer and still maintain an optimal wound healing environment³¹⁻³³, reducing the cost of treating wounds.⁴ In other areas at risk of pressure ulcers, Mepilex® Border Flex protects the tissues from deformation, helping to prevent pressure ulcers.¹⁷

- In a US study, dressing utilization reduced by 78% leading to a cost reduction of 74.2%⁹ compared to the formulary dressing Optifoam® Gentle Border SA
- Recent computer modeling has shown that Mepilex Border Flex can reduce high stress by up to 80% in soft tissues over the iliac crest¹⁷



UP TO **80%**

Reduction in high stresses at the iliac crest during prone positioning¹⁷

74.2%

Cost savings compared to the formulary dressing Optifoam® Gentle Border SA⁹

78%

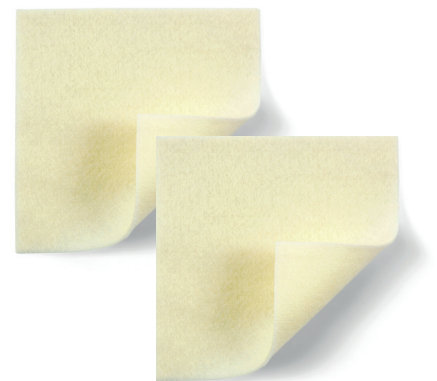
Fewer dressing changes compared to Optifoam® Gentle Border SA⁹

Exufiber® and Exufiber® Ag+

With Hydrolock® technology

Exufiber® has superior* retention that reduces the risk for leakage and maceration, even under compression, while maintaining structural integrity when wet for clean and easy, one-piece removal.²¹⁻²³

- Locks in up to 23% more of the exudate absorbed than Aquacel® Extra™ to reduce the risk of leakage and maceration^{10, 20}
- Exufiber® Ag+ delivers rapid antimicrobial action for up to seven days (*in vitro*) against a broad range of pathogens, reducing the microbial burden that may delay healing^{24, 25}



*When comparing lab test results for retention under pressure with Aquacel®, Aquacel® Extra™, Durafiber® and Urgoclean® dressings.

LOCKS IN UP TO **23%**

More of the exudate absorbed than Aquacel® Extra™^{10, 20}

98%

Of clinicians rated Exufiber as 'easy' or 'very easy' to remove in one piece¹⁸

99.9%

Reduction in *Pseudomonas aeruginosa* over seven days in an *in vivo* biofilm model with Exufiber Ag+¹⁹

Mölnlycke® Turning & positioning system

Continuous protection and offloading

Guidelines recommend offloading for both prevention and treatment of pressure ulcers*. Mölnlycke offers comprehensive solutions to protect the occiput, sacral region and the heels based on fluidized media and the heels by facilitating pressure redistribution through envelopment and/or by keeping the patient in the desired position over time.

- Mölnlycke® Z-Flo™ Fluidized positioners can be molded to conform to the patient's anatomy and will hold its shape over time^{29,30}
- Mölnlycke® Z-flex™ Heel boot and Tortoise™ Turning & positioning system combines the benefit of Z-Flo™ with positive air displacement to create off-loading through envelopment

* Prevention and Treatment of Pressure ulcers /injuries Clinical Practice Guideline, international Guideline 2019* by EPUAP, NPIAP, PPPIA



REDUCTION
BY UP TO

87.7%

In occipital pressure injuries when compared to the use of pillows²⁶

REDUCTION
BY UP TO

45%

In sacral pressure injuries when compared to the use of pillows and wedges²⁷

UP TO

65%

Less stress in occipital tissue compared to medical foam²⁸

Proving it every day

At Mölnlycke®, we deliver innovative solutions for managing wounds, improving surgical safety and efficiency, and preventing pressure ulcers. Solutions that help achieve better outcomes and are backed by clinical and health-economics evidence.

In everything we do, we are guided by a single purpose: to help healthcare professionals perform at their best. And we're committed to proving it every day.

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