Wounds UK VOL 11 ISSUE 2 MAY 2015

Dressings for pressure ulcer prevention made easy

Introduction

A pressure ulcer (PU) is localised injury to the skin and/or underlying tissue usually over a bony prominence, as a result of pressure, or pressure combined with shear (NPUAP, 2014). PUs commonly occur in people who cannot reposition themselves or do not reposition themselves often enough to relieve pressure on bony prominences. People who are very old or young, malnourished, with compromised skin integrity, or with acute illness or chronic comorbidities (e.g. diabetes, vascular disease) are most at risk of developing a PU (Coleman et al, 2013).

Authors: Moore Z, Thorpe E

UNDERSTANDING PRESSURE ULCERS

Each day, 20–25% of beds in medical facilities are occupied by patients who have PUs. Of those, about 60–80% of PUs are acquired within the facility (Vanderwee et al, 2007).

The literature clearly articulates the profound, negative emotional, physical, mental and social effects of PUs on patients' quality of life (Spilsbury et al, 2007). Many prevention and treatment regimens exacerbate these adverse effects, particularly pain (Moore and Cowman, 2012). Patients report pain related to wounds as being all-encompassing and devastating, these findings appears to be a constant problem for individuals with PUs (Price et al, 2008; Moffat et al, 2002; Langemo et al, 2000; Fox, 2002; Hopkins et al, 2006). Where patients are not able to express their feelings or sensations related to pain, quality of life is negatively affected (Donnelly, 2004).

Furthermore, PUs are a significant financial burden to healthcare systems (Clark, 2002). The annual cost of managing PUs in the NHS is estimated to be between £1.76 billion and £2.64 billion annually (Posnett and Franks, 2008), with the cost of treating each PU increasing significantly according to severity:

- Category 1: £1,000 to £2,000
- Category 2: £5,000 to £7,000
- Category 3: £8,000 to £12,000
- Category 4: £12,000 to £17,000 (Department of Health, 2010).

Reducing PU development enhances clinical outcomes, minimises costs and avoids potentially devastating effects on patient quality, making it critical that prevention be a key goal in healthcare organisations (Moore, 2009). Because prevention regimens can also cause pain and discomfort, clinicians must look at altering their efforts with a view towards maintaining/improving patient quality of life and saving time and money for their organisations (Spilsbury et al, 2007).

GUIDANCE ON PU PREVENTION

Clinicians should perform a risk assessment to identify patients at risk of developing PUs as soon as possible, within 8 hours of admission (Box 1) (NPUAP et al, 2014). The risk assessment should be repeated as often as required, based on the needs of the patient, and especially if there is a significant change in the patient's condition (NPUAP et al, 2014). For patients who are deemed at-risk, use of the SSKIN bundle (Gibbons, 2006) has had a significant impact on reducing the occurrence of PUs (Box 2, p2) (McBride and Richardson, 2015).

DRESSINGS AND PU PREVENTION

Dressings are considered to be a useful addition to PU-prevention strategies (Black et al, 2014, and there is a growing body of research around their effectiveness and cost-savings (Table 1, p5).

The mechanisms by which dressings assist in PU prevention are thought to relate to their ability to regulate the microclimate at the skin/dressing interface (Call et al, 2013a) and to reduce shear and friction (Nakagami et al, 2007) (Box 2, p2). Dressings with horizontal fabric structures can also help reduce pressure by assisting in transferring the load over a greater area (Call et al, 2013b). Furthermore, dressings may be particularly advantageous in the prevention of heel PUs through promoting internal shear in the dressing, which diverts loads from tissues (Levy et al, 2015).

Interestingly, Santamaria and Santamaria (2014) suggest that adopting the use of prophylactic dressings to reduce hospital-acquired PUs has the potential for a conservative annual saving of AUS$34.8 million. The authors recommend replication of the economic analysis in other countries, to aid understanding of cost effects.

DRESSING PU PREVENTION PROTOCOL

Patients in intensive care or long-term care facilities, or undergoing long procedures in the operating theatre are at particular risk for development of a PU. Furthermore, the sacrum, heels and other bony prominences are the anatomical areas at greatest risk on patients.

Box 1: PU risk factor assessment (NPUAP et al, 2014)

Consideration should be given to the following:

- Bedbound and/or chairbound
- Mobility/activity limitations
- Current existing pressure ulcer
- Problems with perfusion and oxygenation;
- Poor nutritional status
- Low or high BMI
- Increased skin moisture and/or body temperature
- Advanced age
- Sensory perception
- Haematological abnormalities
- Poor general health status

Patient factors such as swelling due to oedema from being immobile or due to comorbidities (e.g. vascular disease) makes skin more prone to breakdown from pressure, shear, friction and changes in the microclimate (e.g. increased heat and moisture). These factors result in pressure and friction on the skin. With prolonged pressure in the same place, there is also increased moisture and heat at the skin surface, where at-risk anatomy is under pressure from body weight.

It is critical to reduce the friction coefficient at the support/skin interface, evenly distribute pressure, and maintain homeostasis of the skin microclimate. Advanced dressings (e.g. foam with a non-adherent silicone contact layer) are constructed to protect the superficial layers of the skin from pressure, shear, friction and changes in the skin microclimate (Box 3).

In using dressings for PU prevention, it is important that all other relevant prevention strategies (e.g. SSKIN, Box 2) also be continued. Further, the skin should be examined for signs of PU development at least daily, or at each dressing change, to catch early signs of breakdown before they worsen. If the dressing becomes damaged, loose, crumpled or too moist, it should be renewed (NPUAP et al, 2014).

Recommendations for creating a protocol for the use of dressings to prevent PU development:

1. Before selecting a dressing, consider the current status of the skin and the ease of dressing application and removal to prevent mechanical stripping (Black et al, 2014; NPUAP et al, 2014)
2. Consider the use of a five-layer soft silicone bordered foam dressing to enhance, but not replace, PU-prevention strategies for the sacrum, buttock and heel (Black et al, 2014). Choose a dressing that can manage the microclimate, is appropriate for the anatomy location, and is clinically appropriate (NPUAP et al, 2014)
3. Apply the dressing to dry, intact skin. Do not use emollients or other barriers, as they prevent dressing adhesion (Black et al, 2014)
4. Choose a dressing(s) of the correct size; that is, exceeding the area of tissue at risk on the sacrum, buttocks or heel to be protected from pressure and shear (Black et al, 2014; NPUAP et al, 2014)

Box 2: The SSKIN Bundle

Skin assessment
- Carry out top-to-toe inspection; inspect, and inspect again
- Make it routine
- Double-check at handovers for any skin changes
- Photograph damage or areas of concern
- Let the patient see

Surface
- Make sure the right mattress is available from the outset
- Use a pressure-relieving mattress with other appropriate prevention strategies. Dressings may be a useful addition

Keep moving
- Patient should be turned every 2–3 hours
- Prevent shear injury by using patient-movement aids
- Elevate heels
- Do not let at-risk patients to sit >2 hours in one period

Incontinence
- Prevent incontinence-associated dermatitis and excoriation
- Use barrier applications, containment devices and bowel-management systems, per local protocol

Nutrition
- Discuss nutrition early with the multidisciplinary team
- Seek dietician input for patients at risk of malnutrition
- Make help with meals a high priority

Box 3: Qualities of an ideal PU-prevention dressing

- Reduces shear, friction and pressure
- Reduces humidity at the skin/dressing interface
- Does not interfere with any medical devices
- Promotes patient comfort during wear
- Can remain in place for up to several days on first application
- Poses low risk of skin irritation and allergy

5. Inspect the skin under the dressing on a regular basis per local protocol, to monitor skin status and ensure appropriateness of the prophylactic dressing regimen (Black et al, 2014; NPUAP et al, 2014)
6. Change dressings in accordance with institutional policy and manufacturers' recommendations, or as clinically indicated
7. Consider discontinuing the dressing as the patient's risk for PU development decreases, per the results of regular clinical assessment (Black et al, 2014)
8. Use the dressing with other preventive measures (NPUAP et al, 2014).

CONCLUSION

A growing body of research suggests dressings are a useful, cost-effective addition to a holistic PU-prevention regimen. In particular, application of multi-layered soft silicone foam dressings for the prevention of sacral and heel PUs provides a statistically and clinically significant benefit. These dressings redistribute pressure and shear, reduce friction and manage superficial microclimate — the factors that lead to skin breakdown. Prophylactic dressings could save organisations and health systems a significant amount of money. Protocols for using dressings to aid PU prevention should be considered.

REFERENCES

Black J, Clark M, Dealey C, et al (2014) Dressings as an adjunct to pressure ulcer prevention: consensus panel recommendations. *Int Wound J* doi: 10.1111/iwj.12197. [Epub ahead of print].

Clark M, Black J, Alves P, et al (2014) Systematic review of the use of prophylactic dressings in the prevention of pressure ulcers. *Int Wound J* 11(5):460–71.

Brindle CT (2009) Use of an absorbent soft silicone self-adherent bordered foam dressing to decrease sacral pressure ulcers in the surgical trauma ICU. Poster presented at: 41st Annual Conference of the Wound, Ostomy and Continence Society, St. Louis, USA, 6–10 June.

Call E, Pedersen J, Bill B, et al (2013a) Microclimate impact of prophylactic dressings using in vitro body analog method. *Wounds*, 25, 94-103.

Call E, Pedersen J, Bill B, et al (2013b) Enhancing pressure ulcer prevention using wound dressings: what are the modes of action? *Int Wound J* doi: 10.1111/iwj.12123. [Epub ahead of print].

Clark M (2002) Pressure ulcers and quality of life. *Nurs Stand* 16: 74–8.

Clark M, Black J, Alves P, et al (2014) Systematic review of the use of prophylactic dressings in the prevention of pressure ulcers. *Int Wound J* 2014;11(5):460–71.

Coleman S, Gorecki C, Nelson EA, et al (2013) Patient risk factors for pressure ulcer development: Systematic review. *Int J Nurs Stud* 50(7):974–1003.

Department of Health (2010) Pressure ulcer productivity calculator. Accessed 16.03.2015 at: https://www.gov.uk/government/publications/pressure-ulcers-productivity-calculator.

Fox C (2002) Living with a pressure ulcer: a descriptive study of patients' experiences. *Br J Community Nurs* 10:12–4.

Gibbons W, Shanks H, Kleinhelter P, Jones P (2006) Eliminating facility-acquired pressure ulcers at Ascension Health. *Jt Comm J Qual Patient Saf* 32(9):488–96.

Hopkins A, Dealey C, Bale S, et al (2006) Patient stories of living with a pressure ulcer. *J Adv Nurs* 56(4): 345–53.

Langemo DK, Melland H, Hanson D, et al (2000) The lived experience of having a pressure ulcer: a qualitative analysis. *Adv Skin Wound Care* 13(5):225–35.

Levy A, Frank MB, Gefen A (2015) The biomechanical efficacy of dressings in preventing heel ulcers. *J Tissue Viability* 24(1):1–11.

McBride J, Richardson A (2015) A critical care network pressure ulcer prevention quality improvement project. *Nurs Crit Care* doi: 10.1111/nicc.12174. [Epub ahead of print].

Moffatt CJ, Franks PJ, Hollingworth H (2002) Understanding wound pain and trauma: an international perspective. In: *Pain at Wound Dressing Changes*. EWMA Position Document. MEP, London.

Moore Z, Cowman S (2009) Quality of life and pressure ulcers: a literature review. *Wounds UK* 5(1):58–65.

Moore ZE, Webster J (2013) Dressings and topical agents for preventing pressure ulcers. *Cochrane Database Syst Rev* 8:CD009362. doi: 10.1002/14651858.CD009362.pub2.

Table 1. Evidence for using dressings in PU prevention

Reference	Title	Study type	Key points
Levy et al. *J Tissue Viability* 2015;24(1):1–11	The biomechanical efficacy of dressings in preventing heel ulcers	Biomechanical performance evaluation using 9 finite element model variants of the posterior heel	■ Heels are the most common site for facility-acquired PUs ■ Use of multilayer prophylactic heel dressings (Mepilex® Border Heel-type) considerably reduces soft tissue exposures to strains ■ The multilayer design also showed clear benefit over a single-layer foam ■ The use of a prophylactic multilayer dressing indicates a great promise for prevention
Clark et al. *Int Wound J* 2014;11(5):460–471	Systematic review of the use of prophylactic dressings in the prevention of pressure ulcers	Systematic review	■ The introduction of dressings to protect vulnerable anatomical sites may reduce incidence of superficial PUs ■ Reductions in PU incidence may improve both patient and staff satisfaction with care while also improving the quality of health services through reducing patient harm ■ Widespread adoption of prophylactic dressings in PU prevention may save on costs of pressure-area care
Brindle C. Poster presented at: 41st Annual Conference of the Wound, Ostomy and Continence Society, St. Louis, USA, 6–10 June 2009	Use of an absorbent soft silicone self-adherent bordered foam dressing to decrease sacral pressure ulcers in the surgical trauma ICU	Case series of 93 patients in a surgical trauma intensive care unit; prophylactic dressing regimen was initiated in 41 patients deemed high-risk	■ Zero sacral PUs among 41 high-risk patients ■ Six PUs (4 deep-tissue injury, 2 unstageable PUs) occurred over the entire study population; patients who developed PUs either did not qualify for inclusion in the high-risk group and therefore did not receive the sacral dressing, had the sacral dressing discontinued due to discharge from the STICU to nursing units, or had the dressing removed before a surgical procedure ■ Mepilex® Border Sacrum, an absorbent soft silicone self-adherent bordered foam dressing, can reduce hospital-acquired pressure ulcers by reducing shear and friction forces and optimising microclimate
Santamaria, et al. *Int Wound J* 27 May doi: 10.1111/iwj.12101. [Epub ahead of print]	A randomised controlled trial of the effectiveness of soft silicone multi-layered foam dressings in the prevention of sacral and heel pressure ulcers in trauma and critically ill patients: the border trial	Prospective, single-centre, open-label, randomised controlled trial of 440 trauma and critically ill patients admitted to accident and emergency before transfer to the ICU, randomly allocated to the trial group (n=219) or the control group (n=221)	■ Control group patients received standard PU prevention management; trial group received application of Mepilex® Border Sacrum and Mepilex® Heel (to each heel) in A&E, plus usual PU-prevention strategies ■ Trial group had significantly fewer patients with PUs (5 versus 20) in the ICU ■ Significant reductions in both sacral (2 versus 8) and heel PUs (5 versus 19) for trial versus control groups ■ Overall number of PUs was significantly fewer in the trial group than in the control group (7 versus 27) ■ Application of multi-layered soft silicone foam dressings for the prevention of sacral and heel PUs provides a statistically and clinically significant benefit ■ Adopting the use of prophylactic dressings to reduce hospital-acquired PUs has the potential for a conservative annual saving of AUS$34.8 million ■ Countries with different healthcare systems and costing structures should perform same economic analysis
Moore and Webster*Cochrane Database Syst Rev* 2013 8:CD009362. doi: 10.1002/14651858.CD009362.pub	Dressings and topical agents for preventing pressure ulcers	Systematic review of four trials including 561 total participants	■ Dressings applied over bony prominences reduced PU incidence
Clark, et al *Int Wound J* 2014;11(5):460–471	Systematic review of the use of prophylactic dressings in the prevention of pressure ulcers	Systematic review	■ Using a dressing as part of PU prevention may help reduce PU incidence associated with medical devices, especially in immobile ICU patients

Case study: 310 days pressure ulcer-free in a critical care unit

In 2011, a programme to prevent pressure ulcer (PU) development was implemented on the Critical Care Unit (CCU) at University College London NHS Foundation Hospital. It was previous believed that PUs in the critically ill were inevitable. As part of the programme, at-risk patients would receive interventions upon entering the CCU, which shifted the culture from cure to prevention.

Assessment tools in isolation were abandoned in favour of frequent skin inspection that let nurses use minute-by-minute clinical judgement. The avoidable-versus-unavoidable PU debate was also abandoned — it wasn't helping to advance care, and was ultimately pointless, as PU-prevention efforts should always be implemented.

Safety huddle

Patient-safety boards were posted in the CCU, where huddles take place at the beginning of each shift to foster a safety-first focus, which has also improved teamwork and communication significantly. The answers to key questions are discussed:

1. What are the risks to your patient right now?
2. Are you comfortable with the patient allocation, and what support will you need today/tonight?
3. What is the PU prevention plan; is the level of intervention correct?
4. Are you worried about any medications (e.g. GIK, inotropes) your patient is on? Does everyone in the bay understand the risk?
5. Are you worried that your patient is at risk of falls? Do they need constant supervision?
6. Is there anything else that you want the team to know?

Improved assessment

Pressure ulcer assessment means a head-to-toe assessment. This must be done at least once every shift and documented. Any change in skin integrity is peer-assessed with a colleague and escalated to the nurse in charge. When all agree, an incident report is completed and a root-cause analysis undertaken within 48 hours.

Use of dressings for prevention

In at-risk patients, a five-layer foam dressing with Safetac® technology (Mepilex® range) is applied from admission until discharge to help prevent PU development. The dressing is peeled back once per shift, and the sacrum inspected by 2 nurses, with changes as indicated by manufacturer's recommendations or clinical need.

Results of the protocol

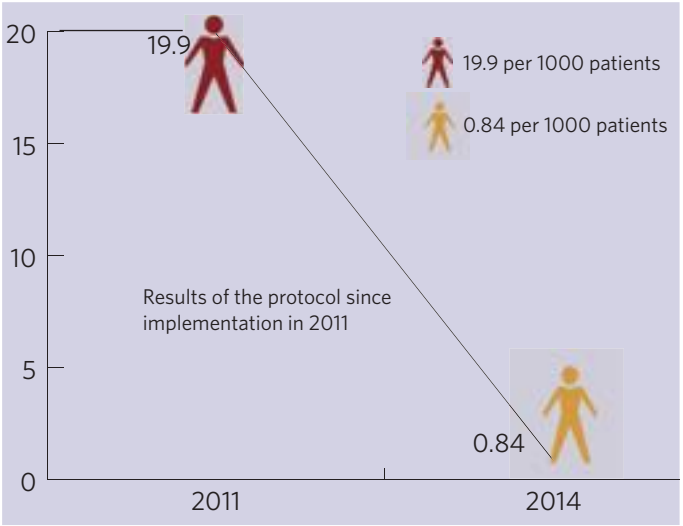
Since implementation of this protocol in 2011, acquired PUs have dropped from 19.9 per 1000 patients, to 0.84 per 1000 patients in 2014. The ward has been PU-free for 310 days. Patient experience, clinical outcomes and staff experience have all improved measurably and significantly.

Figure 1. The Critical Care Unit safety huddle at University College London NHS Foundation Hospital

Challenges to implementation

Changing culture is not easy, and staff may resist implementation of a programme such as this one. The key is to shift the mindset to prevention that begins with high-level intervention, then de-escalates over time. To keep up the momentum and energy for a proactive approach, it is important to communicate with the multidisciplinary team and keep those channels open to encourage teamwork and a shared purpose of reducing all harms.

Measure outcomes against yourself — do not compare against other institutions. When the inevitable lapses or mistakes happen, avoid pointing the blame, but rather find out what went wrong, support staff and share the learning on how a similar situation could be avoided in future. Equally importantly, engender positivity by celebrating the successes and communicating about how good outcomes can be maintained or even improved upon.



National Pressure Ulcer Advisory Panel (NPUAP), European Pressure Ulcer Advisory Panel and Pan Pacific Pressure Injury Alliance. Prevention and Treatment of Pressure Ulcers: Quick Reference Guide. Emily Haesler (Ed.). Cambridge Media: OsbornePark, Western Australia; 2014.

Posnett J, Franks PJ (2008) The burden of chronic wounds in the UK. *Nurs Times* 104(3): 44–5.

Price PE, Fagervik-Morton H, Mudge EJ et al (2008) Dressing related pain in patients with chronic wounds: an international patient perspective. *Int Wound J* 5(2):159–71.

Santamaria N, Gerdtz M, Sage S, et al (2013) A randomised controlled trial of the effectiveness of soft silicone multi-layered foam dressings in the prevention of sacral and heel pressure ulcers in trauma and critically ill patients: the border trial. *Int Wound J* May 27. doi: 10.1111/iwj.12101. [Epub ahead of print].

Santamaria N, Santamaria H (2014) An estimate of the potential budget impact of using prophylactic dressings to prevent hospital-acquired PUs in Australia. *J Wound Care* 23(11):583–4, 586, 588–9.

Spilsbury K, Nelson A, Cullum N, et al (2007) Pressure ulcers and their treatment and effects on quality of life: hospital inpatient perspectives. *J Adv Nurs* 57(5):494–504.

Vanderwee K, Clark M, Dealey C, et al (2007) Pressure ulcer prevalence in Europe: a pilot study. *J Eval Clin Practice* 13(2):227–35.

AUTHOR DETAILS

Moore Z[1], Thorpe E[2]

1. *Professor and Head of the School of Nursing and Midwifery, Royal College of Surgeons in Ireland School of Nursing and Midwifery, Dublin*
2. *Matron, University College London Hospitals NHS Foundation Trust, London*

This Made Easy has been supported by Mölnlycke Health Care. For further information, visit www.molnlycke.co.uk

MÖLNLYCKE HEALTH CARE

To cite this document: Moore Z, Thorpe E (2015) Dressings for pressure ulcer prevention Made Easy. London: Wounds UK. Available from: www.wounds-uk.com