Pressure ulcer prevention with the Dyna-Form Mercury™ Advance Mattress

In the effort to reduce the incidence of avoidable pressure ulcers, a prevention and treatment strategy has been devised by Direct Healthcare Services, called Intelligent™ Pressure Care Management. Central to this approach is the use of the Dyna-Form Mercury™ Advance Mattress. Here, the author reports a case that demonstrates the effectiveness of the mattress in preventing and treating pressure ulcers in a high-risk patient.

KEY WORDS
- Dyna-Form Mercury™ Advance Mattress
- Pressure ulcer prevention
- Sacral pressure ulcer

Pressure ulcer prevention and treatment is at the top of the clinical agenda and, as never before, the role of the tissue viability specialist is under close scrutiny. The long-predicted rise (Moore and Van Etten, 2011) in pressure ulcer prevalence and incidence has not materialised as figures seem to be stubbornly flat (Phillips and Buttery, 2009). Given the UK's aging population everyone is running very hard to stand still, therefore we need to look at new ways to prevent avoidable pressure ulcers.

This case study looks at the clinical impact of use of the Dyna-Form Mercury™ Advance Mattress as part of the management of a patient with serious comorbidities (including diabetes) who was at high-risk of developing pressure ulceration. This product is at the core of Intelligent™ Pressure Care Management – a pressure ulcer prevention and management strategy developed by Direct Healthcare Services (directhealthcareservices.co.uk). Not only did the Category IV pressure ulcer respond well to the regimen, but the patient also benefited from better sleep, improved mobility and uplift in his general mental wellbeing.

Pressure ulcers are the most costly chronic wound treated by healthcare organisations in the UK (Posnett and Franks, 2007). Each year, it is estimated that 400 000 patients in the UK develop a pressure ulcer (Bennett et al, 2004), the vast majority of which are considered avoidable. The European Pressure Ulcer Advisory Panel (EPUAP, 2009) identifies four categories of pressure ulcer and provides guidance on selecting the most suitable pressure-relieving products for each type. It is self-evident that interventions to prevent the development of a pressure ulcer are preferable to incurring costly treatment.

Pressure ulcers are defined as: "Localised injury to skin and/or underlying tissue, usually over a bony prominence, as a result of pressure, or pressure in combination with shear" (EPUAP, 2009). Category IV pressure ulcers are the least common, yet they represent the biggest financial, health service, and patient burden (Bennett et al, 2004). These ulcers place patients at high risk of mortality due to septicaemia, as well as loss of limbs, extensive surgery, ongoing pain, and poor quality of life (Guy, 2012).

CLINICAL AND POLITICAL CONTEXT

Pressure ulcer prevention has been targeted by the Department of Health (DOH, 2009), the Care Quality Commission (Healthcare Improvement Scotland, 2011) and the National Patient Safety Agency (NPSA, 2010). The majority of pressure ulcers are entirely preventable through risk assessment and implementation of effective and timely pressure-relieving measures, such as repositioning immobile patients and reducing pressure from at-risk areas of the body (DOH, 2009).

The terms "zero tolerance" and "never events" have been used in connection with pressure ulceration. The NPSA (2010) have called on all health organisations to "work towards preventing [pressure ulcers] entirely" (Ousey, 2011). In the struggle against avoidable pressure ulceration, this is a call to arms for the tissue viability nurse.

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Figure 1. Dyna-Form Mercury Advance Mattress.

DYNA-FORM MERCURY ADVANCE MATTRESS

The Dyna-Form Mercury Advance Mattress is a dynamic mattress replacement system for patients at high risk of pressure ulceration (*Figure 1*). It includes modern foam technology (*Figure 2*), offering high levels of patient comfort.

This mattress system has the flexibility to be used in three different modes as required by the patient's need. It can be used without a pump as a very high risk foam product, then "stepped up" with a pump as a low pressure alternating system or a higher pressure alternating system. This model effectively moves the product from a pressure redistribution to a pressure-relieving product in two steps. Likewise, it can be "stepped down" from the higher, to Lo, to static mode as required by the improving clinical outcomes.

This process is achieved by simply adding the pump to the static unit, which allows for the rapid stepping-up as clinically required, but does not tie up scarce resources with patients who may or may not require an active surface. The pump can be added while the patient is still on the support surface, avoiding moving and handling issues. This is made possible by the unique foam within an air cell design, combined with a choice of flexible pump settings (Direct Healthcare Services, 2012).

Helpfully, the mattress can be modified as the patient's condition improves. This flexibility makes it ideal for use in a range of healthcare settings, thus reducing logistic and decontamination costs. A high maximum weight capacity (up to 254 kg) allows the product to meet the challenges of supporting heavier patients. All component parts are interchangeable and replaceable, maximising product life and reducing environmental impact.

The outer cover consists of the latest high-frequency welded, multi-stretch, vapour-permeable fabric technology, which surpasses the latest infection control policies (British Healthcare Trades Association, 2011).

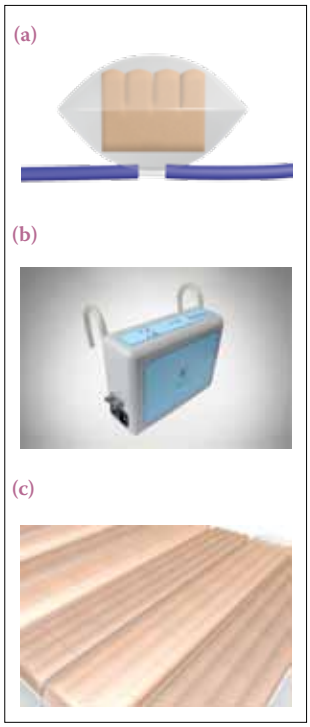

Figure 2. Dyna-Form Mercury Advance Mattress components. (a) The cells. (b) The multi-function pump. (c) Cells *in situ*.

INTELLIGENT PRESSURE CARE MANAGEMENT

Intelligent™ Pressure Care Management (Direct Healthcare Services) is an innovative new solution in the prevention and treatment of pressure ulcers. The model is a systematic implementation of the Mercury Advance hybrid (foam/alternating) surface across all care settings within any organisation. The mattress minus the pump is placed across the whole care setting and the pumps are stored locally in reserve in the ward or unit. When a patient is at risk of pressure ulceration or is admitted with pressure ulceration the staff quickly attach and switch on the pump, it then becomes an alternating system. It is a clinically proven, cost-effective, timely intervention with minimal impact on staff time or management resources.

When combined as a strategic solution, the Intelligent Pressure Care model, the Dyna-Form Mercury Advance Mattress and derivative products may be an important factor in preventing pressure ulcers.

For more than 12 months the author's Trust has been using the Intelligent Pressure Care model, a "step up, step down" strategy, to improve patient care, avoid the risk of injury during moving and handling, and reducing the cost of expensive rental products. The time saved by using the system can free up the nursing staff, so that they may attend to other clinical priorities.

CASE STUDY

A 62-year-old man was admitted from an acute hospital into a community hospital with a Category IV sacral pressure ulcer. The wound was 12 cm long, 6 cm wide, and had a central depth of 4 cm, undermining 3 cm in all directions. The wound bed consisted of 70% slough and 30% granulating tissue. The patient was receiving care from the tissue viability service as well as the ward staff.

The patient has type 2 diabetes and peripheral vascular disease and had undergone a below-the-knee amputation. His diet was good. He had been placed on a full mattress replacement on admission. A risk assessment indicated that the patient required a dynamic support surface, however he was reluctant to be nursed on an alternating pressure-relieving mattress, stating that he found them extremely uncomfortable.

He strongly insisted that he could not sleep as the bed was noisy and the motion of the mattress made him feel nauseous. He also expressed that he could not reposition himself in bed as he felt he was "disappearing into the mattress". He was extremely withdrawn and questioned how was he going to cope at home.

A care plan was discussed with the patient and his relatives. The option of using the Dyna-Form Mercury Advance Mattress was presented as part of this plan. The patient was informed that we would value his opinion concerning the comfort and other potential benefits of this support surface. He subsequently agreed to participate in the evaluation of the mattress.

Clinical outcomes

After 48 hours on the Dyna-Form Mercury Advance Mattress the patient requested to see the tissue viability nurse. Despite such a short time on the mattress, he stated that he had never had such a good night's sleep – and, in fact, had not slept well for weeks. He was able to reposition himself in bed and had, thus, regained some independence.

Within 9 days the wound size had reduced significantly (3 cm × 2 cm × 1 cm). The wound bed was now 50% slough, 50% granulating tissue.

By week 4 following implementation of the care plan and use of the Dyna-Form Mercury Advance Mattress, the wound had reduced by half again and the patient was getting out of bed with the physiotherapist to start mobilising. Eight weeks after admission, the patient's wound was 10% slough and 90% granulation tissue, requiring dressing changes every other day. At this point, he stated that he was looking forward to going home.

By week 12, the patient was discharged home. His wound measured 2 cm × 2 cm, with 100% granulating tissue. When discussing his discharge, the patient asked whether he could have a Dyna-Form Mercury Advance Mattress at home. We advised him that he could now use a standard foam mattress.

Post-Evaluation Impact

Since this evaluation, the author's Trust has purchased a number of Dyna-Form Mercury Advance Mattresses and reduced the need for full therapeutic systems, achieving excellent results on all grades of pressure damage, along with utilising the SSKIN BUNDLE programme (Reddy et al, 2006).

SUMMARY

This case study reports the positive clinical impact of the Dyna-Form Mercury Advance Mattress when used as part of a holistic approach to patient care. It was the surface of choice used to treat an older patient with type 2 diabetes and limited mobility following a below-knee amputation, who had developed a Category IV sacral pressure ulcer. Not only did the pressure ulcer respond well to the regimen, but the patient benefitted from better sleep, improved mobility, and uplift in his general mental wellbeing.

This product is the core component of the new pressure ulcer prevention and treatment strategy called Intelligent Pressure Care Management, developed by Direct Healthcare Services. The author has now been using the Advance for more than 12 months at Staffordshire and Stoke-on-Trent Partnership NHS Trust. All of the community hospitals in the this Trust use the Dyna-Form Mercury Advance Mattress and are gradually replacing static foam surfaces with the product as a result of this work.

The mattresses are kept on standby without a pump, while a smaller number of pumps are free to circulate, only linking them up to the Dyna-Form Mercury Advance Mattress as and when they are needed. This allows for rapid and, thus, cost-effective, intervention.

Intelligent Pressure Care Management allows for one product to meet the vast majority of patient needs within a wide variety of care settings, reducing the need for expensive rentals and simplifying the management of the support surface provision, training and logistics. The strategy delivers clinical performance that is capable of appropriately treating very high risk patient groups, who would not normally tolerate active systems. WUK

REFERENCES

Baxter S, Bartley A (2011) Preventing Pressure Ulcers Driver Diagram and Change Package. Healthcare Improvement Scotland/Tissue Viability Online. Available at: *http://bit.ly/139H98P* (accessed 25.02.2013)

Bennett G, Dealey C, Posnett J (2004) The cost of pressure ulcers in the UK. *Age Ageing* 33(3):230–5

British Healthcare Trades Association [BHTA] (2011) Protect Rinse and Dry. BHTA Guidance on the Care, Cleaning and Inspection of Healthcare Mattresses. BHTA, London

Department of Health (2009) *NHS 2010–2015: From Good to Great. Preventative, People-centred, Productive.* DH, London

Direct Healthcare Services Ltd (2012) Dynamic Mattress Range. Dyna-Form Mercury Advance. Caerphilly, Wales

European Pressure Ulcer Advisory Panel, National Pressure Ulcer Advisory Panel (2009) *Pressure Ulcer Treatment: Quick Reference Guide*. Available at: bit.ly/10cLro (accessed 03.02.2013)

Guy H (2012) The differences between moisture lesions and pressure ulcers. *Wound Essentials* 7(1):49–52

Moore Z, van Etten M (2011) Repositioning and pressure ulcer prevention in the seated individual. *Wounds UK* 7(3):34–40

National Patient Safety Agency (2010) *NHS to Adopt Zero Tolerance to Pressure Ulcers*. Available at: bit.ly/UmVY42 (accessed 03.02.2013)

Ousey, K (2011) Pressure ulcers: how to identify different categories. *Wound Essentials* 6(1):8–12

Phillips L, Buttery J (2009) Exploring pressure ulcer prevalence and preventative care. *Nurs Times* 105: 16 Available at: http://bit.ly/X8U2Lq (accessed on 25.02.2013)

Posnett J, Franks PJ (2007) The costs of skin breakdown and ulceration in the UK. In: Pownall M (Ed.) *Skin Breakdown: The Silent Epidemic*. Smith & Nephew Foundation, Hull: 6–12

Reddy M, Gill SS, Rochon PA (2006) Preventing pressure ulcers: a systematic review. *JAMA* 296(8):974–84

Stephen-Haynes J, Bielby A, Searle, R (2011) Putting patients first: reducing the human and economic costs of wounds. *Wounds UK* 7(3):47–55