With all of the advancements in medicine and healthcare today, pressure injuries (PIs) continue to be a global challenge. The PI rate varies across settings and countries. In the acute care setting, it is believed to be between 0 and 12 percent, and may reach as high as 53.4 percent\(^1\) in the ICU setting. Over the last few years, there have been several initiatives in all healthcare sectors to address this problem. Resources have been allocated in acute care, long-term care, and homecare to reduce the number of facility-acquired PIs. Many acute care facilities strive for and obtain a PI rate of 0 percent, but others struggle with keeping the rate below national benchmarks. This effort can be particularly difficult to facilitate with critically ill patients who have many risk factors and multiple comorbidities, such as diabetes and heart failure.

The National Pressure Ulcer Advisory Panel (NPUAP) defines a PI as:

“A localized injury to the skin and/or underlying tissue, usually over a bony prominence, as a result of pressure or pressure in combination with shear.”\(^1\)

PIs range in the amount of affected tissue from Stage 1 (least severe) to Stage 4 (most severe). The NPUAP published *Prevention and Treatment of Pressure Ulcers: Clinical Practice Guideline*\(^1\) in the fall of 2014. This Guideline reviews the literature published on PI prevention and treatment over the last five years, with the goal of rating the current evidence.

The most recent figure available regarding the costs of treating PIs is 11 billion US dollars annually.\(^1\) Included in this number is the cost associated with an increased length of stay (LOS). Individual costs may vary from as little as $500 to $70,000 per PI, depending on the severity.\(^1\) A Stage 4 PI may require multiple hospitalizations, surgical

### Flap or Graft?

Skin flaps or grafts are often used in surgical PI treatment. This process fills the tissue deficit with the patient’s own skin, or skin, muscle, and a blood supply.

A *flap* is a surgical relocation of tissue from one part of the body to another in order to reconstruct a primary defect. Flaps may be skin flaps, cutaneous flaps, or composite flaps. The flap is often cut and rotated to a neighboring site.

A *graft* is composed of epidermal tissue and varying amounts of dermis, detached from its own blood supply and placed in a new area with a new blood supply.
intervention, medications, dressings, and negative pressure wound therapy.

The Affordable Care Act places restrictions on the amount a hospital can bill for facility-acquired PI care. Since PIs are included in the adverse event category as defined by Centers for Medicare and Medicaid (CMS) and are considered a medical error, a small percentage of reimbursement to the hospital is held back from CMS. PIs are in the same category as falls, medication errors, and hospital-acquired infections. Consequently, there is growing emphasis on PI prevention and treatment.

Preventing facility-acquired PIs involves a comprehensive plan of care that includes risk identification using an accepted tool such as the Braden Scale for Predicting Pressure Sore Risk. The care plan should also include regular skin inspections and the prevention of further damage once a PI is present.

One of the latest initiatives supported by the literature regarding prevention of PIs includes an emphasis on early mobility. A comprehensive body of literature has been devoted to the beneficial effects of getting patients out of bed sooner to prevent complications such as pneumonia, deep vein thrombosis, and PIs. Included in interventions is the ability to turn and reposition as much as is tolerated by the patient. For those unable to turn completely, a turning trial very similar to a ventilator-weaning trial may be appropriate. Repositioning is imperative to prevent tissue destruction in patients who cannot be turned.

Effective therapeutic surfaces are critical for successful PI prevention and treatment. Support surfaces are defined by the NPUAP as “specialized devices for pressure redistribution designed for management of tissue loads, microclimate, and/or other therapeutic functions.” Surfaces are categorized based on their ability to redistribute the load of the patient and the ability of the support surface to off-load areas of higher pressure. Support surface characteristics that address pressure redistribution and microclimate (temperature and humidity) treat PIs most effectively. According to the NPUAP, microclimate is the local tissue temperature and moisture (relative humidity) level at the body/support surface interface.

Treatment of PIs usually includes letting the wound heal by secondary intention with advanced dressings or surgical intervention. Surgical intervention will include a split thickness skin flap or graft (See Flap or Graft? on Page 1). In the case of a flap or graft, it is the surface’s ability to remove the highest points of pressure that allows the body to heal the affected area. In this case,
the newly created surgical incision along with the flap or graft designed to repair the PI are both protected through moisture management and pressure redistribution.

One of the first surfaces used for the treatment of postoperative flaps and grafts was air-fluidized. This surface provides pressure redistribution via a fluid-like medium created by forcing air through beads, as characterized by immersion and envelopment. These surfaces can cause dehydration from very high air loss, as well as difficulty with bed mobility, egress, ingress, transfers, and independence.

An alternative to air fluidized therapy is low air loss, which provides pressure redistribution and microclimate management. Low air loss surfaces can be used for the prevention and treatment of Stages 1-4 PIs as well as Deep Tissue Injuries. They can also be used for burn patient care because of the surfaces’ ability to manage excessive moisture.

While there is some published literature on therapeutic surfaces related to flaps and grafts, it tends toward very small studies, poor follow-up, and little information on the cost-effectiveness of therapeutic mattresses.

In a comprehensive review on the subject of support surfaces for skin flaps and grafts, Woo reviewed published literature and concluded that there is insufficient evidence for the use of one surface over another; however, the cost savings with low air loss were significant.

**PREVENTION**

The choice of therapeutic surface needs to match the individual needs of the patient. Just as a high-density, high-specification foam mattress may be an appropriate choice for the prevention of a PI, a mattress with low air loss and immersion therapy may be more appropriate for patients considered high risk for PI development.

As part of the total care plan, risk factors, such as vulnerable populations (i.e. the elderly, bariatric, and surgical patients), should be identified. It is also recommended that skin assessments be performed on a regular basis (i.e., two times daily), with special attention given to examining vulnerable areas such as the coccyx and sacrum.

PI prevention plans should also include preventive skin care. Ensure that the skin is well hydrated, clean, and dry. Use of a moisture barrier and prophylactic dressings may also be included in a skin care protocol.
Just as a high-density, high-specification foam mattress may be an appropriate choice for the prevention of a PI, a mattress with low air loss and immersion therapy may be more appropriate for those patients considered high risk for PI development.

In addition, all individuals at risk of PIs or those with an existing injury require a comprehensive nutrition screening. This includes documentation of calories, protein, vitamins, minerals, and fluids.

CONCLUSION
Once the risk factors for PI development are identified and a comprehensive skin assessment is completed, a decision can be made about a therapeutic surface. The assessment will drive the care and interventions needed to prevent or treat a PI. Patients at high risk or with an existing injury will need a support surface for immersion, envelopment, and possibly clinically effective low air loss to address any microclimate issues.

References

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