

Pressure mapping: A new path to pressure-ulcer prevention

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Faced with the nursing diagnosis of Impaired skin integrity, we've all written care plans that state our goal as "redistributing or reducing pressure." But how do we do that? Which measures do we take? And how do we know that our interventions have relieved pressure? Do we rely solely on a skin assessment? A patient's self-assessment of comfort? What if the patient can't feel pressure relief because of neurologic impairment? The answers to these questions may be that nurses should use pressure mapping, a tool used by occupational and physical therapists to determine seat-interface pressures and by other healthcare professionals to perform foot assessments.

What is pressure mapping?

A pressure map is a computerized clinical tool for assessing pressure distribution. To use it, you place a thin, sensor mat on a wheelchair seat or a mattress surface. When your patient sits or lies on the mat, a computer screen displays a map of pressures, using colors, numbers, and a graphic image of the patient. Typically, the hotter colors (the reds) indicate areas of higher pressures, and the cooler colors (the blues) indicate areas of lower pressures. The display usually has several options, including a three-dimensional display of peak pressure areas and a statistical analysis. Pressure mapping does have some drawbacks, including inconsistencies in the ways manufacturers report and display the pressures, differences in measurable peak pressures among manufacturers, and sensor accuracy and drift. Still, these visual displays provide key data that can augment nursing assessment of the areas of potential tissue damage. Plus, patients can benefit from the visual feedback. When they see the pressures on the screen, they can identify areas of concern and modify their position accordingly. Soon, there may also be a key economic benefit: As of October 1, 2008, Medicare will no longer reimburse hospitals for the extra costs of treating eight preventable conditions, including pressure ulcers.

Pressure-mapping successes

Research has shown that pressure mapping is a reliable means of assessment, but more research is needed to determine its ability to predict pressure-ulcer development. Here are short summaries of recent research.

- Researchers used pressure mapping to determine if patients on continuous lateral rotation (CLRT) beds during surgery need repositioning. This small study (n=6) showed that additional repositioning of healthy patients may not be needed.
- In 2005, occupational therapists used pressure mapping to assess the wheelchair cushions of 40 patients and found that 19 of them should have been using a different seating surface.
- A 2002 study used a modeling technique with patients on seat cushions to estimate subcutaneous pressures, using pressure mapping. The results suggested that pressure mapping can be used to assess interventions that may reduce subcutaneous tissue stress.
- A 2006 study used pressure mapping to assess seated postural control in children and found the tool useful in evaluating seating stability.
- Using pressure-mapping technology, researchers found that elevating a wheelchair-bound patient's feet and reclining his wheelchair by 30 degrees reduced interface pressure and the risk of pressure-ulcer development.

Assessment and repositioning

Current guidelines on assessment and repositioning come from several sources. A report called "Best Practice Recommendations for the Prevention and Treatment of Pressure Ulcers: Update 2006" says that pressure should be assessed on all surfaces a patient comes in contact with and notes that computerized pressure mapping is one way to assess those surfaces.

Other guidelines on pressure reduction come from the National Collaborating Centre for Nursing and Supportive Care in the United Kingdom.

These guidelines recommend assessing a patient's support surfaces and positioning needs on a regular basis. One key point in several guidelines is that patients need repositioning, regardless of the bed or seating surface. No bed or seating surface replaces repositioning.

The Wound, Ostomy, and Continence Nurses Society guidelines recommend scheduling regular and frequent turning and repositioning for bed- and chair-bound patients. These guidelines say that chair-bound patients should be repositioned every hour, if they can't reposition themselves.

Patients who have sacral or ischial pressure ulcers should have limited sitting time. Using pressure mapping

For now, universal, evidence-based guidelines for pressure mapping don't exist. More research on and experience with pressure mapping is needed. But you should be aware of typical manufacturer's recommendations, which the pressure-mapping clinician will follow.

Be prepared for a session that may take 30 minutes or more. A 2005 study found that interface pressures in wheelchair users continued to fluctuate for up to 8 minutes after the patients were seated. So obtaining good pressure readings may take some time.

Before the procedure, tell the patient how long the pressure-activity level as well as his bed or wheelchair surface. For example, if the results of the session indicate that a new cushion must be ordered, the patient may be confined to bed while waiting for it.

Benefits of mapping

Pressure mapping can provide you with valuable, visual information that augments your assessment of the patient's skin and the potential for skin

breakdown. This information can help you prevent pressure ulcers, one of the eight preventable conditions, thus potentially saving money for your institution and sparing your patient from the complications of pressure ulcers.

Selected references

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www.pressuremapping.com. Accessed September 18, 2007

For a complete list of selected references, visit www.AmericanNurseToday.com.mapping session will take. Explain that he will be able to view the results on a computer screen. During the procedure, you may be asked to help the pressure-mapping clinician with the necessary positioning. Be sure to explain the test and the results to your patient. After the session, follow up by answering any patient questions and carefully documenting the session.

Information from a pressure-mapping session may lead to immediate changes in the patient's