Dear Readers:

One of the best ways to manage pressure ulcers (PU) across the continuum of care is to prevent them. Interventions that work include repositioning at least every 4 hours, when combined with an appropriate pressure redistribution surface, optimizing support surfaces and nutritional status, and moisturizing at-risk skin sites. Pressure redistribution is integral to any approach for preventing PU development. In an effort to clarify which support surfaces are effective, Cochrane reviews have reported “high-specification foam” as more effective than a standard hospital mattress in preventing PU. Comparative benefits of individual support surfaces remain to be clarified, as does the operational definition of “high specification foam” so that professionals can recognize and use effective support surfaces to prevent PU. Gradually, randomized controlled trial (RCT) evidence is adding to our knowledge of what does and does not work. Below are reviews of two studies that may help you to better navigate the maze of PU prevention.

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Heel PU Prevention


Rationale: The heel is the second most common site for a PU and the incidence of heel PU may be increasing. Heel PU are especially prevalent post-operatively or in recumbent patients.

Objective: A meta-analysis investigated effectiveness of preventative interventions in reducing the incidence of heel PU in various settings.

Methods: MEDLINE, CINAHL, PubMed, EMBASE, and Cochrane databases were searched for English language controlled studies of heel PU preventative interventions published from January 1980 through May 2005. Two reviewers reviewed each abstract independently and the entire research team made the final decision for inclusion in the meta-analysis. Included prospective studies were critically reviewed and rated for quality on the Jadad 0–5-point scale for methodology and the PEDro 10-point scale, which includes integrity of randomization, blinding, analysis, and validity of outcome measures. Intervention type, population, study design, and measurement of heel PU prevention outcome(s) were included in the meta-analysis.

Results: Fourteen studies qualified for the meta-analysis of the 105 unique studies selected for full review. Combined analysis indicated that speciality air or foam mattresses or overlays reduced the relative risk of developing a heel ulcer by 50% compared to using a standard hospital mattress (P = 0.03). When interventions were analyzed singly, only the foam mattresses had sufficient evidence of efficacy in preventing heel PU development. Variability in the air mattress study results in addition to the fact that most overlays were compared with other overlays instead of a standard hospital mattress control obscured these results.

Authors’ Conclusions: Evidence supports use of “certain air or foam mattresses/overlays” in preventing heel PU compared to standard hospital mattresses. There is insufficient evidence to support similar efficacy of heel protective devices at this time. Low methodologic study quality and sample sizes as well as difficulties with blinding dictate caution when interpreting these results.

Preventing PU With a Specialized Mattress


Rationale: PU are a common complication of bed rest. An effective, low-cost pressure-relieving mattress would be of clinical and economic value.
Objective: Determine effectiveness of a foamy block (Kliniplot®) interface pressure-reducing mattress in preventing PU.

Methods: A prospective, single-blind RCT studied 1729 consecutive patients free of PU admitted to medical and surgical departments of a Belgian hospital from October 1997 through April 1998 for at least 24 hours for neurology, cardiology, oncology, hematology, neurosurgery (excluding herniated discs), thoracic surgery, or orthopedic surgery. Patients were randomly assigned in a 1:2 ratio to the foamy block mattress (n = 657) or standard mattress in their hospital room (n = 1072). Operating room support surfaces are not described. Patient PU risk was measured on admission and discharge using the Ek score (1 = no mobility to 4 = complete mobility). Outcomes measured were incidence, days to develop, number, grade and location of PU that developed during the hospital stay. Patients who developed a PU remained on the same mattress and the PU was dressed with DuoDERM* (Modified Shea Grade 1 or 2) or gauze (Grade 3 or 4). At least 1600 patients were needed for an expected reduction of PU from 4% to 2% to be significant at $\alpha = 0.05$ and $\beta = 0.80$ (80% power).

Results: The two groups were similar in PU risk on admission and during hospitalization—42 (6.3%) of the foamy block mattress group were at high risk (no mobility) and 47 (4.3%) of the standard mattress group. Overall incidence of new PU was 2.4% with no difference in percent of patients developing a PU ($P = 0.154$) on the foamy block mattress (3.2%) or the standard mattress (1.9%). PU developed a median of 13 days later ($P < 0.001$) for patients on the foamy block mattress (31 days) compared to those on the standard mattress (18 days). Most PU that developed were Grade 2 and located on the sacrum with no significant difference in PU site or PU grade developed in the two groups.

Authors’ Conclusions: The foamy block mattress delayed the onset but did not prevent PU. Higher cost of the single-use foamy block mattress was not justified in preventing PU. Limitations include potential bias due to non-blinded assignment and data collection.

Clinical Perspective

What is the bottom line for foam mattresses? Nicosia et al reported them effective in preventing heel PU. Berthe et al, in an apparently large study, seem to suggest that specialized foam mattresses do not work to prevent PU, but can delay their onset. A closer look at the Berthe et al study raises interesting questions. Most patients who developed a PU were in the “No Mobility” group. This reaffirms that immobility is valid as a PU risk factor. However, less than 30% of the patients Berthe’s group studied had
limited mobility, so few qualified as needing a support surface for PU prevention. Focusing support surface use on higher risk patients is a valuable strategy. Also, the results might have been clearer if intraoperative PU risk had been controlled or analyzed as a covariate. An economic analysis might further clarify whether the foamy block mattress saved money by reducing the added costs of the extra PU treatment days experienced by the standard mattress group.

Many studies have clouded efficacy results by isolating PU prevention modalities as independent variables with little control of important concomitant variables that add variability to data. Such variables include intraoperative procedures including avoiding heating of mattress overlays in the operating room, seating position in spinal cord injury patients, repositioning schedules, and protective wound dressing use. Protocols should control such variables or plan covariate analyses to clarify effects of each support surface. A better question might be, “Within a standardized protocol of care addressing key patient PU risk factors such as nutrition, sedation, seating, repositioning, intraoperative procedures, and protective wound dressings, which provides the best clinical and economic outcomes for preventing PU: pressure redistribution surface A or B?” Clarifying our questions will help clarify our knowledge.

References