Support Surfaces

Boots

Call E, Young DL, Chakravarthy D. A comparative laboratory test between pressure-relief boots to determine duration of effective off-loading. Presented at the Clinical Symposium on Advances in Skin & Wound Care; Las Vegas, NV; September 2014. (Ask your Medline representative for a copy of this poster, LIT010WC)

Heel pressure ulcers (PU) represent 20-30% of all PU's, and the NPUAP and EPUAP in their PU prevention recommendations have said that completely offloading the heel may be the best method for prevention of heel PU's. In this study, the duration of effective off-loading of two, commercially available, pressure-relief boots was compared in a controlled laboratory setting. Six samples of Product A (Heel Raiser Pro) and three samples of Product B (Foot WAFFLE Heel Elevator) were applied on a mannequin calf and foot at size and weight corresponding to the 50th percentile for an adult male. The distance from a plywood base to the tip of the second toe was measured with a caliper daily. Product A and Product B had an average daily loss of 0.37±0.11mm and 0.96±0.41mm, respectively, which corresponds to an estimated useful life of 52 days and 7 days, respectively. Product A had the greater average starting height, the better average height loss per day and the longest estimated duration of effective off-loading of the test boots.

Chakravarthy D, Drey M, Falconio-West M. A Comparative Study on the Average Humidity and Time to Humidity Equilibrium between two heel Off-loading Boots. Presented at the Symposium on Advanced Wound Care, Spring; Orlando, FL; April 2014. (Ask your Medline representative for a copy of this poster, LIT346R)

Pressure ulcer prevention devices, such as pressure redistribution boots, reduce the risk of pressure ulcer development by reducing friction, shear, and pressure to at-risk tissues. The type of microclimate between the contact tissue and the construction material of the boot may alter the boot function. High humidity trapped in the material of the boot can make skin more susceptible to breakdown. The study presents comparative data on the humidity and time to humidity equilibrium in two different heel off- loading boots (Boot A: Heel Raiser, Medline Industries, Inc., Boot B: WAFFLE Heel Elevator, EHOB, Inc.). Heat and vapor were applied at a constant rate to the surfaces of the boots using an indenter that mimics a heel at body temperature that releases perspiration. On average, Boot B retained 23% more humidity than Boot A. Boot A also took significantly longer to achieve its maximum humidity, allowing it to stay more comfortable for the patient for a longer time.

Falconio-West M, McEneaney P, Turturro MV, Rotolo L, Drower E, Drey M, Oberbroeckling C. The Design Element in a Heal Off-Loading Boot that Limits Plantar Flexion: Are Straps Important? A Comparative Biomedical Study. Presented at the Symposium on Advanced Wound Care, Spring; Denver, CO; May 2013. (Ask your Medline representative for a copy of this poster, LIT1056))]

The purpose of the study was to evaluate and compare the supportive strength of two on-market heel protector boots. The (CSB) Heelmedix Heel Protector or non-customizable strap boot (NCSB) and Prevalon Heel Protector. The boots were evaluated in terms of supportive strength in resisting plantar flexion. The CSB

showed twice the supportive strength as NCSB. The heel off-loading CSB was better able to resist plantar flexion forces and on average required 40% more pressure to achieve a 10 degree plantar flexion than the NCSB. The strapping on the CSB prevented plantar flexion beyond 40 degrees under all force conditions.

Mattresses

Paul G, Swerdloff M, Wendelken M, Schoener N, Smith T, Alvarez O. Assessment of Static (Group 1) and Dynamic (Group 2) Alternating Air and Low Air Loss Mattresses Using a Matrix Based Tactile Surface Sensor Allowing for Spot Pressure Analysis. Presented at the Symposium on Advanced Wound Care, Spring; San Antonio, TX; May 2015.

The goal of this study was to assess the pressure relieving properties of 3 different pressure relieving mattress replacements used for the prevention and treatment of pressure ulcers. The 3 mattresses selected feature the following pressure relief technologies: 1) A self-adjusting low air loss and alternating pressure system (α Synergy Air Elite); 2) A micro-low alternating air loss system (β Salute DX); and 3) A foam air cell mattress system that can be converted from a static (group 1) to a dynamic (group 2)support surface (γ Equalizeaire 12000). Pressure mapping was performed using 3 weight categories (125lb, 180lb, 240lb) and at 3 head of bed elevations (HOB 0°, 30°, 45°). At 0° HOB in each weight category, all 3 support surfaces had similar scans demonstrating equivalent pressure redistribution. At 30°HOB, the pressure distribution in the 240lb subject was significantly better with both the foam air cell and the self-adjusting low air loss mattresses than the micro-low alternating air mattress. Compared to the self-adjusting low air loss and the micro-low alternating air mattresses, pressure distribution was greater in Equalizeaire 12000 at HOB 45° in both the 180lb and 240lb subjects.

Chakravarthy D, Oberbroeckling C, Falconio-West M, Reyna R. Pressure Mapping of Neonatal and Pediatric Pressure Redistribution Surfaces. Presented at the Symposium on Advanced Wound Care, Fall; Las Vegas, NV; September 2013. (Ask your Medline representative for a copy of this poster, LIT1030R)

The objective was to evaluate the pressure redistribution of three support surfaces on neonatal and pediatric patients at high risk for developing pressure ulcers. Using X3 Pressure Mapping System, pressure mapping was done on 15 pressure ulcer free patients, 11 of which were patients in the Neonatal Intensive Care Unit. The convenience sample included premature infants, surgical patients- open chest, vented, paralyzed, sedated, and ready to be discharged. A high-resiliency multi-layered pressure redistribution foam surface (HRM) and a visco elastic multi-layered pressure redistribution foam surface (VEM) were tested. On average, the HRM surface showed a statistically significant 22% reduction in the surface pressures ($p = 0.022$), and the VEM surface performed even better resulting in a statistically significant 30% average reduction in surface pressure. The HRM reduced peak pressures an average of 20% compared to the original foam ($p = 0.15$), and the VEM statistically significantly reduced peak pressures an average of 35% compared to the original foam surface ($p = 0.024$)

Miller S, Parker M, Blasiole N, Beinlich N, Fulton J. A prospective, in vivo evaluation of two pressure-redistribution surfaces in healthy volunteers using pressure mapping as a quality control instrument. Ostomy Wound Management. 2013; 59(2): 44-8.

Clinical Evidence Surrounding Skin Health

Abstract: http://www.ncbi.nlm.nih.gov/pubmed/23388397
Purpose: A sensing mat was placed between five healthy adult employee volunteers and the test surface to determine the number of high pressure points.
Conclusion: On the OR table pad, zero to six sensors registered >90 mm Hg compared to two to 20 sensors on the electrophysiology lab surface. These data, combined with the acquired DTI, initiated a change in EP lab surfaces.

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