

Confirming Effective Off-Loading and Repositioning Using Continuous Bedside Pressure Mapping[†]

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Purpose/Problem

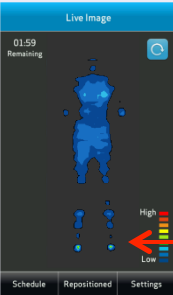
National Pressure Ulcer Advisory Panel Guidelines recommend repositioning patients to reduce the magnitude and duration of pressure over vulnerable areas of the body and repositioning in such a way that pressure is relieved or redistributed.¹ Techniques such as the 30° side-lying position are recommended, but ultimately each individual patient's condition needs to be considered when assessing for effective positioning and off-loading of pressure.¹ Currently, caregivers have no real-time, bedside assessment tool to see if their repositioning and off-loading for each patient is effective.

Methods



A continuous bedside pressure mapping (CBPM) system was utilized to assess various off-loading and repositioning scenarios to determine if its use could enhance individual off-loading and repositioning techniques at the bedside.

Scenarios of heel off-loading, side-lying positioning, head of bed elevation, and detecting objects under a 32-year-old woman, 5'11" tall, weighing 145 pounds were observed utilizing the CBPM with a standard foam hospital mattress and an air mattress. Peak pressures and images were recorded as positioning was completed both without and with the visual image from the CBPM system's monitor. The scale for the pressure mapping device remained constant during the study. Red areas on the pressure map indicate pressures ≥ 75 mmHg.



Heel Off-Loading



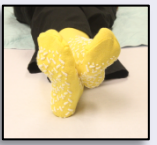
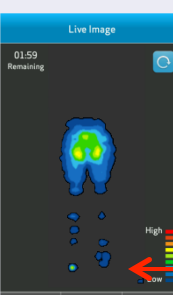
Heels NOT off-loaded
Peak pressure 54 mmHg

Heels off-loaded with pillow
Zero pressure on heels





Legs crossed,
Peak pressure 100 mmHg

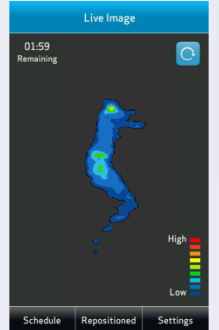



Heel boot on left heel, not on right;
Peak pressure 68 mmHg on right

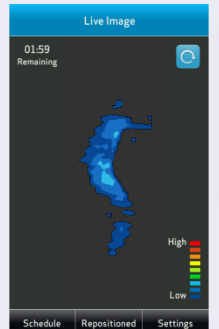
Side-Lying Repositioning



Turn monitor around to use for repositioning and to have patients monitor their pressure and positioning

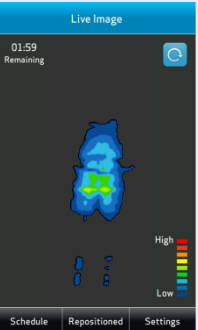


Side-lying without looking at the CBPM; Peak Pressure 58 mmHg




Side-lying looking at CBPM; Peak Pressure 35 mmHg

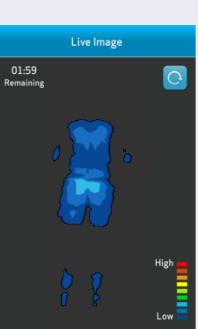
Head of Bed Elevation on Foam Mattress



Elevation 60°
Peak pressure 56 mmHg




Elevation 30°
Peak pressure 44 mmHg

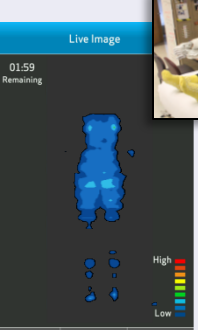


Elevation 10°
Peak pressure 37 mmHg

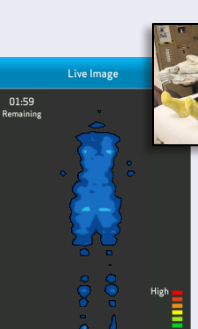
Head of Bed Elevation on Air Mattress



Elevation 60°
Peak pressure 43 mmHg

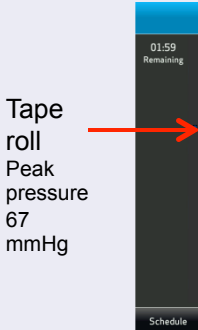


Elevation 30°
Peak pressure 39 mmHg

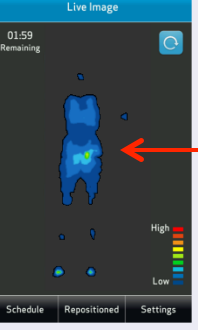


Elevation 10°
Peak pressure 35 mmHg

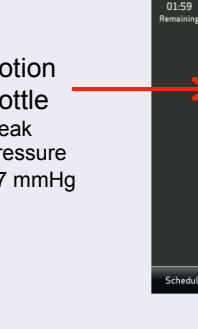
Detecting Objects Under Patients



Tape roll
Peak pressure 67 mmHg



Cell Phone
Peak pressure 59 mmHg



Lotion bottle
Peak pressure 67 mmHg

Outcomes

With the use of the CBPM system, lower peak pressures and lower overall pressures were observed. Effective heel off-loading can be easily and quickly monitored without having to disrupt the patient, or remove blankets, with the use of the CBPM system. Objects that can cause high pressures beneath patients, like cell phones and tape rolls, are easily identified on the CBPM monitor. These results were consistent on both the standard foam mattress and the air mattress.

Conclusions

CBPM provides real-time monitoring to confirm effective off-loading and repositioning on both foam and air mattresses. CBPM provides monitoring that could alert caregivers to situations that could put patients at high risk for pressure damage to their skin.^{2,3}

References

1. European Pressure Ulcer Advisory Panel and National Pressure Ulcer Advisory Panel. Prevention and treatment of pressure ulcers: quick reference guide. Washington DC: National Pressure Ulcer Advisory Panel; 2009.
2. Siddiqui A, Behrendt R, LaFleur M, Craft S. A Continuous Bedside Pressure Mapping System for Prevention of Pressure Ulcer Development in the ICU: A Retrospective Analysis. *WOUNDS*. 2013;25(12).
3. Behrendt R, et al. Continuous Bedside Pressure Mapping and Rates of Hospital-Associated Pressure Ulcers in a Medical Intensive Care Unit. *Am J Crit Care* 2014;23:127-133.

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