

**Leave the Pressure to Us**  
(MSN EBP Poster, Spring 2023)

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I. Introduction

- A. 2.5 million patients suffer from pressure injuries (PI) yearly in the US
- B. Estimated \$9-\$11 billion annually PI cost the US healthcare system
- C. US institutions spend \$20k-\$150k to treat patients with PI
- D. PIs result in costly secondary complications
  - 1. Infections
- E. CMS (Centers for Medicare & Medicaid Services)
  - 1. Determine reimbursement for PIs for healthcare facilities per quality-of care metrics
- F. If PI obtained within facility, facility is not reimbursed for costs of treatment
- G. Hypothesis-Determine if the primary cause of hospital-acquired sacral region PIs if from sustained vascular compression, leading to ischemia-reperfusion with patient repositioning

II. Purpose- “The purpose of this study was to determine the effectiveness of a novel, noninvasive perfusion enhancement system versus beds with integrated alternating pressure capabilities for the prevention of hospital-acquired sacral region (sacral, coccygeal, and ischium) pressure injuries in a high-risk, acute care patient population.”

III. Method2

- A. Inclusion criteria Braden Scale score of 16 or less
- B. Exclusion criteria
  - 1. Preexisting sacral region PI
  - 2. Pregnancy
  - 3. <18 years of age
  - 4. Incarcerated during data collection
  - 5. Unstable spine or pelvic injuries
  - 6. Recent surgical skin graft to the sacral area
  - 7. Body weight >400lb
  - 8. Active admitting dx of psychiatric condition
- C. Experimental and control groups
  - 1. Divided into different sized “blocks” or groups of 2,4, or 6 people to be in either experimental or the control group
  - 2. Fischer’s exact probability test used to compare group differences

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3. Completed during patients hospital stay
  4. Head-to-toe assessment focus on skin assessment skin abnormalities
- D. Units
1. 300-bed acute care community teaching hospital in northeastern US
  2. Medical/Surgical Intensive Care (30 bed)
  3. Progressive Care (30 bed)
- E. Study Device
1. 3-dimensional shape envelops and conforms to the sacral region
  2. A computer-controlled air pump (controller) multichannel inflatable perfusion enhancing support surface (enhancer)
  3. Subjects skin does not come in direct contact with any part of the perfusion enhancement system at any time
- F. Standard of care
1. Both groups received standards of care for PI prevention according to hospital protocols, policies, and guidelines.
    - a) Repositioned Q2hrs
    - b) Incontinence care
    - c) Given aggressive nutritional management (if indicated)
- G. Staff Education
1. 206 RNs 56 PCTs educated
  2. 24/7 trial support phone number
  3. Team leader on each nursing unit to facilitate communications between clinical staff and clinical research team members
  4. In-service education sessions
    - a) PIs Patient safety
    - b) The trial process
    - c) Trial procedures
    - d) Perfusion enhancement system
    - e) Setup system operation
    - f) Trial monitoring
- H. Results
1. Theory shows focus on minimizing vascular compression rather than pressure redistribution

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2. 399 completed the trial
  - a) 186 patients in the experimental group
  - b) 213 patients in the control group
    - (1) Similar in age, Braden Scale score, and BMI
    - (2) Patients aged from 24-100 years old
3. Discharge Dx for Trial Patients
  - a) Sepsis (71 patients, 17.8%)
  - b) Respiratory failure (36 patients, 9%)
  - c) Septic shock (32 patients 8%)
  - d) Stroke (31 patients 7.8%)
    - (1) No statistical differences between discharge diagnoses in the experimental and control groups
4. Follow-up Surveys
  - a) Hospital Clinical Staff
    - (1) Responded to 10 items ranked the perfusion enhancement system with a scale of 1 (being the worst) to 6 (being the best)
      - (a) Experience with the perfusion enhancement system
      - (b) Patients' reaction to the perfusion enhancement system
      - (c) How well the perfusion enhancement system integrated into the clinical workflow
    - (2) 52 responses, weighted score 4.99 out of 6
  - b) Patients
    - (1) 3 Questions with a scale of 1 (being the worst) to 6 (being the best)
      - (a) Comfort on the system
      - (b) Noise level
      - (c) Whether they would want to have the system deployed to them again if they were readmitted

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(2) 18 responses, weighted score 5.21 out of 6

I. Conclusion

1. The perfusion enhancement system used in supplement to alternating pressure beds is shown to be more effective than pressure beds alone.
2. Patients who used the noninvasive system were 5.04 times less likely to develop a sacral region PI
3. Device may prevent sustained vascular compression of critical duration to avoid ischemia-reperfusion and injury
4. These results may increase our understanding of the pathophysiology of PIs along with previously unknown systemic effects impacting the recovery of mobility-impaired patients. Future research is needed.

Reference

Bharucha, J. B., Seaman, L., Powers, M., Kelly, E., Seaman, R., Forcier, L., McGinnis, J., Nodiff, I., Pawlak, B., Snyder, S., Nodiff, S., Patel, R., Squitieri, R., & Wang, L. (2018). A prospective randomized clinical trial of a novel, noninvasive perfusion enhancement system for the Prevention of Hospital-acquired sacral pressure injuries. *Journal of Wound, Ostomy & Continence Nursing*, 45(4), 310–318.  
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