Trial of Heel Pressure Relieving Device Proves Efficacious in Long Term Care Facility:

Leads to Process Improvement Across Continuum of Care

Harriett B. Loehne, PT, DPT, CWS, FCCWS, Clinical Educator, Archbold Center for Wound Management, Archbold Medical Center, Thomasville, Georgia

Background & Overview

Heel ulcers account for 30.3% of total pressure ulcers and are the second most common site for skin breakdown.[1] Increased lengths of stay, inconvenience, and higher medical costs make complex heel pressure ulcers one of the most costly health complications in the elderly. Costs to treat pressure ulcers range from $2,000 to $30,000 and can be as high as $70,000 for a complex full-thickness pressure ulcer.[2] The annual cost of treating facility-acquired pressure ulcers ranges from $46 million to $3.6 billion in the US.[3-6]

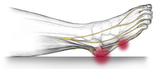
Estimated Costs For Heel Ulcers In Nursing Home Patients

Ulcer Stage	Estimated healing (days)	Total cost in supplies	Potential costs in the US*
I	3	$0	0
II	83	$444	$179 million
III & IV	143	$765	$46 million

* US nursing home population = 1.6 million.[4] Reported prevalence rates for pressure ulcers in long-term care range up to 29%.[3] This cost estimate is based on the observation that 97% of heel ulcers in the long-term care setting are stage II ulcers.[3]

Most heel pressure ulcers can be prevented and are often viewed as quality-of-care indicators. Risk identification and assessment of comorbidities combined with an effective heel pressure ulcer prevention protocol and early, aggressive implementation of pressure-relieving devices can reduce the incidence of heel pressure ulcers.[7,8] The results are decreased care costs and F-tag fines, and improved patient outcomes and quality of care.

The most common risk factor for pressure ulcer development is impaired mobility. Patients who are completely immobile and unable to reposition their lower extremities should have a care plan that includes totally relieving pressure on the heels.[1,7,9]



Because of its small surface area and high interface pressure, the heel is one of the most difficult anatomical areas to be addressed by preventive products. Support surfaces, including special beds, mattresses, and overlays, do not provide complete pressure relief in the heel region.[9,10] Common methods of floating the heels off the bed, such as through the use of pillows or foam block, have had limited success in the prevention and control of heel ulcers.[11,12]

Purpose

In a recent study[13] to compare and evaluate products for the prevention of heel pressure ulcers, a new pressure-relieving heel protector boot received significantly higher scores from critical care nurses on the following evaluation criteria:

- comfortable interior
- not too warm
- no hard, sharp, or rough edges
- protects heels from pressure, friction, and sheer
- compatibility with DVT prevention compression devices
- floats the heel for total pressure relief

Archbold Medical Center is a 746-bed system that includes 5 acute care hospitals, an inpatient rehabilitation unit, a psychiatric hospital, 4 swing bed facilities, 4 nursing homes, 2 hospice groups, 2 home health agencies, and an urgent care facility. To prevent and treat heel pressure ulcers, multiple pressure relieving devices had been used with little success. We sought to evaluate the effectiveness of this new pressure-relieving heel protector in preventing and treating heel pressure ulcers in the IMCU (Intermediate Care Unit) of the our flagship hospital and in one nursing home. Our goal was to implement one device that was efficacious, durable, and could be used across the continuum of care.

Methods

All patients were assessed on admission for risk of pressure ulcers. Patients scoring 18 or below on the Braden scale were automatically placed on the intervention protocol which called for implementation of the new pressure-relieving heel protector boot to suspend heel(s). Two patients from the IMCU and six from the nursing home were included in the study - both heels were treated in all cases, for a total of 16 devices.

Inclusion criteria:

- patient/resident 18 or below on the Braden scale
- inability to move legs
- hip fracture
- hip surgery
- decreased sensation or numbness in the legs

Outcome criteria:

- suspension of the heel off bed
- prevention of pressure ulcers on the Achilles, malleoli, heel, and foot
- device durability of at least 2 months with constant use
- comfort of the patient

- Visual assessment of patients was performed every day for 10 weeks.
- Integumentary evaluation was performed with visual inspection every shift.
- Each heel was checked to see if it was floating (suspended), the skin was checked for redness (stage 1 pressure ulcer) on the foot and Achilles, and the device was checked to see if there was perspiration inside.
- The patient's/resident's most recent weight, prealbumin, and stage of any ulcer present was noted daily.
- Validation of efficacy required 4 successful outcomes in the IMCU and 12 successful outcomes in the nursing home.

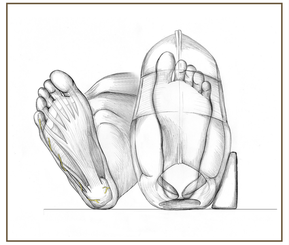
Results

Complete prevention of heel pressure ulcers

- No new pressure ulcers developed during the 10-week intervention period.

Effective healing of existing heel pressure ulcers

- One patient with multiple pressure ulcers at initiation of the trial (from friction and shear due to thrashing in bed) had complete closure of wounds.
- One patient with Stage IV heel ulcers demonstrated progress toward healing, with ultimate complete closure of wounds.



Device efficacy and durability

- The pressure-relieving heel protector device was found to be efficacious in the sitting position (important for residents in nursing homes) and in bed.
- Although the device was marketed for critical care and short term use, we liked the design and hoped to find that it would be durable enough for long term care. While the manufacturer recommends wiping clean with a disposable cloth, and advises against using an industrial washer and dryer, they recommend if such is utilized, to use a gentle cycle with the device in a linen bag and allow to air dry. We used a non-commercial washer and dryer until device was damp, and found that the boot held up well even at 10 weeks.
- Efficacy was demonstrated with documentation of the 4 successful IMCU outcomes and 12 successful nursing home outcomes.

Conclusions

A pressure ulcer prevention protocol that incorporates accurate evaluation of risk factors and early implementation of effective pressure-relieving devices with frequent assessment of heel skin integrity is effective in reducing the incidence of heel pressure ulcers.

The positive outcomes of this study are attributed to the use of the new pressure-relieving heel protector boot, which is also featured in a positive outcome experience recently published by Walsh and Plonczynski in the March-April JWOCN.[13]

The findings of this study demonstrate that the new pressure-relieving heel protector boot:

- **is effective in the prevention and treatment of heel pressure ulcers**
  - The researchers concluded that the new pressure-relieving heel protector device not only significantly reduces the risk of developing heel pressure ulcers in a high risk population for whom pillows placed lengthwise under lower legs with heels suspended is not effective, but also is efficacious in treating existing heel pressure ulcers.
- **was well-received by staff and patients**
  - Staff readily accepted the use of the pressure-relieving heel protector because of its ease of use, ability to fit most patients, durability and patient comfort.
  - Patients were able to wear the boot in a sitting position.
- **is now being used in all of our facilities**
  - Based on the success of this 2-month trial, all of the Archbold Medical Center facilities have converted to using the pressure-relieving heel protector boot.
  - The impact for Archbold is the standardization of a system-wide protocol that prevents heel ulcers in high risk patient populations and substantial cost savings in treating heel pressure ulcers.

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