

Evidence Summary: Pressure Injuries: Preventing heel pressure injuries with prophylactic dressings

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CLINICAL QUESTION

What is the best available evidence on prophylactic dressings to prevent pressure injuries (PIs) of the heel?

SUMMARY

Heels are a common anatomical location in which PIs occur. Due to their small surface area and minimal tissue protection over the bony prominence, interface pressure at the heel is high when an individual is lying in bed, particularly when that individual has reduced mobility¹ (Level 3.c evidence). There is evidence to indicate that suspending the heels using a foam cushion block² or heel suspension boots²⁻⁴ reduces the incidence of heel PIs (Level 1.c evidence).

CLINICAL PRACTICE RECOMMENDATIONS

- Apply a prophylactic dressing to the heels to prevent heels PIs in individuals with limited mobility, particularly those in critical care or undergoing surgery. (Grade B)
- Consider selecting a multi-layer polyurethane foam dressing with a silicone border for preventing heel PIs due to its construction qualities. (Grade B)

Considerations when using prophylactic dressings on the heels

The following recommended practices should be considered when using prophylactic dressings:

- Inspect skin underneath the prophylactic dressing at least daily.² Some prophylactic dressings are designed to be easily removed and reapplied to facilitate skin inspection without causing medical adhesive related skin injury^{2, 11} (Level 5).
- Prophylactic dressings with multiple layers may be more effective in reducing the impact of pressure, shear and friction forces on the skin¹¹⁻¹⁴ (Levels 1 and 5).

- Consider the effect of a prophylactic dressing on skin microclimate.¹⁵ Ability to absorb moisture is thought to contribute to the efficacy of a prophylactic dressing^{7, 16, 17} (Level 5).
- Consider applying a net stocking or over the prophylactic dressing to protect the dressing.^{3, 5, 7, 9} (Levels 1, 3 and 4).
- Apply the prophylactic dressing to clean, dry skin.¹⁸ (Level 5)
- Continue to use a pressure redistribution support surface and elevate the heels in conjunction with a prophylactic dressing² (Level 5).
- Using a prophylactic dressing on the heels is likely to be cost-effective.^{5, 19} (Level 1)

BACKGROUND

The heel is an anatomical location that experiences a high incidence of PIs due to its small surface area and low amount of subcutaneous tissue over the bony prominence.^{2,3} The heel is afforded minimal protection from tissue while sustaining high levels of interface pressure,¹ particularly when the individual is in supine position. During both intended and unintended movement in a bed, the heel is susceptible to friction and shear, further increasing the risk of PI development. Large prevalence studies have identified that the heels closely follow the sacrum as the second most common anatomical location for PIs.^{4, 5} Individuals with reduced mobility, particularly individuals who are sedated, are at the highest risk of heel PIs.^{2, 6}

EVIDENCE

Prophylactic dressings to prevent heel pressure injuries

Applying preventive dressings to the heel appears to relieve shear and friction forces. There is evidence that a prophylactic dressing applied to the heels is effective in reducing the incidence of heel PIs in immobile individuals in critical care^{7,8} (Levels 1 and 2) or long term care^{3, 5, 9} (Levels 1, 3 and 4).

SOURCES OF EVIDENCE				
Level 1	Level 2	Level 3	Level 4	Level 5
Experimental studies	Quasi-experimental	Observational – analytic design	Observational – descriptive	Bench research Expert consensus
1 meta –analysis ¹³ 3 RCTs ^{5,7,19}	2 prospectively controlled studies ^{8,10}	2 cohort studies with control group ^{1,3}	1 prevalence study ⁴ 1 case series ⁹	1 laboratory research ¹¹ 1 <i>in-vitro</i> study ¹⁷ 2 <i>in-vivo</i> studies ^{12,14} Expert consensus ^{2, 16,18}

Evidence for effectiveness of different types of prophylactic dressings is reported below.

Polyurethane foam dressings

Application of a multi-layer polyurethane foam dressing with a silicone border to volunteers with healthy skin decreased the interface pressure between the heel and a standard viscoelastic hospital mattress.¹ (Level 3).

A multi-layer polyurethane foam dressing with a silicone border applied to the heels appears to be effective in reducing incidence of heel PIs in the intensive care unit (ICU). A comprehensive protocol that included regular skin assessment, the prophylactic dressing and a pressure redistribution support surface decreased incidence of heel PIs by about 9% compared with no prophylactic dressing (3.1% versus 12.5%, $p=0.002$). When combined with a sacral prophylactic dressing, the number needed to treat to prevent one PI was ten⁷ (Level 1).

A multi-layer foam hydrocellular prophylactic dressing also showed good effect in a long term care setting when compared to simple protective bandaging (3% versus 44%, relative risk [RR] 13.42, 95% confidence interval [CI] 3.31 to 54.3)⁵ (Level 1).

A hydropolymer foam dressing applied to the heels of individuals undergoing surgical procedures anticipated to take longer than 90 minutes ($n=117$) was associated with a significantly lower rate of heel PIs (8.5% versus 36.5%, p =not reported) compared with individuals who had shorter surgery duration and received no preventive dressing ($n=23$). Selective use of other preventive interventions may have influenced the results¹⁰ (Level 2).

Polyurethane film

A polyurethane film has also been trialled for preventing PIs for individuals in critical care. After a mean hospital stay of 24 days, fewer heels that received a prophylactic film dressing had a PI (6% versus 18%, $p<0.001$). The mean time to experience a PI for heels treated with the prophylactic polyurethane film dressing was 19.2 days (95% CI 17.3 to 21). Concurrent management strategies were not clearly reported⁸ (Level 2).

Protective bandaging

Use of gauze pads and wraps bandaged around the heel and ankle was not as effective as a multi-layer foam hydrocellular prophylactic dressing in long term care settings. Over 40% of individuals treated with a protective bandage experience a heel PI, compared to only 3% who received the prophylactic dressing (RR 13.42, 95% CI 3.31 to 54.3). An economic analysis showed an overall higher financial cost associated with bandaging, when considering material costs and labour⁵ (Level 1).

Heel pads

Silicone heel pads designed to fit over the heel and held in place with tubular bandages appear to have some impact on reducing damage to subcutaneous heel tissue, potentially preventing development of heel PIs. Two reports on the intervention indicated positive findings for dermal water content at the heel, assessed using deep ultrasound for older adults who wore the device for one month. The impact on heel PI incidence was not reported^{3, 9} (Levels 3 and 4).

METHODOLOGY

This evidence summary is based on a structured database search combining search terms that describe heel PIs with search terms related to prophylactic dressings. Searches were conducted in EMBASE, Pubmed, Medline, Scopus and the Cochrane Library. Evidence published up to June 2017 in English was considered for inclusion. Retrieved studies were appraised for relevance and rigour using Joanna Briggs Institute appraisal tools.²⁰

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