



Heel Pressure Ulcers: 2014 International Pressure Ulcer Prevention & Treatment Guidelines

Diane Langemo, PhD, RN, FAAN

©2014 National Pressure Ulcer Advisory Panel | www.npuap.org



Objectives

- **Discuss heel anatomy & physiology as it contributes to pressure ulcer development**
- **Discuss the NPUAP-EPUAP 2014 International Pressure Ulcer Prevention & Treatment Guidelines for heels**
- **Discuss evidence-based heel pressure ulcer prevention & treatment interventions**



Heel Pressure Ulcers

#1
facility
acquired
PU



Debilitating
& painful

#2
overall
PU

Common for surgery
pts, hip fx pts, TKA,
debilitated, sedated,
Etc

Time to
closure &
healing can
be long

3

©2014 National Pressure Ulcer Advisory Panel | www.npuap.org



Heel Anatomy & Physiology

- **Calcaneus** is largest bone of the foot & is angular
- **↓fatty tissue**: heel soft tissue pad = 18mm thick; Skin 0.64mm thick
- **Dermis** thins, dermal-epidermal junction flattens, ↑separation, ↑ risk blister formation (↓shock absorption)
- Sustained, high pressure over small contact area
- Skin thins also with diabetic neuropathy (↓ shock absorption)
- Supine position yields highest risk
- Friction & shear when “sliding down” in bed

4

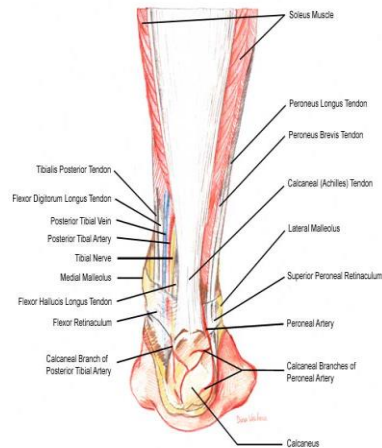
©2014 National Pressure Ulcer Advisory Panel | www.npuap.org



Heel Anatomy & Physiology

- **Blood supply:** End arterial plexus from posterior tibial artery & peroneal artery
- Blood flow impaired by peripheral vascular disease
- Impaired tolerance for ischemia due to lack of subcutaneous tissue & ↑ blood vessel degeneration
- **Bottom Line:** heel is not well protected from pressure, friction or shear
- **Rapid damage can occur**

Back View of Foot Muscles



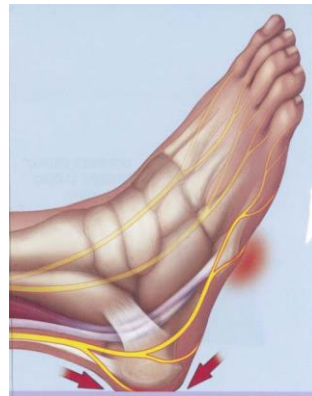
5

©2011 National Pressure Ulcer Advisory Panel | www.npuap.org



What Makes the Heel Vulnerable?

- ↓resting blood perfusion levels
- Calcaneus has small surface w/large wt bearing bony prominence
- **Result:** higher than normal pressures
- Study of 450,000 pts, heel accounted for 41% of all DTIs (Van Gilder et al, 2008)



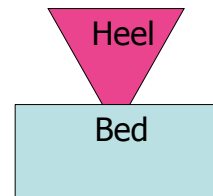
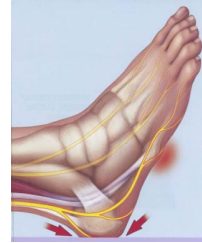
6

©2011 National Pressure Ulcer Advisory Panel | www.npuap.org



Consider that....

- If the heel has little subcutaneous tissue or muscle; and IF the muscle is **MOST** vulnerable, is it not highly likely pressure or pressure + shear will result in a PU



7

©2011 National Pressure Ulcer Advisory Panel | www.npuap.org



What Places the Heel at Risk?

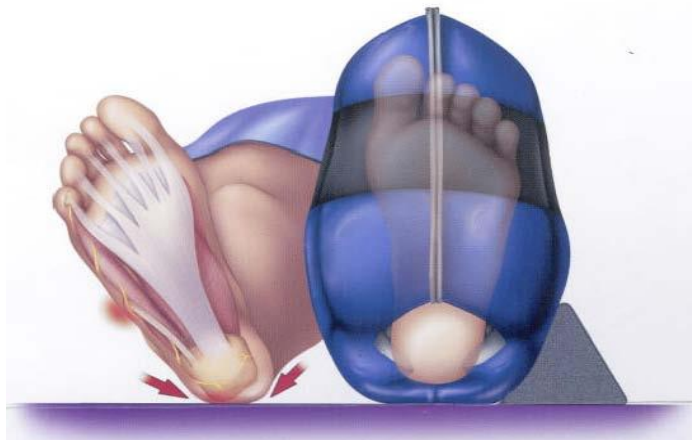
- Heavy weight of foot
- Sharp posterior calcaneus
- Thin soft tissue padding; little to no muscle
- Blood supply via peroneal artery
- Diabetes
- Edema
- Leg spasms, agitation
- Dementia
- Muscle very sensitive to pressure & ischemia
- Poor perfusion/vasopressors
- **IMMOBILITY**: ≈87% of the cases; #1 PU risk factor

8

©2014 National Pressure Ulcer Advisory Panel | www.npuap.org



Risk Related to Heel Position



9

©2014 National Pressure Ulcer Advisory Panel | www.npuap.org



Risk Factors for Heel PUs

- **Extrinsic Factors:**
 - Pressure
 - Friction
 - Shear
- **Intrinsic Factors:**
 - Age (↓cushioning)
 - ↓mobility & activity
 - Malnut/dehydration
 - ↓Sensation, ↓LOC
 - Vascular disease
 - Fragile skin/edema
 - Underlying comorbidities
 - Contractures
 - “Hammocking” of mattress



10

©2011 National Pressure Ulcer Advisory Panel | www.npuap.org



Additional Heel PU Risk Factors

- Agitated patients
- Diabetes mellitus
- Peripheral neuropathy
- Arterial insufficiency
- Malnutrition
- Poor tissue resilience
- Braden 16 or less
- Braden 17-18 + addtl risk factor
- Paralysis/epidural
- Knee/hip replacements
- Post open heart surgery
- Push self up in bed with heels
- Not removing compression hose
- Leg spasms
- >50% of perioperative PUs

11

©2011 National Pressure Ulcer Advisory Panel | www.npuap.org



Risk Reduction Pre-Admission

The legal system believes that if you admitted the patient or resident you must feel you can provide care that meets the standard of care

Be certain you have the staff, equipment and training to handle the patient or resident

Problem of timely insurance approvals for some specialized products/devices



12

©2014 National Pressure Ulcer Advisory Panel | www.npuap.org



Assessing the Heel



13

©2014 National Pressure Ulcer Advisory Panel | www.npuap.org



Assessing Risk of Heel PUs

- Is the **Braden Scale score** the best predictor?
Both total & individual subscale scores important.
- Are there other **independent factors** that increase risk such as medical problems?
 - Is a hip fracture different from immobility?
 - Hip & knee joint replacements
 - Does the Buck's traction score as inactivity?
 - Is DM neuropathy different from impaired cognition?
 - How is the lack of blood flow to the feet scored?

14

©2014 National Pressure Ulcer Advisory Panel | www.npuap.org



General Recommendations

- **Inspect the skin of the heels regularly. (SOE=C; SOR=👍👍)**



15

©2014 National Pressure Ulcer Advisory Panel | www.npuap.org



Assessment

- **Remove devices:**
 - Stockings
 - Support hose
 - Boots
- **Reinspect once “device” removed**
- **Look up, look down, look all around!**
- **Feel: for warmth, boggiess, pulses**

16

©2014 National Pressure Ulcer Advisory Panel | www.npuap.org



Prevention: It Takes a Village



17

©2014 National Pressure Ulcer Advisory Panel | www.npuap.org



Repositioning for Preventing Heel Pressure Ulcers

- 1. Ensure that heels are free of the surface of the bed. (SOE = C; SOR = 👍👍)
 - 1.1. Use heel suspension devices that elevate and offload the heel completely in such a way as to distribute the weight of the leg along the calf without placing pressure on the Achilles tendon. (SOE = B; SOR = 👍👍)



18

©2014 National Pressure Ulcer Advisory Panel | www.npuap.org



Rationale/Evidence

- Heels should ideally be free of all pressure
- Heel suspension devices are preferable for long term use & for those unlikely to keep lower extremity on pillows
- -Select heel suspension devices based on clinical condition, POC, pt tolerance of device, & manufacturer's guidelines.
- Not all devices are to be worn in bed (those with metal support side bars; pt w/contractures, ↓ sensation or inability to communicate)

19

©2014 National Pressure Ulcer Advisory Panel | www.npuap.org



Rationale/Evidence

- **RCT:** fx hip pts (in previous 48hr) >65 yr; n=119 control (standard care), n=120 intervention (heel ↑ + pres redist support surface [cut foam & AP mattress or overlay])
- Significantly ($p<0.001$) fewer subjects in intervention group developed PUs (I-IV) on ankle, feet or heels (7% v 26%).
- Rx group subjects 5x <likely to develop a PU (hazard ratio=1.00; 95% CI [0.008 – 0.54] (Donnelly et al., July 2011, J Wound Care)

20

©2014 National Pressure Ulcer Advisory Panel | www.npuap.org



Heel Device TIPS

- The device should completely lift the heel from the bed
- Do the paper or hand test
- **Boots:** foam, air, fiber, plastic, sheepskin, synthetic sheepskin
- Alignment should be neutral
- **Rigid Boots (AFO):** for maintenance of alignment in 90° neutral position

21

©2014 National Pressure Ulcer Advisory Panel | www.npuap.org



Repositioning for Preventing Heel Pressure Ulcers

- 2. The knee should be in slight (5° to 10°) flexion. (SOE = C; SOR = 👍)



22

©2014 National Pressure Ulcer Advisory Panel | www.npuap.org



Rationale/Evidence

- **Knee hyperextension can cause popliteal vein obstruction, predisposing to DVT (Indirect evidence)**
- (Huber & Huber, Eur J Vascular & Endovascular Surgery, 2009)

23

©2014 National Pressure Ulcer Advisory Panel | www.npuap.org



Repositioning for Preventing Heel Pressure Ulcers

- **3. Avoid areas of high pressure, especially under the Achilles tendon. (SOE = C; SOR = 👍)**



24

©2014 National Pressure Ulcer Advisory Panel | www.npuap.org



Repositioning for Preventing Heel Pressure Ulcers

- 3.1. Use a foam cushion under the full length of the calves to elevate heels. (SOE = B; SOR : 👍 ,)



25

©2014 National Pressure Ulcer Advisory Panel | www.npuap.org



Rationale/Evidence

- **RCT:** ICU pts (n=70), foam cushion (n=35) compared to no heel intervention (n=35). Fewer heel PU in foam group (8.5% vs 54.2%), also longer heel PU-free time in foam group (5.6d vs 2.8d) (Cadue et al., Presse Med, 2008)
- **Pillows** under full length of calf appropriate for short-term use in alert & cooperative pts.
- **Pillows or foam cushions** should extend length of calf to avoid pressure (eg, Achilles area).
- **Flex knee slightly** to avoid popliteal vein compression & DVT risk.

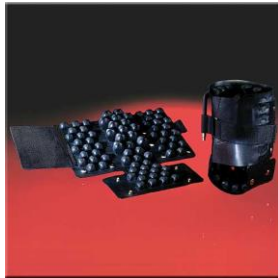
26

©2014 National Pressure Ulcer Advisory Panel | www.npuap.org



Repositioning for Preventing Heel Pressure Ulcers

- **4. Apply heel suspension devices according to the manufacturer's instructions. (SOE = C; SOR = 👍 ,)**



27

©2014 National Pressure Ulcer Advisory Panel | www.npuap.org



Repositioning for Preventing Heel Pressure Ulcers

- **5. Remove the heel suspension device periodically to assess skin integrity. (SOE = C; SOR = 👍).**

28

©2014 National Pressure Ulcer Advisory Panel | www.npuap.org



Rationale/Evidence

- Routinely assess skin under device for pressure-related damage.
- Assess skin more frequently & loosen device in individuals with, or likely to develop, lower extremity edema & individuals with neuropathy & PAD.

29

©2014 National Pressure Ulcer Advisory Panel | www.npuap.org



Rationale/Evidence

- Apply heel suspension devices to avoid creation of areas of increased pressure under the device.
- Ensure device is not too tight & doesn't create additional pressure damage.



30

©2014 National Pressure Ulcer Advisory Panel | www.npuap.org



Repositioning for Treating Existing Heel Pressure Ulcers

- 1. Relieve pressure under the heel(s) with Category/Stage I or II PUs by placing legs on a pillow to “float the heels” off the bed or by using heel suspension devices. (SOE = B; SOR + 👍)



31

©2014 National Pressure Ulcer Advisory Panel | www.npuap.org



Rationale/Evidence

- RCT (modified): compared outcomes of Category/Stage I heel PUs wrapped w/gauze dressings vs heel suspension boot. Healing & stabilization of heel PU seen in 13 of 14 subjects wearing suspension device; 5 PU deteriorated & 5 remained the same in gauze dressing group (Cheneworth et al., Adv Wound Care, 1994).
 - Heel PU relief necessary to promote perfusion
 - Sig increases in laser Doppler flow seen in heel elevation in normal subjects & those with PVD (Huber & Huber, 2008)

32

©2014 National Pressure Ulcer Advisory Panel | www.npuap.org



Repositioning for Treating Existing Heel Pressure Ulcers

- **2. For Category/Stage III, IV and unstageable PUs, place the leg in a device that elevates the heel from the surface of the bed, completely offloading the PU. Consider a device that prevents footdrop. (SOE = C; SOR = 👍👍)**

33

©2014 National Pressure Ulcer Advisory Panel | www.npuap.org



Rationale/Evidence

- **Category/Stage III, IV or unstageable heel PUs should be completely offloaded to the extent possible.**
- **Elevating the heel on a pillow is usually inadequate.**
- **Due to the time required to heal deeper ulcers, a device that completely offloads the ulcer area & prevents footdrop is preferred.**

34

©2014 National Pressure Ulcer Advisory Panel | www.npuap.org



Always...Educate

- Educate patient on how to position heels & rationale for need to do so



35

©2014 National Pressure Ulcer Advisory Panel | www.npuap.org

Heel Protector Products



Company website

36

©2014 National Pressure Ulcer Advisory Panel | www.npuap.org



Heel Protector Products



37

©2011 National Pressure Ulcer Advisory Panel | www.npuap.org

Heel Offloading Devices

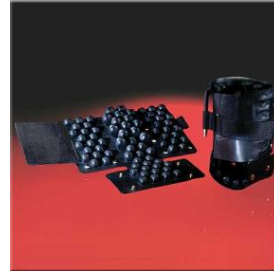


38

©2014 National Pressure Ulcer Advisory Panel | www.npuap.org



Heel Flotation/Stabilization Devices



39

©2014 |

www.npuap.org



Boot vs. Pillow vs. Dressing

- **Dressing:** Agitated pts: stocking, film, foam dressings to ↓ friction damage
- **Pillow:** alert pts who can maintain LE on pillows
- **Boot:** ↓ LOC, SCI, contractures,
- **Other Cares:**
 - Lotion/emollient qd (no massage)
 - Turn regularly
 - OOB as possible
 - ROM with cares
 - CARE when individual in wheel chair



40

©2014 National Pressure Ulcer Advisory Panel | www.npuap.org



What we do know....

- “It is impossible to determine which heel suspension device is most effective.”
- Offloading is effective!

41

©2014 National Pressure Ulcer Advisory Panel | www.npuap.org

So That's What's New in...



42

©2014 National Pressure Ulcer Advisory Panel | www.npuap.org



Thank You & Now You Shouldn't Be Left Hanging.....



43

©2014 National Pressure Ulcer Advisory Panel | www.npuap.org