DEEP TISSUE PRESSURE INJURY

What the Evidence is Telling Us About Prevention and Tissue Recovery

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Disclosure

Dr. Sullivan is employed by Molnlycke Health Care as a Pressure Injury Prevention Clinical Specialist.

The content of this presentation is based on current evidence and best practice standards. Care has been taken to ensure that it is free of commercial bias.

Objectives

- Define the characteristics of a Deep Tissue Pressure Injury (DTPI)
- State the incidence, impact, and evolution of DTPI
- Elucidate contributing risks and co-morbid conditions associated with DTPI development
- Explore how early intervention can prevent, treat, or minimize the severity of DTPI

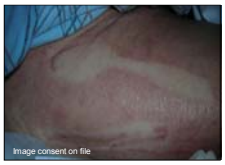
Injury Replaces Ulcer

- "Pressure Injury" replaces "Pressure Ulcer"
- Addresses confusion
- More accurate description
  - Intact (Stage 1/Deep Tissue Injury)
  - Ulcerated skin (All other stages)

NPUAP. (2016). Pressure release: National Pressure Ulcer Advisory Panel (NPUAP) announces a change in terminology from pressure ulcer to pressure injury and updates the stages of pressure injury. Available on www.npuap.org.

Pressure Injury

- Localized damage
- Skin and/or underlying soft tissue
- Usually over a bony prominence
- Related to a medical or other device



NPUAP. (2016). Pressure release: National Pressure Ulcer Advisory Panel (NPUAP) announces a change in terminology from pressure ulcer to pressure injury and updates the stages of pressure injury. Available on www.npuap.org.

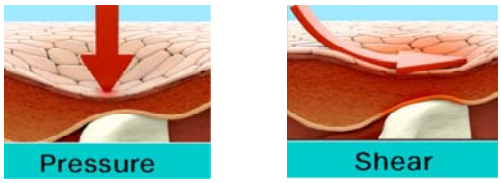
Presentations

- Intact skin
- Open ulcer
- Painful

NPUAP. (2016). Pressure release: National Pressure Ulcer Advisory Panel (NPUAP) announces a change in terminology from pressure ulcer to pressure injury and updates the stages of pressure injury. Available on www.npuap.org.

Primary Contributing Factors

- Intense and/or prolonged pressure
- Pressure in combination with shear



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NPUAP. (2016). Pressure release: National Pressure Ulcer Advisory Panel (NPUAP) announces a change in terminology from pressure ulcer to pressure injury and updates the stages of pressure injury. Available on www.npuap.org.

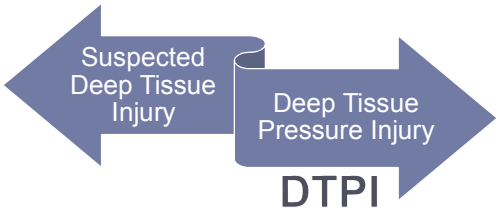
Secondary Contributing Factors

Soft tissue tolerance may also be affected by:

- Microclimate
- Nutrition
- Perfusion
- Comorbidities
- Condition of the soft tissue

NPUAP. (2016). Pressure release: National Pressure Ulcer Advisory Panel (NPUAP) announces a change in terminology from pressure ulcer to pressure injury and updates the stages of pressure injury. Available on www.npuap.org.

"Suspected" Removed



NPUAP. (2016). Pressure release: National Pressure Ulcer Advisory Panel (NPUAP) announces a change in terminology from pressure ulcer to pressure injury and updates the stages of pressure injury. Available on www.npuap.org.

DTPI Characteristics

- Persistent
- Non-blanchable
- Deep red, maroon, or purple discoloration

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NPUAP. (2016). Pressure release: National Pressure Ulcer Advisory Panel (NPUAP) announces a change in terminology from pressure ulcer to pressure injury and updates the stages of pressure injury. Available on www.npuap.org.

Two Presentations

Intact (Discoloration)	Non-Intact (Epidermal Separation)

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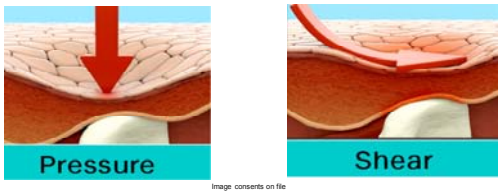
NPUAP. (2016). Pressure release: National Pressure Ulcer Advisory Panel (NPUAP) announces a change in terminology from pressure ulcer to pressure injury and updates the stages of pressure injury. Available on www.npuap.org.

Etiology

- Intense and/or prolonged pressure and shear
- Bone-muscle interface



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NPUAP. (2016). Pressure release: National Pressure Ulcer Advisory Panel (NPUAP) announces a change in terminology from pressure ulcer to pressure injury and updates the stages of pressure injury. Available on www.npuap.org.

Two Evolution Patterns

May resolve without tissue loss

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NPUAP. (2016). Pressure release: National Pressure Ulcer Advisory Panel (NPUAP) announces a change in terminology from pressure ulcer to pressure injury and updates the stages of pressure injury. Available on www.npuap.org.

Two Evolution Patterns

Evolve rapidly to reveal extent of tissue injury

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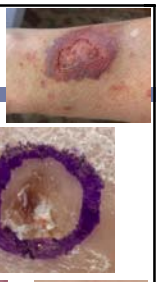
NPUAP. (2016). Pressure release: National Pressure Ulcer Advisory Panel (NPUAP) announces a change in terminology from pressure ulcer to pressure injury and updates the stages of pressure injury. Available on www.npuap.org.

Differentiating DTPI

DTPI is not used for:

- Vascular
- Traumatic
- Neuropathic
- Dermatologic



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NPUAP. (2016). Pressure release: National Pressure Ulcer Advisory Panel (NPUAP) announces a change in terminology from pressure ulcer to pressure injury and updates the stages of pressure injury. Available on www.npuap.org.

CHALLENGES

- Identifying at-risk patients

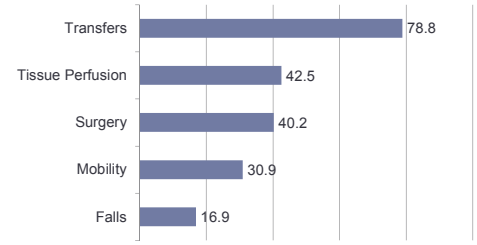
Top Admitting Diagnoses:

- Pneumonia (21%)
- Failure to thrive & dehydration (18%)
- Septicemia (15%)
- CHF (10.5%)
- Acute respiratory failure (8%)

Baharestani, M. Natural history of suspected deep tissue injuries from clinical manifestation to outcome. Retrieved from http://www.npuap.org/wp-content/uploads/2012/01/Baharestani-Suspected-Deep-Tissue-Injuries-Final.pptx1_.pdf

Precipitating Events

- Insult to manifestation: 1 to 5 days



Honaker, J., Brockopp, D., Moe, K. (2014). Suspected Deep Tissue Injury Profile: A Pilot Study. Advances in Skin and Wound Care, 27(3), 133-140

Emergency Department

- Time in EDU: Mean 11.7 hours
  - Median 9.5 hours
  - Range 1-56 hours
- Intubated in the ED: 14%

Baharestani, M. Natural history of suspected deep tissue injuries from clinical manifestation to outcome. Retrieved from http://www.npuap.org/wp-content/uploads/2012/01/Baharestani-Suspected-Deep-Tissue-Injuries-Final.pptx1_.pdf
Image: Wikimedia Commons. (2008). Author: Thierry Geoffroy. Accessed on https://commons.wikimedia.org/wiki/File:Emergency_room.jpg

Operating Room

- Time in the operating room: Mean 5.37 hours
  - Median 3 hours
  - Range 1-19 hours

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Baharestani, M. Natural history of suspected deep tissue injuries from clinical manifestation to outcome. Retrieved from http://www.npuap.org/wp-content/uploads/2012/01/Baharestani-Suspected-Deep-Tissue-Injuries-Final.pptx1_.pdf.

Intensive Care Unit – Risk Factors

- Anasarca (63%)
- Pressors (37%)
- Vent support (35%)
- MODS (15%)

Baharestani, M. Natural history of suspected deep tissue injuries from clinical manifestation to outcome. Retrieved from http://www.npuap.org/wp-content/uploads/2012/01/Baharestani-Suspected-Deep-Tissue-Injuries-Final.pptx1_.pdf
Image: Wikimedia Commons. (2016). Author: Pariswestren. Accessed https://commons.wikimedia.org/wiki/File:Critical_Care_Nursing.jpg

Vasopressors and DTPI

306 Med-Surg and Cardiothoracic ICU patients

- PI rate was 13%
- 39% were DTPI
- 59% of DTPI on sacrum

Image consent on file

Cox, J., Roche, S. (2015). Vasopressors and development of pressure ulcers in adult critical care patients. American Journal Of Critical Care, 24(6), 501-510.

Vasopressors and DTPI

- Significantly associated with PI
  - Norepinephrine and vasopressin
- Predictive of PI
  - MAP < 60 mm Hg in patients on vasopressors
  - Cardiac arrest
  - Mechanical ventilation > 72 hours

Cox, J., Roche, S. (2015). Vasopressors and development of pressure ulcers in adult critical care patients. American Journal Of Critical Care, 24(6), 501-510.

DTPI in Long Term Care

2,936,146 patients

- 1.7% with DTPI (49,915 patients)
- Black residents (Highest risk for any stage)
- Hispanic residents (Highest risk for DTPI)

Ahn, H., Cowan, L., Garvan, C., Lyon, D., Stechmiller, J. (2016). Risk factors for pressure ulcers including suspected deep tissue injury in nursing home facility residents: Analysis of national minimum data set 3.0. Advances in Skin and Wound Care, 29(4), 178-190

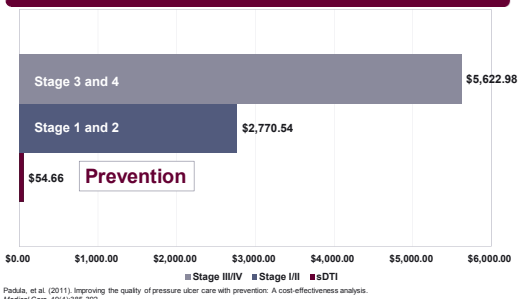
OPPORTUNITIES

- Prevention
- Treatment and Tissue Recovery

DTPI Prevention

Daily Costs

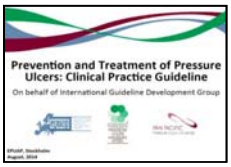
PREVENTION COSTS LESS THAN TREATMENT!



Padula, et al. (2011). Improving the quality of pressure ulcer care with prevention: A cost-effectiveness analysis. *Medical Care*. 49(4):385-392

Prophylactic Dressings

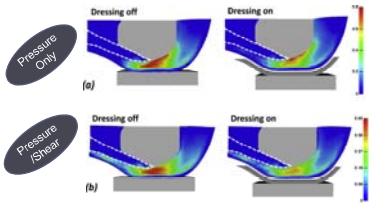
Consider applying a polyurethane foam dressing to bony prominences (e.g., heels, sacrum) for the prevention of pressure ulcers (injuries) in anatomical areas frequently subjected to friction and shear



National Pressure Ulcer Advisory Panel, European Pressure Ulcer Advisory Panel, and pan Pacific Pressure Injury Alliance. Prevention and Treatment of Pressure Ulcers: Clinical Practice Guideline. Emily Haesler (ED.) Cambridge Media: Perth, Australia; 2014. Pg 74.

Scientific Proof of Performance

- Measured pressure and pressure/shear
- VASCULARIZED TISSUE LEVEL



5 layer, bordered heel dressing reduced internal soft tissue exposures for all loads and on all surfaces (40-50%)

Levy, A., Mor Ben-Or, F., Gefen, A. (2015) The biomechanical efficacy of dressings in preventing heel pressure ulcers. Journal of Tissue Viability.(24)1;1-11

Construction Matters

- The construction offers a considerable **PROTECTIVE EFFECT"**
  - Mechanical cushioning and shear (II-IV)
  - Low friction co-efficient (dressing-support interface)
  - Pressure and shear redistribution (all layers)
- This protective effect remains prominent in the more dangerous, high end domain of strains.

Levy, A., Mor Ben-Or, F., Gefen, A. (2015) The biomechanical efficacy of dressings in preventing heel pressure ulcers. Journal of Tissue Viability.(24)1;1-11

Evolution

- Time delay in visible presentation[1]
  - Important for determining present on admission
- Confinement event commonly 48 -72 hours prior
  - "Found down"[1]
  - Medical instability[2]

Image consents on file

Sullivan, R. A Five-Year Retrospective Study of Descriptors Associated With Identification of Stage I and Suspected Deep Tissue Pressure Ulcers in Persons with Darkly Pigmented Skin. WOUNDS 2014;26(12):351-359
Black et al. (2011). Pressure Ulcers: Avoidable or Unavoidable? Results of the National Pressure Ulcer Advisory Panel Consensus Conference. Ostomy Wound Management 2011;57(2):24–37

DTPI Treatment

Wound Assessment + Principles of Wound Care = Dressing Selection

- Administrative support
- Compliance

- Education

- Simplify
- Standardize

Sullivan, R. (2015). Use of soft silicone foam dressing to change the trajectory of destruction associated with suspected deep tissue injury pressure ulcers. MedSurg Nursing Journal. 24(4), 237-242,267

DTPI Differentiation

#1: Rule Out Trauma

Bruise	DTPI

Image consents on file

Sullivan, R. (2015). Use of soft silicone foam dressing to change the trajectory of destruction associated with suspected deep tissue injury pressure ulcers. MedSurg Nursing Journal. 24(4), 237-242,267.

Understanding Differences

- DTPI, traditionally more difficult to identify in patients with darkly pigmented skin
- Visual cues which may be absent

ORIGINAL RESEARCH

A 5-Year Retrospective Study of Descriptors Associated With Identification of Stage I and Suspected Deep Tissue Pressure Ulcers in Persons with Darkly Pigmented Skin

Rhonda Sullivan, PhD, RN, CWON, LNCC

Sullivan, R. A Five-Year Retrospective Study of Descriptors Associated With Identification of Stage I and Suspected Deep Tissue Pressure Ulcers in Persons with Darkly Pigmented Skin. WOUNDS 2014;26(12):351-359

DTPI and Darkly Pigmented Skin

5 year retrospective review

- Stage 1 and DTPI presentation
  - All ethnicities with darkly pigmented skin
  - Documentation of 9 WOC nurses analyzed
  - WOC nurse consult
- Trends measured against NPUAP descriptions and descriptors in the literature

Sullivan, R. A Five-Year Retrospective Study of Descriptors Associated With Identification of Stage I and Suspected Deep Tissue Pressure Ulcers in Persons with Darkly Pigmented Skin. WOUNDS 2014;26(12):351-359

Nurse Responsibility

Look

Listen

Feel

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Sullivan, R. A Five-Year Retrospective Study of Descriptors Associated With Identification of Stage I and Suspected Deep Tissue Pressure Ulcers in Persons with Darkly Pigmented Skin. WOUNDS 2014;26(12):351-359

DTPI Treatment & Tissue Recovery

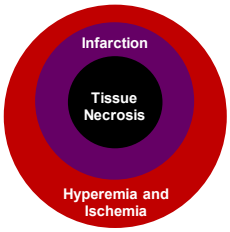


Image consent on file

Salcido, R., Lee, A., Ahn, C. (2011). Heel pressure ulcers: Purple heel and deep tissue injury. Advances in Skin and Wound Care. 24(8):374-382.

DTPI Tissue Recovery

- 24 month IRB-approved retrospective study
- 77 subjects with a total of 128 DTPIs

FEATURE

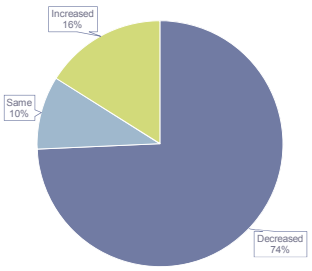
A Two-year Retrospective Review of Suspected Deep Tissue Injury Evolution in Adult Acute Care Patients

Rhonda Sullivan, PhD, RN, CWON, LNCC

Sullivan R. A Two-Year Retrospective Review of Suspected Deep Tissue Injury Evolution in Adult, Acute Care Patients. Ostomy Wound Manage. 2013 Sep; 59(9):30-9

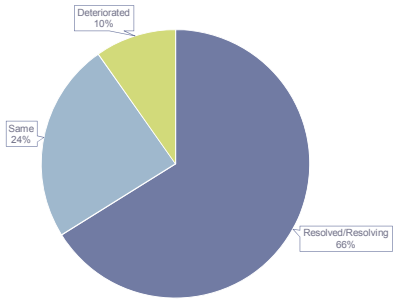
MHC-2015-3474

Tissue Recovery By Size



Sullivan R. A Two-Year Retrospective Review of Suspected Deep Tissue Injury Evolution in Adult, Acute Care Patients. Ostomy Wound Manage. 2013 Sep; 59(9):30-9

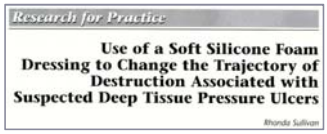
Recovery By Tissue Consistency



Sullivan R. A Two-Year Retrospective Review of Suspected Deep Tissue Injury Evolution in Adult, Acute Care Patients. Ostomy Wound Manage. 2013 Sep; 59(9):30-9

Outcomes

- Tissue recovery
  - Mean healing = 17.8 days
  - Resolution by day 4 = “window of opportunity”
  - 24 resolved and 5 progressing toward resolution


Research for Practice

Use of a Soft Silicone Foam Dressing to Change the Trajectory of Destruction Associated with Suspected Deep Tissue Pressure Ulcers

Rhonda Sullivan

Sullivan R. Use of a Soft Silicone Foam Dressing to Change the Trajectory of Destruction Associated with Suspected Deep Tissue Injury. MedSurg Nursing Journal. 2015; 24(4) p. 237-242..

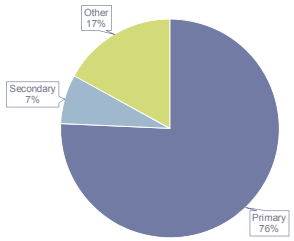
Outcomes

- Damage control
  - Stage 1 and Stage 2
  - Mean size = 2.5cm^2
- Some damage may be irreversible

Sullivan R. Use of a Soft Silicone Foam Dressing to Change the Trajectory of Destruction Associated with Suspected Deep Tissue Injury. MedSurg Nursing Journal. 2015; 24(4) p. 237-242..

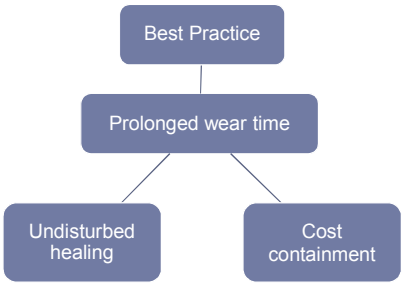
Standardize and Simplify

- Multi-layer soft silicone border dressings



Sullivan R. Use of a Soft Silicone Foam Dressing to Change the Trajectory of Destruction Associated with Suspected Deep Tissue Injury. MedSurg Nursing Journal. 2015; 24(4) p. 237-242..

Undisturbed DTPI Treatment



Rippon, M., Davies, P., White, R. (2012) Taking the trauma out of wound care: The importance of undisturbed healing. Journal of Wound Care, 12(8), 259-268

Unavoidability

- Unavoidable pressure injuries DO occur
- Magnitude and severity of illness precludes safe provision of pressure injury prevention measures

Black, J., Edsberg, L.E., Langemo, D., Baharestani, M.M., Posthauer, M.E., Goldberg, M. (2014). Unavoidable Pressure Injury: State of the Science and Consensus Outcomes. J Wound Ostomy Continence Nurs. 2014;41(4):313-334

Unavoidability

- Not recognized in acute care for reimbursement
- CMS
  - "Reasonably preventable" with evidence based care
- Validity in defending the care
  - Supporting documentation

Image consent on file

Black, J., Edsberg, L.E., Langemo, D., Baharestani, M.M., Posthauer, M.E., Goldberg, M. (2014). Unavoidable Pressure Injury: State of the Science and Consensus Outcomes. J Wound Ostomy Continence Nurs. 2014;41(4):313-334

Take Away Messages

- DTPI do not all represent full thickness tissue loss
- Recovery of injured tissue can be achieved
  - Early identification
  - Evidence-based practice
  - Comprehensive PIP and treatment program