Pressure Ulcer Prevention & Management

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National Pressure Ulcer Advisory Panel new definitions 2007

- NPUAP redefined the definition of a pressure ulcer and the stages of pressure ulcers
  - Redefined original 4 stages
  - Added 2 stages
    1. Deep tissue injury
    2. Unstageable pressure ulcers

Stage 1

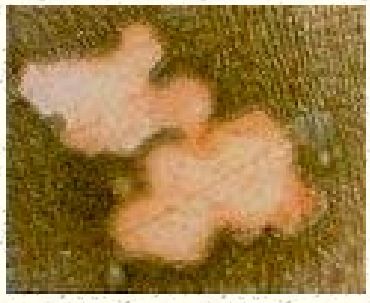
- Intact skin with non-blanchable redness of a localized area usually over a bony prominence. Darkly pigmented skin may not have visible blanching; its color may differ from the surrounding area.

Stage 1

- The area may be painful, firm, soft, warmer or cooler as compared to adjacent tissue. Stage I may be difficult to detect in individuals with dark skin tones. May indicate "at risk" persons (a heralding sign of risk)

Stage 2

- Partial thickness loss of dermis presenting as a shallow open ulcer with a red pink wound bed, without slough. May also present as an intact or open/ruptured serum-filled blister.



Stage 2

- Presents as a shiny or dry shallow ulcer without slough or bruising.*
  - This stage should not be used to describe skin tears, tape burns, perineal dermatitis, maceration or excoriation.
  - *Bruising indicates suspected deep tissue injury

Stage 3

- Full thickness tissue loss. Subcutaneous fat may be visible but bone, tendon or muscle are not exposed. Slough may be present but does not obscure the depth of tissue loss. May include undermining and tunneling.

Stage 3

- The depth of a stage 3 pressure ulcer varies by anatomical location.
  - The bridge of the nose, ear, occiput and malleolus do not have subcutaneous tissue and stage III ulcers can be shallow.

Stage 3

- The depth of a stage 3 pressure ulcer varies by anatomical location.
  - In contrast, areas of significant adiposity can develop extremely deep stage III pressure ulcers. Bone/tendon is not visible or directly palpable.

Stage 4

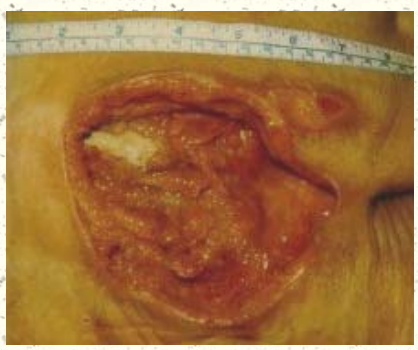
- Full thickness tissue loss with exposed bone, tendon or muscle. Slough or eschar may be present on some parts of the wound bed. Often include undermining and tunneling.

Stage 4

- The depth of a stage 4 pressure ulcer varies by anatomical location.
  - The bridge of the nose, ear, occiput and malleolus do not have subcutaneous tissue and these ulcers can be shallow.

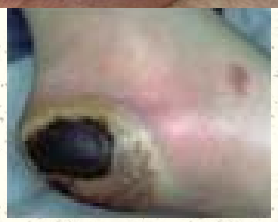
Stage 4

- The depth of a stage 4 pressure ulcer varies by anatomical location.
  - Can extend into muscle and/or supporting structures (e.g., fascia, tendon or joint capsule) making osteomyelitis possible. Exposed bone/tendon is visible or directly palpable.



Unstageable

- Full thickness tissue loss in which the base of the ulcer is covered by slough (yellow, tan, gray, green or brown) and/or eschar (tan, brown or black) in the wound bed.



Unstageable

- Until enough slough and/or eschar is removed to expose the base of the wound, the true depth, and therefore stage, cannot be determined.
  - Stable (dry, adherent, intact without erythema or fluctuance) eschar on the heels serves as "the body's natural (biological) cover" and should not be removed.

Suspected Deep Tissue Injury

- Purple or maroon localized area of discolored intact skin or blood-filled blister due to damage of underlying soft tissue from pressure &/or shear.
- The area may be preceded by tissue that is painful, firm, mushy, boggy, warmer or cooler as compared to adjacent tissue.

Suspected Deep Tissue Injury

- Evolution may include a thin blister over a dark wound bed. The wound may further evolve and become covered by thin eschar. Evolution may be rapid exposing additional layers of tissue even with optimal treatment.

Pressure Ulcer Care, what's new?

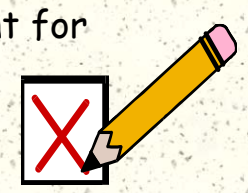
- Care soon to be guided by new clinical practice guidelines to be published May 2009 by National Pressure Ulcer Advisory Panel
- Use of quality indicators to drive quality improvement
- New regulations and public policy changes

Prevention Measures

- Risk Assessment
- Pressure reduction surface use
- Scheduled repositioning
- Nutritional assessment
- Skin assessment
- Address risk factors
  - Incontinence
  - Activity & mobility

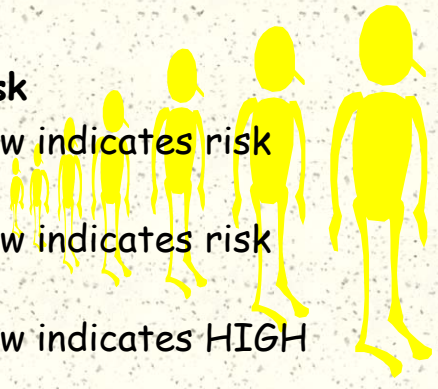
Pressure Ulcers: Screening

- Risk assessment on admission
- Use a standardized instrument for risk assessment
  - Braden Scale
  - Norton Tool
- Re-evaluate at intervals
- If at risk on admission then 1x/wk for 4 wks
- Use sub-scale scores for determining preventive interventions



Braden Scale

- **Score range:**
  - **6-23**
- **Low score=High risk**
- Score of 16 or below indicates risk (acute care)
- Score of 18 or below indicates risk (LTC)
- Score of 10 or below indicates HIGH risk



Do NHs Conduct Risk Assessment?

- Bates-Jensen, et al study, 16 CA NHs
- Medical Record Data
- No difference between low and high PU prevalence NHs in the proportion of residents passing, "*…standardized PU risk assessment on admission to NH*"
  - Low PU: 72%
  - High PU: 82%
- ***Opportunities for prevention***
  - ***Admission time period: 4 weeks***
  - ***Acute illness episodes***

Does Risk Assessment Matter?

- NHs with admission risk assessment scored better on documentation of preventive interventions
  - 95% with an admission risk assessment also had at least 2 preventive interventions noted ***versus***
  - 31% with at least 2 preventive interventions with no admission risk assessment
- Possible reasons?
  - Inadequate licensed nurse staffing
  - Poor knowledge of importance of re-assessment at frequent intervals

Pressure Redistribution Surfaces

- **NON-POWERED**
- Do not use electricity or batteries
- Effective for Sacral location: trochanters, heels problematic
  - Can be an overlay or a mattress composed of foam, air or water.
- Chairs & beds

- **POWERED**
- Requires motor or pump and electricity to operate
- Consistent tissue pressure relief on all body locations below 32mmHg
- Stage IV on trunk of body OR Multiple ulcers involving *at least* 2 turning surfaces
  - Low air loss therapy
  - Alternating air mattress

Pressure Redistribution Surfaces

- Relative reduction of pressure ulcers by 60% compared to standard hospital mattresses
- Wheelchair devices
  - Requires attention to body alignment
- How long in chair?
- How long in bed?
- Is risk expected to increase or decrease with time?
- Quality Control checks
  - Observations at 9 or 10am and 4 or 5 pm

Other Related Areas…

- Assess mobility & activity levels
  - Inform tissue load management plan
  - Wheelchair & Bed pressure reduction surfaces
  - Target scheduled repositioning
  - Evaluate time in bed
- Avoid 90° side lying positions
  - 30° side lying position
- Heels
  - Pillows to prevent contact with bed
  - Inspect DAILY in immobile persons
- Avoid head of bed >30°
  - prevent shearing: turn sheets, trapeze, etc.
  - Limits effectiveness of support surfaces

Recommendations…

- Pressure redistribution surfaces for all residents at risk on admission
- Chair & Bed
- Quality Monitoring:
  - Use of support surfaces
  - Observations at 9am & 4pm once a week

Scheduled Repositioning

- 2-hour turning schedule
  - Derived from spinal injury patients
  - When tested on healthy older volunteers, 1-1½ hours required to prevent erythema
- Average time to turn 1 resident = 5 min.
- What is the optimal interval?
- How do support surfaces effect turning interval?

Defloor, T, et al Int. J. Nurs. Studies, 2005

- 28 days, 838 NH patients
- 6-hr (n= 65) turning
- 4-hr (n=67) turning
  - pressure redistribution surface (viscoelastic foam)
- 2-hr (n=65) turing
- 3-hr (n=65) turning
  - standard mattress
- Standard prevention (n=576)

- Stage I PUs: NO Difference
- Stage II+ PUs:
  - 2-hr group: 14.3%
  - 3-hr group: 24.1%
  - ***4-hr group: 3%***
  - 6-hr group: 15.9%
  - Standard Prevention: 20%
- ***Turning q 4-hr if on support surface makes turning feasible in terms of effort & cost.***

Recommendations…

- Document ability to move independently
- Target the intervention to *only* those most in need
- Quality control checks are difficult without technology

Nutrition Assessment & Support

- Refer residents with existing PUs for nutrition assessment & support
- Should also refer residents who are determined at risk for PUs for nutrition assessment & support

Do NHs Conduct Nutrition Assessments?

- **YES, when a pressure ulcer exists**
- 65 residents with medical records indicating a presence of PU
- 78% obtained a nutritional assessment within 2 weeks of the pressure ulcer initial assessment.

Nutrition Support

- 30-40 cal & 1-2 gms protein/kg/day if consistent with goals
- Adequate fluid intake
- Multi-vitamin supplement

- No evidence for additional supplementation of nutrients (Vitamins A,E,C, Arginine, Zinc)
- Supplements may decrease unfavorable outcomes because reverse nutritional deficits ***but*** may not decrease pressure ulcers
- Tube feedings ***NO*** effect on ulcers

Nutrition Recommendations…

- For those residents at risk
- Monitor nutrition by observing two meals per week to judge amount consumed and assistance provided

Skin Care

- **Daily Skin Inspection**
- KEY to early identification of stage I pressure ulcers
- MUST involve nurse aides and direct care providers in efforts to detect early skin changes
- Acute care hospitals are looking at skin inspection every shift
- Documentation on admission is essential

- **Skin Care**
- Prevent dry skin, use moisturizers
- Provide timely incontinence care; use a topical barrier to protect skin
- Use mild cleansing agents & lotions

Pressure Ulcer Treatment

- Assessment
- Manage tissue loads
- Ulcer care
- Manage bacterial colonization & infection
- Nutritional Support
- NPUAP new guidelines 2009:
  - Include CPG for palliative care & pain
- Focus on Wound Bed Preparation
  - **TIME**
  - T=Tissue
  - I=Infection
  - M=Moisture
  - E=Edge

Assessment

- Use of standardized tools
  - National Pressure Ulcer Advisory Panel PUSH tool
  - Bates-Jensen Wound Assessment tool (BWAT, formerly the PSST)
- Pressure Ulcer pain assessment

Pressure Ulcer Scale for Healing (PUSH)

- Size
  - 10 categorical ratings
- Exudate
  - None, Minimal, Moderate, Large
- Tissue Appearance
  - Healed, epithelial, granulation, slough, necrotic
- Sum all 3 for total score

PUSH Tool

PUSH Tool 3.0

Patient Name:_____ Patient ID#:_____

Ulcer Location: _____ Date:_____

DIRECTIONS:
Observe and measure the pressure ulcer. Categorize the ulcer with respect to surface area, exudate, and type of wound tissue. Record a sub-score for each of these ulcer characteristics. Add the sub-scores to obtain the total score. A comparison of total scores measured over time provides an indication of the improvement or deterioration in pressure ulcer healing.

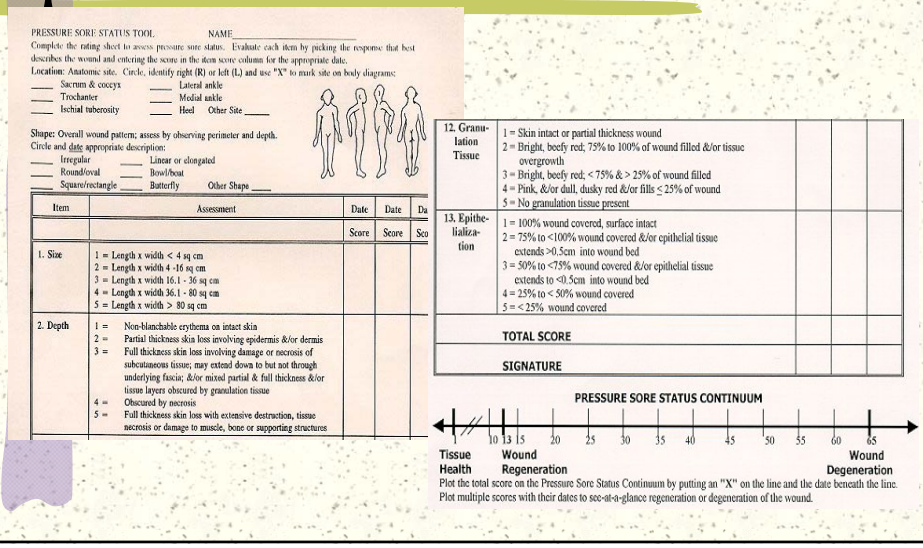
Length	**0** 0 cm^2	**1** <0.3 cm^2	**2** 0.3-0.6 cm^2	**3** 0.7-1.0 cm^2	**4** 1.1-2.0 cm^2	**5** 2.1-3.0 cm^2	
x Width		**6** 3.1-4.0 cm^2	**7** 4.1-8.0 cm^2	**8** 8.1-12.0 cm^2	**9** 12.1-24.0 cm^2	**10** >24 cm^2	**Subscore**
Exudate Amount	**0** None	**1** Light	**2** Moderate	**3** Heavy			**Subscore**
Tissue Type	**0** Closed	**1** Epithelial Tissue	**2** Granulation Tissue	**3** Slough	**4** Necrotic Tissue		**Subscore**
							Total Score

Bates-Jensen Wound Assessment Tool (BWAT)

(formerly Pressure Sore Status Tool)

- Size
- Depth
- Edges
- Undermining & tunneling
- Necrotic tissue type & amount
- Exudate type & amount
- Surrounding Tissue Characteristics
  - Color
  - Induration
  - Edema
- Granulation
- Epithelialization

BWAT Instrument



PRESSURE SORE STATUS TOOL NAME_____

Complete the rating sheet to assess pressure sore status. Evaluate each item by picking the response that best describes the wound and entering the score in the item score column for the appropriate date.

Location: Anatomic site. Circle, identify right (R) or left (L) and use "X" to mark site on body diagrams:

____ Sacrum & coccyx ____ Lateral ankle
____ Trochanter ____ Medial ankle
____ Ischial tuberosity ____ Heel Other Site ____

Shape: Overall wound pattern; assess by observing perimeter and depth. Circle and date appropriate description:

____ Irregular ____ Linear or elongated
____ Round/oval ____ Bowl/boat
____ Square/rectangle ____ Butterfly Other Shape ____

Item	Assessment	Date Score	Date Score	Da Sco
1. Size	1 = Length x width < 4 sq cm 2 = Length x width 4 -16 sq cm 3 = Length x width 16.1 - 36 sq cm 4 = Length x width 36.1 - 80 sq cm 5 = Length x width > 80 sq cm			
2. Depth	1 = Non-blanchable erythema on intact skin 2 = Partial thickness skin loss involving epidermis &/or dermis 3 = Full thickness skin loss involving damage or necrosis of subcutaneous tissue; may extend down to but not through underlying fascia; &/or mixed partial & full thickness &/or tissue layers obscured by granulation tissue 4 = Obscured by necrosis 5 = Full thickness skin loss with extensive destruction, tissue necrosis or damage to muscle, bone or supporting structures			
12. Granulation Tissue	1 = Skin intact or partial thickness wound 2 = Bright, beefy red; 75% to 100% of wound filled &/or tissue overgrowth 3 = Bright, beefy red; < 75% & > 25% of wound filled 4 = Pink, &/or dull, dusky red &/or fills ≤ 25% of wound 5 = No granulation tissue present			
13. Epithelialization	1 = 100% wound covered, surface intact 2 = 75% to <100% wound covered &/or epithelial tissue extends >0.5cm into wound bed 3 = 50% to <75% wound covered &/or epithelial tissue extends to <0.5cm into wound bed 4 = 25% to < 50% wound covered 5 = < 25% wound covered			
	TOTAL SCORE			
	SIGNATURE			

PRESSURE SORE STATUS CONTINUUM

1 10 13 15 20 25 30 35 40 45 50 55 60 65

Tissue Health — Wound Regeneration — Wound Degeneration

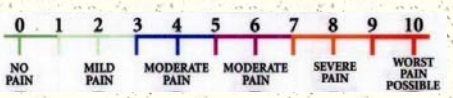
Plot the total score on the Pressure Sore Status Continuum by putting an "X" on the line and the date beneath the line. Plot multiple scores with their dates to see-at-a-glance regeneration or degeneration of the wound.

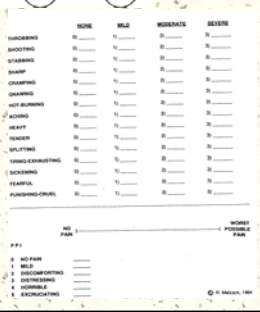
Pain Detection

- Pain
  - Procedural – Dressing changes & debridement
  - Non-procedural pain – Living with wound
- Pressure Ulcer Pain Detection tool
  - *Do you have pressure ulcer pain now?*
  - *Does pressure ulcer pain keep you from doing the things/activities you enjoy?*
  - *Does pressure ulcer pain keep you from sleeping?*
  - *Do you have pressure ulcer pain every day?*

How can pressure ulcer pain be assessed?

- Visual Analogue Scale (VAS)
- Numerical Rating Scale (NRS)
- FACES Scale
- McGill Pain Questionnaire
- Pain Detection Screening Tool





Can people separate ulcer pain from other pain?

YES

- 132 hospitalized patients with stage I/II PUs
- Ulcer pain assessed with VAS (or FACES)
  - Only 44% able to respond
- Mean VAS pain score of those responding
  - 4cm stage I
  - 3.5cm stage II
  - ***59% of those responding reported some degree of pain***
  - ***Only 2% received pain medication***
    - Dallam, et al (1995)

Most recent data on pressure ulcer pain used for comparison…

- Patients from hospitals, nursing homes, outpatient clinics with stage II, III, & IV pressure ulcers, post-op tissue flap for stage III/IV, diabetic ulcers
- McGill Pain questionnaire & NRS (0-100)
- 35% of stage III/IV reported pain
- 17% of stage II
- Mean NRS
  - Stage III/IV: 54.2
  - Stage II: 47.5
    - Roth et al (2004)

Wound Management Guidelines

- Assessment
- Manage tissue loads
- Ulcer care
- Manage bacterial colonization & infection
- Nutritional Support
- *AHRQ in 1993: most expert opinion based*
- *Level of evidence better in some areas*
  - *still weak in most areas*

Ulcer Care

- ***DEBRIDE***
- CLEAN
- DRESS

Ulcer Care: DEBRIDE

- Choice of debridement
  - sharp, mechanical, enzymatic, autolytic, or biosurgery
- A matter of preference
- Few studies document usefulness of

Debridement

- Autolytic & enzymatic approaches better
  - elders in long term care or home care settings
  - those who cannot tolerate other methods
- Enzymes used in the U.S:
  - Collagenase most frequently cited in literature
    - Results in 3-30 days
  - Papain-urea more effective than collagenase in reducing amount of necrosis
  - Hydrogels used in place of enzymes as lower cost

Debridement

- Sharp debridement best method to achieve quick removal of devitalized tissue
- Sequential bedside debridement
  - 15-30 min
  - Provide adequate analgesia prior to procedure
  - Autolytic or enzymatic between sharp debridement visits

Concerns…

- Heels
  - inspect daily
  - if s/s pathology, debride
  - if no s/s pathology, no debridement
- Lower extremity ulcers
  - check collateral flow
  - Ankle/brachial index
    - 1.0 normal
    - ≤ 0.8 arterial disease
    - Diabetes may distort

Chronic wounds & infection

- **Chronic wounds** contaminated with skin flora
  - Enterococcus, Staphylococcus, Bacillus
  - Heal in presence of bacteria
- More likely to develop MRSA
  - Treat with Bactroban or silver dressings topically
- Signs of infection:
  - Increasing pain, friable, edematous, pale dusky granulation tissue, foul odor, & wound breakdown, pocketing at base, or delayed healing
- *Critical level of colonization or BIOFILMS can delay healing*

Wound Biofilms

- Sessile microbial communities
  - Initiated by surface attachment of bacteria & Cell-cell interactions
  - Colonies grow in an elaborate 3-D structure
  - Glycocalyx matrix: extracellular polysaccharide matrix encasing the bacterium
  - Exhibit up to 1000 times more resistance than plain, ordinary bacteria in a planktonic state.

Differences: Infection & Colonization

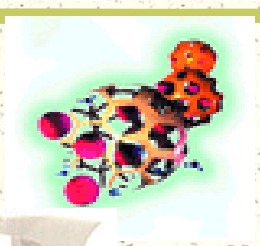
- INFECTION
- Treat with systemic antibiotics
- Topical antimicrobial agents may be useful

- COLONIZATION
- Topical antimicrobial agents helpful
- New agents non-toxic to fibroblast cell

Silver Release Dressings

- MRSA, VRE, broad spectrum effectiveness
- Decrease infection, wound contamination, & resistant bacteria
- Combine with wound cleansing & limited wound contact = thoughtful wound approach
- HOWEVER, no evidence to specifically support use in pressure ulcers

Infection Prevention Strategies



- Cadexomer Iodine
- Non-cytotoxic antimicrobial control
  - Slow release of iodine into wound bed
  - Broad spectrum of effectiveness

Ulcer Care

- DEBRIDE
- ***CLEAN***
- DRESS

Ulcer Care: CLEAN

- At dressing changes, with low pressure
- ***What to clean with?***
- Clean wounds
  - NS, Water
- Necrotic, infected wounds
  - Antiseptic solutions 10-14 days then stop
    - hypochlorite (Dakin's)--staph, strep, dissolves necrotic tissue, controls odor
    - acetic acid--pseudomonas aeruginosa in superficial wounds

Ulcer Care

- DEBRIDE
- CLEAN
- ***DRESS***

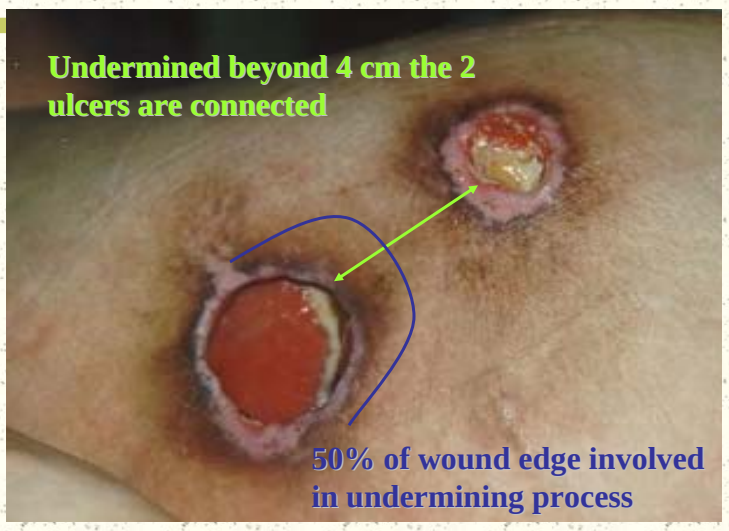
Topical Dressings

- ✓Remove necrotic tissue
- ✓Identify and treat infection
- ❑ Eliminate dead space
- ❑ Absorb excess exudate
- ❑ Maintain moist environment
- ❑ Thermal insulation
- ❑ Protect healing wound

Ulcer Care: TOPICAL DRESSINGS

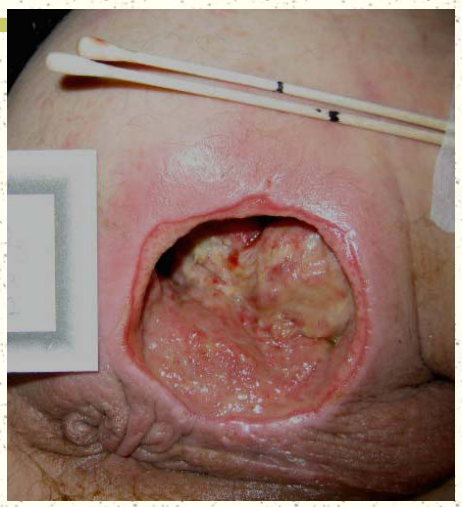
- Moist wound healing dressings instead of *any* form of dry gauze dressings (e.g., wet to dry or dry gauze dressing, impregnated gauze dressing, gauze packing)
- Use hydrocolloid dressings for stage 3/4 pressure ulcers

Undermining & Dead Space



Dressing Dead Space

- Light packing
- Prevent abscess formation
- Treatment of choice
  - Calcium alginates
  - impregnated gauze
- Negative pressure wound therapy



Advanced wound therapy

- Increased use of negative pressure wound therapy in home and nursing home settings
- More options
  - Different suction tubes
  - Multiple companies providing the devices

Moist Not Wet

- Excess exudate:
  - Macerates edges
  - Dilutes healing factors
  - Allows proliferation of bacterial toxins
- Absorption dressings

Absorb Excess Exudate

Dressing	Absorption
Film	None
Hydrocolloid	Minimal
Hydrogel	Min-mod
Hydrofiber	Mod-max
Alginates	Maximum

Moist Wound Healing

- Prevents wound desiccation
- Promotes epidermal migration
- *Moisture retentive dressings functionally equivalent*

Outcomes are expected by specific time points

- All ulcers heal faster first 3 months
- Stage II 5.2 times more likely to heal in 6 months than stage III/IV ulcers
- Stage III/IV improve slower than Stage II ulcers
- ***In 60 Days:***
  - *75% stage II heal*
  - *< 20% stage III/IV heal*
- *Best reported healing rate: 59% at 6 months of treatment*

MDS 3.0 *Recommended* Changes: Pressure Ulcers

- NO Reverse Staging
- NPUAP staging definitions
  - Includes ***Deep Tissue Injury***
- Ulcers existing on admission
- Size of largest ulcer at each stage
- New system of reporting ulcer changes
  - Healing
  - Tissue Type

Status of Ulcer

- Worsening ulcers
  - Number of each stage that worsened (Stage advanced; e.g., stage 2 to 3)
- Healing ulcers
  - Number at each stage healed
  - Re-epithelialized or resurfaced with new skin, since last MDS assessment

My Rules for Therapy

- If it's dirty; clean it,
- If there's a hole; fill it,
- If it's flat; protect it
- If it's healed; prevent it!