Pressure Ulcers: Evaluation, Management & Strategies for Prevention

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Rules for All Wounds

- Examine whole patient to identify risk factors and causes of tissue injury and correct them
- Examine nutritional status
- Examine tissue perfusion and oxygenation
- Ongoing and consistent documentation
  - ✓ Size - base - periwound skin
  - ✓ Exudates - staging - pain

Overview*

- Basic rules of assessment
- Identify risk factors
- Evaluation
- Management
- Complications
- Education

* Content based on Wound Healing Society "Guidelines for the treatment of pressure ulcers" *Wound Repair and Regen;* 2006 14:633-679 or www.woundheal.org

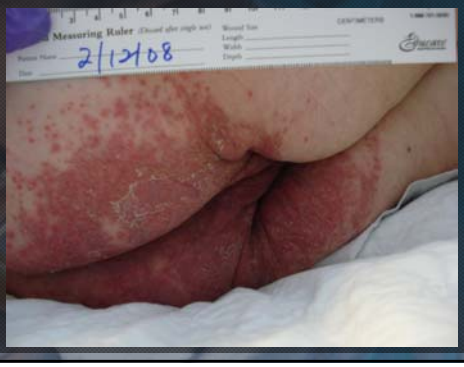
Rules for All Wounds

- Wound infection defined as
  - ✓ $>10^5$ CFU/gm tissue - AFTER debridement
  - ✓ Or presence of β-hemolytic strep
- Bacterial balance defined as
  - ✓ $\leq 10^5$ CFU/gm tissue
  - ✓ And no β-hemolytic strep

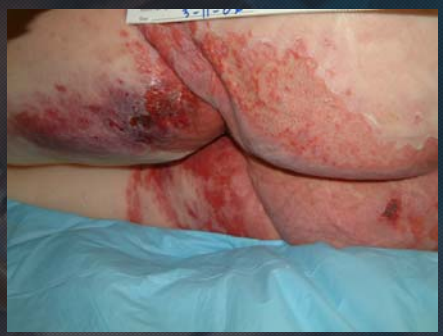
Risk Factors

- Poor nutritional status
- Flexion contractures
- Wheelchair - esp extremes of mobility
- Prolonged hospitalization with bedrest
- Mechanical/shear
  - ✓ Transfers
  - ✓ Hygiene
- Moisture – especially incontinence

Yeast Dermatitis



Incontinence Dermatitis



Etiology

- External pressure exceeds capillary pressure (20-30 mmHg)
- Pressure is greatest over bony prominences
  - ✓ Must be over bony prominence
  - ✓ Decubitus= pressure sore acquired while recumbent
  - ✓ Ischial sore = sitting sore
- Cone of destruction with apex at skin surface
  - ✓ Muscle tissue least tolerant of ischemia
  - ✓ Skin most tolerant to ischemia

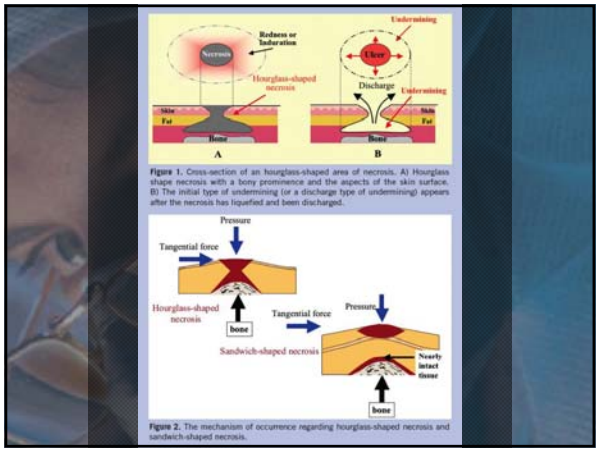
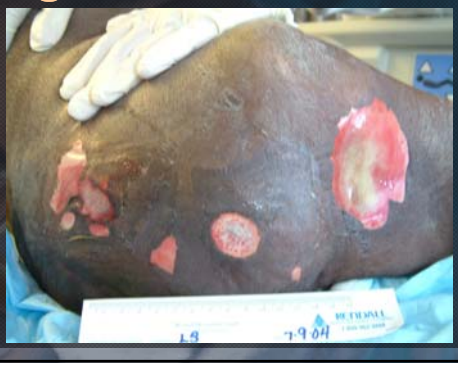


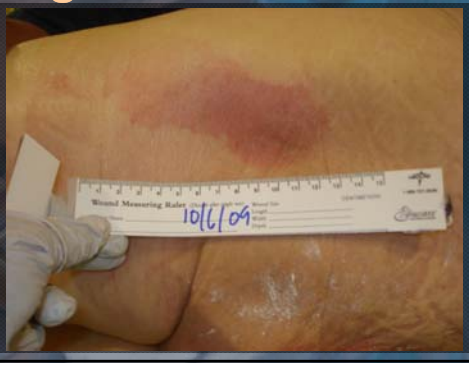
Figure 1. Cross-section of an hourglass-shaped area of necrosis. A) Hourglass shape necrosis with a bony prominence and the aspects of the skin surface. B) The initial type of undermining (or a discharge type of undermining) appears after the necrosis has liquefied and been discharged.

Figure 2. The mechanism of occurrence regarding hourglass-shaped necrosis and sandwich-shaped necrosis.

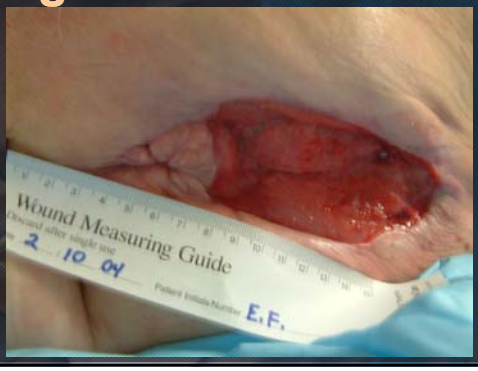
Stage II Pressure Ulcer



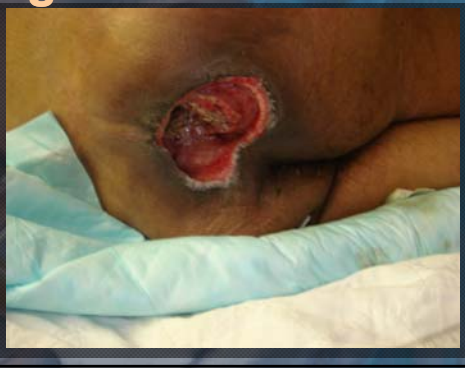
Stage I Pressure Ulcer



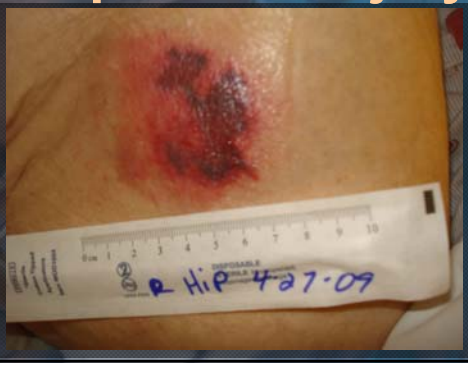
Stage III Pressure Ulcer



Stage IV Pressure Ulcer



Deep Tissue Injury



Unstageable Pressure Ulcer

Evaluation

- Critical surfaces
  - ✓ Chair
  - ✓ Cushion
  - ✓ Mattress
- Pressure mapping
- Nutritional status
  - ✓ Pre-albumin
  - ✓ Albumin for renal failure patients

Evaluation

- Assess nutrition on entry to new health care system or change in condition
- Ensure adequate dietary intake
- Encourage dietary supplements if deficiency suspected
  - ✓ Appetite stimulants
  - ✓ MVI
  - ✓ Increase protein intake
- Monitor nutritional status with weekly pre-albumin levels

Evaluation

- Ambulatory status – avoid bedrest, unless an ischial sore is present
- Flexion contractures
- Spasticity
- Incontinence/moisture

Evaluation

- Physical exam
  - ✓ Location
  - ✓ Measurements: L x W x D, tunneling
  - ✓ Appearance
    - Odor
    - Size
    - Base/necrotic debris
    - Periwound skin
    - Exudates
    - Staging

Management

- Establish repositioning schedule and avoid positioning on wound
- Maintain head of bed at lowest elevation possible (< 30º elevation)
- Use pressure reducing surface for high risk patients
- Get seat and cushion check yearly

Management

- Perform initial and maintenance debridement
- Remove all necrotic debris
  - ✓ Enzymatic
  - ✓ Sharp
  - ✓ Mechanical
- Infection control – reduce bacterial burden/ achieve "bacterial balance"

Management

- Use topical antimicrobials to decrease infected wound bacterial levels
  - ✓ IV antibiotics do not effectively decrease bacterial levels in granulating wounds
  - ✓ Once in "bacterial balance" (10^5 CFU/gm tissue and no β-hemolytic strep) d/c topical antimicrobials
- Achieve "bacterial balance" before attempting surgical closure

Management

- Wounds can harbor persistent organisms due to contamination from distant sites of infection, e.g. urine
- Infection surveillance – obtain specimen AFTER debridement
  - ✓ Tissue biopsy - preferred
  - ✓ Quantitative swab culture
- Check for infection if ≥ 2 weeks stalled healing in debrided wound

Management

- Routine wound cleansing with neutral non-toxic solution
- Achieve local moisture balance
  - ✓ Maintain moist wound environment
  - ✓ Manage exudate to protect periwound skin
- Dressing must stay in place and minimize shear/friction/skin irritation
- Select cost effective dressing

Wound Dressings

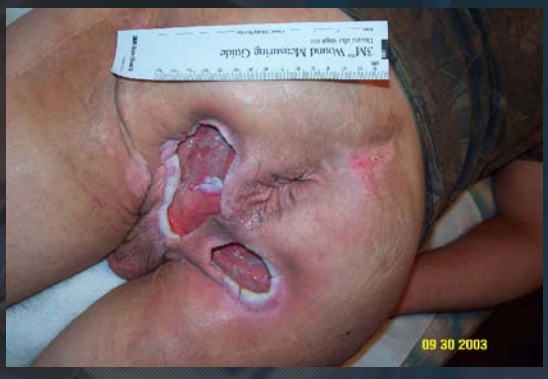
Dressing	Indications	Examples
foam	med exudate	Mepilex
antibacterial	infected	Kerlix AMD
alginate	hi exudate - requires secondary drsg	Kaltostat, Silvercel
hydrogel	dry or fibrinous exudate, granulating	Duoderm gel
hydrocolloid	superficial wound with minimal exudate	Duoderm
hydrofiber	low exudate - autolytic debride	Aquacel (Ag)
bioactive	advanced therapy	Regranex, Promogran
barriers	periwound maceration	Aloe Vesta Aloe Vesta antifungal

Complications

- Infection
  - ✓ Tissue biopsy/quantitative swab for culture
  - ✓ Radiology
  - ✓ Labs
- Secondary Amyloidosis
- Autonomic dysreflexia – peri-op
- Marjolin's ulcer
- Urethrocutaneous fistula

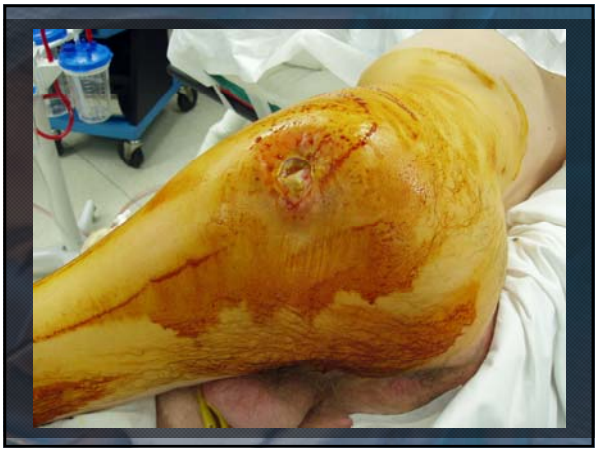
Management

- Negative Pressure Wound Therapy
  - ✓ Indications
    - Stage III or IV ulcer
    - Clean wound
  - ✓ Contraindications
    - Dirty/not debrided (> 30% necrotic tissue)
    - Fistula
    - Stool or urine contamination
    - Active bleeding
    - Untreated osteo



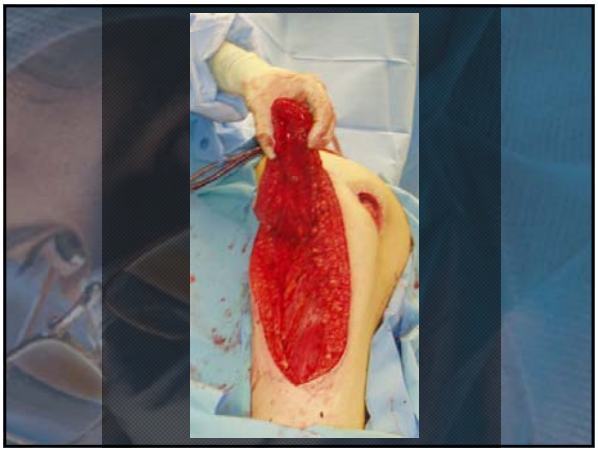
Candidates for Surgery

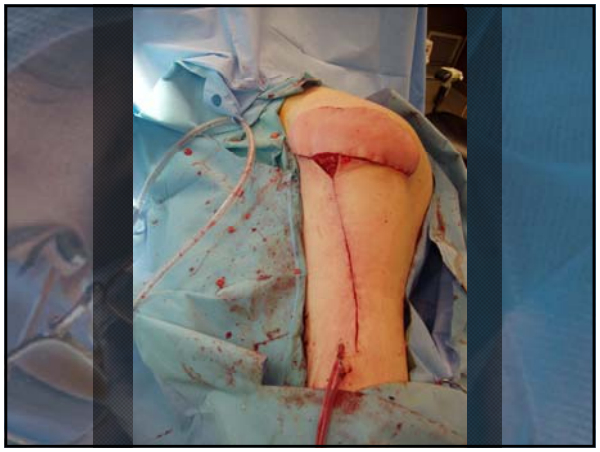
- Grade III or Grade IV ulcer
- Clean wound
- Chair and cushion evaluated ≤ 12 mos
- Adequate nutritional status



Candidates for Surgery

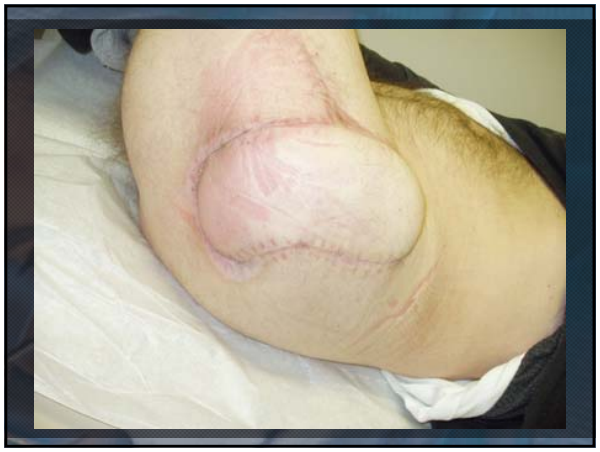
- Spasticity controlled
- No significant flexion contractures
- Evidence of patient compliance
  - ✓ Post-op bedrest for 30 days
  - ✓ One sore repaired per surgery
- Adequate psychosocial support
  - ✓ Pt insight into ulcer condition
  - ✓ Evidence of social support structure





Causes of Surgical Failure

- Spasticity
- Flexion contractures
- Improper cushion
- Infection
  - ✓ Hold bowel regimen immed post-op x 72 hours
  - ✓ Urinary catheter
- Hematoma/seroma
- Shear -poor patient compliance with bedrest
- Poor nutritional status



Education

- Patient and their caregivers
  - ✓ Pressure relief
  - ✓ Moisture
  - ✓ Nutrition
  - ✓ Chair and cushion selection and maintenance
  - ✓ Psychosocial support

Education

- Health care providers - especially for prevention of ulcers
  - ✓ Pressure relief
  - ✓ Frequent checks
    - 3P's: pain, positioning, potty
    - Skin- esp around devices, e.g splints, cervical collars, etc
  - ✓ Management of incontinence
  - ✓ Physical Therapy to prevent flexion contractures
  - ✓ Nutrition support
  - ✓ Infection surveillance
  - ✓ Consistent and ongoing documentation

Resources

- 1. Ohio State's Wheelchair Seating and Positioning Clinic
  - ✓ Dodd Hall Rehabilitation Services Outpatient Therapy
    OSU Martha Morehouse Medical Plaza
    2050 Kenny Road, Suite 2100 • Columbus, Ohio 43221
    (614) 293-3847 (phone) • (614) 293-6400 (fax)
- 2. Information for finding a good rehab Suplier/Clinican outside of central Ohio:
  - ✓ http://resna.org/find-a-certification (has listing of ATP professionals across the country)
  - ✓ www.nrrts.org (resource for w/c suppliers)

Summary

- Optimize conditions for both prevention and healing
  - ✓ Pressure relief
    - Surfaces
    - Positioning
    - Chair and cushion pressure mapping
  - ✓ Moisture management
  - ✓ Nutritional monitoring/optimization
  - ✓ Infection surveillance
  - ✓ Prevention of flexion contractures
  - ✓ Education
    - Patient
    - Family/caregiver
    - Healthcare staff
- Consider referral to Wound Care Center