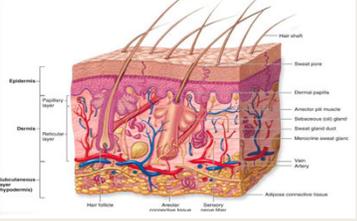


SURGICAL MANAGEMENT OF PRESSURE ULCERS

Linsey Etherington, MD
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Overview: Layers of the skin

- Epidermis
- Dermis
- Subcutaneous tissue
- Though interrelated, each layer of skin has different structures, cell types and functions.

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Skin Facts

- Largest organ of the body that covers approximately 3000 square inches and receives 1/3 of circulating blood volume
- From birth to maturity, the skin will undergo a sevenfold expansion
- Weighs approximately 6 pounds
- 1cm of skin has 15 sebaceous glands, 3 yards of blood vessels, 100 sweat glands, 3,000 sensory cells, 4 yards of nerves, 3000,000 epidermal cells and 10 hair follicles
- Capable of self-generation and can withstand limited mechanical and chemical assault

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What are pressure ulcers?

- Localized areas of tissue necrosis which develop when soft tissue is compressed between a bony prominence and an external surface for a prolonged period of time
- Most pressure ulcers occur over bony prominences, where combined with friction and shearing forces result in skin breakdown
- Several factors other than pressure contribute to ulcers including moisture, friction, shear, immobility, sensory loss, and underlying medical conditions

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Common pressure ulcer sites

- Supine:
 - 23% sacrococcygeal
 - 8% heels
 - 1% occiput, spine
- Sitting:
 - 24% ischium
 - 3% elbows
- Lateral:
 - 15% trochanter
 - 7% malleolus
 - 6% knee
 - 3% heels

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Factors

- Decreased sensation
- Decreased mobility
- Malnutrition
- Incontinence
- Shear and friction

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Classification of Pressure Ulcers

- The staging of pressure ulcers, as defined by national guidelines (NPUAP, CMS), allow for common understanding for healthcare professionals. The staging of pressure ulcers reflects the amount of tissue damage
 - Stage 1
 - Stage 2
 - Stage 3
 - Stage 4
 - Suspected deep tissue injury (DTI)
 - Unstageable

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Scope of the Problem

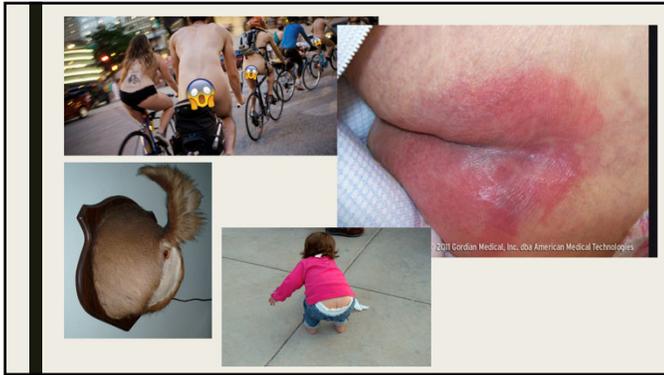
- NPUAP estimated cost to treat and heal hospital acquired pressure sores to be up to \$100K per patient
- Additional costs of managing pressure sores at nursing homes and home care facilities estimates to be approximately \$11 billion in 2006.
- Patients with pressure sores were inpatient nearly 3x longer than those without

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ASSESSMENT:
VISUAL
INSPECTION
OF THE TAIL

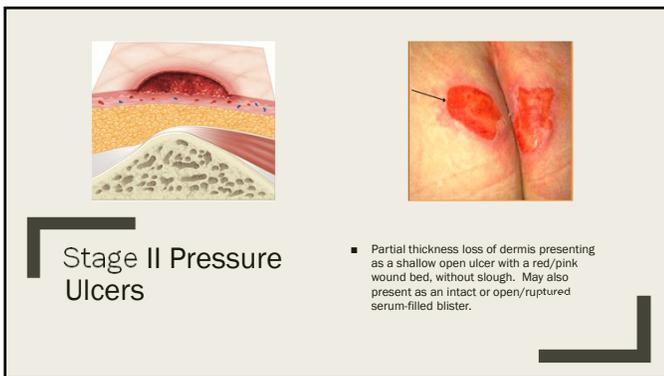
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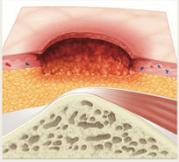
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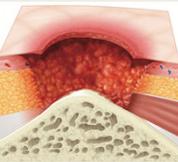
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Stage III Pressure Ulcer

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

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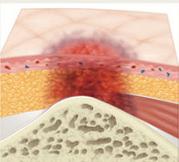
Stage IV Pressure Ulcer

- Full thickness tissue loss with exposed bone, tendon or muscle. Slough or eschar may be present. Often includes undermining and tunneling.

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Skin surface is intact



Suspected Deep Tissue Injury

- Purple or maroon localized area of intact skin or blood-filled blister due to damage of underlying soft tissue from pressure and/or shear.

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Unstageable Pressure Ulcer

- Full thickness tissue loss in which the base of the ulcer is covered by slough and/or eschar in the wound bed. Base of the wound cannot be visualized.

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Causative Factors

- Immobility
- Bowel & Bladder Incontinence
- Shearing and friction
- Advanced age
- Malnutrition
- Obesity
- History of pressure ulcers
- Dehydration
- Contractures
- Use of orthotic devices or restraints
- Lack of compliance

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Treatment: Patient Selection

- Optimize risk factors
- Rarely life threatening
 - *No need to rush into treatment*
- Superficial wounds may heal with risk factors addressed
- Poorly optimized patients will do poorly regardless of surgical technique

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Non Surgical Management

- Pressure relief
- Spasticity
- Infection
- Wound Care
- Negative Pressure Wound Therapy

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Osteomyelitis

- Establishing the diagnosis of osteomyelitis is essential before embarking on definitive surgical treatment of pressure sores.
- Unrecognized osteomyelitis is a major source of morbidity and increased costs.
- MRI is accurate and can help define the extent of infection

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Surgical treatment

- Excision of the ulcer, surrounding scar, underlying bursa and soft tissue calcifications
- Radical removal of underlying bone and any heterotopic ossification
- Padding of bone stumps and filling dead space
- Resurfacing with large regional pedicled flaps
- Grafting the donor site if necessary



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Flap Design

- The flap should be as large as possible, placing the suture line away from direct pressure
- The flap should not violate adjacent flap territories so as to preserve all options for coverage in the event that breakdown or recurrence dictates further reconstruction

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Procedure Selection

- Muscle flaps
- Random skin flaps
- Fasciocutaneous/ Musculocutaneous flaps
- Free flaps

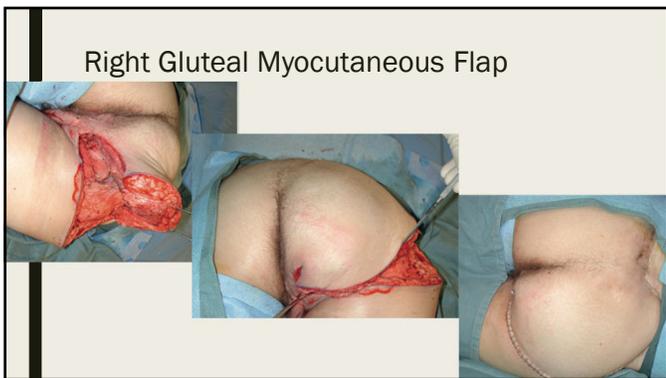
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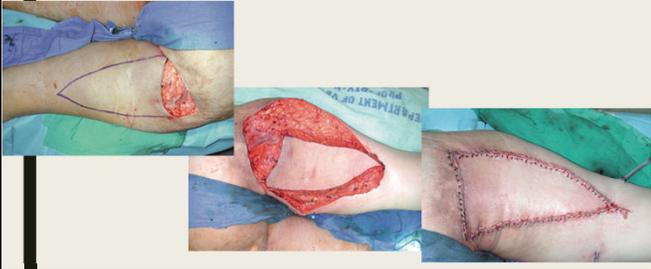


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Right Posterior Hamstring Musculocutaneous V-Y Advancement Flap



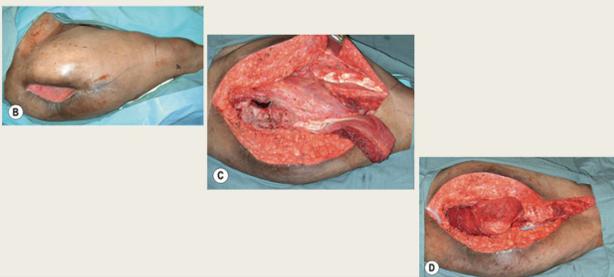
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Tensor Fascia Latae Flap

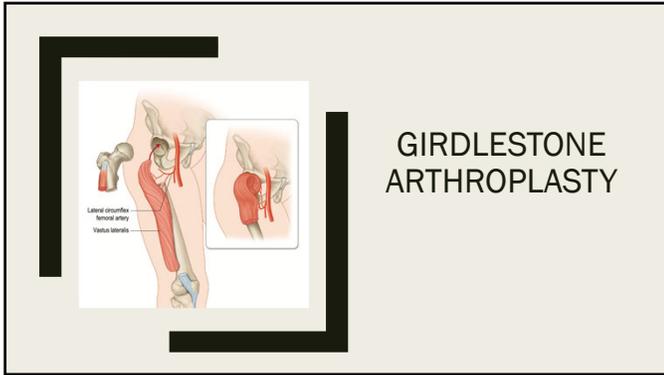


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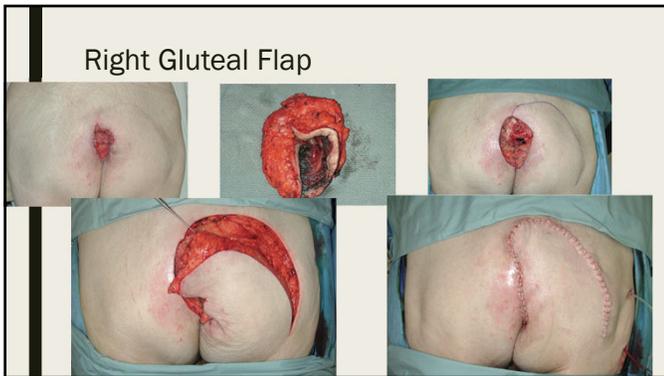
Trochanter Pressure Ulcer



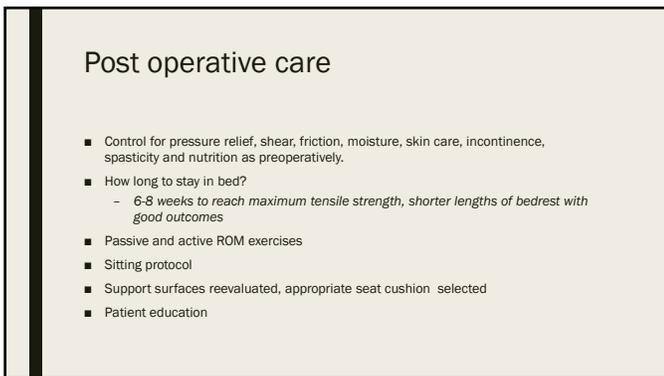
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Ready for surgery?

- Failed non surgical management
- Good nutrition, Pre albumin >18
- No nicotine use
- Appropriate off loading
- Appropriate bowel and bladder management
- Able to lay supine
- Willing to participate
