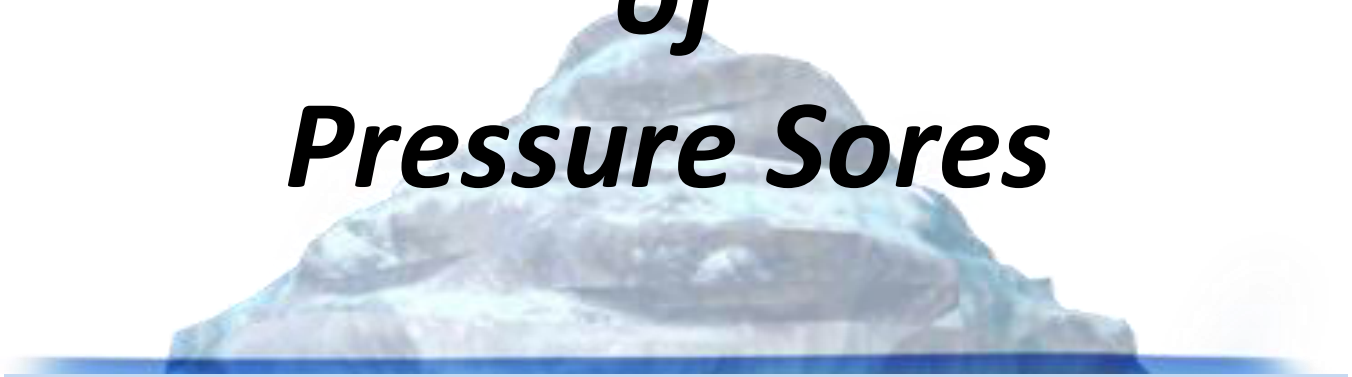
KASR ALAINY
CAIRO UNIVERSITY - FACULTY OF MEDICINE

Surgical Management of Pressure Sores



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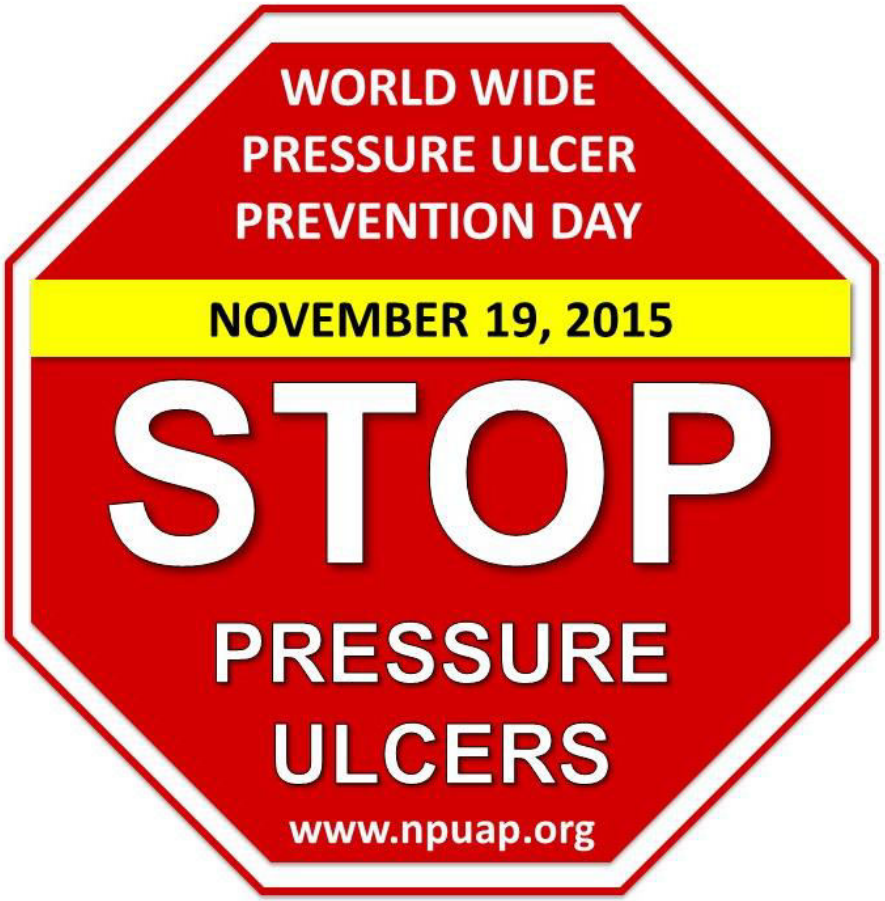
PREVENTION!


WORLD WIDE
PRESSURE ULCER
PREVENTION DAY
NOVEMBER 19, 2015
STOP
PRESSURE
ULCERS
www.npuap.org

Demographics

Janis, 2003

- **Prevalence**
  - General acute setting: 10 - 18%
  - Long term care facilities: 2.3 – 28%
  - Home care setting: 0 – 29%
- **Incidence**
  - General acute setting: 0.4 - 38%
  - Long term care facilities: 2.2 – 23.9%
  - Home care setting: 0 – 17%

Costs

Russo et al, 2006

- **National Pressure Ulcer Advisory Panel**
  - Total estimated *annual* cost for surgical and nonsurgical management is

$9.1 to $11.6

BILLION!

Aetiology: Extrinsic Factors

Enis and Sarmiento, 1973

- Mechanical Forces on soft tissue
  - Shear (parallel): superficial necrosis
  - Pressure (perpendicular): deep necrosis (Ms)
  - Friction: outermost skin
  - Moisture: skin maceration

Aetiology: Intrinsic Factors

Enis and Sarmiento, 1973

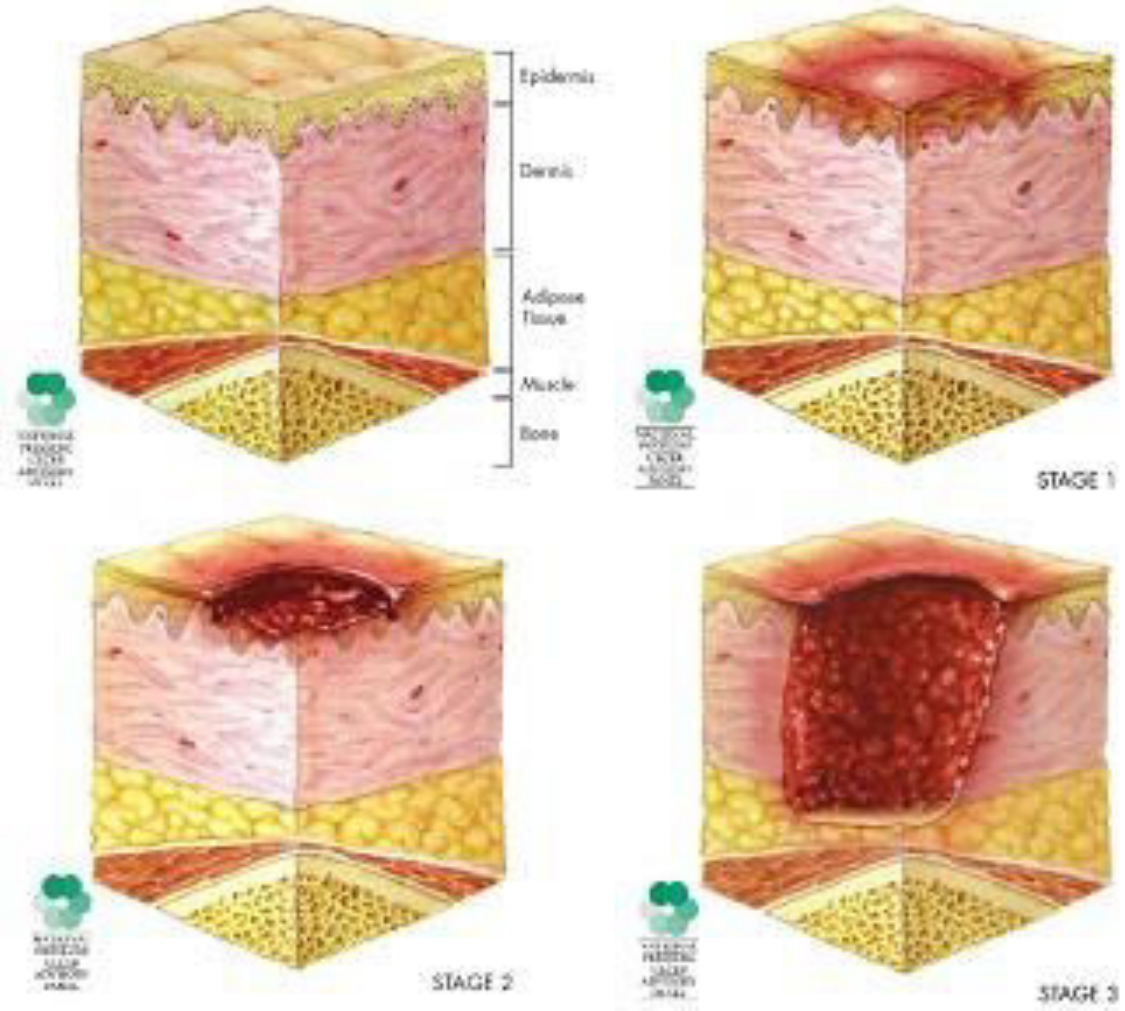
- Patient factors on soft tissue:
  - Ischemia/sepsis
  - Decreased autonomic control
  - Infection
  - Increased age
  - Sensory loss
  - Vascular disease/smoking
  - Anemia
  - Malnutrition
  - Altered level of consciousness

Risk Assessment

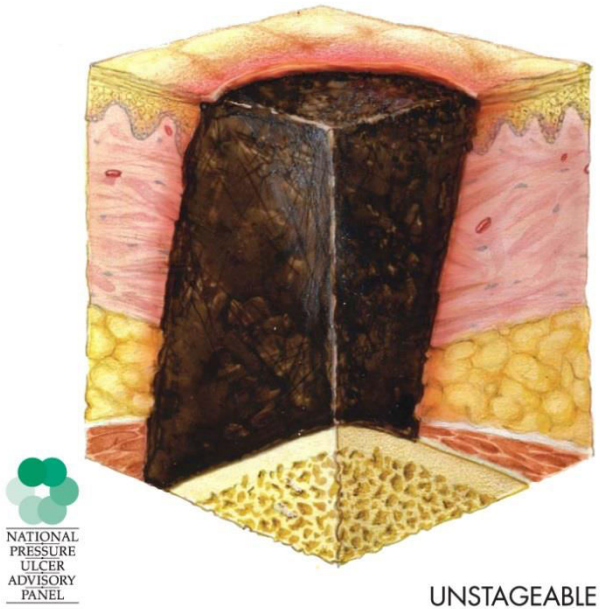
- **Braden scale**
- Norton scale
- Waterlow chart

Classification

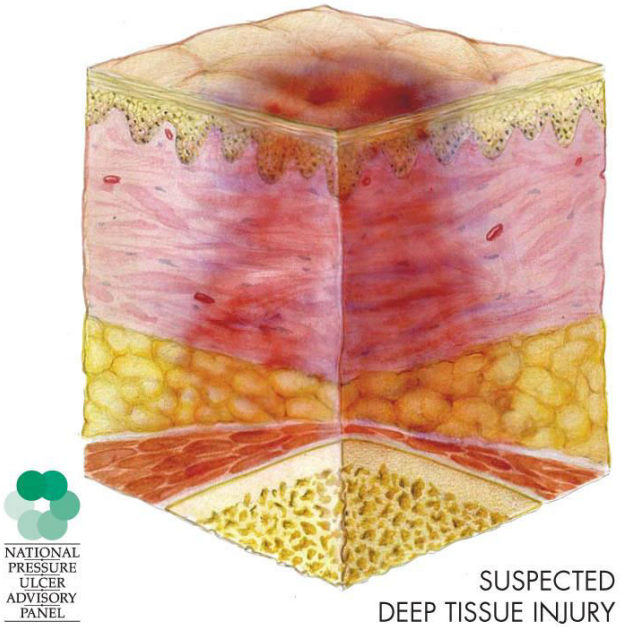
EPUAP - NPUAP(USA)



NPUAP 2007: “unstageable”



NPUAP 2007:
“suspected deep tissue injury”



Management

- **Stages I and II:** *nonsurgical*
- **Stages III and IV:** *surgical intervention*

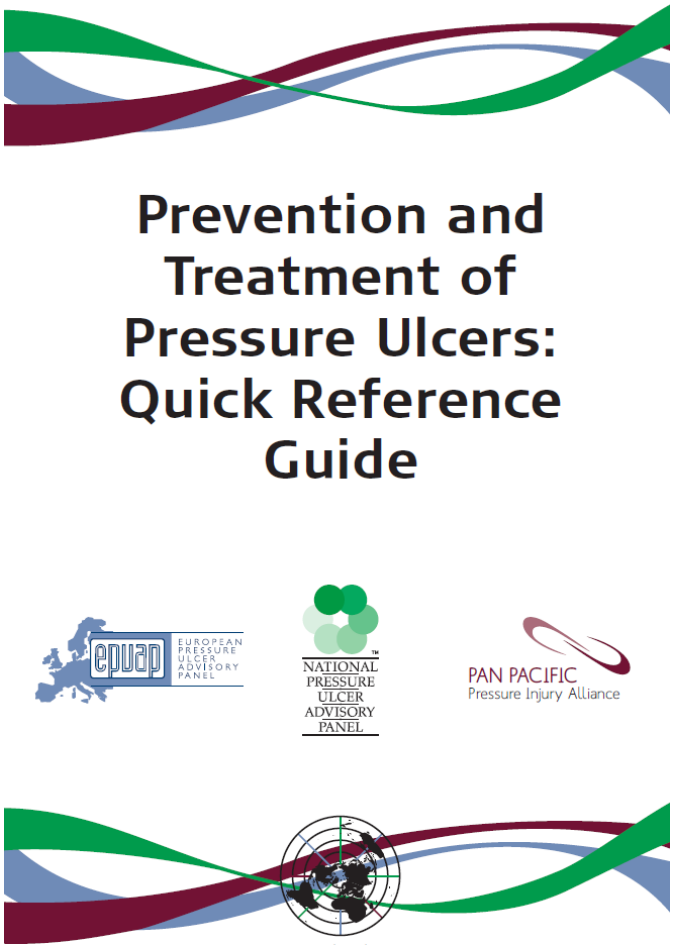
Surgical Management

Overview

Flaps

Postoperative considerations

Indications



2014

Surgical Consultation

- **Possible cellulitis or suspected source of sepsis**
  - Erythema
  - Tenderness
  - Edema
  - Purulence
  - Fluctuance
  - Crepitance
  - Malodor

- **Undermining, tunneling/sinus tracts** and/or extensive necrotic tissue
- **Stages III/IV that are not responding**

Patient Selection

- Well motivated
- Stable condition that is liable to improve
- Optimized general condition
- Consider ambulatory status

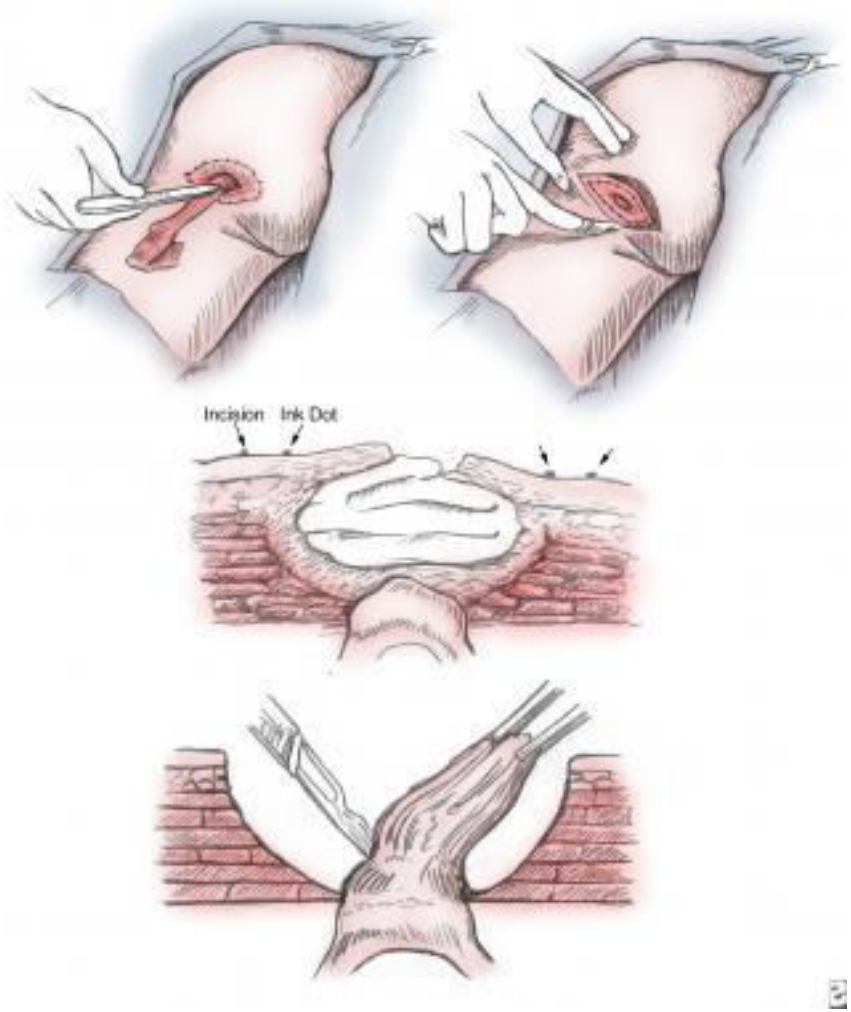
Goals of Surgery

- **Debridement: (oncological)**
  - Removal of all devitalized tissue
  - Complete excision of psuedobursa
  - Ostectomy of all devitalized bone

- **Reconstruction:**
  - Obliteration of dead space
  - Selection of flaps that do not jeopardize future flaps
  - Tension free closure

Debridement

- **Tools:**
  - Sharp
  - Electrocautery
  - Hydrosurgery (Versajet)
- **Infiltration with adrenaline**
- **Methylene blue** to paint bursa to ensure complete excision



NPWT

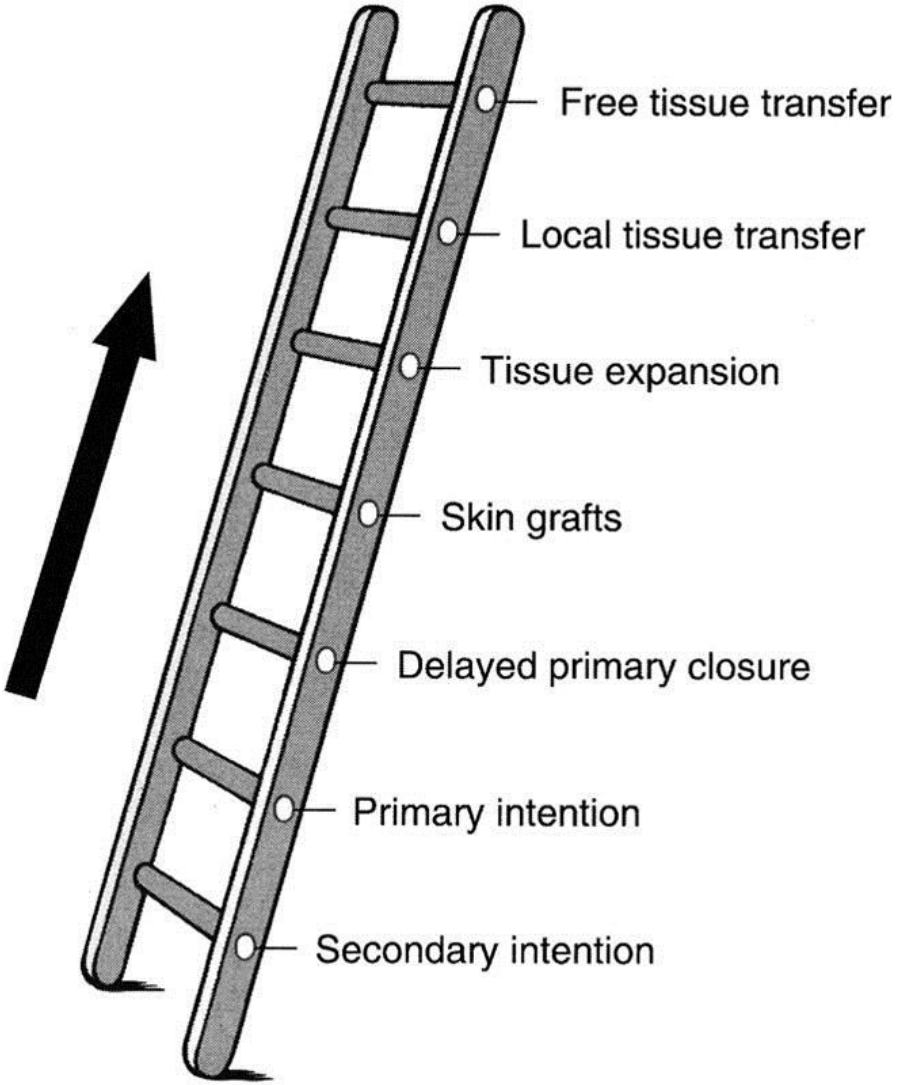
NPWT

- Effective for ***first line*** management of stage III and some stage IV ulcers
- Used ***after debridement*** to improve or reduce ulcer
- May ***bridge ulcers into surgery***
- ***Until patient ready*** for definitive surgery

Adjunctive therapy

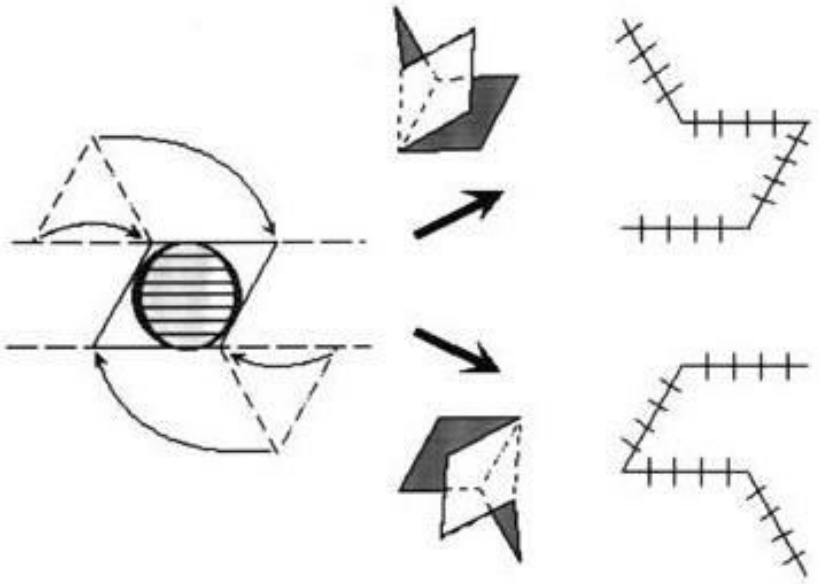
- **Cytokines and growth factors**
- **Hyperbaric Oxygen**
- **Skin graft substitute:**
  - *Collagen matrix substitute dermis* (Ishioka, 2003)
    - Angiogenesis and fibroplasia
    - Cannot be used on infection/necrotic tissue
    - Needs fixation
- **Adipose derived stem cells** (Zuk et al, 2001)
  - VEGF, prevents apoptosis/promote angiogenesis/assist in matrix reorganization/ recruits MSCs

Reconstruction



Reconstruction

- **Flaps:**
  - As ***L A R G E*** as possible
  - Do not violate other flaps
  - Fill dead space
  - Sutures away from pressure



- **Staged operations:**

"Some evidence suggests that one-stage debridement, ostectomy, and immedeiate reconstruction

is as successful as staged debridement, NPWT, and delayed reconstruction"

Larson et al, 2012

Preoperative Evaluation

- **Determine aetiological factors**
  - Extrinsic and extrinsic
- **Laboratory studies**
  - Complete blood count
  - Glucose/HbA_1C
  - ESR/CRP
  - Albumin/Prealbumin
  - Wound swabs
- **Imaging**
  - Extent of osteomyelitis

“All medical **comorbidities** and both extrinsic and intrinsic factors should be documented and ***optimised*** before reconstruction”

"**Anemia, serum protein levels, and inflammatory markers** have been shown to normalize *after* surgical management"

Symptoms, not causes

“If the **extent of osteomyelitis** is unknown or underappreciated,

reconstruction is destined to fail”

Surgical Management

- Overview
- **Flaps**
- Postoperative considerations

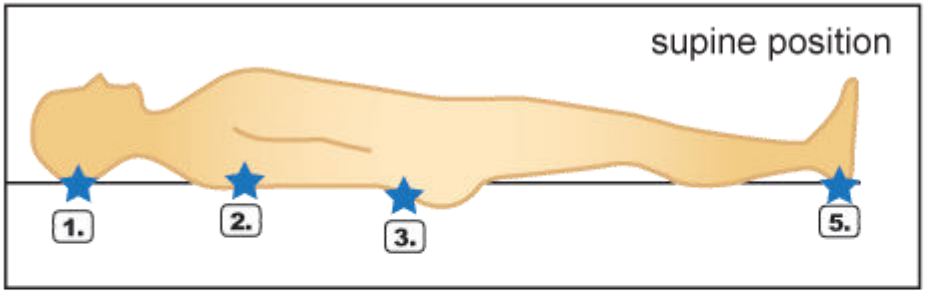
Types of Flaps

- **C**ongruity
- **C**onfiguration
- **C**omponents
- **C**irculation
- **C**onditioning

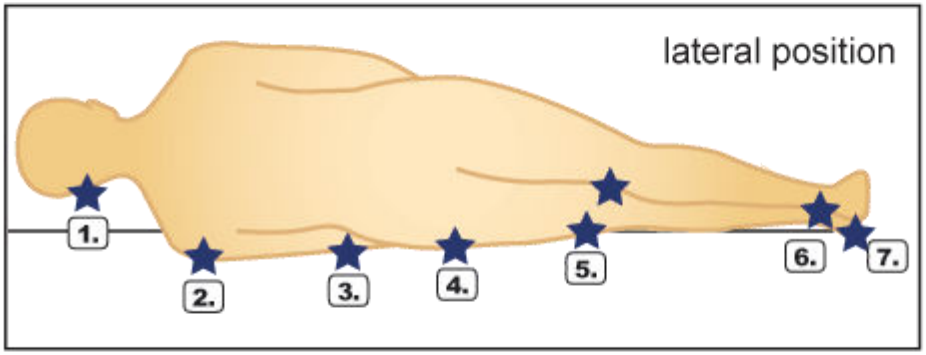
Types of Flaps

- Congruity: Local, Regional, Distant
- Configuration: Advancement, rotation
- Components: Skin, Facsio/Myocutanous
- Circulation: Random, Axial
- Conditioning: Delay

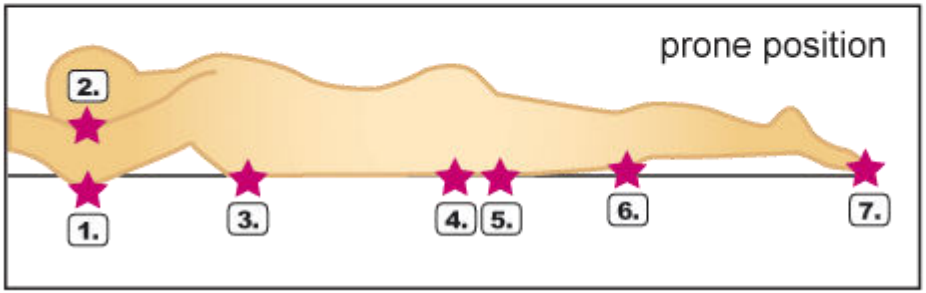
Common Sites



1. occiput
2. scalpula
3. sacrum
4. heels



1. ear
2. acromion process
3. elbow
4. trochanter
5. medial & lateral condyle
6. medial & lateral malleolus
7. heels



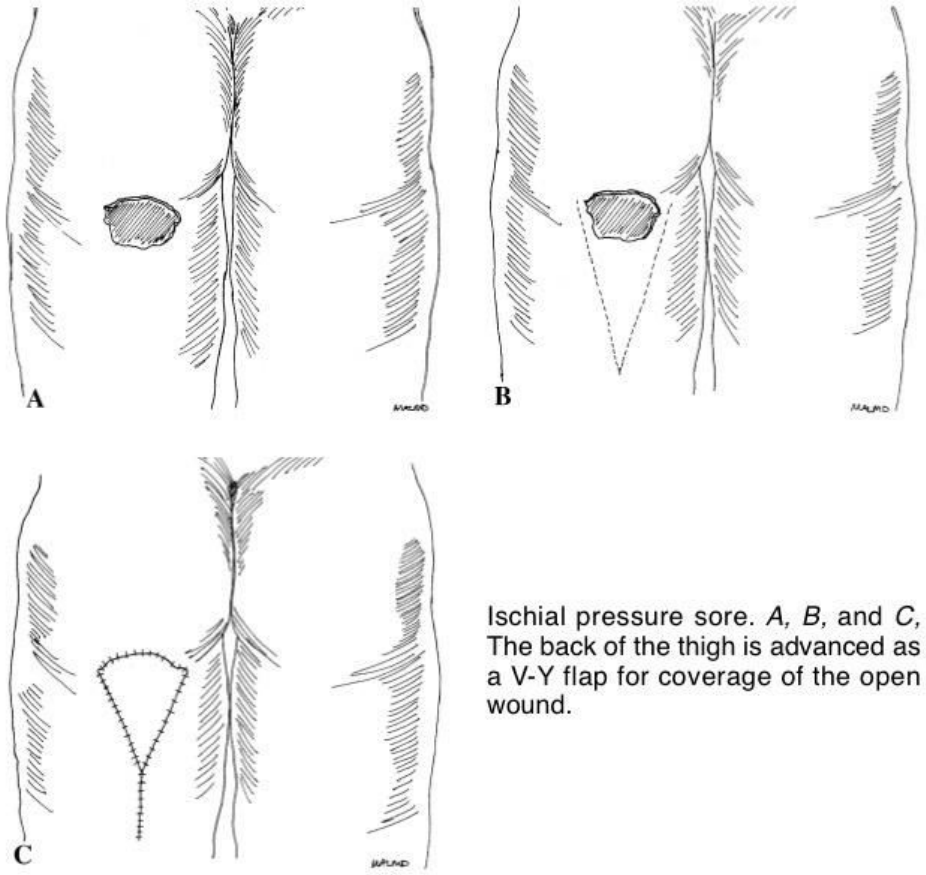
1. elbow
2. ear, cheek, nose
3. breasts (female)
4. genitalia (male)
5. iliac crest
6. patella
7. toes

Ischial (28%) Janis, 2003

- **Posterior Thigh Rotational Flap:**

Ischial

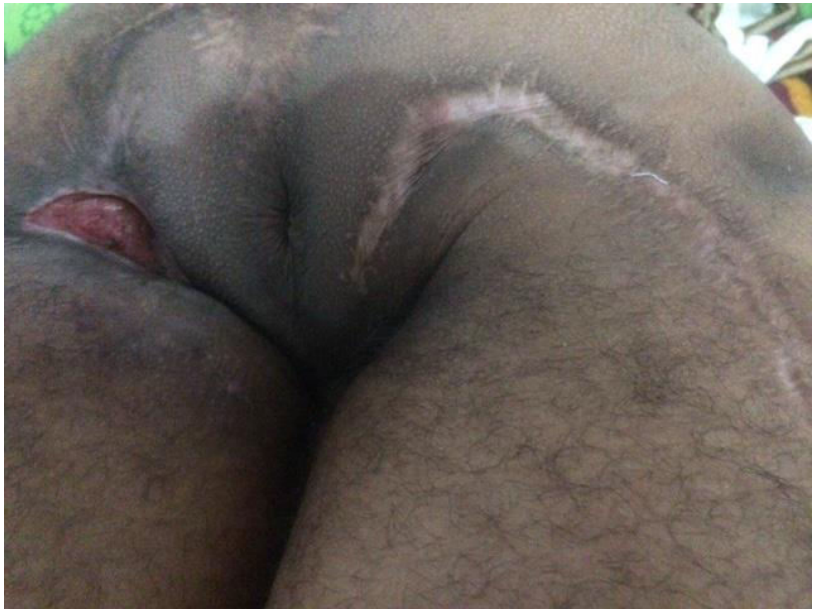
- **Posterior Hamstring V-Y Advancement Flap:**



Ischial pressure sore. *A*, *B*, and *C*, The back of the thigh is advanced as a V-Y flap for coverage of the open wound.

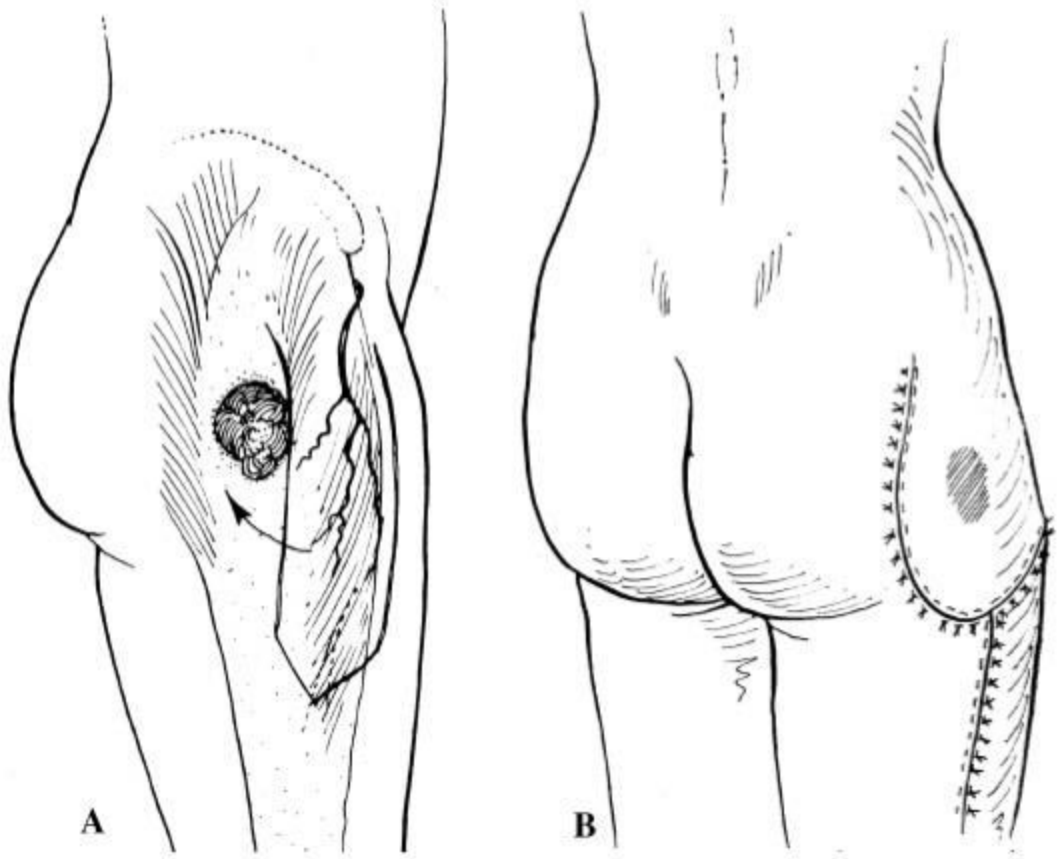
Ischial

- **Posterior Hamstring V-Y Advancement Flap:**



Trochanteric (19%) Janis, 2003

- **Tensor Fascia Lata Flap:**



Trochanteric (19%) Janis, 2003

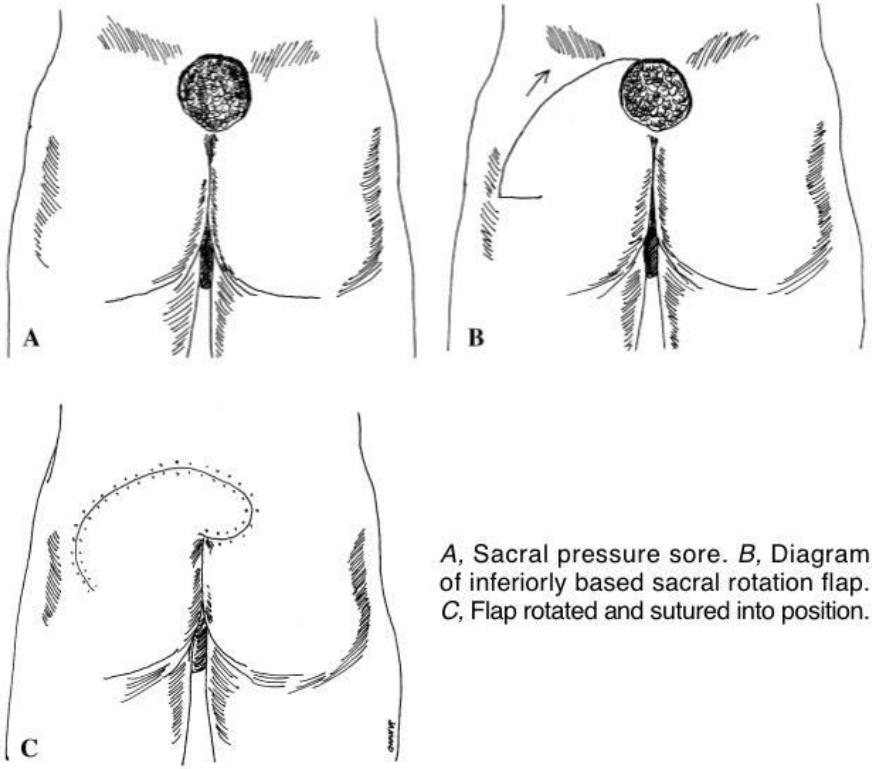
- **Tensor Fascia Lata Flap:**

Trochanteric

- **V-Y Hatchet Flap:**

Sacral (17%) Janis, 2003

- **Rotational Flap:**



A, Sacral pressure sore. *B*, Diagram of inferiorly based sacral rotation flap. *C*, Flap rotated and sutured into position.

Sacral (17%) Janis, 2003

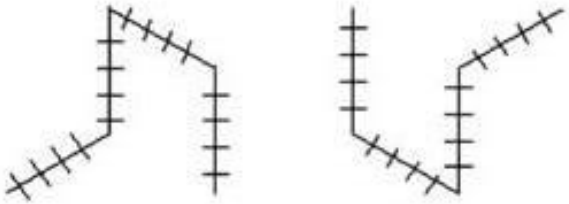
- **Rotational Flap:**

Sacral

- **V-Y Advancement Flap:**

Sacral

- **Rhomboid Flap:**

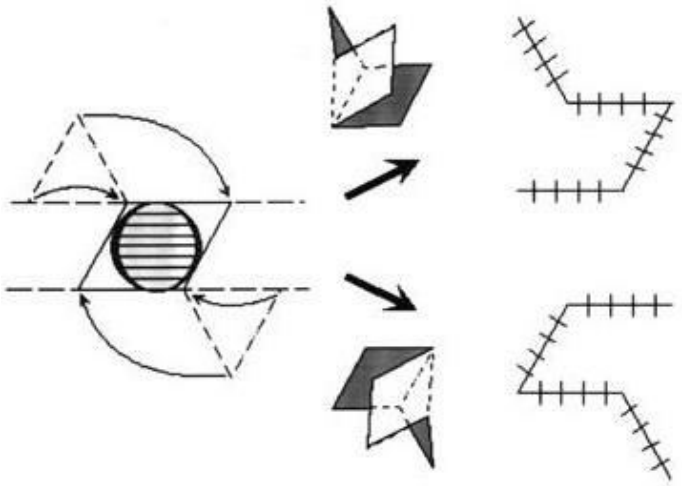


Heel (9%) Janis, 2003

Stable eschar on heel (dry, adherent, intact without fluctuance or erythema) serves as the body's natural (biological) cover and

should not be removed

Other sites



Surgical Management

- Overview
- Flaps
- **Postoperative considerations**

Postoperative Care

- Pressure relief bed for 3-6 weeks
- Suture removal after 2-3 weeks
- Antibiotics (culture) and drains
- Antispasmodics/bowel regimen
- Nutrition
- Preventive measures
- Education

Complications

- Hematoma
- Infection
- Wound dehiscence
- Recurrence
  - Overall 40-60% (Chui 2011)
  - More with ischial sores

“Complication rates are higher with perforator and muscle flaps, while recurrence is higher with fasciocutaneous flaps”

(Sameem et al, 2012)

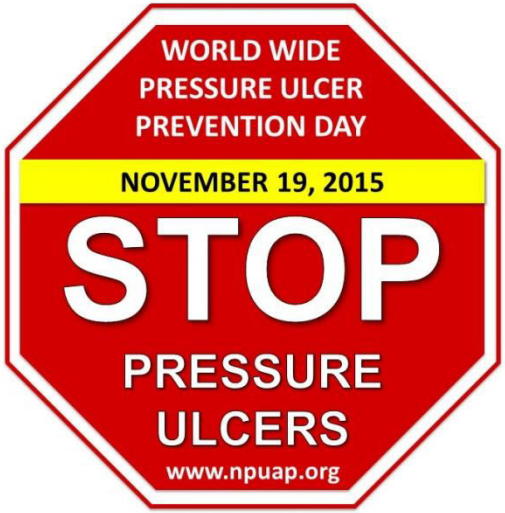
Recurrence

- Identify cause
  - eg. flap failure, infection, post op care…
- Many flaps can be readvanced or rerotated
- May use combination flaps

Key Points

- Prevention Prevention Prevention !
- Low threshold for surgical consultation
- Preop optimization of patient
- Anemia and low Albumin are symptoms, not causes
- Surgery can be staged
- NPWT can be used to bridge to surgery
- Post op care is crucial for successful surgery
- BACK to PREVENTION!

Thank you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