

# Stage IV

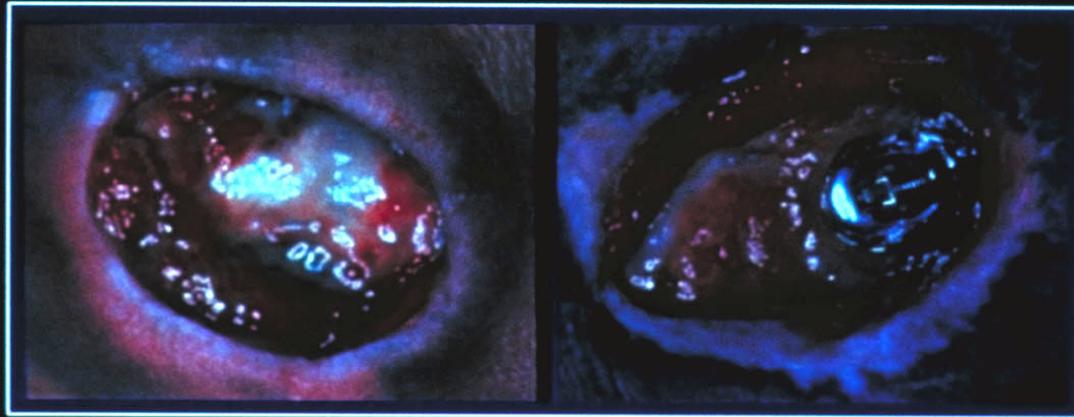
- Full thickness tissue loss with exposed bone, tendon or muscle. Slough or eschar may be present on some parts of the wound bed. Often include undermining and tunneling.

## ***Further description:***

The depth of a stage IV 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 IV ulcers 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.

# Assessment

## Stage IV



THE NATIONAL  
EYE INSTITUTE  
NIH  
U.S. DEPARTMENT OF HEALTH & HUMAN SERVICES

# 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.

***Further description:***

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.

# Assessment

## Unstageable Pressure Ulcer

- Ulcer NOT stageable until eschar removed



# Pressure Ulcer Assessment

- **Purpose of staging is for consistent communication of depth of tissue destruction**
- **Once staged, the ulcer should not be back staged, rather the wound should be described in terms of size, shape, color, drainage, and odor using one of the wound assessment measures ([www.npuap.com](http://www.npuap.com))**
- **To accurately complete the MDS & Oasis, follow instructions provided**

# Assessment

- **Signs of a Concern**
  - **Intact skin with deep red/purple/dusky appearance and/or consistency changes (DTI)**
  - **Surrounding skin having deep red/purple/dusky appearance**
  - **Formation or increase in slough/eschar**
  - **Sudden onset of pain in the wound**
  - **Sudden onset or increase in drainage**
  - **Sudden onset of a foul odor (odor present after dressing removal and irrigation)**
  - **Surrounding skin having erythema & induration >2cm**

# Assessment

- **Signs of a Concern**

- **Lack of progress in 2 weeks**
- **Increase in size and/or depth not secondary to normal debridement**
- **Friable wound bed (overtly beefy red with excessive bleeding and not showing progress)**
- **Visible or palpable bone with lack of progress (osteomyelitis)**
- **Change in cognition**
- **Fever**

# Assessment

- **If a concern is noted:**
  - **Notification of the Physician/NP**
  - **Notification of the family/designee and individual**
  - **Notification of the Interdisciplinary team**
    - » **Wound nurse**
    - » **Dietary**
    - » **Therapies**
  - **Re-assessment of risk factors → up-date interventions/care plan**
  - **DOCUMENT ALL OF THESE ACTIONS & RESULTS**

# Assessment

- **Potential reasons a wound may decline or become chronic:**
  - **Infection/Biofilms**
  - **Rolled wound edges**
  - **Lack of blood supply to the area**
  - **Poor nutrition**
  - **Steroid use**
  - **Declining health status – organ failure of the skin**
  - **Inappropriate topical support**

# Treatment

- **Osteomyelitis**

- **Visible or palpable bone (+ predictive validity of 89% & - predictive validity of 56%)**
- **Bone biopsy gold standard, next MRI**
- **Aggressive antibiotic therapy lasting 6-8 weeks**
- **May need debridement of affected bone**

# Treatment

- **Culture of wound**
  - **Tissue biopsy is the gold standard**
  - **Levine technique – Viable tissue ONLY**
- **Institute appropriate systemic antibiotic therapy for individuals with infected ulcers, bacteremia, sepsis, cellulitis, or osteomyelitis**
- **Immediate surgical debridement if slough, eschar or friable tissue**
- **Do not use semi-occlusive or occlusive dressings on infected wounds (i.e., transparent films or hydrocolloids)**

# Treatment

- **Reducing Bacterial loads**
  - **Silver** (do not use with Santyl or e-stim)
  - **Cadexomer Iodine (Iodosorb)**
  - **HydroFera Blue**
  - **Utilize for 2-4 weeks**

# Treatment

- **Debridement**

- **All Pressure ulcer need debridement of non-viable tissue in order to heal**
- **Except stable heel ulcers with NO signs of infection**
- **Sharp/Surgical is the fastest form of debridement**
- **Santyl is the only enzymatic debrider on the market**
- **Any dressing that promotes a moist environment will promote autolytic debridement**
- **Wet to dry is a form of debridement**

# Topical Treatment

- **Topical Dressings**

- Understand major categories of dressings
- No one dressing will work with all wounds
- Wound Characteristics should be assessed to determine treatment
- As the wound changes so will your topical treatment
- Write Physician order with the category of the product only, when possible

# Topical Treatment

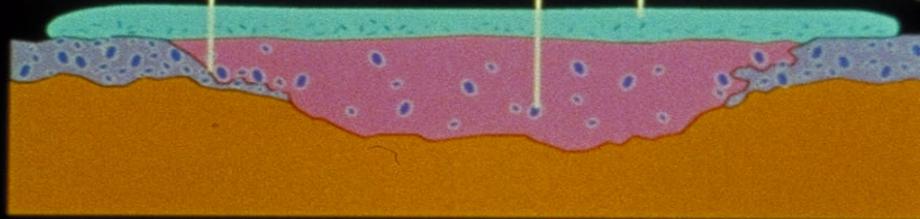
## MOIST WOUND HEALING

### Moist healing

Epidermal cells dividing and migrating across surface

Phagocyte in fluid filled space

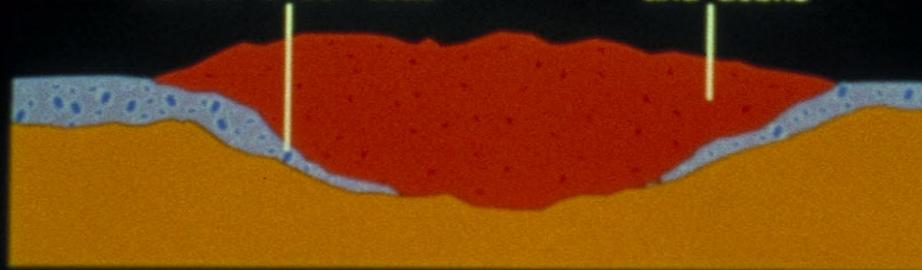
Occlusive dressing



### Dry healing

Epidermal cells have to burrow under scab

Dry scab of film and debris



# Topical Treatment

- **Topical Treatment tips**

- All wounds should be irrigated with normal saline at each dressing change.
- Wounds with adherent materials may benefit from the use of commercial wound cleansers that do not contain harmful chemicals

# Topical Treatment

## **Topical Treatment Tips** (continued)

### **– Choose a dressing that:**

- **Keeps the ulcer bed continuously moist**
- **Keeps the surrounding skin intact (consider skin prep)**
- **Controls exudate, but does not dry the ulcer bed**
- **Eliminates wound dead space (LOOSELY filling all cavities without over packing)**
- **Consider caregiver time**

# Treatment Program

- **Do you have topical products in place for when a wound develops**
  - **Moisture dressings (i.e., hydrogels, hydrocolloids and transparent films)**
  - **Absorptive dressings (i.e., foams and calcium alginates)**
  - **Enzymatic debrider (Santyl prescription only)**
  - **Dressings that decrease bacterial loads (silver, Iodosorb, Hydrofera blue, etc.)**
  - **Access to collagens and/or cellulose dressings**
  - **Access to adjunctive therapies (i.e., V.A.C., Infrared, E-Stim, Ultrasound, etc.)**

# Treatment

- **Resident has appropriate support surfaces**
  - **Low-airloss for stage III or IV and/or multiple turning surfaces affected**
  - **The deeper the air chamber and the more you can program the surface specifically for the resident the more aggressive it is**
  - **Refer to Therapy for seating surface. Gel and air out perform foam**

# Treatment

- **Ensure turning and repositioning is individualized & actually implemented**
- **Ensure toileting programs are individualized and implemented – skin should always be protected**

# Treatment

- **Ensure nutritional support**
  - **Dietary Referral**
  - **35-40 kcalories/kg of body wt/day**
  - **1.0 -1.5 g protein/kg of body wt/day**
  - **Simple multivitamin – Extra Vit C & Zinc only if there is a deficiency. Utilize Zinc for no more then 2-3 weeks**
  - **Labs per discretion of clinician**
    - **Albumin <3.5**
    - **Pre-albumin <17**

# Treatment

- **Monitor for implementation of interventions**
  - **Check treatment records**
  - **Observe dressing changes**
  - **Monitor turning and toileting (sticky notes)**
  - **Observe for heel elevation**
  - **Observe for appropriate equipment**
  - **Housekeeping to observe mattress condition**
  - **Observation of supplementation pass/consumption of meals**

Treatment

**COST** verses **CLINICAL**

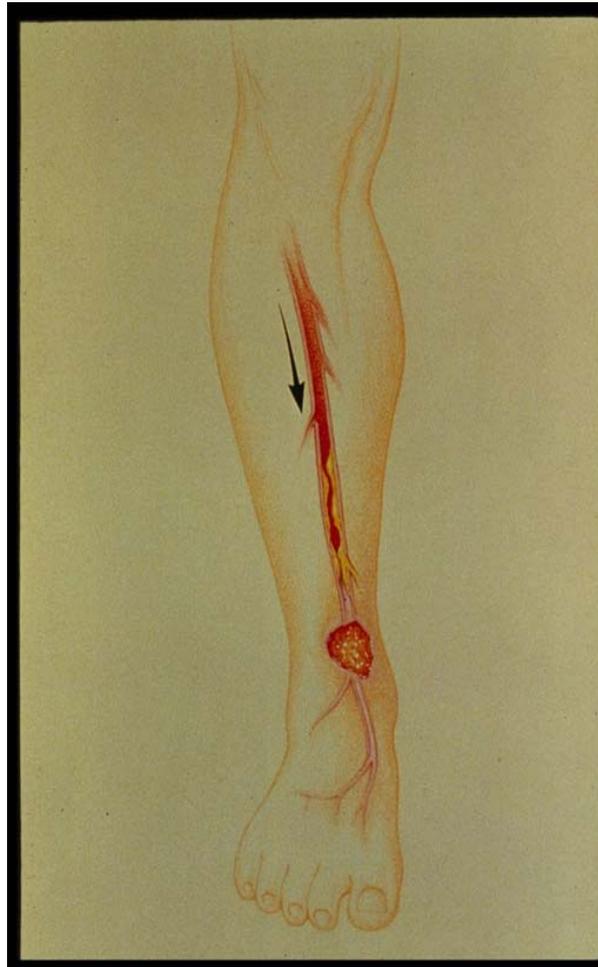
# Communication

- **Notify the Physician/NP & the FAMILY/INDIVIDUAL**
  - Upon the discovery of the ulcer at any stage
  - If there is no progress in 2 weeks
  - If there is a decline
  - Have the Physician/NP observe the ulcer when they visit the resident
  - The Interdisciplinary team should also be notified at these intervals

# Lower Extremity Ulcers

## F309

# Arterial Insufficiency



# Arterial Insufficiency

## Signs & Symptoms

- **Extremity becomes pale/pallor with elevation and has dependent rubor**
- **Skin: shiny, taut, thin, dry, hair loss of lower extremities, atrophy of subcutaneous tissue**
- **Increased pain with activity and/or elevation (intermittent claudication, resting, nocturnal and positional)**

# Arterial Insufficiency

## Signs & Symptoms

### Perfusion

#### –Skin Temperature:

- Cold/decreased

#### –Capillary Refill

- Delayed – more than 3 seconds

#### –Peripheral Pulses

- Absent or Diminished

# Arterial Insufficiency Tests

- **Ankle Brachial Index (Doppler)**
  - $\leq 0.8$
- **Systolic Toe Pressure (Doppler)**
  - TP < 30
- **Transcutaneous Oxygen Pressure Measurements (TcPo<sub>2</sub>)**
  - TcPo<sub>2</sub> < 40 mm Hg

# Arterial Insufficiency Ulcers

## Location

- **Toe tips and/or web spaces**
- **Phalangeal heads around lateral malleolus**
- **Areas exposed to pressure or repetitive trauma (shoe, cast, brace, etc.)**

# Arterial Insufficiency

## Arterial Ulcer

### *Characteristics*

- Deep, “punched out”
- Pale wound bed
- Necrotic tissue
- Minimal exudate
- Even wound margins
- Cellulitis common
- Associated with PVD
- Painful, in absence of neuropathy



# Arterial Insufficiency



# Arterial Insufficiency Interventions

## Measures to Improve Tissue Perfusion

- Revascularization if possible
- Lifestyle changes (no tobacco, no caffeine, no constrictive garments, avoidance of cold)
- Hydration
- Measures to prevent trauma to tissues (appropriate footwear at ALL times)

# Arterial Insufficiency Interventions

## ● **Topical Therapy**

- Dry uninfected necrotic wound: KEEP DRY
- Dry INFECTED wound: Immediate referral for surgical debridement/aggressive antibiotic therapy (Topical antibiotics are typically ineffective for arterial wounds)

# Arterial Insufficiency Interventions

## ● **Topical Therapy** (continued)

### – **Open Wounds**

- Moist wound healing
- Non-occlusive dressings (e.g. solid hydrogel)
- Aggressive treatment of any infection
  - **Cadexomer Iodine (Iodosorb) decrease bacterial loads**

## ● **Adjunctive Therapies**

- Hyperbaric oxygen therapy
- Intermittent pneumatic compression (45min-1hr, 3-4 per day while in a seated position)
- Topical autologous activated mononuclear cells, twice per week (Autologel)

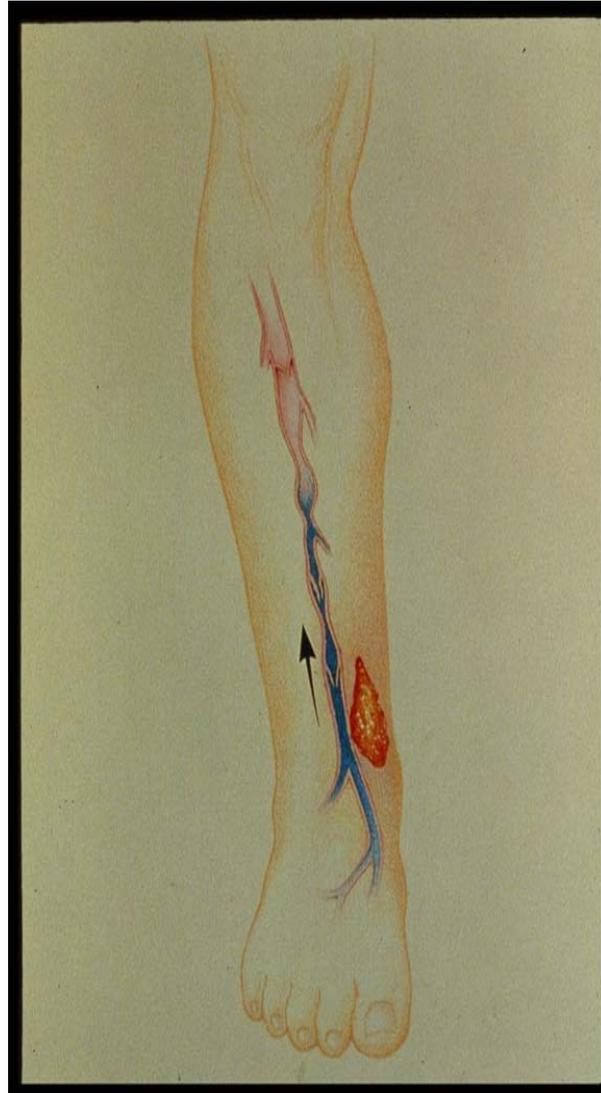
# Arterial Insufficiency Interventions

## ● **Adjunctive Therapies** (continued)

- High-voltage pulsed current (HVPC) electrotherapy

## ● **Patient Education**

# Venous Insufficiency



# Venous Insufficiency Signs & Symptoms

## Lower Leg characteristics

- **Edema**
  - Pitting or non-pitting
- **Venous Dermatitis** (erythema, scaling, edema and weeping)
- **Hemosiderin Staining**
  - Brown staining (hyperpigmentation)
- **Active Cellulitis**

# Venous Insufficiency Signs & Symptoms



# Venous Insufficiency

## Signs & Symptoms

### ● Pain

● Minimal unless infected or desiccated

### ● Peripheral Pulses

● Present/palpable

### ● Capillary Refill

● Normal-less than 3 seconds

### ● Duplex Scan with Doppler Ultrasound

# Venous Insufficiency Ulcers

## **Location**

- Medial aspect of the lower leg and ankle
- Superior to medial malleolus

# Venous Ulcer

## *Characteristics*

- Superficial (dermal)
- Ruddy, granular tissue
- Irregular wound margins
- Exudate usually present
- Usually painless
- Associated with venous disease



# Venous Insufficiency



# Venous Insufficiency



# Venous Insufficiency Treatment

- Elevation of legs
- Compression therapy to provide at least 30mm Hg compression at the ankle
- T.E.D. hose or anti-embolism stockings and Ace wraps are not effective compression
- Recommend to get a baseline ABI
  - If ABI is  $>.8$  use compression at ankle at 30-40 mm/HG or 20-30 mm/HG depending severity
  - If ABI is  $.8$  to  $.6$  use reduced compression up to 23mm/HG
  - If ABI is  $.5$ , resident has a DVT or exacerbated CHF compression is contraindicated

# Venous Insufficiency Treatment

- **Compression to get edema under control or while wounds are healing:**
- Short Stretch/compression wraps (Setopress, Comprilan, Profore, Unna's boot, Coban 2 layer wrap)
- In severe cases compression pumps
- Manufactures instructions must be followed when applying

# Venous Insufficiency Treatment

- **Compression Therapy once edema under control and/or wound have healed**
  - Jobst, Juzo, Sig-varis, etc.
  - CircAid T-3M, if stockings are difficult to put on

# Venous Insufficiency Treatment

## ● **Topical Therapy**

- Absorb exudate (e.g. alginate, foam)
- Maintain moist wound surface (e.g. hydrocolloid)
- Hydrocortisone for active venous dermatitis, once under control petroleum products to lower legs only (no mineral or lanolin oil)
- Monitor and treatment of cellulitis

## ● **Patient Education**

# Peripheral Neuropathy/Diabetic Risk Factors

## History

-  Diabetes
-  Spinal cord injury
-  Hypertension
-  Smoking
-  Alcoholism
-  Hansen's Disease
-  Trauma to lower extremity
-  Family history
-  \*\*\*Please note that there are over 100 known causes

# Peripheral Neuropathy/Diabetic Signs & Symptoms

- **Relief of pain with ambulation**
- **Parasthesia of extremities**
- **Altered gait**
- **Orthopedic deformities**
- **Reflexes diminished**
- **Altered sensation (numbness, prickling, tingling)**

# Peripheral Neuropathy/Diabetic Signs & Symptoms

- ▣ **Intolerance to touch (e.g., bed sheets touching legs)**
- ▣ **Presence of calluses**
- ▣ **Fissures/cracks, especially the heels**

Arterial insufficiency commonly co-exists with peripheral neuropathy!

# Peripheral Neuropathy

## Diabetic Tests

- **Light pressure using a Semmes-Weinstein Monofilament Exam**
- **Vibratory sense using a tuning fork**
- **Deep tendon reflexes of ankle and knee**
- **Recommend an ABI as arterial insufficiency commonly co-exists**

# Peripheral Neuropathy

## Diabetic Location

- ◆ **Plantar aspect of the foot**
- ◆ **Metatarsal heads**
- ◆ **Heels**
- ◆ **Altered pressure points**
- ◆ **Sites of painless trauma and/or repetitive stress**

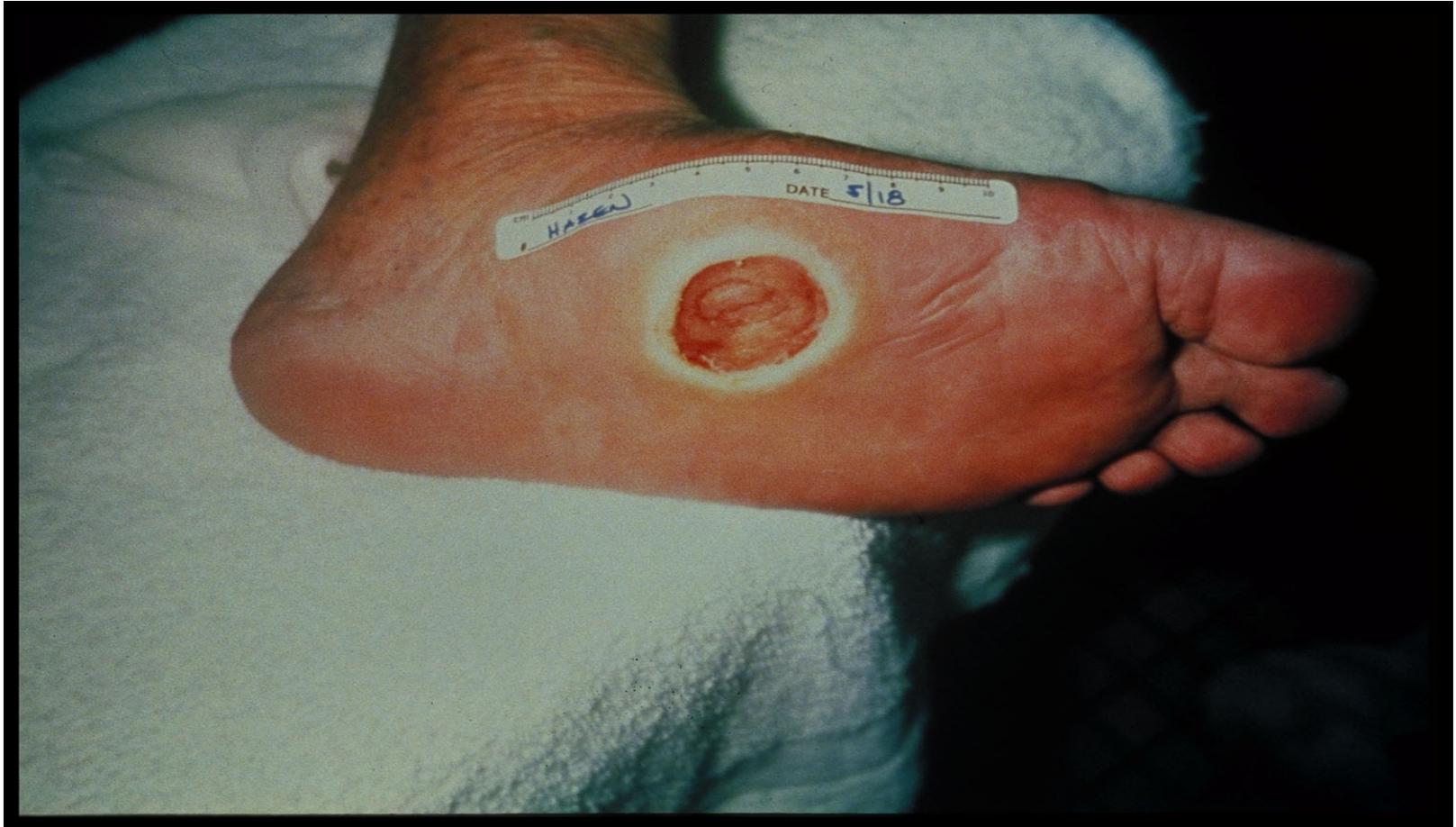
# Diabetic (Neuropathic ) Ulcer

## *Characteristics*

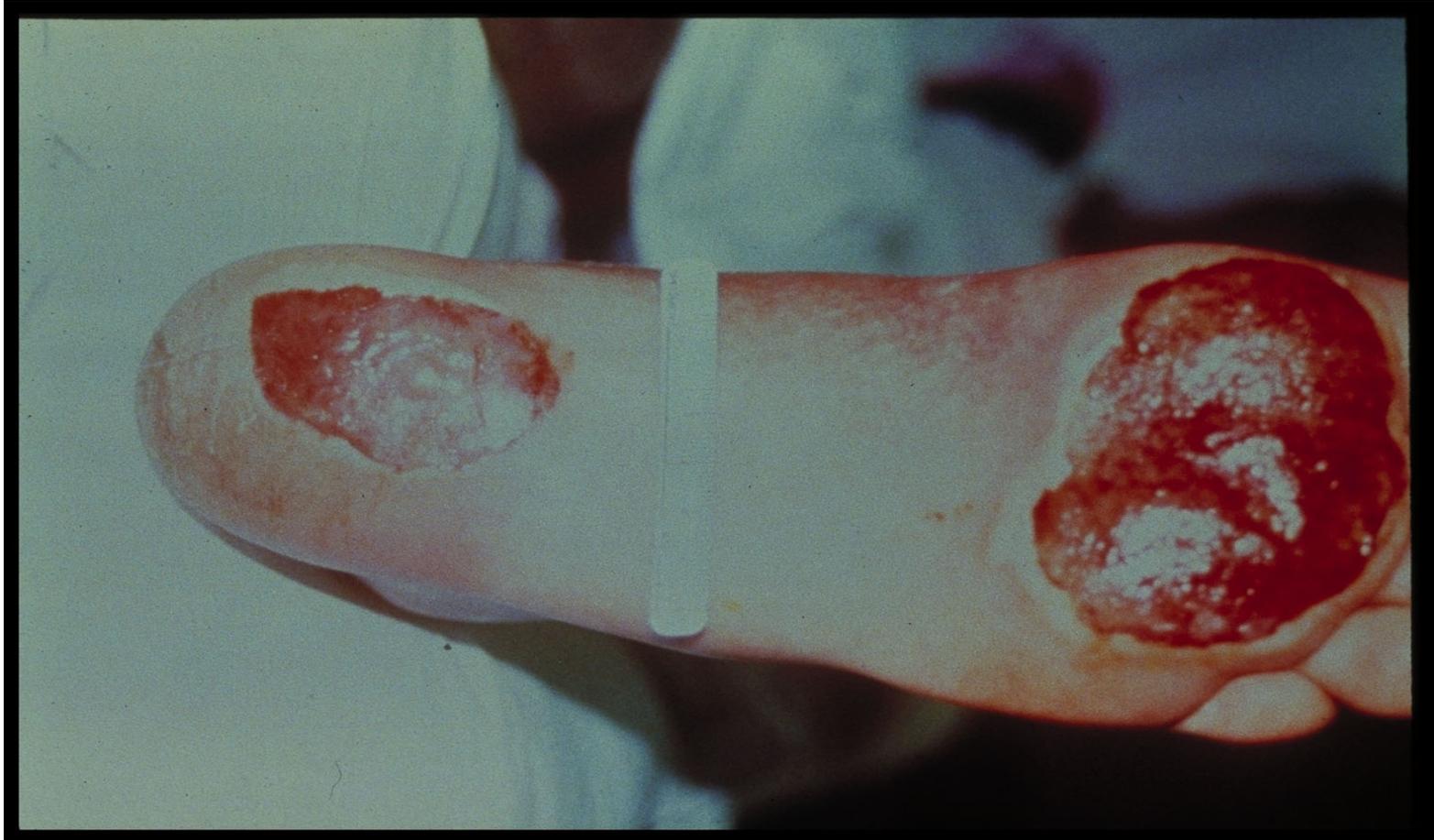
- Deep
- Painless
- Even wound margins
- Callous surrounding ulcer
- Granular tissue, unless PVD
- Cellulitis or osteomyelitis common
- Associated with diabetes



# Peripheral Neuropathy/Diabetic



# Peripheral Neuropathy/Diabetic



# Peripheral Neuropathy

## Diabetic Treatment

- **Pressure relief for heel ulcers**
- **“Offloading” for plantar ulcers (bedrest, contact casting, or orthopedic shoes)**
- **Appropriate footwear**
- **Tight glucose control**
- **Aggressive infection control**
  - orthopedic consult for exposed bone and antibiotic therapy
  - Cadexomer Iodine (Iodosorb)
  - Zyvox – approved for MRSA
- **Treatment for co-existing arterial**

# Peripheral Neuropathy

## Diabetic Treatment

### **Topical Treatment**

- Cautious use of occlusive dressings
- Dressings to absorb exudate
- Dressings to keep dry wound moist

### **Chronic or non-responding wounds:**

- Recombinant human platelet-derived growth factors (Regranex Gel; Johnson & Johnson)
- Human fibroblast-derived dermal substitute (Dermagraft)
- Bi-layered cell therapy (Apligraf; Organogenesis, Inc.)

# Peripheral Neuropathy Diabetic Treatment

## ● **Adjunctive Therapy**

- Hyperbaric Oxygen

- The V.A.C (KCI)

## ● **Patient Education**

# Mixed Etiology



# Mixed Etiology

- **Use reduced compression bandages of 23-30 mm Hg at the ankle. Compression therapy should not be used in patients with  $ABI < 0.5$**
- **Keep extremities in neutral position**
- **Protect from trauma**

# Lower Extremity Wounds

- **Do not use the pressure ulcer staging system for these types of wounds**
  - **Partial thickness (involves the skin)**
  - **Full thickness (below the skin)**

# NPUAP Guidelines

- **Developed in conjunction with the EPUAP**
- **Provide evidence based recommendations**
- **Guidelines address prevention and treatment**
- **Awaiting official roll out**
- **Unknown how CMS will implement or interpret**

# Resources

- **Available Resources and Web Sites:**
  - [www.wocn.org](http://www.wocn.org) (Wound, Ostomy & Continence Nurse Society)
  - [www.ahrq.gov](http://www.ahrq.gov) (Agency for Health Care Research and Quality, formally AHCPR)
  - [www.aawm.org](http://www.aawm.org) (American Academy of Wound Management)
  - [www.npuap.org](http://www.npuap.org) (National Pressure Ulcer Advisory Panel)
  - [www.woundsource.com](http://www.woundsource.com) (Great source to find wound care products)

**Thanks for your participation!!!**

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