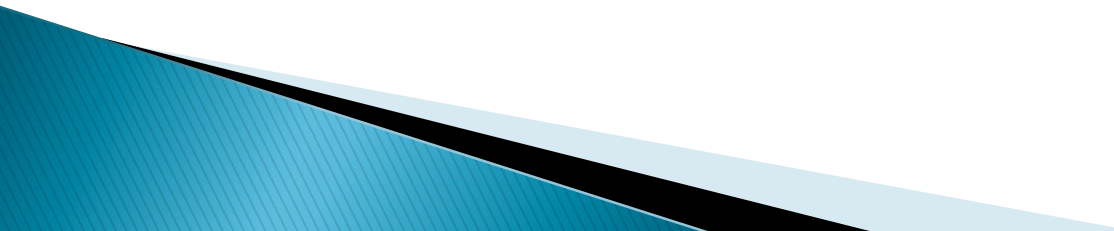
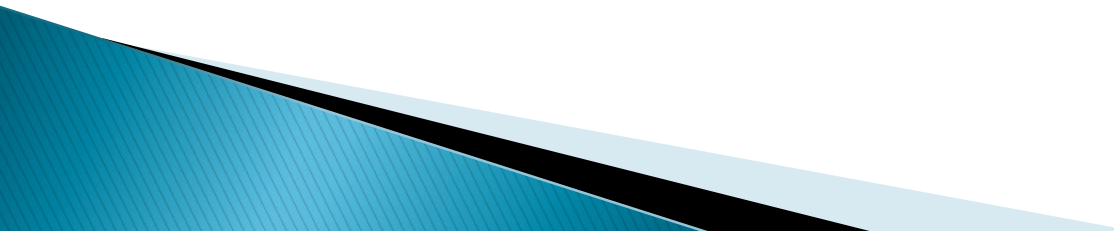


# Acute and Chronic Wound Management

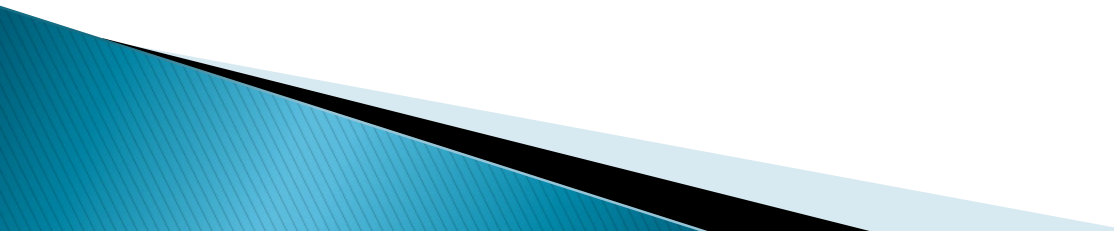
Shark Bird, MD, CMD, CWSP  
Vohra Wound Physicians

- ▶ This presentation is for informational purposes only. Every patient and clinical situation is unique and medical decisions should be based on standard of care and medical practices. Views expressed in this presentation are the sole opinion of the presenter.
- 


# Anatomy of Skin

- ▶ Largest Organ of the Body
  - ▶ Subject to injury and failure
  - ▶ Layers of the Skin
    - Epidermis
    - Dermis
    - Subcutaneous
    - Muscle and Fascia
- 

# Types of Wounds

- ▶ Pressure Ulcers
  - ▶ Arterial Ulcers
  - ▶ Venous Ulcers
  - ▶ Diabetic Neuropathic Ulcers
  - ▶ Surgical Wounds--Dehiscence
- 

# Pressure Injuries

- ▶ Stage one = Redness
  - ▶ Stage two = Damage to epidermis and or dermis, but not subcutaneous.
  - ▶ Stage three = Damage down into the subcutaneous tissue, but not to muscle and fascia
  - ▶ Stage four = Damage through Subcutaneous to level of muscle and fascia
  - ▶ Unstageable
  - ▶ Mucus membrane and device injuries
- 

# Stage I Pressure Injury

- ▶ Redness only
- ▶ Skin is intact
- ▶ Underlying damage may not be evident
- ▶ Early recognition is key



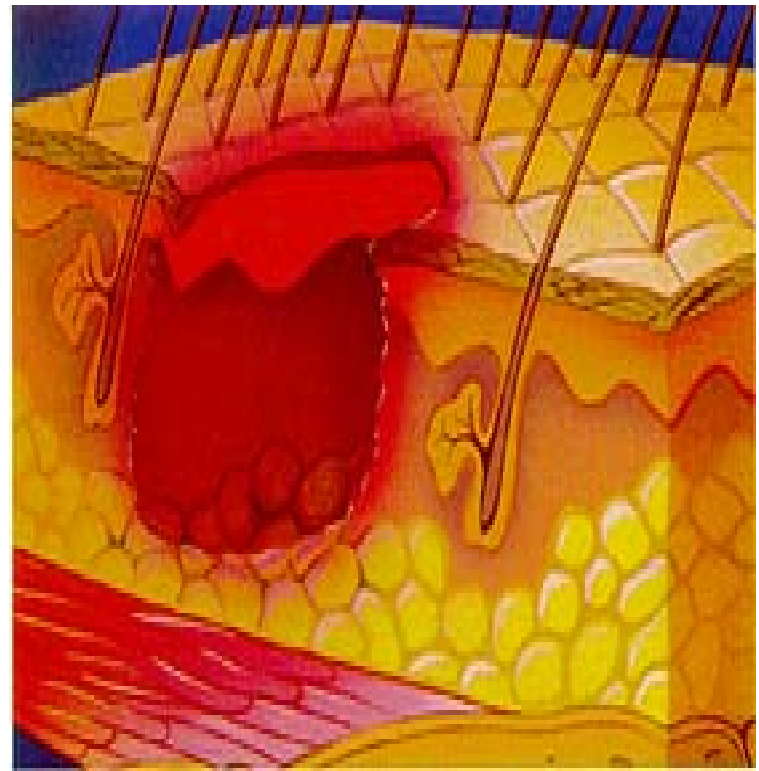
# Stage II Pressure Injury

- ▶ Broken Skin
  - ▶ Involves epidermis and/or dermis
- No slough or necrosis present



# Stage III Pressure Injury

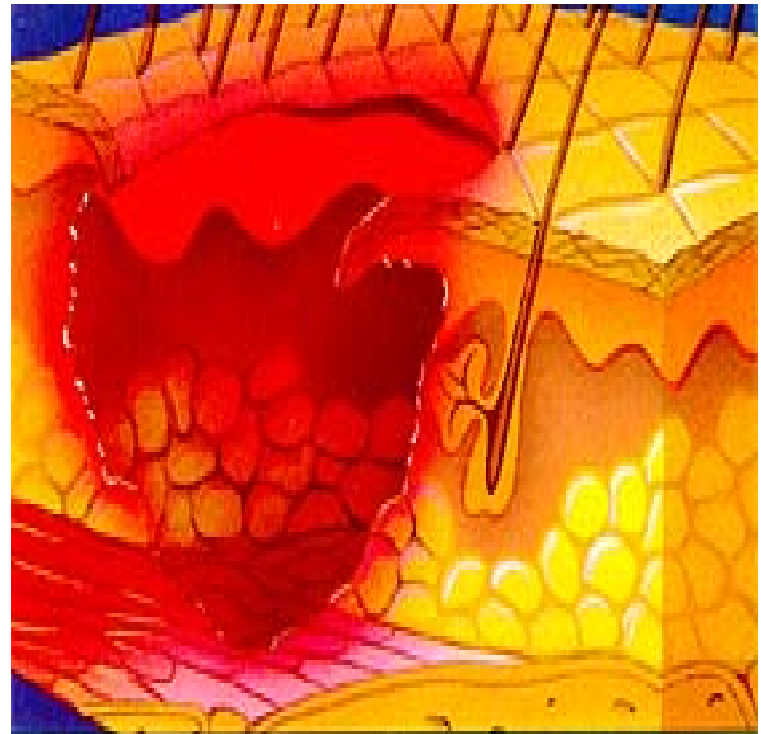
- ▶ More significant damage to skin
- ▶ Involves epidermis, dermis, and subcutaneous tissue





# Stage IV Pressure Injury

- ▶ Most severe damage to skin
- ▶ Involves all layers of skin down to muscle and fascia



# Unstageable Pressure Injury

- ▶ Can not visualize wound bed
- ▶ Number not assigned until full damage is determined



# Other Pressure Injury Categories

- ▶ Mucus membrane pressure injuries
  - ▶ Pressure injuries from medical devices
- 

# Arterial Ulcers

- ▶ Non pressure related, blockage of blood flow
- ▶ Distal portion of the lower leg, top of foot, toes
- ▶ Wound bed dry and pale
- ▶ Intermittent claudication, pain on elevation, cool to touch, poor capillary refill



# Venous Ulcers

- ▶ Open layer of skin and or subcutaneous tissue
- ▶ Venous hypertension from incompetent valves, partial or complete venous obstruction, muscle pump failure
- ▶ Pretibial area
- ▶ Wound bed moist and granular with minimal to copious exudate.
- ▶ Pain in dependant position. Often recurring.

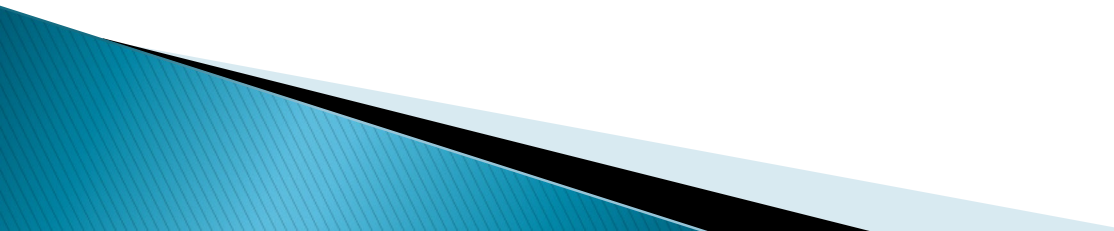


# Neuropathic Ulcers

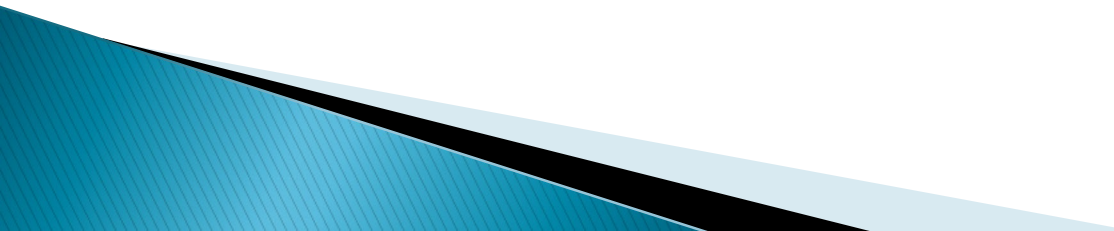
- ▶ Peripheral neuropathy from Di
- ▶ Ball of foot over metatarsal he
- ▶ Resembles arterial, frequently
- ▶ Dx of DM required, with impai  
may have Charcot deformity.



# Surgical Wounds

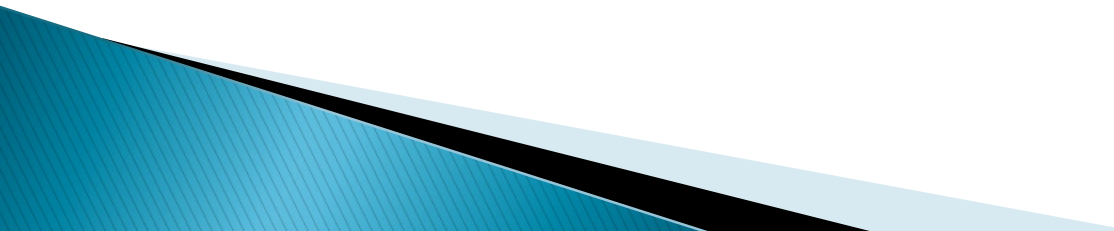
- ▶ Typical Post surgical wounds should be clean, well approximated, and little to no drainage
  - ▶ If early on a breakdown occurs, notify the surgeon as continued care may still be within the global period
  - ▶ Signs of concern: non-healing, increased erythema, increased or pus drainage, wound separation, increased pain
- 

# Litigation

- ▶ Often occurs as a result of improper communication.
  - ▶ Family members should be included in care plan.
  - ▶ Proper documentation is key.
  - ▶ Early recognition and intervention of appropriate care.
- 



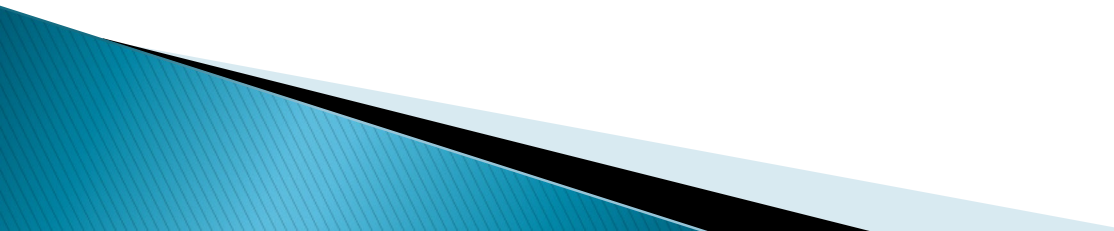
# Modern Wound Management

- ▶ Moist wound bed healing
  - ▶ Debridement
    - Enzymatic
    - Autolytic
    - Mechanical
    - Sharp
  - ▶ Frequency of dressing changes
  - ▶ Control of exudate
  - ▶ Control of odor
  - ▶ Nutrition
- 

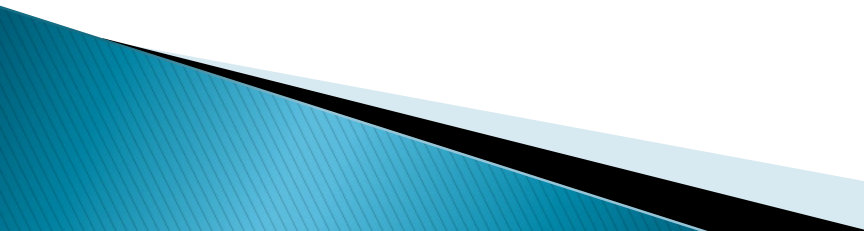
# Wound Care Treatment Options

Shark Bird, MD, CMD, CWSP  
Vohra Health Services

# Objectives

- ▶ Name the categories of wound dressings
  - ▶ Identify the needs of the wound
  - ▶ Match dressing choice to the needs of the wound
  - ▶ Choose a dressing that is both cost effective and meets the needs of the patient
  - ▶ First treatment should generally be to eliminate the cause of the wound
- 

# Wound Treatment Options

- ▶ Driven by condition of wound bed and surrounding tissue.
  - ▶ Treatments may be combined to create an optimal healing environment, in an economical way.
  - ▶ A given wound may have several appropriate treatment options
  - ▶ Treatment should be changed in non-healing wound after 2-4 weeks if no known cause for healing delay
- 

# Basic Treatment Categories

Moisture donating

Moisture absorbing

Enzymatic

Hemostatic

Antimicrobial

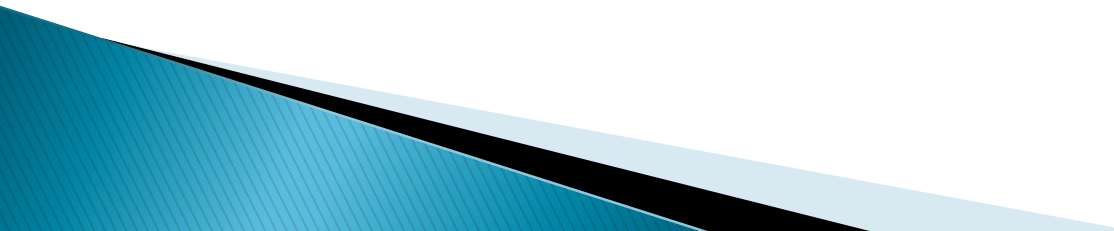
Cavity filling

Stimulatory

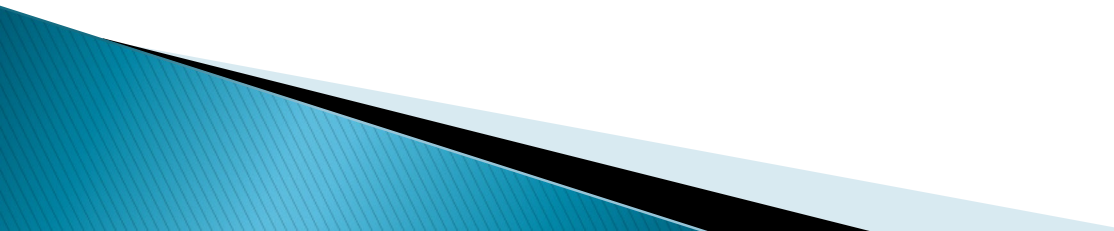
Substrate providing

Artificial membranes

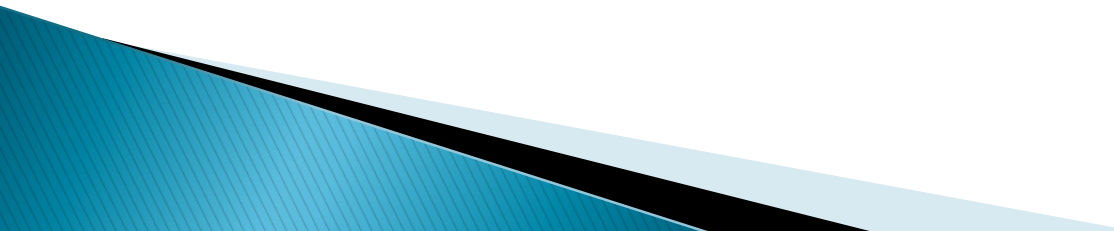
# Treatment Decisions

- ▶ If you have necrotic tissue—Debride it
  - ▶ If it is too wet—Absorb it
  - ▶ If it is too dry—Moisten it
  - ▶ If there is a cavity—Fill it
  - ▶ If there is infection—Kill it
  - ▶ If there is bleeding—Stop it
  - ▶ If there is odor—Eliminate it
- 

# Frequency of Treatment

- ▶ When possible a single treatment is best
  - ▶ Multiple products increases cost.
  - ▶ Many treatments can be changed every other day or less (every three days, three times per week, or even weekly)
  - ▶ Nursing time is part of treatment cost
- 

# Debridement Options

- Autolytic: Slowest, uses bodies own enzymes to slowly eat away necrotic tissue
- ▶ Mechanical: Physical removal of necrotic tissue, ie wet-to-dry, pulse lavage, whirlpool, ect...
  - ▶ Enzymatic: Chemical enzymes that debride away necrotic tissue over a period of days to weeks.
  - ▶ Surgical/Sharp debridement
- 



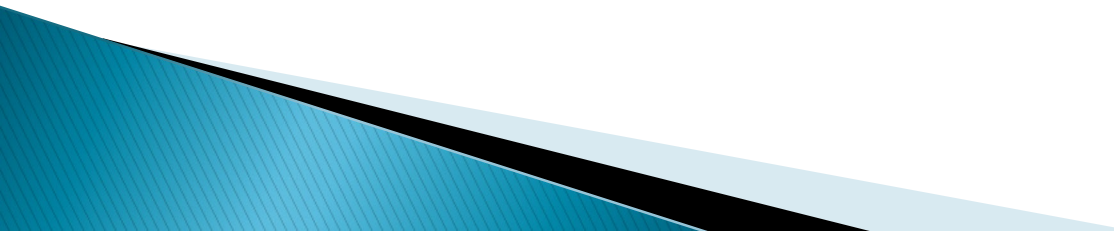
# Surgical Sharp Debridement

- ▶ Removal of necrotic tissue with a curette or blade.
- ▶ Well documented effectiveness in healing and prevention of infection.
- ▶ Removal of senescent cells in the presence of little visible slough
- ▶ Repeated procedures necessary to achieve optimal effect.
- ▶ Performed by a trained clinician ( Physician or trained Nurse Practitioner).
- ▶ Reduces the need for expensive enzymatics

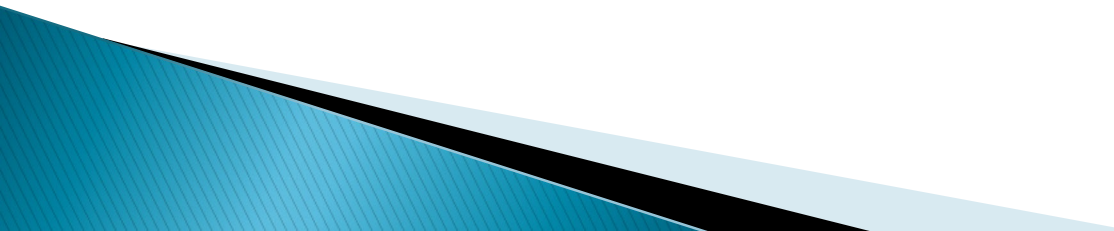
# Current Enzymatic Debriding Agents

- ▶ **Collegenase (Santyl)**
  - Obtained from bacteria
  - Selective debridement of tissue types
  - Viewed as working from wound base up
- ▶ Avoid use with heavy metals
- ▶ When possible, quicker removal of necrosis can be achieved via surgical debridement

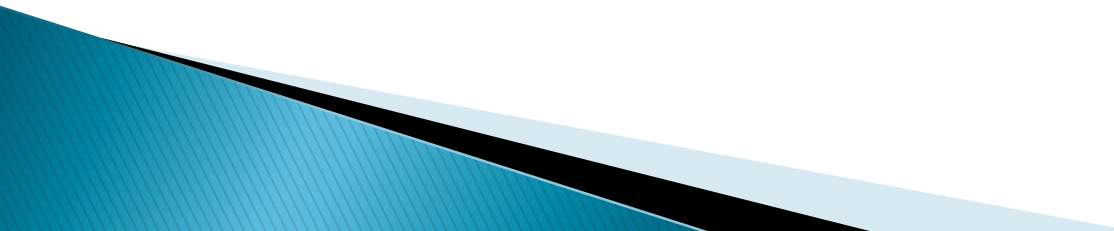
# Antimicrobials

- ▶ Antibiotics: Over-use may lead to resistant bugs
  - ▶ Silver: Bacteriostatic, no known resistance, not an antibiotic, therefore no resistance develops, but patient sensitivity can
  - ▶ Avoid treating cultures of wound surface
  - ▶ Biofilm treatment is best done by debridement
- 

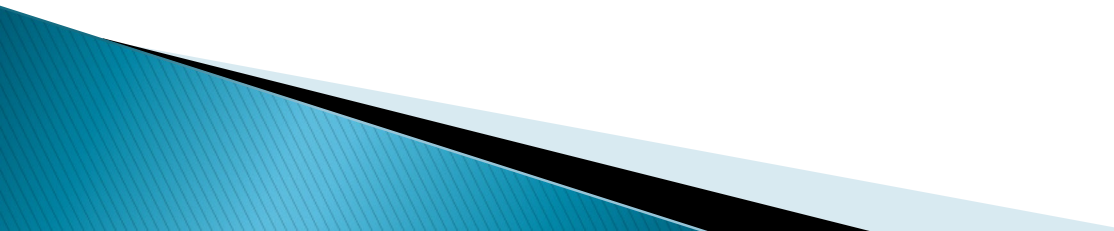
# Bleeding Wounds

- ▶ Pressure will stop most bleeding, don't rub
  - ▶ Silver Nitrate cautery
  - ▶ Monsel's Soln.
  - ▶ Quick Clot
- 

# Wound Cultures

- ▶ Avoid cultures in well healing wounds without signs of infection
  - ▶ Gold standard is tissue biopsy after removal of necrotic tissue and slough
  - ▶ Lavine technique when biopsy not possible
  - ▶ Biopsy should be performed by trained clinician.
- 

# Cavity Filling

- ▶ Calcium Alginate (maxorb)
  - ▶ Hydrofibers ( aquacel)
  - ▶ Iodaform
  - ▶ Silvasorb Cavity
  - ▶ Hydrogel impregnated gauze
- 

# Stimulatory Agents

- ▶ Collagen Dressings (Fibercol, Puracol, Cellerate)
- ▶ Growth Factors ( Regranex, Oasis)
- ▶ Trypsin containing agents ( Xenoderm, Granulex)

# Tissue dressings

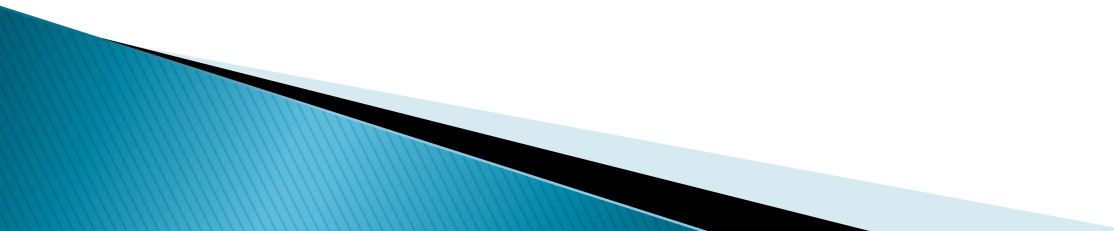
- ▶ Apligraf
- ▶ Skin Grafts
- ▶ Skin Flaps



# Older Treatments to Avoid

- ▶ On rare occasions these treatments may still be appropriate.
  - Wet-to-dry
  - Dakin's Solution
  - Betadine, Iodine, ect...

# Closing Remarks

- ▶ Wound bed condition drives treatment choice.
  - ▶ Removal of necrotic tissue prevents infection, reduces bioburden, and stimulates new growth
  - ▶ Single product use, with attention to cost is crucial in today's environment
  - ▶ Re-evaluate wounds frequently and consider changes if 2–4 weeks pass without improvement
- 



# Unlucky 13: A Case Based Presentation on Wound Care



Shark Bird, MD, CMD, CWSP

# Objectives

- ▶ Identify issues in the treatment of pressure ulcers
- ▶ Select appropriate preventative and treatment modalities
- ▶ Understand etiologies of non pressure wounds
- ▶ Direct optimal patient care to produce quality outcomes

# We will be using the ARS extensively

- ▶ During the presentation we will prompt you when to respond to a question
- ▶ You will have 10 seconds to respond
- ▶ Results will be presented followed by a discussion of the case
- ▶ Go to: [slido.com](https://www.slido.com)
- ▶ Enter code: \*\*\*\*\*

# Test question for the ARS

- ▶ The best ice cream flavor is:
  - A. Chocolate
  - B. Rocky Road
  - C. Cherry Garcia
  - D. Chocolate Chip Cookie Dough

# Answer

- ▶ C. Cherry Garcia

# Case # 1

Mr. Oscar Myerson is a 74 year old man admitted to the hospital for treatment of a hip fracture sustained in a fall at home. You are asked to see him on admission to Happy Manor Rehab.

On exam, you note a dry and intact surgical incision on the right hip. The right heel is erythematous.

When you palpate the heel, Mr. Myerson winces and the skin does not blanch.





# What is your initial treatment for this Stage 1 Pressure Injury?

- A) Santyl
- B) Skin Prep
- C) Betadine paint
- D) Calf pillow

# Answer

- ▶ D. Calf Pillow

# Primary treatment – Offloading

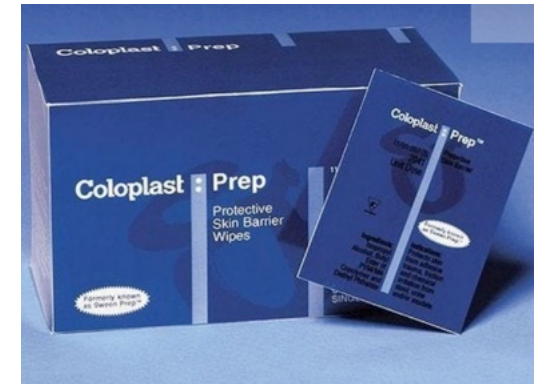
- ▶ Initial treatment of pressure injury is to relieve the pressure
  - Float heels with pillows
  - Use of specialty heel float or wedge cushion
  - Use of offloading boot

Any device that effectively keeps the patient's heels from resting on the bed is effective. Data does not support one "best" device



# Topical treatment – keep it dry and protected

- ▶ Skin Prep is a liquid dressing that dries as a thin film, forming a protective layer that helps and protect skin i



# Case #2

- ▶ 69 year old obese female with significant bilateral lower extremity edema presents with 2 right leg wounds that are 3cm x 4cm x 0.2cm deep and 4.5cm x 2.8cm x 0.2cm deep respectively. You note significant exudate as the dressing and the kerlix wrap are soaked.
- ▶ The wound bed is beefy red with little to no slough/necrosis. The skin is pinkish/red bilaterally in the area below the knee to the ankle.
- ▶ A previous ABI came back as 0.9 in each leg. She is not diabetic.



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# The most important treatment for this lower extremity wound is.....

- ▶ A. Santyl to remove micro necrosis that may not be visible to the eye.
- ▶ B. Keflex to treat the cellulitis evidenced by the bilateral redness
- ▶ C. Compression and elevation to treat the swelling and exudate
- ▶ D. Wound vac to help control the heavy exudate

# answer

- ▶ C. Compression and elevation to treat the swelling and exudate



# Correct answer

- ▶ **C. Compression and elevation to treat the swelling and exudate**
- ▶ While redness around a wound can commonly signal concerns for possible infection and cellulitis, in this case it is the hemosiderin deposition that is likely to be the cause.
- ▶ Santyl is not needed without any necrosis and the exudate will be controlled without the need of a wound vac once proper compression and elevation are applied.

# Case #3

- ▶ Mr. Oscar Myerson completed his hip rehab and was discharged home. While at home, he spent several days confined to bed and returned to Happy Meadows Rehab with blisters on both heels.



# What is your first step in this patient's wound treatment plan?

- ▶ A) Skin Prep
- ▶ B) Foam boots
- ▶ C) Unroof the blisters, use silver alginate
- ▶ D) Bacitracin

*What comes first again?*



# Answer

- ▶ B) Foam boots

# Offload the wound

- ▶ The primary treatment for pressure injury is to remove the pressure
- ▶ Float heels with pillows
- ▶ Offloading cushions or wedge pillow
- ▶ Use offloading foam boots
- ▶ Remember: floating heels increases pressure on the sacrum approximately 16%. Proactively turn/reposition to prevent sacral injury



# What is your topical treatment plan?

Now that Mr. Myerson's heels are offloaded, you need to choose a topical treatment. Of the following options, which would be the best choice?

- ▶ A) Foam dressing
- ▶ B) Betadine, open to air
- ▶ C) Debride or unroof the blisters, use Calcium Alginate
- ▶ D) Hydrocolloid dressing

# Answer

- ▶ B) Betadine, open to air

# Keep it dry and protected

- ▶ Foam dressings are indicated for wounds with moderate to heavy exudate. Additionally, use of foam on intact blisters may cause them to soften/become moist, which increases the risk of blister rupture. Heel protection is best achieved by floating heels, not covering with foam dressings.
- ▶ Opening intact blisters increases risk of infection and patient discomfort and should be avoided.
- ▶ Hydrocolloid dressings are used for wound with light to medium drainage, not dry blisters
- ▶ Betadine paint is usually used for dry arterial wounds for for antisepsis and to moisture prevention. While skin prep would be the usual treatment for these non-arterial intact blisters, of the options presented, Betadine paint would be the most appropriate.



# Case # 4

- ▶ You have been asked to evaluate and treat a 84 year old chronic smoker who has a long standing necrotic black dry second digit to the right foot. The patient has a history of COPD, PAD, and CAD. His most recent arterial study of the lower extremities showed an ABI of 0.4 on the right.





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# Given the information so far, how would you address the necrosis in this wound?

- ▶ A. Immediate debridement of the necrosis by bedside sharp debridement after proper anesthesia
- ▶ B. Topical debridement by use of collagenase
- ▶ C. Autolytic debridement using a moist environment product
- ▶ D. No debridement and paint with betadine, allowing the dry necrosis to possibly auto amputate
- ▶ E. Immediate transport to the hospital for urgent surgical amputation

# Correct Answer

- ▶ **D. No debridement and paint with betadine, allowing the dry necrosis to possibly auto amputate**
- ▶ Bedside debridement would be contraindicated here due to the severe PAD with an ABI less than 0.5
- ▶ Agents that would keep the wound moist might lead to wet gangrene
- ▶ As this is not an embolic event, but rather “long standing”, transportation to the ER is not necessary

# Case #5

- ▶ Mrs. Eunice “Lovey” Howell is an 82 year old woman admitted to Tree Crest Acres Home following a cerebrovascular accident. She also has advanced dementia and limited mobility.
- ▶ When you examine Mrs. Howell, you notice a wound on her hip with heavy drainage.



# What is the first step of your treatment plan?

You correctly diagnose Mrs. Howell's wound as a Stage 3 Pressure Injury. The best first step in treating this wound is:

- A. Hydrofiber dressing
- B. Negative Pressure Wound Therapy
- C. Group 2 mattress
- D. Prescribe multivitamin, Zinc, Vitamin C, and protein supplementation

# Remove the Cause – Offload the Wound

- ▶ Correct Answer: C. Group 2 mattresses – low air loss or alternating pressure mattresses
- ▶ Air is pumped and circulated through connected, air-filled cushions or compartments, replacing air lost through the pores of the surface
- Air flow and evaporation assist in managing heat and humidity of the skin
- Prevent moisture buildup and skin maceration
- Pads under patient minimize this benefit, increase interface pressure
- Must also turn, reposition



- ▶ Negative Pressure Wound Therapy and Hydrofiber dressings could be useful in this case, but would not be your first step in treatment. Offloading a pressure wound is the most critical first treatment.
- ▶ Nutritional optimization is very important for wound healing and must be addressed. The FIRST step is to offload the pressure.

**FIRST**  
**THINGS FIRST**



# What topical treatment do you prescribe?

Now that Mrs. Howell's hip wound is offloaded, what do you prescribe for treatment of the wound bed?

- A. Hydrofiber dressing
- B. Honey dressings
- C. Hydrogel infused gauze dressings
- D. Bacitracin with saline-moistened gauze and dry dressing

# Correct Answer

- ▶ A. Hydrofiber Dressing

# Wet wound – absorbent dressing

- ▶ While honey has helpful antimicrobial and anti-inflammatory properties, the added moisture is undesirable in this heavily draining wound.
- ▶ Similarly, hydrogel infused gauze pads are used for wounds with less exudate
- ▶ Bacitracin is indicated when there is some evidence of infection or over-colonization and a topical antibiotic is required.
- ▶ Saline moistened gauze (wet to moist or wet to dry) is a painful, nonselective mechanical debrider. While there are *many* reasons to avoid wet to dry dressings, at a minimum

# Hydrofiber Dressings

- ▶ Common trade names: Aquacel, Versiva, Opticell, CMC Fiber, Durafiber, KerraCel, Exufiber, AquaRite
- ▶ Composed of sodium carboxymethylcellulose in a nonwoven pad or ribbon
- ▶ They incorporate the benefits of both hydrocolloids and alginates and absorb large amounts of fluid while maintaining moisture balance on the wound



# Case # 6

- ▶ You are seeing an 82 year old obese female with a past medical history of CAD, Hypertension, and type 2 diabetes. Upon examination of her right foot you note that it has lost its plantar arch and there are a couple of callused areas with a central open wound over the first and third MT/P joints on the





[Redacted text box]

# The most likely etiology of this wound is

- ▶ A. Pressure, Stage 4 as it likely extends past the subcutaneous area
- ▶ B. Neuropathic, given the fact that the patient is diabetic and has sensation loss in the foot
- ▶ C. Arterial, as PAD is common in Diabetics
- ▶ D. Trauma, as the patient most likely banged her foot on something

# Correct answer

**B. Neuropathic, given the fact that the patient is diabetic and has sensation loss in the foot**

This highlights the fact that many wounds are multifactorial. While the wound would be classified as Diabetic Neuropathic, the underlying PAD would contribute, as well as the repeated trauma and pressure to the ball of the foot from the malformation.



In addition to your topical treatment post debridement, what else might you consider in this patient, in regard to the wound?

- ▶ A. The possible need for a wound vac in case the wound becomes exudative
- ▶ B. Evaluation for possible underlying osteomyelitis
- ▶ C. Placing the patient on bedrest until the wounds heal
- ▶ D. Using collagenase as a preventative measure

# Correct Answer

- ▶ **B. Evaluation for possible underlying osteomyelitis**
- ▶ While continued walking might continue the pressure, use of proper fitted shoes will assist with this. Neither Santyl or a wound vac are indicated in this patient. ***Maintain a high level of suspicion for underlying pathology in any diabetic with lower extremity wounds.***

# Case #7

- ▶ Mr. Rocky Roadster is a 34 year old man with a history of paraplegia. He presented to Regional Memorial Medical Center with an infected left ischial wound, which was extensively debrided in the operating room. He is transferred to Brearley Rehabilitation Facility for antibiotics for osteomyelitis.

The wound measures  
11cm x 6 cm x 4 cm  
6 cm undermining  
at 12:00 position



# Initial approach to treatment

What Stage is this wound?

Stage 4 Pressure Injury

What is the best initial step for this patient's wound?

- ▶ A) Debridement
- ▶ B) Santyl
- ▶ C) Antibiotic ointment
- ▶ D) Roho cushion and/or bed rest

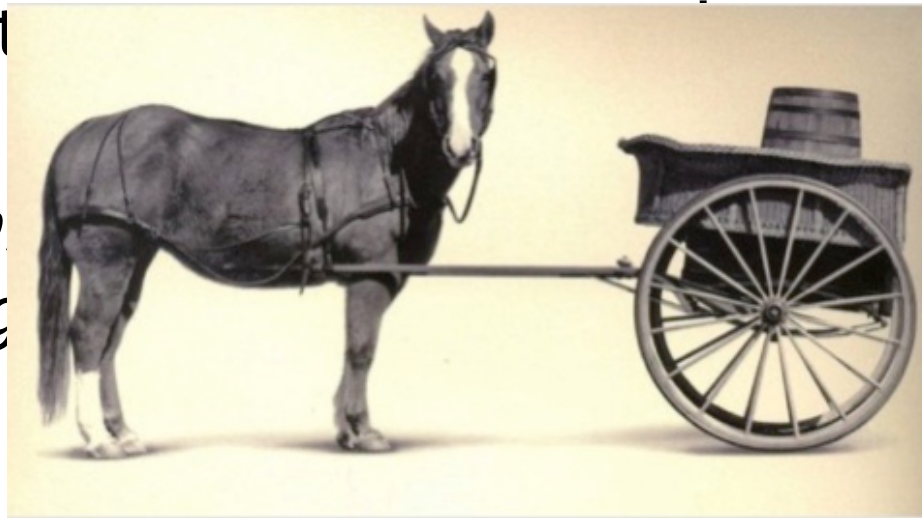
**D) Roho cushion and/or bed rest**

# Yes – Offload before anything else!

- ▶ Best offloading for ischial wound is to STAY IN BED. Sitting puts 50% body weight on 8% body surface area.
- ▶ If up in a chair, a dry flotation cushion (ROHO) provides optimal offloading.
- ▶ This type of cushion works by increasing the contact area of the individual when they immerse (s This redistribute e peak pressure or



- ▶ Removal of necrotic tissue is vital for healing, but is not the first consideration in treatment of pressure injuries
- ▶ Antibiotics are indicated in infected wounds once they are offloaded, but antibiotic ointment



*Remember  
everything*

*before*

# After addressing the underlying cause...

What is the most appropriate dressing choice for this wound?

- ▶ A) Sodium chloride dressing
- ▶ B) Honey gel
- ▶ C) Xeroform to wound bed, Silver Alginate secondary dressing
- ▶ D) Negative Pressure Wound Therapy

# Answer

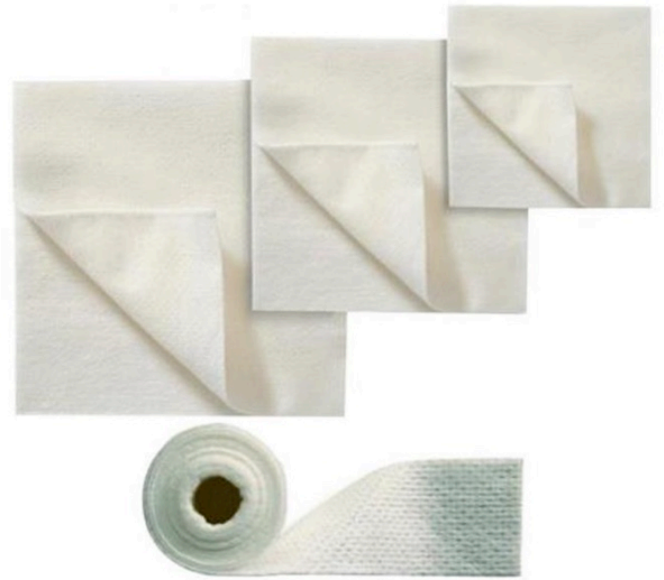
- ▶ A) Sodium chloride dressing



- ▶ Negative Pressure Wound Therapy is contraindicated with active infection, as in this case with osteomyelitis that is not yet fully treated
- ▶ Honey gel products are moisture donating and would not be the best choice for this heavily exudating wound
- ▶ While silver alginate would be a good choice, Xeroform is occlusive and would trap too much drainage in the wound bed, causing maceration and tissue compromise

# Sodium Chloride Dressing (Mesalt)

- ▶ Mesalt is made up of an absorbent nonwoven viscose polyester wound pad impregnated with crystalline sodium chloride – a hypertonic saline pad
- ▶ It creates a hypertonic wound which suppresses growth organisms.
- ▶ Absorbs exudate and bacteria
- ▶ Also has a mild mechanical debriding effect



# Case # 8

- ▶ This is an 89 year old dialysis patient with end stage renal disease. You have been asked to see the patient for a large black necrotic area that has recently developed on her abdomen. Upon examination it is painful, measuring 8 cm x 12 cm. You cannot determine depth due to





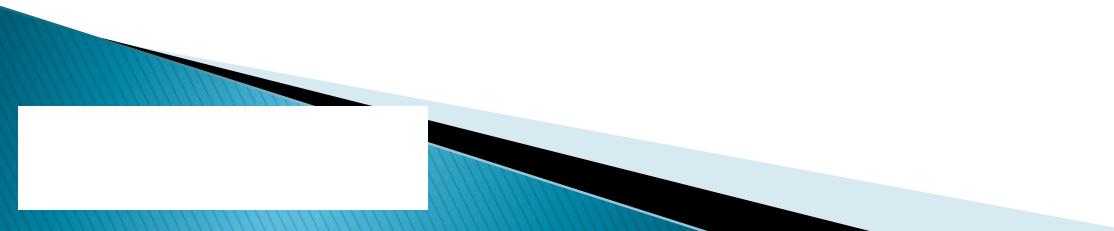
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# What is the most likely etiology given the limited information you have so far?

- ▶ A. Spider bite by a Brown Recluse spider
- ▶ B. Burn from a “too hot to handle” coffee cup from the McDonald’s drive thru
- ▶ C. Calciphylaxis
- ▶ D. Pyoderma Gangrenosum

▶ \



# Correct Answer

- ▶ **C. Calciphylaxis**
- ▶ While both a brown recluse spider and a burn could produce a similar black necrotic area, there is no history consistent with this given. The fact that the patient is on dialysis and the wound is located in an area of fat deposition makes calciphylaxis the best choice.

# What would be your treatment for this wound?

- ▶ A. Transfer to a hospital for management of the renal failure and control of calcium levels
- ▶ B. Bedside debridement to remove necrosis with no further intervention needed
- ▶ C. No debridement with follow up in a week to see if any change has occurred
- ▶ D. Antibiotic ointment covered with foam dressing

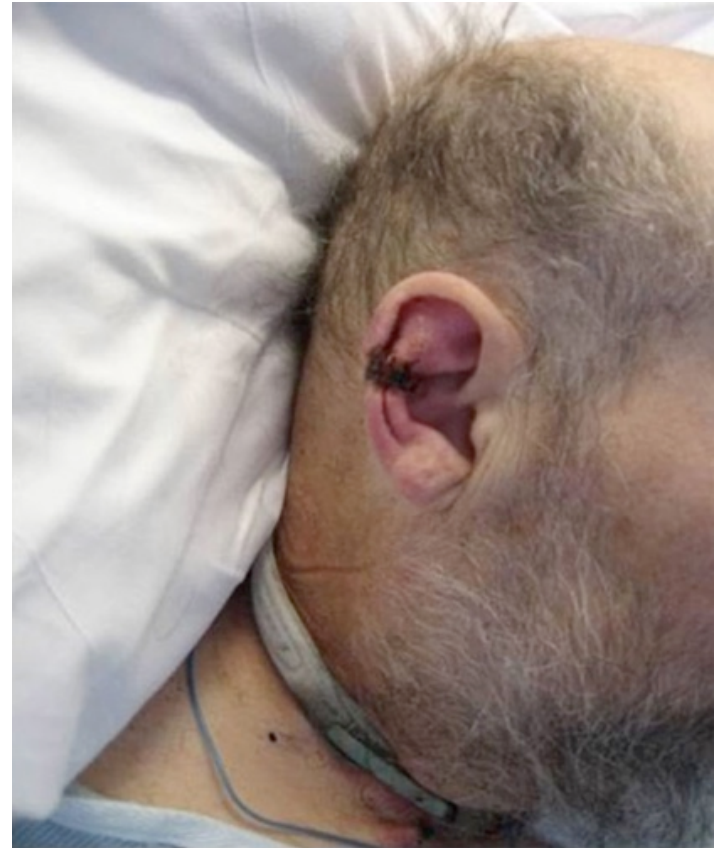
# Correct Answer

- ▶ **A. Transfer to a hospital for management of the renal failure and control of calcium levels**
- ▶ **Calciophylaxis is a serious disease. Prognosis is poor and aggressive therapy including: Debridement, control of calcium (Sodium Thiosulfate), possible HBO, anticoagulation, and close Dialysis management**



# Case #9

- ▶ Mr Loren Suvarabia is an 82 year old man who was admitted to Nightingale News Care Home after a long complicated hospitalization following a motor vehicle accident.
- ▶ While addressing his multiple medical issues, you notice an area of concern on his right ear.



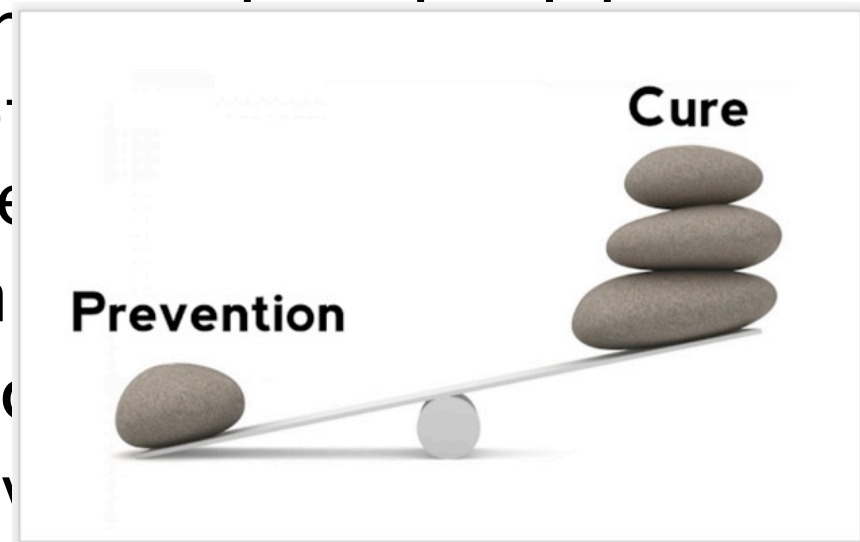
# What is the best first step to address this?

- ▶ A) Evaluate the patient's need for supplemental oxygen
- ▶ B) Apply Santyl to the eschar
- ▶ C) Low Air Loss Mattress
- ▶ D) Bacitracin Ointment

# Answer

- ▶ A) Evaluate the patient's need for supplemental oxygen:  
Determine the medical necessity of a face mask

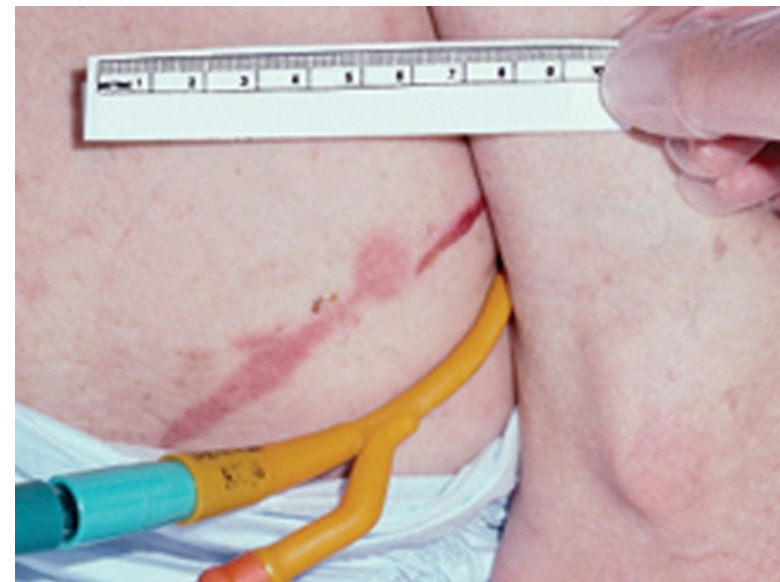
- ▶ Santyl should help with the surface eschar, but is not the first thing that should be addressed
- ▶ A low air loss mattress is an excellent offloading surface the therapist should use, but will not effectively offload the surface of the mattress
- ▶ Bacitracin ointment is indicated when a topical antibiotic is indicated. There is no evidence of infection in this case



tion is key

# Medical Device–Related Pressure Injury

- ▶ A localized injury to the skin or underlying tissue resulting from sustained pressure caused by a medical device (brace, splint, cast, respiratory mask or tubing, tracheostomy device, feeding tube, negative–pressure wound therapy device, prosthesis, bedpan, personal items left in the bed, anti embolism stockings, facility wrist bands, etc)
- ▶ Staged according to NPIAP staging



# 70% Device-Related PIs occur on the head and neck

- ▶ *PREVENTION/PRESSURE RELIEF IS MOST IMPORTANT.* Make sure device is actually needed
- ▶ Remove and inspect underlying skin in correct position so



# Device injuries, Lower Extremities

- ▶ **Second most common location for device related injuries is the lower extremities** (prosthesis, protective splints, compression wraps/socks)
- Confirm appropriate fit
- Check for skin integrity upon removal and prior to replacement



# Case # 10

- ▶ 76 year old female patient who presents with right lower extremity wound that was previously being followed by the wound care center. She has a history of connective tissue disorder, Chronic Fatigue Syndrome, and arthritis. In questioning the patient she states the wound care center kept debriding the wound but that only seemed to make it worse. She says it started as a small spot and she thought was a bug bite.







[Redacted]

Given the history of inflammatory disease and the chronic nature of this wound that gets worse with debridement, which of the following is a likely cause?

- ▶ A. Stage 4 pressure Ulcer
- ▶ B. Arterial Disease
- ▶ C. Calciphylaxis
- ▶ D. Pyoderma Gangrenosum

# Correct answer

- ▶ **D. Pyoderma Gangrenosum**
- ▶ There is no indication or history of pressure
- ▶ It is unlikely to be calciphylaxis as patient has not history of kidney disease
- ▶ There is no history of additional signs of PAD

# Case #11

- ▶ Your new admission Mrs. Elizabeth Borden had a long hospital course which included several weeks on a ventilator in the ICU.
- ▶ While examining Mrs. Borden, you notice a lesion o



# Mucosal Device–Related Pressure Injury

- ▶ What is the most accurate way to describe this wound?
- ▶ A) Traumatic ulcer of the lower lip
- ▶ B) Stage III pressure injury of the lower lip
- ▶ C) Stage IV pressure injury of the lower lip
- ▶ D) There is no staging that applies to this wound

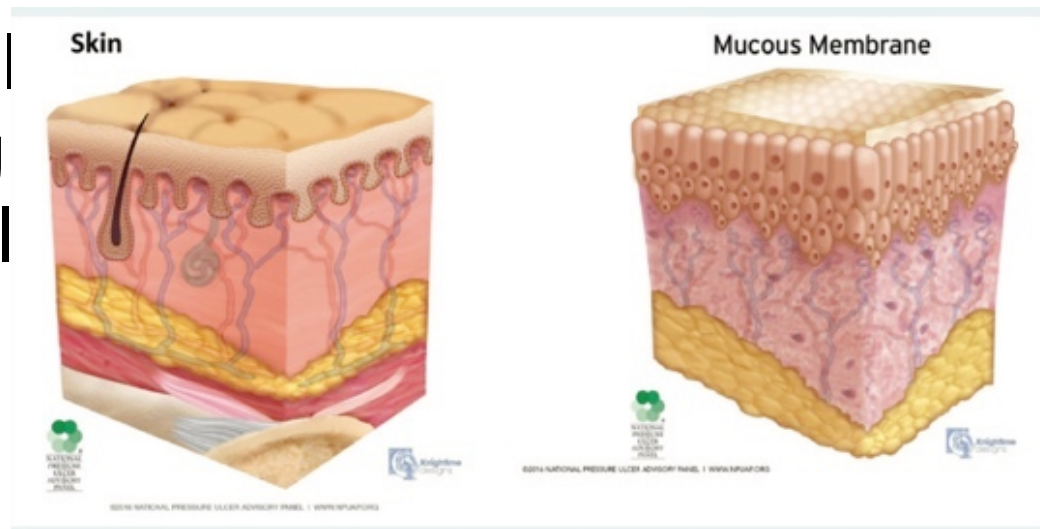
**D) There is no staging that applies to this wound**

# Answer

- ▶ D) There is no staging that applies to this wound

# Mucosal Device-Related Pressure Injuries

- ▶ Not staged with NPIAP staging
- ▶ Mucosal tissue differs histologically from skin tissue. The NPIAP PI staging is based on skin and its underlying anatomical structures; mucosal PIs can not be staged.
- ▶ Clinical distinguishing tissue l



s injury;

# Treatment

- ▶ Having diagnosed Mrs. Borden's mucosal pressure injury, you need to initiate local care of the wound. What would be the most appropriate first step in treatment:
- ▶ A) Debride the yellow slough
- ▶ B) Rinse with dilute chlorhexidine solution q shift
- ▶ C) Rinse with normal saline, apply silver hydrogel q shift
- ▶ D) Silver alginate to the lip sulcus, change q shift



# Answer

- ▶ B) Rinse with dilute chlorhexidine solution

# Anatomic location makes treatment difficult

- Peridex (0.12% chlorhexidine gluconate) swish and spit/suction is safe and promotes a clean wound healing environment
  - ▶ Any intraoral treatment must be safe if consumed orally.
  - ▶ There is no data to confirm that silver hydrogel or silver alginate are safe for oral consumption
  - ▶ Additionally, saliva and inability to fix dressings make application of topical products impractical



*But ... what about debridement?...*

# What about debridement?

- ▶ Injury that leads to bleeding creates a soft clot (or coagulum) that remains flat and loosely attached to the wounded area. This coagulum is not actually slough, even though both tissues can appear yellow and shiny.



# Prevention is key

- ▶ Mucosal injury prevention:
  - Inspect device sites daily
  - If patient has significant edema or fluid shifts, inspect BID
  - Remove potential device-related sources of pressure as soon as medically possible
  - Reposition the patient and/or device regularly



# Case # 12

- ▶ 78 year old male who was admitted to your facility for rehabilitation after receiving an ORIF of his right hip fracture. Patient had been doing well, but about a week ago the wound has opened and is draining a greenish colored pus and the hardware. Additionally the patient had a fever of 102.8 F and is not responding to Tylenol.





[Redacted]

# With the history mentioned how would you manage this patient with an Orthopedic wound?

- ▶ A. Consult the wound doctor to see and evaluate on the next weekly rounds
- ▶ B. Call the Orthopedic Surgeon or send to the emergency room immediately
- ▶ C. Monitor and check on the patient in a couple of days.
- ▶ D. Start a wound vac to control the purulent drainage.

# Correct Answer

- ▶ **B. Call the Orthopedic Surgeon or send to the emergency room immediately**
- ▶ If unsure, you could ask your wound care doctor for an immediate telemedicine consult to get an appropriate recommendation
- ▶ Post surgical orthopedic infections require immediate follow up.



# Case #13

- ▶ Mrs. Armen Hammer is a 77 year old woman admitted to Ocean Breeze Haven. She suffers from dementia and has minimal mobility, requiring total care.
- ▶ On exam, you note a large wound on her sacrum draining copious amount of serous fluid. There is no evidence of infection. A large amount of bone is exposed in the base.



# What is your initial treatment consideration?

- ▶ Your first step in treatment should be:
  - ▶ A) Check the adequacy of the patient's nutrition
  - ▶ B) Order a surgical consult for debridement
  - ▶ C) Have physical therapists obtain a specialty gel offloading wedge cushion
  - ▶ D) Review turning and repositioning protocols with the staff to ensure that patient is offloaded effectively

**D) Review turning and repositioning protocols**

# Answer

- ▶ D) Review turning and repositioning protocols

# Yes – Offload!

- ▶ General standard is to turn and reposition q two hours.
- ▶ Current data do not demonstrate superiority of q 2°, q 4°, or q 6° schedules. However, the CMS standard remains q 2°.
- ▶ Low air loss mattress essential for trunk wounds:
  - Stage IV
  - Stage III
  - Multiple Stage II wounds of the trunk with fa
  - Post surgical flap/graft patients
  - Unstageable necrosis
  - DTI

“ Words  
Worth  
Repeating ”

# Treatment of the wound itself

- ▶ You have ensured that the patient is being effectively offloaded on her low air loss mattress. Because she is at high risk of breakdown over other pressure points, you also ordered an offloading cushion (or boots) for her heels.
- ▶ You now order a topical wound therapy. The best option would be:
  - ▶ A) Negative pressure wound therapy
  - ▶ B) Silver hydrogel with calcium alginate
  - ▶ C) Santyl with calcium alginate
  - ▶ D) Dakin's solution wet to dry dressings

**C) Santyl with calcium alginate**

# Answer

- ▶ C) Santyl with calcium alginate

# Debride the necrosis

- ▶ NPWT is contraindicated in the presence of significant necrotic tissue. It is also very difficult to apply the device when the wound is close to the anal verge.
- ▶ Silver hydrogel is moisture-donating, making it inappropriate in this instance. It is also ineffective to use a moisture-donating gel in combination with a moisture-removing alginate.
- ▶ Dakin's is an indiscriminate cellular toxin which destroys healthy cells as well as bacteria. Sometimes useful in palliative/odor control, not the best option in this case.
- ▶ Debridement of necrotic tissue is essential. Santyl is the best dressing option for this.

# Collagenase

- ▶ Approximately 75% of the skin is comprised of collagen
- ▶ Corneal abrasions have been associated with use of Santyl near the eye
- ▶ Some data suggests that collagenase may induce macrophage function and help decrease wound inflammation, especially in diabetic wounds
- ▶ Preliminary research (on diabetic foot wounds) suggests combined use of Santyl and NPWT on clean wounds may facilitate clearance of non-viable collagen and promote healing faster than either treatment alone



# Summary

- ▶ There are many factors involved in healing of pressure ulcers; it is important to offload these wounds to prevent further injury.
- ▶ Appropriate preventative and treatment options are dependent on the etiology and characteristics of the wound.
- ▶ There are multiple contributing factors to consider with the treatment of any given wound
- ▶ Comprehensive treatment plans help produce optimal patient outcomes



Questions?