HHP Care Model and Disease Management Webinar Series

Essentials of Wound Care

Thursday, February 11, 2021
5:30pm – 6:30pm

HAWAIʻI PACIFIC HEALTH | HAWAIʻI HEALTH PARTNERS

Moderator – 02/11/21

Gerard Livaudais, MD, MPH
Executive Vice President
Population Health and Provider Networks
Hawai‘i Pacific Health

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- The following is intended as information resource only for HHP/HPH providers, clinicians, administrative and clinical leaders.
- Specific areas may not pertain directly to your clinical practice area and/or may not be applicable to your practice based on your existing workflows, infrastructure, software (e.g. EHR), and communications processes.

Webinar Information

- You have been automatically muted.
  You cannot unmute yourself.
- You will be able to submit questions via the Q&A section.
  - Due to time constraints, any unanswered questions will be addressed this week and posted on the HHP website
- A recording of the meeting will be available tomorrow on the HHP website and intranet.

How to Claim CME Credit

1. Step 1: Confirm your attendance
   - You should have completed a brief questionnaire before joining today's live webinar.

2. Step 2: HPH CME team will email you instructions
   - Complete and submit evaluation survey that will be emailed to you within one week of the offering.
   - Your CE certificate will be immediately available to you upon completion of your evaluation.
   - Questions? Email hphcontinuingeduc@hawaiipacifichealth.org

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- Hawai‘i Pacific Health designates this webinar activity for a maximum of AMA PRA Category 1 Credit (s) ™1.0 for physicians. This activity is assigned 1.0 contact hour for attendance at the entire CE session.

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Disclosures

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  - Dr. Michael Shin (Aloha Wound Care, LLC)

HHP Care Model and Disease Management Webinar Series

- Purpose and Goals:
  - To promote integration across the network
  - To increase awareness of network expertise
  - To standardize best practices addressing clinical effectiveness, efficiency, appropriateness and patient experience
  - To improve population level outcomes and the overall performance
  - Billed as a conversation: the set-up is a dyad presentation by a Primary Care Physician and Specialist on a clinical topic of interest

- Occurrence:
  - 2nd and last Thursday of the month from 5:30—6:30 pm

QPP/SSP: Attendance at HHP Webinars

- QPP & SSP
  - 0.5 Point = attended ≥10 live webinars
  - 1 Point = attended ≥15 live webinars

- Providers must register via the pre-survey form and attend at least 10 live webinars in 2021

- Credit will **not** be given for watching the recording

Date	Topic/*Speaker*
1/28	**Chronic Kidney Disease (CKD) #1:** *Dr. Rick Hayashi & Dr. Marti Taba*
2/11	Essentials of Wound Care: *Dr. Mike Shin & Dr. Sandra Noon*
2/25	Pediatric Neurology: *Dr. Keith Abe & Dr. Justin Hino*
3/11	**Congestive Heart Failure (CHF) #1:** *Dr. Carol Lai & Dr. Rajive Zachariah*
3/25	**SPRING BREAK**
4/8	Chronic Kidney Disease (CKD)#2
4/29	Congestive Heart Failure (CHF) #2
5/13	Opioids - Acute
5/27	Peds Nephrology: Hematuria
6/10	Dementia
6/24	Hospital at Home

Date	Topic/Speaker
7/8	Chronic Kidney Disease (CKD) #3
7/29	Congestive Heart Failure (CHF) #3
8/12	Diabetes Mellitus
8/26	Dermatology: Skin Cancer
9/9	Opioids - Chronic
9/30	Diabetic Foot
10/14	Hypertension
10/28	Chronic Kidney Disease (CKD) #4
11/11	Psychiatric Meds: Adult & Peds
11/25	**THANKSGIVING**
12/16	Congestive Heart Failure (CHF) #4
12/30	**NEW YEAR'S EVE**

Please note: This webinar calendar is tentative and subject to change

CREATING A HEALTHIER HAWAIʻI

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Essentials of Wound Care

Mike Shin, MD

President, Aloha Wound Care Group

Medical Director, Queen's Health Systems Wound & Hyperbaric Centers

Assistant Clinical Professor, Department of Emergency Medicine, John A. Burns School of Medicine, University of Hawaii

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Wound Epidemiology

- 1-2% of the population will have a chronic wound during lifetime
- 6.5 million people have chronic ulcers
- Aging population >65 in the US will reach 20% of the population by 2030
- 12-20% of people age ≥65 will have PAD, and it currently affects 8 million today
- 25% of diabetics will develop an ulcer during lifetime
- 5% of diabetics develop an ulcer annually with 1% requiring amputation

Wounds

- A wound is defined as a disruption of normal anatomic structure and function that is usually inclusive of the skin

- Wounds are divided based on chronicity, depth and etiology

Anatomy of the Skin

3 Layers of the skin

- Epidermis & Dermis (Stage II PU)
  - Wounds are pink (capillaries) & painful
  - Heal by re-epithialization

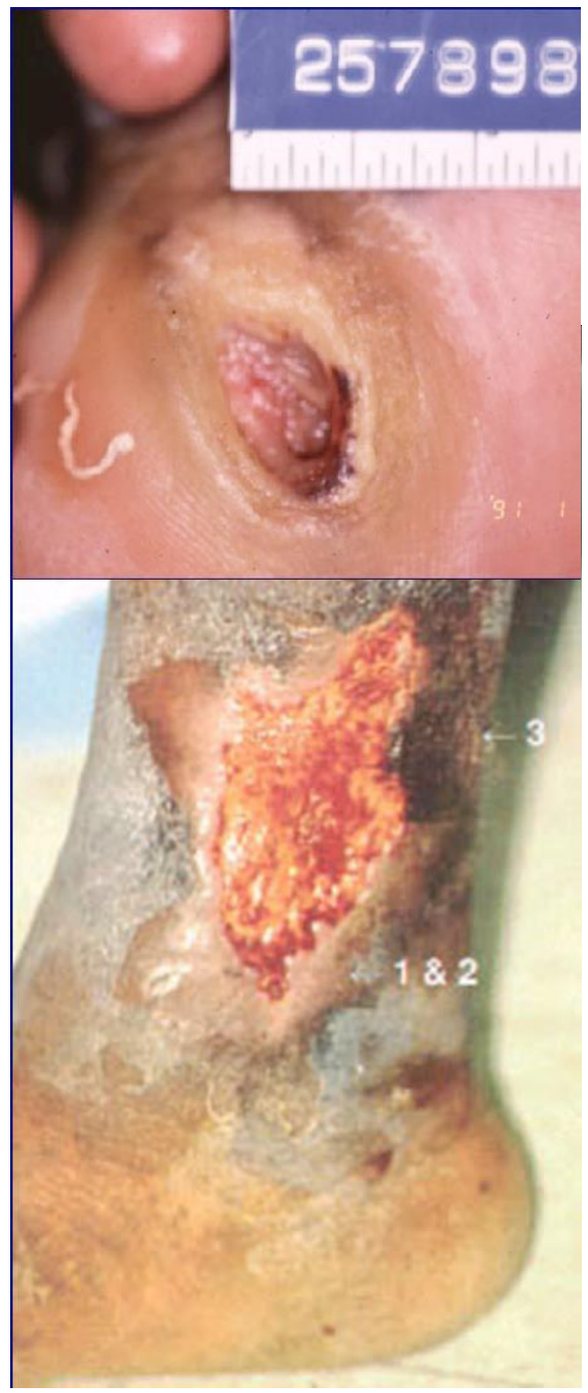
- Hypodermis (Stage III PU)
  - Wounds are yellow (SQ) & less painful
  - Heal by granulation & contraction

Acute Wounds

- Heal in an expected time frame
- Cause is transient
- Usually lack significant impediments to healing
- Repair is sustained

Chronic Wounds

- Slow to failed healing
- Ongoing systemic and local impediments to healing
- Wound often recurs if the underlying cause is not addressed



Wound Care Basics

- Ensure adequate perfusion and oxygenation
- Eliminate non-viable and obstructive tissue
- Control microbial bioburden
- Control edema
- Optimize the wound microenvironment
- Optimize tissue growth
- Relieve pressure, immobilize joints and decrease moisture
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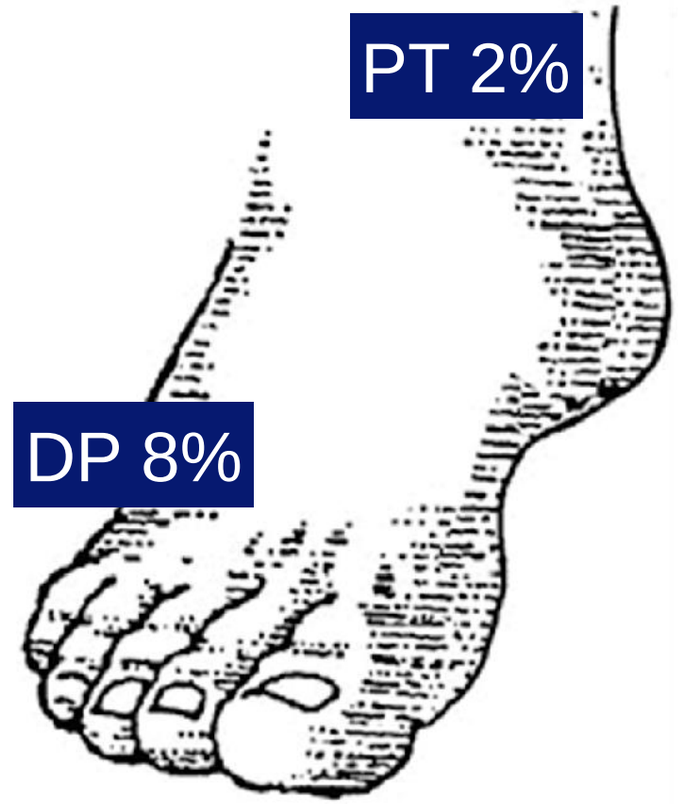
Perfusion & Oxygenation

- Blood flow is vital for:
  - Cellular proliferation
  - Intracellular processes
  - Healing
  - Fighting infections

- Absence of the above functions may lead to serious infections and need for amputation

How do you assess perfusion status?

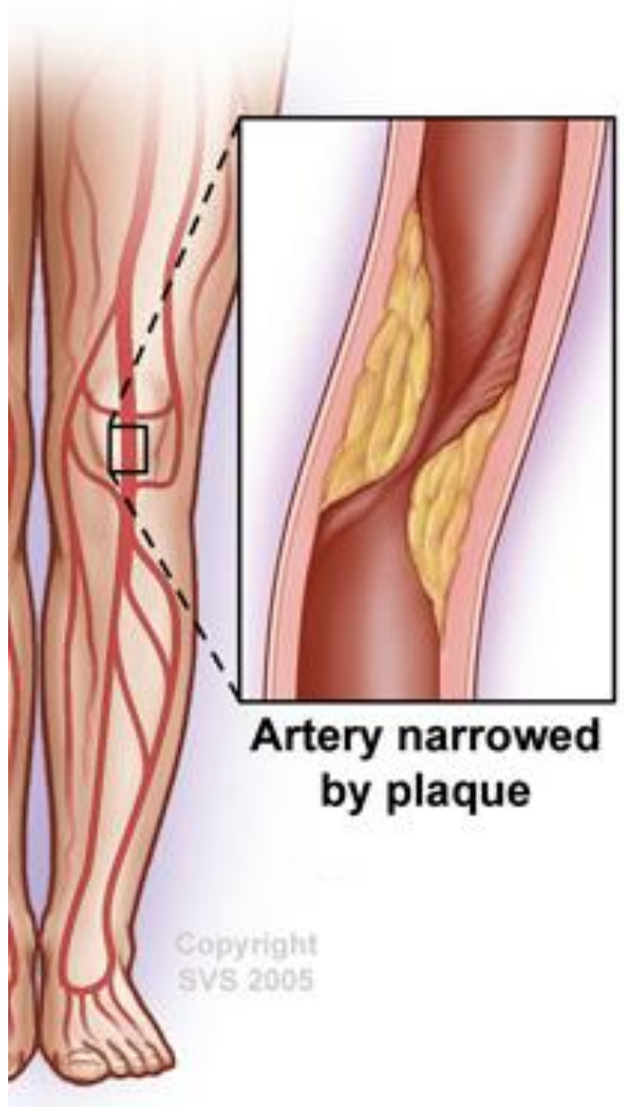
- Physical Exam
  - Visualize color of extremity
  - Capillary refill
  - Palpation of pulses (Absence of both LE pulses correlates to PAD)



- Brachial Indexes
  - ABI (Limited in calcified arteries)
  - TBI (Not dependable in ESRD)

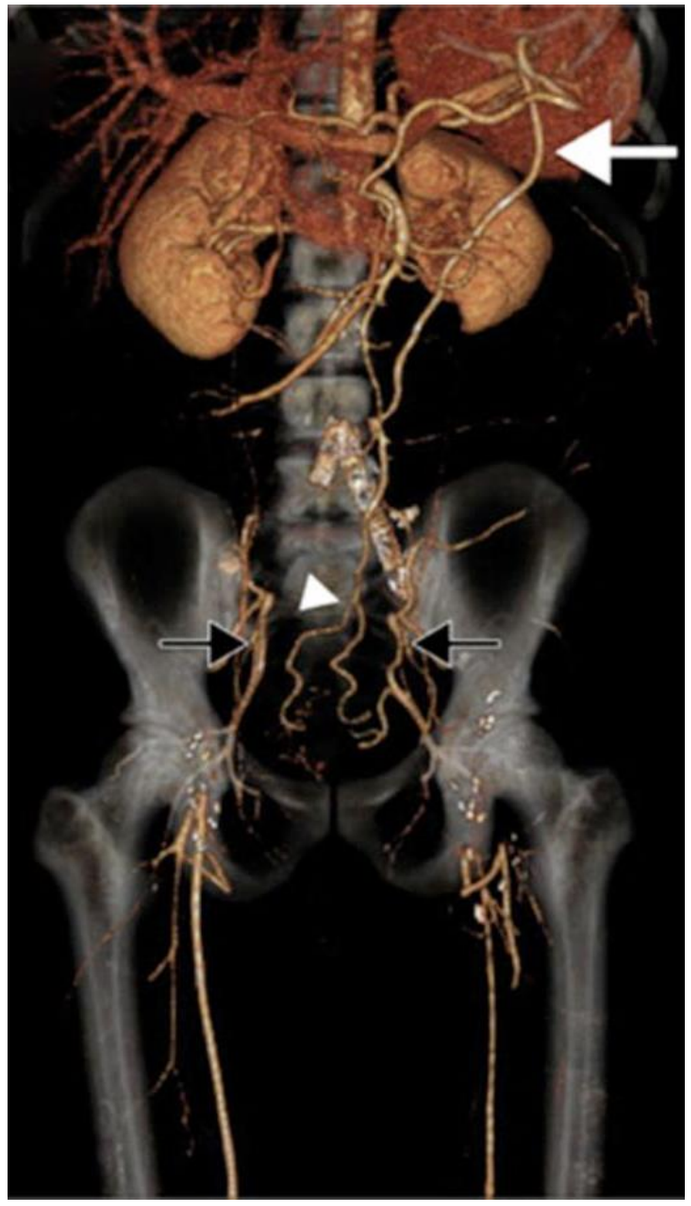
How do you assess need for imaging?

- Indications for imaging:
  - Concerning or abnormal H&P
  - Claudication, non-healing ulcer
  - Color, temperature, pulses, cap refill, skin sheen, hair, ABI, TBI, eschar, gangrene
  - High risk (DM, CAD, CVA, PAD other locations)
  - Multiple a/o deep extremity wounds (muscle, tendon or bone exposure)



How do you choose your imaging?

- Imaging modalities:
  - Arterial Duplex (TOC b/c cheap and non-invasive)
  - CTA (If proximal etiology is suspected, ie iliac occlusions, malignancy, dissection, etc)
  - MRA (If you want to assess for osteomyelitis simultaneously)
  - Angiography (Gold standard with possible intervention)
  - Carbon dioxide CTA and angiography may be options in patients with renal impairment



Why obtain an ABI?

- It’s cheap

- Risk stratisfies possible amputation
  - ABI <0.5 associated w 23% amp at 6 months and 28% at 12
  - ABI >0.5 associated w 10% amp at 6 months and 15% at 12

Marston WA, et al. Natural history of limbs with arterial insufficiency and chronic ulceration **treated without revascularization**. J Vasc Surg 2006; 44:108-114.

What is the mortality after amputation?

- Mortality at 3 years is approximately 50% in amputations secondary to chronic ulcers

- Mortality is higher than the five year mortality for breast cancer, colon cancer, and prostate cancer

- Amputation is an independent risk factor for death

- 55% of amputees with DM will require major amputation of contralateral extremity in 2-3 years

Marston WA, et al. Natural history of limbs with arterial insufficiency and chronic ulceration **treated without revascularization**. J Vasc Surg 2006; 44:108-114.

How common is PAD in diabetic foot ulcers?

- 99% of all diabetic foot ulcers **that require admission** will have significant lesions (50+% luminal occlusion)

- Stenoses were detected in patients with palpable foot pulses, ABI greater than 1 and PtcO2 values greater than 50 mmHg

- The power of a pos is greater than neg in regards to the physical exam

Angiographic Evaluation of PVD as a Prognostic Determinant for Major Amputation in Diabetics with Foot Ulcers causing vessel lumen reduction. Faglia et al. Diabetes Care. 1998; 21(4):625-530

Angiosomes

Peroneal Artery

Posterior Tibial Artery

Anterior Tibial Artery

Treatment of Ischemic Wounds

- Once identified, patients will need consultation from a wound center, interventional cardiologist, interventional radiologist and/or a vascular surgeon

- Treatment will depend on location, extent and risk / benefit profile

- Remember that patency is not a pre-requisite for intervention for wounds

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Debridement

2 Premises:

1. Debridement is the act of removing excess bioburden from wound beds

2. This bioburden includes dead tissue, senescent cells and bacteria

1. Wound healing is either delayed or prevented in the presence of devitalized or contaminated tissue

2. And as a corollary, removal of necrotic tissue must be performed to allow normal healing

Debridement Modalities

- Autolytic (Innate enzymes)
- Enzymatic (Collagenase)
- Mechanical (Wet to dry)
- Biological (Maggots)
- Surgical (Sharp)

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Should You Debride and How Often?

Frequency of debridements and time to heal: a retrospective cohort study of 312 744 wounds. Wilcox JR1, Carter MJ, Covington S. JAMA Dermatology. 2013 Dec;149(12):1441.

Stages of Wound Healing

- Injury & bleeding
- Hemostasis
- Inflammation (First 48 HR)
- Cellular migration, angiogenesis & proliferation (First 48 HR)
- Protein synthesis & contraction (72 HR)
- Remodeling (50% strength at 3 months)

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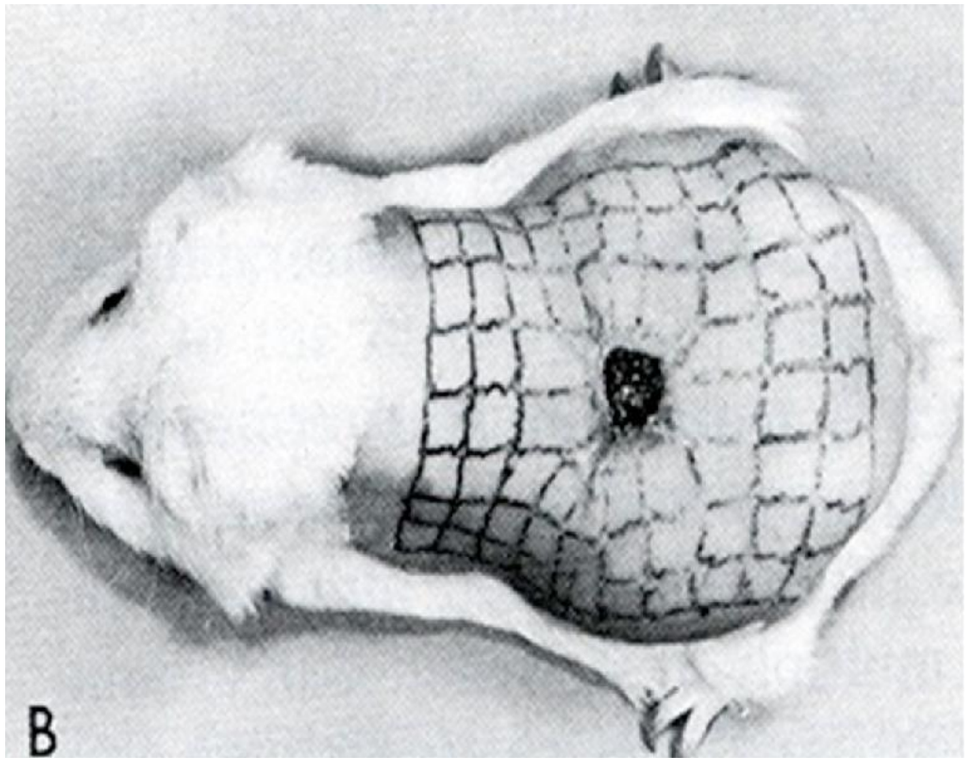

Shaping Wounds

- Wounds need proper shaping to heal appropriately
  - Simple debridement of necrotic material is insufficient and shaping is paramount
  - Undermining needs opening
  - Tunnels need opening

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Debridement Contraindications

- Needs OR debridement
- Extensive necrotic material
- Location is dangerous for injury to arteries or nerves
- Ischemic ulcers / dry and stable eschars
- Wounds will not heal and cannot fight infections
- The exceptions are those that have had revascularization, wet eschars / wet gangrene or abscesses
- Pyoderma gangrenosum

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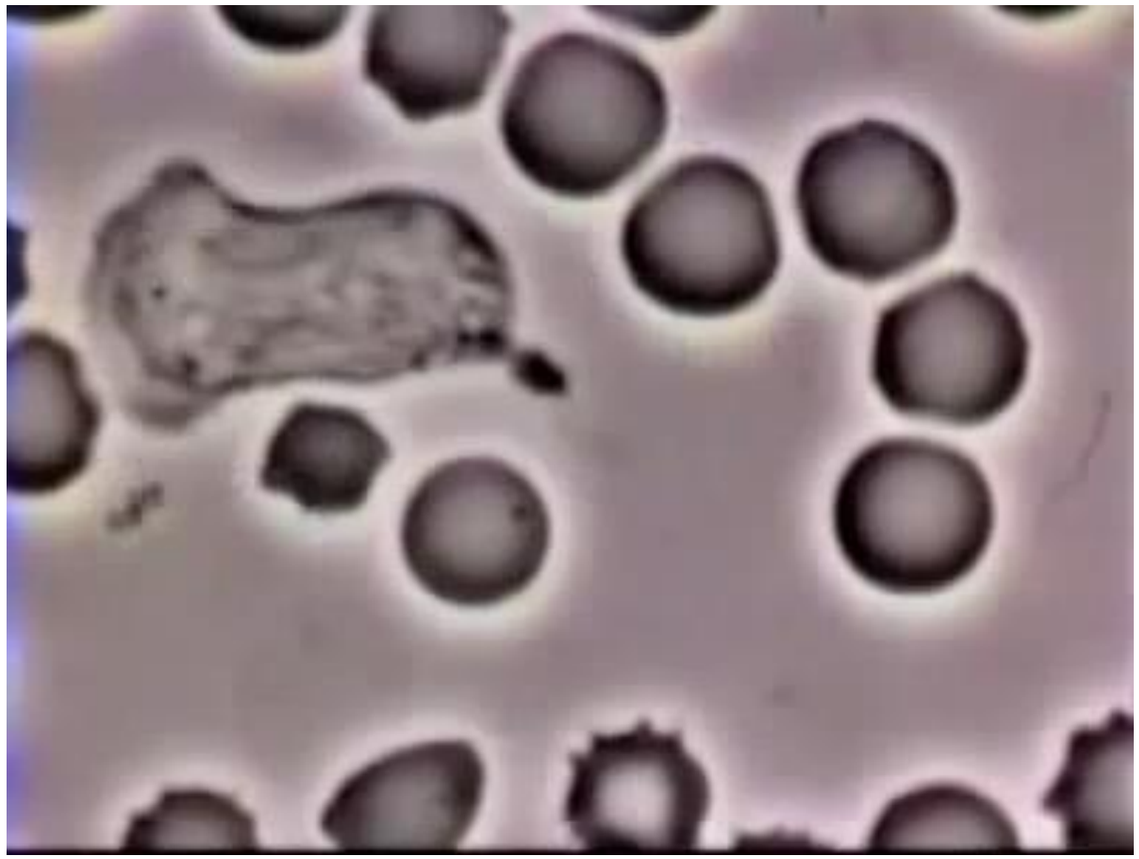
Wounds & Microbes

- The relationship between failing wounds and microbes is complex and is still debated
  - Failure of healing dependent on predominant organism, thus getting cultures from the wound base is important
  - Failure of healing dependent on synergy, thus capturing all bacteria in the culture is important



- C&S will guide antibiotic choices

Intersection of Debridement & Infection

- “Debride it til it bleeds,” because necrotic tissue does not have flow
- Antibiotics will not move beyond the interface between live & dead tissue
- Infected necrotic burden must be removed for source control
- This is true for chronic osteomyelitis and infected foreign bodies like hardware, sutures, tophi, etc

Necrotizing Soft Tissue Infections

- NSTI is a spectrum inclusive of necrotizing cellulitis, necrotizing fasciitis and gas gangrene
- Consider the diagnosis in patients with WBC 20K+, septic and concerning LRINEC score
- Hemorrhagic bulla, ecchymoses, crepitations a/o gas on imaging are common indicators of NSTI
- Treatment is often a combination of surgery, antibiotics, toxin mitigation, +/- hyperbarics and screening and treatment of fundamentals ie PAD, edema control, nutrition, etc

Osteomyelitis

- Wounds typically will not heal with underlying osteomyelitis
- Positive probe to bone is osteomyelitis UPO
- CRP, ESR and XRs are used for screening and tracking progress
- MRI have high se but questionable sp, not ideal for patients with hardware, recent osteomyelitis or surgeries whereas bone scans are good alternatives for these situations
- **Treatment is typically 6 weeks IVABX but can often also require myocutaneous grafts to ensure delivery of antibiotics, endovascular intervention to ensure perfusion a/o possible debridement / resection / amputation**

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Edema

- There are many, many, many reasons people have swelling
- Daily fluctuation of edema tears skin
- Consider dilution of oxygen and antibiotics in uncontrolled edema
- Consider compartment pressure and how it affects oxygen and antibiotic penetration

Edema Management

- Diuretics & Host Optimization
- Elevation (Affected limb above heart)
- Compression (Based on ABI, 5-40 mmHg)
  - Compression stockings
  - 3-4 layer wrapping
  - Elastic tube compression stocking

*** Ace bandage not reliable or consistent

Size	Low pressure circumference	Medium pressure circumference	High pressure circumference
A	–	10–12.5 cm/3.9–4.9 in	12.5–15 cm/4.9–5.9 in
B	10–12.5 cm/3.9–4.9 in	12.5–15 cm/4.9–5.9 in	15–24.5 cm/5.9–9.6 in
C	13.5–15 cm/5.3–5.9 in	15–24.5 cm/5.9–9.6 in	24.5–35.5 cm/9.6–14 in
D	15–24.5 cm/5.9–9.6 in	24.5–35.5 cm/9.6–14 in	35.5–45 cm/14–17.7 in
E	24.5–35.5 cm/9.6–14 in	35.5–45 cm/14–17.7 in	45–50.4 cm/17.7–19.8 in
F	35.5–45 cm/14–17.7 in	45–50.4 cm/17.7–19.8 in	50.4–60.7 cm/19.8–23.9 in
G	45–50.4 cm/17.7–19.8 in	50.4–60.7 cm/19.8–23.9 in	60.7–70.3 cm/23.9–27.7 in
J	60.7–70.3 cm/23.9–27.7 in	70.3–75.5 cm/27.7–29.7 in	–
K	70.3–75.5 cm/27.7–29.7 in	–	–

Low pressure = 5–10 mmHg Medium pressure = 10–20 mmHg High pressure = 20–30 mmHg

ABIs Determine Compressibility

- 0.8-1.0: No limitations
- 0.7-0.8: Reduced compression
- 0.5-0.7: Vascular studies needed before compression
- 0.0-0.5: Compression contraindicated

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COCHRANE CONCLUSIONS*†

2010 Topical silver for preventing wound infection[1]

There is not enough evidence to indicate if dressings or topical agents containing silver encourage wound healing or averts wound infection; non-robust research of poor quality for SSD proposes the opposite.

2010 Topical silver for treating infected wounds[2]

There is not enough evidence to enable the recommendation of using dressings or topical agents containing silver for the treatment of infected or contaminated chronic wounds.

2011 Silver based wound dressings and topical agents for treating diabetic foot ulcers[3]

This review could not find as a conclusion that dressings and topical agents containing silver are of benefit in the healing of diabetic foot ulcers.

2011 Topical negative pressure for treating chronic wounds[4]

There is a lack of valid and trustworthy evidence that topical negative pressure has an impact on increasing chronic wound healing.

2012 Negative pressure wound therapy for treating partial-thickness burns[6]

There is insufficient evidence to draw any conclusions pertaining to the use of NPWT in the treatment of partial-thickness burn wounds.

2012 Negative pressure wound therapy for acute surgical wounds. [7]

There is a lack of evidence in regard to the effectiveness of NPWT on wounds expected to heal and completing healing as the primary intention.

2013 Hydrocolloid dressings to promote foot ulcer healing in people with diabetes when compared with other dressing types[9]

In this review, including four studies with a total of 511 participants, there is no evidence to support that a hydrocolloid wound dressing of any type has greater effectiveness in healing diabetic foot ulcers over other types of dressings.

2013 Foam dressings for healing foot ulcers in people with diabetes[10]

This review of 157 participants finds that when looking at foam wound dressings versus other types of dressings for the healing of diabetic foot ulcers, there is no evidence to support that foam is more effective.

2013 Alginate dressings for healing foot ulcers in people with diabetes mellitus[11]

In this review looking at six studies with a total of 375 participants, no evidence was identified to indicate that alginate wound dressings have greater effectiveness in healing diabetic foot ulcers over other types of dressings. Further research is needed.

2013 Alginate dressings for venous leg ulcers[12]

Only poor quality evidence was found to be available. Further, quality evidence is needed in order to make conclusions regarding the use of alginate dressings and their impact on the management of venous leg ulcers.

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Not too wet, not too dry but just right

- Heavy drainage
  - Foam, ABD pads, NPWT
  - Address underlying cause of heavy drainage

- Mild to mod drainage - Alginates or Hydrofibers
  - Alginates often contain silver, honey & calcium
  - Impregnated alginates may prevent infection

- Light drainage
  - Gel, Silver Sulfadiazine, Lidocaine-Prilocaine, or Hydrocolloid

Not too wet, not too dry but just right

- Ischemic eschars or gangrene - Povidone-Iodine

- Odor control - Metronidazole, iodine base products, Sodium Hypochlorite

- Contamination risk - Zinc paste, NPWT

- Antibiotics - Use CREAMS and not OINTMENTS

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Topical Antiseptics

- Silver Sulfadiazine (All dry wounds (except eschars and gangrene) and burns)
  - Pros: Active against all microbes, resistance is rare
  - Cons: It is a sulfa drug and causes maceration

- Povidone-Iodine (All ischemic wounds until revascularization)
  - Pros: Active against all microbes, resistance is rare
  - Cons: It is an iodine based and dries wounds up

- Sodium Hypochlorite (In large, complex and infected wounds, such as deep PU)
  - Pros: It is bleach, kills everything, it works with Collagenase
  - Cons: It is bleach, kills everything, including healthy tissue

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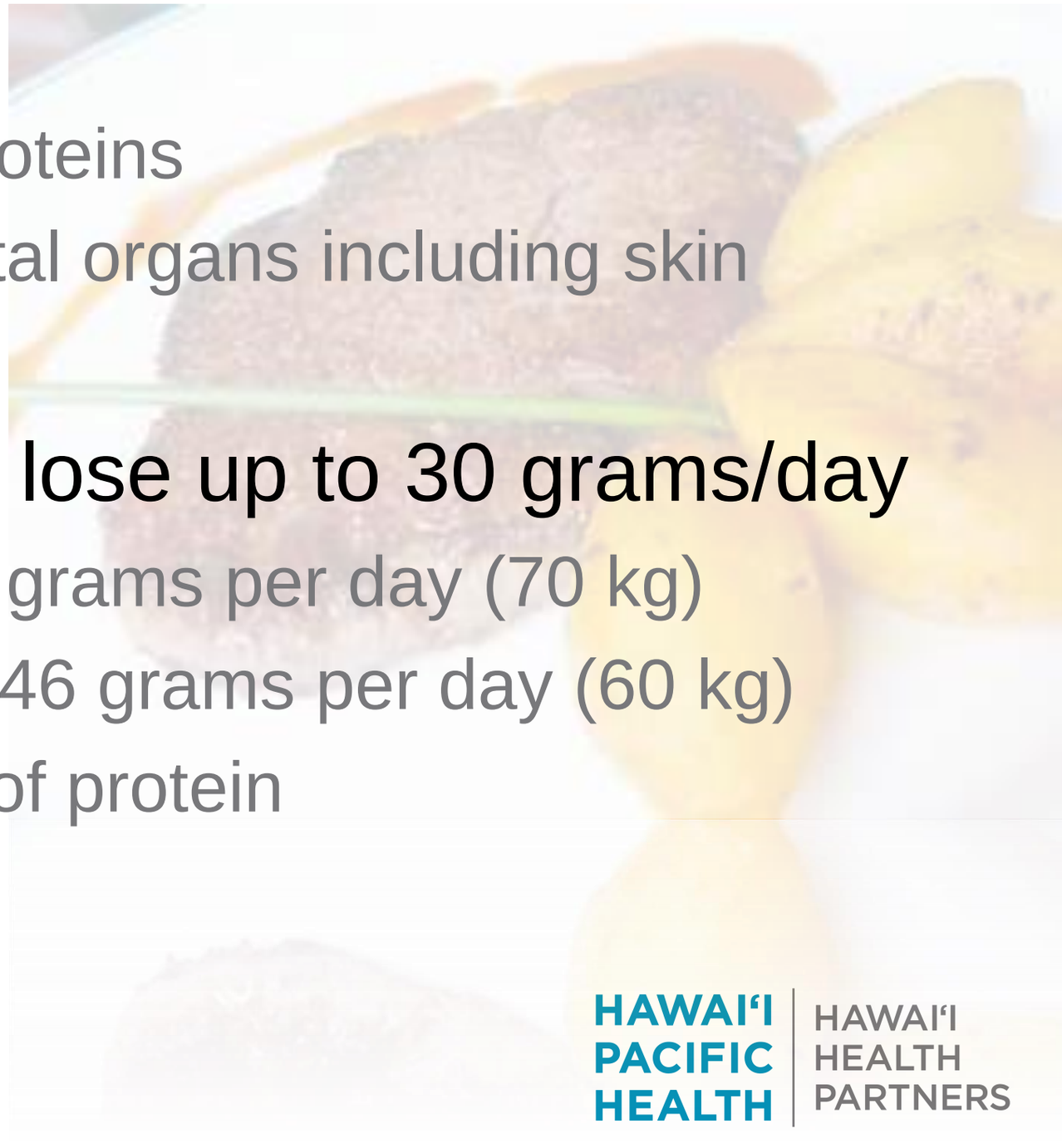
Malnutrition Statistics

- Malnutrition is often the biggest contributor to failed wound healing and is found in:
  - 30-50% acutely hospitalized
  - 50% long-term care
  - 85% nursing home patients

- Adequate protein intake is critical to wound healing

Malnutrition

- Malnutrition results in:
  - Failure to fight infections
  - Failure to produce vital proteins
  - Eventual breakdown of vital organs including skin



- Heavily draining wounds lose up to 30 grams/day
  - Adult men need about 56 grams per day (70 kg)
  - Adult women need about 46 grams per day (60 kg)
  - 6 oz steak has 42 grams of protein

Nutritional Markers

- Albumin (12-21 Day Half-Life)
  - Indicates chronic malnutrition
  - Decreases with infection, hydration, LF
- Prealbumin (72 Hour Half Life)
  - Marker for nut status & Tx response
  - Decreases with infection, ESRD or LF
- Total Lymphocyte Count (Normal 1800+)
  - Low value suggests malnutrition
  - Elevated with infection & inflammation

Index	Mild	Moderate	Severe
% UBW	85-95%	75-84%	<75%
Albumin,g/dl	2.8-3.4	2.1-2.7	<2.1
Prealbumin, mg/dl	10-15	5-9	<5
Transferrin, mg/dl	150-200	100-149	<100
TLC/mm^3	<1500	<1200	<800

Protein Supplements

- Supplement choices:
  - Ensure or Mighty Milk
  - Juven Drink
  - Nepro
  - Beneprotein/Isopure Protein Powder

- Be conscientious in following groups:
  - Diabetics: Sugar
  - CHF: Sodium
  - Predialysis: Protein may worsen GFR
  - Dialysis: Phosphorus

Other Modalities to Optimize Tissue Growth

- Hyperbaric Oxygen Therapy
- Synthetic grafts
- Negative pressure wound therapy

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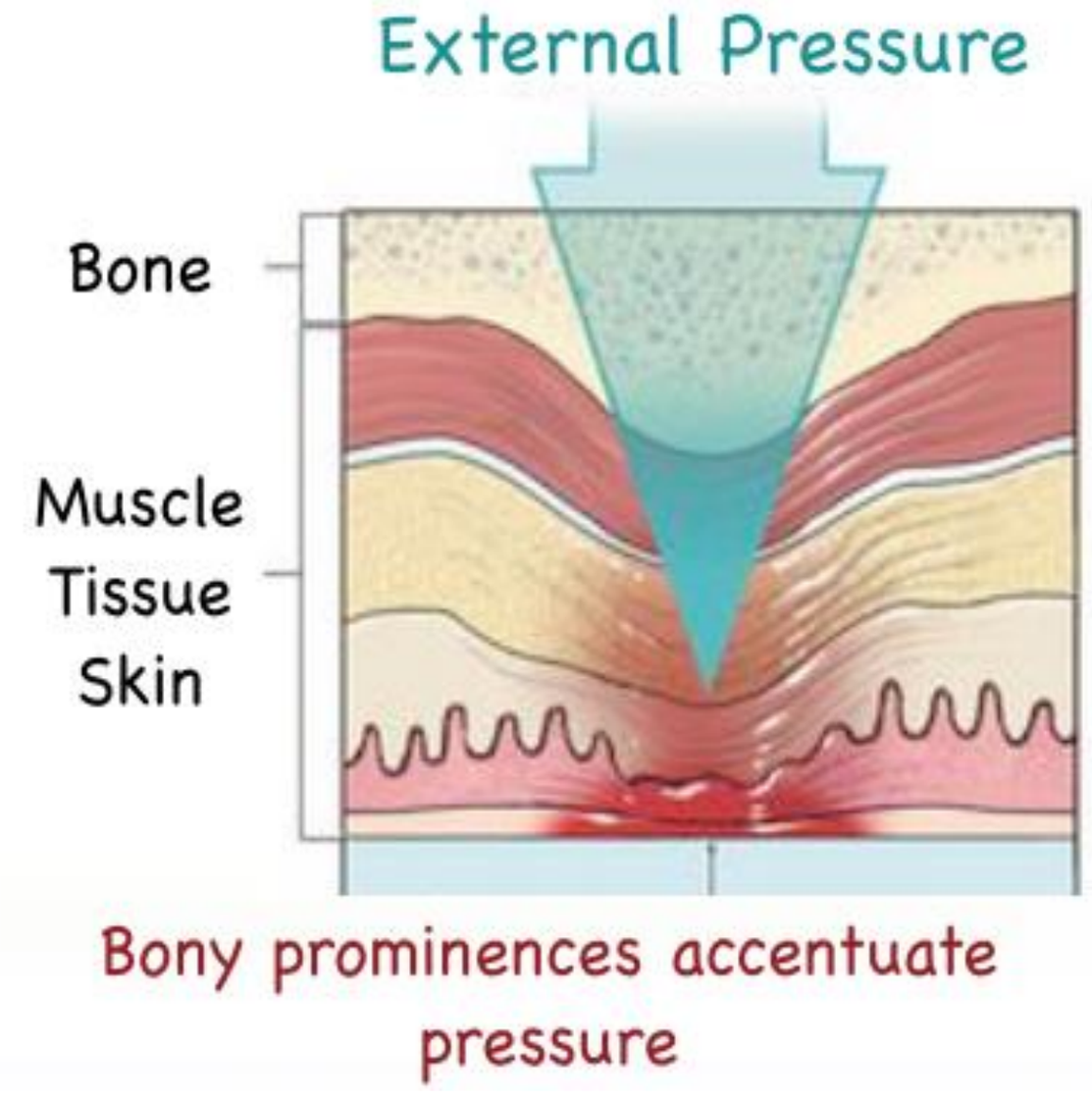
Offloading (Pressure Relief)

- In any wound that is regularly subjected to pressure, offloading is paramount
- Pressure induces local ischemia
- Doughnuts around pressure ulcers amplify ischemic affects as people sink in
- Posterior calf ulcers are often not identified as being subject to pressure



Offloading (Pressure Relief)

- Pressure induces cutaneous ischemia

- Any wound that is regularly subjected to pressure, offloading is paramount

- Doughnuts around pressure ulcers amplify ischemic affects as tissue sinks in

Elastic Wrap

Suspected Deep Tissue Injury

Trach Ties

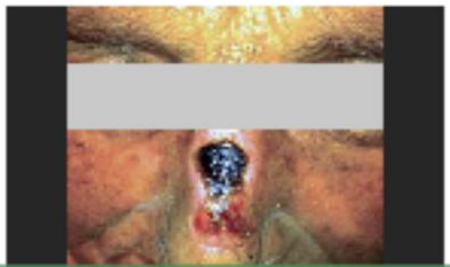
Unstageable

Splint

Suspected Deep Tissue Injury

Oxygen Tubing

Stage II



CPAP Mask

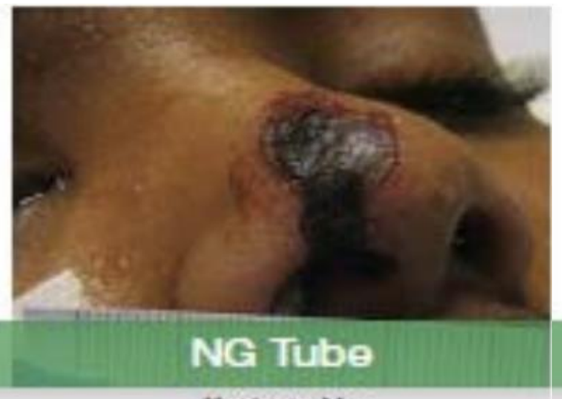
Unstageable

Bedpan

Stage III

Retention Sutures

Stage III

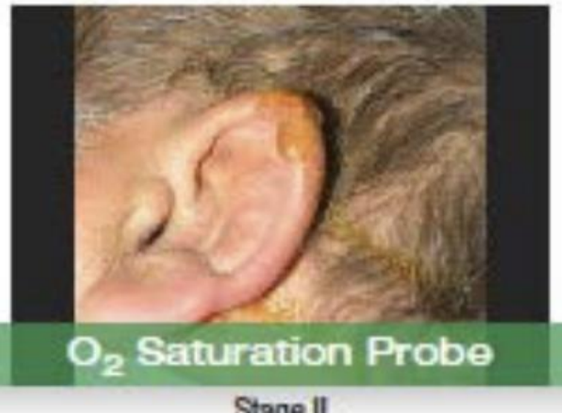


NG Tube

Unstageable

EEG

Unstageable



O_2 Saturation Probe

Stage II

Arterial Line Tubing

Stage II

Oxygen Sat Probe

Suspected Deep Tissue Injury

Pressure Ulcers

- Typically occurs in debilitated, paralyzed and weak

- 2 hours turning not enough

- Address malnutrition, stool, urine and secretions aggressively

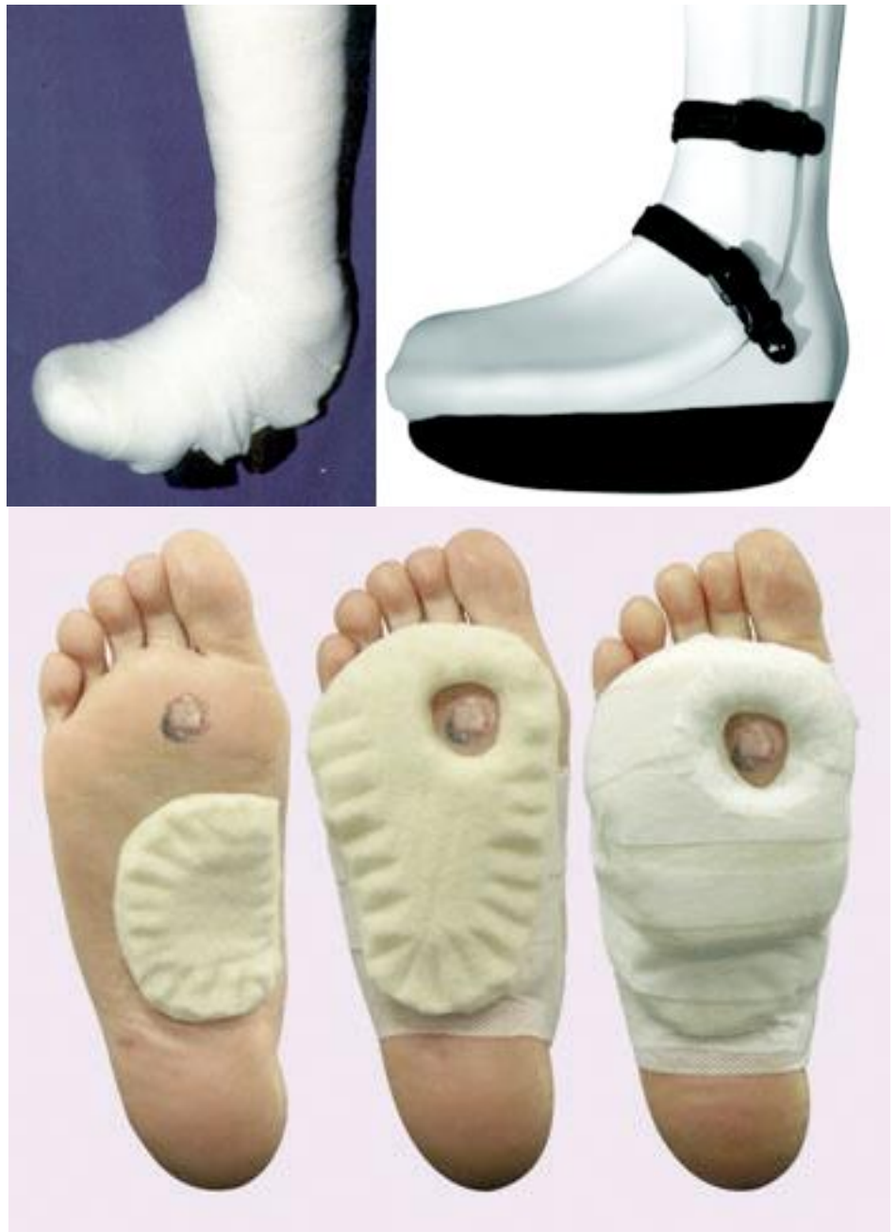
- Special DME and surgery often needed

Moisture Control

- Moisture leads to maceration, new or worsening of wounds and poor wound healing
- Stool, urine and secretions must be controlled
- Diaper, stool bulking (metamucil), rectal tubes and diverting colostomies
- Foley and suprapubic catheters
- Contraceptives in young females
- Consider Zinc paste, barrier spray, NPWT

Preventing Re-Injury

- Lower extremities
  - Total contact casts
  - Prosthetics
  - Felt pads
  - Wheelchairs



Preventing Re-Injury

- Wounds on joints often need immobilization (i.e. knees and ankles)
  - Total contact cast
  - CAM boot walker
  - Knee immobilizers

Wound Care Basics

- Ensure adequate perfusion and oxygenation
- Eliminate non-viable and obstructive tissue
- Control microbial bioburden
- Control edema
- Optimize the wound microenvironment
- Optimize tissue growth
- Relieve pressure, immobilize joints and decrease moisture
- Control pain
- Optimize host factors

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Q&A

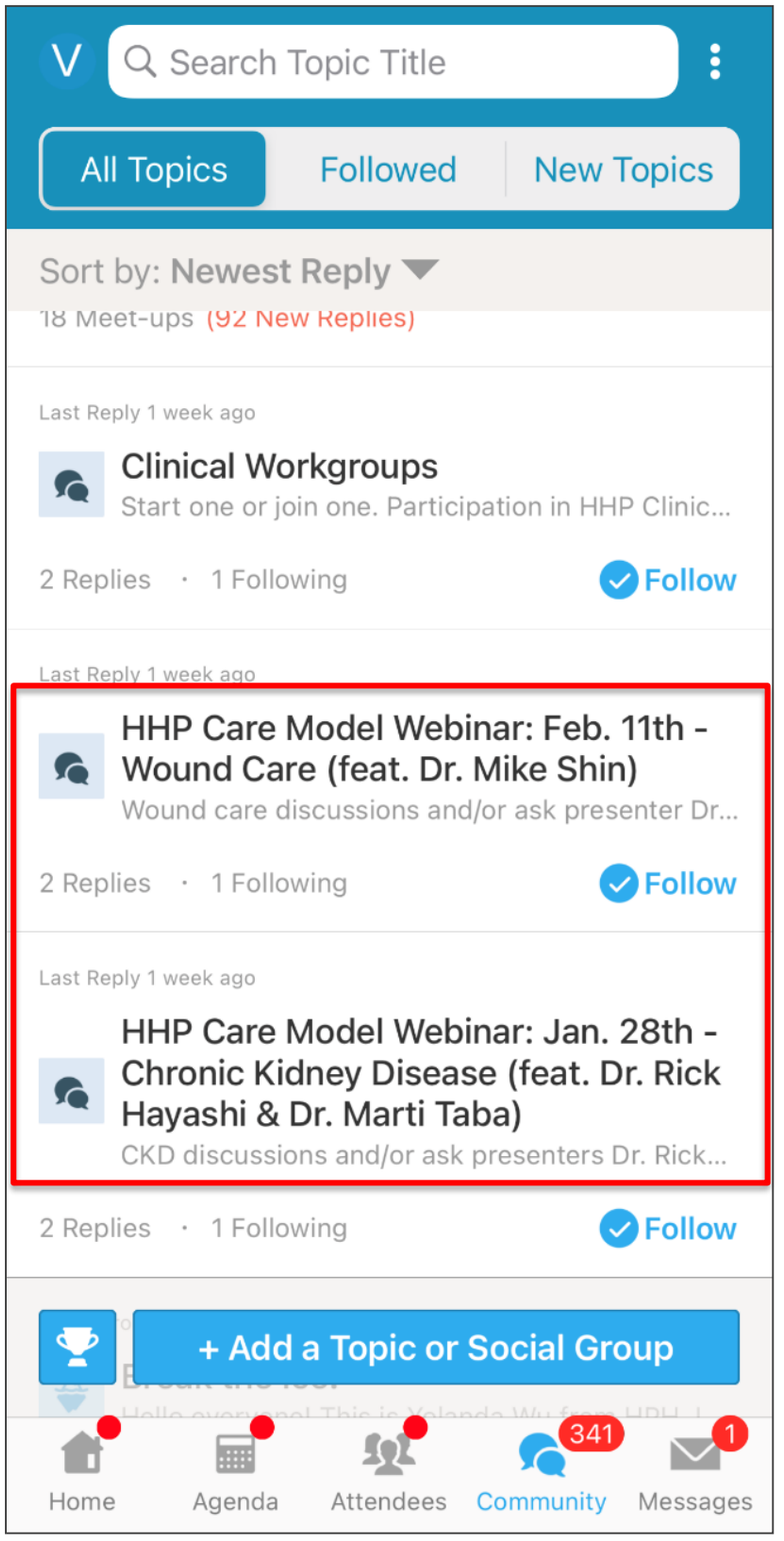
HAWAIʻI PACIFIC HEALTH | HAWAIʻI HEALTH PARTNERS

Whova: Webinar Discussion Topics

- Discussion topic opens 1st week of the month

- Before & after the webinar:
  - Ask presenters questions
  - Discuss with your colleagues

- How to Access
  - Instruction emails sent earlier today
  - Need assistance? Info@hawaiihealthpartners.org



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Next Webinar:

HHP/HPH Community Webinar:

COVID-19: Vaccines, Mutations and Treatments

Thursday, February 18, 2021

5:30pm – 6:30 pm

Thank you!

- A recording of the meeting will be available afterwards
- Unanswered question?
  - Contact us at info@hawaiihealthpartners.org