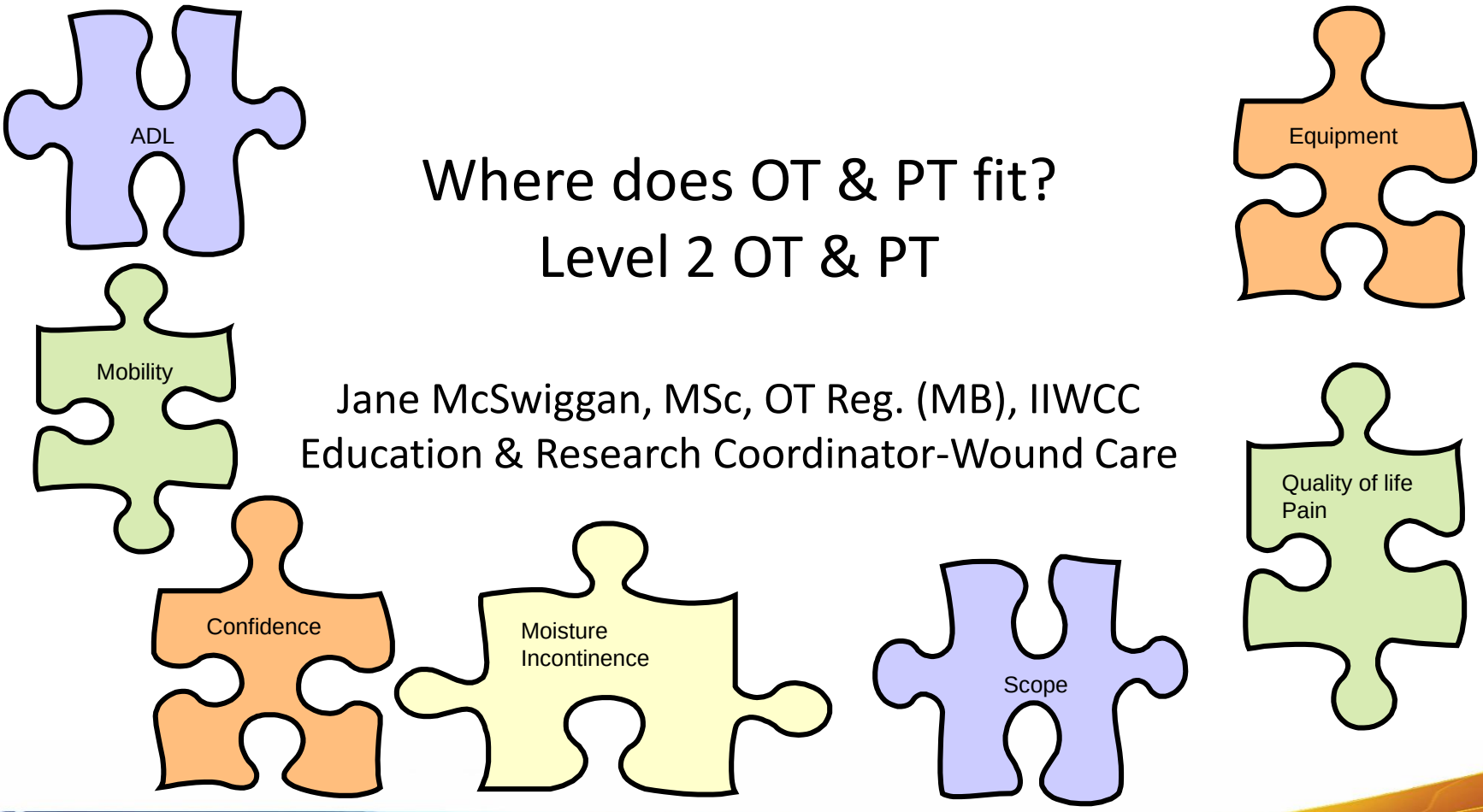
Wounds are always a puzzle!



Where does OT & PT fit?
Level 2 OT & PT

Jane McSwiggan, MSc, OT Reg. (MB), IIWCC
Education & Research Coordinator-Wound Care

Objectives

- Patient safety and wounds
- Role of OT & PT with wounds
- Do you know what are you seeing?
- Learn cool stuff about skin
- Identify wound risk
- Best Practice: Wound Bed Preparation
- Risk assessment and staging pressure injuries
- Review pertinent wounds and dressing types

OT and PT…and wounds…

Role for OT and PT is significant (to name a few)

- Wound prevention: skin risk assessment and management
- Identify/treat the cause of a wound
- Person centered concerns
- Offloading
- Edema management
- Interprofessional practice

Practice change is hard!

- ↓Confidence in wound assessment
- Fear of doing harm
- Knowledge/assumptions
- Scope of practice – ? need MD orders
- Lack of mature culture for safety
- Disjointed systems/finances

WOUND REVIEW

Time to think and not to panic

Determine etiology of these conditions/wounds numbered 1-10


1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4


1cm.
2cm.
3cm.
4cm.
5cm.
PATIENT:
DATE:
Copyright Medetec (http://www.medetec.co.uk)


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7
02/09/2012

8

10

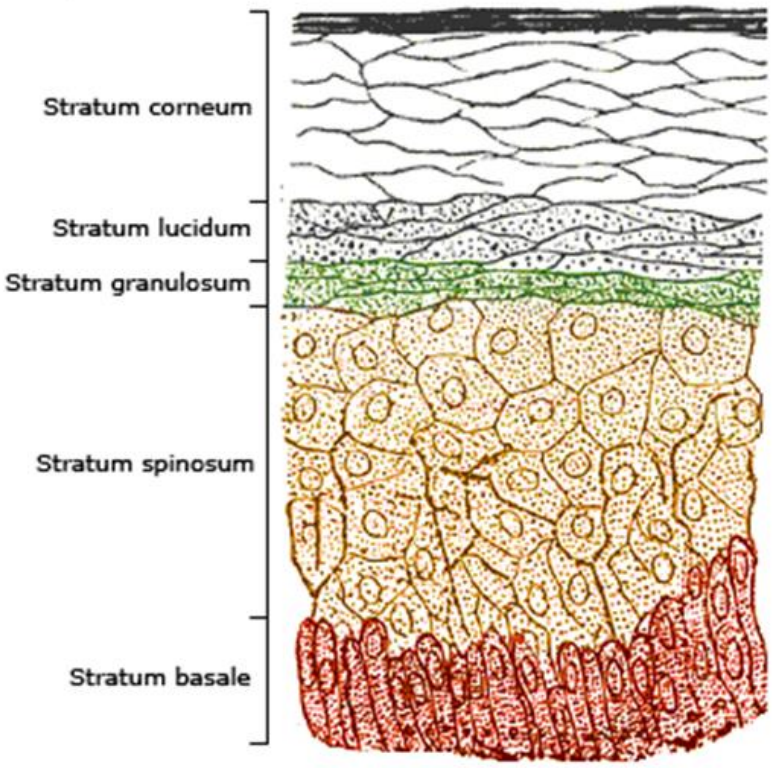
Cool stuff about the skin

Largest organ in body with the function of:

- Protection
- Regulation
- Sensation

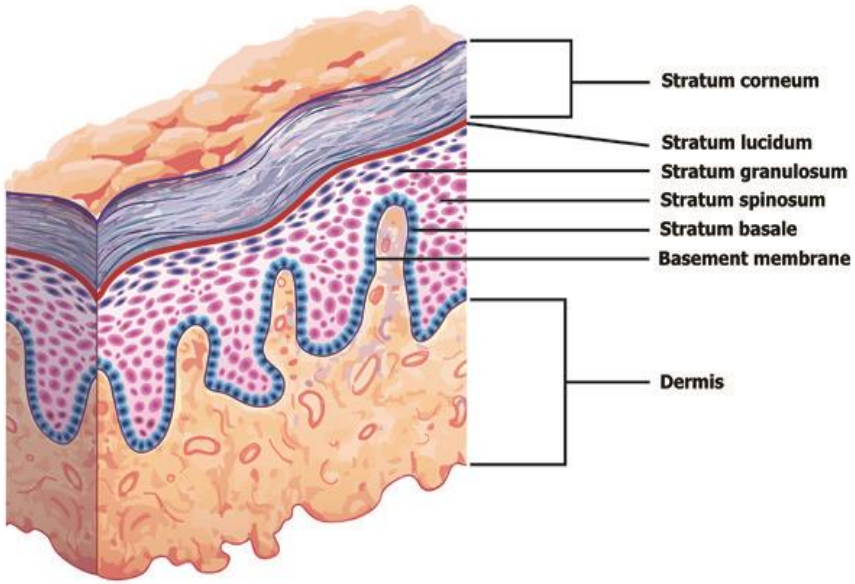
Cool stuff: The epidermis

- Skin does not leak: stratum granulosum has tight junctions
- Skin does not take on water: lipid matrix of stratum corneum is impermeable, pH is acid (acid mantle)



Cool stuff: The dermis

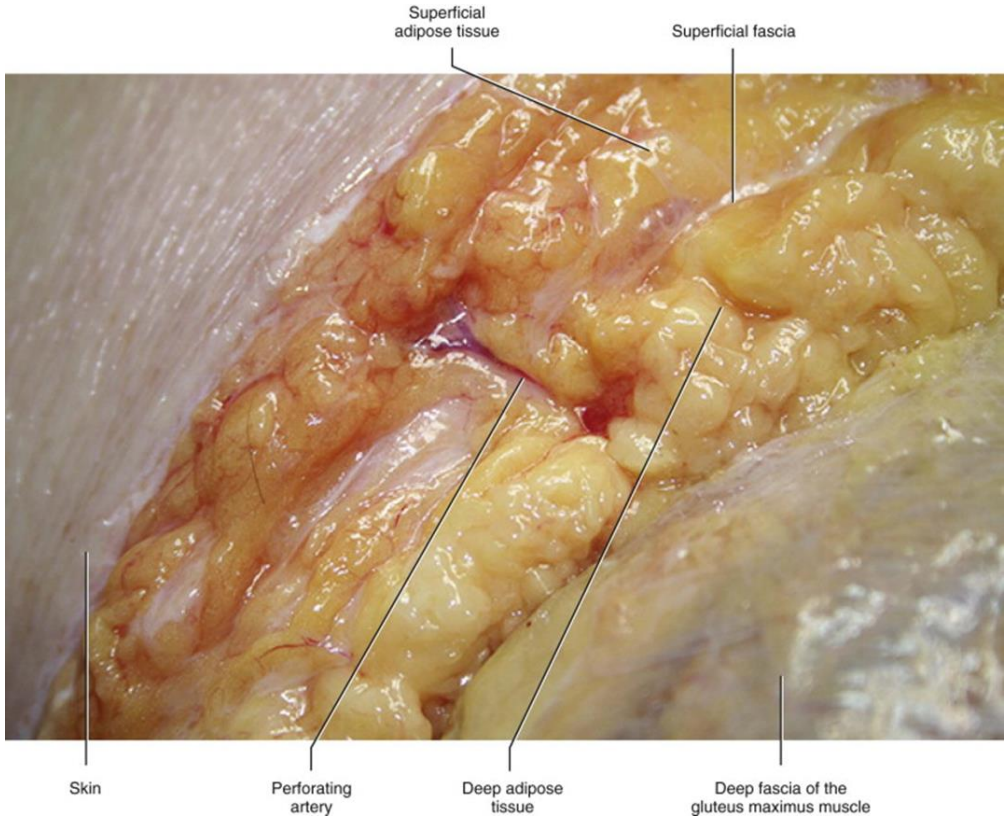
- Sensation
- Circulation
- Temperature
- Excretion
- Lubrication
- Strength
- Flexibility



Cool stuff: The hypodermis

AKA Subcutaneous layer

- Thermoregulation
- Protection
- Connects dermis to the muscular fascia



What creates wound risk?

Answer: Disruption of the function of the skin

- Loss of protection
- Pressure/Mechanical forces/Trauma
- Circulatory
- Pathologies

Loss of Protection

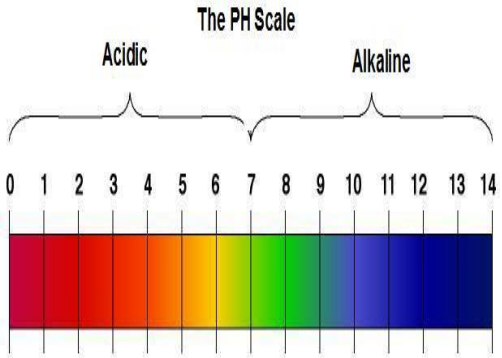
Acid mantle is disrupted, skin become alkaline

- Pervious to moisture: Skin becomes absorbent
- Bacteria can penetrate-infection
- Skin breaks down

Loss of Protection: Moisture

- Normal pH of the skin is 4.5 – 5.5 (slightly acidic)
- Alters the resiliency & permeability of the epidermis by changing the pH of the skin to alkaline
- Urinary incontinence results in loss of acid mantle which protects skin
- Fecal incontinence increases the risk of pressure injuries x 22 times as pH of skin rises to 8

(Thompson et al.2005; Bryant & Nix 2012)



Loss of protection: Moisture

Moisture Associated Skin Damage (MASD)

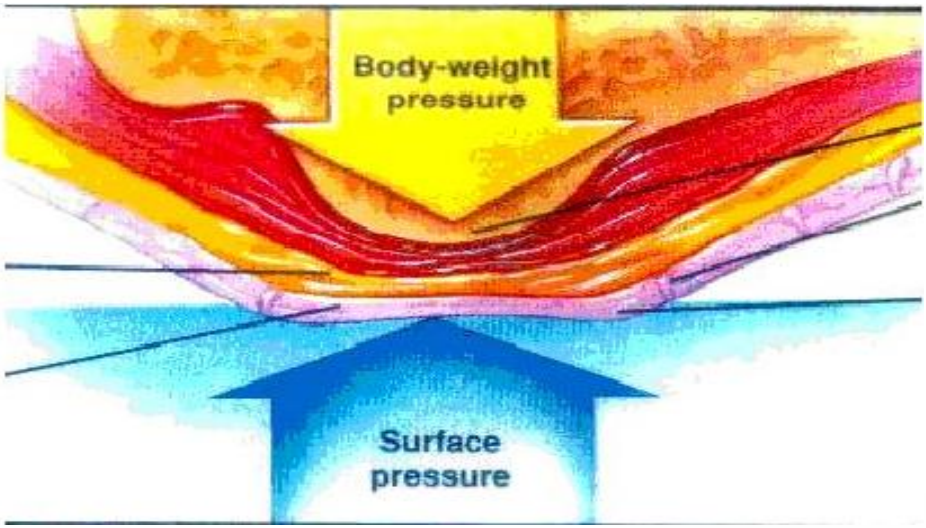
Maceration (white skin)
Wound exudate,
saliva & mucus

Intertriginous Dermatitis (ITD) or Intertrigo
Perspiration trapped in skin folds

Incontinence Associated Dermatitis (IAD)
Urine
Stool
Includes ostomies

Pressure/mechanical forces/trauma

Pressure: Blood vessels collapse and blood flow stops, which results in tissue damage and death

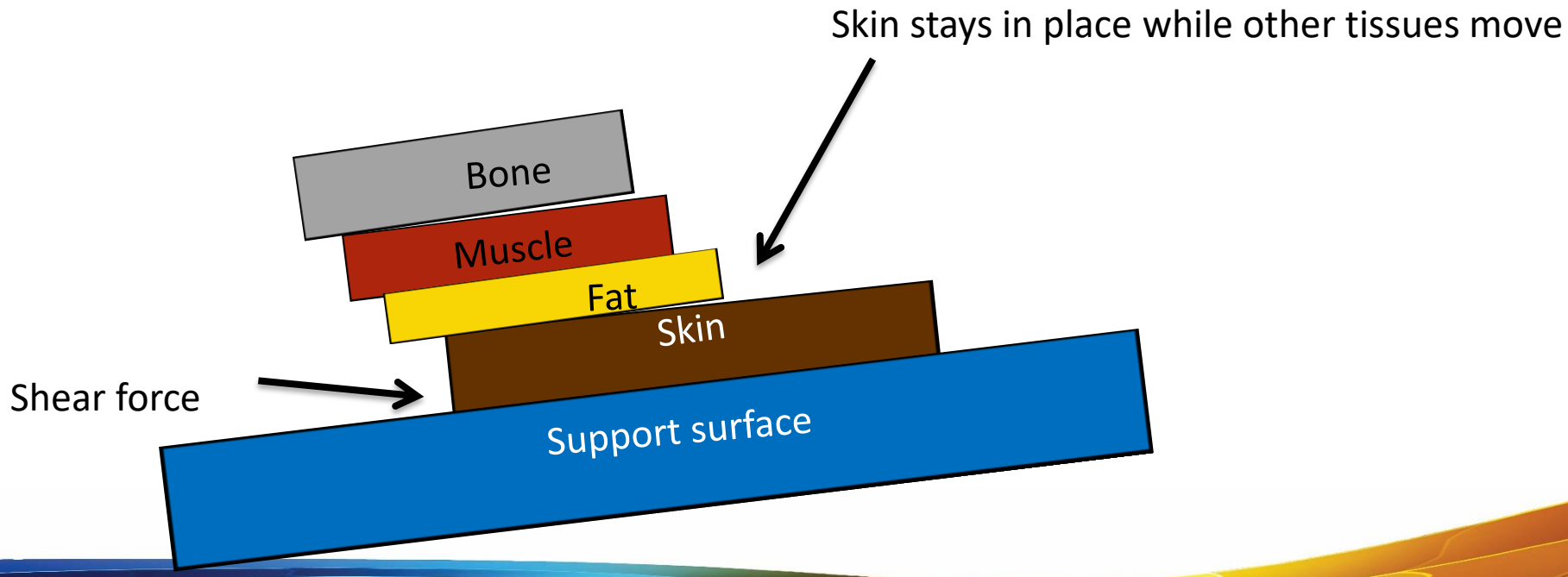


Mechanical forces: Friction

Skin dragged over a surface

Skin rubbing on skin

Mechanical forces: Shear



Trauma

Surgery
Medical devices
Treatments

Time in OR greater than 2.5 hours

Extravasation injury

Pressure injury from nasal prongs

Trauma

Adhesives
Treatments

Puncture

Medical Adhesive Related Skin Injury

Circulatory

- Venous or arterial pathologies
- Cardiac (vasopressor digital necrosis)
- Martorell hypertensive ischemic leg ulcers
- Diabetes
- Limb paralysis – Venous insufficiency

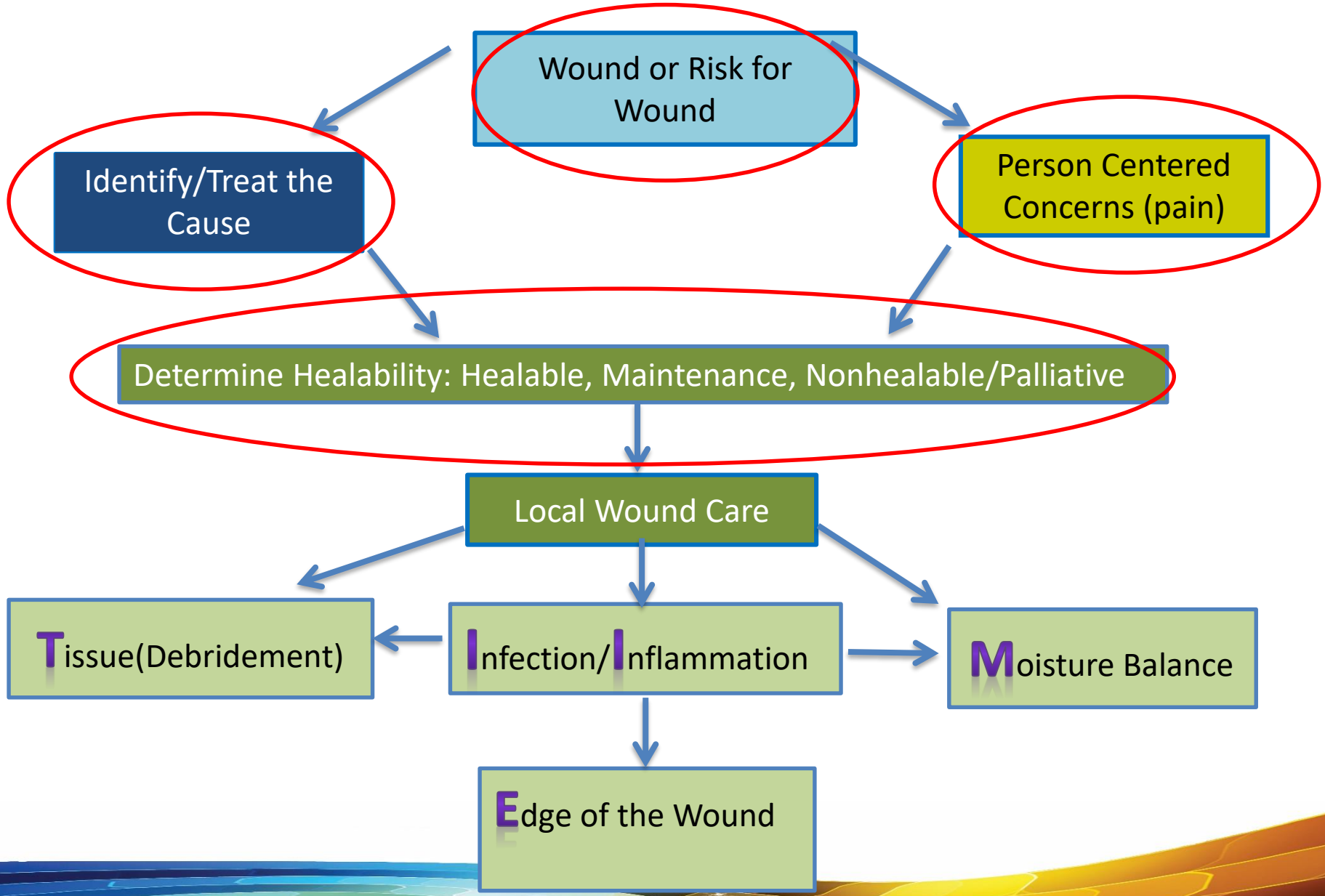
Pathologies

- Malignant fungating wounds
- Skin failure – Terminal Ulcers
- Autoimmune – Pyoderma Gangrenosum
- Complex Regional Pain Syndrome

BEST PRACTICE

Wound Bed Preparation Paradigm

What to do when you see a wound



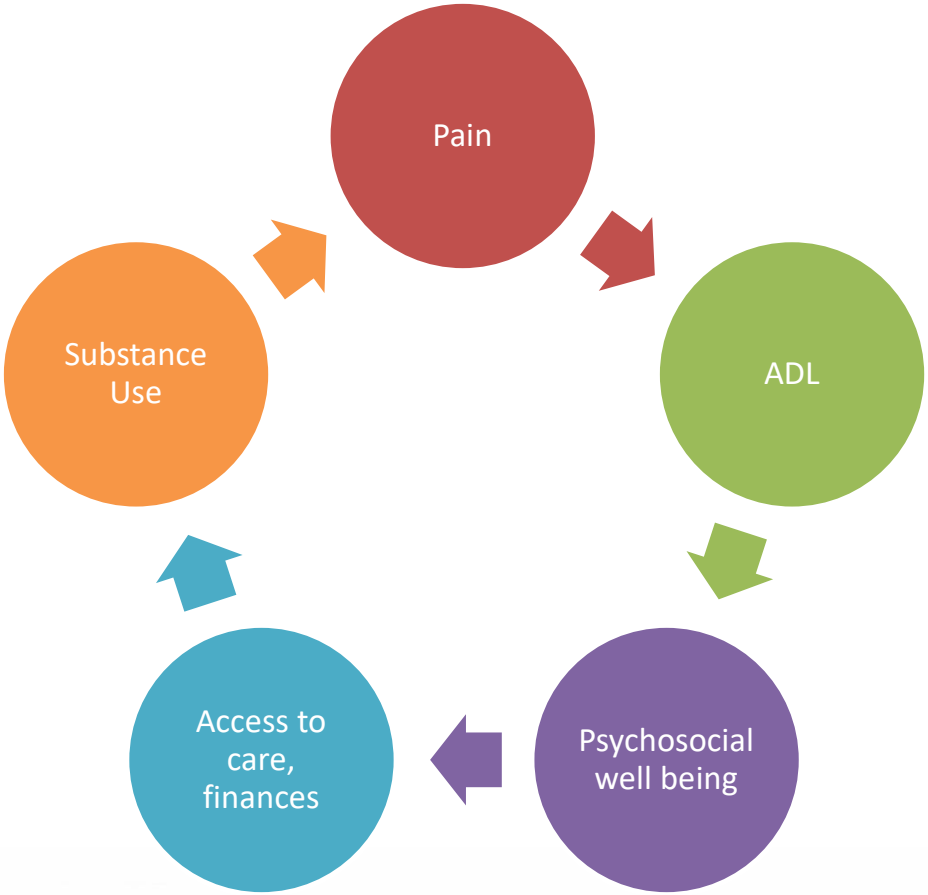
Adapted from: Sibbald, R.G., Elliott, J.A., Ayello, E.A., & Somayaji, R.. (2015)

Always Investigate the Cause

What type of wound is it
Determines intervention/treatment

- Staging of Pressure Injury
- Recognition of Diabetic Foot Ulcer
- Arterial vs Venous Ulcer

Person/Family-Centered Concerns



Wound Healing Trajectory

Healable	Maintenance	Non-Healable
Vascular supply	Vascular supply/needs re-vascularization	Poor vascular supply
Cause of wound can be treated	Medical co-morbidities not optimized	Malignant wounds
Co-morbidities & person factors can be managed	Person unable to follow wound treatment plan	Disease process(s) preclude healing (e.g., aggressive immunosuppression)
Infections (local & deep/surrounding) are treated	Has local +/- deep and surrounding Infection	Person factors such that maximizing for healing not possible (e.g., untreated malnutrition)
Interventions (compression, offloading, nutrition) in place	Debridement required	
Care is accessible	Needs specialist intervention	
	Care is not accessible	

Note. Adapted from "Local Wound Care for Malignant & Palliative wounds" by K. Woo & G. Sibbald, 2010, *Skin & Wound Care*, *23*(9), 417-418. & Optimizing the Moisture Management Tightrope with Wound Bed Preparation 2015 by R.G. Sibbald, J.A. Elliott, E.A. Ayello and R. Somayaji, 2015, *Advances in Skin & Wound Care, 28*(10), 466-476.

PRESSURE INJURIES

Identify/Treat the Cause: Pressure

Risk assessment (Braden Scale)

- Need to know the person's risk so we can develop an appropriate plan of care
- Results of validated risk assessment will help to prevent wounds, when:
  - Used to develop a care plan based on identified risk(s) e.g. a score of >3 in any category on the Braden Scale identifies a risk
  - Applied to wound prevention strategies

Note: PURS used in LTC

SSKIN Care Bundle

Pressure Injury Prevention Strategies

S — Skin Assessment & Skin Care

Check Skin
- During routine care
- Once a shift or more
- Under and around all devices (tubing, casts, braces, catheters)
- After turns and repositioning

Look for
- Changes in skin tone / redness
- Open areas

Communicate / Document
- Results of skin assessment and interventions

Assess Skin
- Using risk assessment (Braden / PURS)

S — Support Surfaces & Offloading

Remove Layers
- Remove extra clothing, bed linen, and lift slings

Offload
- Float/offload heels with pillows or heel boots
- Consider upgrading mattress/support surfaces

Consult
- An OT / PT / Advanced Wound Care Clinician

K — Keep Moving - Redistribute Pressure

Turn and Reposition
- During routine care
- When interacting with patient; make small changes of position to reduce pressure
- Using pillows and wedges to help maintain position

Encourage Mobility
- Promote mobility and self-repositioning

I — Incontinence & Moisture Management

Manage incontinence
- Establish toileting routine
- Avoid briefs if possible

Manage Moisture
- Use barrier cream to protect skin from incontinence
- Keep skin folds dry

N — Nutrition - Optimize Nutrition & Hydration

Encourage Food and Fluid Intake
- Offer meals, drinks and snacks

Consult
- A registered dietitian

What is SSKIN?

It's an acronym for 5 groups of actions to identify risk and prevent pressure injuries

Let’s look at a Pressure Injury

Questions

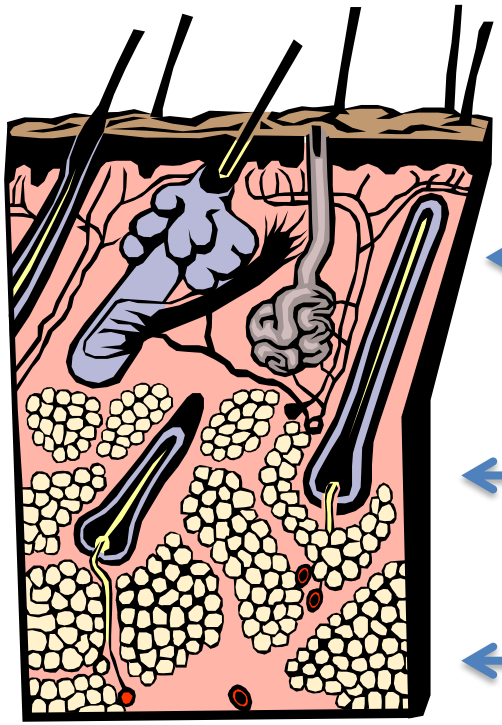
1. What stage is it?

2. What clues are there for the Stage?

3. What is the exact location?
   - Don't forget left & right

Staging – think anatomy

EACH STAGE AFFECTS A DIFFERENT LAYER OF SKIN



Stage 1, **involves epidermis-** the outer layer- squamous & basal cells, melanocytes

Stage 2, involves epidermis & dermis- Blood & lymph vessels, hair, sweat glands

Stage 3, involves epidermis, dermis & subcutaneous layers – fat & connective tissue

Stage 4, involves epidermis, dermis subcutaneous, & deep tissue - such as tendon, muscle & bone

Stage at Time of Initial Discovery

Stage 1: Began in last 12-24 hours

Stage 2: Began in last 24 hours

Stages 3-4: Began at least 72 hours ago

DTI: Began 48 hours ago

- Where was patient 48 hours ago?
- Turning may have been impossible
- OR cases > 2.5 hours

Joyce Black, PhD, RN, CWCN, FAAN (2015)

Pressure Injury Depth

Important: Depth varies by anatomical location

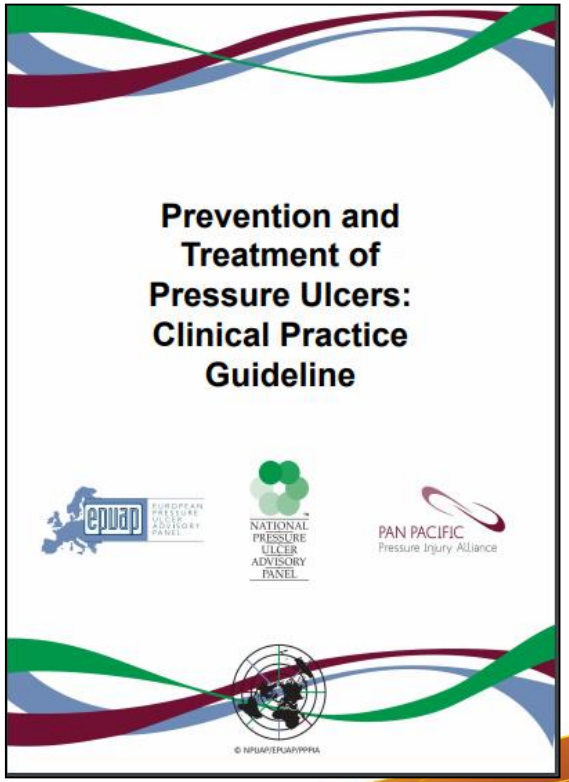
- Stage 3 and 4 injuries will be shallow where there is no adipose tissue; bridge of nose, ear, occiput, heel malleoli


Practice
Practice
PRACTICE
(& then PRACTice some more..)

Local Wound Care

Staging Pressure Injuries

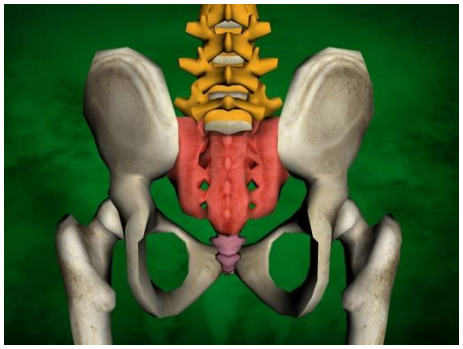
- Stage according to the National Pressure Injury Advisory Panel Recommendations (2016)
- Now called ‘pressure injury’
- Describe the highest stage of severity in the history of the injury
- Don’t change stages as they heal
- Staging is only for pressure injuries



Name the Stage

- Wound on right lateral malleolus
- Slough
- Muscle &tendon visible
- Client had brace

<u>Answer & Reason</u>



Name the Stage

- Wound on right sacrum
- No slough

<u>Answer & Reason</u>

Name the Stage

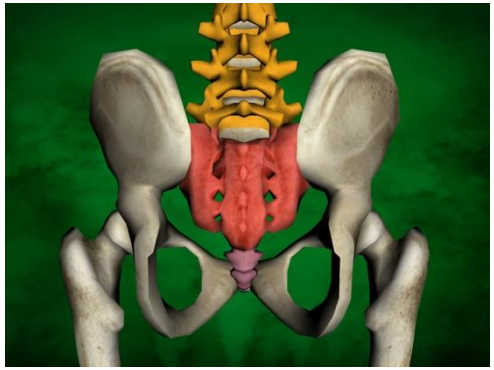
- Right heel
- Intact skin
- Erythema does not blanch when pressed for 3 seconds

<u>Answer & Reason:</u>

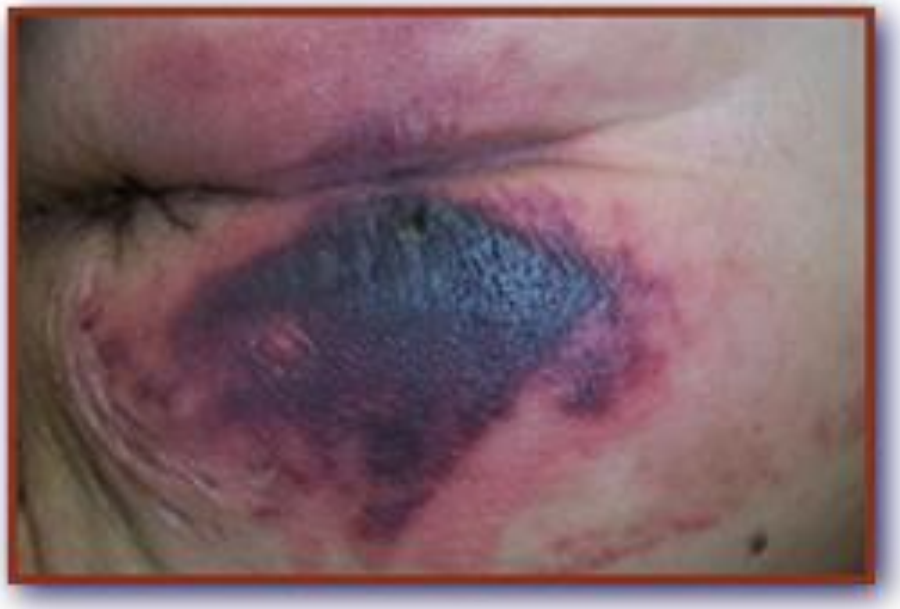
Name the Stage

- Wound on right sacrum
- Covered with slough

<u>Answer & Reason:</u>



Name the Stage



- Wound on right sacrum
- Intact skin
- Deep purple

<u>Answer & Reason:</u>

Name the Stage

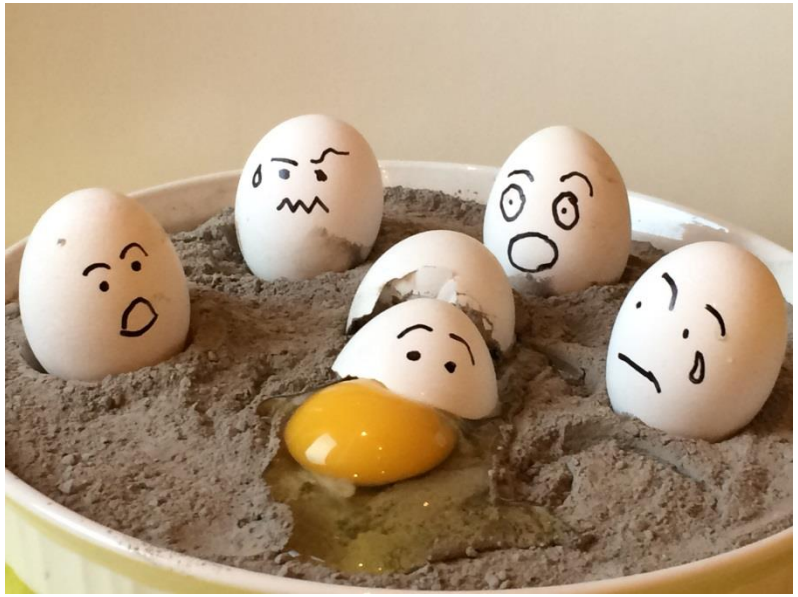
- Wound on inside of upper lip

<u>Answer & Reason:</u>

Critical Incident

Reporting Occurrences and Incidents

- Report Stages 3, 4, Unstageable Pressure injuries as potential CIs
- Report Stages 1& 2 as occurrences
- 204-788-8222 or RL6 online (anonymous)
- Applies to any point on continuum of care where pressure injury is assessed



Staging Quick Reference Guide (QRG)

Stage 1: Intact skin; skin damage

Stage 2: Blister; serum filled/ruptured no slough

Stage 3: Subcutaneous tissue +/- slough/eschar

Stage 4: Structures visible; bone, tendon, muscle

Unstageable: Can’t see base of wound

Deep Tissue: Intact skin: Deep purple, blood blister

Mucosal: On mucosal membrane, not staged

Staging a Stage 1: Not simple!

Stage 1: non-blanchable erythema if pressure is held for 3 seconds and released

In darkly pigmented skin Stage 1 presents as one or more of:

- Purple/bluish discolouration
- Localized swelling due to the inflammatory response
- Temperature change — initial warmth due to the inflammatory response
- Induration (firmness)
- Pain

Mucosal Membrane Pressure Injury

Mucous membranes line eyes, ears, nose, trachea, mouth, lip, vagina, urethral opening, ureters.

Medical devices cause mucosal membrane pressure injuries.

Medical Devices: Protocols

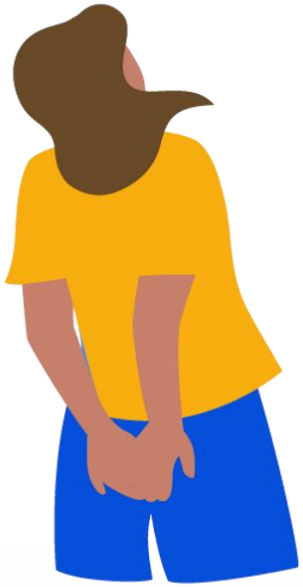
- Inspect the skin under around medical devices every 8 hours
- Conduct more frequent skin assessments at the skin-device interface with fluid shifts &/localized/generalized edema
- Preventing Medical Treatment Related Skin and Tissue Injuries in Adults and Children

  https://professionals.wrha.mb.ca/old/extranet/eipt/files/EIPT-071.pdf

MANAGEMENT of PRESSURE

Pressure Injury Management

- Average healthy individual repositions themselves every 6-11 seconds.

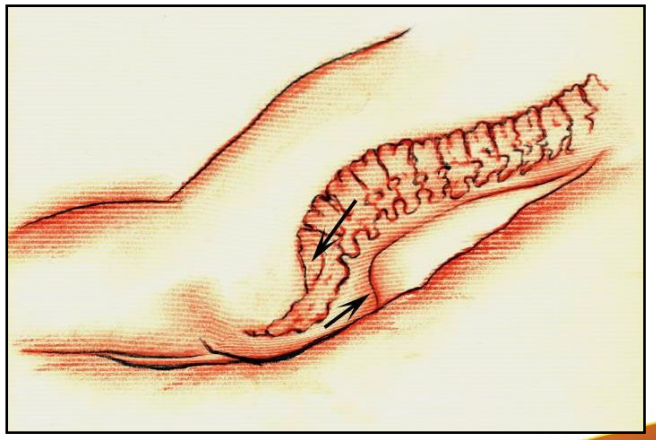


Micro-positioning

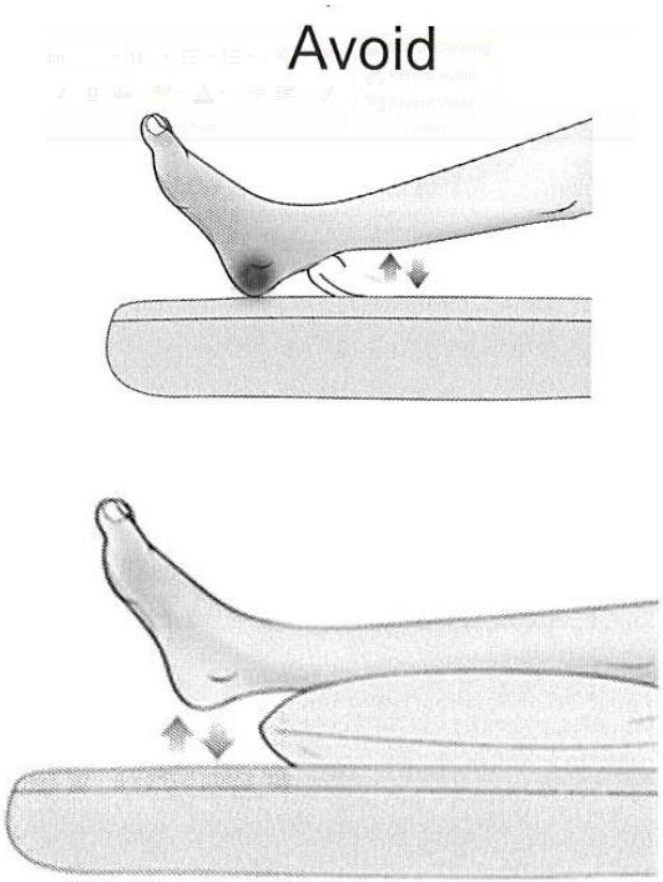
- Tissues of the body are not meant to be stationary
- Micro-positioning mimics the natural movements to relieve pressure
- Micro-positioning is frequent and small changes to the patient's position
- Micro-positioning can be achieved in sitting and lying
- Passive range of motion is micro-positioning

Prevention Strategies

- Use supports for a stable posture
- Reduce the chance of sliding down in the bed, engage knee gatch when raising the head
- When repositioning LIFT don’t DRAG
- Use sliders
- Head of the bed to 30˚ or less



Let’s talk heels…



Moisture Management

Prevent loss of skin protection

- Meticulous skin care & regular toileting
- Barrier cream with intact skin (Criticaid-Clear)
- Well fitting briefs if needed
- Dressing in a tube for broken skin (Triad)
- Investigate & treat incontinence
- Wick moisture from skin folds
- Exudate is controlled
- Microclimate is managed (no excess layers)

Skin Folds/Contracture

- Identify cause of moisture
- Regularly inspect skin, Cleanse
- Product: InterDry®
  - Don’t use creams, ointments, or powders
  - Interdry™ should not be placed directly onto an open wound
  - Wicks moisture
  - Leave at least 2 inches of product outside skin fold

How to use InterDry:

https://www.coloplast.us/Global/US/Skin%20Care/Interdry/HealthTrust-TryInterDry/SC-M5105N-InterDry-Instructions-Poster.pdf

Dressings and Products

Moisture management

- Barrier creams to prevent loss of acid mantle
- Well fitting incontinence products
- Foams to wick moisture under trachs, lines, devices (Fenestrated foam, transfer foams)

Dressings

Pressure injury prevention

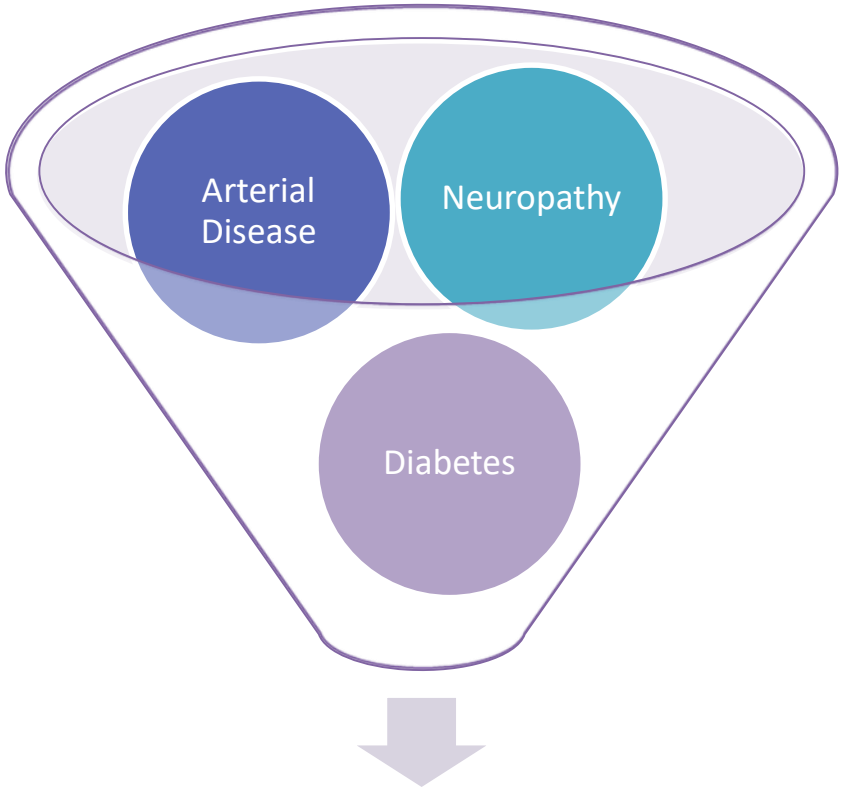
- Soft silicone multilayered foam dressings used over bony prominences (heel and sacrum)

24 Hour Approach to Pressure Management

- Assessment posture, positioning, and functional activities
- Consider all support surfaces used in 24 hour period
- Review of pressure re-distributing, offloading, and transitional movements on and between surfaces
- Collaboration with other members of the health care team

DIABETIC FOOT ULCERS

Diabetic Foot Ulcers: Etiology



+/- Pivotal Event:

Pressure
Trauma
Ill-fitting footwear

Diabetic Foot Ulcer

Causes of Diabetic Foot Ulcers

- 35% Neuropathy (Sensory, Autonomic, Motor)
- 15% Vascular Disease
- 50% Combination of Neuropathy and Vascular Disease
- 55% Pivotal event, pressure or trauma (rule out shoe as pathology)

International Best Practice Guidelines: Wound Management in Diabetic Foot Ulcers (2013)

Diabetic Foot Ulcers

Recognize/Manage Risk

- Foot assessment regardless of diagnosis
- Many people have undiagnosed DM
- Foot issues can identify DM
- Timely access to care and education = limb salvage

Diabetic foot ulcers: Infection

Non-limb threatening	**Limb-threatening**	
Local Infection (NERDS) • Non-healing • Exudate increased • Red, friable granulation tissue, bleeds easily • Debris in wound • Smell	Deep/Surrounding infection (STONEES) • Size increased • Temp of wound increased • Os: Probes to bone • New satellite areas • Exudate increased • Erythema >2cm wound margin • Edema • Smell <u>PLUS</u> • Pain • Flu-like symptoms • Erratic glucose control	Systemic Infection Deep wound infection <u>PLUS</u> • Fever • Rigour • Chills • Hypotension • Multi-organ failure

RNAO (2013); Armstrong et al. (1996); Eneroth (1997); Tennvall (2000); Woo & Sibbald (2009)

Sensory Neuropathy

- Small fibre (stabbing, burning pain, tingling, cold or itchiness)
- Large fibre (painless paresthesia with impairment of vibration, joint position, touch and pressure sensations)

Loss of protective sensation (LOPS) with potential for injury from physical, chemical and thermal trauma

Bansal, et al. (2006); Callaghan, et al. (2012); Hoeijmakers, et al. (2012); Singh, et al. (2005)

Autonomic Neuropathy: Sympathetic Denervation

- Loss of vascular tone
- Reduced peripheral blood flow
- Arteriovenous shunting
- Loss of sweating & natural oils
- Blood flow decreased to bones

Fissures, cracking, calluses, bounding pulses, edema and microvascular gangrene (poor wound healing)

Del Core, et al. (2005); Kamenov, & Traykov (2012)

Motor Neuropathy

- Damage to muscles in foot
- ↓strength, ROM in ankle, foot, toes

Structural foot deformity

Claw toes, hammer toes, high medial arch, collapsed arch, displaced fat pads, bunions

Andersen, et al. (2004); Grunfeld (1992); Veves, et al. (1992)

Onychomycosis (fungal nails)- is it a big deal?

Gupta & Humke (2000); Winston & Miller (2006)

Name the Neuropathies

Name the Neuropathies

Name the Neuropathies

Name the Neuropathies

Charcot Foot (Charcot Neuroarthropathy)

Foot changes from:

- Small muscle wasting
- Decreased sensation
- Abnormal distribution of weight when standing

Fractures occur spontaneously or with minimal stress

Progressive bone disorganization

Increased risk of secondary ulceration

Can be acute or chronic

Harris, et al. (2020)

Acute Charcot Foot * Medical emergency

- Early diagnosis of Acute Charcot requires a high index of clinical suspicion
- in a person with Diabetes, and peripheral neuropathy who presents with
- swelling, erythema, and increased warmth of the foot and ankle.
- Often misdiagnosed with cellulitis, gout or deep vein thrombosis.
- Inflammatory process

- College of Physicians and Surgeons of Manitoba (2022); Harris, et al. (2020)

Management of Acute Charcot Foot

- To prevent foot destruction, refer immediately for offloading and casting
- Plain radiographs may be normal in the early stages of the disease
- MRI should be considered with suspicion of Acute Charcot foot

Offloading

- Pillow to float heels
- Offloading boot for immobile patients
- Offloading footwear for mobile patients
- Appropriate footwear

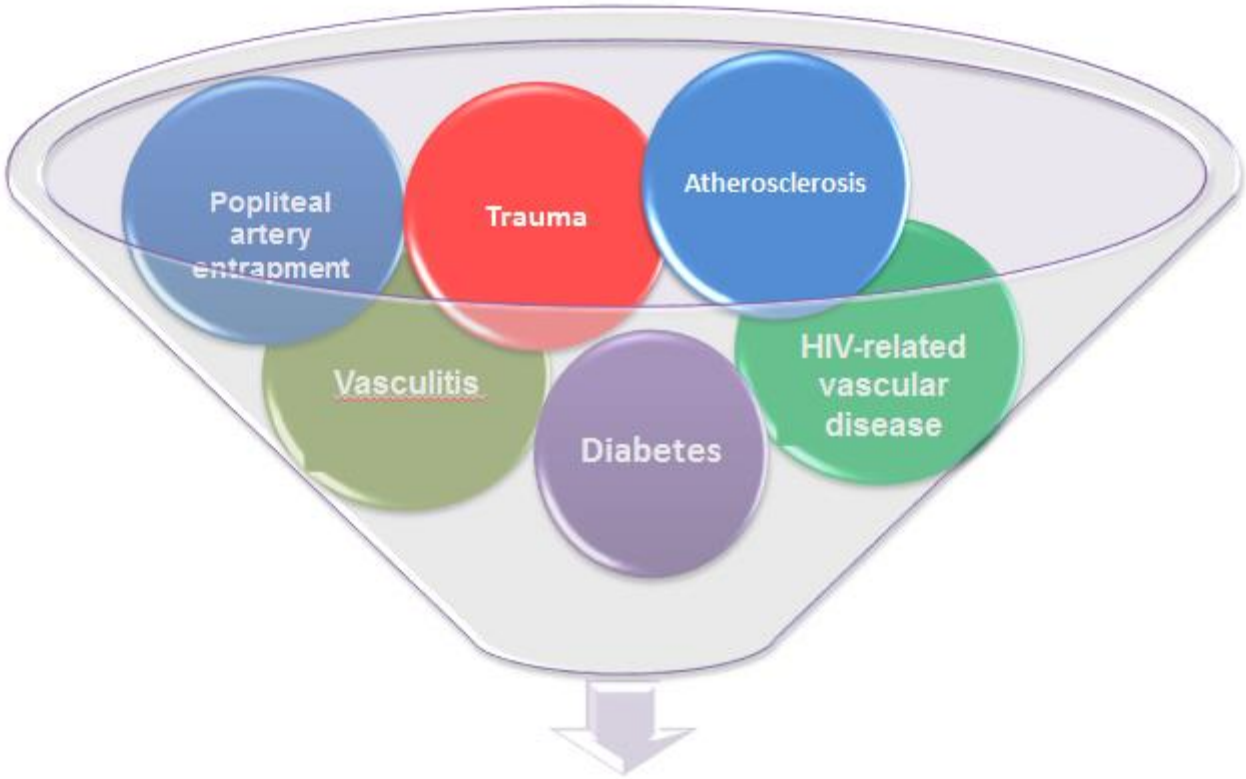
Daily Skin Care

- Inspect feet daily
- Cleanse feet daily, but do not soak
- Moisturize intact skin avoiding web spaces and nails
- Avoid excess moisture
- Apply clean, intact socks daily
- Avoid heating pads

* Foot care nurse for nail and skin care

ARTERIAL LEG ULCERS

Arterial Leg Ulcers: Etiology



Arterial Leg Ulcers

Considerations

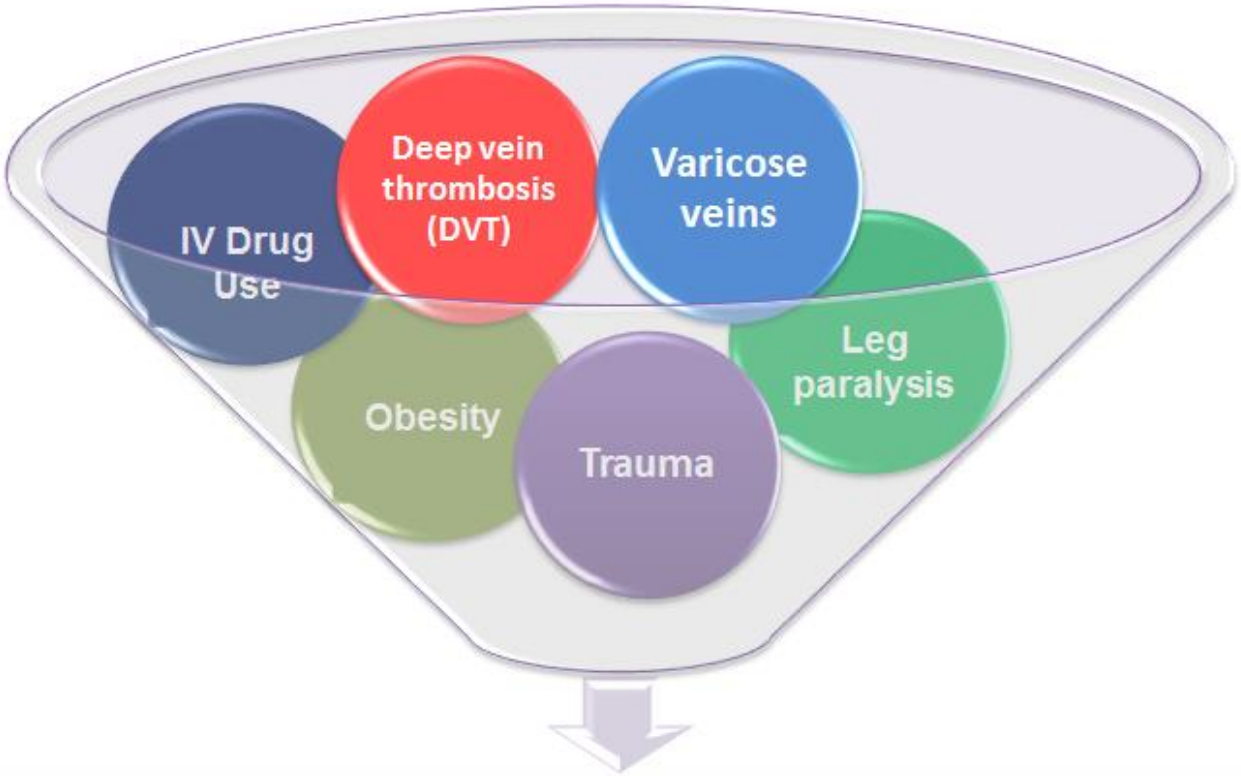
- Circulation: Lower leg assessment
- Co-morbidities: Can preclude healing
- Wounds: Healability determines intervention
- Infection: Can be limb threatening
- Pain: Analgesic routine
- Dressing selection based in wound assessment

Arterial Leg Ulcers: Characteristics

- "Punched out" appearance with well defined borders
- Located on bony prominences of legs & feet
- Very little edema or exudate
- Slough or eschar in the wound bed
- Little or pale granulation tissue
- Peri-wound skin may be pale, shiny, & taut
- Often no hair on legs & feet
- Pedal pulses not usually palpable
- Painful when ambulating or when legs elevated

VENOUS LEG ULCERS

Venous Leg Ulcers: Etiology



Venous Lower Leg Ulcers

Venous Leg Ulcers: Characteristics

- Located in pretibial area
- Irregular borders, may appear deeper
- Large amounts of edema & exudate
- **Hemosiderin staining**, **atrophie blanche**
- Edema & **lipodermatosclerosis** may make pedal pulses non-palpable

Effects of Venous HTN

- Reduced nutrients & O_2 to tissues
- Pooling of waste products
- Acidic environment, ↓ enzyme function
- ↓ tissue viability & wound healing
- Muscle fiber atrophy, **reduced strength**

https://www.youtube.com/watch?v=JawHuaDcgaA (video with extra info on venous hypertension and wound healing, for personal review)

O'Brien, Edwards, Finlayson, & Kerr, 2012; Orsted, Radke, & Gorst 2001

Calf Muscle Pump

- Primary mechanism to return blood to heart
- Less effective muscle pump correlates with ulceration
- Often overlooked as a cause of insufficiency
- Dependent on competent veins and ankle joint mobility

O'Brien, Edwards, Finlayson, & Kerr, 2012

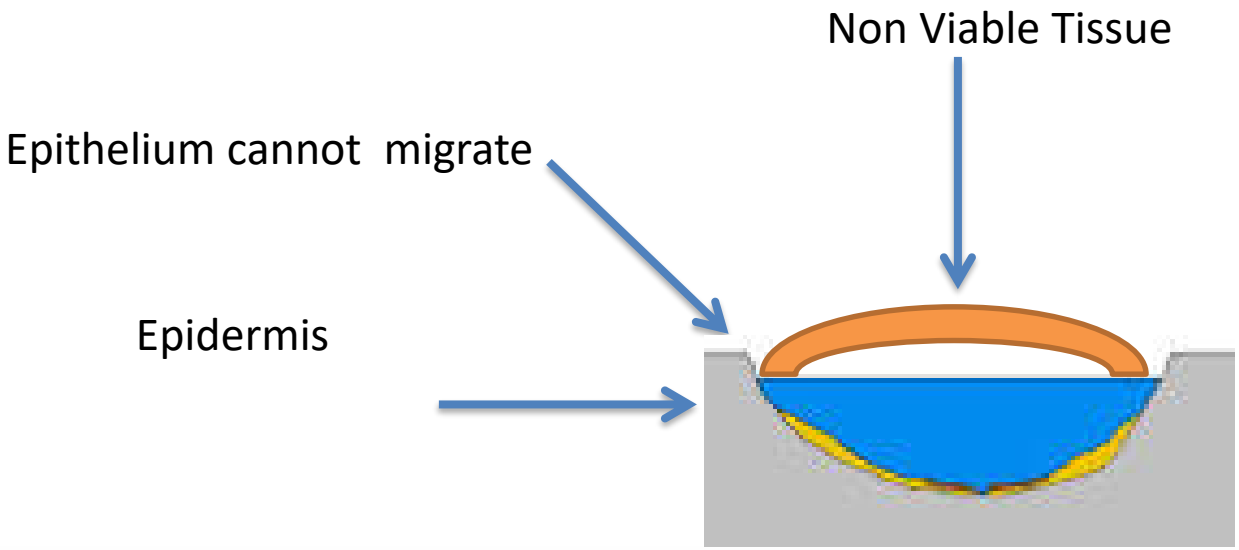
Compression

- Assists venous return
- Some better than none
- Start low, go slow
- Initiate tubular compression without ABPI/Toe Pressures
- Based on client's preference, best is what will be worn
- Worn for life, transition to stockings/wraps

Which Dressing should be used?!?

The ideal wound environment

Moist wound healing mimics the functions of the epidermis



Ideal wound environment

Exudate is managed

Remove or donate moisture

The ideal wound environment

Warm

- Wounds heal effectively at normal core body temperature of 37 degrees C.

- Frequent dressing changes will decrease the temperature of the wound bed by several degrees.

The ideal wound environment

Protected from trauma

- No sticking to wound bed (capillary distribution)
- No dressing residue left in the wound bed.
- Angiogenesis disrupted with adherent dressing.
- Capillaries extend into gauze leading to trauma during dressing changes.

The ideal wound environment

Pain is controlled

- Assume all wounds are painful
- Over time wounds may become more painful
- The skin surrounding the wound can become sensitive & painful

Gauze: the good, the bad, and the ugly

The Good	The Bad	The Ugly
Cheap	Expensive, requires labour	Expensive, has to be soaked off Removes healthy tissue
Always available	Always available	Always available
Familiar	Familiar	Familiar
Absorbs exudate	Sticks to wound	Disrupts new capillaries
Secondary dressing	Primary dressing	Considered for all wound types
Retains dressings	Tape used to secure	Tourniquet effect

We love to hate ABD pads (Army Battle Dressing)

- Use with copious exudate/frequent changes.
- Wick (cellulose) but give moisture back as the cellulose does not have the ability to dry.
- Pads with diaper technology have polymer layer and cellulose to wick and hold
- Sterisorb™ pad has diaper technology

Re-Evaluate

- Wounds should decrease by 20 – 40 % in 2 – 4 weeks
- Wounds are chronic after 4 weeks
- If the wound is not healing, go back to the start of the paradigm and work your way through it again

Dressing Types

Antimicrobial

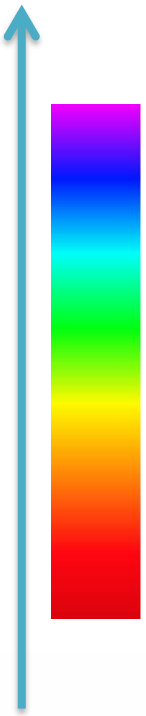
- Iodine depositing: Inadine™ and Iodosorb™
- Chlorhexidine: Bactigras ™
- Silver: Acticoat Flex 3 ™

Moisture Balance

Donate moisture

Intrasite Gel: Hydrogel

Remove moisture



High Absorbency

- Foam
- Cadexomer Iodine (antimicrobial)
- Calcium alginates
- Hydrofibers
- Island Dressings
- Hydrocolloids
- Acrylic Absorbent

Low Absorbency

Context is everything

- Wound management is very complex
- Everyone owns wound care & nobody owns wound care
- Diagnostic criteria are lacking
- Risk assessment takes a back seat
- Wound/risk for wound has to be evaluated in the context of client goals, wound realities and options for interventions

Care at Home Series - Wounds Canada


Thank you!

Resources

Connecting Learners with Knowledge (CLWK) www.clwk.ca
European Pressure Group Advisory Panel (EPUAP) www.epuap.org
Manitoba Association of Foot Care Nurses https://mafcn.ca/
National Pressure Injury Advisory Panel (NPIAP) https://npiap.com/

Occupational Therapy Skin Care Guideline (Vancouver Coastal Health)

https://physicaltherapy.med.ubc.ca/files/2012/05/Occupational-Therapy-Skin-Care-Guideline-Final-July-08.pdf

Registered Nurses Association of Ontario (RNAO) www.rnao.ca

Winnipeg Regional Health Authority – Clinical Practice Guidelines

https://professionals.wrha.mb.ca/old/extranet/eipt/EIPT-013.php

Wounds Canada www.woundscanada.ca

Wounds International: www.woundsinternational.com

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