WOUND CARE

Objectives

- Understand indications/contraindications for various wound treatment options, dressings, modalities, patient education topics, documentation, and common wound diagnoses for inpatient and outpatient settings
- Understand various compression wrapping techniques and products
- Become familiar with the procedure for total contact casting

It's simple!

1. Address the cause of the wound
2. Manage compounding factors
3. Choose the appropriate dressing

1. The Cause[1]

- Swelling → Compression
- Necrotic →Debride
- Venous Insufficiency → Decrease swelling via compression
- Arterial Insufficiency → Re-establish blood flow
- Pressure/Diabetic → Offload

2. Compounding Factors[1]

1. No Smoking
   - Causes venoconstriction thus decreases blood supply to wound
2. Controlled Blood Sugar
   - Prevent food source for infection
3. Controlled Blood Pressure
   - Hypertension creates more wound drainage
4. Adequate Protein Intake
   - Supply the wound with the building blocks of healing

Compliance is crucial!

How to monitor compounding factors…[1]

1. Smoking

- *Subjective report* of smoking frequency
- If pt has not quit, suggest cessation resources

2. Blood Sugar

- *A1C*= laboratory value indicating 3 month level of sugar
- Bacteria feeds off sugar
  - → Leads to infection!
- Medical/dietician referral may be necessary if out of control
- Blood glucose should be 70-130 mg/dl before a meal and <180 mg/dl after a meal

3. Blood Pressure

- *Ankle Brachial Index*= Systolic BP of brachial artery/ Systolic BP of dorsalis pedis

- ABI should = 1.0
  - Doppler of dorsalis pedis should be triphasic

- Vascular consult may be necessary if abnormal

4. Protein[3]

- *Prealbumin*= lab value indicates past 3 days level of protein
- Should be >20
- Normal 18-38 mg/dL

- *Albumin*= lab value that gives a longer indicator of protein

- Pt may need supplemental nutrition if too low

- Need extra protein to heal the wound AND drainage from wound leaks out protein

3. Dressing Options

This part is a little trickier…

*See evidence table for evidence of some dressings

Dressings organized from most occlusive to non-occlusive

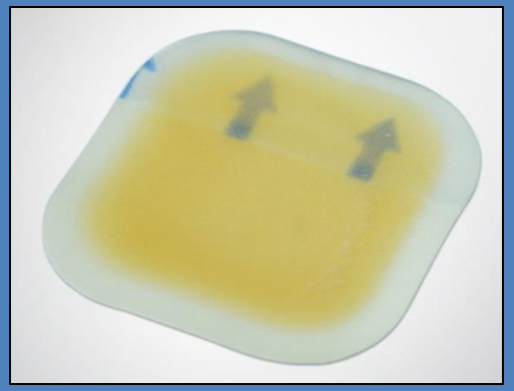
-Occlusion refers to the ability of a dressing to transmit moisture, vapor, or gases between a wound bed and the atmosphere.[1]

-Primary dressings : The therapeutic or protective covering applied directly to the wound base. Ex: hydrocolloids, hydrogels, alginates.[1]

-Secondary dressings: Materials that serve as therapeutic or protective function and are used to secure the primary dressing, i.e. keeps the dressing in place.[1]

Hydrocolloid[2]

- Protects and offers minimal amount of absorbency
  - Can also provide moisture to wound bed
  - Causes autolytic debridement
- Indicated for stage II pressure ulcer, denuded periwound skin, or skin tear
- Contraindicated for infected wounds
- Ex: Exuderm, Duoderm



Hydrogels[1]

- Usually ~90% water gel base
- Donates moisture to a wound
- Ex: *Wound gel filler*: Curasol, Curafil, Intrasite, Solosite, Carrasyn, Normigel, Amerigel, Saf-gel
- *Gel Sheets*: Dermagel, Curagel, Kendall Island, NDM Island, MPM Med Gel Pad, Elastogel, Vigilon, Tenderwet
- *Impregnated Gauze*: CarraGauze, Transigel, Curasol, Dermagran Gauze

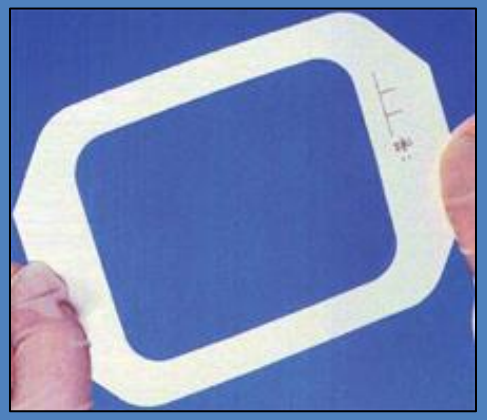
Foam[3]

- Wicks minimal to moderate amount of drainage away to foam, which acts as a reservoir
- Non-adherent, waterproof outer layer
- Provides moist wound environment
- All types of foam have been proven to be similarly effective
  - Consider patient comfort, dressing retention, dressing profile, and ease of use

Foam[4]

- Meant to be able to lifted to check wound and stuck back down
- Meant to stay on for several days
- Ex: Allevyn, Curafoam, Flexzan, Hudrasorb, LYOfoam, Mitraflex, Polymem, Tielle, Mepilex, Biatain, 3M Heel Foam, Comfeel Ulcer Dressing, Optifoam

Film[5]



- Offers no absorption
- Causes autolytic debridement
- Indicated for skin tears and to protect graft donor sites
- Contraindicated for infected wounds
- Research indicates perforation of film, covered by a secondary absorbent dressing, is ideal for draining donor sites
  - This combination is better than a primary absorbent dressing for removal purposes
- Ex: Tegaderm, Opsite, Polyskin, Mefilm

Impregnated Gauze[1]

- Mesalt-salt " "
  - Inexpensive debriding agent
- Xeroform- petrolatum and 3% bismuth
  - Does not stick to skin, great for skin tears
  - Toxic to healthy tissue
- Adaptic- light oil emulsion " "
- Iodoform- iodine " "

Alginate[6]

- Turns gelatinous as it soaks up drainage
- Can stay in place for 1 week
- Contraindicated in patients allergic to seaweed
- Ex: Kaltostate, Kalginate, Sorbsan, Curasorb, Aquacel, Maxsorb

Wet-to-dry dressing[1]

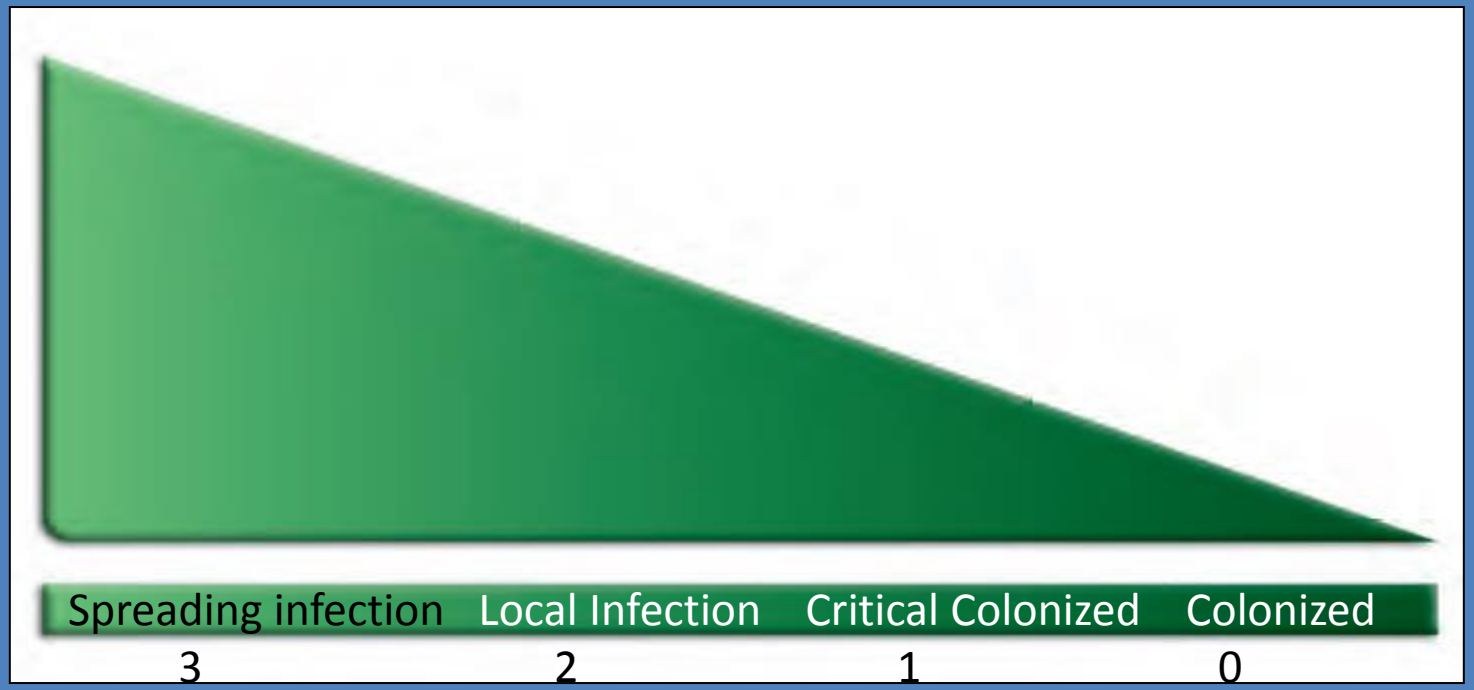
- Gauze with Normal Saline
- Inexpensive but research indicates it's less cost-effective in the long run
- Commonly Used For: packing abscesses or deep cavity wounds

Look out for signs of infection!

- Fever
- Spreading erythema of periwound

- ….. GO TO ER!

Wound Infection Continuum[7]



- **Contamination**- non-replicating bacteria present, no infl response
- **Colonization**- replicating bacteria present, no infl response
- **Infection**- replicating bacteria present, infl response

Other Dressing Options

Silver [8]

- Antimicrobial
- Indicated for green or brown necrotic wounds
- Ex: *Silvasorb*- slight debridement
- *Silvadene*- contains sulfar and silver, keeps wound bed moist, helps dead tissue to slough off, not a debriding agent, good for burns, removes from wound easily

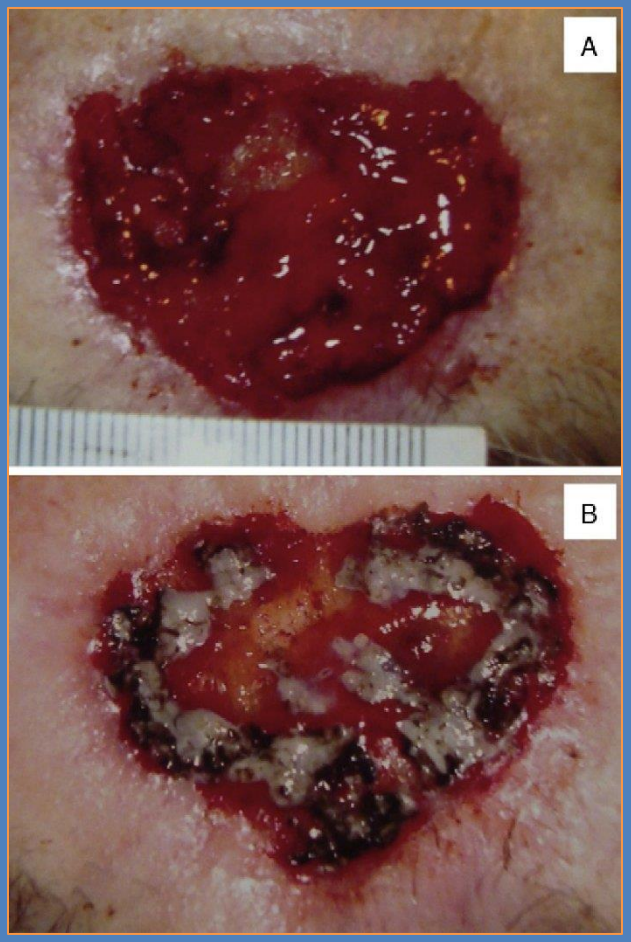
Acticoat _____=
Silver Impregnated _____

- Acticoat Flex= " " fabric
  - Stretchy, can stay in place 7 days max
- Acticoat Absorbant= " " calcium alginate
  - Can stay in place 7 days, good to put under a cast

- Some people react to silver… if it burns, take it off!!!

Silver Nitrate[1]

- Cauterizes hypergranulation tissue buds to enable skin to cover evenly

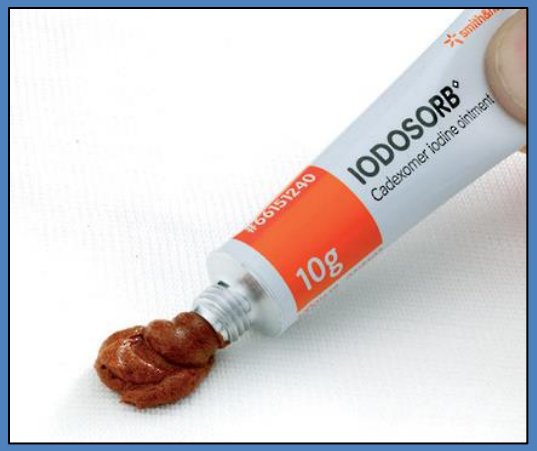


Santyl Collagenase [9]

- Prescription highly-effective, selective debriding agent for necrotic wounds
- Compatible with collagen dressing (eg Fibracol Plus) and pigment-complexed PVA dressing (Hydrofera Blue)
  - Inhibited by silver dressings (Acticoat) and iodine dressings (Iodoflex and Iodosorb)

Iodosorb [10]

- Decreases infection- bacterial against *Pseudomonas* and *MRSA*
- Absorbs drainage
- Debriding agent- destroys biofilm
- More cost-efficient than silver



Primary dressings that are non-selective debriding agents

Dakins, Acetic Acid, and Hydrogen Peroxide

Dakins Solution[11]

- Diluted Bleach
- Indicated for foul smelling, highly necrotic wounds
- Contraindicated for patients with healthy granulating tissue!!!

Acetic Acid[12]

- Indicated for wounds infected with *pseudomonas*
  - Wound presents with a sweet odor, BRIGHT GREEN/blue drainage

- Use for 5-7 days or longer depending on drainage, odor, and appearance

Hydrogen Peroxide[1]

- Indicated for wounds with heavy, adherent biofilm
- Usually only necessary 1-2 times
- Contraindicated for patients with healthy granulating tissue!!!

Think…

- What is the cause of the wound?
- Is the wound bed wet or dry?
- Does it need cleaning/removal of necrotic tissue?

1. Use silver (antimicrobial) for chronic wounds with light odor/light yellow biofilm
2. Use debriding agent for a large amount of necrotic tissue
3. Use non-selective topical solution if FOUL SMELLING and MAX amount of necrotic tissue

Modalities[1]

Wound Vac

- Negative Pressure creates angiogenesis, removes drainage, and assists in achieving wound closure
- Indicated for cavity wounds that are free of necrotic tissue

Whirlpool

- 98 degrees x 10 minutes
- Must consider: location of wound, if heavily bleeding, venous stasis, enteric isolation, suture lines, in ICU, intact dry eschar, mulitple wounds

- Indicated for lymphedema
  - 1-2 treatments at 92 degrees for initial debridement and softening of dry crusty skin
- Contraindicated for venous stasis wounds- should not be put in a dependent position

Pulsatile Lavage

- Loosens tissue to enable more effective debridement
- Indicated in wounds with nonviable tissue that are malodorous

Hyperbaric Oxygen

- Mechanism of Action:
  - Direct Pressure
  - Hyper-oxygenation
  - Angiogenesis
  - Anti-microbial Effects
  - Vasoconstriction
  - Reduction Ischemia-Reperfusion Injury

Hyperbaric Oxygen

4 Medicare approved Dx's for OP setting:

- Diabetic Foot Ulcers meeting 4 criteria
- Chronic Refractory Osteomyelitis
- Preparation and preservation of comprised skin grafts and flaps
- Late Radiation Tissue Injury

During an eval…

- History of the wound
- How has the patient been treating it at home
- Ask and then EDUCATE about barriers to healing
- Who will do dressing changes at home

Documentation[7]

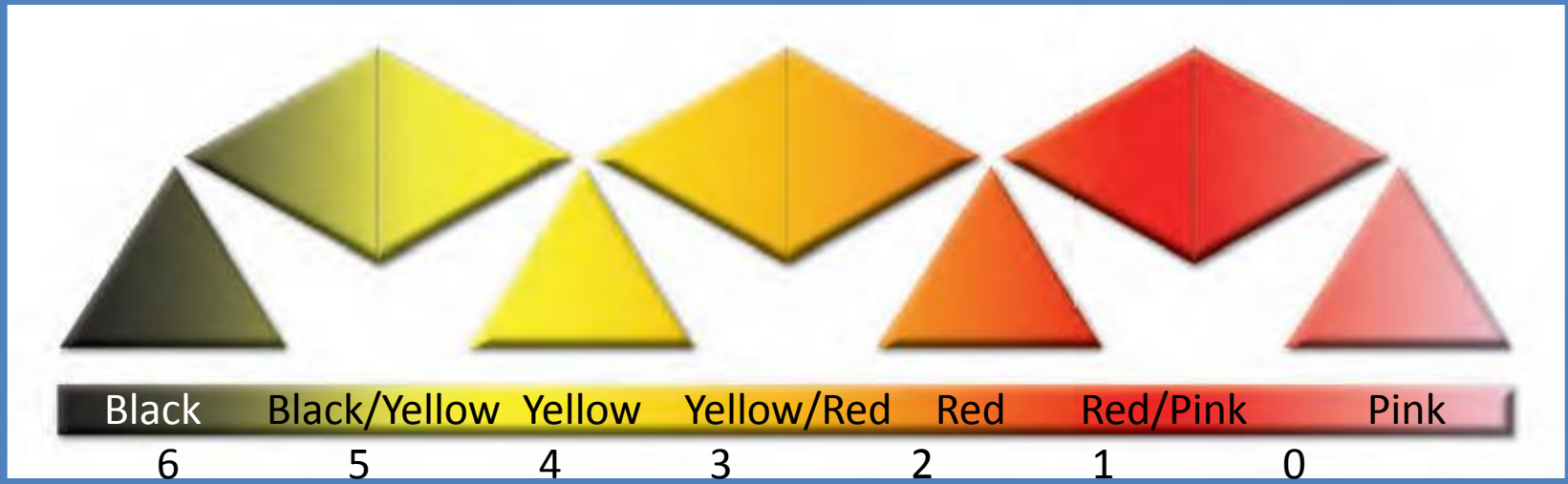
- Drainage (amount, color, and odor)
  - Consider amount retained within dressing
  - # of dressing changes

Wound Exudate Continuum

Volume \ Viscosity	High 5	Medium 3	Low 1
High 5			
Medium 3			
Low 1			

Documentation[7]

- Wound bed (% amount of granulation tissue vs necrotic tissue/fibrin/slough)



Documentation[1]

- Location
- Measurements
- Presence of tunneling/tracts/undermining (described by position as it relates to a clock, with patient in anatomical position)
- Involvement of underlying structures (tendon, bone)
- Odor (malodorous, sweet)

Documentation

- Borders
- Periwound
  - Denuded= raw
  - Macerated= wet
  - Indurated= hard, woody
- Edema (with girth measurements if needed)
- Response to previous treatments/chronicity
- ±scar assessment

Documentation

- What you tissue was debrided, why, what tools you used
- Ex: “debridement of scab, peeling skin, and yellow slough with forceps”

- Always document how many pieces of gauze are applied
  - How many pieces of foam for wound vac

Documentation

- When describing drainage, consider how long dressing has been on and how big the wound is/where it is
- If too much drainage, need more absorptive drainage
- If no drainage, need to keep wound bed moist with gel

Documentation

Example

Assessment: __ year old _(male/female)_ with _(decub s/p I&D)_. Describe wound. What you did. What he will need/why he would benefit from skilled therapy services. POC. D/C.

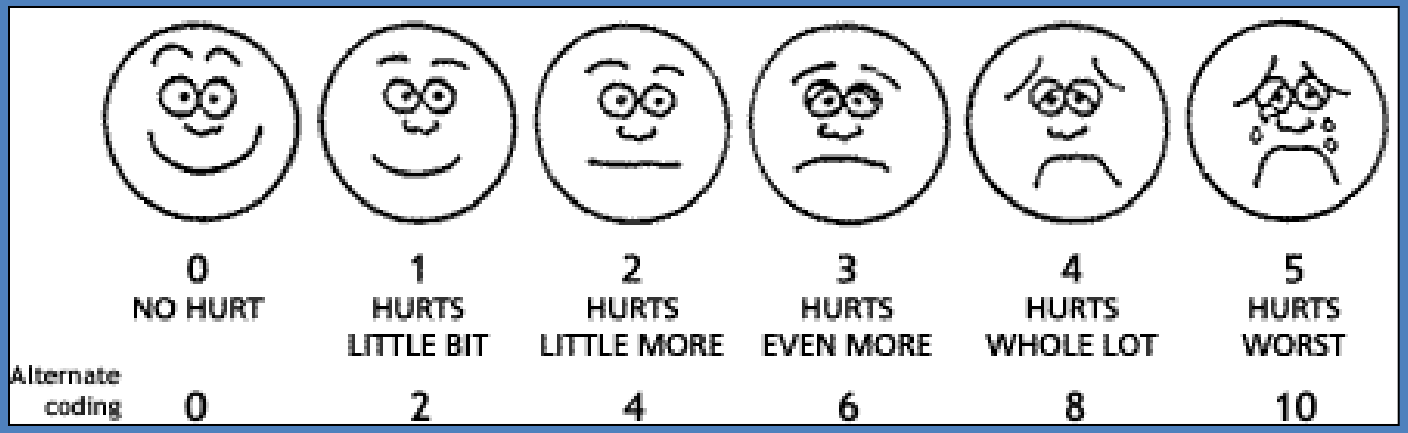
Documentation

Example

Pt presents with a 2cm x 2cm x 3cm puncture wound to her right anterior lower extremity proximal to the knee secondary to a fall on a pair of scissors. The wound bed is 30% healthy red granulation tissue, 70% yellow slough, with regular margins and no undermining or tunneling present. Wound extends to rectus femoris muscle, but no signs of infection are present. Wound has mod amount of serosanguinous drainage with no maceration of periwound skin.

Documentation

- “Per FACES scale”= for pain scale when the patient cannot or do not rate pain



Documentation

Examples of charges typically billed for wound care:

- Eval
- WD vac< or > 50 cm^2 (wound vac supplies depending on size of wound)
- SD < or > 20cm^2 (sharp debridement depending on size of wound)
- WP, MT, SC (whirlpool, manual therapy, self-care/ pt education)
- PT multi-layer wrap (such as profore lite wrap)
- PL kit (pulse lavage kit)
- Supplies- from database picklist (some are covered, some not)

Other Techniques…

Total Contact Casting[1]

- Use on plantar wounds, most often for Diabetic Foot Ulcers
- Off-loads wounds to evenly distribute pressure

How to Apply a Contact Cast

1) Cotton between toes
2) Stockinette- cut out top of ankle crease
3) Pad top of foot/toes, malleoli, and anterior tibia
4) Roll on Webril, pad bottom of foot and Achilles
5) Plaster- 1st heel, 2nd toes, (2) 3 inch rolls
6) Blue fiberglass- (3) 4 inch rolls. Cover all plaster. Go up leg and reinforce weak parts; i.e. back of ankle and toes

Other Off-loading Devices

- Forefoot off-loading shoe
- Heel off-loading shoe
- NWB with AD
- Cam Walker boot, post-op shoe
- Pelvic Pressure ulcers; limit OOB
- Foot/Plantar/Toe wound; limit weight bearing

Considerations for off-loading:

What is the goal?

Mobility or wound healing

Compression Wrapping[13]

For heavily draining wounds

- **Profore**= 4 layer wrap
  - ABI > 0.8
  - cotton layer, 1 short stretch, 2 long stretch
- **Profore Lite**= 3 layer wrap
  - ABI between 0.6-0.8
  - cotton layer, 1 short stretch, 1 long stretch

Compression Wrapping[14]

For patients with lymphedema + VLU

Coban 2 and **Coban 2 Lite**

- Indicated for:
  - Irregularly shaped legs
  - Morbidly obese patients
  - Active patient that needs to wear shoes
  - Patient with latex allergy/sensitivity

Compression Wrapping[14]

Coban 2

- ABI <0.8
- 2 short stretch layers

Coban 2 Lite

- ABI between <0.6
- For patients less tolerant of compression
- Short stretch, apply at full stretch

Compression Wrapping[14]

- Kerlix and Coban
  - For heavily draining wounds that need frequent dressing changes
  - Wounds contaminated with *Pseudomonas* needing acetic acid dressings
  - Patients needing mild compression, unable to tolerate other wraps

- Like all other areas of PT….
  - Use clinical reasoning AND
  - COMMON SENSE!!!!

- Identify the cause and address it
- Patient education for barriers to healing
- Choose your dressing and treatment method

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