



Essential 5: Wound Bed Optimization...Topical Wound Care

Managing
The Wound
Micro Environment



Essential 5: Wound Bed Optimization...Topical Wound Care

Goal of this presentation: Attendees will be able to apply an evidence based algorithm for the application of topical products in wound care.

Objectives:

1. Attendees will know the categories of topical wound care products based upon characteristics and impact on specific surface impediments to wound healing.
2. Attendees will be able to select topical wound care products on the basis of specific characteristics of the wound bed and surrounding skin.
3. Attendees will understand the potential hazards of some topical wound care products when exposed to hyperbaric oxygen.

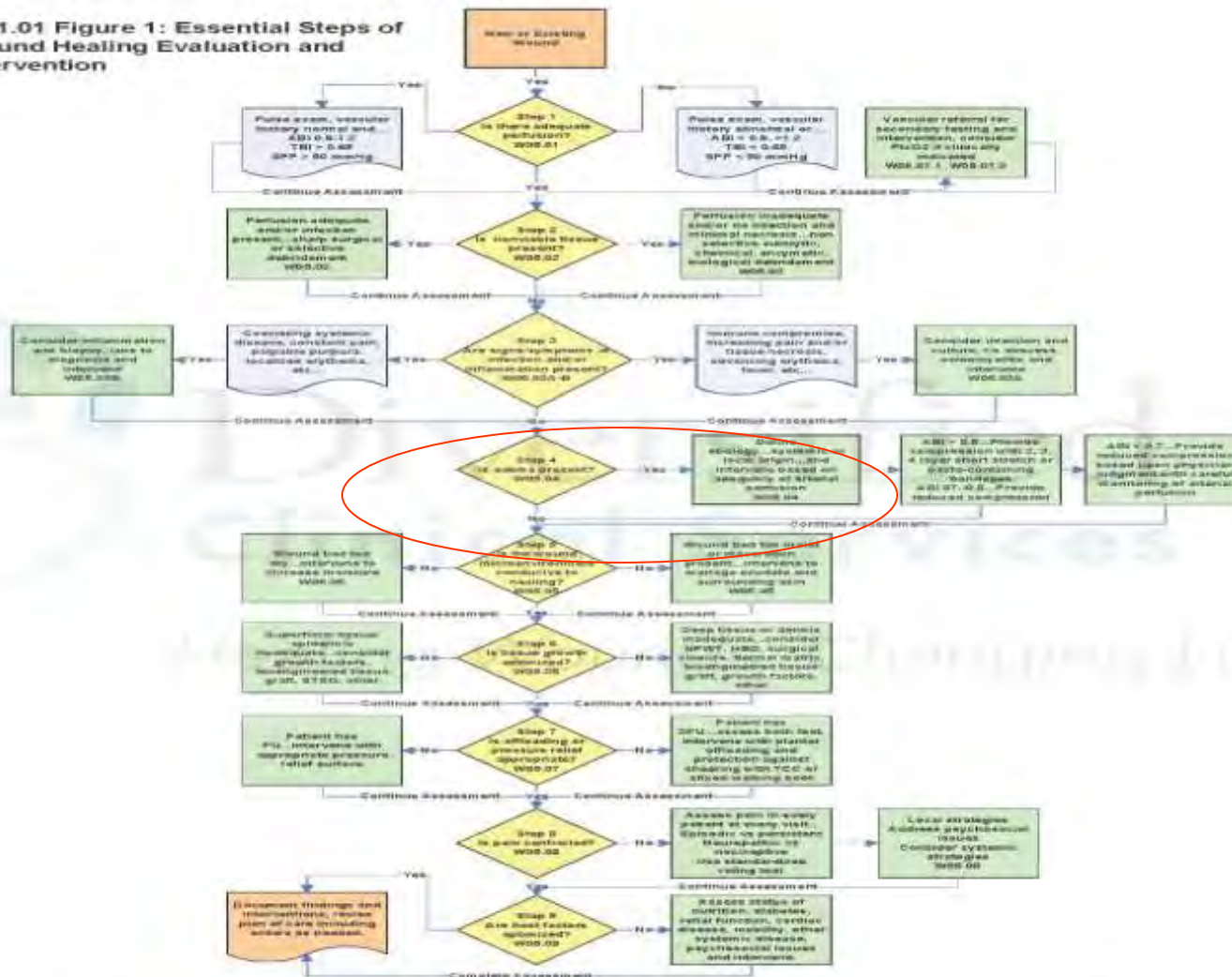
Product and Technology Recommendations

- It is the policy of Diversified Clinical Services, Inc. (“DCS”) to be product neutral. DCS does not endorse or dictate the use of any particular brand of wound care products. Any references in the Clinical Practice Guidelines (“CPG’s”) to a specific product by name brand is done only because the product is patented and there is no generic name that can be used to reference a product type or group. DCS shall update product references at the time reprints or updates of the CPG’s are issued.”

Essential Step 5 Wound Bed Optimization

DCS CPG: W01.01 Essentials of Wound Healing

W01.01 Figure 1: Essential Steps of Wound Healing Evaluation and Intervention

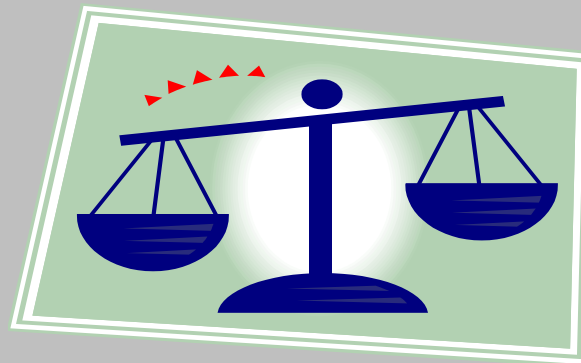


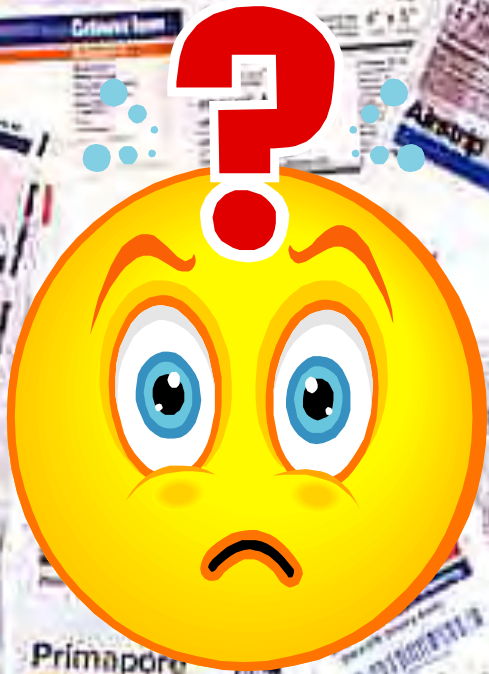
Essential Step 5

Managing the Wound Microenvironment



Balance





Dressing Goals

(The Joint Commission Patient Safety Standards)

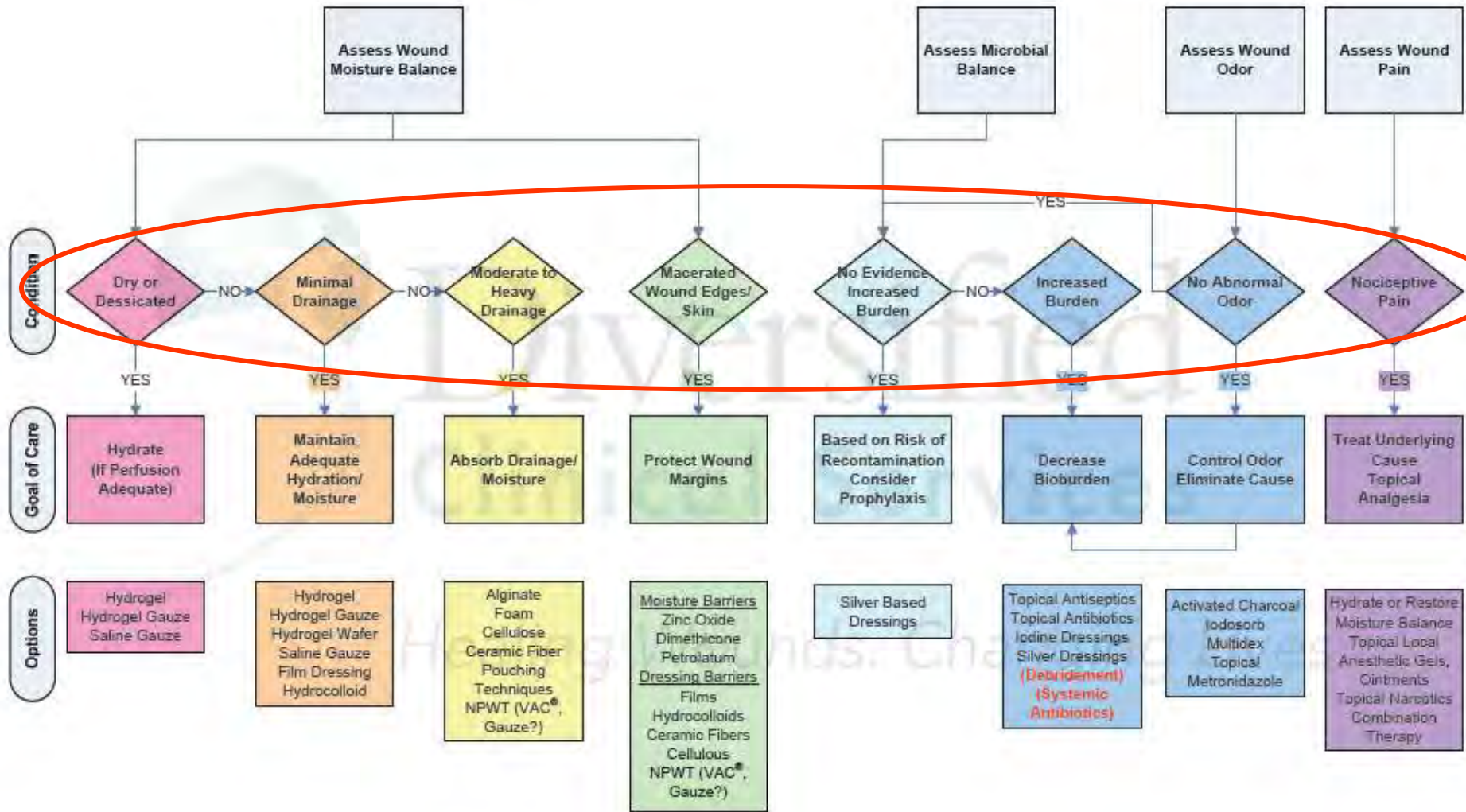
The right dressing
The right wound
The right patient
The right time



DCS CPG: W05.05 Optimize Wound Bed Moisture Balance, Exudate, Odor Control

W05.01 Figure 1. Assess Wound Moisture Balance

W05.01 Figure 2. Assess Wound Microbial Balance, Odor Pain



THE IDEAL DRESSING...

THE RULE IS TO KEEP THE WOUND BED
MOIST AND SURROUNDING TISSUE DRY

cost



effective

Wound Care Product Companies

- Coloplast
- Smith & Nephew
- Medline
- Systagenex (formally Johnson & Johnson)
- Healthpoint
- ConvaTec
- DeRoyal
- Molnlycke
- 3M
- Hollister

DOES YOUR HOSPITAL USE A BUYING SERVICE OR HAVE A PREFERRED PROVIDER AGREEMENT?



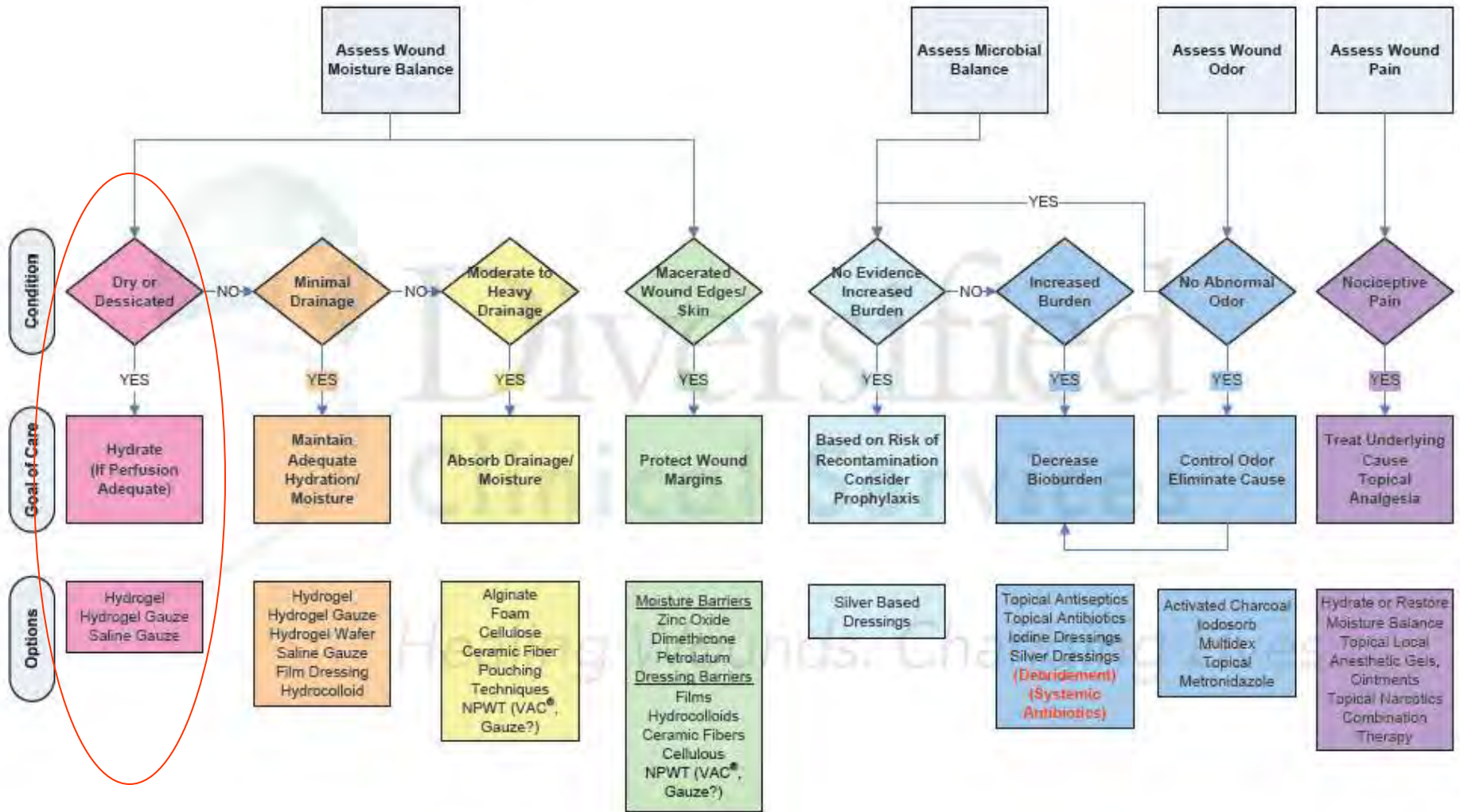
Components of Wound Assessment

- Eschar
- Slough/Fibrin/Necrotic Tissue
- Wound Base Color
- Granulation Tissue
- Exposed Features (bone, muscle, tendon, ligament, joint)
- Tunneling or Undermining
- Drainage Amount (none to large)
- Drainage Color
- Epithelium
- Peri-Wound Integrity

DCS CPG: W05.05 Optimize Wound Bed Moisture Balance, Exudate, Odor Control

W05.01 Figure 1. Assess Wound Moisture Balance

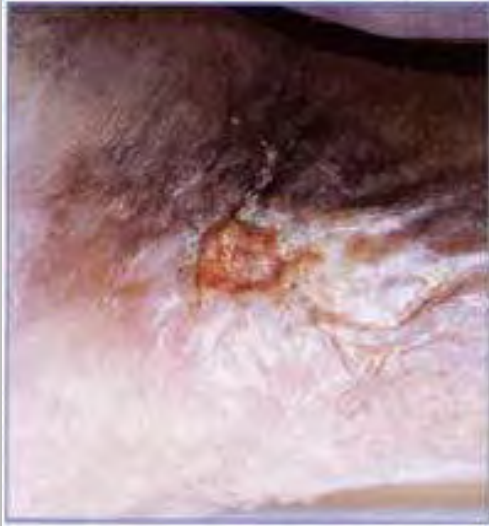
W05.01 Figure 2. Assess Wound Microbial Balance, Odor Pain



Dry or Desiccated

NO Eschar
NO Exposed Features
NO Drainage
Peri Wound Dry





**CONDITION -
Dry or Desiccated Wound**



Decisions for Dressing Applications

GOAL
Hydrate Wound
If perfusion adequate

OPTIONS -
Hydrogel/Sheets
Hydrogel Gauze
Saline Gauze

Hydrogels

Curasol, DuoDERM g\Gel, Hypergel, TegaDerm Gel, Intrasite Gel

- Clear, viscous gel made up of combination of water and glycerin
- Viscosity will depend on greater % of glycerin
- Help maintain a moist healing environment



Hydrogel Sheet

Aquasorb, Flexgel, Skintegrity

- Used on dry wounds or when moisture is required for comfort or cushion.
- Can provide moisture over longer periods.
- Little absorptive qualities.
- Change every 1-2 days.



Hydrogel - Advantages

- **Re-hydrate the wound bed**
- **Soothing**
- **Help reduce pain**
- **Longer wear time than damp gauze**
- **Easy to apply and remove**
- **Comes in different forms**
- **In gauze form can be used to fill wounds**
- **Does not leave residue in wounds**
- **Facilitates Autolytic debridement**

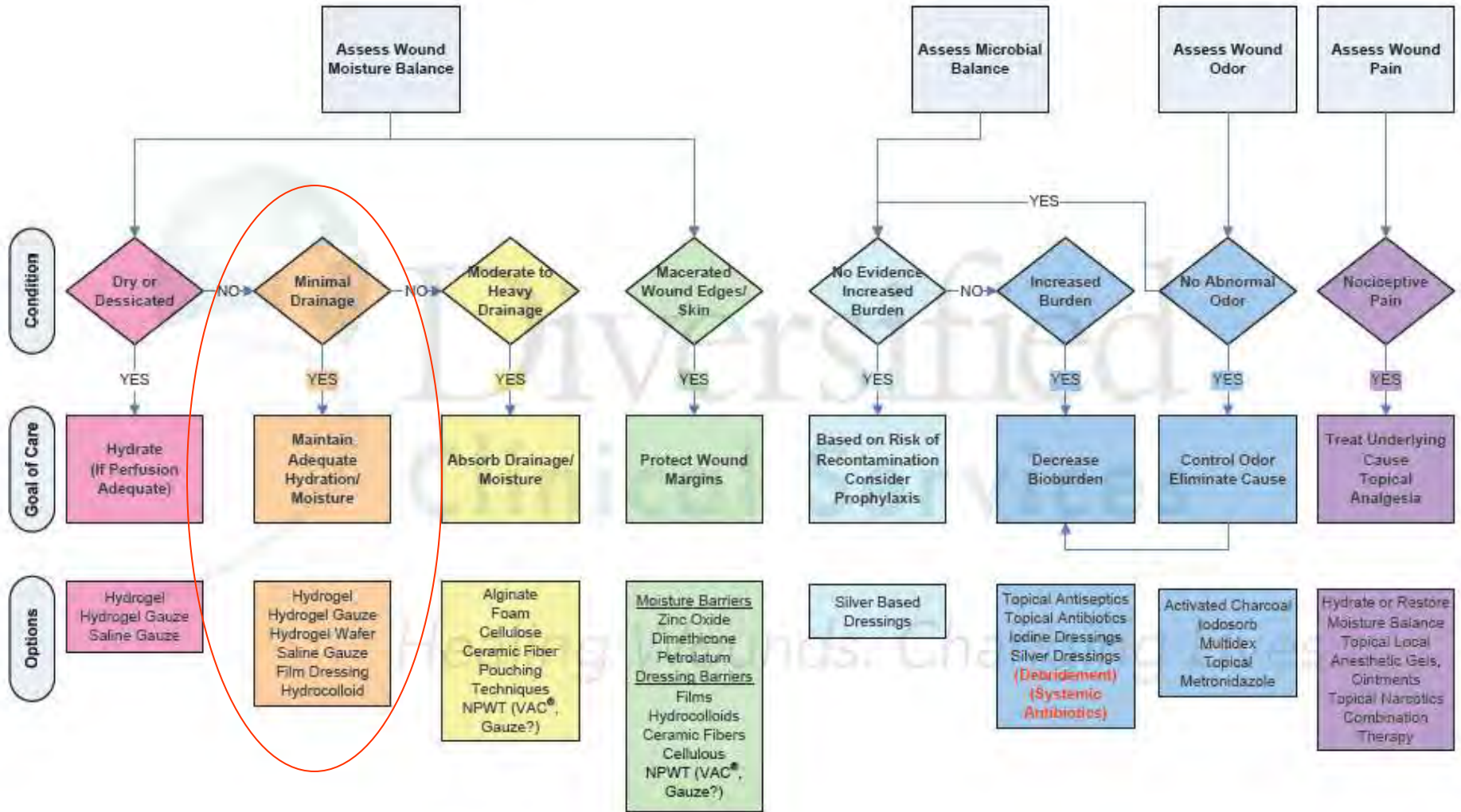
Hydrogel - Disadvantages

- **May break down in wound bed -- will depend on viscosity for wear time**
- **Limited absorption**
- **May cause maceration if exudate increases**
- **Usually requires a secondary dressing**

DCS CPG: W05.05 Optimize Wound Bed Moisture Balance, Exudate, Odor Control

W05.01 Figure 1. Assess Wound Moisture Balance

W05.01 Figure 2. Assess Wound Microbial Balance, Odor Pain

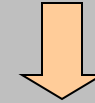


Minimal Drainage

Fibrin
Granulation Tissue
No Exposed Features
Scant to Small Drainage
Peri Wound- Intact



**CONDITION -
Minimally
Draining Wound**



Decisions for Dressing Applications

**GOAL -
Maintain Adequate
Hydration/Moisture**

**OPTIONS -
Hydrogel Hydrogel Gauze
Saline Gauze
Film Dressing
Hydrocolloid**



Films

Opsite, Suresite, Tegaderm

- Possess high adherence properties.
- Nonabsorbant.
- Avoid use on fragile tissue.



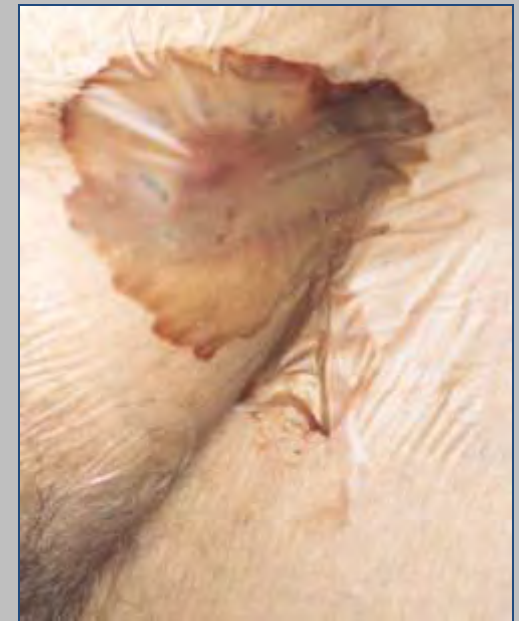
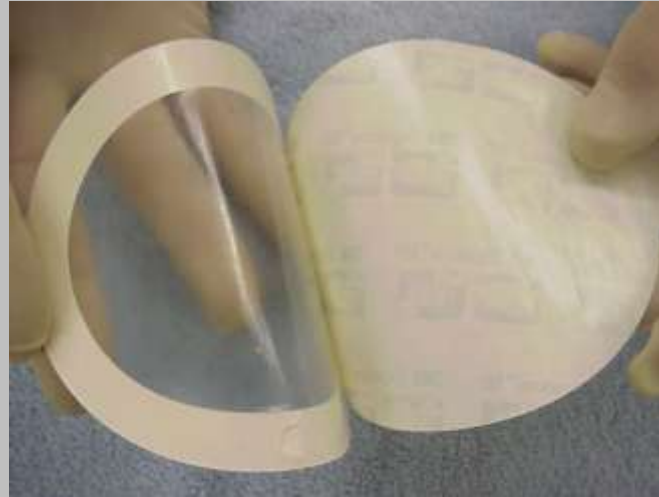
Films Advantages

- **Act as cover dressing and may be left in place for several days**
- **Apply over gauze dressings to act as a waterproof covering**
- **One-piece dressing, no need for tape**
- **Creates a moist wound environment that softens thin areas of eschar and/or slough**
- **Covers recently epithelialized areas**
- **Protects from external contamination (bacteria, urine, and stool)**
- **Allows for wound visualization**

Films Disadvantages

- **Not an absorptive dressing if left on too long over exudate, may cause maceration**
- **When wrinkled, may lift up sooner and allow leakage of fluid**
- **Traumatic on removal of fragile skin**
- **Contraindicated with cavity wounds, undermining or tunneling unless wound is filled with packing material**
- **Do not use if clinical signs of infection present**

Vapour Permeable Films



Hydrocolloids

Comfeel, DuoDerm, Exuderm, Restore, Tegaserb

- Hydrocolloid dressings contain a dressing matrix which absorbs exudate and creates a gel like dressing.
- For low to moderate exudating wounds.
- Avoid on skin tears, diabetic foot ulcers, intact blisters, or areas that requires frequent dressing changes.
- Change every 3-7 days.
- Does have an odor when it breaks down.



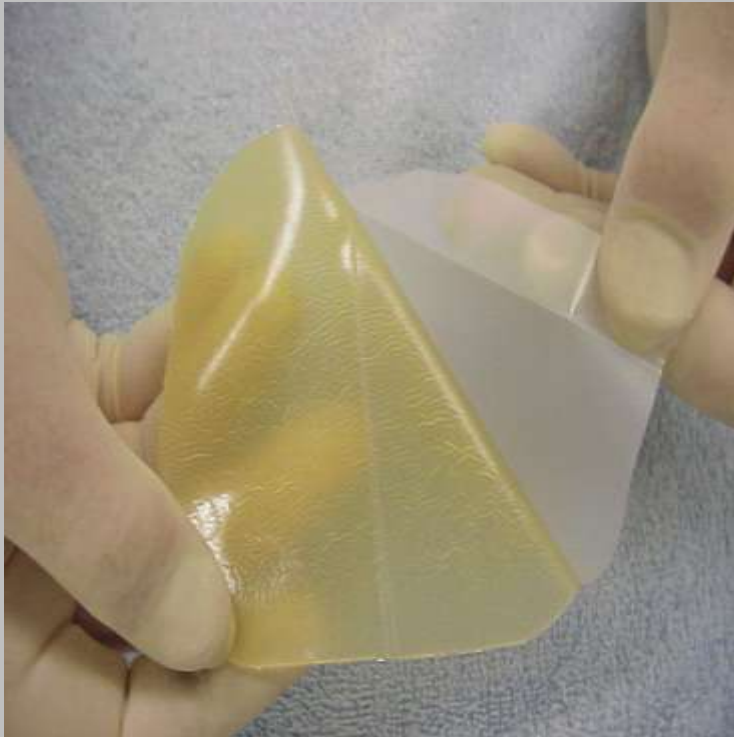
Hydrocolloid Advantages

- **Waterproof and may prevent contamination**
- **Somewhat absorptive**
- **Flexible and conformable**
- **Long wear time**
- **Ease of use**
- **Does not usually require secondary dressing**
- **Promotes Autolytic debridement**

Hydrocolloid Disadvantages

- Risk of hypergranulation tissue
- Break down in wound
- Occlusion and odor
- Could mistakenly think the wound is infected.
- Can be dislodged in the presence of heavy exudate
- May damage fragile periwound skin
- Not for wounds with undermining or tunneling
- Not for heavily draining wounds

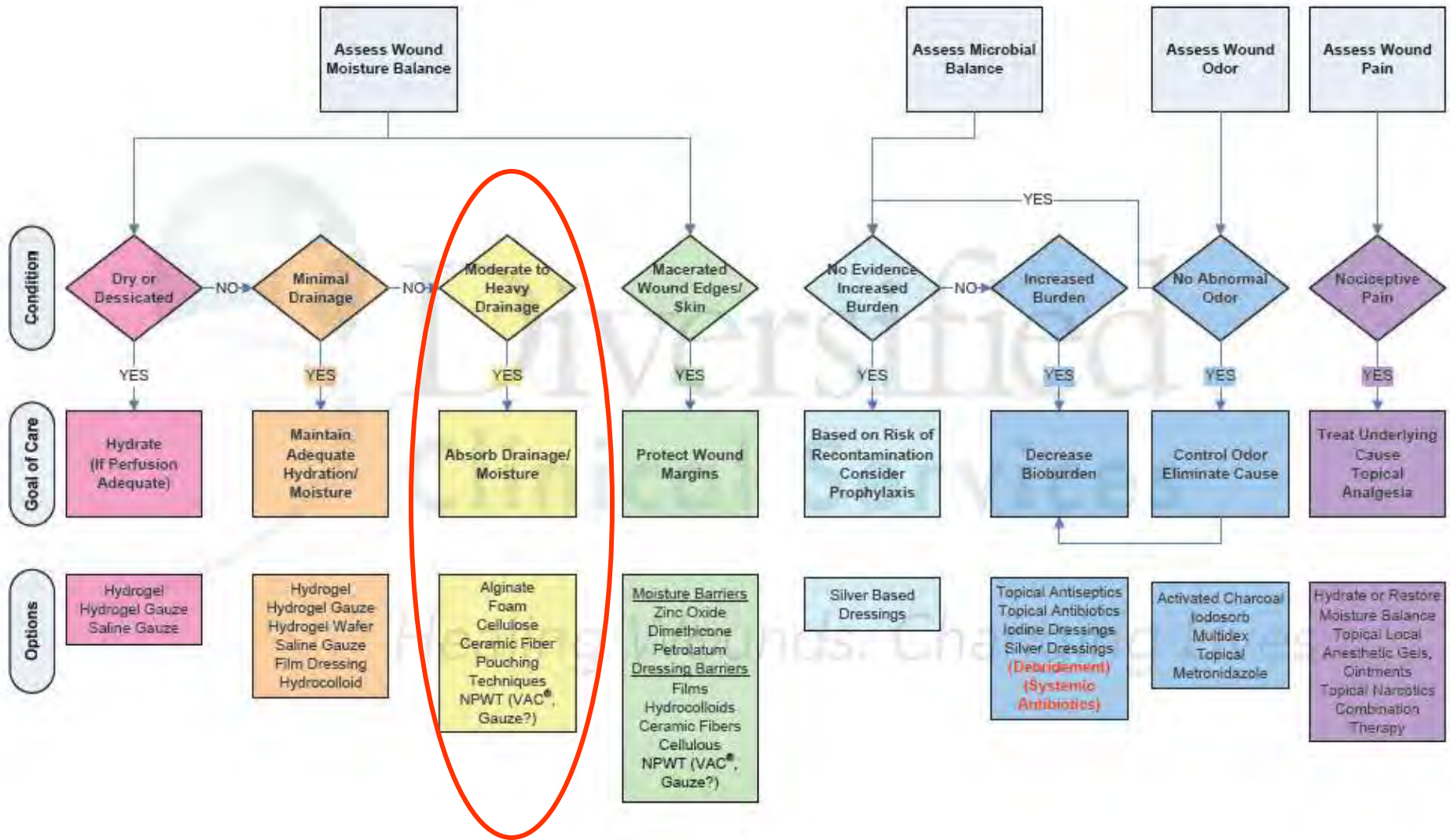
HYDROCOLLOID DRESSINGS



DCS CPG: W05.05 Optimize Wound Bed Moisture Balance, Exudate, Odor Control

W05.01 Figure 1. Assess Wound Moisture Balance

W05.01 Figure 2. Assess Wound Microbial Balance, Odor Pain



Moderate to Heavy Drainage



Necrotic Tissue
Exposed Muscle
Moderate Drainage
Peri-Wound - Macerated

**CONDITION -
Moderate to Heavy
Draining Wound**



Decisions for Dressing Applications

**GOAL-
Absorb Drainage
Moisture**

**OPTIONS -
Alginates
Foams
Absorptive Dressings
Pouching Technique
NPWT – Vac Closure**



Alginate

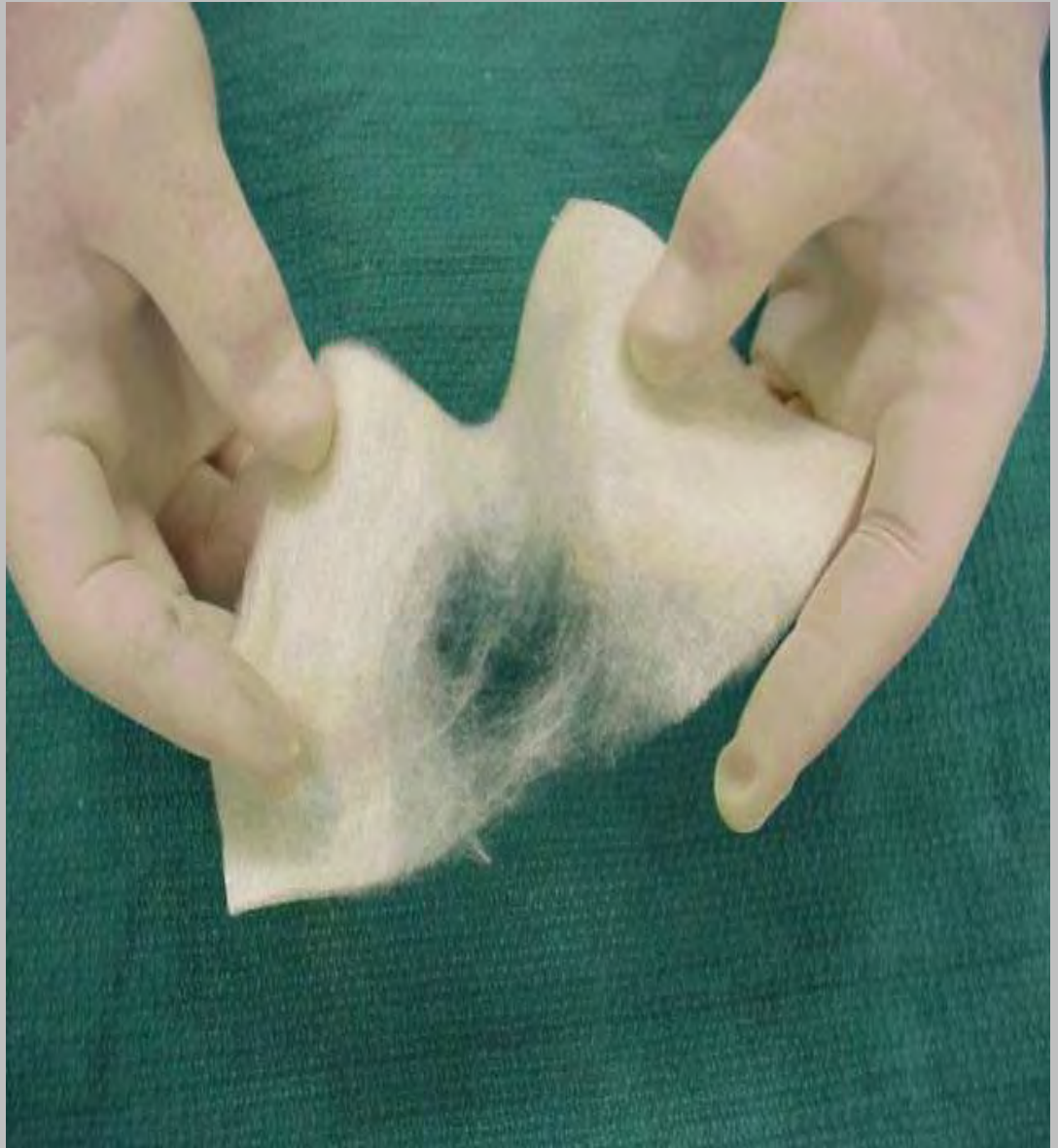
Algisite, Maxorb, SeaSorb

- Alginate dressings are considered to be primary dressings for wounds that have moderate to heavy exudate and transudate.
- Alginate, once wet with exudate, forms a gel-like plug in the wound.
- Alginates can absorb up to 20 times its weight in exudate.
- It facilitates autolytic debridement of the wound

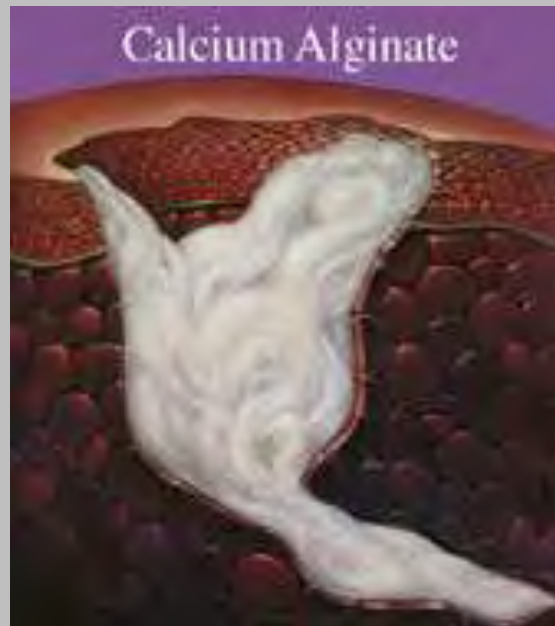


Alginate

- Moderate to highly exudating wounds.
- Requires secondary dressing. such as a biocclusive thin film, a hydrogel sheet, or gauze
- Change when exudate visible on secondary dressing.
- If dressing particle remain in wound bed, may irrigate them out with normal saline.
- Do not use on dry wound bed.



Alginate Dressings



Alginate Advantages

- **High capacity for absorption**
- **Easy to apply**
- **May be used under compression**
- **Forms a gel like substance when in contact with wound exudate to maintain moist wound environment**

Alginate Disadvantages

- **May desiccate a wound bed if used inappropriately**
- **May cause maceration to periwound skin if absorption capability is not enough**
- **Gel like substance may break down upon removal from wound bed**

Hydrofiber

- Use for highly exudating wounds.
- In sheets or ropes.
- As fibers absorb, they convert into a gel that provide a moist environment as absorption continues.
- Requires a secondary dressing.
- Lift from wound bed in one piece.



Absorption and Conformity



Foams

Allevyn, Biatain, Gentleheal, Mepilex, Optifoam, Polyderm



Foams

- **Foam dressings are highly absorbent primary dressings made of a hydrophilic polyurethane foam.**
- **Foam dressings keep a moist wound environment but absorb the excess exudate.**
- **Foam dressings are useful for cavitating wounds because they can be placed in the wound to fill the wound bed while absorbing the continuous exudate.**
- **Foam dressings placed in deep wounds can remain for 3-4 days but must be secured in place by a bio-occlusive type dressing.**
- **Some of the foam dressing products have an adhesive backing at the margins of the dressing and therefore these cannot be packed into deep wounds.**
- **Foam dressings with adhesive backings are very useful for placing over wounds smaller than the absolute diameter of the dressing.**

Foam Advantages

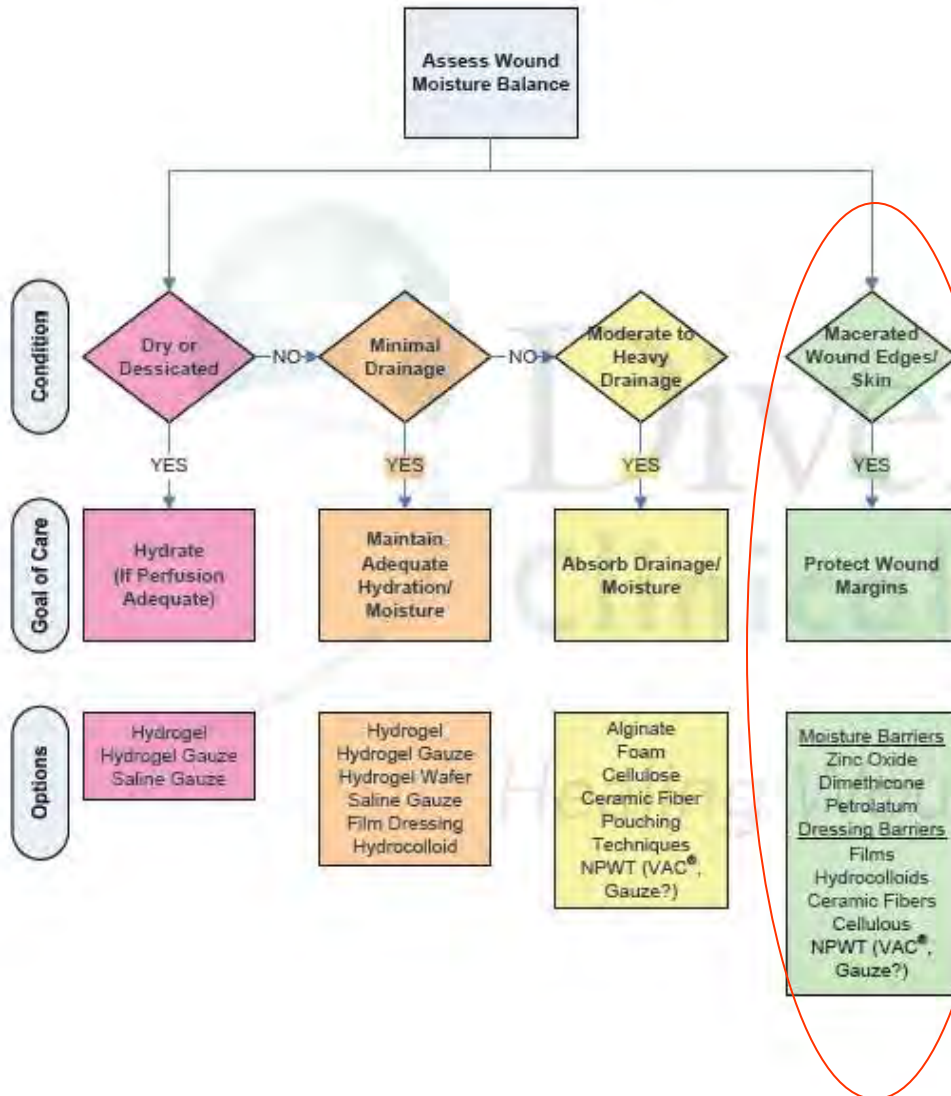
- **Absorb under compression**
- **Insulator for wound**
- **Easy to apply**
- **Adhesive foams leave no residue**
- **Gentle on friable skin**
- **Does not adhere to wound bed**

Foam Disadvantages

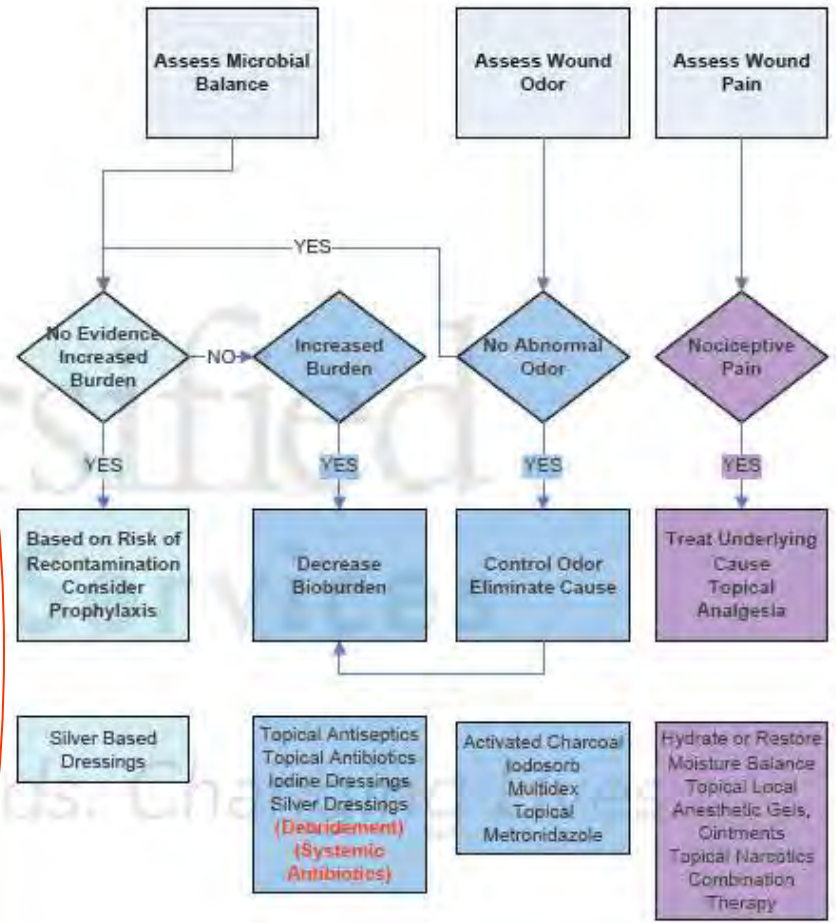
- **If used inappropriately, may dry out wound bed**
- **May lead to maceration of periwound skin if left in place too long**
- **Some foams may require a secondary dressing**

DCS CPG: **W05.05 Optimize Wound Bed Moisture Balance, Exudate, Odor Control**

W05.01 Figure 1. Assess Wound Moisture Balance



W05.01 Figure 2. Assess Wound Microbial Balance, Odor Pain



Peri-Wound: Macerated



**CONDITIONS -
Macerated Wound Edges
Macerated Skin**



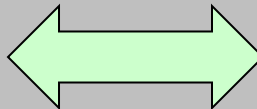
Decisions for Dressing Applications

**GOAL -
Protect Wound
Margins and Skin**



Moisture Barriers

**Zinc Oxide
Dimethicone
Petrolatum**



Dressing Barriers

**Films
Hydrocolloids
VAC®**

Skin Care

- **Skin is a natural barrier to infection**
- **Diabetics have microvascular changes that result in excess dryness**
- **Any crack is a potential source of problems**
- **Objective of intervention is to moisturize without maceration**
- **Toe spaces typically not dry**



Skin Care



- **General hygiene often an issue**
- **Exudate or weeping from wound is irritant**
- **Frequent cellulitis**
- **Nutrition, hydration, and age play a major role in skin condition**
- **Incontinence issues**
- **This is the place good nursing care plays an important role.**

Cleansers

Allclenz, SAF-Cleans

- **Gentle cleansing of the wound, at the time of dressing change, reduces the risk of infection and wound healing is optimized.**
- **Dakins, betadine, acetic acid and hydrogen peroxide are cytotoxic and are contraindicated, as routine cleansers.**

Normal Saline

- **Optimally delivered at 8-12 psi**
 1. **Requires 60 cc syringe with 18 gauge angiocath**
- **Issues of application**
- **Issues of waste/cost effectiveness**
- **Issues of infection control**
 1. **Disposal of open container past 24 hours**
 2. **The Joint Commission Patient Safety Guidelines**



Wound Cleansers

- **Surfactant agents**
- **Wetting agents/moisturizers**
- **Antimicrobials agents**
- **Equalize normal ph of wound bed**
- **Spray or stream**
- **Less waste**
- **Not cytotoxic**

MOISTURE BARRIER PRODUCTS

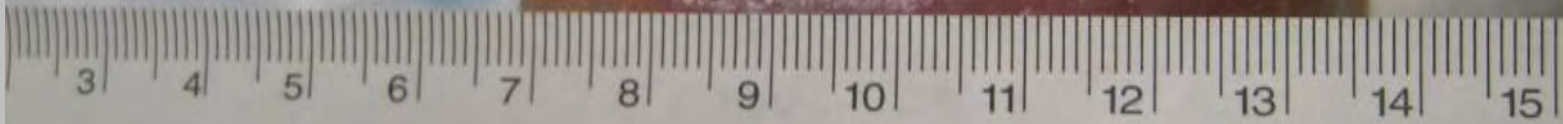
Should contain one or any or combination of:

- 1. ZINC OXIDE**
- 2. PETROLATUM**
- 3. DIMETHICONE**

MOISTURE BARRIER PRODUCTS







™ Wound Measuring Guide

1 after single use

____ / ____ / ____

Patient Initials/Number

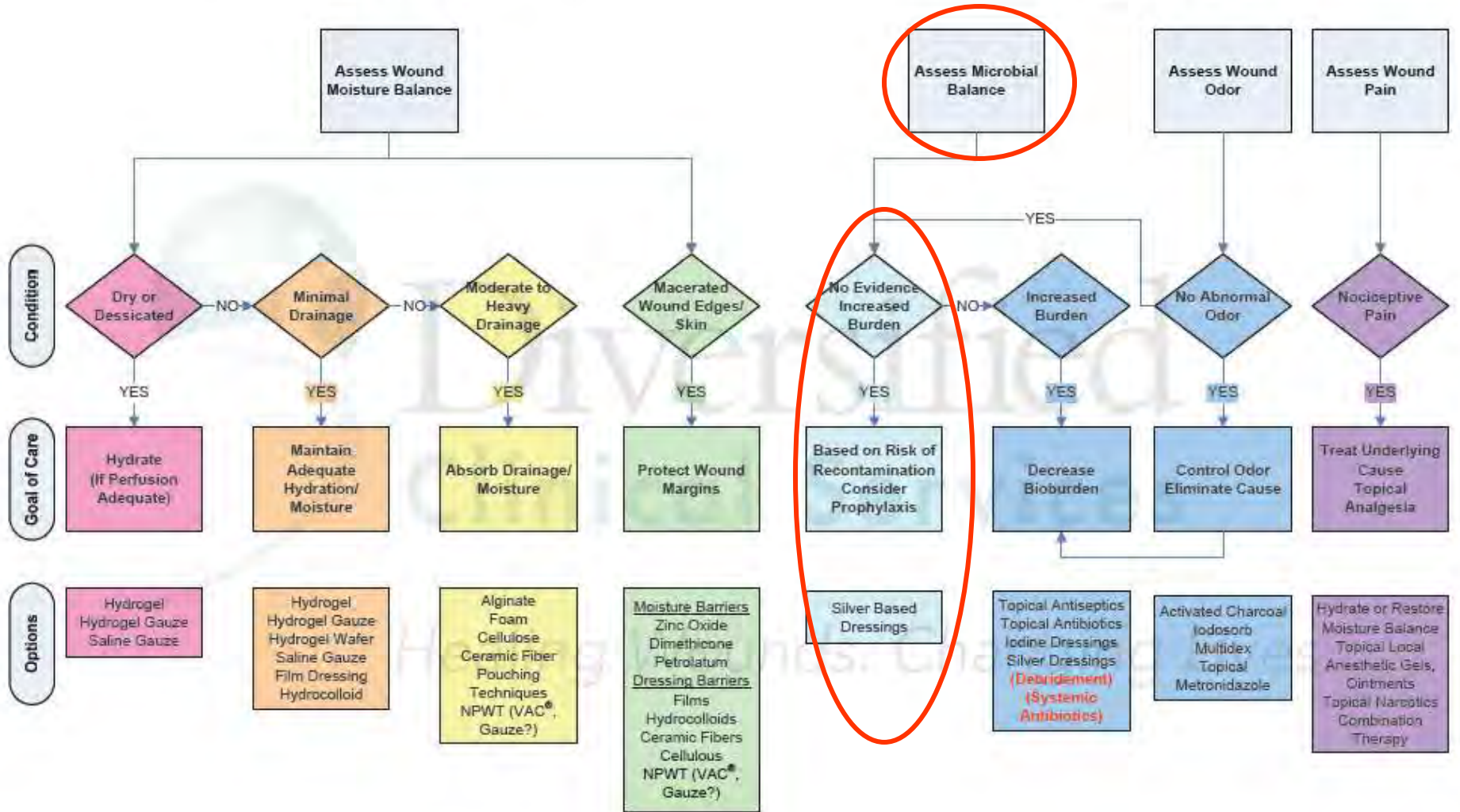
4-6-07 811005



DCS CPG: **W05.05 Optimize Wound Bed Moisture Balance, Exudate, Odor Control**

W05.01 Figure 1. Assess Wound Moisture Balance

W05.01 Figure 2. Assess Wound Microbial Balance, Odor Pain



Newly Debrided: No evidence of Increased Bioburden



**CONDITIONS -
No evidence of Increased Bioburden**



Decisions for Dressing Applications

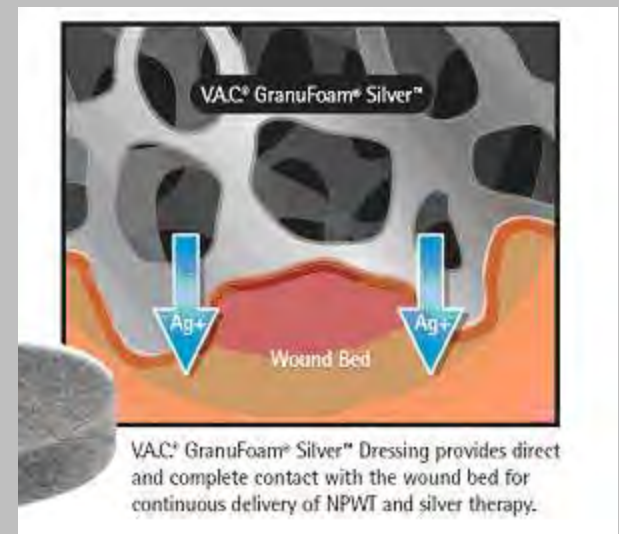
**GOAL –
Based on Risk of
Contamination –
Consider Prophylaxis**

**OPTIONS -
Silver Based Dressings**



Silver Products

Acticoat, Actisorb, Aquacel Ag, Arglaes, Silvasorb, SilverCel



Mechanism of Silver Dressings

- **Characterized by the amount and nature of silver released and the properties of the agent to which the silver is bound**
- **Once in the cell the silver binds to and denatures proteins, including DNA and RNA, inhibiting cell replication.**

Antimicrobial Action of Topical Silver

- Silver is effective as an antimicrobial because it binds to and destroys bacteria cells at multiple sites.
- The ability to bind to several sites is the main reason why bacterial resistance to silver is rare, making silver an attractive option.

When the silver cation binds to proteins in the bacteria, the following can result:

- The protein structure is altered, causing structural and functional changes in the cell
- The bacterial cell wall can rupture, causing its contents to leak out, leading to cell death
- The bacteria is prevented from carrying out functions necessary for its survival, such as respiration and taking in nutrients, leading to cell death
- Antibiotics usually only have one method of killing bacteria (i.e. preventing replication) while silver has several methods of killing bacteria.

Antimicrobial Action of Topical Silver

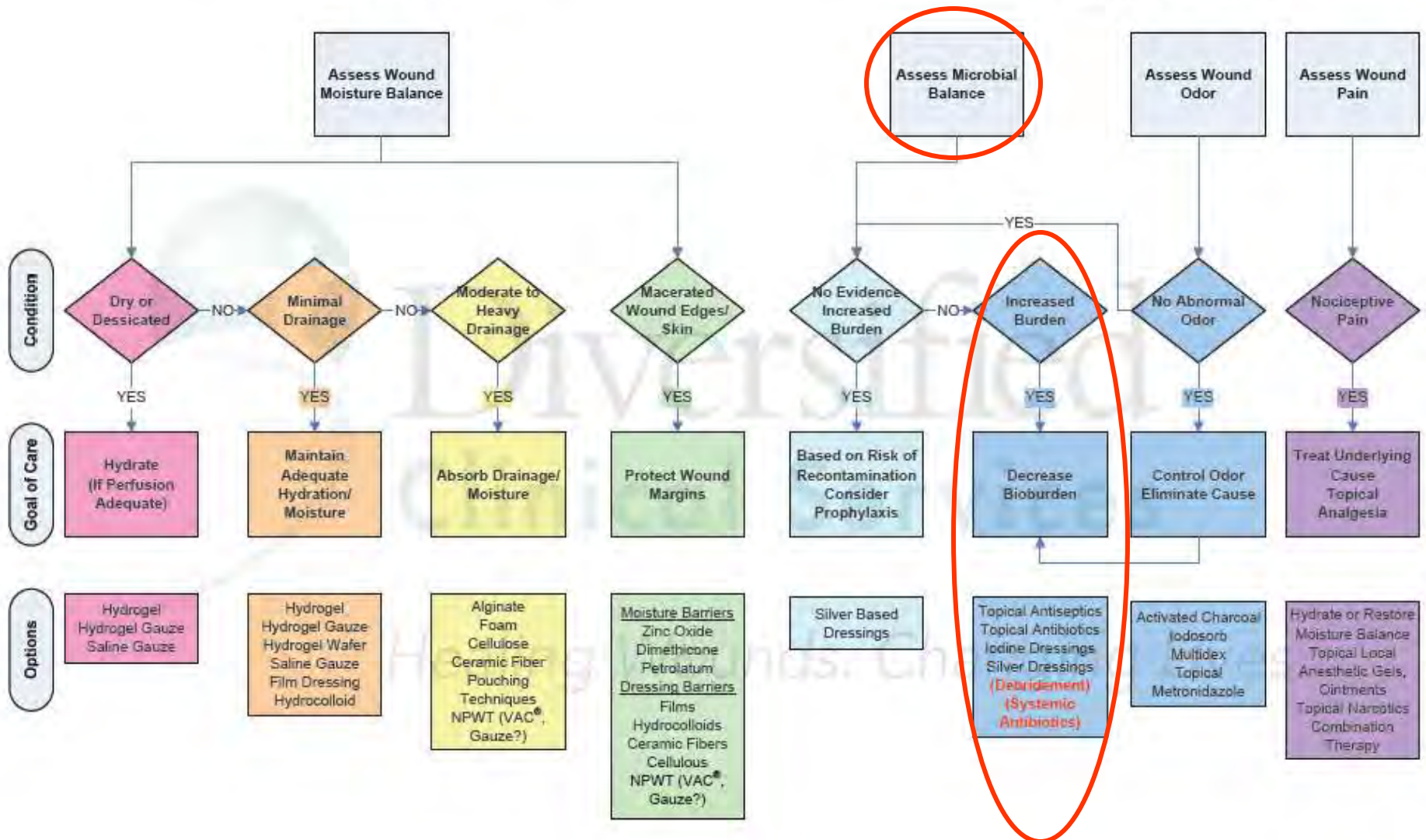
Active against a wide range of bacteria & fungi

- **Staphylococcus aureus**
- **Escherichia coli**
- **Pseudomonas aeruginosa**
- **Candida albicans**

DCS CPG: W05.05 Optimize Wound Bed Moisture Balance, Exudate, Odor Control

W05.01 Figure 1. Assess Wound Moisture Balance

W05.01 Figure 2. Assess Wound Microbial Balance, Odor Pain



Increased Bio-burden

Necrotic Tissue
Exposed Bone, Muscle, Tendon



Increased Bio-burden



**CONDITION –
Increased Burden**



Decisions for Dressing Applications

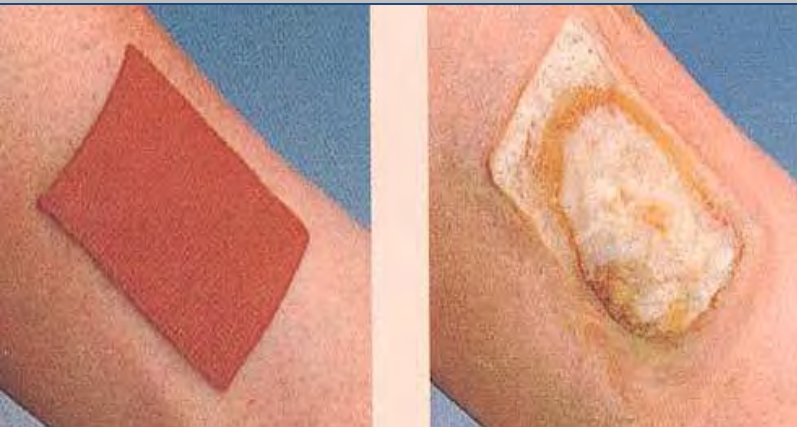
**GOAL -
Decrease
Bioburden**

**OPTIONS –
Topical antiseptics/antibiotics
Cadexemer iodine
Silver dressings
Debridement
Systemic Antibiotics**

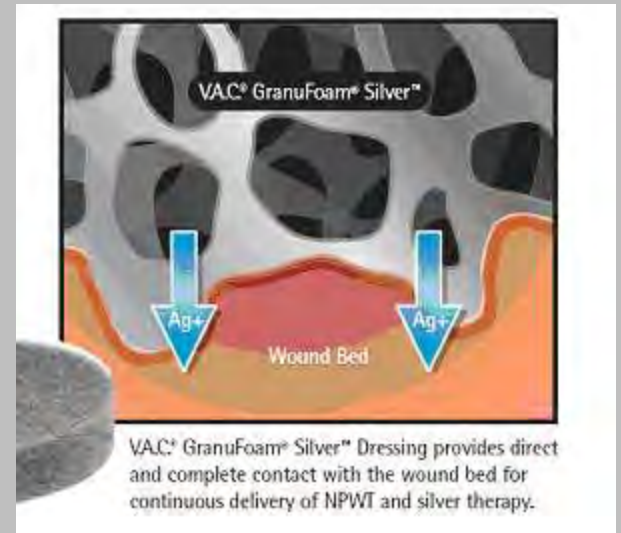
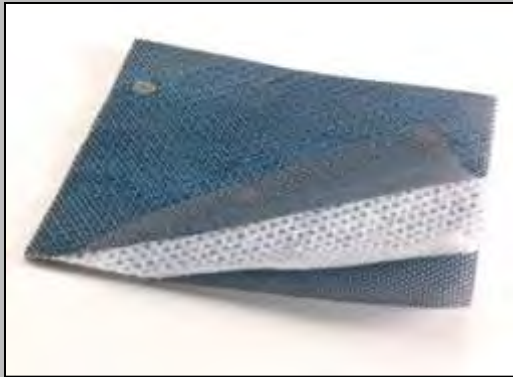


Cadexomer Iodine Iodoflex, Iodosorb

- **Cadexomer iodine based products absorb fluids, removing exudate, pus and debris. As they swell, iodine is slowly released killing micro-organisms and forming a protective gel over the wound surface.**
- **avoid in patients with thyroid disorders & pregnancy**



Silver Products



SANTYL/COLLAGENASE

- **Product Description**

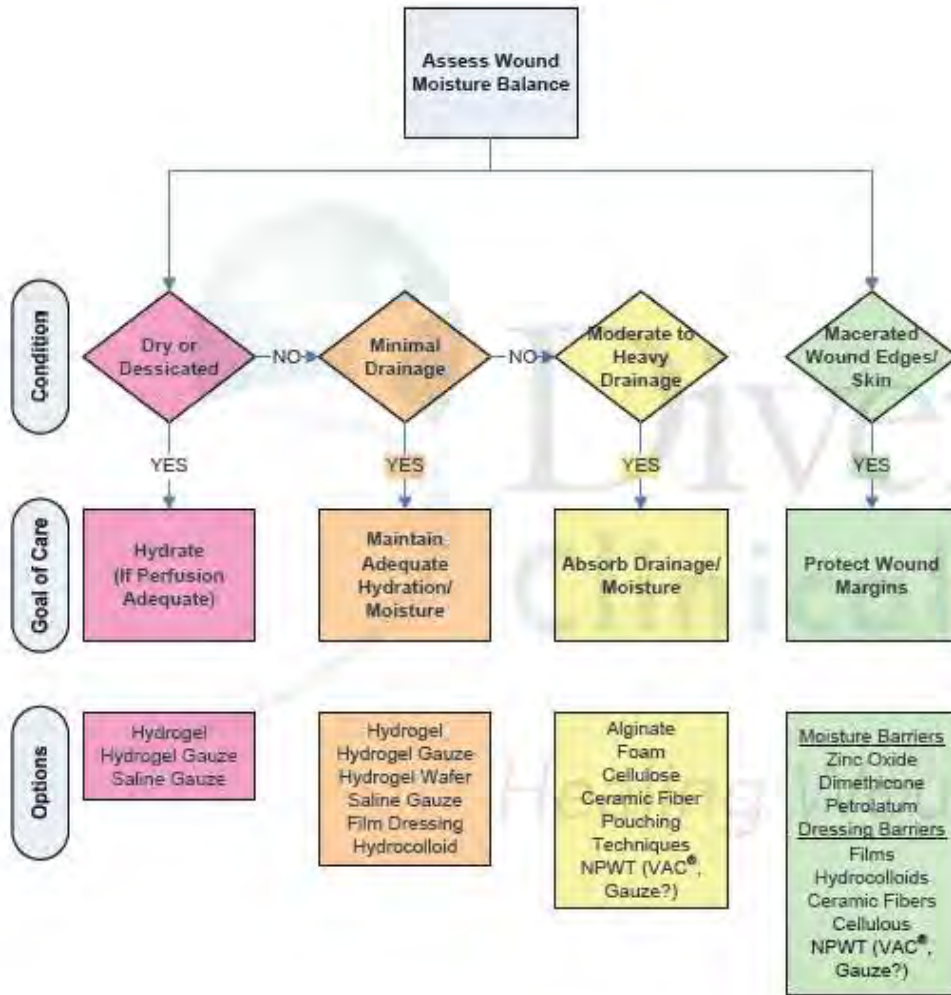
Santyl is a sterile enzymatic debriding ointment which contains 250 collagenase units per gram of white petrolatum USP. The enzyme collagenase is derived from the fermentation by *Clostridium histolyticum*.

Debridement to Remove Bioburden

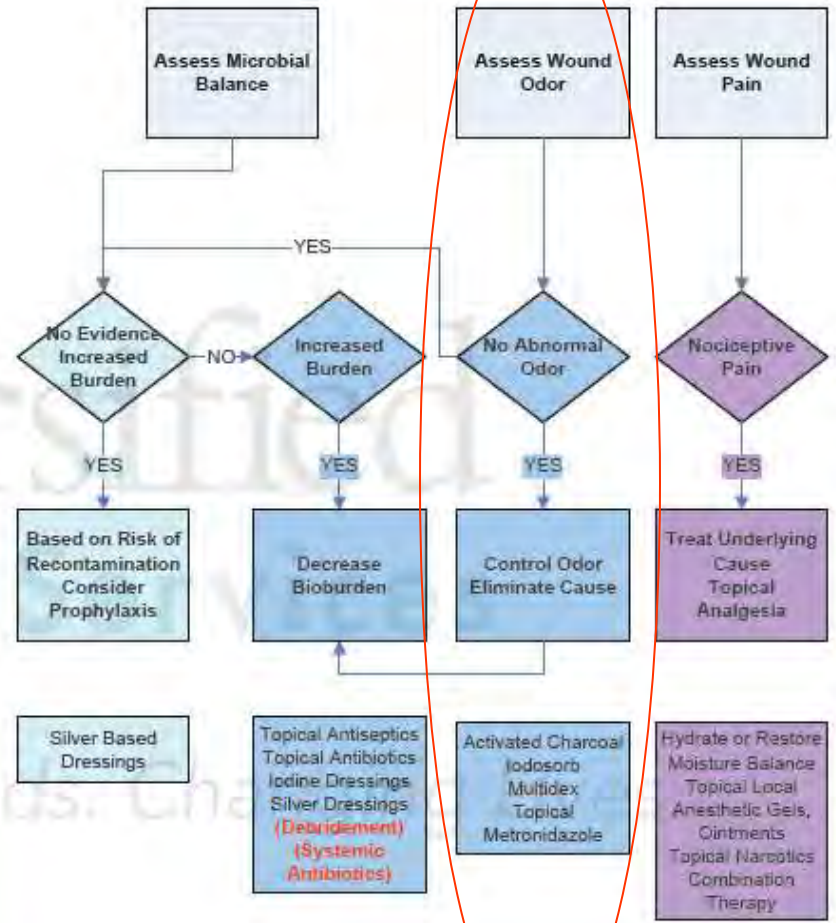


DCS CPG: **W05.05 Optimize Wound Bed Moisture Balance, Exudate, Odor Control**

W05.01 Figure 1. Assess Wound Moisture Balance



W05.01 Figure 2. Assess Wound Microbial Balance, Odor, Pain



No Odor





**CONDITION –
abnormal odor**



Decisions for Dressing Applications

**GOAL
Control Odor
Eliminate Cause**

**OPTIONS –
Activated Charcoal
Iodosorb
Multidex
Metronidazole**

Multidextran Polysaccharide Gel or Powder

- **Multidex (DeRoyal)**

1. **Monosaccharides and polysaccharides derived from plant starches**
2. **1% ascorbic acid**
3. **Molecular weight prevents systemic absorption of starches**
4. **Heals by adding topical nutrients and creating osmotic effect of glucose to PMN (polymorphonuclear cells)**
5. **Indicated on both infected and non-infected wounds including**



Controlling Odor in Wounds

Activated Charcoal

- **Activated Charcoal Dressings** contain a layer of activated charcoal that traps volatile, odor containing molecules, thereby containing the smell.
- **Example:**
CarboFlex- Convetec

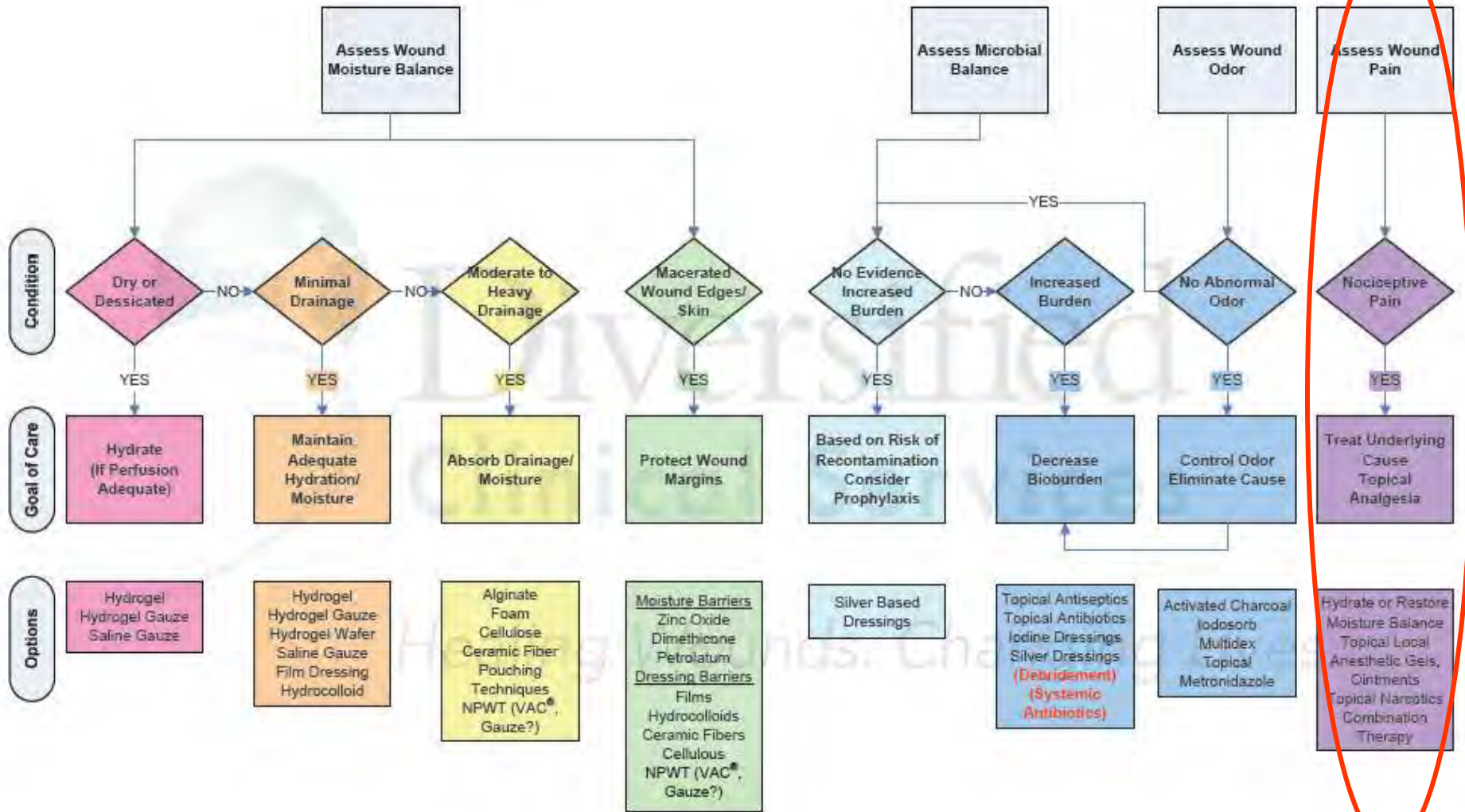
Metronidazole (Flagyl)

- **Metronidazole** is an antibiotic effective against anaerobic bacteria and certain parasites.

DCS CPG: W05.05 Optimize Wound Bed Moisture Balance, Exudate, Odor Control

W05.01 Figure 1. Assess Wound Moisture Balance

W05.01 Figure 2. Assess Wound Microbial Balance, Odor Pain



**CONDITION –
Nocioceptive Pain (Pain associated with damaged tissue)**



Decisions for Dressing Applications

GOAL
Treat underlying cause
Topical analgesia

**OPTIONS –
Restore moisture balance
Topical local anesthetic gels
Topical Narcotics
Combination Therapy**

Additional Dressings

Additional Dressings

- **Hydrofera Blue (HealthPoint)-**
 1. **Methylene Blue and Gentian Violet**
 2. **Provides broad spectrum bacteriostatic protection, Effective against MRSA & VRE,**
 3. **Provide some odor control properties**
- **Moisten with sterile H₂O or saline**
- **Comes in various sizes, including squares and 9 & 12 mm tunnel dressings**

Additional Dressings

MediHoney

- 1. Polysaccharides derived from Manuka Honey**
- 2. Molecular weight prevents systemic absorption of starches**
- 3. Mode of action, works by adding topical nutrients and creating osmotic effect of glucose.**
- 4. Indicated on both infected and non-infected wounds including**

Additional Dressings

Cellulose/Collagen

Promogran (Systagenix)

1. **45% oxidized regenerated cellulose, 55% collagen biopolymer**
2. **Binds matrix metalloproteases with tissue growth factors in chronic wound exudate**
3. **Heals by providing an environment which attracts cells and limits the proteases (MMP) that inactivate growth factors.**



PROMOGRAN PRISMA™ (Systagenex)

- **Collagen, oxidized regenerated cellulose (ORC) and silver-ORC⁺⁺**
- **Kills clinically relevant bacteria in the dressing to help maintain bacterial balance and reduces bacterial growth**



When All Else Fails.



Dressing Choices for Hyperbaric Therapy Patient

*Approved dressing items for use in the Hyperbaric Chamber
(DCS Policy D415)*

- *Tubular net bandage, Tube gauze*
- *Dry gauzes, pads, foams and sponges*
- *Acticote™ silver dressing, Acticote 7™*
- *Cast—fiberglass or plaster that has been set greater than 10 hours*
- *Pads, foams and sponges containing water based hydrating gels*
- *Safe-Gel® (hydrating dermal wound dressing with alginate)*
- *Stoma bags with standard dry adhesives and putties and water based liquid sealers after dry*
- *Liquid stoma sealer with hexane base once completely cured*
- *Adaptic™, Vaseline® petrolatum gauze and Xeroform™ petrolatum dressing*
- *Silvadene, Thermazene Cream™*
- *Other jellies, gels and pastes that do not contain alcohols or other potentially flammable material, if approved.*
- *Hydrofera Blue*

Dressing Choices for Hyperbaric Therapy Patient

Dressing items not allowed in the Hyperbaric Chamber

- Dressings with velcro or metal clasp fasteners.
- Alcohol wipes or swabs.
- Casting Materials less than 10 hours from application
- Any dressing or material that may emit a fume or gas that could be considered combustible.
- When in doubt contact your Hyperbaric Safety Director, DCS Safety Committee representative, or RDCO.

REMEMBER!



***Because wounds and patients evolve during the process of healing, the dressing you start with may not be the dressing you end with!!**

***Don't be afraid to adjust during the course of treatment....**

Questions

