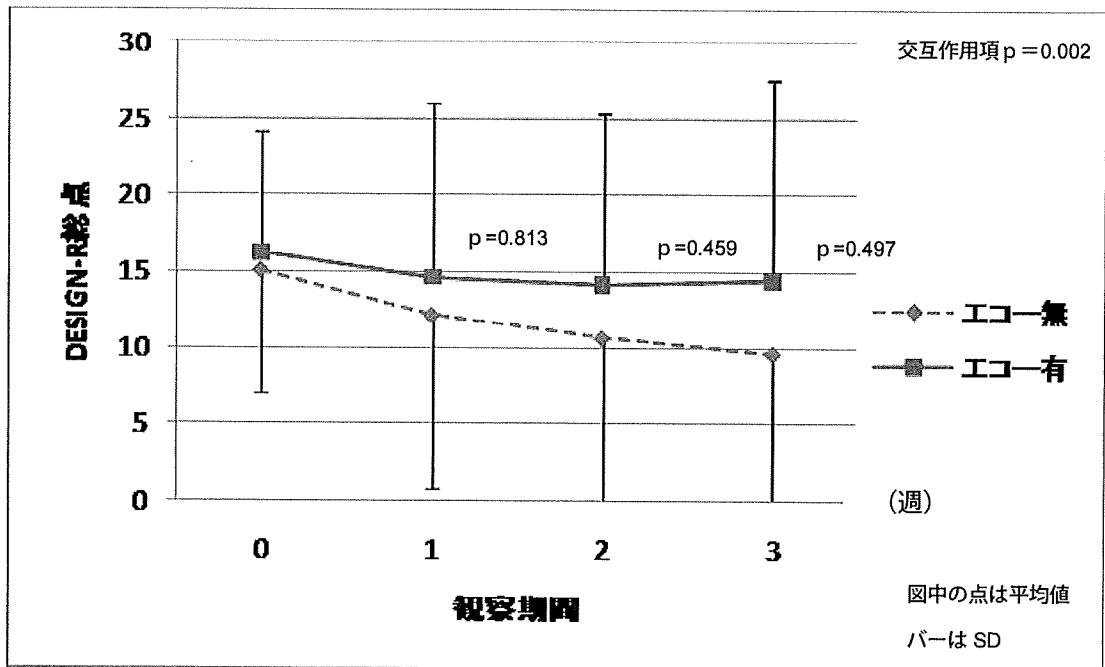


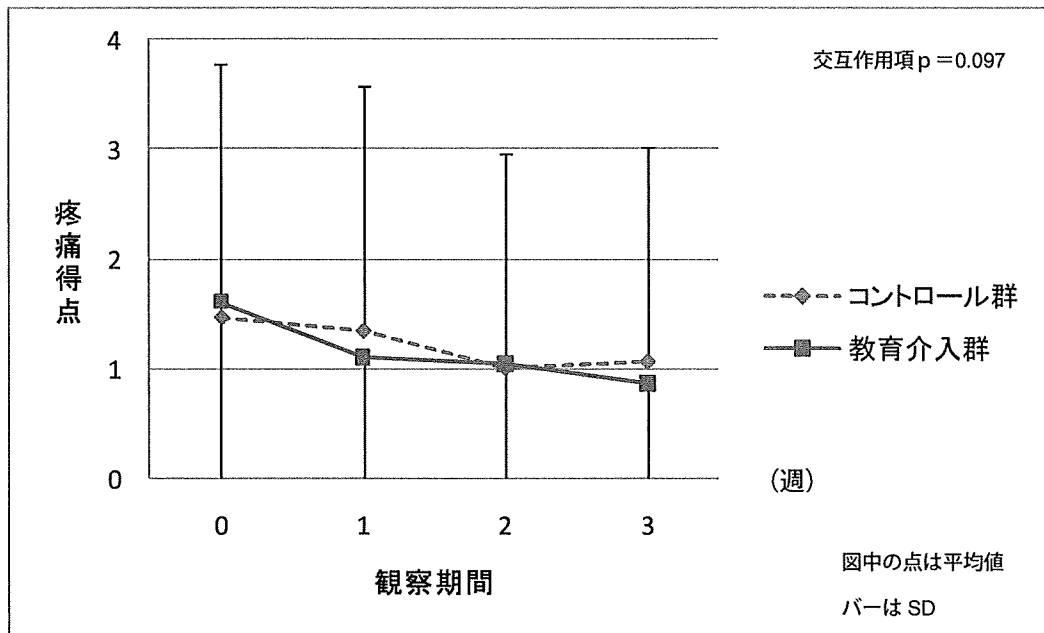
*モデルには調整変数として
 WOC 看護師経験年数を含む
 変量効果として
 患者を含む

図 8 : デブリードマン技術介入による DESIGN-R 経時的変化



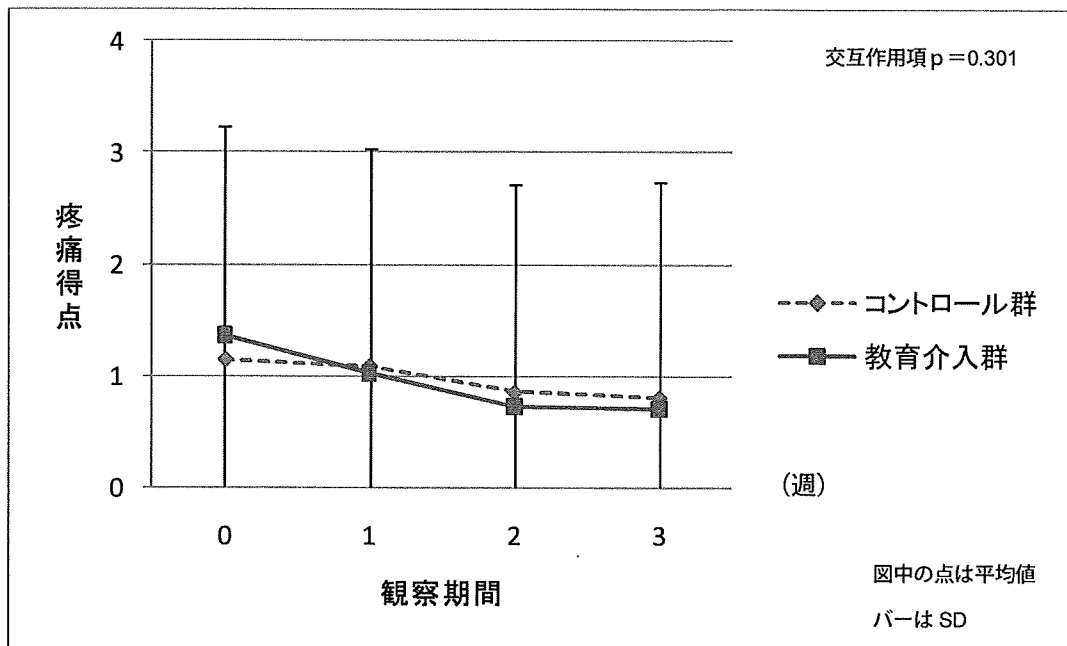
*モデルには調整変数として
WOC 看護師経験年数を含む
変量効果として
患者を含む

図 9：エコー介入による DESIGN-R 経時的変化



*モデルには変量効果として
患者を含む

図 10：褥瘡の処置時の疼痛強さの経時的变化



*モデルには変量効果として
患者を含む

図 11：褥瘡の処置時以外での疼痛強さの経時的変化

2009 年 5 月 26 日



高度創傷管理技術講習会

テキスト



厚生労働省科学研究費 H20-医療-一般-022

東京大学大学院医学系研究科

健康科学・看護学専攻 老年看護学／創傷看護学分野

研究代表者 真田弘美

高度創傷管理教育プログラム

日程：平成21年 5月26日（火）

場所：午前－東京大学医学部5号館3階 老年看護学/創傷看護学教室

午後－東京大学教育研究棟 2階201会議室

5月26日（火）	
褥瘡処置の実習指導 講師：Dr. Courtney Lyder (University of California, Los Angeles)	8：00～11：00
昼食＊（昼食は準備いたしております）	12：00～12：40
壊死組織除去の知識 講師：Dr. Courtney Lyder (University of California, Los Angeles)	13：00～14：00
休憩・実習準備	14：00～14：20
壊死組織除去の演習 講師：Dr. Courtney Lyder (University of California, Los Angeles)	14：20～16：20
陰圧閉鎖療法 講師：館 正弘（東北大学大学院医学系研究科） 内藤 亜由美（東京大学大学院医学系研究科）	16：30～18：00

当日は医学部5号館3階 老年看護学教室にお越しください。

X III Wound Debridement for Nursing

講師：Dr. Courtney Lyder (University of California, Los Angeles)

Wound Debridement for Nursing

Courtney H. Lyder, ND, GNP, FAAN
Dean and Professor
UCLA School of Nursing

I. Anatomy and Physiology

VIABLE TISSUE

1. Skin
 - a. Epidermis
 - (1) Avascular, outer layer
 - (2) Function is to repel H₂O, prevent H₂O loss, protective barrier
 - b. Dermis
 - (1) Supports and nourishes epidermis
 - (2) Contains nerves, blood vessels, sweat glands, hair follicles, sebaceous glands
2. Subcutaneous Tissue
 - a. Composed of mostly adipose (fat) and connective tissue
 - b. Lymphatics and deep blood supply
 - c. Yellowish in color
3. Fascia
 - a. Appearance
 - (1) Shiny white
 - (2) Thick to thin
 - (3) Sheath-like tough covering over muscle, blood vessels, and nerves
 - (4) Non-viable fascia is grayish in color and slimy to touch
 - b. Function
 - (1) Supports muscle fibers to keep them together so they can act as a unit

I. Anatomy and Physiology

A. VIABLE TISSUE

4. Muscle
 - a. Approx 650 muscles in body
 - b. Appearance
 - (1) Dull red to red, striated
 - (2) Contractile
 - c. Vascular - bleed easily
 - d. Low tensile strength - can tear or be cut easily
 - e. Important for movement
 - f. Non-viable muscle is grayish in color and difficult to cut
5. Ligaments
 - a. Fibrous band or sheet connecting bone and cartilage
 - b. Facilitate motion
 - c. Poor vascularity
 - d. Appearance
 - (1) Yellowish white due to higher concentration of elastin than tendons

I. Anatomy and Physiology

6. Tendon

- a. Appearance
 - a. (1) White shiny when healthy
 - b. (2) Fibrous tissue - cords, elastic, high tensile strength
 - c. (3) Dull white or gray when dead (DEAD TENDON CANNOT BE RECOVERED)
 - a. b. Attach bone to muscle -
 - b. Vascularity is poor
 - c. Easily infected

I. Anatomy and Physiology

VIABLE TISSUE

7. Bones
 - a. Appearance
 - (1) Bright white in color
 - (2) Solid, hard - very distinct sound/feeling when touched
 - (3) Becomes yellow/brown when exposed
 - b. Composition
 - (1) Periosteum - external layer, will granulate or accept skin graft
 - (2) Cortical - will die with exposure, infection portal
8. Blood vessels
 - a. Arteries are bright red; veins are deep maroon/purple
 - b. Tend to run side by side
 - c. Observe for pulsing of structure before cutting
9. Adipose/Fat
 - a. Yellow, globular, slippery and will recoil when touched
 - b. Non-viable fat is grayish in color; dissolves or is hard/crunchy when touched
10. Viable Tissue in the Wound Bed
 - a. Granulation - beefy red, bubby tissue
 - b. Epithelial - pink, fragile, new tissue; migrates from wound margins towards the center
 - c. Clean, non-granular - pink to red in color; no visible signs of granular buds
11. Necrotic/Non-viable Tissue in the Wound Bed
 - a. Definition: avascular, dead tissue which is insensate dull in color
 - (1) Eschar - leathery, crusty, or scabbed dead tissue; usually black or brown in color
 - (2) Slough - Can be yellow, grey or white in color; may present as wet, stringy or fibrous (adherent)
 - (3) Maceration - softening and breakdown of a tissue due to prolonged exposure to moisture; usually white in color.
 - (4) Callus - thickening and hypertrophy of horny layers of the skin. Usually yellow, light brown or white in color.

II. Debridement

A. Definition: the removal of necrotic tissue, cellular waste, harmful exudate, and other metabolic waste from a wound

B. Essential component of wound preparation

C. Objectives of Debridement Notes:

1. Remove necrotic/denatured tissue or foreign material from a wound.
 - a. Necrotic tissue impairs the development of healthy granulation tissue and the migration of keratinocytes
 - b. Necrotic tissue prolongs the inflammatory Phase
 - (1) Increases leakage of blood vessels in the wound bed leading to loss of protein/fluid in open wound
 - (2) Protein leakage results in fibrin leaking onto wound surface that converts into hard, soluble protein coat of fibrin
 - (3) Loss of protein from the vascular space leads to edema and malnutrition locally as well as protein malnutrition in general
 - c. Necrotic tissue is a medium for bacteria/infection
 - (1) When bioburden is high, delays wound healing
 - i. Contamination: presence of bacteria on the surface that are not actively multiplying
 - ii. Colonization: pathogens attach to surface of wound, but do not invade healthy tissue. Bacteria compete with wound cells for oxygen and nutrients, secrete byproducts that can be toxic to cells, and may cause increased cellular production of protein degrading enzymes.
 - iii. Critical Colonization: presence of replicating bacteria that are beginning to cause local tissue damage
 - iv. Infection: invasion of pathologic organisms into healthy tissue. The organisms multiply and overwhelm the immune system. This results in host reactions (pain, heat, induration, fever, edema, and erythema) 1,00,000 organisms/ml
 - (2) Necrotic tissue can interfere with host defenses and facilitate deeper penetration of bacteria leading to cellulitis, osteomyelitis or septicemia

II. Debridement

d. Necrotic tissue is a physical barrier to wound contraction

C. OBJECTIVES OF DEBRIDEMENT:

2. Prevent infection / Remove source of pathogenic flora i.e. bone (ex. Osteomyelitis)
3. Interrupt the cycle of a chronic wound by bringing protease and cytokine levels closer to that of an acute wound, thus increasing cellular activity
 - a. Debridement removes aging fibroblast cells, necrotic epithelial cells, and MMP's (matrix metalloproteinases) thus allowing greater proliferation and migration of cells as well as growth factors
4. Restore circulation at the wound site
5. Correct abnormal wound repair
 - a. Hypergranulation, epithelial hyper-contraction with hypogranulation, fistula and deep pressure necrosis
6. Facilitates visualization of wound wall and base
 - a. Necrotic tissue may conceal abscesses and tunnels
7. Good vs. Harm

II. Debridement

D. CONSEQUENCES OF NOT DEBRIDING:

1. Increased risk of infection
2. Imposition of additional metabolic load
3. Psychological stress
4. Ongoing inflammation
5. Compromised restoration of skin function
6. Abscess formation
7. Odor
8. Inability to fully assess wound depth
9. Nutritional loss through exudate
10. Sub-optimal clinical and cosmetic outcome
11. Delayed healing

II. Debridement

GENERAL CONTRAINDICATIONS

1. Ischemic wounds

2. Stable/intact heel ulcers/eschar

a. Definition

- (1) Firmly adherent to surrounding skin
- (2) No inflammation
- (3) No drainage
- (4) Eschar does not feel boggy or soft

b. AHCPR Recommendations

- (1) Heel ulcers with dry eschar need not be debrided if they do not have edema, erythema, fluctuance, or drainage.
Assess these wounds daily to monitor for pressure ulcer complications that would require debridement (e.g., edema, erythema, fluctuance, drainage). (Strength of Evidence = C.)
- (2) Stable heel ulcers with a protective eschar covering are considered an exception to the recommendation that all eschar be debrided. The eschar provides a natural protective cover.
**If any signs of complications appear, however, debridement is usually mandatory.
- (3) DO NOT DEBRIDE!!! Just keep clean and dry.

3. Patients with septicemia in the absence of systemic antibacterial treatment

4. Medically unstable patients

6. Active lesions of Pyoderma gangrenosum

II. Debridement

F. TYPES OF DEBRIDEMENT

1. Selective

a. Removal of only devitalized tissue

b. Types

- (1) Autolytic
- (2) Enzymatic
- (3) Bio Surgical

2. Non-selective

a. Removal of both healthy and necrotic tissue

b. Viable tissue sacrificed for rapid results with some methods

c. Types

- (1) Mechanical
- (2) Chemical
- (3) Surgical sharp debridement
- (4) Conservative sharp debridement

II. Debridement

G. SELECTIVE METHODS

1. Autolytic Debridement

a. Body uses own endogenous enzymes to dissolve necrotic tissue

- (1) Proteolytic, fibrinolytic and collagenolytic
- (2) Non-invasive, painless and non-harmful to healthy tissue
- (3) Typically a slow process especially in the elderly population, the malnourished, and patients with comorbidities
- L As a person ages production of these enzymes are decreased and in some cases ineffective

b. Risk of increased fibrosis

c. What maintain moist wound healing to promote this process

- (1) Select dressing that maintain moisture and fluid within wound bed
- (2) George Winter, PhD, University of London questioned if allowing wound to dry out was the best method of healing.
 - i. 1992 conducted study by creating multiple small partial thickness wounds on the backs of pigs. Portion of the wounds were allowed to dry out and form eschar, while others were covered with a polymer film.
 - ii. Results: Wounds that had been covered by polymer film re-epithelialized twice as quickly as the wounds exposed to air.
- (3) In 1970, DT Rivers presented a study regarding water loss thru the epidermis.
 - i. Trans-epidermal water loss through intact skin is 42gm of water vapor per square meter of skin every day.
 - ii. Trans-epidermal water loss through skin with the stratum corneum removed increased to 7,874 gm of water vapor per square meter of skin every day.
- (4) Temperature Effects
 - i. The loss of moisture from any surface by evaporation is accompanied by cooling of that surface; therefore as wound tissues lose moisture, there is local cooling of the wound.
 - ii. Cells and enzymes function optimally at normal body temperature. A temp fall of 2° C is sufficient to affect the biological process. A dressing change can drop the wound base temperature for up to four hours before it returns to normal.
 - iii. These cooling can lead to increased risk of infection by causing vasoconstriction and increasing hemoglobin's need for oxygen. This results in decreased oxygen available for neutrophils which fight infection.

II. Debridement

G. SELECTIVE METHODS

c. Indications

- (1) Any wound with necrotic tissue, although other forms of debridement may be faster
- (2) Dry Gangrene

d. Contraindications

- (1) Wet gangrene
- (2) Severe neutropenia
- (3) Immunocompromised patients
- (4) Deep, extensive wounds

e. Criteria for dressing selection

- (1) Select dressing that maintain moisture and fluid within wound bed or add moisture?
- (2) Amount of drainage?
- (3) Maceration or fragility of periwound skin?
- (4) Frequency of dressing change
- (5) Minimal disruption of wound bed

II. Debridement

G. SELECTIVE METHODS

I. Dressings

(1) Alginates

i. Sorbsan, Curasorb, Kaltostat

ii. Advantages

- Excellent exudate absorption
- Moist wound environment
- Can be used on infected wounds
- Biocompatible to tissues
- Easy application
- No irritation to healing tissue with removal
- Can fill in dead space
- Conformable

iii. Disadvantages

- Permeable - poor barrier
- Can dehydrate wound bed if inadequate exudate
- Require secondary dressing

II. Debridement

G. SELECTIVE METHODS

(2) Semi-permeable Films (transparent)

i. Tegaderm, Opathe, Polyskin

ii. Advantages

- Good visual monitoring
- Moist wound environment
- Limited permeability to oxygen/H₂O vapor
- Biocompatible to tissue
- Waterproof
- Excellent bacteria barrier
- Cost effective in long run
- Good for superficial wounds

(3) Semi-permeable foams

i. Allevyn, Flexzan, Curafoam, Lycofoam

ii. Advantages

- Moist wound environment
- Fair to Good exudate absorption
- Limited permeability to oxygen/H₂O vapor
- Easy application
- Minimal irritation to healing tissue (nonadherent)
- Biocompatible with tissue
- Decreases pain at wound site
- Most brands can be used on infected wounds (see manufacturer recommendations)
- May be used under compression

iii. Disadvantages

- No direct visual monitoring of wound
- May macerate tissue if they become saturated
- May need secondary dressing

II. Debridement

G. SELECTIVE METHODS:

(4) Hydrogels and Hydrogel Sheets

i. Hydrogels: Curasol, IntraSite, SoloSite

ii. Hydrogel Sheets: Elastogel, Vigilon, Carradras, Flexderm

iii. Impregnated gauze: Transigel, Carragauze

iv. Advantages

- Moist wound environment
- Good for dry wounds/rehydrate
- Biocompatible with tissue
- Can fill in dead space
- Can be used with infected wounds
- Non-irritating to healing tissues
- Some allow visual monitoring

v. Disadvantages

- Poor/fair exudate absorption
- Permeable (sheets semi-permeable)
- May be difficult to secure
- May require secondary dressing
- May cause maceration
- Poor barrier to infection

II. Debridement

SELECTIVE METHODS:

(5) Hydrocolloids

i. Duoderm, Restore, Replicare, Tegaserb

ii. Can be occlusive or semi-occlusive

iii. Advantages

- Moist wound environment
- Easy application
- Can be used in high moisture environment
- Biocompatible with tissue
- Occlusive/microbial barrier
- Fair/Good exudate absorption
- Decreases pain in wound site
- Some are semi-occlusive and/or semitransparent
- May be used under compression products
- Change Q 3 to 7 days

iv. Disadvantages

- Poor moisture vapor transmission
- Not for heavily draining wounds, fragile periwound skin or exposed bone/tendon
- May curl at edges
- Can leave residue behind
- Occlusive dressings cannot be used on infected wounds
- Not recommended for diabetic ulcers

II. Debridement

SELECTIVE METHODS:

(6) Composites

i. Telpa Island, Aldress, Covaderm

ii. Advantages

- Limited permeability to oxygen/H₂O vapor
- Conformable to wound
- Easy application
- Adhesive border
- Can be used on infected wounds
- Good exudate absorption
- Dressing change 3x/wk

iii. Disadvantages

- Require border of intact skin
- May cause tissue trauma with removal
- Can be expensive

(7) Specialty Absorptives

i. Aquacel, Comcliderm, Exu-Dry

ii. Advantages

- Can be used on any type of wound
- Infected wounds
- Min to heavy draining wounds
- Non-adherent
- Prevents maceration

iii. Advantages

- Can be costly

II. Debridement

SELECTIVE METHODS:

(8) Collagens

i. Fibrac, Woundres, Medil Pads[®]

ii. Available as freeze-dried sheets, pastes, gels

iii. Advantages

- PM-FTW, tunneling wounds, skin grafts
- Facilitate debridement
- Min to heavy draining wounds
- Non-adherent
- Can be used on infected wounds
- Conformable
- Stimulate new tissue formation

iv. Disadvantages

- Not to be used on 3rd degree burns (full thickness)
- Require secondary dressing

II. Debridement

SELECTIVE METHODS:

- (9) Wound Fillers
 - I. Flexigel, Iodoflex, Multidex
 - II. Advantages
 - Moist wound environment
 - Easy application and removal
 - Fall to Good exudate absorption
 - Fill dead space
 - Conformable
 - Can use in infected wounds
 - III. Disadvantages
 - Not recommended for dry wounds
 - Require secondary dressing
 - May require extra cleansing

II. Debridement

SELECTIVE METHODS:

- g. Basic dressing application guidelines
 - (1) Always cleanse with appropriate solution before
 - (2) Reassess wound each time to determine if current wound treatment plan is most appropriate
 - (3) Use skin protectants (i.e. Skin prep, barrier creams) to protect periwound area
 - (4) Use cytotoxic agents (i.e. Dakins, povidine-iodine, etc) only when necessary
 - (5) Keep dressing approx 1-2 inches larger than wound itself unless specified by manufacturer.

II. Debridement

G. SELECTIVE METHODS:

2. Enzymatic Debridement
 - a. Application of proteolytic substances/exogenous enzymes to wound bed to facilitate the breakdown of devitalized tissue (protein, collagen, fibrin)
 - b. Types of Enzymatic Agents
 - (1) Acoszyme (Papain/urea)
 - i. Papain is a proteolytic enzyme
 - ii. Urea denatures non-viable protein facilitating the action of papain
 - III. Effective over broad pH range 3-12
 - iv. Hydrophilic
 - v. Non-harmful to viable tissue
 - vi. Once daily dressing change
 - (2) Collagenase Sanyl
 - i. Breaks down collagen which provides the framework that adheres necrotic tissue to wound bed
 - ii. Effective over narrow pH range 6-8
 - III. Hydrophobic
 - iv. Non-harmful to viable tissue
 - v. Once daily dressing change
- c. Process/technique
 - (1) Follow product guidelines per manufacturer
 - (2) Cleanse wound prior to application of each Tx
 - (3) Cover with appropriate secondary dressing
- d. Indications
 - (1) >20% necrotic tissue in wound bed typically
 - (2) Elderly patients-supplement body's own enzymes
- e. Contraindications
 - (1) Sensitivity to the enzymes
 - (2) <20% necrotic tissue in wound

II. Debridement

G. SELECTIVE METHODS:

3. Bio Surgical Debridement
 - a. Also known as larval or maggot therapy
 - b. Process/technique
 - (1) Use of sterile maggots from "green bottle fly" applied to wound and covered with secondary dressing
 - (2) Maggots liquify necrotic tissue and ingest it; consume bacteria and promote growth of fibroblasts
 - (3) Leave in wound 1-3 days
 - (4) Most ulcers completely debride in 2 to 6 cycles
 - c. Indications
 - (1) Extensive necrotic tissue >70%
 - (2) Chronic non-healing wounds
 - (3) Infected wounds
 - (4) Wounds in which debridement may expose bone, tendon or joint
 - (5) Patient unable to tolerate surgery
 - d. Contraindications
 - (1) Patient uncomfortable with thought of maggots
 - (2) Granulating wounds
 - (3) Deep, tunneling wounds
 - (4) Life- or limb-threatening wounds
 - (5) Patients with bleeding abnormalities
 - (6) Osteomyelitis
 - (7) Rapid progressing infection
 - (8) Patients with allergies to fly larva, chicken eggs, brewer's yeast or soy beans
 - e. To order maggots go to following website: www.ucfhs.ucl.edu/com/pathology/sherman/home_page.htm

II. Debridement

NON-SELECTIVE METHODS – MECHANICAL

1. Wet to dry dressings
 - a. Process/technique
 - (1) Application of saline moistened, single layer large weave gauze to a wound, then allowed to dry out over a 4-6 hour period. Then remove dressing with a force great enough to pull non-viable tissue attached to gauze from the wound bed.
 - (2) Process repeated every 4-6 hours
 - (3) Can be painful with removal
 - (4) Minimal effectiveness in removing necrotic tissue
 - b. CNS (DHHS) "May be appropriate in limited circumstances, but repeated use may damage healthy granulation tissue in healing ulcers and may lead to excessive bleeding and increased resident pain". "Considered to be against standard of practice in LTC."
 - c. Indications
 - (1) Necrotic tissue in wound bed >70%
 - (2) Stage III and IV wounds
 - (3) Chemical or endogenous enzymes unable to remove debris
 - (4) When surgical or other debridement not indicated

II. Debridement

d. Contraindications

- (1) Wounds with < 70% necrotic tissue - traumatic to granulation and epithelial tissue
 - (2) Superficial wounds
 - (3) Bleeding
 - (4) Pain (may need analgesics if other debridement options not indicated)
 - (5) Infected wounds
 - (6) Exposed tendon
 - (7) May leave strands of gauze in wound
 - (8) Blood thinning meds (precaution)
- e. Why not "Wet to Dry"?
- (1) Allows loss of moisture vapor and local wound tissue cooling
 - (2) Trauma to viable tissue with removal
 - (3) Provides no physical barrier to exogenous bacteria
 - (4) Removal disperses bacteria into air (cross contamination)
 - (5) Labor Intensive

II. Debridement

NON-SELECTIVE METHODS – MECHANICAL

2. Wound Scrubbing

- a. Process/technique
 - (1) Use gauze or sponge and scrub from center of wound outward
 - (2) Purpose is to remove soft slough and debris
 - (3) Recommend 1x/day or less; as needed
- b. Indication
 - (1) Shallow wounds
 - (2) Stage II, III, IV wounds
- c. Contraindications
 - (1) Granulation
 - (2) Infected wounds
 - (3) Bleeding (4) Patients on Coumadin or blood thinning meds (precaution)

II. Debridement

H. NON-SELECTIVE METHODS – MECHANICAL

3. High Pressure Irrigation

- a. Irrigation of wound with fluid delivered at 8-16 psi to remove debris and necrotic tissue
- b. Process/technique
 - (1) Use 35 ml syringe and 18 gauge angiocatheter
 - (2) Direct stream of fluid into wound bed at approximately a 60-70 degree angle
 - (3) Typically use normal saline
 - (4) Can use prepackaged canisters of pressurized saline
 - (5) Wear personal protective equipment due to risk of splashing
 - (6) 1x day or less; as needed
- c. Indications
 - (1) Superficial non-attached cellular debris
 - (2) Malodorous wounds
 - (3) Venous ulcers
 - (4) Neuropathic ulcers
 - (5) Pressure ulcers
 - (6) Deliver bactericidal agent
- d. Contraindications/precautions
 - (1) Clean, granulating wounds
 - (2) Infected wounds (protective equipment)
 - (3) Tunneling/undermining (precaution)

II. Debridement

NON-SELECTIVE METHODS - MECHANICAL

4. Pulsed Lavage

- a. Hydrotherapy delivered with handheld device
- b. Provides pressurized solution to wound bed for irrigation and debridement
- c. Purpose/Benefits
 - (1) Soften and remove debris
 - (2) Reduce bacteria
 - (3) Can be used with undermining and tunneling wounds
 - (4) Portable
 - (5) Less labor intensive than whirlpool
 - (6) Typically will not harm granulating tissue esp at lower psi
- d. Process/technique
 - (1) Pulsed lavage offers return suction and variable pressure control
 - (2) 4-16 psi with 8 psi most effective
 - (3) Utilizes interchangeable tips for different size wounds
 - (4) Tx time varies depending on wound size and extensiveness of necrosis or debris
 - (5) Frequency varies from 1-2x/day for 3-7 days/wk
 - (6) Where appropriate protective clothing

II. Debridement

H. NON-SELECTIVE METHODS - MECHANICAL

4. Pulsed Lavage

- e. Indications
 - (1) Superficial non-attached cellular debris
 - (2) Malodorous wounds
 - (3) Venous ulcers
 - (4) Neuropathic ulcers
 - (5) Pressure ulcers
 - (6) Fasciitis
 - (7) Sternal wounds
 - (8) Pulsed lavage good for large or multiple wound sites
 - (9) Febrile patients
- f. Contraindications/precautions
 - (1) No absolute contraindications
 - (2) Clean, granulating wounds
 - (3) Tunneling/undermining
 - (4) Patients on anticoagulants
- g. Can be costly

II. Debridement

H. NON-SELECTIVE METHODS - MECHANICAL

5. Whirlpool

- a. Effects/Purpose
 - (1) Vasodilation and increase blood flow
 - (2) Soften and loosen necrotic tissue
 - (3) Wound cleansing
 - (4) Mechanical debridement
 - (5) Analgesic effects
- b. Process/technique
 - (1) 10 to 20 minutes as determined by goal and size/amount of Necrotic Tissue
 - (2) Optimal temperature 92 to 98 degrees F
 - (3) Can be done 1-2x/day
- c. Chemicals used in Whirlpool treatments
 - (1) Chlorazene
 - (2) Betadyne
 - (3) Povidoneiodine
 - (4) Sodium hypochlorite
- d. Indications
 - (1) Extensive necrosis >90%
 - (2) Malodorous wounds
 - (3) Infected wounds
 - (4) Wounds with loose debris and foreign material
 - (5) Ischemic wounds where vigorous perfusion of wound and surrounding tissue is desired

II. Debridement

H. NON-SELECTIVE METHODS - MECHANICAL

6. Whirlpool

- e. Contraindications
 - (1) Superficial wounds
 - (2) Wounds with <90% necrotic tissue
 - (3) Granulating wounds
 - (4) Systemic complications i.e. cardiopulmonary dysfunction, severe peripheral vascular impairment
 - (5) Maceration
 - (6) Acute phlebitis
 - (7) Renal failure
 - (8) Wet/Dry gangrene
 - (9) Febrile conditions
 - (10) Active bleeding
 - (11) Moderate to severe edema
 - (12) Callous or Hyperkeratotic tissue
- f. Should have written, reviewed and implemented P&P for all hydrotherapy treatments that include guidelines for disinfecting/cleaning, sterilizing and culturing equipment

II. Debridement

I. NON-SELECTIVE METHODS - CHEMICAL

1. Dakins Solution (sodium hypochlorite)
 - a. Primary action is antibacterial and odor control
 - b. Denatures proteins to loosen slough (controversial)
- c. Indications
 - (1) Infected wounds
 - (2) Malodorous wounds
 - (3) Extensive slough
- d. Contraindications
 - (1) Thick eschar
 - (2) Granulating wounds
 - (3) Epithelializing wounds
- e. Process/technique
 - (1) Saturate gauze with solution
 - (2) Lightly pack into wound.
 - (3) Cover with gauze dressing
 - (4) Change twice daily :1
- f. Precautions
 - (1) Cytotoxicity - damages fibroblasts
 - (2) Use 1/4 strength to decrease cytotoxic effects (0.25%)

II. Debridement

NEW DEBRIDEMENT TECHNOLOGIES AND TECHNIQUES

1. JETOX
 - a. Made by Teitech, Ltd
 - b. Uses compressed O2 and Normal saline for irrigation and debridement
 - c. Portable
 - d. Two Types
 - (1) JETOX ND
 - i. No debris evacuation
 - (2) JETOX HD
 - i. Debridement with debris evacuation
 - e. Ideal for patients sensitive to traditional debridement methods
 2. Ultrasonic-Assisted Debridement
 - a. Low frequency US in conjunction with a gravity fed saline solution which aids in gently flushing of wound.
 - b. Little to no pain
 - c. Biological Effects
 - (1) Ultrasonic energy generates a cavitation response at cellular level
 - i. Gas bubbles created, separate non-viable matter from viable because tensile strength of necrotic cells is less than that of viable tissue
 - (2) Bactericidal Effect
 - i. Kills bacteria, viruses and fungi
 - ii. Direct correlation between level of antibacterial effects and the length of time US is delivered to wound
 - d. Indications
 - (1) Locally infected wounds
 - (2) Wounds with impaired circulation
 - (3) Necrotic tissue (slough, fibrin, biofilms)

II. Debridement

J. NEW DEBRIDEMENT TECHNOLOGIES AND TECHNIQUES

- e. Contraindications
 - (1) Untreated advancing cellulitis
 - (2) Metal hardware (i.e. artificial joints, plates, screws) in treat field
 - (3) Electronic devices in treatment fields
 - (4) Uncontrolled pain
- f. Treatment parameters
 - (1) Frequency at 20-60 kHz
 - (2) Tx time: varies based on size of the wound, amount of necrotic tissue and patient tolerance
 - (3) Do not operate without irrigating fluid
 - (4) Can only be administered by trained and licensed providers: MD, PA, PT, APNP and RN.
- g. Devices
 - (1) Quosic Wound Therapy System (Arabella Medical)
 - i. Device utilizes a combination of US and sharp curettes
 - ii. 3 different curette tips available (autoclavable and reusable)
 - Full curette
 - Half curette
 - Open curette
 - iii. www.arabella.com
 - (2) Sonoca 180 (Soring)
 - i. Delivers US at 25 kHz
 - ii. 3 different probes available to handle various wound topographies (autoclavable and reusable)
 - iii. www.sonocac.com
 - (3) SonicOne (Misonix)
 - i. Delivers US at 22.6 kHz
 - ii. 4 different probes that offer a variety of aggressiveness for debridement (autoclavable and reusable)
 - iii. www.misonix.com

III. Sharp Debridement

III. SHARP DEBRIDEMENT

- A. Also known as instrumental debridement
- B. Fastest and most effective way to remove necrotic tissue
- C. Comes from French word desbrider, meaning to unbind
- D. Reasons for Sharp Debridement
 1. Removing nonviable tissue is imperative in improving the outcomes for individuals requiring wound care.
 2. Produces more rapid results than other forms of debridement, and can reduce the risk of infection, and possible sepsis.
 3. Various experts view sharp debridement as essential to the healing process and the conclusion that some draw from research is that sharp debridement should be considered the "gold standard", from the different methods of debridement studied, because it minimizes complications and maximizes healing.
 4. Migration of epithelial cells will not occur with necrotic tissue in the base of the wound because they need nutrients in order to migrate across the membrane - nonviable tissue removal is imperative.
 5. A wound cannot properly be assessed without removing the necrotic tissue.
 6. Some studies have shown that sharp debridement can improve healing rates (Steed DL et al, Effect of extensive debridement and treatment on the healing of diabetic foot ulcers, 1993)
 7. Clinical experience and basic wound physiology tells us that the more rapidly you remove the necrotic tissue, the quicker a wound can close.

III. Sharp Debridement

F. GENERAL CONSIDERATIONS

1. Anticoagulant therapy
2. Terminally ill
3. Wounds on hands and face
4. Immunocompromised patients
5. Smoking
6. Pain tolerance

III. Sharp Debridement

G. TYPES OF SHARP DEBRIDEMENT

1. Surgical Debridement v LO
 - a. Debridement was originally described by Napoleon's surgeon Baron Dominique Jean Larrey
 - b. Process/technique
 - (1) Major procedure performed by MD/podiatrist/surgeon in an operating room under anesthesia
 - (2) Complete debridement transforming a chronic wound to an acute one
 - (3) Rapid results at the sacrifice of viable tissue
 - c. Indications
 - (1) One time use
 - (2) Extensive Necrotic Tissue > 70%
 - (3) Osteomyelitis
 - (4) Advancing cellulitis and sepsis from a wound
 - (5) Life threatening necrosis, i.e. necrotizing fasciitis
 - (6) Abnormal wound repair
 - d. Contraindications
 - (1) Wounds < 70% Necrotic Tissue
 - (2) Patient unable to tolerate / survive procedure
 - (3) See general contraindications of debridement

III. Sharp Debridement

G. TYPES OF SHARP DEBRIDEMENT

- e. Laser Debridement
 - (1) Form of surgical debridement
 - (2) Performed by physicians or surgeons
 - (3) Use of focused beams of light to cauterize, vaporize, or slice through tissue
 - (4) Indications/Contraindications
 - i. Same as Surgical
 - (5) Advantages/Notes:
 - i. Wound bed is sterilized
 - ii. Severed vessels usually cauterized
 - (6) Disadvantages
 - i. Limited availability
 - ii. Injury to adjacent healthy tissue
- f. Versa Jet (HydroSurgery System)
 - (1) High pressure jet of saline solution (200 psi) that travels parallel to the wound surface comb excision, cleansing and aspiration
 - (2) Surgeon able to differentiate tissue types using technique and varying the power settings
 - i. Able to target damaged tissue and decrease damage to viable tissue
 - ii. Multiple tip configurations provides more flexibility
 - (3) Smith Nephew (www.versaJet.net)

III. Sharp Debridement

G. TYPES OF SHARP DEBRIDEMENT

- 2. Conservative Sharp Debridement
 - a. Process/Technique
 - (1) Minor procedure performed by therapist or nurse (if state practice act allows) to remove only devitalized tissue
 - (2) May require several sessions
 - (3) Recommend ABI
 - i. ABI calculation: Ankle systolic divided by brachial systolic
 - ii. Interpreting Readings
 - Normal > 1.0
 - LEAD < 0.9
 - Borderline 0.6 - 0.8
 - Severe ischemia < 0.5
 - b. Indications
 - (1) Cross hatching of eschar
 - (2) Extensive devitalized tissue.
 - (3) Signs of advancing cellulitis or sepsis
 - (4) Adjunct in combination with other methods
 - (5) Hyperkeratotic rim diabetic neurotrophic foot ulcers (callus formation)
 - (6) Unstable eschar caps
 - c. Contraindications
 - (1) Bleeding disorders/abnormalities
 - (2) Arterial insufficiency
 - i. Check ABI prior to debridement if lower extremity wound
 - (3) Dry Gangrene
 - (4) Stable heel ulcer or stable eschar
 - (5) Malignant wounds
 - (6) Unidentifiable structures
 - (7) If wound can be managed without procedure
 - (8) State law or practice disallows performance by therapist or nurse

III. Sharp Debridement

IV. LEGAL IMPLICATIONS/POLICY AND PROCEDURE FOR SHARP DEBRIDEMENT

- A. Legal Standards of Practice
 - 1. State Practice Act
 - 2. Company Policy & Procedures
 - 3. National Professional Standards of Practice
- B. Who can do sharp debridement?
 - 1. Physicians and Podiatrists
 - 2. Physicians assistants
 - 3. Physical Therapists and PTA's
 - 4. Nurse Practitioners and nurses
- C. Policy and Procedure
 - 1. Must have a physician / NP order that specifically notes each site: new site new order.
 - a. Ex: P.T. (or R.N.) to perform conservative sharp debridement to left heel and left lateral malleolus prn (or state specific frequency i.e. 3x/week x 2 weeks)
 - 2. Be sure that facility policy & procedures reflect what disciplines can perform sharp debridement
 - 3. Nurses must complete the following to perform sharp debridement (following is an excerpt from a WOCN position statement)
 - a. Must have additional didactic education in the skill
 - b. Must have additional laboratory education to develop the skill
 - c. Must participate in a clinical practicum involving patients with wounds
 - 4. It is highly recommended that PT's/PTA's complete an education course on wound debridement and a competence validation of debridement skills

III. Sharp Debridement

VI. OTHER THINGS TO CONSIDER BEFORE PERFORMING SHARP DEBRIDEMENT

- A. Does your state or employer require any special education, training or credentials?
- B. Are you required to periodically updated knowledge and skills?
- C. Are there any specific guidelines outlined by your professional organization or employer?
- D. Are there policies and procedures in place?
- E. Is there any physician supervision required and if so to what extent?
- F. Is malpractice insurance provided by employer?
- G. Do you have malpractice insurance?

III. Sharp Debridement

VII. PRACTICAL APPLICATIONS OF CONSERVATIVE SHARP DEBRIDEMENT

- A. What does it take for effective sharp debridement?
 - 1. Good working knowledge of anatomy
 - 2. Ability to identify viable tissue
 - 3. Adequate equipment, lighting and assistance
 - 4. Ability to explain the procedure to the patient
 - 5. Pain management skills before, during and after procedure
 - 6. Ability to deal with complications, i.e. bleeding
 - 7. Recognition of clinician skill limitations and those of the technique
 - 8. Use of secondary debridement technique as indicated

III. Sharp Debridement

VII. PRACTICAL APPLICATIONS OF CONSERVATIVE SHARP DEBRIDEMENT

- B. Sharp Debridement Tools
 - 1. Tools used in conservative sharp debridement
 - a. Scalpels - for cutting away nonviable tissue and crosshatching eschar.
 - (1) Size 11: small pointed blade tip for getting into small areas and cross-hatching eschar.
 - (2) Size 15: small rounded blade for cutting away necrotic tissue, trimming loose tissue, and cross hatching eschar.
 - (3) Size 10: large rounded blade for cutting away large amounts of necrotic tissue (i.e. callous formation)
 - b. Forceps - for holding or pulling away nonviable tissue.
 - (1) With teeth (pick-ups): contain small metal teeth at the end of the forceps for grabbing and pulling tissue up or out in order to remove or cut away.
 - (2) Without teeth (serrated): most commonly used tool.

III. Sharp Debridement

c. Scissors - for cutting and trimming away nonviable tissue.

- (1) Sharp: used for getting into small areas. ✓
- (2) Blunt: not used often.
- (3) Curved: tip curved up; helpful for trimming edges safely.

d. Curettes: spoon-shaped instruments with a sharp edge. Comes from the French verb, "cure", which is to "scrape clean".

- (1) Ear curette: spoon-shaped, for removal of soft necrotic tissue. (melon-ball scooper)
- (2) Loop curette: looped end for removal of soft or fibrous, necrotic tissue
- (3) Dermal curette: looped, with a sharp end for the removal of fibrous necrotic tissue
- (4) Fox Curette: flat handle with a cylindrical arm extending from the handle. There is an oval or rounded-looped cutting edge at the end of the arm. This tool is generally metallic.
- (5) Pfriem Curette: large metal handle tapering inwardly from the bottom of the handle. It is similar to the Fox Curette with the cylindrical arm, and similar cutting edges. It differs from the Fox Curette in that it is provided with ribbed and grooved surfaces extending lengthwise along the handle.
- (6) Eye curette: very similar to the Fox Curette except the working element is dish-like rather than loop-shaped allowing for a scooping action. (melon-ball scooper) It is metallic, rather than plastic, like the ear curette, and can be disposable rather than autoclaved. The eye curette also has ribbing on the handle.

III. Sharp Debridement

VII. PRACTICAL APPLICATIONS OF CONSERVATIVE SHARP DEBRIDEMENT

B. Sharp Debridement Tools

2. Disposable versus Reusable
 - a. Disposable pros - single patient use, quality is improving, custom pack
 - b. Disposable cons - lower quality than reusable, higher long term cost, limited choices
 - c. Reusable pros - numerous choices, wide range of quality, unlimited usage
 - d. Reusable cons - higher initial cost, sterilization process capabilities, instruments have to be maintained, exposure risk with sterilization process

C. Analgesics

- a. May be needed in some cases
- b. Oral Analgesics
- c. Topical analgesics
 - (1) EMLA (topical lidocaine anesthetic) cream, applied 60 to 90 minutes before a sharp debridement procedure, can successfully eliminate pain.
 - (2) LMX-4 (formerly ELA-Max): over-the-counter (OTC) topical anesthetic that produces dermal anesthesia in 18 to 30 minutes. The 4% lidocaine preparation contains 40 mg of lidocaine per gram. The lidocaine molecules are encapsulated in a lipid layer (liposomes) to enhance dermal absorption.
 - (3) CETACAIN - comes in a spray and gel. Applied directly to wound site. Federal law requires IND order.
 - i. Spray: Applied for 1 second or less for normal anesthesia.
 - ii. Gel: Applied with cotton applicator. Should not be held in one area for extended periods of time.
 - iii. Improper use can cause Methemoglobinemia which is a condition when more than 1% of hemoglobin in the blood has been oxidized to the ferric form. If increases to 30% it can lead to cyanosis, dizziness, headaches, drowsiness. If increases to 50% it will progress to seizures, cardiac arrhythmias and coma. Requires large quantities for it to be harmful.
 - (4) Interferential current or TENS

III. Sharp Debridement

VII. PRACTICAL APPLICATIONS OF CONSERVATIVE SHARP DEBRIDEMENT

D. Safety with Sharp debridement

1. Stay FOCUSED! Eliminate distractions.
2. Stay organized.
3. Use safety scalpels if possible.
4. Wear cotton gloves under sterile gloves: www.eriehandcare.com
5. Double glove if possible
6. Be comfortable with the tools in your hand.
7. Keep free hand away from debridement area when not using forceps.
8. Place patient in comfortable position and stabilize area of the body being treated.
9. Adhere to standard precautions.
 - a. Goggles
 - b. Mask
 - c. Gown
 - d. Shoe covers

III. Sharp Debridement

VII. PRACTICAL APPLICATIONS OF CONSERVATIVE SHARP DEBRIDEMENT

E. Preparing to Debride

1. Collect supplies
2. Arrange for help if needed
3. Ask patient for history regarding blood thinners, and allergies if known
4. Position patient for their comfort, and to decrease clinician fatigue
5. Prepare sterile field and place instruments needed
6. Ensure containers are available for sharps and tissue disposal

III. Sharp Debridement

VII. PRACTICAL APPLICATIONS OF CONSERVATIVE SHARP DEBRIDEMENT

F. When to 'STOP' Sharp Debridement Procedure

1. Intolerable pain
2. Reach viable tissue - the best indicator of viability is bleeding during debridement
3. Clinical/patient fatigue
4. High patient anxiety
5. Location of a fascial plane
6. Change in patient's medical status
7. Severe bleeding
 - a. Most frequent complication
 - b. How to 'STOP' Bleeding
 - (1) Pressure - should stop most bleeding. Using the palm of your hand on the gauze or cloth, apply direct pressure to the wound for 6 minutes. (During the 6 minutes, do not stop to check the wound or disturb any blood clots that may form on the gauze.) If blood soaks through the gauze, do not remove it. Apply another gauze pad on top and continue applying pressure
 - (2) Silver Nitrate - cauterize by holding a silver nitrate (AgNO₃) applicator firmly over the bleeding source for 16-30 seconds. Repeat 2-3 times as needed.
 - (3) Elevation
 - (4) Calcium alginate

III. Sharp Debridement

VII. PRACTICAL APPLICATIONS OF CONSERVATIVE SHARP DEBRIDEMENT

G. Selecting the Right Method of Debridement

1. Wound Characteristics Notes:
 - a. Amount of necrotic tissue to be removed
 - b. Type of necrotic tissue
 - c. Infection
 - d. Pain
 - e. Exudate
 - f. Required rate of debridement
2. Patient's concerns and individual wishes
 - a. Patient's medical history (comorbidities)
 - b. Patient allergies and medications (blood thinners, NSAIDs, steroids, etc)
 - c. Pain tolerance
 - d. Personal preferences and perception of condition
3. Clinician concerns
 - a. Clinician skill level and confidence
 - b. Time
 - c. Cost
 - d. Available resources
 - e. Potential for bleeding and complications
4. IND order state specific method?

III. Sharp Debridement

VII. PRACTICAL APPLICATIONS OF CONSERVATIVE SHARP DEBRIDEMENT

H. Combination Methods

1. Use of two or more types of debridement to facilitate faster or more effective results based on needs of the patient
2. **Ex:** Hard, black eschar; use whirlpool to soften followed by conservative sharp debridement to remove tissue then followed by enzymatic debridement to continue softening and debriding necrotic tissue until following day.

III. Sharp Debridement

VII. PRACTICAL APPLICATIONS OF CONSERVATIVE SHARP DEBRIDEMENT

I. Correcting Abnormal Wound Repair

1. Epiboly- wound edges become curled, impossible to heal when this exists

a. How to treat or correct

- (1) Clean area thoroughly.
- (2) Explain to patient that the procedure may burn slightly if they have sensation in the area.
- (3) Protect wound by placing saline moistened gauze in the wound bed
- (4) Protect periwound area using Vaseline or other topical product that will prevent silver nitrate damaging it.
- (5) Tissue that is going to be treated must be moist.
- (6) Roll silver nitrate stick along area of epiboly. This will turn epiboly tissue into necrotic tissue.
- (7) Leave silver nitrate in contact with the tissue for up to 2 minutes.
- (8) Rinse area thoroughly with normal saline to deactivate silver nitrate.
- (9) When done with procedure, apply same dressing as was previously covering wound.
- (10) Remove necrotic tissue during next treatment session.
- (11) Repeat procedure until wound edges are flat again.

III. Sharp Debridement

VII. PRACTICAL APPLICATIONS OF CONSERVATIVE SHARP DEBRIDEMENT

2. Hypergranulation

- a. Overgrowth or hypertrophy of granulation tissue behind the wound margins.
- b. Impedes re-epithelialization and wound closure
- c. How to treat and correct
 - (1) One method is the use of foam dressings. Simply apply foam to hypergranulated area, pushing hypergranulated tissue into wound bed, and wrapping with kerex.
 - (2) Second method is the use of silver nitrate in much the same manner used to treat epiboly.
 - (3) Cleanse wound and explain to patient that procedure may burn slightly.
 - (4) Roll silver nitrate stick over hypergranulated area.
 - (5) Tissue will turn grey and white.
 - (6) When done with procedure, apply same dressing as was previously done.
 - (7) Debride tissue during next treatment session.
 - (8) Repeat as needed until granulation tissue is even with the wound edges.

III. Sharp Debridement

VII. PRACTICAL APPLICATIONS OF CONSERVATIVE SHARP DEBRIDEMENT

J. Documenting the Debridement Session

1. Note description of wound before and after session

a. Location = note using anatomical landmarks; be specific

b. Measurement

- (1) Length X width X depth
- I. Length = 12:00 to 6:00 (head to toe)
- II. Width = 3:00 to 9:00 (side to side)
- III. Depth = distance from the visible surface to the deepest area of the wound

(2) Options

- I. Linear = using paper ruler or measuring device. Recommended method is Head to toe (length) and Side to Side (width) at perpendicular angle.
- II. Tracing = provides 2-dimensional record of wound; helpful if photography prohibited

III. Photography

- Very specific
- Requires consent/release form (example in appendix)
- Must ensure that lighting, angle and focal length are consistent
- Lay paper ruler next to wound with first initial, last name of patient, date and time photograph was taken, for every photograph.
- Controversial

c. Wound Bed Description

- (1) Types of tissue present
- (2) Color of tissues: Most common descriptors are red, yellow, black, pink, gray and white
- (3) Absence of tissues
- (4) Other structures: note presence of tendon, muscle, bone, sutures, staples, etc

III. Sharp Debridement

VII. PRACTICAL APPLICATIONS OF CONSERVATIVE SHARP DEBRIDEMENT

J. Documenting the Debridement Session

d. Surrounding Tissue

- (1) Must note the condition of periwound area: healthy, macerated, callus, ecchymosis, erythema, etc

e. Drainage/exudate

(1) Types

- i. Serous - clear
- ii. Sanguineous - red, bloody, fresh bleeding
- iii. Serosanguineous - pink, clear and bloody
- iv. Purulent - yellow, brown, or green, containing pus

(2) Amount

- i. None = dry wound bed
- ii. Scant = wound bed moist; no measurable exudate on dressing
- iii. Minimal/small = wound tissue moist; <25% of dressing
- iv. Moderate = wound tissue very moist; 50-75% of dressing
- v. Copious = wound tissue filled with fluid; >75% of dressing

f. Signs and symptoms of or absence of infection

- (1) IFEF signs: (Induration, fever, edema, and erythema)
- (2) Streaking, pain, increased exudate, delayed healing, odor (abnormal or foul)

g. Miscellaneous

- (1) Tunneling - channeling or passageway, extends in any direction, results in dead space
- (2) Sinus tract - drainage passageway from a deep focus of acute infection to surface opening
- (3) Undermining - destruction of tissue or erosion along the wound margins beneath intact skin

III. Sharp Debridement

VII. PRACTICAL APPLICATIONS OF CONSERVATIVE SHARP DEBRIDEMENT

J. Documenting the Debridement Session

2. Tools used

a. Be specific of the types of tools used during the session

b. Medicare prefers "Excisional extraction"

3. Amount and type of tissue debrided

4. Dressing (sterile) applied after treatment

III. Sharp Debridement

VIII. PERFORMING SHARP DEBRIDEMENT

K. Sterile Field Preparation

1. Used when sharp debridement is performed; a form of surgical asepsis designed to keep the area free from pathogens.

III. Sharp Debridement

VIII. PERFORMING SHARP DEBRIDEMENT

2. Procedure

- a. A nonabsorbent sterile towel, or the outer cover or wrapping of a package is used as a base for the sterile field. Open the package, folding the topmost part of the packaging away from your body. Next, open the next layer of wrapper to the sides. The last layer of wrapper is opened toward you to avoid reaching over the sterile field.
- b. Sterile objects may be added to the field carefully by peeling back the top layer of the outer package, and dropping the sterile item on the sterile field.
- c. Only take out the objects that have been specifically sterilized or sterile packaged can be considered sterile.

3. 4 Rules of Asepsis:

- a. Know which items are sterile
- b. Know which items are not sterile
- c. Separate sterile items from non-sterile items
- d. If a sterile item becomes contaminated, the situation must be remedied immediately. Contamination occurs any time a sterile item physically contacts a non-sterile item. It may be necessary to re-establish the sterile field.

III. Sharp Debridement

VIII. PERFORMING SHARPE DEBRIDEMENT

4. Guidelines for Maintaining a sterile field

- a. Do not talk, sneeze, cough or reach across a sterile field.
- b. Do not turn your back to a sterile field.
- c. Do not allow a non-sterile object to come in contact with a sterile object.
- d. Do not leave sterile field unattended, even if covered with a sterile towel.
- e. A 1-inch border at the edges of the field is considered to be non-sterile.
- f. The only sterile protective clothing that you wear is the gloves, the front of the gown above the waist, and both sleeves of the gown.
- g. When tools are stored in a disinfectant, they should be handles with the tip downward, so the fluid will not flow to a non-sterile area, and then back down.
- h. The field must remain dry, as moisture is a source of contamination.
- i. Try to position the tools in the order that they will be used and closest to you.
- j. Any item that falls or is located below the sterile field is considered contaminated.
- k. General cleanliness and proper hand-washing techniques should be practiced at all times!!!!

III. Sharp Debridement

VIII. Performing Sharp Debridement

L. Applying sterile gloves

1. Grasp edge of folded cuff
2. Lift and hold glove with fingers down
3. Pull first glove on with cuff folded
4. Slide fingers of gloved hand under cuff of second glove
5. Insert hand with cuff folded
6. Adjust gloves on both hands

M. Removing contaminated gloves

1. Invert glove as it is removed
2. Hold contaminated glove that was just removed in other gloved hand
3. Slide ungloved fingers under / inside gloved hand
4. Remove second glove onto other glove, inside out.

III. Sharp Debridement

VIII. Performing Sharp Debridement

N. Utensil Techniques

1. Pick-Ups

- a. Hold instrument between index finger and thumb, like a pencil
- b. Hold pick-up in the palm of hand utilizing index finger palm, and thumb

2. Scalpel

- a. Pencil hold
 - (1) Between index finger and thumb like a pencil.
- b. Palmar Technique (less control)
 - (1) Handle of scalpel runs along the palm of the hand

III. Sharp Debridement

VIII. Performing Sharp Debridement

O. Debridement Techniques

1. Paring or Shaving

- a. Typically used with removal of callus or eschar caps
- b. Clinician uses scalpel, usually in conjunction with a forceps to cut thin layers of devitalized tissue from a wound

2. Cross Hatching or Scoring

- a. Used to prepare eschar for enzymatic agents or hydrogel
- b. Clinician cuts a "checkerboard" pattern on eschar using scalpel
 - (1) Increases the surface area of eschar
 - (2) "Checkerboard" squares should be approx. 1/4 inch in size

3. Debridement

- a. Removal of necrotic tissue from wound using scalpels, scissors and/or forceps.
 - b. Clinician usually removing extensive amounts of necrotic tissue utilizing different instrument techniques being careful to not harm viable tissue
4. Demonstration of sharp debridement techniques (see Competency Checklist form)
 5. Return demonstration with check off

Clinical Decision Making Scenarios

Clinical Decision Making Scenarios

PATIENT SCENARIO #1

History

Patient is an 88 y.o. female who has resided in nursing home for several years and has recently developed a wound on her left LE. PMH includes atherosclerosis, HTN, venous insufficiency, right CVA with hemiplegia of left lower extremity and left upper extremity. Current medications include blood thinners, anti-hypertensives, and a diuretic. Edema noted in bilateral LE's. Pt. uses wheelchair for mobility; able to pivot transfer with assist.

Wound Assessment

Full thickness venous stasis ulcer on medial aspect of left lower leg measuring 6.7cm x 6.1cm x 0.4cm. Wound base is 75% yellow adherent slough and 25% pale red granulation tissue. No undermining noted. Large serosanguinous drainage. No odor noted. Attending physician's orders are for whirlpool followed by gauze and ABD pad dressing bid. Patient to have ace wraps applied to bilateral lower extremities.

Discussion Questions

Is current treatment appropriate

Concerns?

What other options could be considered?

Debridement?

Dressings?

Other?

Clinical Decision Making Scenarios

Clinical Decision Making Scenarios

PATIENT SCENARIO #2

History

68 y.o. male admitted with wound on plantar aspect of right foot under the heel. PMH significant for 100M, obesity, COPD and myocardial infarction approximately 2 years ago. Patient states currently taking meds for high cholesterol and HTN. Patient works part-time at Wal-Mart. Semmes-Weinstein is negative on entire plantar aspect of foot. Pt. referred with eval and treat orders. Current wound treatment daily whirlpool w/ hydrocolloid dressing.

Wound Assessment

Wound measures 2.2cm x 2.8cm x 0.6cm. Wound base is 50% eschar, 60% yellow slough. Moderate amount of purulent exudate noted. Foul odor noted. Callus around the perimeter of wound with erythema beyond the callus. Charcot foot bilaterally.

Discussion Questions

What type of wound is this?

What are your concerns regarding this patient's situation/wound?

What would your treatment plan consist of?

Clinical Decision Making Scenarios

Clinical Decision Making Scenarios

PATIENT SCENARIO #3

History

67 y.o. male with multiple pressure ulcers (left trochanter, sacrum and right heel). PMH, significant for myasthenia gravis, ASHD, malnutrition, and dementia. Pt. has a history of non-cooperative behavior. Family is considering placing patient on hospice. Current treatment for all wounds is wet to dry dressings bid.

Wound Assessment

Left Trochanter: 6.5cm x 4.1cm x 2.3cm. Tunneling at 8 o'clock 6.2cm deep. Wound base is 80% granulation and 10% yellow slough. Mild foul odor noted. Minimal serous drainage.

Sacrum: 5.8cm x 7.2cm x 2.4cm. Undermining from 1-8 o'clock with depth of 3cm. Wound base is 25% eschar, 25% gray slough and 60% clean non-granular tissue. Exposed bone noted in lower right quadrant. Epiboly noted at the wound edges from 1-8 o'clock. Moderate serosanguinous drainage. Mild foul odor noted.

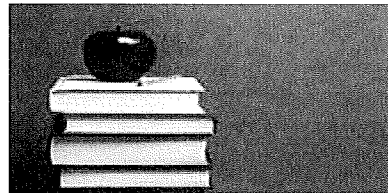
Right heel: 3.9cm x 3.7cm. Depth indeterminate secondary to necrotic tissue in wound bed. Wound base is 100% dry, black, leathery eschar. No drainage noted. Periwound skin normal and intact.

Discussion Questions

Concerns?

How would treat each ulcer?

Thank You!



XIV 陰圧閉鎖療法

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高度創傷管理技術講習会

陰圧閉鎖療法


2009年5月26日

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目的

- 褥瘡管理の基本としての陰圧閉鎖療法の適応を理解し安全に施行できる知識と技術を習得する。

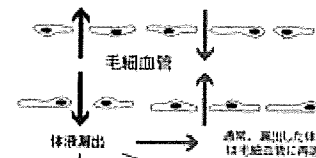


I. 基礎



1. 浸出液とは何か？

- 浸出液生成の基本的機序



約10%がリンパ系を介して血中に戻る

過剰な浸出した体液の90%は毛細血管に再吸収される


創傷がある場合はさらに浸出液が漏出し、その分が創傷に侵入して浸出液となる

回復期の創傷：浸出液の生成は時間とともに減少する
治癒遅延の創傷：炎症が持続し浸出液が過剰となる場合がある

出典
真田弘美監修・創傷浸出液およびドレッシング材の役割
A World Union of Wound Healing Societies' Principles of best practice: Wound exudate and the role of dressings. A consensus document. London: 1997, 2007

1. 浸出液とは何か？

- 浸出液の組成
 - 水
 - 電解質
 - 栄養素
 - 炎症性メディエーター
 - 白血球
 - タンパク分解酵素
 - (タンパク質メタロプロテアーゼ:MMP)など
 - 成長因子
 - 老廃物
など



1. 浸出液とは何か？

メディエーターとは

- さまざまな生体内の反応を媒介する一連の生物活性をもつ物質群の総称
- 生体内で産生される
 - 各種サイトカイン
 - 成長因子 (growth factor)
 - 脂質系メディエーター(エイコサノイド)
 - プロスタグランジン
 - ロイコトリエン など
 - PAF (platelet-activating factor) 接着因子
 - 血液凝固因子
 - 一酸化窒素
 - 活性酸素 (NO)
 - タンパク分解酵素 (MMP)
 - ヒスタミン
 - キニン
 - 神経伝達物質
 - 各種ホルモン

炎症性メディエーター

- 局所や全身の炎症反応を惹起促進するメディエーター
 - 炎症性サイトカイン
 - TNF
 - IL-1
 - IL-6
 - IL-8
 - 脂質系メディエーター
 - 種々の eA, C3a など
 - タンパク分解酵素
 - ヒスタミン
 - キニン
 - 活性酸素
 - 一酸化窒素
- 複雑なカスケード、ネットワークを形成して作用する
- カスケードの末端で放出され直接組織障害に関わるメディエーターを final mediator とよぶ
 - 活性酸素, MMP など