

***As a courtesy to those around you,
please silence your cell phone and
other electronic devices. Excessive
disturbances may result in you being
asked to rise and sing our national
anthem.***

Thank you for your cooperation

A Clinical Guide to Wound Assessment

***Chuck Gokoo, MD, CWS, FACCWS
Chief Medical Officer
American Medical Technologies***

Disclaimer

- ✦The information presented herein is provided for educational and informational purposes only. It is for the attendees' general knowledge and is not a substitute for legal or medical advice. Although every effort has been made to provide accurate information herein, laws change frequently and vary from state to state.
- ✦The material provided herein is not comprehensive for all legal and medical developments and may contain errors or omissions. If you need advice regarding a specific medical or legal situation, please consult a medical or legal professional. Gordian Medical, Inc. dba American Medical Technologies shall not be liable for any errors or omissions in this information.

Overview and Objectives

- ✦Describe the importance of wound assessment
- ✦Describe ulcer and periwound characteristics
- ✦Explain components of wound bed preparation

Assessment

Photodocumentation

- Informed consent/Authorization
- HIPAA compliant
- Criteria about who can take the photograph
- Method of validating individuals' competency to do photograph
- Frequency of revalidation of competence
- Frequency (serial photographs)
- Type of equipment used
- Chain of Trust - means to assure that digital images are accurate and not modified
- Inclusion of the residents identification (PIN), ulcer location, date taken, measurement grid and visible parameters for comparison



Distinguishing Arterial, Diabetic, & Venous Ulcers

Arterial Ulcers	Diabetic Ulcers	Venous Ulcers
Predisposing Factors		
<ul style="list-style-type: none"> • Peripheral vascular disease (PVD) • Diabetes mellitus • Advanced Age 	<ul style="list-style-type: none"> • Diabetic patient with peripheral neuropathy 	<ul style="list-style-type: none"> • Valve incompetence in perforating veins • History of deep vein thrombophlebitis and thrombosis • Previous history of ulcers • Obesity • Advanced age
Anatomic Location		
<ul style="list-style-type: none"> • Between toes or tips of toes • Over phalangeal heads • Around lateral malleolus • At sites subjected to trauma or rubbing of footwear 	<ul style="list-style-type: none"> • On plantar aspect of foot • Over metatarsal heads • Under heel 	<ul style="list-style-type: none"> • On medial lower leg and ankle • On malleolar area
Wound Characteristics		
<ul style="list-style-type: none"> • Even wound margins • Gangrene or necrosis • Deep, pale wound bed • Blanched or purpuric periwound tissue • Severe pain • Cellulitis • Minimal exudate 	<ul style="list-style-type: none"> • Even wound margins • Deep wound bed • Cellulitis or underlying osteomyelitis • Granular tissue present unless PVD is present • Low to moderate drainage 	<ul style="list-style-type: none"> • Irregular wound margins • Superficial wound • Ruddy, granular tissue • Usually no pain • Frequently moderate to heavy exudate
Patient Assessment		
<ul style="list-style-type: none"> • Thin, shiny, dry skin • Hair loss on ankle & foot • Thickened toenails • Pallor on elevation and dependent rubor • Cyanosis • Decreased temperature • Absent or diminished pulses 	<ul style="list-style-type: none"> • Diminished or absent sensation in foot • Foot deformities • Palpable pulses • Warm foot • Subcutaneous fat atrophy 	<ul style="list-style-type: none"> • Firm edema • Dilated superficial veins • Dry, thin skin • Evidence of healed ulcers • Periwound and leg hyperpigmentation • Possible dermatitis

Staff Proficiency

- ➔Ulcer(s) etiology
- ➔Predisposing factors
- ➔Anatomic location
- ➔Ulcer characteristics
- ➔Resident assessment
- ➔Document the clinical basis for determination that the ulcer is not pressure related

Assessment

- Evaluation includes verification and interpretation of the observations made
- Complement the clinical judgment in resident management
- Use of standardized risk assessment tool
- Assessment tools do not supplant regular staging, measurement, and a narrative description of the ulcer

Copyright 2011 Gordian Medical, inc. dba
American Medical Technologies.
www.amtwoundcare.com

8/23/2011

7

HATES-JENSEN WOUND ASSESSMENT TOOL NAME _____

Complete the rating sheet to assess wound status. Evaluate each item by picking the response that best describes the wound and entering the score in the next score column for the appropriate item.

Location: Anatomic site. Circle, identify right (R) or left (L) and use "X" to mark site on body diagram.
 --- Sacrum & coccyx --- Lateral ankle
 --- Trochanter --- Medial malleolus
 --- Dorsal tuberosity --- Heel --- Other Site _____

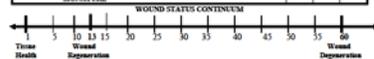
Shape: Overall wound pattern, scores by observing perimeter and depth.

Circle and draw appropriate description:
 --- Irregular --- Linear or elongated
 --- Round/oval --- Trapezoidal
 --- Square/rectangle --- Bimodal --- Other Shape _____



Item	Assessment	Date Score	Date Score	Date Score
1. Size	1 = Length x width < 4 sq cm			
	2 = Length x width 4-16 sq cm			
	3 = Length x width 16-36 sq cm			
	4 = Length x width 36-81 sq cm			
	5 = Length x width > 81 sq cm			
2. Depth	1 = Non-healed/ulceration on intact skin			
	2 = Partial thickness skin loss involving epidermis &/or dermis			
	3 = Full thickness skin loss involving damage or necrosis of subcutaneous tissue, may extend down to but not through underlying fascia, &/or muscle partial &/ full thickness &/ or tissue layers obscured by eschar/necrotic tissue			
	4 = Obscured by necrosis			
	5 = Full thickness skin loss with extensive destruction, tissue necrosis or damage to muscle, bone or supporting structures			
3. Edges	1 = Indistinct, diffuse, some clearly visible			
	2 = Distinct, regular clearly visible, attached, even with wound base			
	3 = Well-defined, not attached to wound base			
	4 = Well-defined, not attached to base, rolled up, thickened			
4. Undermining	1 = None present			
	2 = Undermining < 2 cm in any area			
	3 = Undermining 2-4 cm involving < 50% wound margin			
	4 = Undermining > 4 cm involving > 50% wound margin			
5. Necrotic Tissue Type	1 = None visible			
	2 = White/grey non-viable tissue &/or non-adherent yellow slough			
	3 = Lascally adherent yellow slough			
6. Necrotic Tissue Amount	1 = None visible			
	2 = < 17% of wound bed covered			
	3 = 17% to 50% of wound covered			
	4 = 50% and > 75% of wound covered			
7. Exposed Tissue	1 = None			

Item	Assessment	Date Score	Date Score	Date Score
8. Exudate Amount	1 = Bloody			
	2 = Serous/exudate, thin, watery, pale red/pink			
	3 = Serous, thin, watery, clear			
	4 = Purulent, thin or thick, opaque, tan/yellow, with or without odor			
	5 = Purulent, thin or thick, opaque, tan/yellow, with or without odor			
9. Skin Color Surrounding Wound	1 = None, dry wound			
	2 = Skin, wound moist but no observable moisture			
	3 = Small			
	4 = Moderate			
	5 = Large			
10. Peripheral Tissue Edema	1 = No swelling or edema			
	2 = Non-pitting edema extends < 4 cm around wound			
	3 = Non-pitting edema extends < 4 cm around wound			
	4 = Pitting edema extends < 4 cm around wound			
	5 = Crepitus and/or pitting edema extends > 4 cm around wound			
11. Perforation Infection	1 = None present			
	2 = Infection, < 2 cm around wound			
	3 = Infection 2-4 cm extending < 50% around wound			
	4 = Infection 2-4 cm extending > 50% around wound			
	5 = Infection > 4 cm in any area around wound			
12. Granulation Tissue	1 = Skin tone or partial thickness wound			
	2 = Single, bumpy red, < 75% of wound filled &/or some overgrowth			
	3 = Single, bumpy red, > 75% of wound filled &/or some overgrowth			
	4 = Pink, &/or dull, dusky red &/or fibrous > 75% of wound			
13. Epithelial Tissue	1 = 100% wound covered, no/low intact			
	2 = 75% to > 100% wound covered &/or epithelial tissue extends < 0.5cm into wound bed			
	3 = 50% to < 75% wound covered &/or epithelial tissue extends < 0.5cm into wound bed			
	4 = 25% to < 50% wound covered			
	5 = < 25% wound covered			
TOTAL SCORE				



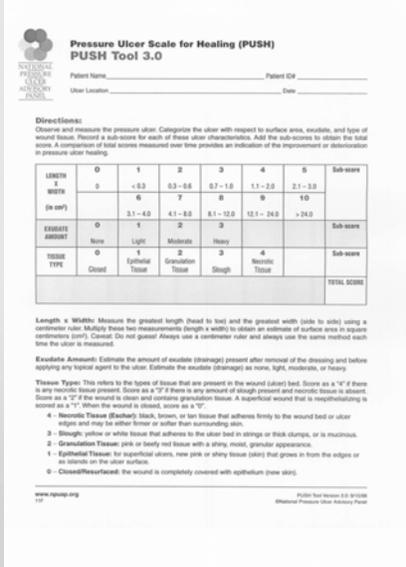
Plot the total score on the Wound Status Continuum by putting an "X" on the line and the date beneath the line. Plot multiple scores with their dates to see at a glance regeneration or degeneration of the wound.

© 2011 Gordian Medical, Inc.

Copyright 2011 Gordian Medical, inc. dba
American Medical Technologies.
www.amtwoundcare.com

8/23/2011

8



**Pressure Ulcer Scale for Healing (PUSH)
PUSH Tool 3.0**

Directions:
Observe and measure the pressure ulcer. Categorize the ulcer with respect to surface area, exudate, and type of wound tissue. Record a sub-score for each of these ulcer characteristics. Add the sub-scores to obtain the total score. A comparison of total scores measured over time provides an indication of the improvement or deterioration in pressure ulcer healing.

LENGTH (cm)	0	1	2	3	4	5	Sub-score
WIDTH (in cm)	0	<0.3	0.3-0.6	0.7-1.0	1.1-2.0	2.1-3.0	
		6	7	8	9	10	
EXUDATE AMOUNT	0	1	2	3			Sub-score
		None	Light	Moderate	Heavy		
TISSUE TYPE	0	1	2	3	4		Sub-score
		Closed	Epithelial Tissue	Granulation Tissue	SloUGH Tissue	Necrotic Tissue	
							TOTAL SCORE

Length x Width: Measure the greatest length (head to tail) and the greatest width (side to side) using a centimeter ruler. Multiply these two measurements (length x width) to obtain an estimate of surface area in square centimeters (cm²). Do not guess! Always use a centimeter ruler and always use the same method each time the ulcer is measured.

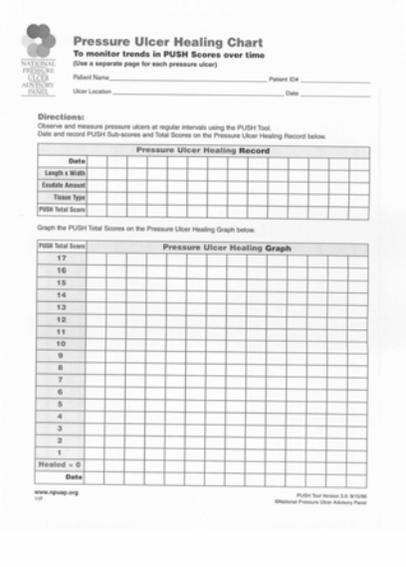
Exudate Amount: Estimate the amount of exudate (drainage) present after removal of the dressing and before applying any topical agent to the ulcer. Estimate the exudate (drainage) as none, light, moderate, or heavy.

Tissue Types: This refers to the types of tissue that are present in the wound (ulcer) bed. Score as a "4" if there is any necrotic tissue present. Score as a "3" if there is any amount of sloUGH present and necrotic tissue is absent. Score as a "2" if the wound is clean and contains granulation tissue. A superficial wound that is re-epithelializing is scored as a "1". When the wound is closed, score as a "0".

- 1 - Necrotic Tissue (Eschar): black, brown, or tan tissue that adheres firmly to the wound bed or ulcer edges and may be either firmer or softer than surrounding skin.
- 2 - SloUGH Tissue: yellow or white tissue that adheres to the ulcer bed in strips or thick clumps, or is mucinous.
- 3 - Granulation Tissue: pink or beefy red tissue with a shiny, moist, granular appearance.
- 4 - Epithelial Tissue: for superficial ulcers, new pink or shiny tissue (skin) that grows in from the edges or as islands on the ulcer surface.
- 0 - Closed/Resurfaced: the wound is completely covered with epithelium (new skin).

www.amt.org
139

Push Tool Version 3.0, 8/2008
©National Pressure Ulcer Advisory Panel



Pressure Ulcer Healing Chart
To monitor trends in PUSH Scores over time
(Use a separate page for each pressure ulcer)

Directions:
Observe and measure pressure ulcers at regular intervals using the PUSH Tool. Date and record PUSH Sub-scores and Total Scores on the Pressure Ulcer Healing Record below.

Pressure Ulcer Healing Record

Date:							
Length x Width							
Exudate Amount							
Tissue Type							
PUSH Sub-score							
PUSH Total Score							

Graph the PUSH Total Scores on the Pressure Ulcer Healing Graph below.

Pressure Ulcer Healing Graph

PUSH Total Score:							
17							
16							
15							
14							
13							
12							
11							
10							
9							
8							
7							
6							
5							
4							
3							
2							
1							
Healed = 0							

www.amt.org
139

Push Tool Version 3.0, 8/2008
©National Pressure Ulcer Advisory Panel

Copyright 2011 Gordian Medical, inc. dba
American Medical Technologies.
www.amtwoundcare.com

8/23/2011 9

Assessment

Comprehensive Assessment

- Consider all recumbent dependant or seated dependant residents or those whose inability to reposition to be at-risk
 - Multi-system organ failure or an end-of-life condition
 - Residents refusing care and treatment (why/alternatives notification, documentation)
- Address those factors having an impact on the development, treatment and/or healing of ulcers
 - Reduce the degree and/or duration of pressure to which a resident is exposed
 - Tissue damage due to immobility or illness prior to admission
 - Skin condition on admission
- Identify pre-existing signs (Deep Tissue Injury)
 - Wound characteristics at the time of admission (if present)
 - Previous history of ulcers measures

Copyright 2011 Gordian Medical, inc. dba
American Medical Technologies.
www.amtwoundcare.com

8/23/2011 10

Assessment

Comprehensive Assessment

➔Residents having no signs of progression toward healing within 2 to 4 weeks:

- Review documentation
- Ulcer characteristics
- Resident's condition
- Complications
- Time needed to determine the effectiveness of a treatment

➔Facility's efforts to remove, modify or stabilize the risk factors and underlying causal factors

Pain

Pain Assessment (WILDA)

➔What does the pain feel like

- When possible, allow the resident to chose their own words to describe the pain
- Sharp/dull/stabbing/burning/crushing

➔Intensity of pain using valid tool (Numeric/VAS/Verbal)

- How severe is the pain on a scale of 0 - 10
- How much does it hurt when it is the worst
- How much does it hurt when it is the best

➔Location of pain (all sites)

- Is it in one place
- Does it go anywhere else
- Did it start elsewhere and has it now moved to one spot

Pain

Pain Assessment (WILDA)

➔Duration and frequency of pain (constant/intermittent)

- When did the pain start
- How often does it occur
- Has its intensity changed
- How long does it last

➔Aggravating and alleviating factors (better or worse)

- What causes the pain
- What makes it better
- What makes it worse
- What has been effective in reducing the pain in the past

Pain

➔Non Verbal Resident

- Aphasic
- Language barrier

➔Define specific treatment goals and risks

- Optimal pain control with minimal side effects
- Assessment of benefits and risks of pain medications resident-centered
- Determine the best combination of pain assessment tools to use



Pain

Observation

↔ **Vocalization of pain**

- Constant muttering
- Moaning/groining

↔ **Breathing**

- Strenuous
- Labored
- Negative noise on inhalation or expiration

↔ **Pained facial expression**

- Clenched jaw
- Troubled or distorted face
- Crying

↔ **Body language**

- Clenched fist
- Wringing of the hands
- Strained and inflexible position
- Rocking

↔ **Movement**

- Restless
- Altered gait
- Forceful touching
- Rubbing of body parts

Pain

↔ **Develop quantifiable objectives for the highest level of functioning the resident may be expected to attain, based on the comprehensive assessment:**

- Type/quantity of pain
- Consequences of unrelieved pain
- Pharmaceuticals
- Dosing
- Understanding addiction and tolerance

↔ **Control measures**

- Effective medication
- Therapeutic positioning
- Support surfaces
- Non-pharmacological interventions (comfort touch, active listening/distraction, relaxation, imagery, music)

Ulcer Cleansing

Cleansing

→ Completed at each dressing change

→ Clean with non-cytotoxic non-irritating cleanser

-Normal saline is considered the most appropriate solution

→ Do not use skin cleansers or antiseptics

→ Use appropriate irrigation pressure between 4 - 15 psi

-35 cc syringe with 19-gauge soft tipped catheter (delivers 8 psi) >15 psi may drive wound fluid & debris into wound

→ Ulcer bed pH 5.6-6.8



Copyright 2011 Gordian Medical, inc. dba
American Medical Technologies.
www.amtwoundcare.com

8/23/2011

17

Area Measurements

Length/Width/Depth

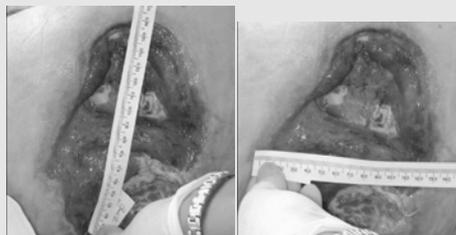
→ Must be taken in a consistent manner to be accurate and repeatable

→ Multiple measurements

-Averaged to determine the length/width/depth

→ Depth cannot be measured if debris or necrotic material cover the ulcer

→ Use centimeters, millimeters (cm²/cm³)



Copyright 2011 Gordian Medical, inc. dba
American Medical Technologies.
www.amtwoundcare.com

8/23/2011

18

Staging

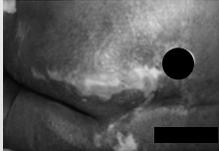
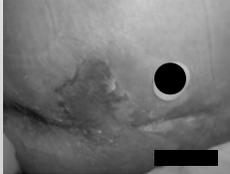
Category/Stage I PrU

- Intact skin with non-blanchable redness of a localized area, usually over a bony prominence



Category/Stage II PrU

- Partial-thickness loss of dermis presenting as a shallow open ulcer with a red-pink wound bed without slough
- May present as an intact or open/ruptured serum-filled blister
- A Stage II ulcer also may present as a shiny or dry shallow ulcer without slough or bruising.* This stage should not be used to describe skin tears, tape burns, perineal dermatitis, maceration, or excoriation.

* *Bruising indicates susp*

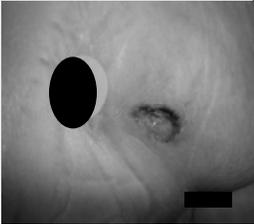
Copyright 2011 Gordian Medical, inc. dba
American Medical Technologies.
www.amtwoundcare.com

8/23/2011 19

Staging

Category/Stage III PrU

- Full-thickness tissue loss
- Subcutaneous fat may be visible (fascia)
- No visible muscle/tendon/bone
- Necrotic tissue may be present but does not obscure the depth of tissue loss
- Undermining and tunneling



Category/Stage IV PrU

- Full-thickness tissue loss
- Exposed muscle/tendon/bone
- Slough or eschar may be present on some parts of the ulcer bed
- Undermining and tunneling



Copyright 2011 Gordian Medical, inc. dba
American Medical Technologies.
www.amtwoundcare.com

8/23/2011 20

NPUAP Definitions

Unstageable

Necrotic Tissue

→ Eschar tissue

-Thick leathery type of tissue ranging in color from brown to black

→ Slough

-Devitalized tissue in the process of separating from the viable portions of the tissue

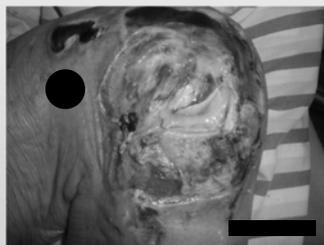
-Stringy, moist, light-colored

-Confused with fibrin

-Stage II PrUs do not have necrotic tissue

→ Debride or dressing

→ sDTI



Copyright 2011 Gordian Medical, inc. dba
American Medical Technologies.
www.amtwoundcare.com

8/23/2011

21

Venous Insufficiency Classification

→ Clinical signs: (0-6), supplemented by (A) for asymptomatic and (S) for symptomatic patients

-Class 0 No visible or palpable signs of venous disease

-Class 1 Telangiectasias or reticular veins

-Class 2 Truncal varicose veins and their branches

-Class 3 Edema

-Class 4 Skin changes ascribed to venous disease (e.g., pigmentation, stasis eczema, dermatoliposclerosis)

-Class 5 Skin changes as defined above with healed ulceration

-Class 6 Skin changes as defined above with active ulceration

→ Etiology classification: congenital, primary, secondary

→ Anatomic distribution: superficial (S)/deep (D)/perforating veins (P)/combinations

→ Pathophysiologic dysfunction: reflux or obstruction, alone or in combination

Copyright 2011 Gordian Medical, inc. dba
American Medical Technologies.
www.amtwoundcare.com

8/23/2011

22

Venous Insufficiency Classification



C(2) E (p) A (s, p) P (r)



C (4) E (p) A (s, p) P (r)

Diabetic Ulcers Classification

Table 3. Wagner Classification System

Grade	Lesion
0	No open lesions: may have deformity or cellulitis
1	Superficial ulcer
2	Deep ulcer to tendon or joint capsule
3	Deep ulcer with abscess, osteomyelitis or joint sepsis
4	Local gangrene — forefoot or heel
5	Gangrene of entire foot

Adapted from Wagner FW. The dysvascular foot: a system for diagnosis and treatment. *Foot Ankle*. 1981;2:64-122.

Treatment

- ➔0 - antibiotic, prophylactic surgery
- ➔1 - antibiotic, soft tissue and bone evaluation, debridement
- ➔2 - antibiotic, soft tissue and bone evaluation, debridement
- ➔3 - antibiotic, soft tissue and bone evaluation, debridement, resection, amputation
- ➔4 - amputation
- ➔5 - high amputation

Wagner and Meggitt 1970

Ulcer Characteristics

A precise description of the ulcer

Location - anatomical terms

Area - L x W x D

Odor - type/amount

Sinus Tract - blind bursa sac

Tunneling - small tissue loss and possible deep

Undermining - large tissue loss extending laterally

Exudate - Type/amount

Necrotic Tissue - Eschar/slough tissue (type/amount)

Granulation Tissue - healthy ground matrix

Epithelialization - resurfacing of a denuded area



8/23/2011

Copyright 2011 Gordian Medical, inc. dba
American Medical Technologies.
www.amtwoundcare.com

25

Periulcer Characteristics

➔ **Ulcer Edge - color, thickness, attachment and rolling of the edges**

➔ **Edema - amount of fluid in the interstitial space, associated with venous disease**

➔ **Erythema - diffuse redness of the skin due to vasodilatation**

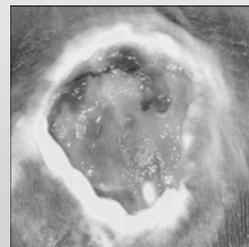
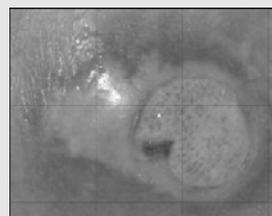
➔ **Induration - abnormal firmness of tissue with a definite border**

➔ **Maceration - softening of tissue due to abundance of fluid in the tissue**

➔ **Desiccation - drying of the skin**

➔ **Callous Formation - thickening of the skin edge, typically seen with arterial disease**

➔ **Hair Distribution - promotes epithelialization in partial-thickness ulcers**



8/23/2011

Copyright 2011 Gordian Medical, inc. dba
American Medical Technologies.
www.amtwoundcare.com

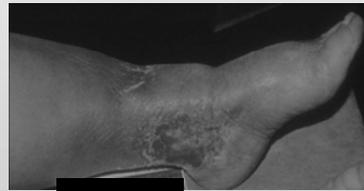
26

Ulcer Characteristics

Venous Insufficiency Ulcer

➔Lipodermatosclerosis

- Deposition of hemosiderin in the skin
- Discoloration of the skin (brownish color)
- Conversion to scar tissue
- Induration due to fibrosis of the subcutaneous fat
- May be confused with cellulitis/dermatitis
- Severe pain above the malleolus
- Warmth/tender/ hot/painful



8/23/2011

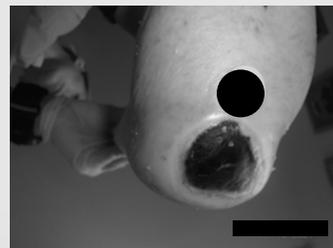
Copyright 2011 Gordian Medical, inc. dba
American Medical Technologies.
www.amtwoundcare.com

27

Ulcer Characteristics

Diabetic Foot Ulcer

- ➔Pressure build up: a callus is usually present
- ➔Black, intact, stable heel
- Pad and protect
- ➔Thickening of the skin results in cracking of the skin
- ➔Atrophy of the subcutaneous fatty tissue
- ➔Infection/gangrene



8/23/2011

Copyright 2011 Gordian Medical, inc. dba
American Medical Technologies.
www.amtwoundcare.com

28

“Suspected” Deep Tissue Injury

- ➔ Pressure-related injury to the subcutaneous tissues under intact skin
- ➔ Initially the area may appear as a white waxy area
- ➔ Deep bruise
- ➔ Demarcation
 - 7 days from the early signs of redness
 - Spontaneous “skin slippage” occurs on days 9-11
 - Mature brown/black eschar forms on days 14-15
 - Red - ischemia
 - Purple - infarction
 - Black - necrotic



8/23/2011

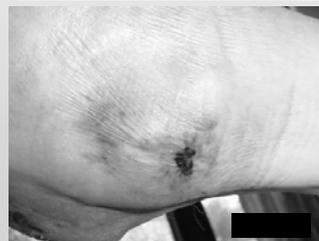
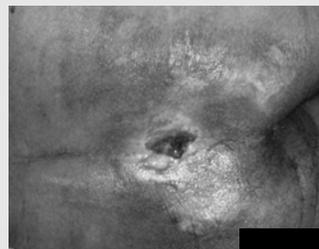
Copyright 2011 Gordian Medical, inc. dba
American Medical Technologies.
www.amtwoundcare.com

29

Deep Tissue Injury

POC of Deep Tissue Injury

- ➔ Capillary refill assessed q8h x 24 hours
- ➔ Immediate, constant pressure relief (tissue off-loading, positioning, support surface)
- ➔ If tissue is intact, protect with dressing and possible wrap
- ➔ Monitor for skin opening
- ➔ Monitor for deterioration
- ➔ Modify plan as needed
- ➔ Notification of appropriate referrals
- ➔ Documentation



8/23/2011

Copyright 2011 Gordian Medical, inc. dba
American Medical Technologies.
www.amtwoundcare.com

30

Deep Tissue Injury

Documentation

➔DTI is generally “unstageable” as the wound base is not visible

➔NPUAP recommends:

-“DTI under intact skin”

-“DTI in evolution”

➔Include risk factors, interventions, turning schedule, etc.



8/23/2011

Copyright 2011 Gordian Medical, inc. dba
American Medical Technologies.
www.amtwoundcare.com

31

Terminal Ulcer

➔Cause is unknown

➔Possible the result of a perfusion deficit exacerbated by multi-system failure

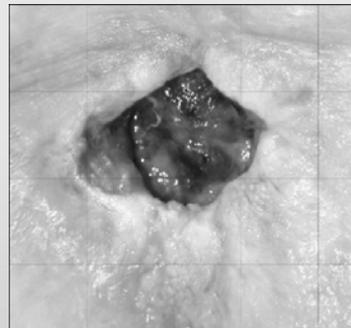
➔Rapid breakdown of the skin

➔Palliative treatment

-Pressure redistribution/pain relief/odor control

➔Aggressive treatment

-May be reserved in accordance with the family wishes of “aggressive or non-aggressive” intervention



8/23/2011

Copyright 2011 Gordian Medical, inc. dba
American Medical Technologies.
www.amtwoundcare.com

32

Bioburden

Contamination

- ➔ Presence of non replicating bacteria at a ulcer site

Colonization

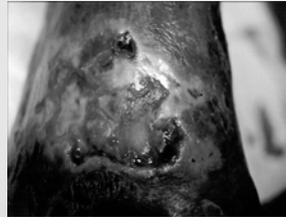
- ➔ Presence of replicating bacteria at a ulcer site
- Not causing harm or injury to the host

Critical Colonization

- ➔ Bioburden level interferes with healing
- Does not produce the classic signs and symptoms of infection

Infection

- ➔ Deposition and multiplication of bacteria in the tissue
- Results in host response that leads to non healing or a decline in the ulcer



8/23/2011

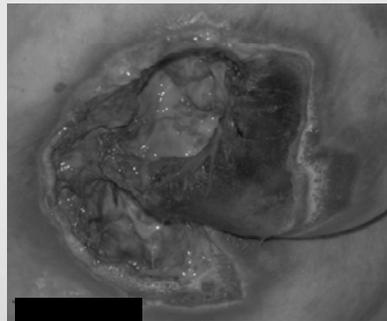
Copyright 2011 Gordian Medical, inc. dba
American Medical Technologies.
www.amtwoundcare.com

33

Bioburden

Local Signs of Infection

- ➔ Erythema
- ➔ Warmth
- ➔ Edema
- ➔ Induration
- ➔ Pain
- ➔ Purulent drainage
- ➔ Crepitation
- ➔ Foul odor
- ➔ Pocketing at the base of the wound
- ➔ Discolored/friable granulation tissue



8/23/2011

Copyright 2011 Gordian Medical, inc. dba
American Medical Technologies.
www.amtwoundcare.com

34

Infection

Types of Infection

- Abscess
- Cellulites
- Osteomyelitis
- Gangrene



8/23/2011

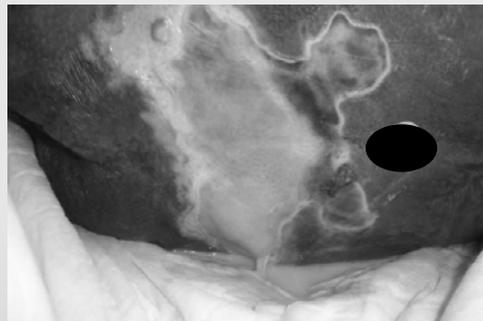
Copyright 2011 Gordian Medical, inc. dba
American Medical Technologies.
www.amtwoundcare.com

35

Infection

Abscess

- Involves the fascia or tendon tissue
- Treatment
 - Incise and drain
 - Debridement of necrotic/infected tissue
 - Tissue graft may be necessary
 - Antibiotics therapy is variable



8/23/2011

Copyright 2011 Gordian Medical, inc. dba
American Medical Technologies.
www.amtwoundcare.com

36

Infection

Cellulites

- Most common soft tissue infection
- Signs and symptoms
 - Warmth/swelling/tenderness/erythema/fever
- Rule of 2 (cm)
 - Mild/moderate/severe
- Usually caused by Group A streptococcus
- Treatment
 - Oral antibiotic for localized infection
 - Hospitalization with IV antibiotics for spreading cellulitis



8/23/2011

Copyright 2011 Gordian Medical, inc. dba
American Medical Technologies.
www.amtwoundcare.com

37

Infection

Osteomyelitis

- Involves toes and small bones of the foot
- Associated with a non-healing or a recurring ulcer
- Local signs include swelling and erythema
- Severity of infection
 - Visible or palpable bone implies an 85% chance of osteomyelitis
- Treatment
 - Bacterial culture
 - Debridement of necrotic tissue/bone
 - Hospitalization with IV antibiotics may be required



8/23/2011

Copyright 2011 Gordian Medical, inc. dba
American Medical Technologies.
www.amtwoundcare.com

38

Infection

Gangrene

→ "Dry"

-Due to loss of arterial blood supply to the tissue or part

→ "Wet "

-Infectious component and requires surgical debridement and/or antimicrobial therapy to control the infection

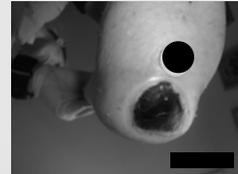
→ "Fetid foot"

-Combined infection involving bone and soft tissue

Treatment

→ Debridement of necrotizing fasciitis

→ Vascular reconstruction if possible



8/23/2011

Copyright 2011 Gordian Medical, inc. dba
American Medical Technologies.
www.amtwoundcare.com

39

Infection

→ Tissue biopsy

-Most definitive method of quantifying bacteria

→ Clinical infection

≥100,000 (10⁵) cfo or bacteria/gm of tissue or ml of fluid is indicative of infection

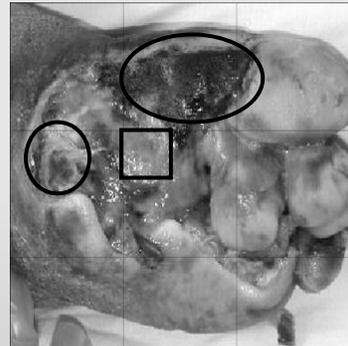
→ Culture

-If changes in appearance occur resulting in local signs of infection or if systemic signs resulting in sepsis occur

→ Do not be routinely culture

-Ulcers are contaminated

Levine swab culture



8/23/2011

Copyright 2011 Gordian Medical, inc. dba
American Medical Technologies.
www.amtwoundcare.com

40

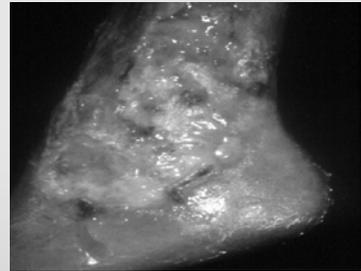
Infection

$$\text{Infection} = \frac{\text{Dose} \times \text{Virulence}}{\text{Host resistance}}$$

Host Resistance

→ Factors influencing host resistance

- Age
- Vascular disease
- Diabetes mellitus
- Poor nutritional status
- Smoking
- Immunosuppression/use of steroid medications



8/23/2011

Copyright 2011 Gordian Medical, inc. dba
American Medical Technologies.
www.amtwoundcare.com

41

Antimicrobial Therapy

→ Povidone - Iodine Agents

- Drying agent
- Fibroblast toxicity

→ Sodium Hypochlorite Solution

- Dakin's - 0.025% -0.054%
- Collagen degradation

→ Acetic Acid

- Fibroblast toxicity

→ Hydrogen Peroxide (H₂O₂)

- 3% solution
- Poor antimicrobial affect

→ Nitrofurazone

- Slows epithelialization
- Propylene glycol - renal failure

→ Silver Sulfadiazine

- Antimicrobial affect
- Transient leukopenia (neutropenia with white cell depression)

→ Petrolatum

- Slows epithelialization

8/23/2011

Copyright 2011 Gordian Medical, inc. dba
American Medical Technologies.
www.amtwoundcare.com

42

Debridement

Debridement

➔ Removal of dead or devitalized tissue

- Sharp (surgical)
- Mechanical (wet-to-dry/whirlpool/pulsed lavage)
- Enzymatic (chemical/bacterial)
- Autolytic (ulcer fluid)
- Biodebridement (maggot therapy)

➔ Excessive debridement

- Can result in a reinstatement of the inflammatory process with an influx of inflammatory cytokines



Copyright 2011 Gordian Medical, inc. dba
American Medical Technologies.
www.amtwoundcare.com

8/23/2011

43

Moisture-Associated Skin Damage

MASD

➔ Incontinence-associated dermatitis

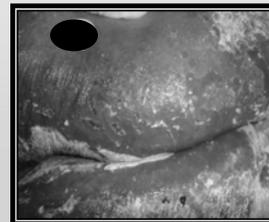
- Intertriginous dermatitis
- Periwound moisture-associated dermatitis
- Peristomal moisture-associated dermatitis

➔ Bile acids and enzymes in feces

➔ Urea converted to ammonia

Treatment

- ➔ Use non-alcohol based moisturizers
- ➔ Establish continence training
- Bowel or bladder training programs
- ➔ Avoid skin contact with plastic surface to reduce sweating
- Maceration, friction, shear



Copyright 2011 Gordian Medical, inc. dba
American Medical Technologies.
www.amtwoundcare.com

8/23/2011

44

Skin Integrity

Maintenance

➔Daily skin inspections

- Over bony prominences
- Assess for compromised peripheral circulation

➔Promote skin hygiene

- Cleanse skin after soiling with saline and skin cleanser
- Avoid alkaline agents which increase skin irritation
- Reduce skin pH to avoid bioburden build up and risk of infection
- Use skin protectants or barriers
- Do not massage or rub over bony prominences



Copyright 2011 Gordian Medical, inc. dba
American Medical Technologies.
www.amtwoundcare.com

8/23/2011

45

Ulcer Dressing

Resident/Patient

- ➔Medical status (Immunocompromised)
- ➔Vascular status (arterial/venous)
- ➔Adherence (education)

Ulcer and Periwound Characteristics

- ➔Safe (hypoallergenic)
- ➔Therapeutic benefit
 - Exudate control , decrease pain, promote granulation tissue repair and epithelialization, prevent necrotic tissue formation
- ➔Cost-effective
 - Easy to apply and remove
 - Frequency of dressing change



Copyright 2011 Gordian Medical, inc. dba
American Medical Technologies.
www.amtwoundcare.com

8/23/2011

46

Ulcer Dressing

Decision Tree (MEASURES)

- Decisions in selection should be based on the resident, the wound/ulcer characteristics, and the efficacy of the dressing
- Minimize trauma to wound bed
- Eliminate dead space
- Assess and manage exudate
- Support the body's tissue defense system
- Use non-toxic wound cleansers
- Remove bacteria, debris, necrotic tissue
- Environment maintenance - thermal insulation and moist wound bed
- Surrounding tissue - protect from injury and bacteria
- Education for all staff involved

Types

- Gauze
- Transparent films
- Hydrocolloid
- Hydrogel
- Alginates
- Foam
- Composite
- Collagen
- Debriders
- Hydrofibres
- Ionic Silver
- Biologicals

8/23/2011

Copyright 2011 Gordian Medical, inc. dba
American Medical Technologies.
www.amtwoundcare.com

47

Ulcer Dressing

Amount of Drainage

Light ←————→ **Heavy**

Thin Film

Hydrogel

Gauze

Hydrocolloid

Collagen

Hydrofiber

Foam (primary)

Calcium Alginate

8/23/2011

Copyright 2011 Gordian Medical, inc. dba
American Medical Technologies.
www.amtwoundcare.com

48

In Closing

→Ulcer care includes a variety of information that reflects the ulcer status during healing. Providing an accurate description of the skin and ulcer characteristics is critical for all residents. These findings will help the clinician devise and revise the plan of care and treatment strategies over time, based on the current status of the ulcer.

Thank you
Questions?

References

- ✦Cohen K, Diegelmann RF, Yager DR, et al: Wound Care and Wound Healing. In: Schwartz SI, Shires GT, Spencer FC, Daly JM, Fischer JE, Galloway AC, eds. Principles of Surgery. 7th ed. New York, NY: McGraw-Hill; 263-96, 1999.
- ✦CMA Manual System, Publication 100-07 State Operations, Provider Certification, Guidance to Surveyors for Long Term Care Facilities. November 12, 2004.
- ✦Cuddigan J, Ayello EA, Sussman C, Baranoski S, (Eds) (2001) Pressure Ulcers in America: Prevalence, Incidence and Implication for the Future. National Pressure Ulcer Advisory Panel Monograph (pp.181). Reston VA: NPUAP.
- ✦Fleck C, Differentiating MMPs, Biofilms, Endotoxins, Exotoxins and /Cytokines Advances in Skin & Wound Care. , 2006; 19(2):77-81, Mar.

8/23/2011

Copyright 2011 Gordian Medical, inc. dba
American Medical Technologies.
www.amtwoundcare.com

51

References

- ✦Ayello EA, Baranoski S, Kerstein MD, & Cuddigan J, (2003) Wound Debridement. In Baranoski S & Ayello EA, eds) Wound Care Essentials: Practice Principles. Philadelphia, PA: Lippincott Williams & Wilkins.
- ✦CMA Manual System, Publication 100-07 State Operations, Provider Certification, Guidance to Surveyors for Long Term Care Facilities. (2004). November 12.
- ✦Bergstrom N, Bennett MA, Carlson CE, et al., (1994) Treatment of Pressure Ulcers Adults (Publication 95-0652). Clinical Practice Guidelines, 15, Rockville, MD: U.S. Department of Health and Human Services, Agency for Health Care Policy and Research.
- ✦Kingsley A. A Proactive approach to wound infection. Nursing Standard. 2001; 15(30):50-58.

8/23/2011

Copyright 2011 Gordian Medical, inc. dba
American Medical Technologies.
www.amtwoundcare.com

52

References

- ✦Kjaer ML, Mainz J, Soerensen LT, et al. Clinical Quality Indicators of Venous Leg Ulcers: Development, Feasibility, and Reliability. *Ostomy/Wound Management*. 2005; 51:64-74.
- ✦Levenson SA, (2005) Medical Director and Attending Physicians Policy and Procedure Manual for Long Term Care. Dayton, Ohio: MedPass.
- ✦Maklebust J, & Sieggreen, M, *Pressure Ulcers: Guidelines for Prevention and Management* (3rd ed., pp. 49). Springhouse, PA: Springhouse, 2001.
- ✦Posthauer, ME, Hydration: Does It Play a Role in Wound Healing? *Advances in Skin & Wound Care*. 2006; Mar, 19(2):74-76.
- ✦Krasner DL, Sibbald RG, SCALE: Skin Changes At Life's End Final Consensus Statement . *JWOC*.2009;36(3S):S33.