Wound Assessment and Measurement

Content Creators:
Members of the South West Regional Wound Care Program's
Clinical Practice and Knowledge Translation Learning Collaborative

Learning Objectives

1. Explain the importance and frequency of accurate wound assessments

2. Describe common data collection and documentation forms, and why and how to use them

3. Understand how to assess common wound characteristics

WOUND ASSESSMENT AND DATA COLLECTION AND DOCUMENTATION

What is Wound Assessment?

- Systematic process of assigning numbers or grades to the wound/wound characteristics during an examination. This process includes:
  - Tests:
    - Wound/wound characteristics are measured/assessed
  - Examination:
    - Process of determining the values of the tests
  - Evaluation:
    - Process of making clinical judgments based on the data obtained from the exam

Wound Assessment:

- Purpose:
  - Examine the severity of the wound
  - Determine the status of wound healing
  - Establish a baseline for the wound
  - Prepare a plan of care
  - Report observed changes in the wound over time

Wound Assessment

Recording method should allow for tracking of each assessment item over time, in objective terms and show the changes in the wound status, including:

- Periwound skin attributes
- Wound tissue attributes
- Wound exudate characteristics

Examples of valid, reliable wound healing tools:

- Pressure Ulcer Scale for Healing (PUSH)
- Bates-Jensen Wound Assessment Tool (BWAT)
- Photographic Wound Assessment Tool (PWAT)

Pressure Ulcer Scale for Healing (PUSH Tool)

- Developed by the National Pressure Ulcer Advisory Panel (NPUAP) 1996 to address practice of back staging pressure ulcers

- Tool assesses three components:
  - Surface area measurement (scored from 0-10)
  - Exudate amount [scored from 0 (none) to 3 (heavy)]
  - Tissue type [scored from 0 (closed) to 4 (necrotic tissue)]

PUSH Tool Continued

- To ensure consistency, definitions for each scored item are found at the bottom of the tool
- Studies have found the tool to have content validity, correlation validity, prospective validity, and is sensitive to change[1-4]
- Tool has been validated to assess healing of venous and diabetic foot ulcers in addition to pressure ulcers[5]

PUSH Tool 3.0

Pressure Ulcer Scale for Healing (PUSH)

PUSH Tool 3.0

Patient Name_____ Patient ID# _____

Ulcer Location _____ Date _____

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 X WIDTH (in cm^2)	**0** 0	**1** < 0.3	**2** 0.3 – 0.6	**3** 0.7 – 1.0	**4** 1.1 – 2.0	**5** 2.1 – 3.0	**Sub-score**
		6 3.1 – 4.0	**7** 4.1 – 8.0	**8** 8.1 – 12.0	**9** 12.1 – 24.0	**10** > 24.0	
EXUDATE AMOUNT	**0** None	**1** Light	**2** Moderate	**3** Heavy			**Sub-score**
TISSUE TYPE	**0** Closed	**1** Epithelial Tissue	**2** Granulation Tissue	**3** Slough	**4** Necrotic Tissue		**Sub-score**
							TOTAL SCORE

Length x Width: Measure the greatest length (head to toe) 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 (cm^2). Caveat: 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 Type: 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 reepithelializing is scored as a "1". When the wound is closed, score as a "0".

- 4 – **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.
- 3 – **Slough:** yellow or white tissue that adheres to the ulcer bed in strings or thick clumps, or is mucinous.
- 2 – **Granulation Tissue:** pink or beefy red tissue with a shiny, moist, granular appearance.
- 1 – **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).

Bates-Jensen Wound Assessment Tool (BWAT)

- Evaluates 13 wound characteristics with a numerical rating scale and rates from best (1) to worst (5)
- Total score ranges from 13 (skin closed) to 65 (profound tissue degeneration) – watch total score to see if wound healing or not
- Valid and reliable tool which has evolved to include measuring and predicting wound healing[6]

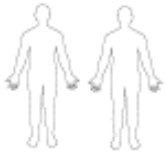
BWAT Tool

BATES-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 item score column for the appropriate date.

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 ankle
___ Ischial tuberosity ___ Heel Other Site



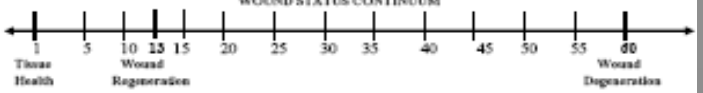
Shape: Overall wound pattern; assess by observing perimeter and depth.

Circle and date appropriate description:

___ Irregular ___ Linear or elongated
___ Round/oval ___ Bowl/boat
___ Square/rectangle ___ Butterfly 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 16.1–<36 sq cm 4 = Length x width 36.1–<80 sq cm 5 = Length x width >80 sq cm			
2. Depth	1 = Non-blanchable erythema 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 mixed partial & full thickness &/or tissue layers obscured by granulation 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, none clearly visible 2 = Distinct, outline clearly visible, attached, even with wound base 3 = Well-defined, not attached to wound base 4 = Well-defined, not attached to base, rolled under, thickened 5 = Well-defined, fibrotic, scarred or hyperkeratotic			
4. Undermining	1 = None present 2 =Undermining < 2 cm in any area 3 = Undermining 2-4 cm involving < 50% wound margins 4 = Undermining 2-4 cm involving > 50% wound margins 5 = Undermining > 4 cm or Tunneling in any area			
5. Necrotic Tissue Type	1 = None visible 2 = White/gray non-viable tissue &/or non-adherent yellow slough 3 = Loosely adherent yellow slough 4 = Adherent, soft, black eschar 5 = Firmly adherent, hard, black eschar			
6. Necrotic Tissue Amount	1 = None visible 2 = < 25% of wound bed covered 3 = 25% to 50% of wound covered 4 = > 50% and < 75% of wound covered 5 = 75% to 100% of wound covered			
7. Exudate Type	1 = None			
8. Exudate Amount	1 = None, dry wound 2 = Scant, wound moist but no observable exudate 3 = Small 4 = Moderate 5 = Large			
9. Skin Color Surrounding Wound	1 = Pink or normal for ethnic group 2 = Bright red &/or blanches to touch 3 = White or gray pallor or hypopigmented 4 = Dark red or purple &/or non-blanchable 5 = Black or hyperpigmented			
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. Peripheral Tissue Induration	1 = None present 2 = Induration, < 2 cm around wound 3 = Induration 2-4 cm extending < 50% around wound 4 = Induration 2-4 cm extending ≥ 50% around wound 5 = Induration > 4 cm in any area around wound			
12. Granulation Tissue	1 = Skin intact or partial thickness wound 2 = Bright, beefy red; 75% to 100% of wound filled &/or tissue overgrowth 3 = Bright, beefy red; < 75% & > 25% of wound filled 4 = Pink, &/or dull, dusky red &/or fills ≤ 25% of wound 5 = No granulation tissue present			
13. Epithelialization	1 = 100% wound covered, surface intact 2 = 75% to <100% wound covered &/or epithelial tissue extends >0.5 cm into wound bed 3 = 50% to <75% wound covered &/or epithelial tissue extends to <0.5 cm into wound bed 4 = 25% to < 50% wound covered 5 = < 25% wound covered			
	TOTAL SCORE			
	SIGNATURE			

WOUND STATUS CONTINUUM



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.

South West Regional Wound Care Program

Photographic Wound Assessment Tool (PWAT)

- Consists of 6 items: edges, necrotic tissue type, necrotic tissue amount, skin color surrounding wound, granulation tissue, and epithelialization
- Can be used with a wound photograph and therefore very versatile
- Valid, reliable, and responsive[7-9]

PWAT

Photographic Wound Assessment Tool
PWAT – Revised

Item	Assessment			Score
1. Size	0 = wound is closed (skin intact) or nearly closed (<0.3cm^2) 1 = 0.5 – 2.0 cm^2 2 = 2.0 - 10.0 cm^2 3 = 10.0 – 20.0 cm^2 4 > 20.0 cm^2			
2. Depth	0. wound is healed (skin intact) or nearly closed (<0.3cm^2) 1. full thickness 2. unable to judge because majority of wound base is covered by yellow/black eschar 3. full thickness involving underlying tissue layers 4. tendon, joint capsule, bone, visible/ present in wound base			
3. Necrotic Tissue Type	0 = None visible or wound is closed (skin intact) or nearly closed (<0. 3cm^2) 1 = majority of necrotic tissue is thin White/grey or yellow slough 2 = majority of necrotic tissue is thick, adherent white yellow slough or fibrin 3 – majority of necrotic tissue is white/grey devitalized tissue or eschar 4 = majority of necrotic tissue is hard grey to black eschar			
4. Total Amount of Necrotic Tissue	0 = None visible in open wound or wound is closed (skin intact) or nearly closed(0.3cm^2) 1 = < 25% of wound bed covered 2 = 25% to 50% of wound covered 3 = > 50% and < 75% of wound covered 4 = 75% to 100% of wound covered			
5. Granulation Tissue type	0 = Wound is closed (skin intact) or nearly closed (<0.3cm^2) 1 = majority (>50%) of granulation tissue is healthy looking (even bright red appearance) 2 = majority of granulation tissue is unhealthy (eg. pale, dull, dusky, hypergranulation) 3 = majority of granulation tissue is damaged, friable, degrading 4 = there is no granulation tissue present in the base of the open wound (all necrotic)			
6. Total Amount of Granulation Tissue	0 = Wound is closed (skin intact) or nearly closed (<0.3cm^2) 1 =75% to 100% of open wound is covered with granulation tissue 2 =>50% and <75% of open wound is covered with granulation tissue 3 = 25% to 50% of wound bed is covered with granulation tissue 4 = <25% of wound bed is covered with granulation tissue			
7. Edges (directly touching and within 0.5cm of wound edge)	0 = Wound is closed (skin intact) or nearly closed (<0.3cm^2) or edges are indistinct, diffuse, not clearly visible because of re-epithelialization 1 = majority (>50%) of edges are attached with an advancing border of epithelium 2 = majority of edges are attached even with wound base (not advancing) 3 = majority of edges are unattached and/or undermined 4 = majority of edges are rolled, thickened or fibrotic (do not include callus formation)			
8. Periulcer Skin Viability (consider skin visible in photo or within 10 cm of wound edge)	Number of factors affected 0 = None 1 = One only 2 = Two or Three 3 = Four or Five 4 = six or more	- callus - dermatitis - maceration - desiccation or cracking - bright red, erythemic	- edema - excoriation - skin tearing/irritation r/t wound dressing or tape - hypo/hyper pigmentation - other: _____	
TOTAL SCORE				

Data Collection Forms

- Depending on the patient's medical diagnosis and/or medical impairments, multiple assessment forms may be required, i.e.:

  - Initial Wound Assessment Screen
  - Interdisciplinary Lower Leg Assessment Form
  - Interdisciplinary Diabetic/Neuropathic Foot Assessment Form
  - Interdisciplinary Pressure Ulcer Contributing Factors Assessment Tool

These forms and their instructions can be found online at:
swrwoundcareprogram.ca

ASSESSMENT OF WOUND CHARACTERISTICS

Wound Characteristics

- Wound characteristics[6]:
  - Location
  - Age of wound
  - Size of wound
  - Stage or depth of tissue involvement
  - Undermining or tunneling
  - Necrotic tissue
  - Granulation tissue
  - Epithelium
  - Exudate

Location

- Where the wound occurs on the person's anatomy
  - Use anatomic terms

- If there are multiple wounds in a similar location:
  - Identify with letters, i.e. wound A, B, C
  - Use references such as lateral, medial, proximal, distal, etc.
  - Measure as a single wound

Wound Location

- Location may help determine etiology, i.e.:
  - Venous ulcers:
    - Above ankle
    - Medial lower leg
  - Arterial ulcers:
    - Lower leg dorsum
    - Foot, lateral border of foot, toe joints, over boney prominences
    - Malleolus
  - Neuropathic ulcers:
    - Plantar surface of foot and heel
    - Metatarsal heads
    - Lateral border of foot and mid-foot deformities

Wound Duration

- Describe in terms of days, weeks, months, years
- Wound duration will help guide treatment
- Age of the wound is the highest predictor of healing potential

Size of Wound

- Accurate, complete, uniform, and consistent wound size measurements are required to establish diagnosis, plan of care, and to evaluate

- Three components:
  - Area
  - Depth
  - Volume

- No current gold standard for wound measurement

Tips to Measure Accurately

- Take measurements the same way each time from noted reference point on the body
- Use same units of measure and terminology for each measurement
- Have same person take measurements
- Use an assistant to record measurements
- Use a prepared form

Wound Area[10]

- A variety of methods are available to measure wound area:
  - Ruler method
  - Acetate tracing
  - Digital tracings
  - Wound photography

- Regardless of the method used, it should be consistently applied, and the results should be documented to assess progress of healing

- Wound surface area (l x w) is a geometric formula for a rectangle – can inflate the area of the wound up to 44%

Ruler Measurement[10]

- Simple, inconsistent
- Not reliable for irregular or large wounds
- Accuracy is increased by taking an average of three measurements
- Surface Area Measurement:
  - The longest length
  - The greatest width perpendicular to it
  - Multiply length x width for surface area

Google images

Acetate Tracing[10]

- Tracing of a wound shape on acetate paper – repeated tracings show changes in size/shape over time
- When tracing is made on metric graph paper, it's called planimetry. Size is determined by counting graph squares
- Tracing can become a wound map, showing different areas of non-viable tissue and areas of undermining

Wound Photography[6]

- Benefits:
  - Permanent record of wound
  - Serial photos can show progression towards healing, can be used as teaching tool
  - Reliable, accurate, improves measurement consistency
  - No contamination
  - No damage to wound bed
  - Less painful

- Disadvantages/challenges:
  - Need consent
  - Lighting may affect color of wound characteristics
  - Difficulty measuring wounds on a curved surface
  - Cost of camera

Tips for Good Photos[6]

- Use a good lighting source
- Screen private areas from the camera
- Position ruler to show relative size
- Use a string of known length and position camera from wound the same distance every time
- Use ID signs with patient ID, wound location, and date
- Use a ring flash attachment to reduce shadows
- Use an assistant to position the person and id sign

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Using Wound Measurements to Track Healing[6]

- Wound care providers must regularly re-evaluate the rate of wound surface area closure to help determine whether or not the wound is closing at an expected rate

- The precision of wound measurement and the method of calculating the rate of change can influence clinical decisions

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Calculating % Reduction in Wound Size Over Time[6]

- In general, a 20-30% reduction in surface area over a three to four week period is a reliable predictive indicator of chronic wound healing

- Specific wound closure rates based on wound etiology:

Etiology	% Reduction in Surface Area as a Predictor of Wound Healing
Venous Leg Ulcer[11]	> 28.79% at 4 weeks will close by 24 weeks
Diabetic Foot Ulcer[12,13]	> 50% a 4 weeks will close by 12 weeks
Pressure Ulcer[14,15]	> 39% after 2 weeks will close more quickly
Open Surgical Wound (average size of 10cm^2)[16]	50% at 13 days will close by 21 days

Wound Depth[6]

- Distanced from the visible skin surface to the wound bed
- Associated with extent of tissue damage
- Crude method of tracking growth of granulation tissue
- Methods:
  - Find deepest site and measure
  - Clock method

Wound Edges[6]

Indistinct, diffuse

- Normal tissues have blended into the wound bed

Attached

- Even or flush with the wound base, no sides or walls present, flat

Unattached

- Sides or walls are present; floor or base of wound is deeper than edge

Rolled under, thickened

- Soft to firm and flexible to touch

- Hyperkeratosis
  - Callus like tissue formation around wound and at the edges

Tunneling and Undermining[6]

Tunnel

- A separation of the fascial planes leading to sinus tracts
- Involves a small % of the wound margins
- Narrow and long, and seems to have a destination
- Measure and record depth of tunnel

Undermining

- Involves a greater % of the wound margins, with more shallow length than tunneling
- Usually involves subcutaneous tissues
- An erosion under the edge of the wound

Necrotic Tissue[6]

Impairs wound healing as it:

- Is a physical barrier to granulation, contraction and re-epithelialization
- Can harbor bacteria

The more non-viable tissue there is in a wound:

- The more severe the underlying damage
- The longer it will take to close the wound

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Red/Yellow/Black System[17]

- The type of non-viable tissue present can help identify the phase of wound healing that the wound is in, and as such, can help to direct treatment options.

Red	• Wound bed is clean and tissue is red/pink • Goal: maintain moist wound healing environment
Yellow	• Wound bed has slough/fibrin present and tissue may be combo of red/pink + ivory/canary yellow/green (depending if infection is present) • Not all yellow is bad – granulation grows through yellow fibrin and healthy tendon may appear as white/yellow • Goal: maintain moist environment whilst managing excess exudate and remove slough
Black	• Non-viable tissue present. Color may be dark brown/black/grey +/- red/pink +/- canary yellow/green • Goal: remove non-viable tissue, except stable eschar on a heel

Granulation Tissue[6]

- The growth of small blood vessels and connective tissue into the wound cavity
- Healthy when bright, beefy red, shiny, and granular with a velvety appearance
- A paler appearance with spontaneous bleeding may indicate ischemia, infection, or a co-morbidity such as anemia

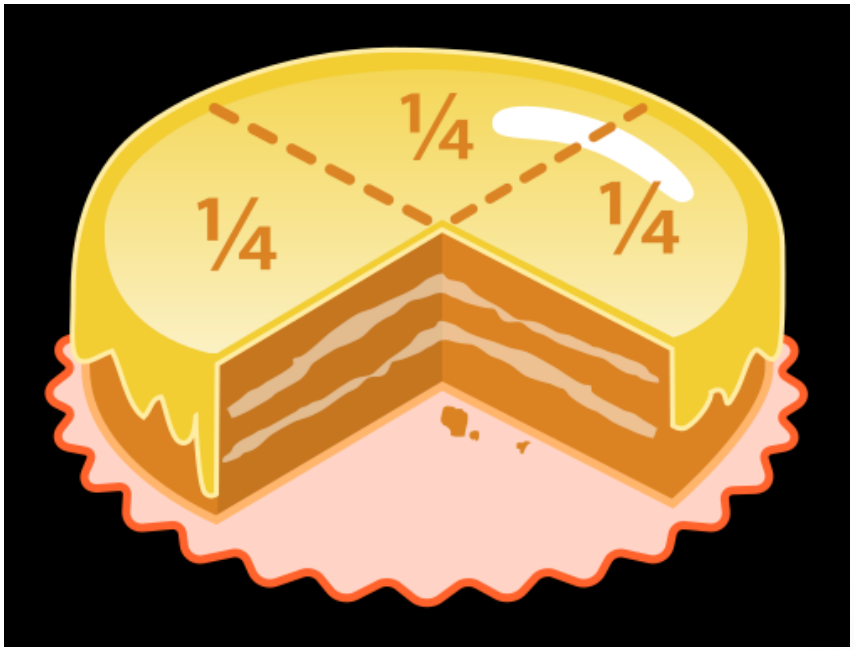
Epithelial Tissue

- Process of epidermal resurfacing
- Appears as red or pink skin
- May migrate from islands on the wound surface, the wound edges, or both

Measuring Necrotic, Granulation and Epithelial Tissue Amount

- Use clinical judgment to estimate the percentage of the wound covered and the tissue type in quarters

- E.g.
  - < 25%
  - 25 → 50%
  - > 50 → < 75%
  - 75 →100%



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Exudate[6]

- The term given to the fluid that leaks from a wound

- Exudate characteristics are influenced by:
  - Wound etiology
  - Wound healing physiology
  - Wound environment
  - Compounding pathological factors

- Asses color, consistency, amount and odor by looking at:
  - The wound itself, post wound cleansing and debridement
  - The dressing

Exudate Color and Consistency[6]

Exudate Descriptor	Color and Consistency
Serous	Clear/light yellow, thing/watery
Sero-sang	Pink → light red, thin/watery
Sang	Bright red, thin/watery
Purulent	Darker yellow/tan or blue/green, thin → thick, watery → opaque
Other	Some dressings and topicals can alter the appearance of exudate, i.e. silver, cadexomer iodine, etc.

Exudate Amount

Descriptor	Definition
None	No visible exudate on the dressing or on the wound.
Scant	No measurable exudate on the dressing; however the wound tissues are moist.
Small	• ≤ 25% of the dressing has drainage on it • Wound tissues are visibly moist • Moisture is evenly distributed in the wound
Moderate	• Drainage involves > 25% to ≤ 75% of the dressing • Wound tissues are saturated • Moisture is/isn't evenly distributed in the wound
Large	• Drainage involves > 75% of the dressing • Wound tissues are saturated • Drainage is freely expressed from the tissue • Moisture is/isn't evenly distributed in the wound

Exudate Odor[6]

- Odor
  - No standard terminology
  - All occluded wounds have an odor
  - Necrotic tissue in a wound contaminated with anaerobes may produce a foul odor
  - Pseudomonas has a sickening sweet odor along with blue/green exudate

- Odor is significant when it is new or when it has changed

References

1. Thomas DR, Rodeheaver GT, Bartolucci AA, et al. Pressure Ulcer Scale for Healing: Derivation and validation of the PUSH tool. Adv Wound Care. 1997;10(5):96-101.
2. Gardner SE, Frantz RA, Bergouist S, Shin CD. A prospective study of the pressure ulcer scale for healing (PUSH). J of Gerontology. 2005;60A(1):93-97.
3. Stotts NA, Thomas DR, Frantz RA, et al. An instrument to measure healing in pressure ulcers: Development and validation of the pressure ulcer scale for healing (PUSH). J Gerontol Series A. 2001;56(12):M795-799.
4. Lee S, Kwon PME, Dorner B, et al. Pressure ulcer healing with a concentrated, fortified collagen protein hydrolysate supplement: A randomized controlled trial. Advances in Skin and Wound Care. 2006;19(2):92-96.
5. Hon J, Lagden K, McLaren AM, et al. A prospective multicenter study to validate use of the PUSH in patients with diabetic, venous, and pressure ulcers. Ostomy Wound Management. 2010;56(2):26-36
6. Sussman C, Bates-Jensen B. Wound care: A collaborative practice manual for health professionals. USA:Lippincott Williams & Wilkins;2007.
7. Houghton PE, Kincaid CB, Campbell KE, et al. Photographic assessment of the appearance of chronic pressure and leg ulcers. Ostomy Wound Management. 2000;46(4):20-30.
8. Houghton PE, Kincaid CB, Lovell M, et al. Effect of Electrical Stimulation on Chronic Leg Ulcer Size and Appearance. Physical Therapy. 2003;83(1):17-28.
9. Thawer HA, Houghton PE, Woodbury MG, et al. A Comparison of Computer-assisted and Manual Wound Size Measurement. Ostomy Wound Management . 2002;48(10
10. Keast DH, Bowering CK, Evans AW, et al. MEASURE: A proposed assessment framework for developing best practice recommendations for wound assessment. Wound Rep Reg. 2004;12:S1-S17.
11. Kantor J, Margolis DJ. A multicenter study of percentage change in venous leg ulcer area as a prognostic index of healing at 24 weeks. Br J Dermatol. 2000;142:960-964.
12. Snyder RJ, Cardinal M, Dauphinee DM, et al. A post-hoc analysis of reduction in diabetic foot ulcer size at 4 weeks as a predictor of healing by 12 weeks. Ostomy Wound Management. 2010;56(3):44-50.
13. Bolton L. Chronic wounds and delayed healing risk. Wounds. 2010;22(6):8-12.
14. Van Rijswijk L. Full-thickness pressure ulcers: Patient and wound healing characteristics. Decubitus. 1993;6:16-21.
15. Gunes UY. A prospective study evaluating the pressure ulcer scale for healing to assess stage II, stage III, and stage IV pressure ulcers
16. Ramirez AT, Soroff HS, Schwartz MS, et al. Experimental wound healing in man. Surg Gynecol Obstet. Feb. 1969;128(2):283-293.
17. Krasner D. Wound care: how to use the red-yellow-black system. Am J Nurs. 1995:95(5):44–47.

References Continued

- VanRijswijk L, Polansky M. Predictors of time to healing deep pressure ulcers. Ostomy Wound Management. October 1994;40(8):40-42, 44, 46-48.
- Bergstrom N, Allman RM, Alvarez OM, et al. Clinical practice guideline: Treatment of pressure ulcers. Rockville MD: US Department of Health and Human Services Public Health Service Agency for Health Care Policy and Research; 1994. 15.
- www.npuap.org
- Bates-Jensen BM, Vredevoe D, Brecht ML. Validity and reliability of the pressure sore status tool. Decubitus. 1992;5(6):20-28.
- Bolton L, McNees P, Van Rijswijk L, et al. Wound healing outcomes using standardized assessment and care in clinical practices. J Wound Ostomy Continence Nursing. 2004;31(2):65-71.
- Ferrell BA, Artinian BM, Sessing D. The sessing scale for assessment of pressure ulcer healing. J Am Geriatr Soc. 1995;43(1):37–40.
- Ferrell BA, Keeler E, Siu AL, Ahn S-H, Osterweil D. Cost-effectiveness of low-air-loss beds for treatment of pressure ulcers. J Gerontol A Biol Sci Med Sci. 1995;50A(3):M141–M146.
- Ferrell BA. The Sessing Scale for measurement of pressure ulcer healing. Adv Wound Care. 1997;10(5):78-80.
-):46-53.
- Woodbury MG, Houghton PE, Keast DH, Campbell KE. Development, Validity, Reliability and Responsiveness of a New Leg Ulcer Measurement Tool. Advances in Skin & Wound Care 2004;17:187-196.
- Woodbury MG, Houghton PE, Campbell KE, Keast DH. Leg ulcer measurement tool (LUMT): more about its ability to detect change. Ostomy Wound Management . 2004;50(10):78.
- Nachbar F SW, Merkle T, Cognetta AB, et al. The ABCD rule of dermatoscopy, High prospective value in the diagnosis of doubtful melanocytic skin lesions. J Am Acad Dermatol. Apr 1994;30(4):551-559.
- Throne N. The problem of black skin. Nursing Times; 1969”999-1001.
- Weiss EL. Connective tissue in wound healing. McCulloch J KL, Feedar J, ed. Wound Healing Alternatives in Management. Second ed. Philadelphia: FA Davis; 1995:26-28.
- Makelbust J, Sieggreen M. Etiology and pathophysiology of pressure ulcers. In: Makelbust J SM, ed. Makelbust J, Sieggreen M. First ed. West Dundee, IL:S.N. Publications; 1991:19-27.
- Dorland. Dorland’s Illustrated Medical Dictionary. W.B. Saunders (Harcourt Health Services) [electronic]. Available at: http://www.mercksource.com/pp/us/cns/cns_hl_dorlands. Accessed September 19, 2005.
- Flanagan M. Improving accuracy of wound measurement in clinical practice. Ostomy/Wound Management. 2003;49(10):28-40.