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 various common data collection and documentation forms, and why and how to use them

3. Understand how to assess common wound characteristics
Photographs and Illustrations

Images/illustrations obtained via Google Images, unless otherwise stated
WOUND ASSESSMENT AND DATA COLLECTION AND DOCUMENTATION
What is Wound Assessment¹?

• Systematic process of assigning numbers or grades to the wound/wound characteristics during an examination. This process includes:
  • Tests:
    • Instruments or means the 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 and Frequency

• **Purpose:**
  - Examine the severity of the lesion
  - 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

• **Frequency:**
  - Assessment is done with/of a person with a wound before implementing special tests/examinations and before implementing interventions to ensure that only medically necessary, reasonable, and appropriate care/treatments/services are provided
  - Re-assess at regular intervals to measure change in status of wound, ideally each time the dressing is changed, using the same tests selected for the initial assessment
Wound Assessment: Procedure\textsuperscript{1}

- Use a standardized data collection and documentation forms that list the significant skin and wound features at baseline and that will be tracked over the course of care

- Information collection easier, better organized, more consistent when collected on form

- Use of standardized forms ensures that important information is not lost

- Most common form is ‘Wound Care Flow Sheet’
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)\textsuperscript{1}

- 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 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 to be sensitive to change.\textsuperscript{5-8}

• Tool has been validated to assess healing of venous and diabetic foot ulcers in addition to pressure ulcers.\textsuperscript{32}
### PUSH Tool 3.0

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

**PUSH Tool 3.0**

<table>
<thead>
<tr>
<th>Length x Width</th>
<th>0</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>Sub-score</th>
</tr>
</thead>
<tbody>
<tr>
<td>(In cm²)</td>
<td>0</td>
<td>&lt; 0.3</td>
<td>0.3 - 0.6</td>
<td>0.7 - 1.0</td>
<td>1.1 - 2.0</td>
<td>2.1 - 3.0</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td>7</td>
<td>8</td>
<td>9</td>
<td>10</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Exudate Amount</td>
<td>0</td>
<td>None</td>
<td>1</td>
<td>Light</td>
<td>2</td>
<td>Moderate</td>
<td>3</td>
</tr>
<tr>
<td>Tissue Type</td>
<td>0</td>
<td>Closed</td>
<td>1</td>
<td>Epithelial Tissue</td>
<td>2</td>
<td>Granulation Tissue</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>4</td>
<td>Necrotic Tissue</td>
<td>5</td>
<td>Resurfaced</td>
<td>6</td>
<td>Total Score</td>
<td>7</td>
</tr>
</tbody>
</table>

**Length x Width:** Measure the greatest length (head to toe) and the greatest width (side to side) using a centimeter ruler. Multiply those two measurements (length x width) to obtain an estimate of surface area in square centimeters (cm²). Caution: 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 some granulation tissue. A superficial wound that is rep epithelializing is scored as a "1." When the wound is closed, score as a "0."
Bates-Jensen Wound Assessment Tool (BWAT)

- Adapted from the Pressure Sore Status Tool⁹ by Barbara Bates-Jensen

- 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

- Has evolved to include measuring and predicting wound healing

- Average content validity 0.62¹⁰
BWAT Tool

RATES-JENSEN WOUND ASSESSMENT TOOL

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 data.

Item | Assessment | Date Score | Date Score | Date Score
--- | --- | --- | --- | ---
1. Site | 1 = Length × width ≤ 0 sq cm |  |  |  
| 2 = Length × width > 0 sq cm |  |  |  
| 3 = Length × width = 10 × 10 cm |  |  |  
| 4 = Length × width = 10 × 50 cm |  |  |  
| 5 = Length × width = 50 × 100 cm |  |  |  
| 6 = Depth |  |  |  
| 2 = Non-blanching pressure on intact skin |  |  |  
| 3 = Partial thickness skin loss involving epidermis & dermis |  |  |  
| 4 = Full thickness skin loss involving damage or necrosis of subcutaneous tissue, may extend down to but not through underlying fascia, dermis or partial fat & full thickness skin loss layer covered by granulation tissue |  |  |  
| 5 = Obtained by metrics |  |  |  
| 6 = Inflamed, diffuse, non-blanching |  |  |  
| 7 = Well defined, not attached to base, raised edge, thickened |  |  |  
| 8 = Well defined, fibrous, granulation tissue, hyperkeratinized |  |  |  
| 2. Depth |  |  |  
| 3. Edges |  |  |  
| 4. Undermining | 1 = None present |  |  |  
| 2 = Undermining ≤ 2 cm in any area |  |  |  
| 3 = Undermining > 2 cm involving < 50% wound margin |  |  |  
| 4 = Undermining > 2 cm involving > 50% wound margin |  |  |  
| 5 = Unreconstructed, thin, black skin |  |  |  
| 6 = Loose skin, subcutaneous tissue, fat, muscle or bone |  |  |  
| 7 = Necrosis Type | 1 = None |  |  |  
| 2 = Necrosis |  |  |  
| 3 = Wound filled with dry keratinized scale or yellow slough |  |  |  
| 4 = Wound filled with moist keratinized scale or yellow slough |  |  |  
| 5 = Wound filled with necrotic tissue, black slough |  |  |  
| 6. Necrotic Tissue | 1 = None |  |  |  
| 2 = Necrosis |  |  |  
| 3 = Wound filled with dry keratinized scale or yellow slough |  |  |  
| 4 = Wound filled with moist keratinized scale or yellow slough |  |  |  
| 5 = Wound filled with necrotic tissue, black slough |  |  |  
| 7. Exudate Type | 1 = None |  |  |  

TOTAL SCORE

WOUND STATUS CONTINUUM

Plot the total score on the Wound Status Continuum by placing an “X” on the line and the date beneath the line. Plot multiple scores with their dates to see-regression progression or degradation of the wound.

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Photographic Wound Assessment Tool (PWAT)

- Developed by wound care clinicians and researchers by extracting the Pressure Sore Status Tool subscales that could be evaluated from photographs

- Consists of 6 items: edges, necrotic tissue type, necrotic tissue amount, skin color surrounding wound, granulation tissue, and epithelialization

- Scored 0 – 24

- Valid, reliable, and responsive \(^{14-16}\)
### Photographic Wound Assessment Tool

**PWAT – Revised**

<table>
<thead>
<tr>
<th>Item</th>
<th>Assessment</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Size</td>
<td>0 = wound is closed (skin intact) or nearly closed (&lt; 0.3 cm²)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>1 = 0.5 – 2.0 cm²</td>
<td></td>
</tr>
<tr>
<td></td>
<td>2 = 2.0 – 10.0 cm²</td>
<td></td>
</tr>
<tr>
<td></td>
<td>3 = 10.0 – 20.0 cm²</td>
<td></td>
</tr>
<tr>
<td></td>
<td>4 = &gt; 20.0 cm²</td>
<td></td>
</tr>
<tr>
<td>2. Depth</td>
<td>0 = wound is hatched (skin intact) or nearly closed (&lt; 0.3 cm²)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>1. full thickness</td>
<td></td>
</tr>
<tr>
<td></td>
<td>2. unable to judge because majority of wound base is covered by yellow/black eschar</td>
<td></td>
</tr>
<tr>
<td></td>
<td>3. full thickness involving underlying tissue layer</td>
<td></td>
</tr>
<tr>
<td></td>
<td>4. tenacious, point capsule, base, visible/eschar in wound base</td>
<td></td>
</tr>
<tr>
<td>3. Necrotic Tissue Type</td>
<td>0 = None visible or wound is closed (skin intact) or nearly closed (&lt; 0.3 cm²)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>1 = majority of necrotic tissue is thin White/grey or yellow eschar</td>
<td></td>
</tr>
<tr>
<td></td>
<td>2 = majority of necrotic tissue is dark, adherent White yellow eschar or slough</td>
<td></td>
</tr>
<tr>
<td></td>
<td>3 = majority of necrotic tissue is White/grey devitalized tissue or eschar</td>
<td></td>
</tr>
<tr>
<td></td>
<td>4 = majority of necrotic tissue is hard grey to black eschar</td>
<td></td>
</tr>
<tr>
<td>4. Total Amount of Necrotic Tissue</td>
<td>0 = None visible in open wound or wound is closed (skin intact) or nearly closed (&lt; 0.3 cm²)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>1 = &lt; 5% of wound bed covered</td>
<td></td>
</tr>
<tr>
<td></td>
<td>2 = 5% to 50% of wound covered</td>
<td></td>
</tr>
<tr>
<td></td>
<td>3 = &gt; 50% and &lt; 75% of wound covered</td>
<td></td>
</tr>
<tr>
<td></td>
<td>4 = &gt; 75% to 100% of wound covered</td>
<td></td>
</tr>
<tr>
<td>5. Granulation Tissue Type</td>
<td>0 = Wound is closed (skin intact) or nearly closed (&lt; 0.3 cm²)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>1. majority (~50%) of granulation tissue is healthy looking (even bright red appearance)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>2. majority of granulation tissue is unhealthy (eg, pale, dull, dry, hypertrophy)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>3. majority of granulation tissue is damaged, friable, degrading</td>
<td></td>
</tr>
<tr>
<td></td>
<td>4. there is no granulation tissue present in the base of the open wound (all necrotic)</td>
<td></td>
</tr>
<tr>
<td>6. Total Amount of Granulation Tissue</td>
<td>0 = Wound is closed (skin intact) or nearly closed (&lt; 0.3 cm²)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>1 = &gt;75% to 100% of open wound is covered with granulation tissue</td>
<td></td>
</tr>
<tr>
<td></td>
<td>2 = &gt;50% and &lt; 75% of open wound is covered with granulation tissue</td>
<td></td>
</tr>
<tr>
<td></td>
<td>3 = 25% to 50% of wound bed is covered with granulation tissue</td>
<td></td>
</tr>
<tr>
<td></td>
<td>4 = &lt; 25% of wound bed is covered with granulation tissue</td>
<td></td>
</tr>
<tr>
<td>7. Edges</td>
<td>0 = Wound is closed (skin intact) or nearly closed (&lt; 0.3 cm²)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>or edges are indistinct, diffuse, not clearly visible because of re-epithelialization</td>
<td></td>
</tr>
<tr>
<td></td>
<td>1 = majority (~50%) of edges are attached even with wound base (not advancing)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>2 = majority of edges are untethered and/or undermined</td>
<td></td>
</tr>
<tr>
<td></td>
<td>3 = majority of edges are rolled, thickened or thick</td>
<td></td>
</tr>
<tr>
<td></td>
<td>4 = all of the above</td>
<td></td>
</tr>
<tr>
<td>8. Perimeter Skin Visibility</td>
<td>0 = None</td>
<td></td>
</tr>
<tr>
<td></td>
<td>1 = One only</td>
<td></td>
</tr>
<tr>
<td></td>
<td>2 = Two or Three</td>
<td></td>
</tr>
<tr>
<td></td>
<td>3 = Four or Five</td>
<td></td>
</tr>
<tr>
<td></td>
<td>4 = six or more</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- edema</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- dehiscence</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- necrosis</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- excoriation</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- skin necrosis/limitation n° wound dressing or tape</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- bright red, erythemic</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- hypo-hypopigmentation</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- other:</td>
<td></td>
</tr>
</tbody>
</table>

**TOTAL SCORE**

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Data Collection Forms

• Regardless of the form you use to collect findings, all attributes on the form must be assessed

• Depending on the person’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\(^1\):
  - Location
  - Age of wound
  - Size of wound
  - Stage or depth of tissue involvement
  - Undermining or tunneling
  - Necrotic tissue
  - Granulation tissue
  - Epithelium
  - Exudates
Location\(^1\)

- 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
    • Malleolus
  • Neuropathic ulcers:
    • Plantar surface of foot and heel
    • Metatarsal heads
    • Lateral border of foot and mid-foot deformities
Where Are These Wounds?
Answers

Coccyx

Right forehead

Mid-abdominal incision

Dorsum of the left hand

Left medial malleolus

Right BKA stump
Age of Wound

• Describe in terms of days, weeks, months, years

• The age of the wound will help you to determine whether the wound is:
  • Acute – less than four weeks old
  • Chronic – greater than four weeks old

• Age of the wound will help guide treatment and will inform you of the ‘healability’ of the wound
Size of Wound

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

• Three components:
  • Area
  • Depth
  • Volume

• No current gold standard for wound measurement

• Measurements of wound size important to providers, payers, regulators, patient – your best legal defense
Tips to Measure More Accurately

- Define specific procedures to determine:
  - Wound edge
  - Total wound area

- 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$^{24}$

- 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 meticulously documented to assess progress of healing

- Wound surface area ($l \times w$) is a geometric formula for a rectangle – can inflate the area of the wound up to 44%
Ruler Measurement$^{24}$

- 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
South West Regional Wound Care Program

Wound Area

Longest length

X

Widest perpendicular axis
Where is the Length/Width?
Location Answers
Acetate Tracing\textsuperscript{24}

- 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

- Commonly used on flat wounds, limited use on full thickness wounds
Tracings

• Benefits:
  • Easy to learn
  • Inexpensive
  • Readily available
  • Requires minimal training

• Inaccuracy from:
  • Estimating partial squares
  • Tracing of wound edges
Digital Tracings

• Acetate tracing plus a digitizing tablet, i.e. Visitrak (Smith and Nephew)

• Benefits:
  • Tablet can calculate wound area and % change size for you
  • Simple to handle and use
  • Minimizes risk of contamination (multilayer acetate)
  • Tablet is portable, light weight, can be disinfected
  • Can track undermining, epithelialization, % of tissue types
  • 94% accuracy, more consistent and reliable measurements

Click on the Visitrak to watch a video on how it works!
Wound Photography

• Benefits:
  • Prevent litigation
  • 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

- Use 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 pt. id, wound location, and date
- Use a ring flash attachment to reduce shadows
- Use an assistant to position the person and id sign
Using Wound Measurements to Track Healing\(^1\)

- 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
Calculating % Reduction in Wound Size Over Time\textsuperscript{1}

- 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:

<table>
<thead>
<tr>
<th>Etiology</th>
<th>% Reduction in Surface Area as a Predictor of Wound Healing</th>
</tr>
</thead>
<tbody>
<tr>
<td>Venous Leg Ulcer\textsuperscript{25}</td>
<td>&gt; 28.79% at 4 weeks will close by 24 weeks</td>
</tr>
<tr>
<td>Diabetic Foot Ulcer\textsuperscript{26-27}</td>
<td>&gt; 50% a 4 weeks will close by 12 weeks</td>
</tr>
<tr>
<td>Pressure Ulcer\textsuperscript{28-30}</td>
<td>&gt; 39% after 2 weeks will close more quickly</td>
</tr>
<tr>
<td>Open Surgical Wound (average size of 10cm\textsuperscript{2})\textsuperscript{31}</td>
<td>50% at 13 days will close by 21 days</td>
</tr>
</tbody>
</table>
Calculating % Surface Area Reduction

\[
\frac{\text{Surface Area (admission)} - \text{Surface Area (current)}}{\text{Surface Area (admission)}} \times 100 = \underline{\text{________}} \% \text{ reduction}
\]

NOTE: Surface area = length x width (in centimeters)
Calculation Practice

- What is the % reduction in wound surface area for the following wounds:

<table>
<thead>
<tr>
<th>Wound</th>
<th>Admission Surface Area</th>
<th>Surface Area at One Month</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>15 cm(^2)</td>
<td>23.7 cm(^2)</td>
</tr>
<tr>
<td>B</td>
<td>22.4 cm(^2)</td>
<td>9.2 cm(^2)</td>
</tr>
<tr>
<td>C</td>
<td>76.3 cm(^2)</td>
<td>66.9 cm(^2)</td>
</tr>
<tr>
<td>D</td>
<td>3.1 cm(^2)</td>
<td>5.2 cm(^2)</td>
</tr>
</tbody>
</table>
Calculation Practice Answers

- What is the % reduction in wound surface area for the following wounds:

<table>
<thead>
<tr>
<th>Wound</th>
<th>Admission Surface Area</th>
<th>Surface Area at One Month</th>
<th>% Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>15 cm²</td>
<td>23.7 cm²</td>
<td>+ 58%</td>
</tr>
<tr>
<td>B</td>
<td>22.4 cm²</td>
<td>9.2 cm²</td>
<td>58.9%</td>
</tr>
<tr>
<td>C</td>
<td>76.3 cm²</td>
<td>66.9 cm²</td>
<td>12.3%</td>
</tr>
<tr>
<td>D</td>
<td>3.1 cm²</td>
<td>5.2 cm²</td>
<td>+ 66.7%</td>
</tr>
</tbody>
</table>

- Which wound is closing at an expected rate (i.e. 20-30% over a period of 3-4 weeks)?
Wound Surface Area

- In general, the wound surface area should initially reduce rapidly and then slow.

- The wound should continue to progressively close as it moves through the phases of wound healing.

- If a ‘healable’ wound is not getting smaller, a full reassessment of the cause and corrective therapies needs to occur.

- If despite reassessment and implementation of best practices a wound continues to fail to proceed towards closure in a timely manner, advanced therapies may need to be considered.
Wound Depth¹

- 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
The Clock Method

- Take depth measurements at:
  - 12 o’clock
  - 3 o’clock
  - 6 o’clock
  - 9 o’clock
Wound Volume\textsuperscript{1}

- Difficult, usually limited to research studies

- Two methods:
  - Filling the wound with a measured amount of saline
  - Pouring Jeltrate (alginate hydrocolloid used by dentists) into the wound, making a mold

- Significant inaccuracies
Wound Edges

- Indistinct, diffuse
  - Unable to distinguish wound outline clearly
  - 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
How Would You Describe These Wound Edges?
Wound Edge Answers

Attached

Unattached

Hyperkeratotic,

Indistinct
Tunnelling¹

• A separation of the fascial planes leading to sinus tracts

• Usually involves a small % of the wound margins

• Usually narrow and long, and seems to have a destination
Undermining

• Usually 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
Tunnel or Undermining?
Undermining/Tunneling Answers

Undermining

Tunneling

Undermining

Tunneling
Measuring Undermining

• Method #1:
  • Map undermining around the entire wound perimeter by using a probe and marker
  • Connect the points and measure length and width, multiplying to calculate the overall undermined estimate
Undermining Measurement

- Method #2:
  - A.K.A. The Sussman Method
  - Using four cardinal points of the clock
Necrotic Tissue¹

- 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
Necrotic Tissue

• As tissue dies, it changes in color, consistency and adherence to the wound bed

• Color:
  • White/gray
  • Yellow fibrinous
  • Yellow/tan (slough)
  • Black/brown (eschar)

• Consistency:
  • Mucinous
  • Soft, stringy
  • Soft, soggy
  • Hard

• Adherence:
  • Clumps
  • Loosely attached
  • Attached at base only
  • Firmly adherent at base and edges
Red/Yellow/Black System

- 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.

<table>
<thead>
<tr>
<th>Color</th>
<th>Description</th>
</tr>
</thead>
</table>
| **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* |
Necrotic Tissue Amount

- Use clinical judgment to estimate the percentage of the wound covered with necrosis in quarters. i.e.:
  - < 25%
  - 25 → 50%
  - > 50 → < 75%
  - 75 → 100%
Types of Necrotic Tissue

- **Slough**
  - Indicates less severity
  - Yellow to tan mucinous or stringy material
  - Loosely adherent to wound bed
  - If non-adherent will be scattered throughout the wound

- **Eschar**
  - Indicates deeper tissue damage
  - Black, gray, brown in color
  - Usually adherent or firmly adherent
  - May be soggy and soft or hard and leathery
Describe This Necrotic Tissue
Necrotic Tissue Answers

Eschar

Slough

Slough

Eschar
Granulation Tissue

- 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
Granulation Tissue Continued

- Hypergranulation may indicate excessive moisture at the wound surface
- A building up of tissue that prevents epidermal migration or resurfacing across the wound, by proliferating above the intact margins of the skin
Granulation Tissue Amount

- Use clinical judgment to estimate the percentage of the wound filled with granulation in quarters. i.e.:
  - < 25%
  - 25 → 50%
  - > 50 → < 75%
  - 75 → 100%
Epithelial Tissue\textsuperscript{1}

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

- Use clinical judgment to estimate the percentage of the wound covered with epithelium in quarters. i.e.:
  - < 25%
  - 25 → 50%
  - > 50 → < 75%
  - 75 → 100%
Exudate

• 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

<table>
<thead>
<tr>
<th>Exudate Descriptor</th>
<th>Color and Consistency</th>
<th>Image</th>
</tr>
</thead>
<tbody>
<tr>
<td>Serous</td>
<td>Clear/light yellow, thin/watery</td>
<td><img src="image1.png" alt="Image" /></td>
</tr>
<tr>
<td>Sero-sang</td>
<td>Pink → light red, thin/watery</td>
<td><img src="image2.png" alt="Image" /></td>
</tr>
<tr>
<td>Sang</td>
<td>Bright red, thin/watery</td>
<td><img src="image3.png" alt="Image" /></td>
</tr>
<tr>
<td>Purulent</td>
<td>Darker yellow/tan or blue/green, thin → thick, watery → opaque</td>
<td><img src="image4.png" alt="Image" /></td>
</tr>
<tr>
<td>Other</td>
<td>Some dressings and topicals can alter the appearance of exudate, i.e. silver, cadexomer iodine, etc.</td>
<td><img src="image5.png" alt="Image" /></td>
</tr>
</tbody>
</table>
## Exudate Amount

<table>
<thead>
<tr>
<th>Descriptor</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>None</td>
<td>No visible exudate on the dressing or on the wound.</td>
</tr>
<tr>
<td>Scant</td>
<td>No measurable exudate on the dressing; however the wound tissues are moist.</td>
</tr>
</tbody>
</table>
| 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\(^1\)

- 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
Anatomical Structures

- Tendon
- Capsule
- Nerve
- Vessels
- Bone
- Muscle
SWRWCP Wound Assessment Resources

'Treat the Cause' Resources

It is important to consider and address the underlying cause(s) and extrinsic, intrinsic, and iatrogenic factors affecting the 'healability' of a wound, when approaching the assessment and management of a wound. Such a holistic assessment will also help you to determine 'healability', which will guide your selection of interventions and help you establish realistic, person-centered goals.

The following resources are intended for health care providers involved in skin and wound care, to use to educate themselves, their co-workers, and/or their patients. The guidelines, tools, algorithms, and pamphlets can also be taken, modified as necessary, and implemented in health care facilities within copyright restrictions (which are noted with specific tools where applicable) and with approval from your organizations senior managers.

› Assessment Guidelines
› Assessment Tools
Review

1. The importance of accurate wound assessment

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

3. Assessment of common wound characteristics
For more information visit: swrwoundcareprogram.ca
References

4. www.npuap.org
References Continued

30. Gunes UY. A prospective study evaluating the pressure ulcer scale for healing to assess stage II, stage III, and stage IV pressure ulcers.