# Surgical Wound Clinical Pathway

## 0-7 Days Expected Outcomes

<table>
<thead>
<tr>
<th>Notes</th>
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<tbody>
<tr>
<td>Most Responsible Physician (MRP)/Nurse Practitioner (NP) identified/informed</td>
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<tr>
<td>- Refer patient to ‘Care Connects’ if no responsible practitioner currently involved with patient</td>
</tr>
<tr>
<td>- Determine if MRP/NP is part of family health team (FHT) or community health centre (CHC) and consider additional supports available</td>
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</table>

## Holistic Patient and Wound Assessment Completed

<table>
<thead>
<tr>
<th>Notes</th>
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<tbody>
<tr>
<td>Transfer of care communications received and reviewed</td>
</tr>
<tr>
<td>- Dressing and treatment history</td>
</tr>
<tr>
<td>- Medication use</td>
</tr>
<tr>
<td>- Diagnostic/vascular/lab results</td>
</tr>
<tr>
<td>- Discharge summary</td>
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<tr>
<td>- Consultation notes</td>
</tr>
<tr>
<td>- Care plan</td>
</tr>
<tr>
<td>- Details of surgery and complications</td>
</tr>
<tr>
<td>- Nursing notes re: dressing changes etc</td>
</tr>
<tr>
<td>- Current/ongoing adjunctive therapies integrated into care plan i.e: NPWT</td>
</tr>
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</table>

## Medical/surgical history and co-morbidity management considered within care plan

### Classifications of Surgical Wounds

**Clean** (1-2% infection rate)
- Surgery does not enter colonized viscus or body cavity and there are no breaks in surgical technique

**Clean-contaminated** (6-9% infection rate)
- Surgery does enter colonized viscus or body cavity but under elective or controlled conditions

**Contaminated** (13-20% infection rate)
- Gross contamination at the operative site in the absence of clinical infection or there are breaks in surgical technique

**Dirty/Infected** (40% infection rate)
- Active infection already present during surgical procedure

## Risk factors that may cause surgical wounds to open, develop infection or stall healing:

<table>
<thead>
<tr>
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<tbody>
<tr>
<td>- Diabetes</td>
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<tr>
<td>- Obesity</td>
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<td>- Cigarette smoking</td>
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<tr>
<td>- Vascular status</td>
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<tr>
<td>- Infection</td>
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<tr>
<td>- Multiple co-morbidities</td>
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<tr>
<td>- Medications (see section below)</td>
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<td>- Renal failure</td>
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<tr>
<td>- History of radiation treatments</td>
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<tr>
<td>- Use of internal grafts/implants</td>
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<tr>
<td>- Emergent surgery</td>
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<tr>
<td>- Re-exploration of wound</td>
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<tr>
<td>- Prolonged surgical time</td>
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<tr>
<td>- Prolonged ventilation during surgery</td>
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<tr>
<td>- Psychosocial factors (anxiety, depression, social isolation, low economic status and pain)</td>
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<tr>
<td>- Use of blood products</td>
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<tr>
<td>- Type of Surgery (i.e. clean, clean-contaminated, contaminated or dirty and infected)</td>
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<tr>
<td>- Inappropriate use of cleansers or wound dressings</td>
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<tr>
<td>- Coincident remote site infections</td>
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<tr>
<td>- Systemic use of steroids</td>
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<tr>
<td>- Extremes of age</td>
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<tr>
<td>- Nutritional deficits</td>
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</tbody>
</table>
### Medication reconciliation and their impact on wound healing reviewed

- Prescription, non-prescription, naturopathic and illicit drug use (including e-cigarettes, inhaled substances and nicotine replacement therapy)
- Medications that can affect healing include:
  - chemotherapy, anticoagulants, antiplatelets, corticosteroids, vasoconstrictors, antihypertensives, diuretics and immunosuppressive drugs
- Other medications used to treat acute episodic illnesses may affect healing (eg. antibiotics, colchicine, anti-rheumatoid arthritics)
- Vitamin and mineral supplementation

### Recent blood work and other diagnostic test results reviewed and implications for wound healing considered

- Determine if bloodwork and other diagnostic tests required (see chart in guidelines) i.e: Vascular Segmental Studies, MRI, CT Scan, Ultrasound, X-ray

### Home glycemic control and monitoring if diabetic

- Blood Sugar (BS) and A1C are within recommended range per responsible physician or NP
- Use of glucose log book (Diabetes Passport/Diabetic Log Book)
- Adequate insulin supplies
- Glucometer and required supplies
- Assess for barriers in monitoring glycemic control
- Community/health resources
  - Link to Waterloo Wellington Diabetes Directory can be found at [http://www.waterloowellingtondiabetes.ca/userContent/documents/Public-Resource%20Library/Waterloo%20Wellington%20Diabetes%20Directory%202015%20%20proof%204.pdf](http://www.waterloowellingtondiabetes.ca/userContent/documents/Public-Resource%20Library/Waterloo%20Wellington%20Diabetes%20Directory%202015%20%20proof%204.pdf)
  - Diabetic Education Program
  - Patient self-referral link [http://www.waterloowellingtondiabetes.ca/Public-Referrals.htm](http://www.waterloowellingtondiabetes.ca/Public-Referrals.htm)
  - Medical professional referral link [http://www.waterloowellingtondiabetes.ca/Professional-Site-Referral-Page.htm](http://www.waterloowellingtondiabetes.ca/Professional-Site-Referral-Page.htm)

### Physical assessment performed

- Baseline B/P, Pulse and respiration
- Baseline weight and height, BMI
- Use of Braden Risk Scale

### If surgical wound is below knee: assess potential to heal

- ABPI 0.5 to 0.8
- TBPI 0.64 to 0.7
- Suggest Transcutaneous Oxygen Pressure(TcPo2), Laser Doppler Flowmetry, Doppler Arterial Waveforms or Segmental Doppler Pressure studies

- Complete Bilateral lower Leg Assessment (LLA):
  - ABPI/TBPI completed within last 3 mths and results documented
  - If unable to obtain ABPI/TBPI, referral to medical imaging for Vascular Segmental studies is recommended
  - Repeat ABPI/TBPI assessment every 3 months if healing is not progressing
  - Bilateral lower leg assessment that includes:
    - Leg measurements (foot, ankle, calf, thigh) to assess edema
    - Nail changes (thicker, dry, crumbly, presence of fungal infection)
    - Assess pulses
    - Temperature
Wound and periwound assessment completed

**Expected Reduction in Wound Size**

**Primary intention:**
- Wounds with minimum tissue loss
- Surgical closure joins the wound edges
- Will re-epithelialize within 2-3 days

**Secondary intention:**
- Left open to heal using moist wound healing
- 20-30% reduction in size in the first 3-4 weeks

**Tertiary intention (Delayed Primary Closure):**
- Used when wound heavily contaminated
- Reduces risk of infection and controls debris/necrotic tissue

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**Infection Assessment**

**Presence of Superficial Bacteria**
- N - Non-healing wound
- E - Exudate increased
- R - Red friable (fragile tissue that bleeds easily)
- D - Debris (presence of necrotic tissue (eschar/slough) in wound
- S - Smell

**Presence of Spreading Bacteria**
- (< 3 low bacteria count, >3 high bacteria count)
  - S - Size increasing
  - T - Temperature increased (> 4 degrees F difference)
  - O - Os (probes to bone or bone is increased)
  - N - New areas of breakdown
  - E - Exudate present
  - E - Erythema and/or Edema
  - S - Smell

**Temperature difference can be measured from:**
- Wound to peri-wound
- Limb to corresponding limb

**Difference of > 4 degrees Fahrenheit** is measurement used to identify a temperature difference in STONEES

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**Complete (after 48 hours):**
- Bates-Jensen Wound Assessment Tool (BWAT)
- Measure and document size of wound
- Assess wound exudate
- Peri-wound assessment to include: edema, induration, colour, redness, irritation of skin (to dressing or tape, skin colour changes, skin temperature, tenderness, maceration)
- Assess potential to heal
- Assess need for debridement
- Assessment for infection
  - NERDS – Any 3 or more of the following indicate HIGH superficial infection
  - STONEES - Any 3 or more of the following indicate HIGH superficial infection in deep compartment (Require Urgent Medical Attention)
  - Swabs for C&S to determine the type of bacteria and the appropriate antibiotics
- Obtain photos following best practice as per framework for individual organization policies and procedures. Suggest following publication as guideline: [http://mydigitalpublication.com/publication/?i=206722](http://mydigitalpublication.com/publication/?i=206722)

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**Infection Assessment**

**Acute Surgical Site Infection (<30 days):**
- Localized heat
- Pain/tenderness
- Redness
- Swelling
- Purulent drainage
- Fever (>38.5°C or 101.5°F)
- Spontaneous dehiscence (category 2 or 3)
- Wound opened by surgeon
- Surgeon confirms SSI present
- Abscess may be present

**Chronic Surgical Site Infection (>30 days):**
- Pain
- Decline in function
- Fever may be absent
- Lack of healing
- Unresolved dehiscence
- New sinus or fistula formation
- Persistent wound drainage
- Presence of foreign body
- Presence of devitalized tissue
- Poor local vascularity
- Persistent odour
- Absence of healing
- Infected prosthetic implant

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**ABPI <0.5 TBPI <0.64**

Urgent vascular surgical consult needed
### Moisture Associated Skin Damage (MASD) assessment completed

MASD: Inflammation and erosion of the skin caused by prolonged exposure to various sources of moisture, including wound exudate, urine or stool, perspiration, mucus, or saliva.

- Assess continence of urine and stool
- If incontinence is a concern, a continence assessment should be completed by a qualified practitioner (e.g. an Enterostomal Therapist (ET) or Nurse Continence Advisor (NCA)
- Skin assessment including all skin folds
- Link to RNAO Prompted Voiding Best Practice Guidelines

### Pain management considered and initiated

**Pain Red Flags**
- Possible Infection
  - Increase in pain level
  - New pain in patients with altered sensation

Any sudden, severe, acute pain could be an emergency situation and should be investigated immediately.

Pain can be a trigger for autonomic dysreflexia that may occur.

- Identify and document type of pain
  1. **Neuropathic Pain** (described as burning, stinging, shooting, stabbing or hyperesthesia – sensitivity to touch). Suggested pharmaceutical treatment: Second generation tricyclic agents – e.g. Nortriptyline or Desipramine. If pain is not relieved try using Gabapentin or Pregabalin.
  2. **Nociceptive Pain** (described as sharp, aching or throbbing). Suggested pharmaceutical treatment: Non-Opioids – e.g. ASA or Acetaminophen
     - Mild Opioids – e.g. Codeine
     - Strong Opioids – e.g. Morphine or Oxycodone

- Obtain MRP/NP orders for pharmaceutical treatments (opioids and non-opioids)
- Non-pharmacological pain control options (support surfaces, repositioning)
- Coordinate analgesic administration with wound care treatment times
- Treatment of side-effects of medication
- Assess pain control history
- Assess appropriate use of narcotics (under and over medicating)

### Patient’s nutritional status optimized

- Nutrition is an essential component of wound healing.
- Consider dietician referral for supplementation recommendations.

- Calculate Body Mass Index (BMI)
- Determine recent weight loss/gain
- Complete Mini Nutritional Assessment (MNA)
  - If screening section results < 11 = complete assessment section
  - If assessment section results < 24 = Registered Dietician referral required
- Review recent dietary consult
- Identify barriers or risk factors to healthy eating
- Link to EatRight Ontario to talk to dietician
  [www.eatrightontario.ca](http://www.eatrightontario.ca) 1-877-510-510

**Correct Clinical Pathway Confirmed**
## Wound etiology and appropriate pathway established

- Identify initial cause of wound
- Results of lower leg assessment i.e: ABPI/TBPI & Vascular Segmental Studies
- Results of wound assessment

## Best Practice Wound Therapy Initiated

| WHEN TRYING A NEW PRODUCT, ALLOW 2 WEEKS TO ASSESS EFFECTIVENESS UNLESS ADVERSE EFFECT NOTED. |
| Initiation of compression therapy requires a lower leg assessment to be completed, ABPIs/TBPIs to be determined and results evaluated in addition to physician/NP order |

- Arrange for MRP/NP orders as required to begin plan of care including agreeance to professional referral recommendations
- Maintain original dressing x 48 hours after surgery (reinforce dressing prior to this if necessary)
- Provide pressure redistribution (support surfaces) for sleeping, seating and use of medical devices
- Debridement by qualified professional if required
- Ensure appropriate skin care
- Identify any potential barriers to wound treatment plan
- Consider required referrals and further follow-up with previous professional referrals
- Consider compression if venous insufficiency/edema present and if ABPI/TBPI is within safe range
- Link to Waterloo Wellington Venous Leg Guidelines – Compression: [http://wwwoundcare.ca/102/](http://wwwoundcare.ca/102/) |
- Utilize toolkit to determine wound cleansing, debridement and dressing selection (South West Region Wound Care Program: Wound Cleansing Table and Dressing Selection and Cleansing enablers and CAWC Product Picker chart)
- Advanced therapies e.g. Negative Pressure Wound Therapy (NPWT), Electric Stimulation and Hyperbaric Oxygen Therapy might be considered

## Patient discharge planning initiated for patient independence and prevention

| WHEN TRYING A NEW PRODUCT, ALLOW 2 WEEKS TO ASSESS EFFECTIVENESS UNLESS ADVERSE EFFECT NOTED. |
| Initiation of compression therapy requires a lower leg assessment to be completed, ABPIs/TBPIs to be determined and results evaluated in addition to physician/NP order |

- Cardiff Wound Impact Questionnaire
- World Health Organization Quality of Life (WHOQOL) form
- Ensure all patient/caregiver goals and concerns been addressed

- Recent changes in overall activity level
- Daily routine including continence concerns and/or access to bathroom
- Personal assistance available to perform activities of daily living
- Determine where patient sleeps at night and sits during day
- Safety of transfers
- Assess barriers to sleeping in bed
- Assess mobility and dexterity aids currently being used (bedrail, superpole, trapezebar, therapeutic surfaces, raised toilet seat and seating devices)
- Recommendations for exercise as per qualified professional
- Referral to Physiotherapy/Occupational Therapy as necessary
- Smoking and e-cigarette cessation with goal to be nicotine-free
- deep vein thrombosis, cellulitis, impaired blood flow, difficulties with compression

## Patient/caregiver educational plan initiated

Lifestyle

- Smoking and e-cigarette cessation with goal to be nicotine-free

Dietary

- deep vein thrombosis, cellulitis, impaired blood flow, difficulties with compression
Guidelines can be found at: [http://rnao.ca/sites/rnao-ca/files/Integrating_Smoking_Cessation_into_Daily_Nursing_Practice.pdf](http://rnao.ca/sites/rnao-ca/files/Integrating_Smoking_Cessation_into_Daily_Nursing_Practice.pdf)

- Pain management
- Rest/Activity/Mobility
  - Turning and sitting schedule for repositioning
  - Pillow between knees
  - Activity level according to post-operative instructions
- Safety
  - Prevention of injury – friction, shearing
- Wound
  - Self care of wound/tube(s) if appropriate
  - Handwashing/hygiene
  - Aseptic technique
  - Reprocessing of instruments
  - Appropriate storage of equipment and supplies
  - When to call primary caregiver (e.g. signs and symptoms of infection, dehiscence, ...)

- Dietary requirements as per dietician
- Blood glucose testing and recording in diary
- Link to EatRight Ontario to talk to dietician: [www.eatrightontario.ca](http://www.eatrightontario.ca) 1-877-510-5102

### Diagnostic Tests
- Results understood by patient

### Skin Care
- Comprehensive self care of skin
- Incontinence and prevention/treatment of Moisture Associated Skin Damage (MASD)

### Community Supports
- Seating clinic for wheelchair
- Community support groups (e.g. Diabetic education and self-management sessions, walking groups, Southern Ontario Aboriginal Diabetes Initiative - SOADI)
- Other ____________________________

### Ability to self-manage optimized

#### Review for independence or need for ongoing assistance with the following:
- Barriers to participate (poor eyesight, physical limitations, transportation, socioeconomic, social environment, cognitive ability, other co-morbidities)
- Decreased sensory perception
- Review importance and potential barriers to smoking cessation at every visit
- Adequate hygiene skin exposed to moisture, perspiration

- Home Environment
- Wound care
- Nutrition
- Equipment (IV, NPWT etc)
- Post op medical device application and removal (compression, binders etc)
- Social/medical/family/employment obligations
- Suggested website for review: [http://www.wwselfmanagement.ca/](http://www.wwselfmanagement.ca/)
- Other ____________________________

### Coping strategies implemented into plan of care

- Patient’s concerns and fears
- Promoting independence to avoid practitioner/caregiver dependency
- Signs of anxiety or other mental health issues (e.g. delusions, hallucinations, paranoid behaviour)
- Depression screen using Geriatric Depression Scale assessment form –GDS15
- Suicide assessment if applicable
- ETOH and illicit/recreational drug use

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‘Teach-back’ method is a way of ascertaining patients understanding about what they need to know or do regarding their health. Patients are asked to state in their own words what they understand to be important. It is a way to confirm that things have been explained in a manner that the patient understands.
<table>
<thead>
<tr>
<th>Family and caregiver support identified and incorporated into plan of care</th>
<th>• Check for availability for financial compensation (e.g. private insurance, veterans medical benefits, Ontario Disability Support Program – ODSP, Non-Insured Health Benefits – NIHB and Southern Ontario Aboriginal Diabetes Initiative – SOADI for First Nations people and Inuit)</th>
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<tbody>
<tr>
<td></td>
<td>• Family/caregiver actively willing and able to participate in treatment plan</td>
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<td></td>
<td>• Assess family fears and concerns</td>
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<td></td>
<td>• Repositioning, nutrition, continence if needed</td>
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<td></td>
<td>• Access need for caregiver respite/relief</td>
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<tr>
<td></td>
<td>• Conflict with caregivers</td>
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<tr>
<td>Social supports/community resources currently utilized are integrated into plan of care</td>
<td>• Family support</td>
</tr>
<tr>
<td></td>
<td>• Check for availability for financial compensation (e.g. private insurance, veterans medical benefits, Ontario Disability Support Program – ODSP, Non-Insured Health Benefits – NIHB and Southern Ontario Aboriginal Diabetes Initiative – SOADI for First Nations people and Inuit)</td>
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<tr>
<td></td>
<td>• Caregiver conflicts</td>
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<td></td>
<td>• Long or short term placement</td>
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<td>• Confirm that ongoing medication coverage is arranged</td>
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<td></td>
<td>• Community Support Services Link: <a href="http://waterlooregion.org/supports/">http://waterlooregion.org/supports/</a></td>
</tr>
<tr>
<td>Professional referrals are initiated</td>
<td>• MRP/NP orders received as required to change plan of care including agreement to professional referral recommendations</td>
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<td></td>
<td>• Ensure referrals done according to patient’s needs</td>
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<td></td>
<td>• Refer to Surgical Wound guideline for list of health care professionals</td>
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<td></td>
<td>• Consider referrals to ET/WCS if required to ensure appropriate treatment plan.</td>
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<table>
<thead>
<tr>
<th>21 to 28 Days Expected Outcomes</th>
<th>Notes</th>
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<tbody>
<tr>
<td><strong>Reassess, measure and document size of wound</strong></td>
<td><strong>Complete:</strong></td>
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<tr>
<td></td>
<td>• Reassessment using Bates-Jensen Wound Assessment Tool (BWAT)</td>
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<td>• Calculation: The two most important points are that measurements are done weekly, and using a standardized method within each organization.</td>
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<td>$\frac{V_{\text{Initial}} - V_{\text{Current}}}{V_{\text{Initial}}} \times 100 = % \text{ reduction in volume}$</td>
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<td>($V = \text{volume of wound calculated as Longest Length} \times \text{Perpendicular Widest Width} \times \text{Depth straight in}$)</td>
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<td>(Adapted from Sussman and Bates-Jensen 2007)</td>
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<td></td>
<td>• Review adherence to care plan</td>
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<td></td>
<td>• Reassess self-manage ability and coping to plan of care</td>
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<tr>
<td>Expected Reduction in Wound Size</td>
<td>Notes</td>
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<td>---------------------------------</td>
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<tr>
<td><strong>Primary intention:</strong></td>
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<tr>
<td>- Wounds with minimum tissue loss</td>
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<tr>
<td>- Surgical closure joins the wound edges</td>
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<td>- Will re-epithelialize within 2-3 days</td>
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<td><strong>Secondary intention:</strong></td>
<td></td>
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<tr>
<td>- Left open to heal using moist wound healing</td>
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<tr>
<td>- 20-30% reduction in size in the first 3-4 weeks</td>
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<tr>
<td><strong>Tertiary intention (Delayed Primary Closure):</strong></td>
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<tr>
<td>- Used when wound heavily contaminated</td>
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<td>- Reduces risk of infection and controls debris/necrotic tissue</td>
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<thead>
<tr>
<th>53-60 Days Expected Outcomes</th>
<th>Notes</th>
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<tr>
<td><strong>Wound is closed by 8 weeks</strong></td>
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<tr>
<td>- Ensure wound is closed.</td>
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<tr>
<td>- If wound is not closed, move to most appropraite pathway i.e: Maintenance Pathway or Non-healing Pathway</td>
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‘Closed’ vs ‘Healed’

- **Closed**: Skin intact, underlying tissue or structures are not visible
- **Healed**: Wound has been closed for a 2 year time period allowing for collagen re-modelling from type 3 to type 1

These terms are often mistakenly used interchangeably. Understand and teach the difference!