Wound Care for Hand Therapy

By Julie Belden, OTR/L/CHT
- Wound Healing Stages
- Impacts on Wound Healing
- Wound Assessment
- Wound Classification
- Wound Care
- Wound Cleaning
- Wound Dressings and Functions
- Wound Types
Stages of Wound Healing
Stages of Wound Healing

- Haemostasis
- Inflammation
- Proliferation
- Maturation
Haemostasis

- First 6-8 hours.
- Release of platelets.
- Fibrin clot.
- Acts as migratory matrix.
- Generates release of chemical mediators.
Inflammation

- 0-3 days.
- Release of histamines from mast cells.
- Neutrophils to help phagocytose bacteria.
- Platelet clot releases growth factors and fibronectin.
- Macrophages help engulf larger debris.
- Vasodilation of surrounding blood vessels.
Proliferation

- 3-24 days.
- Clearing out of dead and devitalized tissue.
- Tissue repair or replacement.
- New tissue formation or regeneration.
- Collagen network scaffold is formed.
- Granulation tissue forms and fills in gaps.
- Contraction of tissues.
Proliferation:
Re-epithelialization Phase

- Wound grow from the edges inward.
- Moves only over viable tissue.
- Requires a warm and moist environment.
Maturation

- 3 weeks to months.
- Tissue repair and new tissue formation.
- Collagen network continues.
- Epithelialization continues with contraction of the tissues.
- Scar matures and settles.
WOUND HEALING COMPLEX PROCESS

- Coagulation
- Inflammation
- Tissue formation
- Remodeling

Harding KG et al. BMJ 2002
The phases of cutaneous wound healing

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Healing by Primary and Secondary Intention

Healing by First Intention

- SCAB
- NEUTROPHILS
- PLATELETS CLOT
- GRANULATION TISSUE: MACROPHAGES, FIBROBLASTS
  3–7 DAYS
- FIBROUS UNION, REMODELED TISSUE
  WEEKS

Healing by Second Intention

- SCAB
- PLATELETS CLOT
- GRANULATION TISSUE
  3–7 DAYS

Healing by Third Intention

- SCAB
- WOUND CONTRACTION
  WEEKS
Healing by Primary Intention
Healing by Secondary Intention
Healing by Secondary Intention
Healing by Secondary Intention
Factors that Influence Wound Healing

- Nutrition
- Hypoxia (smoking)
- Infection
- Tumors
- Diseases such as Diabetes, HIV, Hepatitis C
- Medications
- Debris and necrotic tissue
- Patient compliance
Nutrition and Wound Healing
Nutrition and Wound Healing

- Nutritional deficiencies can impede wound healing.
- Vitamins and Minerals essential to wound healing include:
  - Vitamin A
  - Vitamin C
  - Zinc
  - Vitamin E
Nutrition and Wound Healing

- Dietary Supplements
  - Bromelain
  - Glucosamine
  - Protein

- Amino acids
  - Arginine
  - Glutamine

- Botanical Medicines
  - Centella asiatica (gotu kola)
  - Aloe vera
Assessment
Assessment: Moist Wound

- Moisture is important as it allows cells and chemicals needed for healing to move about the wound surface.
Assessment: Dry Wound

- Cells and chemicals cannot move.
- White blood cells cannot fight infection.
- Enzymes cannot break down dead tissue.
- Macrophages cannot carry away dead tissue.
- Wound edges curl over and new skin cells cannot grow over and cover the wound.
Assessment: Too Moist

- Too much moisture can cause moisture to spill out onto the skin and cause the death of skin cells.
Assessment: Color

- Look at color of surrounding skin.
- White skin indicates maceration from too much moisture.
- Red skin can indicate inflammation, injury or infection.
- Purple skin can indicate bruising or trauma.
Assessment: Feel

- Feel the surrounding skin.
- Hard surrounding skin could indicate an infection, even if skin is not red.
- Tender area of skin that appears shiny or feels hard could indicate inflammation.
Assessment: Dimensions

- Measure length, width, and depth of wound.
- Check for tunneling and undermining.
- Do not use Q-tip to measure depth or tunneling, as it could leave behind strings.
- Measure skin discoloration around the wound bed separately.
- Use transparent measuring devise or disposable tape measure.
  - Briggs Medirule II.
Assessment: Texture

- Assess texture of wound bed.
- Very smooth red tissue in partial thickness wound is probably dermis.
- Very smooth red tissue in full thickness wound is probably muscle.
- Red, soft bumpy appearance is healthy granulating tissue. (skin buds)
Assessment: Drainage

- Is it well contained or oozing over edges?
- Is dressing saturated or dry?
- Color and consistency?
- Odor?
- How much drainage is there?
  Scant    Moderate    Large
Assessment: Drainage

- Serous drainage: thin and watery.
- Sanguineous: thin and red.
- Serosanguineous: pink to light red, thin and watery.
- Purulent:
  - creamy yellow, green, white or tan.
  - Thick and opaque.

- Texture of drainage
  - Thick could just have WBC that have killed bacteria.
Assessment: Odor

- There should be no odor in a non-infected wound.
- The exception is that it is normal for there to be an odor under a hydrocolloid dressing from degradation process.
- Does the odor go away with wound cleaning?
Wound Classification
Wound Classification

- **Type:** Surgical or nonsurgical
- **Age:** Acute or chronic
- **Depth**
  - Partial thickness involves only the epidermal layer, or through the epidermis and into, but not through the dermis.
  - Full thickness is through all layers of skin.
Wound Care
Wound Care Based on Wound Condition

- Granulation Tissue
- Fibrin Sough
- Eschar
Granulation Tissue

- Cover wound to keep it clean and protect it and to keep it moist.
- If minimal drainage, use transparent film, hydrocolloid or hydrogel dressing. Absorb drainage with foams, alginates, or hydrofibers.
Fibrin Slough

- Debride wound with enzymatic debridement or pulsatile lavage.
- Use moisture retentive dressing for autolytic debridement.
  - Transparent film
  - Hydrogel
  - Hydrocolloid.
- Use alginate or hydrofiber to absorb drainage and support autolytic debridement.
Eschar

- Use conservative sharp or enzymatic debridement or pulsatile lavage.
- Keep wounds with poor blood supply and non-infected heel ulcers clean and dry.
- May need topical antimicrobial as tissue breaks down.
Escar
Escar
Cleaning Wounds
Cleaning Agents

- Sterile saline Promotes a moist environment.
  - Promotes granulation tissue formation.
  - Causes minimal fluid shift.

- Skin wound cleanser
  - Smith and Nephew makes Dermal Wound.
  - Gentle, non-irritating, buffered pH.

- Antiseptic solutions
  - May damage tissues and delay healing.
  - Sometimes used to clean infected or newly contaminated wounds.
Cleaning Agents

- Antiseptic Solutions
  - ½ strength hydrogen peroxide
    - Can aid in mechanical debridement through foaming action.
    - Warms wound, promoting vasodilation and decreases inflammation.
  - Don’t use in a surgical wound.
- Acetic Acid: treats pseudomonas
Cleaning Agents Cont.

- Dakins fluid (sodium hypochlorite)
  - An antiseptic that lightly dissolves necrotic tissue.
- Providone iodine
  - Broad spectrum fast acting antimicrobial. Can dry and stain the skin.
- Saline soaks
Saline Soaks
Goals of Saline Soaks

- Helps to prevent infection.
- Keeps wound clean.
- Aids in removal of adherent dressings.
- Promotes healing.
Procedure for Saline Soaks

- Mix ratio of one cup warm water and 2 level teaspoons salt in metal, glass or ceramic cup or bowl. Mix enough solution to cover wound.
- Place wound into mixture and soak for 15 minutes. Adherent dressings can be removed after several minutes of soaking.
- Dry with paper towel and apply clean dressings.
- Wash cup or bowl in dishwasher or in hot soapy water and drip dry.
- Complete BID, unless directed otherwise.
Pin Site Care for External Fixators

- No showering for first 10 days, then only with physician approval. No showers if open wounds.
- If showering, use antibacterial soap, no scrubbing.
- Clean pin sites daily with 50/50 hydrogen peroxide and sterile saline solution.
  - Wash hands well.
  - Use different Q-tip for each pin.
  - Wipe with Q-tip, then dry with new Q-tip.
  - Clean entire length of pin with sterile gauze.
  - Use gauze dressing only if excessive drainage.
Wound Dressings
Questions to Ask
When Choosing a Dressing

- What dressings are available in-house?
- What is the simplest method of closing the wound?
- Can the patient afford the supplies?
- Who will provide wound care at home?
- What caused the wound, and can the cause be alleviated? (important for chronic wounds)
Questions Continued

- How often does the dressing need to be changed?
- How much drainage is present?
- Does the wound need more moisture? Is it too moist?
- Should the wound be debrided and how is this best done?
- Are the wound edges open or closed?
Questions Continued

- After cleaning and drying the wound, does the wound have an unpleasant odor?
  - Is it infected?
  - Is a culture needed?
- Is there tunneling, undermining or a cavity that needs to be filled?
- How large is the wound?
  - Does it need a Wound VAC?
Wound Dressing

Functions
Wound Dressing Functions

- Keep wound tissue moist and surrounding skin dry.
- Protect wound from trauma and contusion.
- Provide compression if bleeding or swollen.
- Apply medication.
- Absorbing drainage.
- Debriding necrotic tissue.
- Filling or packing wound.
- Protect surrounding skin.
Wound Dressing Types
Non Stick Dressings

- Low or non-adherent contact gauze dressing.
- Mepitel can prevent surrounding skin maceration and can be left in place for 7-10 days.
- Need secondary dressing.
# Non-stick Dressings

## Uses
- Closed wounds
- Low adherence
- Small, low exudating wound
- Superficial wounds

## Type
- Mepitel
- Skintact
- Xeroform Tegapore
- Adaptic
- Telfa pad
Hydrogel

- Insoluble polymers with hydrophilic nature.
- Donate liquid and absorb limited amount of exudates.
- Moist environment to devitalized tissue (necrotic or sloughy).
- Facilitate autolysis (very slow).
- Facilitate re-epithelialization.
- Need semi permeable film dressing as secondary dressing.
Hydrogels

Uses
- Used when a wound needs more moisture.
- Protects exposed tendon.

Type
- Nu-gel
- Elta dermal
Hydrocolloids

- Moist wound healing.
- Forms gel in contact with exudates.
- Removes slough.
- Autolysis of necrotic tissue.
- Left on for up to 7 days.
- Not to be used for anaerobic infection.
- Impermeable to oxygen, water and water vapor.
Hydrocolloids

Uses

- Can be used with moderate, but not heavy exudate.

Type

- Duoderm
- Tegasorb
Hydrofiber Dressing

- Gels on contact with exudate, maintaining moist environment.
- Absorbs more exudate than alginate dressing.
- Can be moistened with Saline if dry wound bed.
- Protects wound edges from maceration.
- Pad or ribbon dressing.
- Must use secondary, non-occlusive dressing.
- May need extra dressing layers if heavy exudate.
Hydrofiber Dressings

- **Uses:**
  - Moderate to heavy exudate
  - Moist environment

- **Types:**
  - Aquacell
Alginate Dressings

- Made from seaweed.
- Pads or ropes.
- Can be used for moderate to heavy exudate.
- Can be used on infected wound.
- Gels on contact with exudate, maintaining moist wound.
- Need secondary dressing.
Alginates

- **Uses**
  - Wound with moderate or heavy exudate

- **Types**
  - Sorbsan
  - Tegagon
  - Kaltostat
Capillary Action Dressings

- Low adherence.
- Accelerated capillary action “pulls” interstitial fluid from wound bed.
- Removes bacteria from wound bed.
- Reduces maceration.
- Can add extra dressing on top for more absorption.
- Type: Advadraw, Vacutex.
Capillary Action Dressings

- **Uses**
  - Heavy exudate
  - Draws fluid out of wound
  - Prevents maceration

- **Types**
  - Advadraw
  - Vacutex
Semi-permeable Films

- Permeable to water vapor and oxygen.
- Impermeable to water and microorganisms.
- Secondary dressing.
- Can help to enhance epithelialization regeneration.
Semi Permeable Films

Uses

- Secondary dressing.
- Reduces change of germs getting in wound.
- Use only for minimal exudate, not moderate or heavy.

Type

- Opsite
- Tegaderm
Gauze Dressings

- Does not promote moist healing.
- Allows loss of tissue temperature, which can slow healing.
- Bacteria can penetrate up to 64 layers of dry gauze.
- Moist gauze presents even less of a barrier to bacteria.
- Can protect closed wound from trauma or infection.
Gauze Dressings

Uses
- Closed surgical wounds.

Type
- Curity gauze sponges
- Telfa pad
Anti-microbial Dressings

- Used for unhealthy wound beds.
- Silver for infected wounds or prophylactic.
- Iodine
- Honey
Anti-Microbial Dressings

Uses

- Unhealthy wound bed.
- Destroys microbes or prevents their growth and multiplication.
- Treat acute wounds that have potentially high bacterial loads.

Type

- Iodoflex
- Silvasorb
- Inadine
- Actisorb silver
- Mepilex
Honey Dressings

- Antimicrobial.
- Anti-inflammatory.
- Promotes debridement in sloughy and necrotic wounds.
- Provides moist environment.
- Reduces wound odor.
Foam Dressings

- Absorbs exudate and allows moisture evaporation.
- Provides warm, moist environment.
- Conforms to wound bed.
- Used for light, moderate or heavy exudate.
- Can be left on 5-7 days.
Foam Dressings

**Uses:**
- Primary or secondary dressing.
- Any wound.
- Exposed tendon.
- Prevention of maceration of good tissue.

**Types:**
- Mepilex.
- Allevyn non-adhesive.
- Epi-lock wound dressing.
Soft Silicone Dressings

- Contact layer prevents adherence.
- Allows exudate to pass through holes in outer dressing.
- Low potential for skin irritation.
- Conformable.
Soft Silicone

Uses

- Painful wound.
- Pediatrics.
- Fragile skin.

Types

- Mepitel
- Mepilex
- Mepitac
Gel Pads

- Occlusive-no vapor movement.
- Maintains moist environment.
- Provides padding for body prominences.
- Softens scar tissue.
Gel Pad

Uses

- Pad and protect wound.
- Moist wound.
- Not for use on infected wound.

Types

- Elasto-gel cast and splint padding.
- SP silicone gel sheet
  - Sammons Preston
- Nova Gel silicone gel sheeting
Other Considerations
With Wound Care
Debridement

- Mechanical
  - Whirlpool
  - Hydro jet
  - Wet-dry
- Autolysis
- Enzymatic (varidase)
- Biological (maggots)
- Sharp debridement
Wet to Dry/Wet to wet

- Non selective debridement of wound bed.
- Increased risk of infection.
- Labor intensive.
- Painful for patient.
- Distribution of airborne bacteria leading to cross contamination.
- Causes local tissue cooling, which impedes healing.
  - Dries out wound bed.
Vacuum Assisted Closure

- Non invasive, active wound closure system.
- Uses controlled, localized negative pressure.
- Promotes healing in acute and chronic wounds.
- Reduces swelling to help close wound edges.
Wound VAC
VAC Indications

- Chronic open wounds
  - Diabetic ulcers
  - Pressure ulcers
  - Venous stasis ulcers
  - Arterial ulcers
- Partial thickness burns
- Acute and traumatic wounds
- Dehisced incisions
- Meshed grafts
- Flaps
Desensitization of Scars

- Can be started as soon as the scar is closed and there are no underlying problems.
- Should be done 4-6 times a day to be effective.
- Usually is graded from light to firm, and from soft to rough.
- Can include tapping area, rubbing textures or lotion on area, or rubbing area over or through items.
Scar massage and scar desensitization are related, but are not the same.
Desensitization

- Bins or materials of various textures and coarseness.
- Water pic, jet pulses, Fluidotherapy.
- Massage.
- Repetitious percussion.
- Protect specific areas as needed (glove, splint, elastomer, gel pads)
Escarotomy
Skin Buds
Skin Buds
Healing Skin Grafts
Hypertrophic Scarring
Osteomyelitis
Raised Scar (Proud Flesh)
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