Sam Coffman

Wound Management & Infection Control



Herbal First Aid – Wound Healing

First: First Aid

Treat every wound in the field AS IF it were life-threatening

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Herbal First Aid – Wound Healing

Amount of bleeding or blood loss

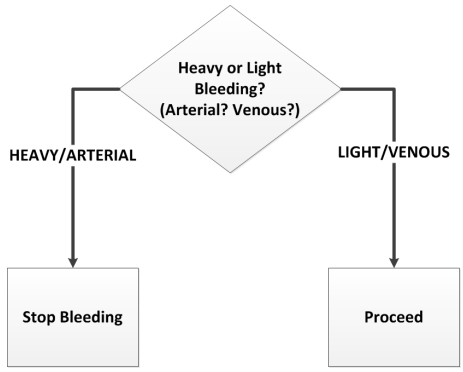
Shock

Irrigation

Further or Functional Damage

Herbal First Aid – Wound Healing

Amount of bleeding or blood loss



Herbal First Aid – Shock

Shock

- **Hypovolemic**
- **Cardiogenic**
- **Neurogenic**
- **Anaphylactic**
- **Psychogenic**

Herbal First Aid – Shock

Assuming the worst case (unknown person and accident)

- **Introduce yourself and give brief background in one sentence**
- **Ask permission to help**
- **Ask name, injury related questions**
- **Be sincere and let them know you are there to help.**
- **Treat Injury**
- **Keep them warm & comfortable!**

Herbal First Aid – Irrigation

- **Clean or Sterile Saline or Clean Water**
- **Pressure**
- **Location**
- **Visualization & moving into:**

Functional or

Further Damage

Herbal First Aid – Functional Damage

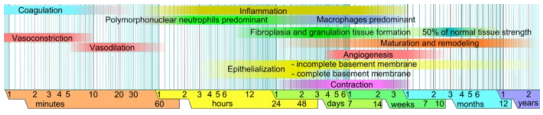
- **Clean or Sterile Saline or Clean Water**
- **Pressure**
- **Location**
- **Visualization & moving into:**

Functional or

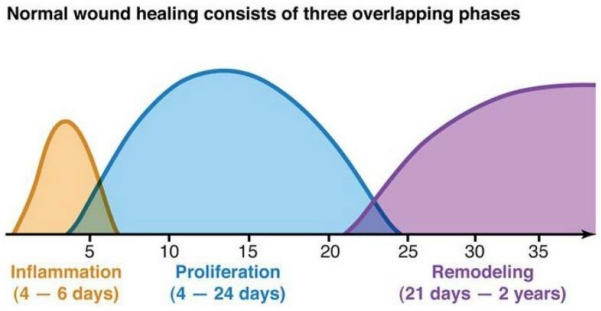
Further Damage

4 Stages of Wound healing

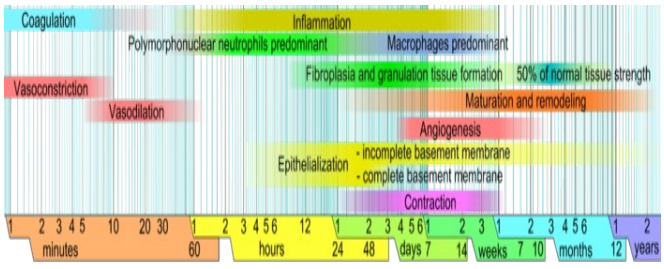
- **Hemostasis**
- **Inflammation**
- **Proliferation**
- **Remodeling**



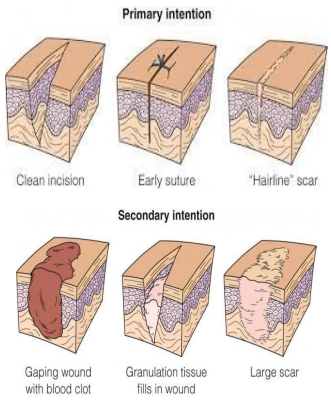
Three Phases (after hemostasis)

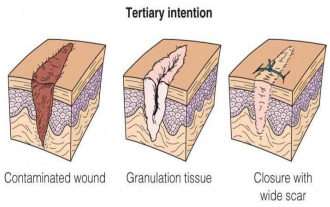


Spectrum of Wound Healing

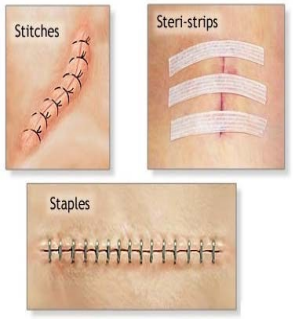


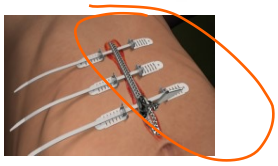
Classifications of Wound Closure





Orthodox Closure Techniques





Orthodox Closure

Type of Wound Closure	Advantages	Disadvantages
Sutures	Meticulous closure Strong (tensile strength) Lowest dehiscence %	Greatest tissue reactivity May require removal
Staples	Lowest tissue reactivity Low cost Rapid application	Lower meticulous closure Imaging interference
Wound adhesives	Patient comfort Resistance to bacterial growth No removal methods required	Lower tensile strength (usually) Greater dehiscence % (depending on brand) Not around joints or high tension Not around mucosa/moist areas Not jagged or avulsions Sensitivity/Allergy
Strips (+ tincture of Benzoin)	Patient comfort Low cost Lowest infection rates Easy to use in conjunction with topical phytotherapy	Highest dehiscence % Lower tensile strength Less effective when wet Cannot use around hair (shave)

Plant Medicine Goals

- **Phytotherapeutic approaches – both singularly and as adjuvant/integrative care to assist with:**
  - **Reducing tissue inflammation (i.e. speeding up inflammation phase)**
  - **Immune and lymph support**
  - **Infection management**
  - **Antibiotic-resistant bacterial infections**
  - **Biofilm inhibition**
  - **Increasing tissue proliferation**

1. Wound Cleaning

- **Irrigation**
- **Activated charcoal (USP food grade preferred)**
- ***Opuntia* spp. (Prickly Pear)**
- **Calcium bentonite (e.g. green clay)**

Basics – Infection

- **Hemostasis**
- **Inflammation**
- **Proliferation**
- **Remodeling**

Infection
Specific Pain
Exudate
Bright Redness
Streaking (Lymphangitis)
Local (Cellulitis)
Systemic (Fever)
Non-Healing (Chronic)

2. Inflammation vs. Infection

Inflammation	Infection
Redness	**Bright red**
Swelling	**Specific swelling (i.e. abscess)**
Pain	**Specific pain location**
Decreasing symptoms with time	**Streaking (lymphangitis)**
	Cellulitis (waxy red sheen, increasing pain)
	Exudate (sanguinous to purulent)
	Systemic signs (i.e. fever)

Cellulitis

Lymphangitis

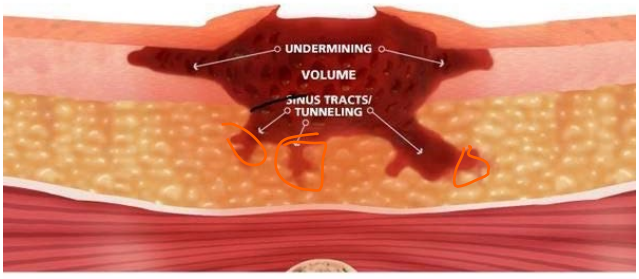
Wound Colors

- **Red – healthy, good blood flow (in the wound bed itself)**
- **Pink - Epithelializing**
- **Pale pink – poor blood flow; ischemia, anemia**
- **Purple – engorged; edema; excessive bioburden; trauma (usually deep wounds, lack of perfusion over time)**
- **Black or brown – nonviable, necrotic tissue**
- **Yellow – nonviable, necrotic tissue (slough)**
- **Gray – nonviable, necrotic tissue**
- **Green – infection; nonviable tissue**
- **White – ischemia; maceration (too much moisture), may also be confused with bone or fascia**

Wound Exudate

- **Serous – thin clear "watery" plasma Normal in the acute inflammatory stage (Moderate to heavy amount may indicate heavy bio-burden or chronicity due to infection)**
- **Sanguinous – bloody (fresh bleeding) seen in deep partial thickness & full thickness wounds during angiogenesis. Small amount normal in the acute inflammatory stage.**
- **Serosanguineous- thin, watery, pale red to pink, plasma with RBC's. Small amount normal in acute inflammatory stage**
- **Purulent – thick, opaque, tan, yellow, green or brown color, never normal in wound**

Wound Tunneling



Wound Tunneling

- **Infection → tissue destruction**
- **Dehydrated wound (wound dressing)**
- **Pressure/shear on the wound**
- **Steroids and NSAIDS**
- **Diabetes**
- **Extended inflammation period**
- **Inadequate wound packing**
- **Biofilms**

Wound Tunneling

Orthodox Approaches
- Reduce/Eliminate causes
- Wound care and cleansing
- Wound Packing
- Encourage granulation
- Remove pressure/weight bearing on wound

Wound Packing

Wound Tunneling

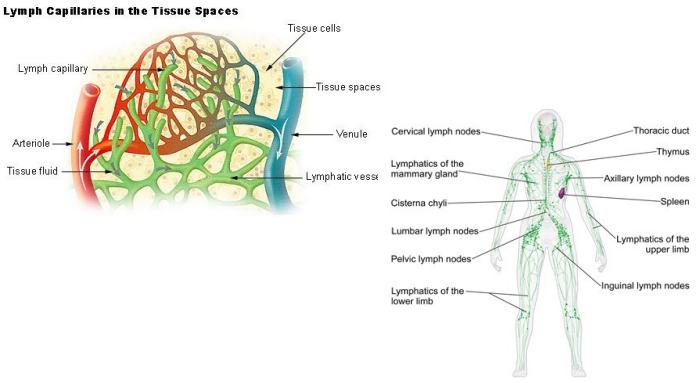
Herbal Approaches

Washes	Packing	Infection (Topical – Can be in wash as well)
Oak	Charcoal	Echinacea
Heartsease	Prickly Pear	Berberine-Containing Herbs
Oregon Grape (leaf + root)	Chaparral	Baikal Skullcap
Calendula	Fomentation packing - Oak - Black Walnut - Calendula - Red Sage	Black Walnut
Red Sage		Chaparral
Black Walnut		Andrographis

Acute vs. Chronic Wound

	Acute Wound	Chronic Wound
Definition	Occurred in last 4-6 weeks.	Present for longer than 6 weeks. Caused by endogenous mechanisms related to a predisposing condition or risk factors (diabetes, obesity, smoking, AIDS, chemotherapy) which eventually compromises dermal and epidermal tissue structures.
Examples	Surgical wounds, bites, burns, abrasions, traumatic wounds.	Leg/foot ulcers and pressure sores – likely from vascular insufficiency or neuropathy.
Treatment	Expected to heal within a predictable time frame. Clean and minor: minimal intervention. Severe and contaminated: 1. Surgical debridement 2. Antimicrobial therapy 3. Wound lavage	1. Wound dressing 2. Antimicrobial agents 3. Footwear 4. Physical therapy 5. Educational strategies 6. Optimise treatment for co-morbidities Pressure sores: pressure relieving mattresses and cushions Venous leg ulcer: compression therapy

Lymph Capillaries & Microcirculation



Factors Affecting Wound Healing

Local	General
Infection	**Nutritional deficiency**
Ischemia	**Age**
Foreign bodies	**Condition**
Iatrogenic stress (e.g. rough tissue handling)	**Liver disease**
Lack of circulation	**Diabetes**
Neoplasia	**Neoplasia**
Steroids	**Chemotherapy**
Radiation	**Steroids (immune suppression)**

Goals

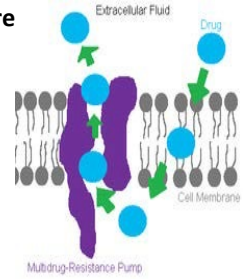
- **Phytotherapeutic approaches – both singularly and as adjuvant/integrative care to assist with:**
  - **Reducing tissue inflammation**
  - **Increasing tissue proliferation**
  - **Wound infection**
  - **Chronic (non-healing) wounds**
  - **Antibiotic-resistant bacterial infections**

Preparations & Applications

- **Rinses & Soaks**
- **Compresses**
- **Poultices**
- **Plasters**
- **Salves**
- **Oils**
- **Liniments**
- **Wraps**
- **Washes**

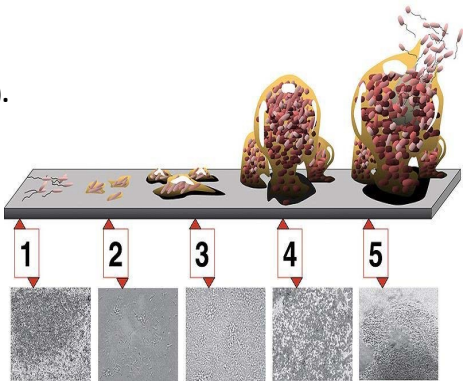
Efflux Pump Inhibition

- **Berberine + 5' Methoxyhydnocarpin (MHC)**
  - **NorA MDR (efflux) pump, most specific to Staphylococcus (esp. MRSA) infections**
  - **Berberidiceae (Barberry species, Ore**
  - ***Hydrastis canadensis* (Goldenseal)**
- **Capsaicin + Cipro tests**



Biofilms

- **Planktonic**
- **Micro colonies , excrete extracellular polymeric substances (EPS).**
- **Biofilm formed**
- **Maturation**
- **Critical Mass - Recolonization**



Biofilm Management

- **Quorum Sensing Inhibition (QSI)**
  - **Baicalin**
    - ***Plantago spp.* (Plantain)**
    - ***Scutellaria baicalensis* (Baikal skullcap)**
  - ***Arctostaphylos uva ursi***
  - ***Juglans* spp.**
  - ***Commiphora spp.***

Biofilm Management

Quorum Sensing Disruption	
Punica granatum (Pomegranate rind)	*Andrographis panniculata (Andrographis)*
Achyranthes aspera (Chaff Flower)	*Taraxacum officinale (leaf) (Dandelion)*
Archtystapholos uva ursi (Bearberry)	*Parkinsonia aculeata (Ratama)*
Scutellaria baicalensis (Baikal Skullcap)	*Quercus* spp. *(Oak)*
Rosmarinus officinalis (Rosemary)	*Terminalia catappa (Indian Almond)*
Hamamelis virginiana (Witch Hazel)	*Commiphora spp. (Myrrh)*

Proliferation

Collagen-Fibrin Matrix Formation

- ***Larrea spp.*** **(Chaparral) – External Only**
- ***Lantana spp.*** **(Lantana) – External Only**
- ***Centella asiatica*** **(Gotu Kola) – External and Internal**
- ***Achillea spp.*** **(Yarrow) – External and Internal**
- **Vitamin C (Internal) - Internal**
- ***Carica papaya*** **(*Unripe Papaya fruit) – External Only***
- ***Equisetum spp.*** **(Horsetail)**
- ***Symphytum off. (Comfrey)***

Wound Healing Protocols

Infection Management	Inflammation	Proliferation	Remodeling
Charcoal (cleaning)	*Prunella vulgaris*	*Larrea spp.*	Castor oil + Coconut oil (1:1) Infused with • *Centella asiatica* • *Caspicum anuum* • *Zanthoxylum spp.* • Vitamin E Oil
Opuntia spp. (cleaning)	*Astragalus membranaceous*	*Symphytum off.*	
Juglans spp.	*Ginkgo biloba*	*Plantago spp.*	
Echinacea purpurea + angustifolia	*Centella asiatica*	*Centella asiatica*	
Berberine-containing herbs	*Salvia miltiorrhiza*	*Lantana camara, urticoides*	
Quercus spp. + Pomegranate rind	*Angelica sinensis*	*Achillea spp.*	
Larrea spp.	*Achyranthes bidentata*	Vit C.	

Lymph & Herbs

- Stressors
  - Lifestyle (uncompensated stress)
  - Nutrition
  - Sleep
- Innate
  - Stimulate WBC count
  - Stimulate WBC activity
- Lymph
  - Increase flow and activity of lymph & nodes
- Adaptive
  - Increase B Cell and T Cell Counts and Activity

Lymph & Herbs

- Innate
  - ***Eupatorium perfoliatum*** **- Boneset**
  - ***Echinacea spp.***
- Lymph
  - ***Phytolacca americana*** **- Poke**
  - ***Iris versicolor*** **– Blue Flag**
  - ***Ceanothus spp.*** **– Red Root, New Jersey Tea**
  - ***Trifolium pratense*** **– Red Clover**
  - ***Galium aparine*** **– Cleavers**
  - ***Fouquieria splendens*** **– Ocotillo**
  - ***Stillingia*** **– Queen's Delight**
- Adaptive
  - ***Maitake, Shiitake, Cordyceps***
  - ***Aziridachta indica*** **- Neem**
  - ***Astragalus membranaceous***

Key Formula Concepts

↑ Lymph & Microcirculation	↑ Proliferation (granulation & epithelialization)	Strengthen & Support Veins
Phytolacca americana	*Larrea spp.*	*Alchemilla vulgaris*
Salvia miltiorrhiza	*Symphytum off.*	*Achillia millefolium*
Zanthoxylum spp.	*Calendula off.*	*Ruscus aculeatus*
Foquiera splendens	*Plantago spp.*	*Aesculus hippocastanum*
Stillingia spp.	*Acalypha spp.*	*Hamamelis virginiana*
Zingiber off.	*Equisetum spp.*	*Vaccinium myrtillus*
Myrica spp.	*Geranium maculatum & spp.*	*Centella asiatica*

Lymph Formula (acute)
What do we want to accomplish?

Increase WBC Count & Activity Increase Adaptive Immunity	Increase Lymph Flow/ Activity	Liver Support	Eliminition (Urinary)
Echinacea spp.	*Phytolacca a.*	*Arctium lappa*	*Arctium lappa*
Eupatorium perfoliatum	*Iris versicolor*	*Rumex crispus*	*Taraxacum off.*
Astragalus m.	*Ceanothus spp.*	*Cnicus benedictus*	*Petroselenium crispus*

Granulation

Granulation (Exudative)

Epithelialising

Maceration

Slough

Slough

Necrotic

Bio-burden

Charcoal - Wound Case Study

Ankle – Cellulitis (Nicaragua): Before Charcoal

Ankle – Cellulitis (Nicaragua): 2 hours of Charcoal

Ankle – Cellulitis (Nicaragua): 4 hours of Charcoal, 2 hours of herbs

Case Studies

Charlie – April 8th, 2018

Case Studies

Charlie – April 8th, 2018

First 4 Weeks

Honey +

- **Plantain**
- **Chaparral**
- **Oak**
- ***Arnebia euchroma***

Alternating with

Mesalt Gauze

Alternating with

Prickly Pear

Case Studies

Charlie – April 8th, 2018

Case Studies

Charlie – April 12th, 2018

Case Studies

Charlie – April 20th, 2018

Case Studies

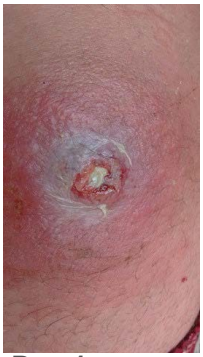
Charlie – July 3rd, 2018

Case Studies

Charlie – July 3rd, 2018

Brown Recluse Bite

Echinacea flower and root poultices on the full area



Day 1

Day 2

Day 4

Diabetic Ulcer – Day 1

Honey +
- **Chaparral**
- **Black Walnut**
- ***Echinacea***

Diabetic Ulcer – Day 13

Diabetic Ulcer – Day 33