



Soothe & Solve: The Equine Topical Treatment Guide

PANELISTS:

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Outline

- Stages of wound healing
- When to call the vet
- Emergency kits
- Wound FAQ
- Common terms and definitions
- Individual topical products
- Common mistakes



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Stages of Healing

- Hemostasis phase
 - Coagulation
- Inflammatory phase
 - Granulation tissue!!
- Proliferative phase
 - Epithelial cell migration
- Remodeling phase
 - Wound strengthened



Morales Yniguez et al 2024, Frees 2018



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Stages of Healing

- Inflammatory phase
 - ~1 week
- Proliferative phase
 - 2-3 weeks
- Remodeling phase
 - 1 year +



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Exuberant granulation tissue “Proud Flesh”

- Failure of healing
- Causes
 - Bacterial contamination
 - Biofilm formation
 - Excess motion
- Prevention
 - Proper cleaning
 - Resolving chronic inflammation



Morales Yniguez et al
2024, Bertone 1984



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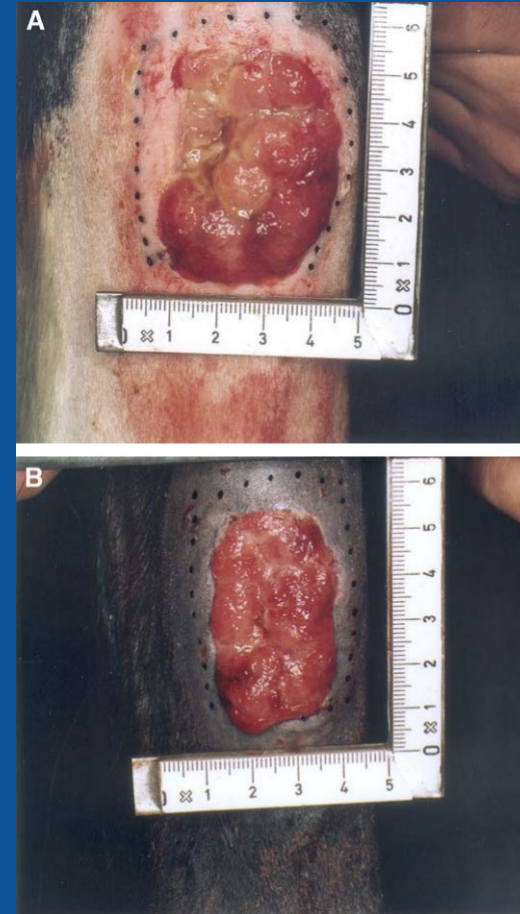
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Exuberant granulation tissue “Proud Flesh”

- Predisposing factors
 - Distal limb
 - More motion?
 - Body weight and height
 - Ponies heal better!
 - Bandage application



Bertone 1984, Wilmlink and Weeren 2005, Maher and Kuebelbeck 2018



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Exuberant granulation tissue “Proud Flesh”

- Treatment
 - Topical corticosteroids
 - 1-2 applications at the start
 - Surgical excision
 - No nerve endings!
 - Skin grafts



Morales Yniguez et al
2024, Bertone 1984



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When to call the vet!

- Full thickness skin
- Over a joint or tendon
- Significant blood loss
- Marked lameness



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What to do while waiting for the vet

- If stable, move to a barn or shed
 - Electricity ideal
- Bandage if bleeding
- Clean and cover wound



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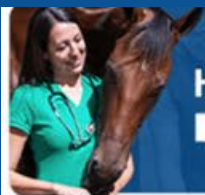
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Supplies for Emergency Kit

- Medications
 - Make sure in date
 - Discuss with your vet what is best for your farm
 - Oral syringes
 - Neomycin Polymyxin Bacitracin eye ointment
- Bandage material
 - Cotton roll
 - Vet wrap
 - Standing wrap/combi roll
 - Gauze
 - Nonstick bandage
 - Rolled gauze
 - Elastikon
 - Ace wrap
 - White tape
- Baling twine
- Flashlight/Head lamp
- Gloves
- Thermometer
- Hoof care
 - Epson salt
 - Animalintex
 - Thrush Buster
 - Hoof pick
 - Duct tape
 - Diaper
- Wound Care
 - Betadine/chlorhex
 - Alu-mend
 - Petroleum jelly
 - Silver sulfadiazine
 - Swat
 - Wonder dust
- Scissors/Bandage scissors
- Hemostats
- Towel
- Instant ice pack



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Supplies for Emergency Kit

- Wound Care
 - Betadine/chlorhex
 - Alu-mend
 - Petroleum jelly
 - Silver sulfadiazine
 - Swat
 - Wonder dust
 - Neomycin Polymyxin Bacitracin eye ointment

Ask your vet what else they recommend!



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Emergency Kit

- Locations
 - Barn
 - Trailer
- Restock after any use



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Initial Veterinary Wound Care

- Lavage
 - 10-15 PSI remove 80% organisms
 - +/- antiseptic
- Palpation
 - +/- Radiograph
- +/- Fluid pressure test
- Culture/PCR?



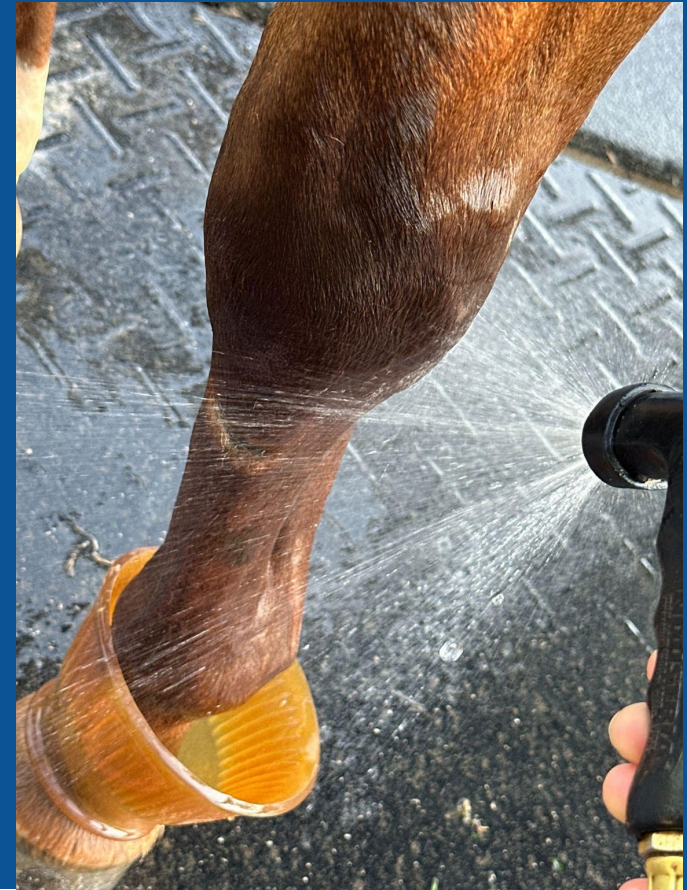
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Lavage

- Bacterial adhesion begins at 3 hours
- Saline with lavage system
 - 3 hours > 70% reduction in bacteria
 - 6 hours > 52% reduction in bacteria
 - 12 hours > 37% reduction in bacteria



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Types of Wounds

Primary Closure

- Ideal!!
- Sharp laceration
- Within hours of injury



Second Intention Healing

- Less cosmetic outcome
- Older wound
- Significant tissue loss



Wound Closure

Primary Closure

- Cleaning/Debridement
- Closure with sutures
- Bandaging

Secondary Closure

- Cleaning/Debridement
- Daily cleaning
- Daily hydrotherapy
- +/- Bandaging



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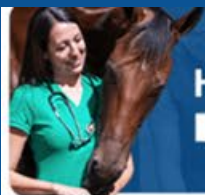
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Wound Care Tips

- Cleaning
 - Different for each wound!
 - Appropriate materials
- Use gloves
- No creams on sutures



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Hydrotherapy

- Not necessary once granulation tissue present
- Options
 - Sterile saline ideal
 - Tap water ok
 - Can contaminate wound
 - Can cause cell death with prolonged use



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Factors that Delay Healing

- Older
- Horses (vs ponies)
- Cushing's disease
- Malnutrition
- Tissue hypoxia/ poor perfusion
 - Dehydration/hypovolemia
- Hypoproteinemia



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Terms & Definitions

Antimicrobial vs Antiseptic vs Disinfectant

- Antimicrobial = broad, overarching term that refers to any therapeutic substance that kills or inhibits the growth of microorganisms
- Antiseptic = antimicrobial substance that is gentle enough to be used topically on living tissue.
 - Used to prevent or suppress microbial infection
- Disinfectant = antimicrobial compounds that are applied to inanimate surfaces.
 - Used to reduce/destroy microbial growth on counters, equipment, floors, etc.

Antiseptic

Disinfectant

Antimicrobial



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Scrub vs Solution

Scrub

- Base antiseptic + a detergent/soap
- Forms a lather with scrubbing action
- Used for active cleaning of wound
- Should be rinsed off

Solution

- Base antiseptic only
- “Painted” or sprayed on skin
- Left on skin to air-dry; leaves a residual film



Ointment vs Cream vs Gel

- Differ in the base product composition and how they interact with the skin

Ointment

- Primarily oil or petroleum product based
- Heavy, greasy, sticky texture
- Form a barrier that traps moisture

Cream

- Typically a 50/50 oil/water mix
- Lighter and easier to spread

Gel

- Water or alcohol base, thickened with polymers (no oil)
- Transparent, jelly-like texture
- Dry/evaporate rapidly, leaving a film of medication



Antiseptics

Povidone Iodine

- Broad spectrum antibacterial activity and strong biofilm prevention
- No bacterial resistance despite > 100 years of use
- Forms:
 - Solution
 - Scrub
 - Ointment
- Available in various strengths (typically 5-10%)
- Should be diluted prior to flushing directly into wounds



Marchant et al., 2024



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Chlorhexidine Gluconate

- Used as both an antiseptic and disinfectant
- Broad antimicrobial activity
- Forms:
 - Solution
 - Scrub
 - Ointment
- Available in various strengths (typically 2-4%)
- Should be diluted prior to flushing directly into wounds
- In-vitro work suggests decreased skin cell proliferation/migration even in low concentrations



Streetman et al., 2026



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Hydrogen Peroxide

- Used as an antiseptic to clean minor cuts and scrapes
- Naturally produced by immune cells as part of inflammatory process
- 3% solution most common
- Less effective against some bacteria compared to povidone iodine and chlorhexidine
- Topical application of 3% H_2O_2 (980 mM) delayed healing, while a much lower concentration (50 mM H_2O_2) promoted wound closure



Zhu et al., 2017



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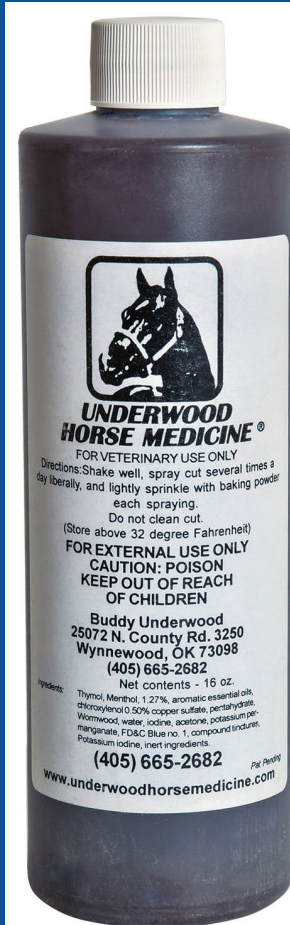
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Topical Medications

Underwood Horse Medicine

- Contains several ingredients including antiseptic botanicals, copper sulfate, and iodine.
- Directions:
 - Liquid is sprayed onto wound, then dusted with baking powder
 - This mixture is left on the wound and not washed off
- Efficacy based on testimonials – NO published research studies



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Blu-Kote

- Fast drying antiseptic
- Active Ingredients: sodium propionate, gentian violet, and acriflavine; combined in a base of water, urea, glycerin, isopropyl alcohol
 - Gentian violet = antibacterial and antifungal; dye
 - Sodium propionate = antiseptic and preservative
 - Acriflavine = antiseptic and fluorescent dye
- Used for minor surface wounds



Maley & Arbiser, 2013



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Hypochlorous Acid

- Similar to natural product produced by immune cells
- Broad antimicrobial activity
 - No known resistance
- Epithelial wounds
 - Improved epithelialization at d 4 in humans compared to saline
- In-vitro
 - Effective against common eye bacteria

Burian et al., 2022; Stolle et al., 2026



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Zarasyt

- Active ingredient: Hydrated silica / Orthosilicic acid
- Study of 11 horses with leg wounds
 - No complications (including exuberant granulation tissue)
 - No control comparison



Chevalier and Pearson, 2023



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Honey

- History
 - Use dates back to ancient Egyptians
 - Lost favor once modern antibiotics were developed
 - Rise of antibiotic resistance has renewed interest
- MOA
 - High sugar-low water content causes osmotic fluid shifts
 - Low pH (3.2-4.5)
 - Generation of hydrogen peroxide
 - Other non-peroxide bioactive compounds
 - Antibacterial, anti-inflammatory and wound healing
- Not all honey varieties are equal!!



Dart et al., 2015



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Manuka Honey

- Native to Australia and New Zealand
- Honey that contains high levels of methylglyoxal (MGO)
 - Antimicrobial activity
- Forms – cream, ointment, gel, bandages
- Some evidence that honey can speed healing (early wound phase only – first 21 d)
 - Lack of evidence on long-term effects or cosmetic outcomes

Dart et al., 2015;
Freeman et al.,
2020



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Spray on and Liquid Bandage Products

- Water-resistant, antibiotic-free spray on bandages used to protect minor cuts, scrapes, and wounds.
- Common active ingredients:
 - Aluminum powder
 - Ceragenins
 - Silver nanoparticles
- Forms a physical, flexible barrier that shields wounds from water, dirt, bacteria, and insects.
- Can be applied over other ointments.



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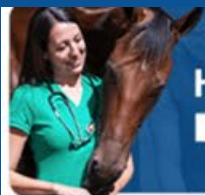
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Amniotic Membrane

- Availability
 - Amnion harvesting
 - Commercial products
- Forms
 - Liquid
 - Ophthalmic drops
 - Bandage
 - Stem cells



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Amniotic Membrane

- Skin

- No difference in speed of wound healing in iatrogenic ulcers (SQ liquid)
- Wounds with pinch grafts healed in 30 days vs 39 days (bandage)
- Burn wounds
 - Epithelialization on day 7: 100% amniotic membrane, 77% nitrofurazone
 - Amniotic membrane group: less pain, scarring, morphine use, length of hospitalization

- Corneal

- No difference in speed of ulcer healing in iatrogenic ulcers

Lyons et al, Duddy et al, Goodrich et al, Lange-Consiglio et al

- Tendon

- Intralesional injection of amniotic stem cells (compared to bone marrow) had a lower rate of reinjury (4% vs 23%) and faster return to work (4-5 months vs 5-12 months).



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Amniotic Membrane

- Overall
 - Less exuberant granulation tissue
 - Quicker epithelialization
 - Best used once granulation tissue has formed



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Nitrofurazone

- Forms
 - Cream
 - Impregnated gauze
- Concerns
 - Teratogenic
 - Carcinogenic
 - Mammary and ovarian tumors
 - Oxidative DNA damage



Hiraku et al 2004



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Nitrofurazone

- Skin wounds
 - Accelerated healing in mice compared to saline
 - Improved healing at 7 and 10 days in rats (short term study)
 - Delayed healing in pigs and rats

Karapolat et al 2020, Kazemzadeh et al 2021,
Gooch et al 2017, Kovacic et al 2014



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Silver Sulfadiazine

- History
 - Developed in 1960s
 - Used in Vietnam War for burns
- MOA
 - Silver binds to bacterial cell components
 - Local cytotoxicity
- Forms
 - 1% cream
 - Slow-release matrix
 - Silver sulfadiazene coated catheters



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Silver Sulfadiazine

- Applied to iatrogenic wounds
 - Cream vs slow-release matrix
 - No difference in healing times
 - Bandaged had more exuberant granulation tissue
- Exuberant granulation tissue was increased
 - Compared to TAB or control
 - No change in healing time
- Silver sulfadiazine coated catheters
 - No difference in incidence of thrombophlebitis
- Burn wounds
 - 21 days: 100% healed honey and 84% SSD
 - Efficacy of TAB against isolates from burn wounds (77%)

Harmon et al, Berry et al,
Olivier et al, Subrahmanyam et
al, Nethery et al



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Triple Antibiotic Ointment

- Allergic contact dermatitis
 - Bacitracin can trigger activation of mast cells
 - “Contact allergen of the year” in 2003
 - Neomycin and polymyxin also implicated
- Forms
 - Ophthalmic ointment
 - Same ingredients but different grade
 - Ophthalmic solution
 - Skin ointment
 - Wound spray



Nguyen et al 2024, Ngo et al 2019



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Triple Antibiotic Ointment

- Ophthalmic
 - Changes the ocular microbiota
 - Decreased bacteria and fungi
 - Returns to normal in 3 weeks
- Skin
 - Efficacy of TAB against isolates from burn wounds (64%)

Martin de Bustamante et al, Nethery et al



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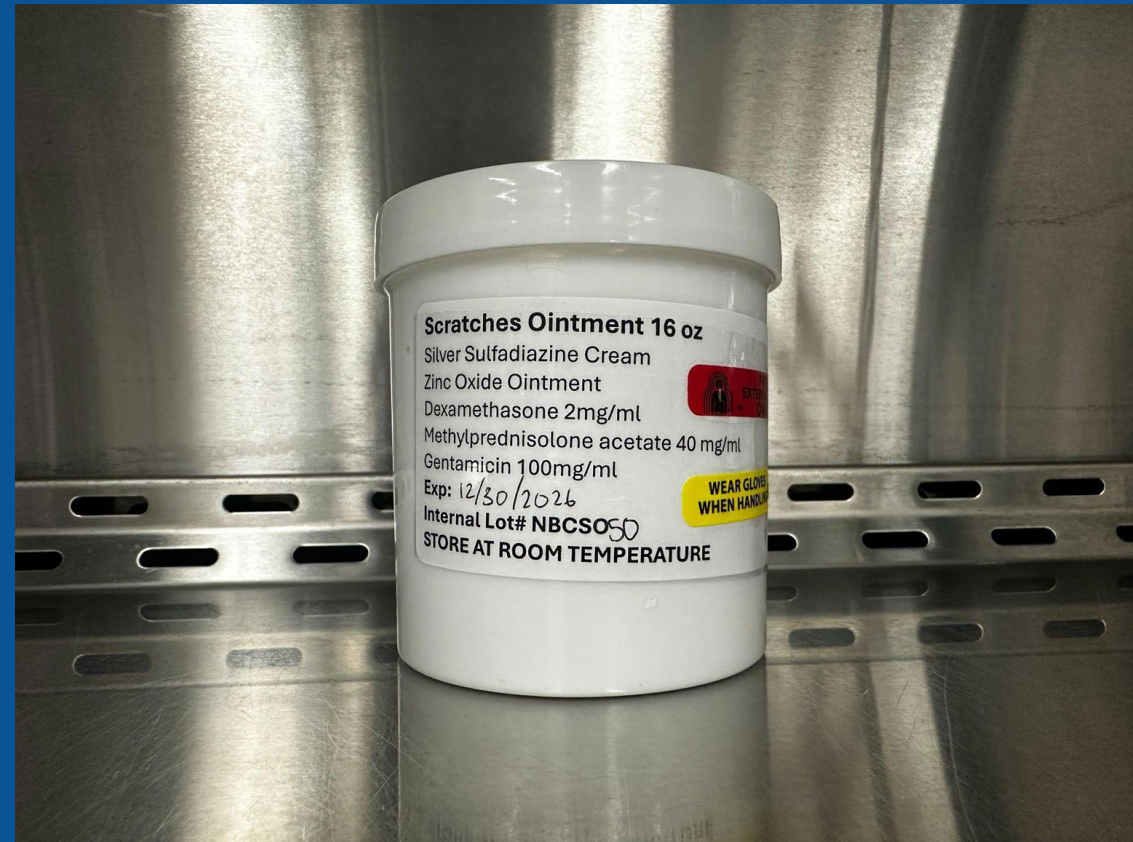
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Scratches Cream

- Many variations
- Usually includes
 - Steroid
 - Antibiotic
 - Zinc oxide
 - Protective barrier



What is safe near the eye?

- Triple antibiotic ointment
- Silver sulfadiazine cream
- Miconazole
- Petroleum jelly
- Aquafor



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Do NOT use ON wounds

- Surpass
- Swat
- Full strength antiseptics
- Hydrogen peroxide
- Lye



General Use for Topical Meds

- Superficial wound
 - Liquid bandage
- Wounds with sutures
 - No topical medications!
- Second intention healing
 - Initial hydrotherapy
 - Topical antibiotics
 - Honey
- Exuberant granulation tissue
 - Amniotic membrane
 - Honey



Case Examples

Superficial Wound



Second Intention Healing



Take Home Points

- Prompt wound lavage
 - Prevents infection
- Timely veterinarian evaluation
 - Small wounds can be more than they appear
- Some lacerations will fall apart
- Granulation tissue is part of second intention healing
 - Exuberant granulation tissue is what we want to avoid
- Long-term care likely for best result

Questions?



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Screwworm

- Maggots of the fly *Cochliomyia hominivorax*
- Female flies lay hundreds of eggs at a time in wounds or mucous membranes
 - a. Eggs hatch into maggots which feed on LIVING flesh
- Only on warm blooded animals
- "distinctive odor"
- Maggot collection into alcohol in screw-top container

