



Wound Care : A practical approach

Nathan Slovis DVM, Dipl. ACVIM

HAGYARD

Equine Medical Institute

Hagyard-Davidson-McGee Since 1876

Hagyard Field Care
Davidson Surgery Center
McGee Medicine Center
McGee Fertility Center
Hagyard Laboratory

Presentation title



HAGYARD

Equine Medical Institute

Hagyard-Davidson-McGee Since 1876

Hagyard Field Care
Davidson Surgery Center
McGee Medicine Center
McGee Fertility Center
Hagyard Laboratory

Presentation title



- **OUTLINE**

- Pathophysiology of Wound Repair
 - Burn Injuries
 - Exuberant granulation tissue
 - Distal Limb Injuries VS Other locations
 - Complicated Wounds
- Wound Dressings
 - Evidence based medicine



Initial Insult

- Acute Inflammation
 - Platelets → Cytokine release that attracts inflammatory leukocytes
 - Expressed by coagulation
 - Neutrophils
 - Destroy debris and bacteria
 - Enhanced by IL-1 and TNF ∞
 - Die within a few days when the infection has been cleared
 - Macrophages
 - Debridement
 - Microbial Killing
 - Coordinates repair → Secrete cytokines



Initial Insult

- Acute Inflammation
 - Termination occurs when:
 - Inciting stimulation has been resolved
 - Microvascular permeability has been restored
 - Big problem with Thermal Injury



Initial Insult

- Cellular proliferation
 - Granulation Tissue
 - Macrophages
 - Fibroblasts
 - Blood Vessels
 - Provides surface of epithelial migration
- Angiogenesis
 - Capillaries begin to invade wound space 2nd day after injury
- Epithelialization



Factors Affecting Wound Healing

- Wound Type
 - Important to classify because indicator of vascular supply, contamination and viability of surrounding tissue
- Wound Contamination
 - Biofilm
 - Linked to increased resistance to antimicrobial agents and the hosts' immune system
 - *Staphylococcus 100x more resistant when in a biofilm compared to free floating*
 - *Bacteria competition with local cells*
- Location
 - Distal Limbs
 - Decreased vascular supply compared to other regions of the body
 - Higher degree of contamination
 - Tension
 - Impair wound healing by ↓ blood flow and compromising surrounding tissue

Factors Affecting Wound Healing

- EXUDATE
 - Nutrients
 - Growth Factors
 - Growth of Endothelial cells
 - Dermal Fibroblasts
- Health of the Horse
 - Nutritional State
 - Vitamin A deficiency



HAGYARD

Equine Medical Institute

Hagyard-Davidson-McGee Since 1876

Hagyard Field Care
Davidson Surgery Center
McGee Medicine Center
McGee Fertility Center
Hagyard Laboratory

Presentation title

BARN FIRE



HAGYARD

Equine Medical Institute

Hagyard-Davidson-McGee Since 1876

Hagyard Field Care
Davidson Surgery Center
McGee Medicine Center
McGee Fertility Center
Hagyard Laboratory

Presentation title

BARN FIRE





Stable fires, natural disasters stun horse owners

BY BETSY PARKER
Times-Democrat Staff Writer

The Oct. 26 barn fire that killed 10 horses at a well-known boarding facility in Clifton was tragic, but it was not the only stable fire to touch Virginia's horse country over the past few weeks.

A barn fire near Hartwood in Stafford County killed five horses Oct.

16, when a stable owned by Tina and Craig Johnson burned to the ground in the middle of the night.

Forty firefighters responded to the alarm. Following an investigation, Stafford Deputy Fire Marshal Ben Gouldman said the cause of the fire was accidental.

Tina Johnson hosts the local

Commonwealth Foxhounds Pony Club every Sunday on the property.

Thirty-three horses were killed in an enormous barn fire west of Chicago on Oct. 5, when a 40,000-square-foot stable and indoor arena caught fire in the early evening. Just a single horse was rescued, by his owner, who was the only person on site when the blaze began.

No cause for the Chicago fire has been identified.

On Nov. 6, tornadoes that ripped through the central states resulted in the deaths of three horses stabled at the Ellis Park racetrack. The fast-moving twister also destroyed the infield toteboard and damaged other parts of the Ellis Park grandstand in Henderson, Ky.

See FIRES, Page B7



SHOCKING: The rubble left behind from a 1993 horse barn fire near Marshall is a chilling reminder of how devastating fire can be to a timber-frame stable building.

Times-Democrat file photo

Fact or fiction?

Checklist separates myth from reality of stable fires

BY REID FOLSOM
Special to the Times-Democrat

Fiction: Horses will run back into a burning barn to get to their stalls.

Fact: A horse's only means of defense is to run. They run away from a threat or danger. The only exception may be a horse that is stabled day and night, taken outside only with a human handler. Some of these horses may try to return to their familiar stall, but most will run away from a blaze.

Fiction: Blindfold a horse's eyes to lead him out of a burning barn.

Fact: A blindfolded horse has lost his key sense of sight. Unless exceptionally well-trained to follow a handler when blindfolded, a horse is more likely to panic and run. A running, blindfolded horse is a dis-

aster in progress. This only works in the movies.

Fiction: Hay causes most barn fires.

Fact: Most barn fires are caused by electrical problems. Some are caused by piles of oily rags, others by discarded cigarettes.

Improperly put-up hay (wet, or too green) will reach internal combustion temperature in less than two weeks after baling. Good hay that gets wet during delivery and is then stacked while wet can also combust, as can hay dampened by a leaking roof, but properly made and properly handled hay is not a fire risk.

Fiction: If there is a fire, open

See CHECKLIST, Page B7

HAGYARD

Equine Medical Institute

Hagyard Davidson McGee Since 1976

Hagyard Field Care
Davidson Surgery Center
McGee Medicine Center
McGee Fertility Center
Hagyard Laboratory

Presentation title

BLIND FOLDING



HAGYARD

Equine Medical Institute

Hagyard Davidson McGee Since 1976

Hagyard Field Care
Davidson Surgery Center
McGee Medicine Center
McGee Fertility Center
Hagyard Laboratory

Presentation title



THERMAL INJURIES

- FIRST DEGREE
 - Superficial Layer Epidermis
 - SIGNS
 - Painful
 - Erythema
 - Edema
 - HEALING
 - Germinal Layer Spared
 - Heal without complications





THERMAL INJURIES

- SECOND DEGREE
 - Superficial VS Deep
 - **SUPERFICIAL**
 - Stratum Corneum
 - Stratum Granulosum
 - Few basal layers
 - **HEALING**
 - Minimal Scarring
 - 10-14 days

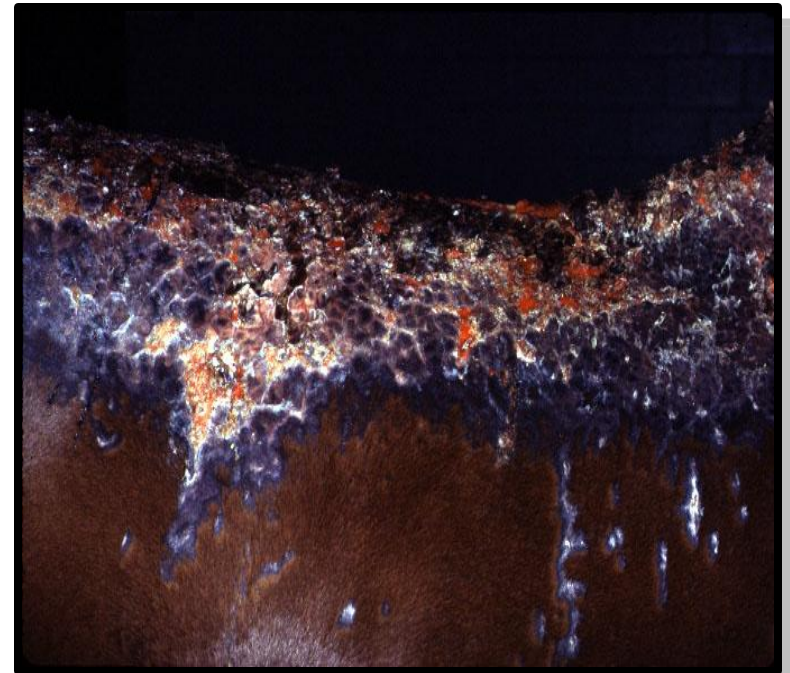


- SECOND DEGREE

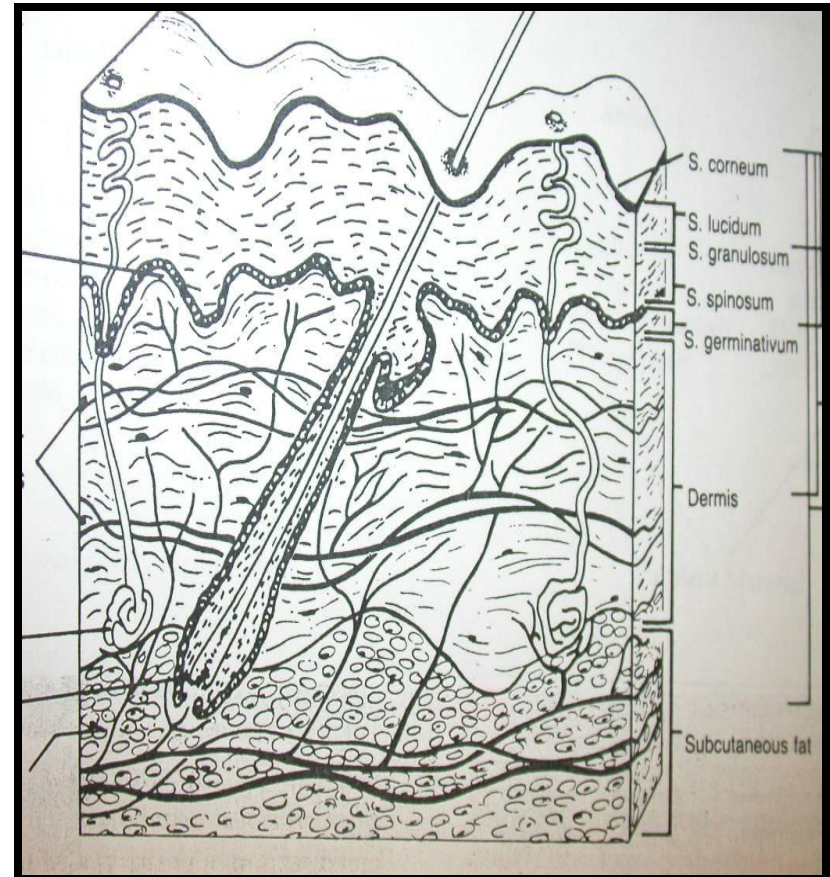
- Superficial VS Deep

- **DEEP**

- All layers of the Epidermis
 - Including Basal Layer
 - Hair Follicles and Sweat Glands Spared
 - Heal 3-4 weeks
 - SCAR FORMATION LIKELY
 - GRAFTS +/-



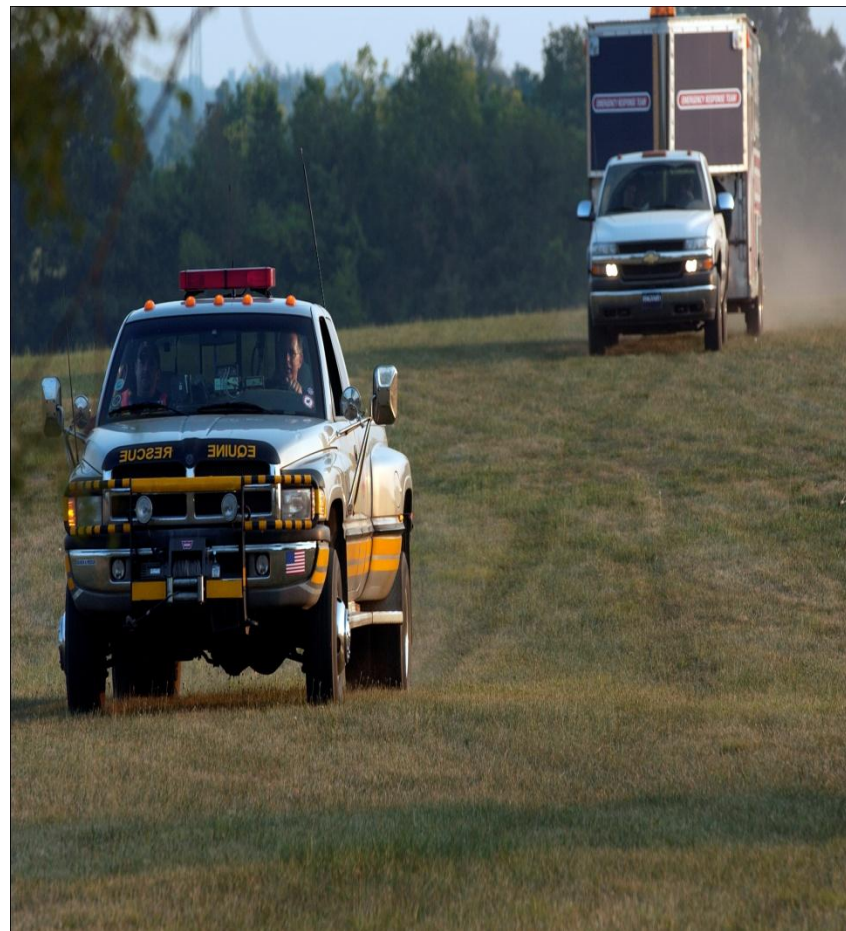
- **THIRD DEGREE**
 - Loss Epidermal and Dermal Components
 - Anesthetic = Destruction of Nerves
 - Marked Fluid Losses
 - Shock
 - High Incidence of Wound Infection
 - Bacteremia/Septicemia
 - GRAFTS NEEDED



• FOURTH DEGREE

– INVOLVES

- Skin
- Muscle
- Bone
- Ligaments
- Fat
- Fascia



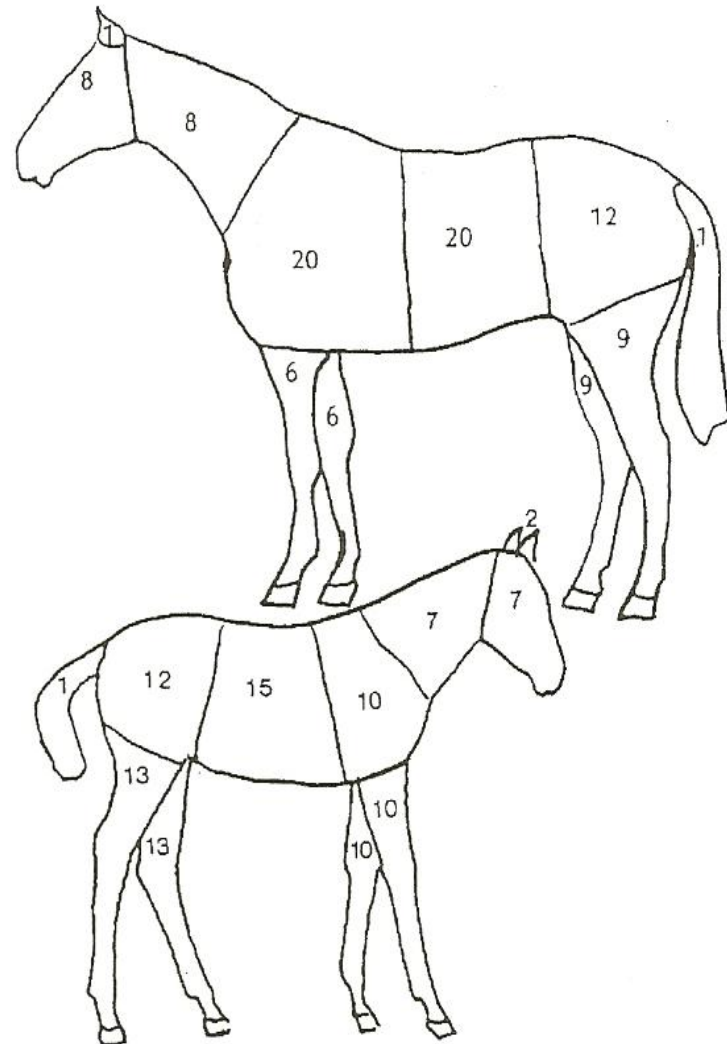
THERMAL INJURIES

Greater Than 50% BSA

**GRAVE
PROGNOSIS**

➤ 20% BSA

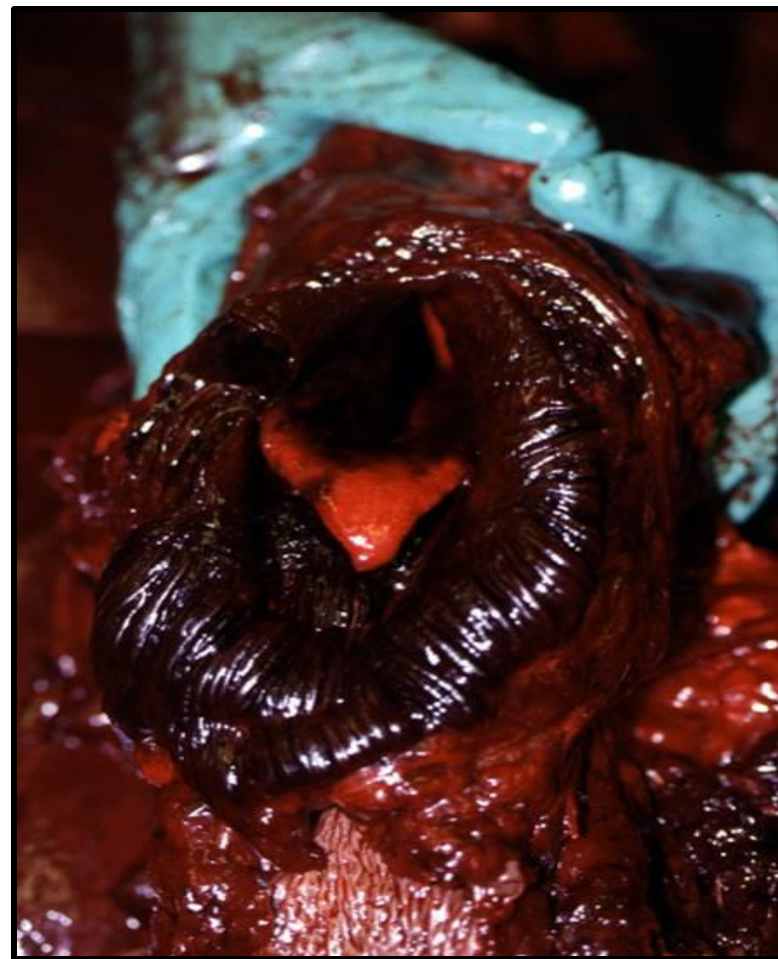
- Cellular and Humoral Immunity Compromise
- Depressed Cardiac Function
- Myocardial Depressant Factor



THERMAL INJURIES

- Physiologic/Metabolic Changes
- DIVIDED INTO 4 PHASES
 - Resuscitation Phase (0-36 Hours)
 - Postresuscitation Phase (2 to 6 days)
 - Hypermetabolic-Sepsis Phase (7 days to End)
 - Rehabilitation and Wound Remodeling Phase
(Admission to 1 year afterward)

- **SMOKE INHALATION**
 - 1/3rd of all Burn Victims
 - **Immediate Reactions**
 - Thermal Injury to Upper Airway
 - Supraglottic Injury
 - Superheated Air
 - Toxins and soot in the smoke
 - RARELY LUNG PARENCHYMA



Resuscitation Phase (0-36 Hours)

- **Burn Shock**

- HYPOVOLEMIA

- Increased Microvascular Permeability
- Intravascular-Extravascular Fluid Shifts
- Hypoproteinemia
 - Loss of albumin
- Loss of Epithelium
 - Prevents evaporation of water

Resuscitation Phase (0-36 Hours)

- **Burn Shock**

- TREATMENT

- 2-4 ml/kg Hypertonic Saline (1-2 Liters)
 - Crystalloids
 - 2-4 ml/kg per % body burned

500 kg horse 30% of Body Surface Burned

$30 \times 4 = 120 \text{ ml}$

$120 \times 500 = 60 \text{ Liters}$

Resuscitation Phase (0-36 Hours)

- Burn Shock

- TREATMENT

- Hetastarch 10ml/kg
 - 5 Liters for a 500 kg Animal
 - Plasma
 - AT3

Postresuscitation Phase (2 to 6 days)

- HEMODYNAMIC STABILITY

- Evaporative Water Loss ml/hr

- $(25 + \% \text{ Total Body Surface Area}) \times M^2 \text{ (BSA)}$
- $(25 + 30) \times 6.3$ (1100 Pound Horse Surface Area)
- $55 \times 6.3 = 346.5 \text{ ml/hr}$
- ROUGHLY 10 L a DAY

- Keep In cool Environment

- Decrease Evaporative Losses

Hypermetabolic-Sepsis

- Wound Sepsis Primary Concern
 - Natural Dressing
 - Scabs
 - Cells and Fibrin
 - Eschar
 - Collagen
 - Cells
 - Blood vessels



Hypermetabolic-Sepsis Phase (7 days to End)

- OCCLUSIVE DRESSING
 - Decrease Bacterial Population
 - Adhering to Wound Bed
 - Decrease Heat/Water Loss
 - Protect Granulation Tissue
 - Hasten Wound Healing
- LARGE WOUNDS
 - Painful (Frequent Debridement)
 - Extensive Bandaging (COSTLY)

- SEMIOPEN VS OPEN Technique
 - Echar is Left in Place
- Lavage Wound with 0.05% Chlorohexidine (~25 ml to 1L)
- **Silver Sulfadiazine 1%**
 - Gram – Bacteria (Especially *Pseudomonas*)
 - Good Against *Staphylococcus*, *E. coli*, Enterobacteriaceae and *Candida albicans*
 - *CHANGED 2x DAILY*
 - *Inactivated with Tissue Secretions*



HAGYARD

Equine Medical Institute

Hagyard-Davidson-McGee Since 1876

Hagyard Field Care
Davidson Surgery Center
McGee Medicine Center
McGee Fertility Center
Hagyard Laboratory

Presentation title

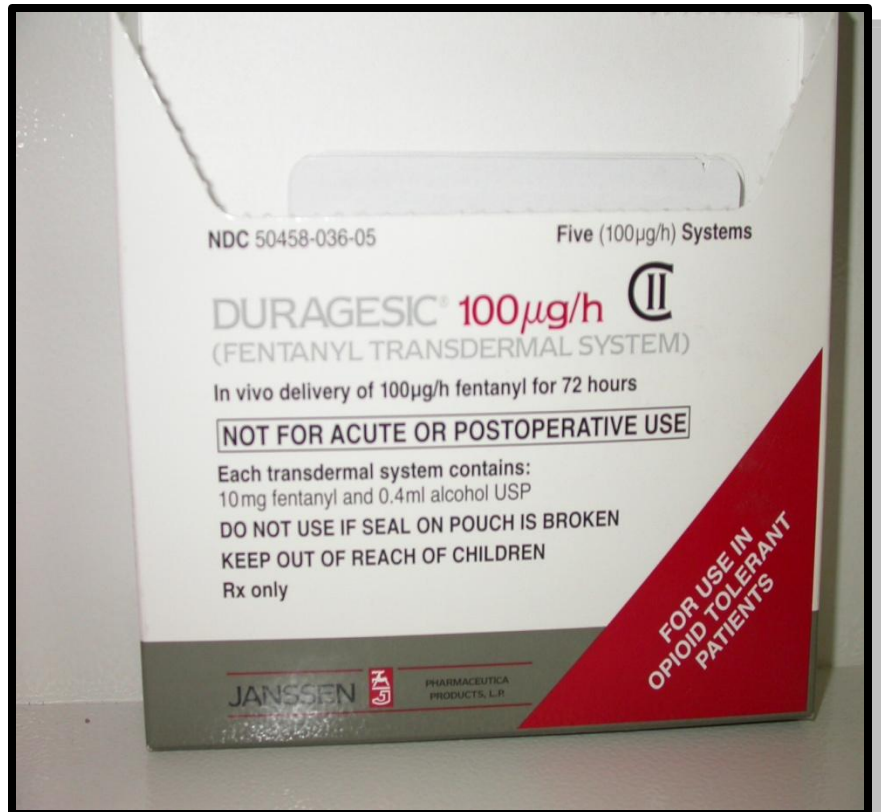
- Aloe Vera
 - Yucca Plant
 - Antithromboxane and antiprostaglandin
 - Relieve pain
 - Stimulate Cell Growth
 - Kill Bacteria and Fungi



Hypermetabolic-Sepsis Phase

- Hypermetabolic State
 - Increased Core Body Temperature 1-2 Degrees
 - Increase Caloric Intake Needed
 - Supplement with Vitamins
 - Vitamin C (50cc added to fluids)
 - Vitamin B Complex (20cc added to Fluids)
 - Vitamin E orally 5,000 – 10,000 IU
 - Vitamin A ?

- JVIM 2004
 - 2-3 Patches 450-500kg
 - Lasts 48-72 Hrs
 - Expensive



- MORPHINE
 - 0.1 mg/kg IV/IM Q4-6 Hrs
 - COMPLICATIONS
 - GI STASIS
 - Excitement



PAIN MANAGEMENT

- **Pentafusion**

- Eric J. Abrahamsen, DVM, DACVA

- ketamine, morphine, lidocaine, detomidine, and acepromazine

- CRI

- www.hagyardpharmacy.com to obtain formulary

HAGYARD

Equine Medical Institute

Hagyard-Davidson-McGee Since 1876

Hagyard Field Care
Davidson Surgery Center
McGee Medicine Center
McGee Fertility Center
Hagyard Laboratory

Presentation title

COMPLICATIONS



Exuberant Granulation Tissue

- Granulation tissue is one of the essential phases to wound healing
 - Endothelial cells
 - Leukocytes
 - Fibroblasts
- Location on the body
 - Distal limb Vs body

Exuberant Granulation Tissue

- Several Mechanisms have been incriminated
 - Poor Blood Supply (*Cochrane Wound Repair Reg 1996, Martsen Wound Repair Reg 1999*)
 - Poor Inflammatory Response (*Wilmink EVJ 1999*)
 - Persistent upregulation of proinflammatory factors (*Theoret Vet Surg 2001*)
 - Disparity between collagen synthesis and lysis (*Schwartz Am J Vet Res 2002*)

Exuberant Granulation Tissue

- Experiment where wound of similar nature were formed on the body and distal limbs
(1993 Wilmink EVJ)
 - Bandaging was noted to form exuberant granulation tissue
- Bandage is it good for wounds?
 - Necessary for high motion regions
 - Decrease oxygen tension in the tissue? (1981 Knighton Surgery)

Exuberant Granulation Tissue

- Breed
 - Ponies Vs Horses
- Iatrogenic
 - Lye
 - Antiseptics
 - Bleach and etc
- Neoplastic Transformation



Exuberant Granulation Tissue

- Other causes
 - Bone Sequestrum
 - Foreign Bodies
 - Necrotic tendons and ligaments
 - Habronema

Recommend the use of the ultrasound or radiographs

Exuberant Granulation Tissue

- Wound Debridement
 - Involves the removing of dead or damaged tissue, foreign bodies and bacteria.
 - Surgical
 - Enzymatic
 - Laser
 - Bandage
 - Biosurgical/Bioactive
- +/- Skin grafting for chronic cases

- Acupuncture Beads (Frauenfelder EVE 2008)
 - Gold Plated Beads
 - Placed 3-5mm under the skin edges
 - Go through the granulation tissue bed
 - Circle the Dragon Technique
 - 1cm intervals around the wound edges
 - “Ting Points”
 - Just above the coronet band
 - End Points of the acupuncture meridians

- Acupuncture Beads (Frauenfelder EVE 2008)
 - Acute wounds wait 7-8 days
- MOA:
 - Hypothesis:
 - Tissue Electrical and Acid/Base Balance
- Looked at 35 horses with good results

Topical Dressings

- Numerous products on the market
 - Few have been tested on the horse
- Antiseptics
 - Antimicrobial substances applied to living tissue
 - Chlorohexidine
 - Providone Iodine
 - Dakin's Solution (Sodium Hypochlorite)
 - Hydrogen Peroxide
 - Destroy bacteria by lysing their cell walls

Antiseptics

- Chlorhexidine Diacetate
 - Binds to stratum corneum
 - Residual antibacterial capacity
 - Continued activity in organic debris
 - Dogs very efficacious (1992 Lozier *Vet Surg*)
 - 100% kill Rate
 - Did not interfere with wound healing and contracture
 - Do not use around the eye: Damage Cornea
 - *Pseudomonas in Canada starting to become resistant* (1983 Amber *Vet Surg*)

Antiseptics

- Providone Iodine
 - 10% solution has a broad spectrum
 - No real resistance has been noted
 - Activity lasts 4 to 6 hours
 - Inactivated by organic material and blood
 - Serum with in 2 minutes
 - Cytotoxic
 - Flush with diluted solution
 - 0.1 – 0.2 % (10-20 ml/1000ml)
 - » Kills bacteria in 15 sec

Wound Dressings

- Topical medications as opposed to systemic medications are not FDA tested or Approved
 - This means plethora of new products
 - Need to critically evaluate these new products
- Commonly used
 - Triple Abx
 - Silver Sulfadiazine
 - Can be used with aloe vera with no side effects
 - Nitrofurazone
 - Questionable efficacy against Pseudomonas

Wound Dressings

- EquitrXtm
 - Distributed by Bayer
 - Chemical modification of Hyaluronan
 - Natural component of the ECM
 - Cross linked- Acts like scaffolding
 - Gel or Thin Sheet
 - Accelerate wound closure by re-epithelialization
 - CD44 receptor



A Comparative of Chlorhexidine Treated vs equitrX Treated Wounds at 26 days



**Chlorhexidine
Treatment**

**equitrX[®]
Treatment**



SEPTEMBER 7, 2007



Debridement 9/7/07



SEPTEMBER 21



SEPTEMBER 28



OCTOBER 5

HAGYARD

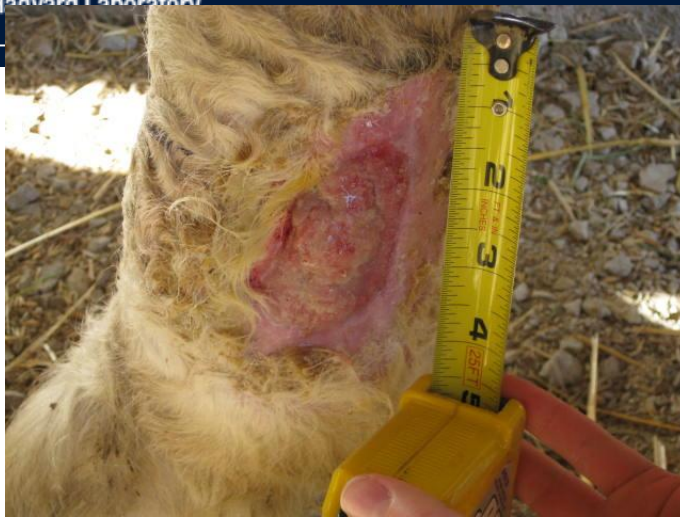
Equine Medical Institute

Hagyard-Davidson-McGee Since 1876

Hagyard Field Care
Davidson Surgery Center
McGee Medicine Center
McGee Fertility Center
Hagyard Laboratory

Presentation title

December 21 :
3 months



January: 4 months

March : 6 months



Wound Dressings

- Platelet Rich Plasma
 - Cytokines released by ∞ granules
 - Platelet Derived Growth Factor
 - Insulin Like Growth Factor -1
 - TGF- β 1
 - Study looking at 6 horses PRP did not accelerate wound healing. (Monterio AJVR 2009)
 - Contradicts a single horse study using platelet gel (Carter Exp Mol Pathol 2003)

- Platelet Rich Plasma **.(Monterio AJVR 2009)**
 - 6 mixed breed 10-15 yr old mares
 - 36 wounds (3 wounds on each front leg)
 - Tx vs Control
 - Biopsies
 - WSA
 - Biomechanical (Wound Strength) w/ tissue strips
 - REMEMBER:
 - These were fresh wound...Not chronic wounds

- Injured Saddlebreds Continue Treatment: One in Critical Condition
- By [Stephanie L. Church](#)
- End of June 2003
- Wild Eye and Wicked → Euthanized





8.12.03

7.28.03

8.26.03



7.18.03



HAGYARD

Equine Medical Institute

Hagyard-Davidson-McGee Since 1876

Hagyard Field Care
Davidson Surgery Center
McGee Medicine Center
McGee Fertility Center
Hagyard Laboratory

Presentation title



HAGYARD

Equine Medical Institute

Hagyard-Davidson-McGee Since 1876

Hagyard Field Care
Davidson Surgery Center
McGee Medicine Center
McGee Fertility Center
Hagyard Laboratory

Presentation title



Wound Dressings

- Vetericyn®
 - Hypochlorous Acid Technology
 - Exactly what neutrophils release
 - 6 hours of residual activity
 - Neutral pH
 - Broad Spectrum Antimicrobial
 - Won't develop resistance
 - Safe as using water
 - Antihistamine properties
 - Decrease Bioburden



HAGYARD

Equine Medical Institute

Hagyard-Davidson-McGee Since 1876

Hagyard Field Care
Davidson Surgery Center
McGee Medicine Center
McGee Fertility Center
Hagyard Laboratory

Presentation title



HAGYARD

Equine Medical Institute

Hagyard-Davidson-McGee Since 1876

Hagyard Field Care
Davidson Surgery Center
McGee Medicine Center
McGee Fertility Center
Hagyard Laboratory



Anasept® Antimicrobial Skin & Wound Cleanser



HAGYARD

Equine Medical Institute

Hagyard-Davidson-McGee Since 1876

Hagyard Field Care
Davidson Surgery Center
McGee Medicine Center
McGee Fertility Center
Hagyard Laboratory

Presentation title

Anasept® Antimicrobial Skin & Wound Gel

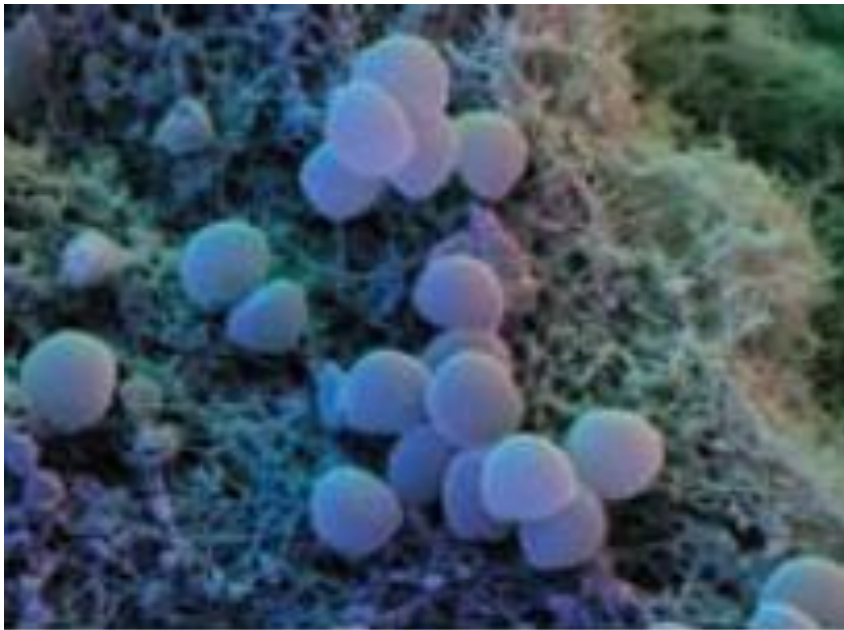
Long-Lasting Antimicrobial Properties



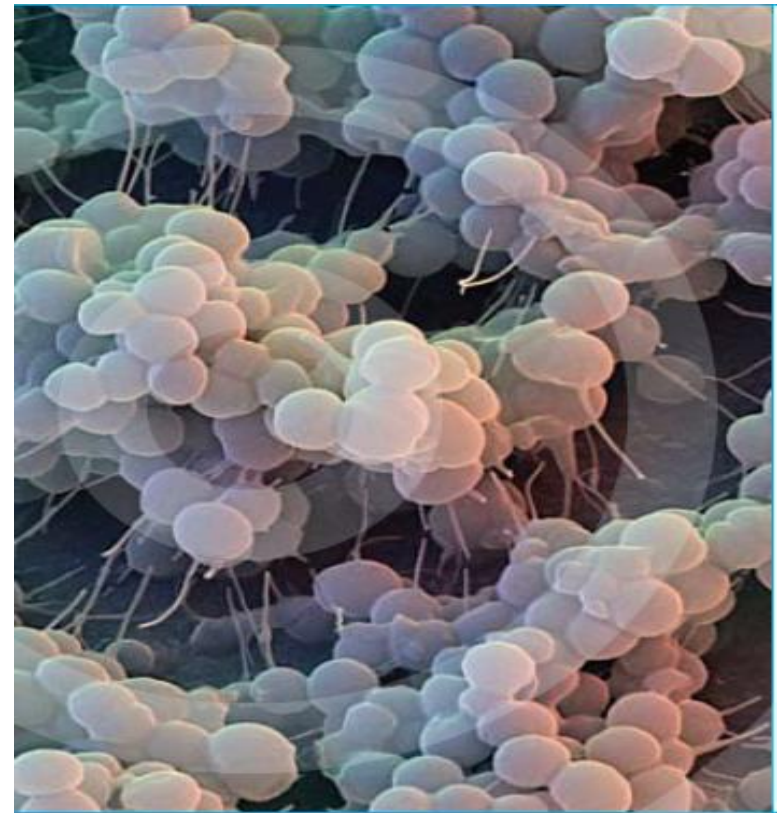
Wound Dressings

- Anasept ®
 - Sodium Hypochlorite
 - Gel (24 hrs residual activity in organic presence) and Spray
 - Use for bandaging of Peritoneal drains and etc.
 - MRSA, VRE 60 sec kill rate
 - Decreases incidence of resistance
 - Safe for incision sites
 - Decrease Bioburden

Biofilm- Factor in Chronic Wounds



Scanning Electron Micrograph:
Methicillin-Resistant
Staphylococcus aureus (MRSA)



Scanning Electron Micrograph: *Staphylococcus epidermidis* enlarged 27,000x

Biofilm- Factor in Chronic Wounds

Biofilms are microbial communities that are tightly attached to surfaces and /or tissue and cannot easily be removed . Once these masses form, microbes within them can be resistant to disinfectants and antibiotics by multiple mechanisms including physical characteristics, microbial production of neutralizing enzymes, and physiologic gradients within the biofilm.

Bacteria within biofilms are up to 1000 times more resistant to antimicrobials than are the same bacteria in suspension.

Chlorine compounds such as hypochlorites and hypochlorous acid can effectively inactivate biofilm bacteria.

Historical Perspective on the Uses of Sodium Hypochlorite in Wound Treatment

- **Historical Perspective on the use of Sodium Hypochlorite in the treatment of Wounds**
- **1915- Henry Dakin's Published his now classic investigations of antiseptic substances wherein he described the superior qualities of hypochlorite solution for the treatment of wounds¹**
- **Dakin evaluated the antiseptic qualities of a number of substances including: phenol, silver nitrate, salicylic acid, hydrogen peroxide and sodium hypochlorite.**
- **Dakin judged sodium hypochlorite the superior agent. He recognized not only its outstanding antiseptic properties, but also the ability of hypochlorites to debride wounds, noting that "the solution has the valuable property of assisting in the rapid dissolution of necrosed tissue¹."**
- **Dakin's solution fell into decline with the advent and commercialization of antibiotics, however, this was short-lived as the development of drug-resistant microbes and poor penetration into necrotic tissue and compromised tissue.**
- **During the 1980's in-vitro evaluations of the wound-healing properties of Dakin's solution was undertaken by investigators who concluded that Dakin's solution was deleterious to wound repair and healing and that this agent should discontinued for the use in the treatment of wounds. The use of Dakin's Solution soon afterward declined dramatically for use in wounds³.**
- **2002 development by Anacapa Technologies, Inc. of a stable, non-cytotoxic, broad-spectrum anti-infective analog of sodium hypochlorite sold under the trade name: Anasept®Antimicrobial Skin & Wound Cleanser.**

Time kill studies:

Extremely high concentrations of pathogenic micro-organisms were exposed to Anasept Antimicrobial Skin and Wound Gel over the course of precisely timed intervals in the presence of an interfering substance that simulates the organic load conditions of the wound environment and is known to **inhibit** the action of antimicrobial agents. Anasept Antimicrobial Skin and Wound Gel proved 100% effective within the first ten minutes of application against all **pathogenic micro-organisms** tested except for *Acinetobacter baumannii* where it was shown to be 99.998% effective in the same test period (see tables).

TIME KILL STUDIES

Test Organisms: Table of Antimicrobial Activity

Pathogenic Bacteria:	Initial Organism Count	Exposure Time/% Kill			
		1 min.	3 min.	5 min.	10 min.
<i>Escherichia coli</i>	10 ⁷	99.25%	99.986%	99.9995%	100%
<i>Staphylococcus aureus</i>	10 ⁷	100%	100%	100%	100%
Methicillin Resistant <i>Staphylococcus aureus</i> (MRSA)	10 ⁷	100%	100%	100%	100%
Vancomycin Resistant <i>Enterococcus faecalis</i> (VRE)	10 ⁷	100%	100%	100%	100%
<i>Pseudomonas aeruginosa</i>	10 ⁷	99.996%	100%	100%	100%
<i>Proteus mirabilis</i>	10 ⁷	99.888%	99.998%	99.9998%	100%
<i>Serratia marcescens</i>	10 ⁷	100%	100%	100%	100%
<i>Acinetobacter baumannii</i>	10 ⁷	99.722%	99.977%	99.996%	99.998%
<i>Clostridium difficile</i>	10 ⁶	100%	100%	100%	100%
Pathogenic Fungi:					
<i>Candida albicans</i>	10 ⁶	100%	100%	100%	100%
<i>Aspergillus niger</i>	10 ⁶	100%	100%	100%	100%

TIME KILL STUDIES

Test Organism: Table of Sporicidal Activity

Test Substance	Initial Microorganism Count/ML	Exposure Time	Percent Reduction	Log Reduction
<i>Clostridium difficile</i> - spore	10 ⁶	15 minutes	99.986%	> 4.0

SHOCK WAVE

- Does it help Enhance Wound Healing?
 - Popular for the treatment of equine desmitis as well as for the stimulation of osteogenesis
 - Deflect at zones of different acoustic impedance.
 - Releasing Kinetic Energy → Alters Cell Membranes
 - Induce signaling
 - Cytokines
 - Growth Factors (IGF1, VEGF)

SHOCK WAVE

- Conflicting Results
 - Silveira et al. Effects of Unfocused extracorporeal shock wave therapy on healing of wounds of the distal portion of the forelimbs in horses. *AJVR* 2010
 - 6 healthy horses (3 mares and 3 geldings, 5 TB and 1 STB)
 - 5 wounds per forelimb (One control and One Treated)
 - » Scapel Blade used w/ template
 - » 2.5cm by 2.5cm

SHOCK WAVE

- Electrohydraulic Pulse Wave
 - 620 Pulses per wound at 7 days intervals (Total: 4)
- Blinded clinical evaluation 7 d intervals up to 56 days
- Biopsies taken from 1x only from each wound at a random cycle every 7 days to day 35
 - Objectively look at Epithelialization, fibroplasia neovascularization and inflammation
 - Label myofibroblasts (Immunohistochemical)

SHOCK WAVE

- Conclusion
 1. Did not accelerate wound healing
 - Treated wounds had less evidence of Proud Flesh
 - Treated wounds appears less inflamed
 2. No significant difference in:
 - Histological variables
 - Immunohistochemical variables
 3. Further studies are needed before clinical applications can be justified

HAGYARD

Equine Medical Institute

Hagyard-Davidson-McGee Since 1876

Hagyard Field Care
Davidson Surgery Center
McGee Medicine Center
McGee Fertility Center
Hagyard Laboratory

Presentation title

