


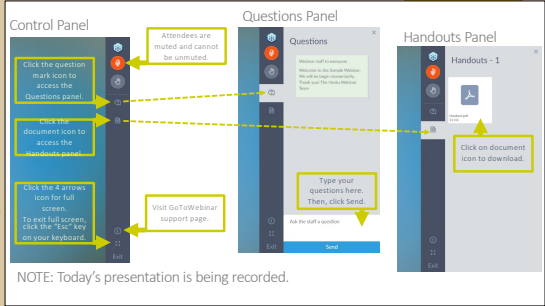
What's New in Wound Care: Dressings for Second Intention Healing

December 14, 2023
Dean A. Hendrickson, DVM, MS, DACVS
Professor of Surgery, Consultant to Heska



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Disclosures

- Funding Sources: None
- Financial Interests: None
- Conflicts of Interest: None
- Ethical Considerations: The Speaker has adhered to the AVMA's Principles of Veterinary Medical Ethics

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Relevance to Clinical Practice

- Wound care is one of the more common procedures done in Veterinary Medicine
- Advances in wound care dressings allow the practitioner to better treat their patients
- Advances in wound care understanding allow the practitioner to minimize the use of agents that actually slow the healing process

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Second Intention Healing

- Used especially in wounds where there is not enough skin to close over the wound
- Contamination is too severe to allow closure
- The wound is generally debrided and bandaged to prevent further contamination. Don't recommend the use of any topical agents as they tend to impede healing
- May require skin grafting to provide more cosmetic appearance
- Requires the use of dressings

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H. Bloom (Army Surgeon)

- Cellophane dressing for second degree burns.
- Lancet 1945; 2:559
- Burn wounds at WWII prisoner of war camp
- Sterilized cellophane
 - Semipermeable membrane to reduce bacterial penetration
- Less pain at dressing change and with movement
- Less loss of plasma
- Less infection
- Maceration of surrounding tissues

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JP Bull, Squire JR, Topley E.

- Experiments with occlusive dressings of a new plastic.
- Lancet 1948; 2:213-215
- Transparent nylon dressing
 - Stopped bacterial and fluid penetration
 - No fluid collection or maceration of normal skin
 - Wounds healed faster and required fewer dressing changes

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Moist Wound Healing

- George Winter
- Formation of the scab and the rate of epithelization of superficial wounds in the skin of the young domestic pig. Nature. 1962 Jan 20;193:293-294.
- Effect of air exposure and occlusion on experimental human skin wounds. Nature. 1963;197:91-92
- Demonstrated that occlusion nearly doubles the rate of re-epithelialization when compared to air exposed wound

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Moist Wound Healing Principles

- A full thickness wound kept in a moist environment will usually re-epithelialize in 12-15 days.
- The same wound exposed to air will take 25-30 days to heal
- Wound exudate not lost via absorption by gauze
- Wound exudate remains in contact with wound bed
- Wound exudate contains healing "rich" properties

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Moist Wound Healing

- Neutrophils and other WBC's play important role in wound repair
 - Phagocytosis of bacteria
 - Stimulate release of factors that in turn stimulate cellular proliferation
 - More neutrophils can invade a moist occluded wound than in a dry wound
- Occlusion provides constant thermal regulation
- Fine balance between drying out and maceration of peri-wound tissue

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Exposed wounds to air are:

- More inflamed
- Painful
- Itchy
- Have thicker crusts
- Scar more

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Pros and Cons of MWH

<p>Pros</p> <ul style="list-style-type: none"> ■ Faster epidermal and dermal repair ■ Decreased pain ■ Decreased inflammation ■ Cost-effective ■ Enhanced Autolytic Debridement 	<p>Cons</p> <ul style="list-style-type: none"> ■ Bacterial colonization ■ Folliculitis ■ May cause trauma to peri-ulcer borders ■ Allergies to dressing material
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Phases of Wound Healing

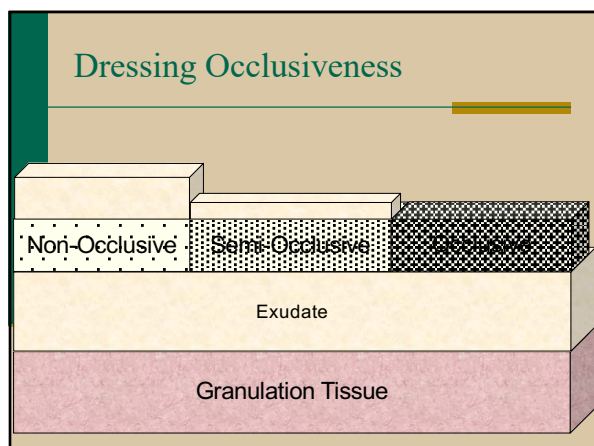
- Necrotic/Heavily Exuding Wounds - Debridement Dressings
 - Hypertonic Saline, Kerlix AMD, Honey
- Dry Wounds – Moistening
 - Gel Dressings
- Granulation Tissue Defects –
 - Calcium Alginate: Curasorb
- Epithelialization –
 - Semi-Occlusive Foam: COPA/Hydrasorb

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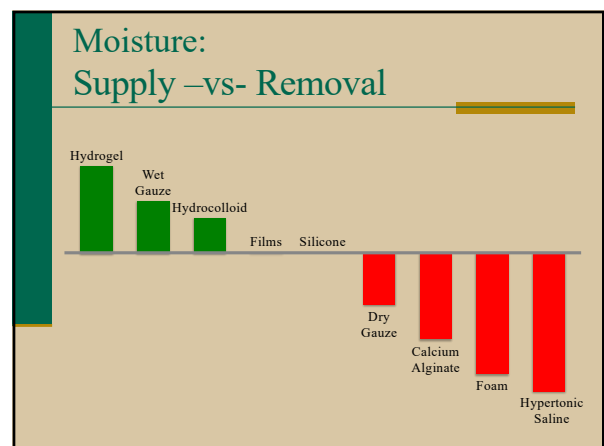
Advanced Dressings

- Designed to encourage moist wound healing
- Different dressings should be used for different stages of wound healing
- Dressings should be changed based upon wound exudate, and wound characteristics

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Debridement Dressings

Saline
Hypertonic Saline
Antimicrobial Dressing
Honey

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Wet Gauze

- Wet to Wet dressing
- Tends to dry out
- Amount of moisture retention dependent upon many factors:
 - secondary dressing
 - amount of solution and type of gauze
 - frequency of dressing change
 - Moistened up to 6 times daily

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Woven -vs- Non-Woven Gauze

Woven Gauze

- Made of 100% Cotton
- High Strength
- Vertical Wicking Ability
- Relatively Adherent
- Superior Debridement
- Superior Prepping

Non-Woven

- Synthetic Blends
- Low Lint Levels
- Low Strength
- Highly Absorbent
- Horizontal Wicking Ability
- Less adherent




Woven (Kerlix) Non-Woven (Versalon)

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Hypertonic Saline Dressings Curasalt®

- Pre-moistened Wet Dressing
- Designed for **infected or heavily exuding** wounds ONLY
- 20% vs 0.9%
- Osmotic Action
- Non-Selective Debridement



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Presentation



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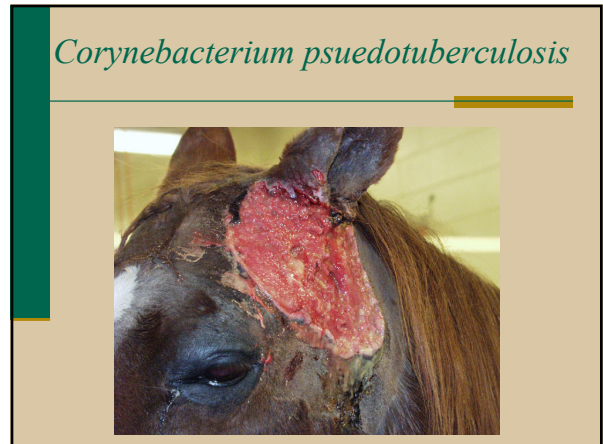
24 hours



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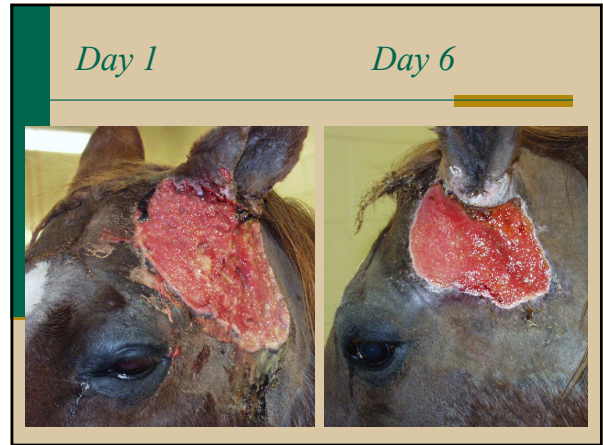
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Dressing Changes

- Depends on:
 - The amount of exudate
 - The character of the exudate
 - Amount of necrotic tissue
- At least every 3 days to prevent dilution of the hypertonic saline.
- Cover with plastic if necessary
- Make your own: 200g (1/2 cup) table salt in a liter of water

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Other Debridement Dressings

- Sugar
- Honey
 - Effects of honey and sugar dressings on wound healing. J Wound Care. 2007 Jul;16(7):317-319
 - Mphande AN, Killowe C, Phalira S, Jones HW, Harrison WJ.
 - Honey appears to be more effective than sugar in reducing bacterial contamination and promoting wound healing, and slightly less painful than sugar during dressing changes and motion.

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Manuka Honey

- Manuka bush (*Leptospermum scoparium*)
- Infection is rapidly cleared
- Inflammation, swelling and pain are quickly reduced
- Healing occurs rapidly with minimal scarring
- Antimicrobial properties
 - "Unique Manuka Factor" (UMF)
- No tissue damage
- Prevents the dressing from sticking

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Manuka honey vs. hydrogel--a prospective, open label, multicentre, randomised controlled trial to compare desloughing efficacy and healing outcomes in venous ulcers

- Gethin G, Cowman S. *J Clin Nurs.* 2009;18:466-74
- OBJECTIVE: Comparison of desloughing efficacy after four weeks and healing outcomes after 12 weeks in sloughy venous leg ulcers
- 108 patients with venous leg ulcers
- No antibiotics or immunosuppressant therapy
- Honey group had increased incidence of healing, effective desloughing and a lower incidence of infection than the control.
- Effective desloughing significantly improves healing outcomes.

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Is Manuka honey the best type of honey for wound care?

- Majtan J, Majtan V. *J Hosp Infect* (2009) in press
- Control Sugar solution of similar osmotic nature

Bacteria	Type of honey					
	Manuka	Acacia	Rape	Meadow	Forest	Control
<i>Staphylococcus aureus</i> (2022)	12.5	50	50	50	25	50
<i>Staphylococcus aureus</i> (MRSA)	12.5	50	50	25	25	>50
<i>Klebsiella pneumoniae</i> (4985)	12.5	50	50	50	50	50
<i>Pseudomonas aeruginosa</i> (1960)	25	50	25	25	12.5	50
<i>Proteus</i> spp. (1799)	25	25	25	25	12.5	>50
<i>Serratia marcescens</i> (303)	25	50	25	25	25	>50
<i>Listeria monocytogenes</i> (4699)	12.5	25	25	25	25	>50
<i>Staphylococcus epidermidis</i> (4418)	6.25	50	25	25	6.25	>50

Numbers in parentheses as designated in the Czech Collection of Microorganisms.

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Greater One Horned Rhino




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1 Week Later



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After Curettage Calcium Alginate Dressing



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Applying Honey to Alginate Dressing



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2 weeks after Curretage



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3 Months after initial injury



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Antimicrobial Dressing Kerlix® A.M.D.



- A.M.D. = Anti-MicrobIal Dressing
- Polyhexamethylene Biguanide=PHMB (0.2% concentration)
- Dressings incorporating PHMB as antimicrobial component
- KERLIX® Super Sponge, Roll gauze
- Telfa
- Excilon - designed to go around catheters

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Antimicrobial Dressing

PRODUCT CLAIMS

- Resists bacterial colonization within the dressing
- Reduces bacterial penetration through the dressing
- Kills bacteria by disrupting outer phospholipid membrane allowing cytoplasm to leak out
- Other PHMB uses
 - Contact Lens Solution
 - Baby Wipes



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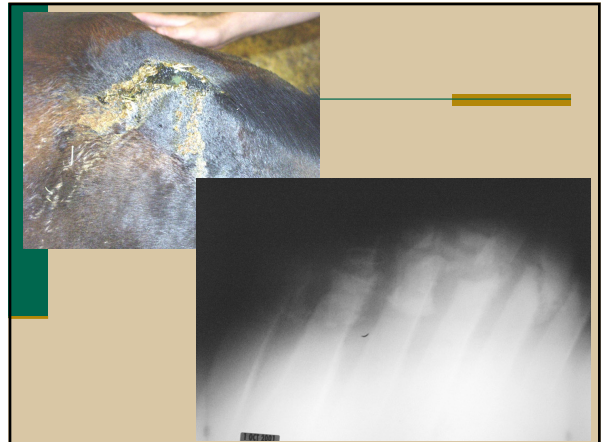
Effective Against

- | | |
|----------------------------|-------------------------|
| ■ Candida albicans | ■ Enterococcus faecalis |
| ■ Escherichia coli | ■ Enterobacter cloacae |
| ■ Pseudomonas aeruginosa | ■ Klebsiella pneumoniae |
| ■ Staphylococcus aureus | ■ Proteus mirabilis |
| ■ Staphylococcus epidermis | ■ Serratia marcescens |

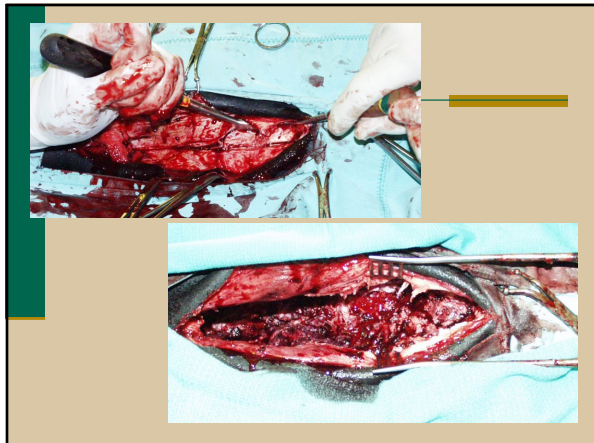
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Dressing Changes

- Depends on:
 - The amount of exudate
 - The character of the exudate
 - Amount of necrotic tissue
- In surgical incisions every 5 days.
- In necrotic wounds at least every 3 days to prevent dilution of the PHMB.
- Premoisten in dry wounds/cover





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Negative Pressure Wound Therapy

- VAC therapy
- Sub-atmospheric pressure application
- Indication:
 - Highly exudative wounds
 - Wounds with large dead space
 - Infected Wounds



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Moisturizing Dressings

Hydrogels

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Hydrogel Wound Dressings

- What are they?
 - A moist, medical grade gel that is intended to promote moist wound healing
 - Used for dry wounds
 - Composed of water, glycerin, polymer



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Applications

- Dry to moist wounds with cavities
- First and second-degree burns
- Cuts
- Abrasions
- Minor irritations of the skin



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Fetlock wound 3 days after placing dry Kerlix AMD




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Dressing Changes

- Depends on:
 - The amount of exudate
 - The character of the exudate
- Can be left on up to 5 days

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Granulation and Wound Contraction Dressings

Calcium Alginate

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Calcium Alginate Dressings Curasorb®

- Soft, nonwoven fabric pads composed of Sodium and Calcium Alginate, a derivative of seaweed
- Interacts with sodium in wound
- Absorb up to 20 times its weight in exudate
- Used for moderate to heavily draining wounds




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Applications

- Wounds where granulation tissue needs to be stimulated
- Dehisced Surgical Wound
- Abrasions
- Lacerations
- Skin tears
- Pressure ulcers
- Other external wounds with moderate to heavy exudate

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Corynebacterium pseudotuberculosis



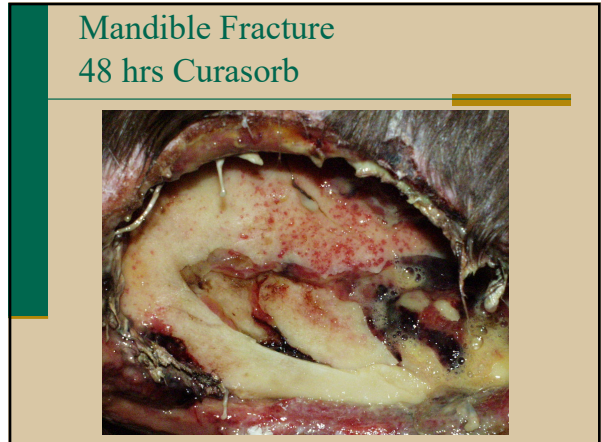
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Dressing Changes

- Depends on:
 - The amount of exudate
 - The character of the exudate
- Can be left on for 5 to 7 days
- Cover with plastic in dry wounds

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Epithelialization Dressings

Semi-Occlusive Foam

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Semi occlusive foam dressing COPA (was Hydrasorb)

- Semi-occlusive
- Use on mildly exudative wounds
- Minimized exuberant granulation tissue

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July 1 October 1 October 15

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October 24

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October 27

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Cannon Bone Wound

11/5 1/17

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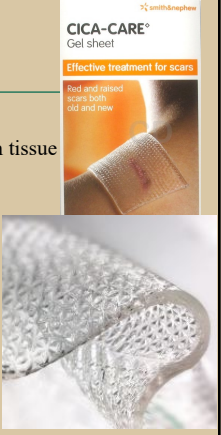
Dressing Changes

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- Can be left on for 5 to 7 days

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Silicone Dressing

- Indication
 - Recurrent exuberant granulation tissue (after surgical excision)
- Mechanism of action
 - Occlusion of microvessels
- Disadvantage
 - Expense
 - Collection of exudate/Odor

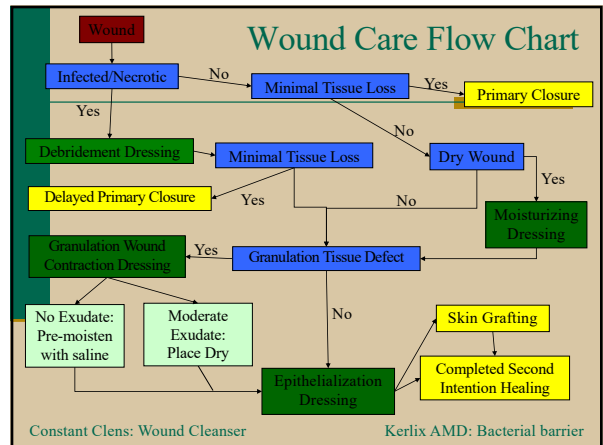


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Questions?

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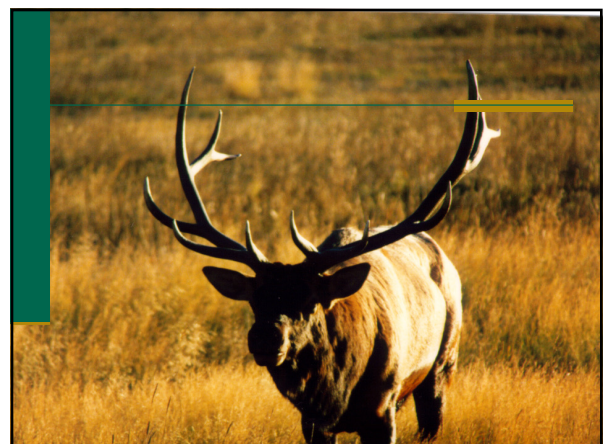
Questions about CE? events@heska.com

Questions about topic? Dean.Hendrickson@Colostate.edu

Thank you for joining us!



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