9:00 Welcome and Registration
9:30 Wound types and the physiology of wound healing - Essential understanding
10:15 Prepare and Promote - Wound bed preparation and dressing selection
12:00 Lunch
12:45 Bandaging wounds - The rules and physics
13:00 Workshop - Rotation 1 (groups of 4) - 15 minutes per group at 4 stations
To include: Limb injury - Bandaging a limb
Tail bandage, Tie over dressings
Use of do-nuts for pressure redistribution
Ear tips and creativity!

15:00 Tea/Coffee
15:15 Case discussion and review of bandaging workshop:
How did you do? what would you do differently now?
16:30 Close of day

Who am I?
I'm the one on the right!
Georgie Hollis BSc

The Veterinary Wound Library
“A dedicated resource to enable clinicians to master the art of wound management”

Advice on dressing selection
Surgical closure and reconstruction
Bandaging Techniques
Problem solving and standardisation
Education, Research and Product Reviews

Dedicated to helping you heal - in any species www.vetwoundlibrary.com
Telemedicine support for ANY wound...

1. Prepare - lavage
2. Promote - close
3. Protect - bandage

and support you until your wound is healed.

Suggested Dressings:

Share your case in confidence by phone or PC at www.vetwoundlibrary.com

Your specialist will reply with the advice you need until your wound is healed.

The Bandaging Angels

We deliver independent practice training covering best practice bandaging and wound management techniques.

We aim to:

- Improve skills, engage the team and encourage continuity of care to reduce the risk of bandaging complications
- We also run trials and evaluations on products to aid in the development of best practice through evidence based medicine

Wound management, WHY?
"What is the evolutionary advantage of a wound that doesn't heal?"

“Professor Derek Knottenbelt OBE”

But we can help...

What do you think the reasons are for helping?

A Functional, Cosmetic Repair
Relief of Pain and Distress
Rapid Return to Normal Use
within a reasonable budget
Types of wound

Aetiology - The cause and presenting features

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**Surgical**
- Characteristics: Clean edges
- Bioburden: Zero to very low
- Associated with: Elective Surgery

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**Laceration**
- Characteristics: Sharp edges
- Bioburden: Low-Moderate
- Associated with: Sharp items eg. barbed wire, knives, nails or glass.
**Avulsion**
Characteristics: Torn from body
Bioburden: Moderate to High
Associated with: Fighting wounds, Pulling away from entrapment
Sterile - Clean - Contaminated - Dirty

**Degloving**
Characteristics: physiological OR mechanical loss of tissue from extremity "glove like"
Bioburden: Moderate to High
Associated with: Ischaemic necrosis (eg. Snake bite, tourniquet effect) OR pulling away from entrapment
May be full or partial

**Puncture**
Characteristics: As described
Bioburden: High - RISK OF INFECTION
Associated with: Bite injuries, Impalement
NB. May be associated or combined with other injuries including crush injuries and major underlying trauma
**Puncture**
Characteristics: As described
Bioburden: High - RISK OF INFECTION
Associated with: Bite injuries, Impalement
NB: May be associated or combined with other injuries including crush injuries and major underlying trauma

**Abrasion/Shearing**
Characteristics: From superficial grazes to deeper tissue damage involving 'grinding' forces.
Bioburden: High
Associated with: RTA’s, Entrapment,
Abbrasion is dragging across a surface
Shearing is entrapment of tissue between one or more moving surfaces.

Does Aetiology Matter?
PREPARE
Clip and cleanse
Remove bioburden

PROMOTE
Optimise healing and early decision making
- Meticulous wound management
- Surgical Closure Options

PROTECT
Manage the factors that cause healing delay
- Pre-empt inhibitors of healing
Understanding the healing process

Phases of healing

What are they?

And what it looks like
Haemostasis

Macrophages follow neutrophils and replace their activity triggering the next phase of healing once ‘bioburden’ is reduced.

Exudate is principally water. It will contain nutrients, oxygen, antibodies and white blood cells.

Neutrophils are the first white blood cells to appear at the site of injury within the first 24 hours.

Macrophages follow neutrophils and replace their activity triggering the next phase of healing once ‘bioburden’ is reduced.

Inflammation

Exudate is principally water. It will contain nutrients, oxygen, antibodies and white blood cells.

Neutrophils are the first white blood cells to appear at the site of injury within the first 24 hours.

Macrophages follow neutrophils and replace their activity triggering the next phase of healing once ‘bioburden’ is reduced.

Essential messengers

<table>
<thead>
<tr>
<th>Essential messengers</th>
<th>Cell Source</th>
<th>Exudate</th>
<th>Oxygen</th>
<th>Antibody</th>
<th>Neutrophil</th>
<th>Macrophage</th>
<th>Bioburden</th>
</tr>
</thead>
<tbody>
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</tbody>
</table>
Infection or inflammation?

Healthy granulation tissue:
- Bright red and moist
- Slightly granular/uneven appearance
- Exudate levels minimal

MANAGEMENT aim:
- Promote a moist wound environment
- Manage exudate – wound not too wet or dry
- Manage the peri-wound environment
- Minimise contamination
- MINIMAL DRESSING CHANGES 3-4 days

Proliferation

Angiogenesis

PROLIFERATION
Wound Contraction

12 weeks
Maturation

Tensile strength of tissue only achieves 80% of its strength.

Our role is to help not harm!

Haemostasis and inflammation
Bleeding leading to platelet aggregation. Platelets release growth factors and inflammatory mediators - neutrophils, lymphocytes and macrophage activity peaking at 2 days post injury.

Proliferation
Angiogenesis leading to granulation tissue formation. Fibroblasts lay down collagen and myofibroblast differentiation leads to contraction.

Maturation
Remodelling of collagen, type I replaced by type III.

Contraction
Haemostasis and inflammation
Bleeding leading to platelet aggregation. Platelets release growth factors and inflammatory mediators - neutrophils, lymphocytes and macrophage activity peaking at 2 days post injury.

Remember .... 80% of wounds will heal what ever you do!
Any questions so far?

**Prep**
- Clip and cleanse
- Remove bioburden

**Promote**
- Optimize healing and early decision making
- Moist wound management
- Surgical Closure Options

**Protect**
- Manage the factors that cause healing delay
- Pre-empt inhibition of healing
What solution? What Volume? How long for?

Lavage

Wound Lavage:
High Volume
(100mls/cm minimum)
At pressure 8-15psi
(19/20G needle + 20ml syringe)

Ideally compatible with tissues:
Saline, balanced electrolyte solution
ok to use tap water

Lavage helps to remove debris, reduces contamination and significantly reduces infection risk

No product will substitute for good initial lavage

Antiseptics: Do you REALLY need them?

Povidone Iodine:
Between 0.5 and 1% for wounds (1:10 or 1:20 dilution of 10% povidone iodine)

Polyhexamine Biguanide (PHMB):
Relatively safe - pre-prepared lavage solution (Prontosan® - BBraun)

Chlorhexidine Gluconate:
Scrub - use then dispose at PPI for hands
0.5% - for skin prep with water or alcohol
0.05% - for wound lavage

What about the dirty dog?
THE EARLIER YOU LAVAGE THE BETTER!

Early Wound Irrigation Improves the Ability to Remove Bacteria

Shel D. Owens, MD; Joseph C. Wenke, PhD

Debridement

Methods of debridement

Surgical
Mechanical
Chemical / Enzymatic
Autolytic

Fast
Slow

Charity clinic likely to favour surgical options
Mechanical Debridement

Agressive Debridement

Dead tissue serves no purpose but to delay healing and encourage bacterial proliferation.

Necrotising fasciitis is rapid in onset and requires a fast, aggressive approach.

Necrotising fasciitis: usually group A Streptococcus, but also known Staphylococcus sp.
Tissue may take time to ‘Declare’ itself

Burns may take up to 10 days to reveal the extent of injury with clear demarcation.

Staged debridement may be necessary

Surgical ‘En-bloc’ Debridement

Removal of entire wound to enable immediate Surgical closure.
“Wet to Dry” Mechanical debridement:

Sterile Gauze + Saline

We will try this later!

Very effective when done correctly

Something a bit gentler?

Debrisoft
Active Debridement

Before

After

Slough
Neutrophilic exudate
Hemorrhagic exudate
Acute wound
Herniated disc in diabetic foot wound
Chemical & Enzymatic Debridement

Many enzymes and chemicals break down ‘bioburden’

<table>
<thead>
<tr>
<th>Enzyme</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Papain</td>
<td>Most tenderize</td>
</tr>
<tr>
<td>Trypsin</td>
<td>Catalyze endopeptidase</td>
</tr>
<tr>
<td>Thrombin</td>
<td>Thrombolytic agent</td>
</tr>
<tr>
<td>Neutrophil elastase</td>
<td>Necrotic tissue dissolution</td>
</tr>
<tr>
<td>Plasmin</td>
<td>Dissolve fibrin</td>
</tr>
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</table>

‘BIOFOAM’ DRESSING

Ready for Removal:
‘Biofoam’ dressing at 3 days after application
Day 3 after removal:

‘Biofoam Bag’ disposed of in clinical waste

Day 6

On removal of second ‘Biofoam Bag’

AUTOLYTIC DEBRIDEMENT

Hydration

Hydrogels and Hydrocolloids donate moisture to aid removal of slough and debris
**Autolytic debridement**

Honey, Sugar and Salt
Osmotic action
High sugar or salt hydrates slough and dead tissue through osmosis.

+ Antimicrobial Benefits when using honey

**Antimicrobial Effect:**
Glucose Oxidase, pH and Sugars

Effective against common wound pathogens, including:

- MRSA
- Pseudomonas
- E-Coli
- Staphylococcus Sp.

**MEDICAL GRADE MANUKA HONEY**

Antimicrobial
Anti-inflammatory
Debriding
Why use medical grade honey?

- Gamma vs heat
- Clostridium
- Botulinum
- UMF

Wound bed preparation:
An example

Heat pad injury
Maltese X female

How old is this wound?
What would you do?
Infection or Necrosis?

Open Wound Management and Decision Making

TIE OVER DRESSINGS

Ideal for open wound management in hard to bandage areas

- Suture loops 2 cm from wound margins (in healthy tissue)
- Full thickness 'bite' of tissue
- Tie sutures over a 2ml syringe to create loop
- A minimum of 6 loops to hold dressings in place
- Apply primary dressing to suit wound
- Cover with pads of gauze to 'bulk' up and hold dressing in place
- Tie over the top using a coloured suture material
- Change primary dressing as necessary by removing coloured sutures and replace
- Suture loops can be used over a period of 14 days
# Wound Dressings

![Image of wound dressing]

Independent Wound Management Support & Product Expertise

www.vetwoundlibrary.com

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# Medical Devices and wound care

<table>
<thead>
<tr>
<th>Human Wound Care Products</th>
<th>Veterinary Wound Care Products</th>
</tr>
</thead>
<tbody>
<tr>
<td>Health + Medicines Regulatory A</td>
<td>VMD – only if medicinal by nature</td>
</tr>
<tr>
<td>CE marking</td>
<td>No CE mark required</td>
</tr>
<tr>
<td>Class 1, 2 or 3 medical device</td>
<td>No legislation for cytotoxic components</td>
</tr>
</tbody>
</table>

| Market Value: £8,500,000,000 | Market Value: less than £1,000,000? |

---

Batch No: 007/12

exp. 25/12/19

Seriously GOOD GOO for wounds

50% Faster Healing

Soothing formulation

Provides a physical barrier against contamination

---
OPTIMAL WOUND HEALING?

Closure options?
- Open wound management?
- Surgical Closure?
- Graft / Reconstruction?

Removal of bioburden
Healthy Granulation


OPTIMAL WOUND HEALING?

Removal of bioburden
Healthy Granulation


NEW APP TRANSFORMS WATER into SUPERCHARGED SALINE with water and a phone

Developed the NEW REVOLUTIONARY SUPERCHARGED SALINE APP and turned the power of your phone into super wounds.

Download FREE today and get your SUPERCHARGED SALINE with one tap. This app makes water instantly a super saline.

WHAT YOU NEED
- JOOLS WATER
- 1 TSP SALT (LEVEL)
- 1 PHONE & APP
- 1 USB LEAD

Standard price: £1.00 per use
FREE during TODAY ONLY!

The Journey of a Wound

Clean surgical wound

Prevent infection and cross contamination

Primary Intention

Traumatic, dirty wound

Debridement:
- Surgical
- Mechanical
- Enzymatic
- Autolytic

Promote

No need or not suitable for surgery or reconstruction

Healing by Secondary Intention

Tissue / skills available to close

Reconstructive Surgery
- Grafting

The Veterinary Wound Library

Independent Wound Management Support & Product Expertise
www.vetwoundlibrary.com
**PROMOTE - Optimal Healing**

- **Basic Wound Management**
  - Haemostasis
  - Early Inflammation
  - Stabilise patient
  - Reduce ‘bioburden’
  - Reduce pain

- **Advanced Wound Management**
  - Moist Wound Healing
  - Autolytic debridement
  - Preservation of necrotic debris
  - Growth factors, ECM substitutes
  - Cytokines, MMP modulation
  - ‘Intelligent’ dressings

- **Advanced PLUS Wound Management**
  - Maintain a moist environment
  - Preserve cells
  - Salvage viable tissue
  - Optimise cell migration
  - Minimal interference

---

**Basic Wound Management**

- Haemostasis
- Early Inflammation
- Maturation
- Proliferation
- Necrotic
- Sloughy
- Granulating
- Epithelialising

**Advanced Wound Management**

- Haemostasis
- Early Inflammation
- Late Inflammation
- Proliferation
- Maturation

**Advanced PLUS Wound Management**

- Haemostasis
- Early Inflammation
- Late Inflammation
- Proliferation
- Maturation

**Dressing intervals**

- **Inflammation**
  - 1 to 2 days
  - ‘Debridement’

- **Proliferative phase**
  - 3 to 4 days
  - ‘Promote healing’

---

**Independent Wound Management Support & Product Expertise**

www.vetwoundlibrary.com
Remember:
Open wound management may not be the fastest route to closure

Dressings don't overcome inhibitors of healing

- Movement
- Necrotic Tissue/Foreign Body
- Tissue Deficit - Tension
- Toxicity - Antimicrobials!!!
- Repeated Trauma - interference
- Iatrogenic Issues... technique

Get help if you need it...
PROTECT:
Remove inhibitors of healing and decide what the wound needs.

Thank you for listening!