



VETERINARY WOUND MANAGEMENT SOCIETY

## NEWSLETTER

### FROM THE PRESIDENT'S PEN...

The VWMS had another successful meeting at this year's North American Veterinary Conference in Orlando. In a new format for NAVC, the first event of the small animal program was a longer, 75 minute, multi-speaker presentation, which gave Dr. Bryden Stanley and myself the opportunity to discuss the use of Negative Pressure Wound Therapy in practice, with case examples to show what this modality can do. Dr. Stanley then gave very informative presentations on "Skin Flaps You Can Do At Home", "Honey and Wound Healing - the Low Down", and "Pretensioning and Other Tension Relieving Techniques"— all with very practical, user-friendly information. In the afternoon, Dr. Hayley Murphy's presentation called "Common Wounds in Uncommon Species- Treating Wounds in Wild and Exotic Animals" was eye-opening. Dr. Murphy is the Director of Veterinary Services at Zoo Atlanta, and her talk demonstrated many of the challenges inherent in treating wild animals. I found it especially interesting to hear about the process that is involved in even deciding whether to treat a wounded animal or to let healing progress as well as it can on its own. In many cases, removal of an animal from the group for treatment means that the individual cannot be returned to the group without significant

risk of it being harmed by group members or of causing an upsetting shift in the social dominance structure of the group. In naked mole rats, every individual in the colony must be treated identically (everyone is handled the same, given the same medications, etc.), because an individual who is singled out for treatment will be killed if returned to the colony. Thus, a decision to treat one naked mole rat is a decision to treat the whole group! We finished up the day with three clinical briefs, in which Dr. Stanley talked about the use of topical oxygen and I gave presentations on wound debridement and tips for reconstructive surgery.

In the equine program, Dr. Bradford Bentz gave very interesting presentations entitled "Acute Management Decisions for the Injured/Recumbent Horse", "Occult Problems of the Wounded/Injured Horse, and "Pain Management in the Wounded/Injured Horse". All of these topics are just as key to successful healing as treatment of the wound itself, and contained very valuable information that could be readily applied in practice. The theme of the afternoon equine session might have been "The Future is Now" with Dr. Scott Reiners talking on "The Current Status of Regenerative Medicine (Stem Cell Therapy)" and the "Use of PRP in Wound Treatment" and

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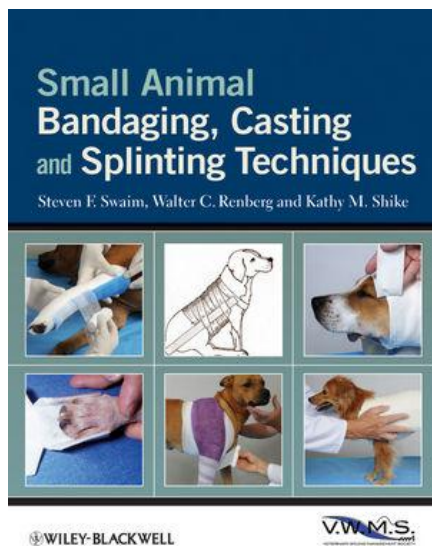
Dr. Hank Jann talking on "The Use of Low Level Laser Treatment (LLLT) in Wound Management". It is exciting to learn more about newer modalities that have become available for us to manage wounds! The equine day wrapped up with very practical information by Dr. Bentz on "Practical Wound Preparation Prior to Closure" and Dr. Jann on "Suture Material and Suture Patterns in Wound Closure".

If you were not able to attend the meeting, the proceedings for all of these talks are available to VWMS members on the website, as are the archived proceedings for VWMS programs in past years. Check them out at [www.vwms.org](http://www.vwms.org)!

Thanks to all of you who recently renewed your VWMS membership and welcome to those who just joined us! As a reminder, membership benefits include:

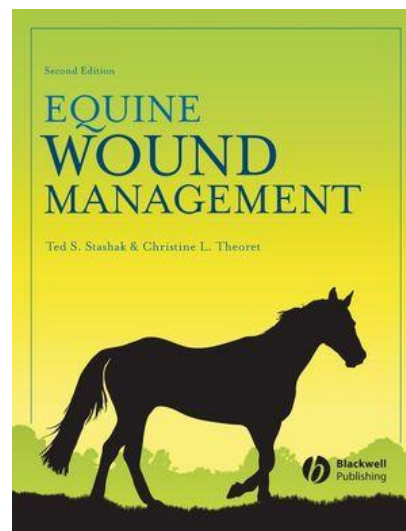
- Veterinary Wound Management Society Newsletter  
Each issue (e-published quarterly) features articles on repairing and managing wounds in small and large animals, as well as technician-focused article on wound care. Articles are highlighted by color photographs and cover topics ranging from cutting edge advances to tried-and-true techniques you can use today in your practice. If you have an idea for an article, whether you want to write it yourself or suggest it for someone else, please let us know!
- Membership in the Veterinary Wound Library ([www.vetwoundlibrary.com](http://www.vetwoundlibrary.com))  
Access to the Veterinary Wound Library is provided by our European counterpart, the Veterinary Wound Healing Association, who also receive these newsletters. At this site, you can obtain one-on-one specialist support on wound care and access an extensive database of case studies and articles that illustrate a variety of techniques and outcomes in animal wound management.

- 20% discount on the following well-illustrated, go-to resources for veterinarians:



If you have not already, there is still time to renew for 2012! The membership form is available on the website at [www.vwms.org](http://www.vwms.org).

It is now time for me to hand the traditional gavel (perhaps we should have a scalpel or wound dressing?!) into the good care of Dr. Hank Jann, as he now steps into the VWMS presidency. It has been an honor for me to work with



the diverse members of the VWMS, from clinicians to researchers to technicians, from the U.S.A. and across the globe, from specialists with small animals, large animals, and wildlife/exotic species, all brought together by a common interest in wound management. The veterinary profession is enriched by the participation of all of you in this organization – thank you!

Sincerely,  
Bonnie G. Campbell

small animal wound management

## OMENTAL ENHANCED CLOSURE OF NON-HEALING WOUNDS

Eric Hans, DVM  
Texas A&M University College of Veterinary Medicine  
College Station, TX

Chronic and non-healing wounds are a source of great frustration within the veterinary field for both owners and veterinary practitioners. Non-healing wounds can present themselves for a variety of reasons, including the presence of foreign material, neoplasia, bacterial or fungal infection, panniculitis, and immunodeficiency disorders. Appropriate surgical and medical therapy directed towards an underlying

etiology will generally resolve the wound over time; however in some instances wounds persist for no identifiable cause. While many options to assist with healing are available, surgeons often overlook the use of omentum and omental pedicle grafts, which are well described in both the human and veterinary literature for the promotion of wound healing.

Omentum is a free-hanging mesenteric sheet within the abdominal cavity comprised of arteries, veins, and lymphatics interwoven in a connective tissue network. This organ has several major known functions including peritoneal lymphatic drainage, angiogenesis, immune surveillance, hemostasis, tissue adhesion, and neurotopism. It is for these reasons that omentum has so many surgical

applications. The first surgical use of omentum was described in human medicine as early as 1896, and has since evolved into a variety of intra-abdominal and extra-abdominal procedures in both the human and veterinary fields. Most commonly veterinary surgeons utilize omentum intra-abdominally for augmentation of enterotomy or anastomosis sites, treatment of pancreatic or prostatic abscess, and assisting with the closure of abdominal or diaphragmatic hernias. The use of omentum outside the peritoneal cavity was initially reported with thoracic wall reconstruction, but has since expanded to enhance healing or drainage with chylothorax, non-healing wounds, caudal esophageal procedures, and even a case report of use in a non-union fracture.



Figure 1. Chronic, non-healing wound on inguinal region of a cat.

The creation of an omental pedicle graft requires neither specialized training nor instrumentation, just a good understanding of the omental anatomy. The omental sheet is divided into a ventral leaf, which attaches at the greater curvature of the stomach, and a dorsal leaf, which attaches at the pancreas and spleen. A standard ventral midline approach is made and the omentum is exteriorized and reflected cranially to expose its dorsal attachment. Sharp dissection is used to free the dorsal leaf from its attachments, utilizing electrocautery for hemostasis. This procedure alone doubles the length of the omentum. If further length is desired an inverted "L" incision is made along the left aspect just caudal to the gastrosplenic ligament. This incision will cross one half to two-thirds the width of the omental sheet and extend

approximately two-thirds the length of the sheet. This lengthening procedure should only be performed if necessary, as it does increase the risk of circulatory compromise through division of collateral vascular channels. The laparotomy incision is then closed with the exception of a 2-3cm window where the omental pedicle exits. Blunt dissection is used to create a subcutaneous tunnel under which the omentum was passed, leading up to the chronic wound. Care must be taken to



Figure 2. Omentum (non-extended) exteriorized from ventral midline incision.

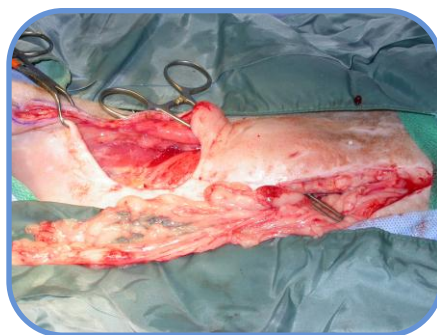


Figure 3: The omentum has been exteriorized and a subcutaneous tunnel has been made (see instrument) to enable positioning of the omentum within the chronic inguinal wound.

avoid vascular compromise to the omentum through excessive tension, rotation, or strangulation during this entire process. Penrose drains can often assist in the passing of omentum through the subcutaneous tunnel. It is then loosely tacked down to the wound bed with quick absorbing suture, such as polyglactin. Typically the wound bed will require debridement prior to omental placement, so wrapping the omentum in saline soaked gauze is recommended to

avoid desiccation. Once the omentum is placed, the adjacent tissues can then be apposed for wound closure. An alternate paracostal window can be used for thoracic wall and axillary defects if desired. The full thickness omental exit site within the linea alba can be closed approximately 4-6 weeks following the initial surgery. This is performed to prevent herniation of abdominal contents, a minor complication noted in several studies. The omental pedical can also be amputated at the level of the body wall at the time of closure. If the paracostal option is used then closure at a later date is unnecessary. The only major limitation to omentalization is the relative fragility of the omentum itself. If circulatory compromise occurs due to rotation, tension, or strangulation then flap necrosis will result.

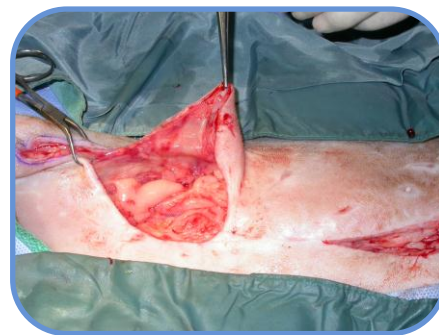


Figure 4. The omentum has been placed within the wound prior to closure of the wound. Midline abdominal incision is to the right of picture.

The best-described utilization of this procedure with regards to wound therapy has undoubtedly been with chronic axillary wounds in cats due to collar entrapment. These wounds are generally highly exudative and under constant motion resulting in failure to heal. Primary closure combined with omentalization was first attempted in 10 cats, and successfully closed wounds that had persisted for an average of 11 months within 24 days in 7 of them. Despite the majority of successful outcomes, dehiscence rates were high due to motion from the anatomic location so clients must be warned of the associated risks if this option is chosen. Reconstructive procedures have been used, most notably thoracodorsal and omocervical axial

pattern flaps, which have demonstrated faster healing and less surgical complication comparatively. One study of 10 cats undergoing omentalization combined with thoracodorsal flap demonstrated wound resolution within 14 days. Omentalization is an excellent modifier to axial pattern flaps as there is an additional vascular supply to assist with graft uptake and complete obliteration of dead space via omental drainage. This drainage is also beneficial as it eliminates the need for an active drainage, i.e. Jackson-Pratt, which can potentially serve as a nidus for infection and would require post-operative management.

In summary omental pedicle grafts have been demonstrated to be an excellent technique for surgeons attempting to heal chronic, poorly perfused wounds. It must be remembered, however, to

perform a thorough work up on any chronic wound prior to attempting closure. Omentalization can be used in combination with either primary closure or advanced reconstructive efforts, and may offer the best opportunity to help resolve non-healing wounds in high motion locations such as the axillary or inguinal regions.

Images courtesy of BJ Stanley, Michigan State University

**READING**

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2. Gray MJ. Chronic axillary wound repair in a cat with omentalization

and omocervical skin flap. *J Small Anim Pract* 46:499-503, 2005.

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4. Lascelles BDX, Davison L, Dunning M, et al: Use of omental pedicle grafts in the management of non-healing axillary wounds in 10 cats. *J Small Anim Pract* 39:475-480, 1998.
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large animal wound management

**TRANSDERMAL CONTINUOUS OXYGEN IN HEALING EQUINE WOUNDS**

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 Medical Director  
 Ogenix Corp.

Oxygen is an element critical for the life of humans and animals. When one thinks of wounds that are slow to heal, there may be many factors involved, but oxygen is a very necessary component. Oxygen plays a significant role in energy metabolism, enhances fibroblast proliferation and collagen synthesis. Oxygen is necessary to enhance angiogenesis and stimulate various wound healing factors such as VEGF.

In the past, there has been a debate if topical oxygen has clinical applications. However, with a new technology, the ability to provide oxygen in a continuous delivery, the evidence is changing. Unlike hyperbaric oxygen, Transdermal Continuous Oxygen Therapy (TCOT)



Figure 1. Full thickness laceration to the forehead of a horse.



Figure 2. Application of the EPIFLO device.



Figure 3. Appearance of the laceration at Day 2.

creates a new wound healing approach whereby there is no known complication. EPIFLO (TCOT) reduces the cost of treatment to a fraction of the cost of hyperbaric. EPIFLO is a 15 day disposable device manufactured by Ogenix Corp.

The simplicity with the application of EPIFLO makes the device extremely friendly to the caregiver and horse during therapy. A thin sterile cannula is placed in the wound center and held in position with a piece of tape. Then a sterile absorbent dressing is applied, followed by a clear film dressing to keep the oxygen under a seal. A wrap is then applied over the dressing and cannula to keep the horse from disturbing it. Ideally, the dressing is changed twice weekly. One must not apply any ointment to the wound as it may block the oxygen from absorbing into the wound.



Figure 4. Appearance of the wound, now healed, at Day 16.

Our clinical experience has shown significant change in the wound size and depth in a short period of time. We show pictures here of a clinical case where the horse lacerated its forehead. EPIFLO was applied the second day of injury until completely healed 16 days later. A Caravet dressing was used with the EPIFLO device in this particular case presentation. This treatment modality would be highly suited to a randomized, controlled, clinical trial to fully evaluate efficacy.



Figure 5: EPIFLO device

Please refer to [www.ogenix.com](http://www.ogenix.com) for more background information, scientific literature and updates.