

# InTown Veterinary Group Newsletter

Volume 8, Issue 1  
January 2008

InTown Veterinary Group is dedicated to providing referring veterinarians and their clients with an unparalleled range of emergency & specialty services.

**Services:**

**Dermatology:**

Mass Vet, Woburn

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Mass Vet, Woburn

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**Hospital Information:**

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■ Massachusetts Veterinary Referral Hospital  
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www.InTownMassVet.com

Dr. Lauren Blaeser practices at  
Essex County Veterinary Referral Hospital in N. Andover.

## Small Animal Arthroscopy The Minimally Invasive Approach to Joint Surgery

Lauren Blaeser, DVM, DACVS



Arthroscopy has become the standard surgical option for a variety of orthopedic conditions in human surgery. It is even considered one of the most significant advances in human orthopedics. Large animal orthopedics saw the advantages of arthroscopy earlier than the small animal veterinary community. Between the 1970's and 1980's the number of referenced reports using arthroscopy in the large animal literature increased dramatically. It wasn't until the mid 1980's that reports of small animal patients treated with arthroscopy began to emerge in literature. Prior to this the overriding belief was that arthroscopic technology was neither practical, nor necessary, for small animals. Over the last 20 years technology has continued to improve and the number of experienced veterinarians utilizing this procedure has steadily increased.

To be successful in arthroscopy it is essential both to understand, and acquire, the appropriate equipment. The arthroscoper tower contains four major components:

- The Arthroscope
- The Light Source
- A Video Imaging System
- A Power Shaver

In addition the appropriate cannulas, hand instruments and irrigation are necessary for performing the procedures.

### **Arthroscope**

The arthroscope is a series of lenses that transmits light and images either directly to the viewer, or indirectly through a capturing system. Fiberoptic bundles, located in the outer tube, transmit light to a focusing lens at the eyepiece. The inner tube transmits the image into a 3-chip camera providing clear image quality. Arthroscopes are measured by diameter - the most commonly used being the 1.9mm, 2.3mm, and 2.7mm arthroscopes - and length - short (8.5cm) and long (13 cm). Available lens angles include 0 degrees, 30 degrees (most common) and 70 degrees.

Changes to the viewing angle affects the amount of illumination and the field of view. Increasing the lens angle decreases illumination while increasing the field of view, and vice versa. The lens angle permits the surgeon to view around corners and soft tissue structures. This feature is especially important in joints such as the shoulder where the surgeon needs to see around the biceps tendon and deep within the caudal medial pouch.

### **Light Source**

Correct illumination of the joint is essential. A fiber optic cable attaches to the light post on the arthroscope, and runs into a light source box which contains the lamp and intensity regulator. The lamp can be tungsten-halogen or 300 W xenon. The 300W xenon light is necessary for photographic documentation.

### **Video Imaging System**

The video imaging system consists of a handheld video camera mounted on the eyepiece of the arthroscope. The camera has a high resolution chip that electronically transmits the image to a processor which is displayed on a high resolution monitor. The image that is produced is magnified 5-15 times, resulting in a clear and detailed picture of the viewing field. In addition to magnification and high image resolution, the video capturing system decreases operator fatigue by allowing the surgeon to stand upright while working. The monitor also allows for team participation and facilitates documentation of the procedure. The ability to store electronic images in paperless patient files is becoming more necessary as demand for paperless systems increases. In addition these images can be emailed to referring veterinarians and/or specialists for a speedy (and even intra-operative) review.

### **Irrigation**

No surgery can be successful without continuous irrigation of the joint during the procedure. A constant, reliable flow of fluid is necessary to expand the joint and allow the surgeon to view structures without the collapse of the joint capsule. Clear fluid provides an appropriate medium for clear image quality. As the surgeon manipulates instruments within the joint, the flowing fluid minimizes bleeding, and clears the joint of debris and contamination. If too much

pressure is applied to the fluid being pumped into the joint, the end result will be extravasation of fluid into the surrounding soft tissue and the secondary collapse of the joint. Arthroscopic irrigation can be maintained by gravity, gravity assisted flow, or through the use of fluid pumps.

### **Power Shaver**

The power shaver rapidly debrides soft and hard tissue. The shaver includes a control box, a handpiece and a shaver tip. The shaver tips are available in numerous designs for both soft tissue and bone debridement. Use of the appropriate tip is instrumental to debridement of OCD lesions, ligament tears and osteoarthritis lesions.

### **Surgical Equipment**

Correctly performing procedures within the joint, requires the use of appropriate equipment. Examples of surgical instrumentation used in arthroscopy include grasping forceps, right angle probes, punch forceps, arthroscopic knives and cannulas. Arthroscopic cannulas protect the scope during the procedure and maintain the portal for constant viewing. Arthroscopic instruments can be inserted into the joint through a portal with or without a cannula. The advantage to using a cannula is that repeated attempts to unsuccessfully insert an instrument, through a poorly defined portal, will not result in soft tissue trauma.

### **Advantages of Arthroscopy**

There are several benefits to arthroscopy over the more traditional arthrotomy. Arthroscopy is a minimally invasive surgical technique. Most procedures only require a few stab incisions for the introduction of the arthroscope and surgical instruments. This is in stark contrast to the muscle splitting, tenotomy, osteotomy procedures and retraction needed in many standard arthrotomy procedures. This minimally invasive technique results in less disruption of the periarticular soft tissue.

Small portal sites transect fewer painful nerve endings, resulting in less pain for the patient. It is well documented in human literature that patients treated with arthroscopy, over arthrotomy, are more comfortable post operative. A recent veterinary article documented a significant decrease in lameness, more comfortable range of motion and decreased synovial fluid inflammation, following arthroscopy.

In many cases arthroscopy can even be performed on an outpatient basis.

In addition to improved comfort for our patients, we see an earlier return to function following an arthroscopic procedure. Minimal tissue disruption allows for a shorter recovery time and allows the patient to engage in rehabilitation at a faster rate. In the traditional shoulder

arthrotomy approach for the OCD, patients are restricted from activity for 4-8 weeks, depending upon the surgical approach. Patients are allowed to start rehabilitation activity within 2 weeks post operative following an arthroscopic repair of the OCD shoulder lesion.

Magnification improves visualization of the joint pathology. With enhanced magnification the surgeon is better able to appreciate pathology such as chondromalacia, cartilage fissures and partial ligament tears. The arthroscope allows the surgeon to see all areas of the joint. Small meniscal tears can be difficult to appreciate and repair with traditional arthrotomy. Through arthroscopy all aspects of the medial and lateral meniscus can be visualized in detail. Even small tears are readily noted.

There are times when multiple joints may be suspected of contributing to lameness. Arthroscopy can be used as a diagnostic tool in evaluating one or more joints during one anesthesia episode. For example, a patient with pathology in both its elbow and shoulder could present for evaluation. The patient can be scheduled for an arthroscopic view of both joints under the same anesthesia.

### **Disadvantages**

The disadvantages of arthroscopy include a steep learning curve for the surgeon and the need for expensive, specialized equipment. A complete set of arthroscopic equipment can cost upwards of \$44,000.

There is often limited space to work in most small animal joints, and excessive movement of the tip scrapes soft cartilage. Iatrogenic damage to the cartilage and surrounding soft tissue can be the end result of inexperience. Iatrogenic cartilage damage can be greatly reduced or eliminated with adequate training and case load, appropriate limb positioning and draping.

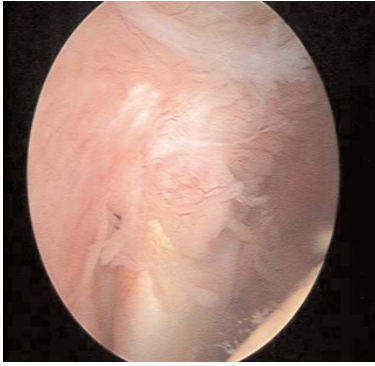
Using the correct size arthroscope can also prevent cartilage scraping. Smaller joints require the use of a 1.9mm or 2.4mm scope, while the larger joints can accommodate 2.7mm or 4.0mm arthroscopes.

### **Application of Arthroscopy in Small Animal Surgery: Forelimb**

The shoulder is the joint most frequently evaluated with arthroscopy, and the technique can be used both as a diagnostic and a therapeutic tool.

Osteochondrosis (OCD) lesions can be confirmed and treated successfully with arthroscopy. The OCD flap can be removed through the instrument portal and the defect curettage with the shaver. Any "joint mice" which have migrated can be identified and removed without the need for additional approaches. In addition, both joints can be evaluated under the same anesthesia leading to a shorter recovery time and satisfied clients.

Cases of biceps tenosynovitis, which do not resolve with conservative treatment, can be confirmed and treated.



*Fig 1: Arthroscopic view of an injured biceps tendon.*

There have been reports of successful treatment with biceps brachii tenotomy performed through an arthroscopic release.

Other uses for arthroscopy include supraspinatous strain, arthroscopic removal of bone fragments associated with the incomplete fusion of caudal glenoid ossification center,

arthroscopic guidance of the reduction of supraglenoid tuberosity avulsion fractures and shoulder instability.

Arthroscopic evaluation of the elbow has changed the philosophy and treatment of elbow pathology. A common cause of front limb lameness is the fragmented coronoid process. Prior to arthroscopy, there was controversy over whether removing the fragment with an arthrotomy provided any relief for the patient. Whereas current reports indicate that over 61% of patients treated with arthroscopy to inspect the joint and remove the offending fragment, show no lameness following the procedure. In my experience, over 50% of dogs have pathology in both legs even if there are no bilateral radiographic or clinical signs. I therefore recommend evaluating both joints during the same anesthesia in dogs less than one year of age.

Other uses in the elbow include arthroscopic removal of osteochondrosis lesions along the humeral condyle, closed management of canine humeral condylar fractures and diagnosing incomplete ossification of the humeral condyle. Arthroscopic management of arthritic lesions is routinely recommended in humans. If a primary cause is not identified the surgeon is able to evaluate the depth of the articular damage. In some cases arthroscopic debridement and treatment can contribute to clinical improvement in the joint.

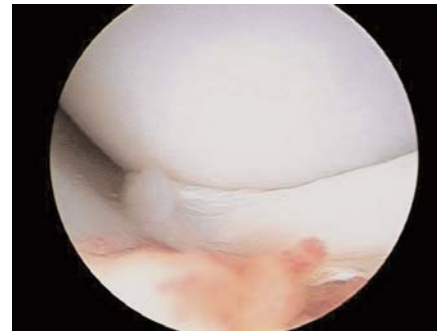
Indications for carpal arthroscopy include intra-articular fractures, osteoarthritis, joint instability, treatment for septic joints and diagnostic examination.

### **Hindlimb**

The hip joint can be difficult to assess in patients with chronic degenerative joint disease due to the thickened joint capsule. However, in patients in the infancy of hip dysplasia, arthroscopy can be extremely useful for determining whether patients are good candidates for triple pelvic osteotomy (TPO). In dogs with excessive articular cartilage wear a TPO is contraindicated. Recent

studies have shown that radiographs are not sensitive in identifying moderate cartilage lesions in young dogs with hip dysplasia. It is recommended, prior to performing the TPO, to evaluate the integrity of the cartilage with arthroscopy. Other uses include using arthroscopy as a diagnostic tool for obtaining biopsy or culture of bone, cartilage or synovial membrane.

The stifle is the joint most commonly scoped in human surgery. The need to evaluate canine stifles is just as great. Lameness associated with partial or complete anterior cruciate ligament (ACL) tears is a common presenting complaint in small animal medicine. Unfortunately the diagnosis in a palpably stable stifle is sometimes delayed, resulting in a rapid progression of osteoarthritis. Arthroscopic evaluation of the joint can provide an early diagnosis with minimal patient discomfort. Treatment of ACL tears can be performed without the need for an arthrotomy. The joint can be examined without the arthrotomy followed by an extracapsular or TPLO repair. During the arthroscopic inspection of the joint pathology, other tissue within the joint can be evaluated. This would include inspecting the integrity of the meniscus, caudal cruciate ligament and cartilage. If a meniscal tear is observed during the evaluation of the joint a meniscectomy can be performed with arthroscopic instrumentation. The elimination of the arthrotomy portion of the procedure reduces some of the discomfort to our patients. Other indications for stifle arthroscopy include OCD lesion, osteoarthritis and septic osteomyelitis.



*Fig 2: Arthroscopic view of bucket handle tear of medial meniscus.*

It is possible to perform arthroscopy on the tarsal joint however, due to the tight space within the joint, it is one of the more difficult joints to work within. Some indications for tarsal arthroscopy include the removal of osteochondrosis flaps, removal or assistance in reduction of fracture fragments and septic arthritis.

Arthroscopy is a tool that allows the orthopedic surgeon to correct joint pathology with minimal trauma and pain to the patient. The long list of advantages of arthroscopy over the standard arthrotomy provides good reasons for veterinarians to become familiar with arthroscopy as a viable surgical option in veterinary orthopedics.

**References Available Upon Request**



Dr. Dianne Phillips practices at  
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## Antioxidant Supplementation in Health and Disease

Dianne Phillips, DVM, DACVIM (Internal Medicine)

### Oxidative Stress in Health and Disease

Our bodies and those of our veterinary patients are constantly bombarded by a host of factors including environmental pollutants, radiation, chemicals and drugs that contribute to the formation of free radicals. Investigation into free radical formation and the development of clinical disease has been of recent interest in human literature. Investigations within veterinary medicine are ongoing.

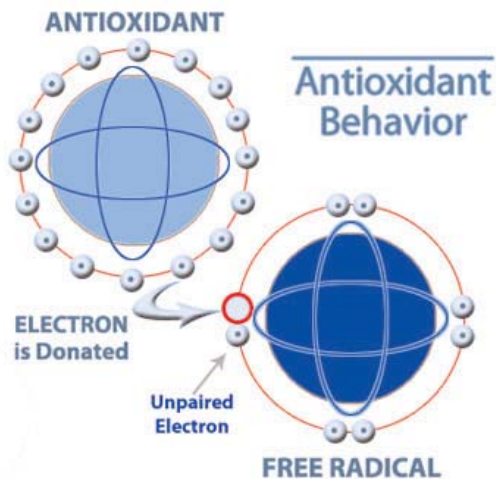


Fig 1: Antioxidant Behavior.  
Source: biomatrixone.com,  
Biomatrix® Nutraceuticals, 2006.

hydroxyl radicals). During exercise, when the amount of oxygen utilized is quite high, free radical production occurs in very large numbers. Free radicals are also produced through other oxidative processes including inflammation via activated phagocytes - the so-called oxidative burst produced by neutrophils.

Free radicals and ROS are not always harmful, they can serve useful purposes in the body. Several observations indicate that the oxygen radicals in living systems are necessary compounds in the maturation processes of cell structures. Free radicals modify DNA transcription. In addition, white blood cells release free radicals to destroy invading pathogenic microbes as part of the body's defense mechanism against disease.

Free radicals are very reactive, as a result they can have deleterious effects on the body. Free radicals have a particular affinity for lipid cell membranes, resulting in lipid peroxidation. Reactive oxygen species that are associated with physiologic damage include the superoxide anion, the hydroxyl radical and hydrogen peroxide. Transition metals such as iron, which is especially abundant in the body, are free radicals themselves and produce hydroxyl radicals from the relatively abundant  $H_2O_2$ , iron and copper through reactions such as Fenton's reaction. If free radicals remain active, their chemical reactivity can damage all cellular macromolecules including proteins, carbohydrates, lipids and nucleic acids. Free radical damage to DNA in humans has been implicated in the causation of cancer and, through its effect on LDL cholesterol, heart disease. Free radicals have been implicated in multiple health problems in humans. Associations have been made with the development of senile cataracts, acute respiratory distress syndrome and rheumatoid arthritis. Most recently, a theory associating free radicals with the aging process has gained widespread acceptance.

### Counteracting Free Radical Damage

The body has developed several mechanisms to counteract damage by free radicals and other reactive oxygen species. Each of these act on different oxidants and within different cellular compartments.

Understanding the free radical is important in understanding oxidative stress. Free radicals or "oxidants" are molecules that have one or more unpaired electrons in their outer shell. Unpaired electrons are highly reactive and unstable. In this article, we speak of reactive oxygen species (ROS), which are free radicals that involve oxygen.

### Production of Free Radicals in the Body

Free radicals, and other reactive oxygen species, are derived both from normal essential metabolic processes in the body, and external sources such as exposure to radiation, ozone, cigarette smoke, air pollutants, and/or industrial chemicals.

In the body, free radicals are generated constantly as part of normal aerobic metabolism. The highly efficient production of adenosine triphosphate (ATP), or energy, comes with a price. Stepwise reduction of oxygen by the electron transport chain results in the formation of several reactive oxygen intermediates (e.g. superoxide anion, peroxide ion and

hydroxyl radicals). During exercise, when the amount of oxygen utilized is quite high, free radical production occurs in very large numbers. Free radicals are also produced through other oxidative processes including inflammation via activated phagocytes - the so-called oxidative burst produced by neutrophils.

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The first line of defense is a system of enzymes, including glutathione peroxidases, superoxide dismutases (SOD) and catalase, which decrease concentrations of the most harmful oxidants in the tissues. Several essential minerals including selenium, copper, manganese and zinc are necessary for the formation or activity of these enzymes. If the nutritional supply of these minerals is inadequate, enzymatic defenses against free radicals becomes impaired.

A second line of defense against free radical damage is the presence of antioxidants. An antioxidant is a molecule stable enough to donate an electron to a free radical and neutralize it, thus reducing its ability to cause cell damage. Some antioxidants, including glutathione, ubiquinol and uric acid, are produced during normal metabolism; other antioxidants are found in the diet. Over 4,000 antioxidants have been identified to date, the best known of which are vitamin E, vitamin C and the carotenoids. Many other non-nutrient food substances, such as phenolic or polyphenolic compounds (found in red wine and coffee), display antioxidant properties and may be important in human health.

The balance between the production of free radicals and the antioxidant defenses in the body has important implications for overall health. If too many free radicals are produced with too few antioxidants to provide a counter balance, a condition of "oxidative stress" develops which may cause disease. Numerous studies in people have shown the protective effects of antioxidant nutrients on multiple health problems. The bulk of human research has focused on antioxidants as essential nutrients or precursors of nutrients (e.g. vitamin E, vitamin C and the carotenoids). Each of these antioxidant nutrients have specific activities and they often work synergistically to enhance the overall antioxidant capability of the body.

In animals, where research is more limited, the bulk of our publications have focused on supplementation with four antioxidants, namely S-adenosylmethionine (SAME), silybin (silibinin), zinc and Vitamin E. Clinical recommendations for these agents have largely focused on chronic hepatic diseases and hepatotoxicity affecting canine and feline patients. At present, it is not known whether antioxidant supplementation would be beneficial to animals with other chronic inflammatory conditions such as chronic pancreatitis and chronic airway disease. Future studies may help guide antioxidant therapy in patients with these and other chronic diseases.

## **Specific Antioxidant Supplements**

### **S-adenosyl-L-methionine (SAME)**

SAME is sold in grocery stores as an antioxidant and is also marketed in veterinary medicine under the tradename Denosyl® Nutramax Laboratories™. SAME is a precursor for glutathione (GSH), considered the most abundant and most important endogenous antioxidant in mammalian cells. It is not possible to supplement a patient with glutathione, thus, we supplement with the stable salt of SAME, Denosyl SD4, a glutathione precursor. In humans, SAME increases red cell and hepatocyte GSH and protects against drug-induced hepatotoxicity. It has also been shown to increase hepatic and red cell GSH in normal cats, and dogs with steroid hepatopathy. Studies have shown that SAME supplementation in dogs presenting with some form of hepatic disease has resulted in a greater than 50% reduction in glutathione levels. SAME has also been shown, in a published case report, to successfully counter the oxidative damage from acetaminophen intoxication in a dog.

In addition to its antioxidant properties, SAME acts as the "gateway" for three different intracellular metabolic pathways important for cellular health and function. The transmethylation, trans-sulfuration, and aminopropylation pathways all utilize SAME. The transmethylation pathway acts as a CH<sub>3</sub> group (i.e., a methyl group) donor and is important in drug detoxification, steroid hormone metabolism, protein and carnitine synthesis, and normal hepatocyte membrane function. The aminopropylation pathway is necessary for DNA, proteoglycan, and protein synthesis. The trans-sulfuration pathway generates sulfur compounds such as taurine. This variety of potentially beneficial properties make SAME one of the most popular nutraceutical supplements in humans with hepatic disease.

SAME is one of the most extensively studied nutraceuticals in veterinary medicine and has an excellent safety record. Studies have shown that SAME administration favorably affects the pro-oxidant:antioxidant balance inside erythrocytes and hepatocytes. SAME is currently being used in both dogs and cats for a wide variety of inflammatory, cholestatic, toxic, and vacuolar hepatopathies. Examples include: cholangiohepatitis, canine chronic hepatitis, hepatic lipidosis, vacuolar hepatopathy, steroid hepatopathy, and hepatic damage secondary to drugs or toxins.

### **Milk Thistle (Silibinin/Silymarin)**

Silibinin is the active flavonoid ingredient extracted from the milk thistle plant. Silibinin likely has multiple modes of action; it is thought to be an antioxidant, a cell membrane stabilizer, a general "hepatoprotectant," and

a compound that helps to conserve intracellular glutathione levels and encourage hepatocellular growth and regeneration. In experimental models silymarin has been found to be effective antifibrotic agent, with possible anti-inflammatory properties through the inhibition of NF- $\kappa$ B activity and TNF- $\alpha$  signaling. It is currently being recommended for chronic inflammatory hepatic disease, acute hepatotoxicosis, and extrahepatic biliary duct obstruction. Silibinin can be purchased alone, or in combination with vitamin E, SAMe, and N-acetylcysteine. It is also available in combination with vitamin E and zinc as a product specifically marketed for veterinary patients (Marin<sup>®</sup> Nutramax Laboratories<sup>TM</sup>). Gastrointestinal absorption of silibinin is fairly low. A complex with phosphatidylcholine has been shown to enhance bioavailability.

### Vitamin E

Vitamin E is the collective name for eight compounds, four tocopherols and four tocotrienols, found in nature. It is a fat-soluble substance present in all cellular membranes and is mainly stored in adipose tissue, the liver and muscle. Vitamin E is a principal antioxidant in the body. It protects polyunsaturated fatty acids in cell membranes from peroxidation. Vitamin E is a singlet oxygen quencher, neutralizing highly reactive and unstable singlet oxygen molecules. Vitamin E also protects the double bonds of b-carotene from oxidation. Due to the ability of vitamin E to work at higher oxygen pressures, free radicals are scavenged and tissue injury is minimized. In humans vitamin E is known to afford protection against cancer, ischemia and reperfusion injury, cataract, arthritis and certain neurological disorders.

In veterinary medicine, vitamin E has been advocated for patients with copper-associated liver disease and other chronic inflammatory hepatic diseases, in addition to chronic pancreatitis. Recommended doses vary widely and are based on minimum dietary intake to prevent signs of deficiency. Oral supplementation of 50-100 IU/day/cat and 500IU/day/dog is generally considered safe. Recommended doses based on disease prevention may be higher, however no studies to guide therapy have been performed. A water-soluble formulation is advised for cholestatic diseases.

### Zinc

Zinc contributes to cell membrane stabilization by protecting against vitamin E depletion. It also acts as an antioxidant cofactor, protecting sulfur-hydroxyl groups against oxidation. Aside from its antioxidant effects, zinc has important regulatory and immunomodulatory functions. Zinc acetate also blocks intestinal absorption of dietary copper through the induction of metallothionein. It has been used as the sole therapy for hepatic copper toxicosis. Zinc is available as zinc acetate, sulfate, and gluconate. It should be administered on an empty stomach.

### Concerns About Supplementation

It is important to note that certain antioxidants, such as ascorbic acid, while able to function as an antioxidant, can also act as a pro-oxidant. Supplementation with supraphysiologic doses of Vitamin C can result in accumulation of oxidant radicals. Similarly, excessive administration with vitamin E may result in excess free radical formation. Caution is advised when using high doses of any antioxidant therapy.

### Suggested Antioxidant Doses & Clinical Indications

Disease	Drug	Dose
Copper-associated hepatopathy	Vitamin E (water-soluble)	50-500IU PO/day
	S-adenosyl-L-methionine (SAMe)	20 mg/kg/day on an empty stomach
	Zinc acetate	5-10 mg/kg PO BID 60 min prior to food
Large variety of inflammatory, cholestatic, toxic, and vacuolar hepatopathies	S-adenosyl-L-methionine (SAMe)	20 mg/kg/day PO on an empty stomach
Hepatotoxicity, hepatic recovery/regeneration, hepatic fibrosis	Milk thistle (Silymarin)	20-50 mg/kg/day
	Zinc acetate	5-10mg/kg PO BID 60 min prior to food
Hepatic fibrosis	Zinc acetate	5-10mg/kg PO BID 60 min prior to food
Hepatopathy	Vitamin E (water-soluble)	50-500 IU PO/day
Inflammatory bowel disease	?	?
Chronic airway disease	Vitamin E, C and selenium supplementation protective in horses with COPD	?
Chronic pancreatitis	Variety of supplements shown to reduce recurrence rate and abdominal pain in humans	?

### References Available Upon Request



# Notes :

## Upcoming Technician CE Lecture:

Monday, January 28, 2008, 7:30 - 9:30pm at Bulger Animal Hospital in N. Andover (2CEU)  
Wednesday, January 30, 2008, 7:30 - 9:30pm at Mass Vet Referral Hospital in Woburn (2 CEU)

## **Radiographic Technique & Positioning for the Veterinary Technician**

**presented by Tonya C. Tromblee, DVM, MS, DACVR**

For more information and to sign up, please contact Betsy Hensley, CVT at [bhensley@intownvet.com](mailto:bhensley@intownvet.com), or call: (978)651-2278.



## Veterinarian CE Lectures in 2008:

A schedule of upcoming lectures for veterinarians is available on our website. Click on "referring veterinarians", then click on "CE Lectures".

For real-time access to patient files, medical records and doctors' notes, email [referringvets@intownvet.com](mailto:referringvets@intownvet.com) to set up a username & password.



## Imaging Symposium:

In March we plan to offer a 4-hour day of CE on imaging as a specific diagnostic modality. Lectures will include topics on the subjects of diagnostics involving the use of CT, Radiology, Ultrasound, MRI, Endoscopy, Rhinoscopy and Cystoscopy. More information will follow as we finalize dates, times and lecture content.



## 7-Day/week Surgery:

We are very pleased to announce that surgery at Mass Vet is now available to your clients **7 days a week**. Kechia Davis, DVM, DACVS is available for surgery on Sundays.

