Pain in Veterinary Patients

Simply put pain is the worst. Pain is so awful our brains frequently try to shield us from the memories of pain. Unfortunately people frequently anthropomorphize pain responses in animals. I commonly have clients tell me their pet is not in pain because they are not crying out loud or whimpering. Not many pets vocalize from pain, and if they do the pain has to be really severe.

Even though cats and dogs have been domesticated they still retain many "wild" characteristics. One of those traits is the concept of survival of the fittest. Animals that are visibly in pain are considered weak, and weak animals either get eaten or beat up. As a result pain signs in animals can be very subtle. The bottom line is animals in pain do not mirror people in pain. The following table compares pain responses between people, dogs, and cats.

Humans	Dogs[1]	Cats[2]
• Facial Grimacing • Frowning • Moaning • Groaning • Whimpering or Crying • Complaining • Yelling • Anger or Irritability • Restlessness or Agitation • Grabbing/Holding Area in Pain	• Antisocial Behavior (hiding, wants to be alone) • Aggressive Behavior • Changes in Eating Habits • Changes in Drinking • Changes in Sleeping (more or less, fitfully) • Vocalization • Excessive Grooming • Panting or Abnormal Breathing • Mobility Issues (limping, walking more slowly, slow to rise, reduced jumping) • Agitation or Irritability • Changes in Body Posture • Holding Tail Down or Tucked • Holding Ears Back or Pinned Close to the Head	• Hiding • Sitting Still or Hunched Up • Loss of Interest in People, Pets or Activities • Excessive Grooming • Decreased Grooming • Excessive Purring or Meowing • Unusual Vocalization (chitter, chirp, yowl, moan) • Inappropriate Urination • Inappropriate Defecation • Fast Shallow Breathing • Reduced Appetite

The recognition and treatment of pain is such a hot button topic in veterinary medicine right now. Pain is considered the 5th vital sign (temperature, pulse (heart rate), respiratory rate, mucus membrane color, capillary refill time, and pain), and a patient's pain status is/should be noted on every physical examination. The most common scale used is 0-5 where 0 is normal (no pain) and 5 is excruciating pain.[1,2,3]

Before the scientific community understood a lot about the mechanisms behind pain it was classified as either acute or chronic. Generally acute and chronic pain occurs through the same pathways, and the division only refers to the length of time the condition has existed. Better terminology would be adaptive and maladaptive pain.

Adaptive pain is a normal physiologic response to actual or perceived tissue damage. This form of pain requires a functioning nervous system and generally occurs secondary to trauma, surgery, or medical issues. The pain stops as soon as the underlying cause dissipates. Adaptive pain is generally acute in nature. Adaptive pain is necessary for survival. This response serves to protect individuals from repeated injury and prolonged tissue damage. A primary example is why people avoid touching hot stoves, unfortunately this lesson is frequently learned through hands-on experience.

Maladaptive pain occurs because the central nervous system became confused. The initial source of the pain has resolved but the pain persists. Maladaptive pain serves no purpose and can actually negatively affect survival. Neuropathic pain can develop after nerve damage occurs and is the primary mechanism through which maladaptive pain occurs. Neuropathic pain can lead to wind-up pain. Wind-up pain is an unnecessarily complicated cascade of events that results in this never ending cycle of pain causes more pain which causes more pain and so on. Wind-up pain can be harder to treat and frequently requires multiple medications and physical treatments to relieve the symptoms.

So now that we have “summarized” pain and we know maladaptive pain, specifically neuropathic pain, is our super villain, how do we know our pet is experiencing this type of pain? In general any uncontrolled chronic musculoskeletal and many neurologic conditions will eventually cause neuropathic pain. Even simpler still if you pet has arthritis, back pain, limps, has trouble getting up from a seated positon, has trouble lying down, and/or refuses to jump up onto furniture he or she likely has maladaptive pain.

The next logical question is how do we treat maladaptive pain? Any pain management plan should have 3 parts.

First, control the pain. Aside from the obvious moral and ethical reasons for stopping pain in our pets why is pain control so important? Patients with chronic maladaptive pain have poorer quality of life, shorter lives, weaker immune systems, poorer gut motility, retain water, have reduced oxygen supply to their body, and are slower to heal.

Second, plan for continuous pain control. Lapses in pain control can allow wind-up pain to occur which makes stopping pain even harder.

Lastly, a multimodal plan works best. The brain recognizes pain because of signals sent to it by various nerves throughout the body. Electrical, chemical, and/or thermal signals can be the inciting factors that trigger the nerves to fire. Each type of signal requires a different approach to treat and prevent it from causing pain. Because pain pathways are so complex multiple treatment options are needed to stop and prevent pain. This includes supplements, pharmaceuticals, physical treatments, and holistic options.

The remainder of the article will focus on the different treatment modalities available for cats and dogs experiencing maladaptive pain. Your veterinarian is the best person to contact and work with to develop a tailored pain management plan for your pet. While this article does provide some at-home or over-the-counter options remember one treatment is generally not enough.

The following tables outline the different treatment options for pain in both cats and dogs. Pharmaceuticals are medications that can only be used if prescribed by a veterinarian.

PHARMACEUTICALS		
Drug Class	**Mechanism of Action**	**Drug Examples**
NSAIDs	• Provide oral anti-inflammatory and pain control. • Primarily used for acute muscle or back injury, chronic arthritis, and chronic back pain. • Can be used short and long-term. • Reduce production of specific prostaglandins responsible for pain and inflammation by inhibiting COX-2. *More specific information about NSAIDs can be found in the NSAID section after the chart.* • Galliprant is not recommended for short-term use as it can take up to 14 days to become fully effective. • All require blood work monitoring (generally every 6 months if on long-term therapy).	• Rimadyl (Carprofen) • Metacam (Meloxicam) • Onsior (Robenacoxib) • Previcox (Firocoxib) • Deramaxx (Deracoxib) • Galliprant (Grapiprant)
Opioids	• Provide pain relief by stimulating opioid receptors in the body. • Does not reduce inflammation, so they are frequently used with NSAIDs to provide better pain control. • Can be used short and long-term. • Almost always cause sedation in both cats and dogs. • Cats and dogs do not become addicted to opioids like people. • Shortage of some opioids for pets because of the human opioid crisis. • Virginia Law stipulates veterinarians can initially prescribe 7 days of an opioid. A recheck examination is required to prescribe more drug. Patients with “chronic” pain issues can receive long-term opioid prescriptions but must be examined by their veterinarian at least every 6 months specifically to discuss the continued use of opioids for their pet. • Tramadol is oral only and is the most commonly prescribed opioid for long-term use in pets. • Buprenorphine is an injectable medication that can be given through injection or orally. Cost generally prohibits long-term use. This medication is most commonly used in cats due to high costs for larger dogs. • Codeine is most frequently used orally with Tylenol in DOGS ONLY. I personally do not prescribe this but many boarded veterinary surgeons prefer this for post-operative	• Tramadol • Buprenorphine • Codeine • Fentanyl • Hydromorphone • Morphine

	pain control at home. • Fentanyl is available as an injection and a transdermal patch. The injection is most often used as a continuous rate infusion (CRI) in-hospital for acute trauma and post-operatively. The patch takes 24 hours to take effect and lasts for 3 days. Fentanyl is not used long-term because of cost and risk of human abuse. • Hydromorphone and Morphine are injectable medications used short-term in-hospital generally after acute trauma or post-operatively. Morphine is not used as much because hydromorphone has fewer side effects. Morphine should not be used in cats.	
Other Medications	**Gabapentin** • GABA agaonist but exact mechanism of action is unknown. • Used for nerve pain and help stop wind-up pain. • Does not provide direct pain relieve or reduce inflammation. • Sedation is the most common side effect. • Can be combined with other medications, but concurrent use with opioids may cause significant sedative effects. **Amantadine** • N-methyl-D-aspartate (NMDA) receptor antagonist. • NMDA receptors are located in the central nervous system and can be triggered in cases of maladaptive, especially neuropathic, pain. • Inhibition of the receptor reduces neuropathic and wind-up pain. • Does not provide direct pain relieve or reduce inflammation.	• Gabapentin • Amantadine

Nonsteroidal Anti-inflammatory Drugs (NSAIDs) work on some of the chemical signals involved in pain, specifically COX-1 and COX- 2 enzymes. Cyclooxygenase (aka COX) is an enzyme responsible for the formation prostaglandin through the Arachadonic Acid Pathway. There are many types of prostaglandins, of particular interest for this article are the prostaglandins involved in propagation of pain and inflammation. Inhibition of COX enzymes prevents the production of prostaglandin which stops pain and inflammation.[7]

There are 2 main COX enzymes, 1 and 2, and both are found in cells throughout the body. COX-1 is found in higher concentrations in cells needed for normal physiologic function, such as platelets, the lining of the GI tract, and the kidney. COX-2 is found in low concentrations in many cells and tissues in a healthy body but in higher concentrations when pain and inflammation exist. Initially NSAIDs were manufactured that inhibited both COX-1 and COX-2, but these medications had higher risk of side effects, specifically GI upset and ulceration, kidney disease, and liver disease. Over the last two decades emphasis is placed on COX-2 specific NSAIDs with fewer side effects.[7]

Galliprant is the newest NSAID. It works on a different type of prostaglandin, EP4. This medication is touted as being “safer” on the liver and kidneys because EP4 is not found in these organs.

All NSAIDs, even COX-2 Inhibitors and EP4 Receptor Antagonists, have the potential to negatively affect the GI tract, Liver, and Kidneys. Blood work monitoring before starting any NSAID therapy is always recommended. Blood work monitoring should continue if NSAIDs are used long-term. In general I recommend checking blood work either before starting or 7 days into treatment, then 1 month later, then 3 months later, and then every 6 months as long as the patient remains on the medication and the liver and kidney enzymes remain stable.

Unfortunately there are no NSAIDs labeled for long-term use in cats. Cat kidneys are particularly sensitive to NSAIDs. Metacam was previously used to treat chronic arthritis (which we now know should really be called maladaptive pain due to arthritis) in cats, but a lot of cats developed kidney disease secondary to long-term metacam use. Metacam now has a "black box" warning which means veterinarians have to be really really careful and warn owners of the probable risk of kidney disease if used in cats. Onsior is labeled only for short-term post-operative use in cats. For my feline patients that I believe would benefit from long-term NSAID use I generally reach for Onsior. I have a very open discussion about the pros and cons with the owner, and it is imperative we come to a joint consensus about NSAID use in cats.

Neutraceuticals are pharmaceutical-grade supplements that provide medicinal benefits. There are no governing bodies that regulate neutraceuticals. To ensure your pet is receiving the safest and purest supplement I only recommend supplements I trust and ones that have outside laboratories certify their ingredients.

NEUTRACEUTICALS	

Joint Supplements	**Dasuquin Advanced**
	• Flavored chew for dogs and a sprinkle powder in a capsule for cats.
	• Given daily to every other day long-term depending on the size of the cat or dog.
	• Need a 4-6 week loading period where double the dose is given, and then continued long-term on a maintenance dose.
	• Care should be taken when using in a diabetic patient. Glucosamine can interfere with blood sugar levels.
	• Ingredients
	  ○ Glucosamine Hydrochloride – Provides cartilage-building cells (called chondrocytes) with the building blocks needed, glycosaminoglycans (GAGs) and hyaluronan, to manufacture new cartilage and repair damaged cartilage. Also has mild anti-inflammatory effects by acting as a free radical scavenger. (Free radicals are unstable molecules made during normal cell metabolism. High levels of free radicals can cause cell damage.) [4]
	  ○ Methylsulfonylmethane (MSM) – Sulfur containing compound reduces joint inflammation and breakdown of joint cartilage and connective tissue.[5]
	  ○ Sodium Chondroitin Sulfate – Reduced damaging enzymes found in inflamed or arthritis joints and damaged cartilage. Also stimulates the production of GAGs. [4]
	  ○ Boswellia serrata – Plant shown to reduce joint inflammation through

	inhibition of multiple enzyme pathways, including Lipoxygenase and Metalloproteinase. Lipozygenase (LOX) is involved in the cascade of events which cause inflammation, similar to COX. Matalloproteinase causes cartilage degradation and is found in higher concentrations in patients with arthritis. Also helps support a healthy immune system.[6,7] ○ Curcuma longa – Plant and cooking spice, aka Tumeric, shown to be a powerful anti-oxidant that protects joints and supports the immune system.[6] ○ Green Tea Extract – Green tea contains numerous flavonoids, polyphenol antioxidants, which reduce inflammation and slow cartilage damage. ○ Avocado/Soybean Unsaponifiables (AS) – Extracts made from avocado and soybean oils that cannot be used for soap making. These oils contain a complex mixture of chemicals, in particular sterols, which inhibit cartilage breakdown and promote chondrocytes to repair damaged cartilage, in part by inhibiting nitric oxide synthase (another enzyme involved in the cascade of inflammation).[6] ○ Eicosapentaenoic Acid (EPA) – Long-chain Omega-3 Polyunsaturated Fatty Acid (PUFA) found in cold water fish. Reduces joint inflammation through inhibition of the Arachadonic Acid pathway.[8] ○ Docosahexaenoic Acid (DHA) - Long-chain Omega-3 Polyunsaturated Fatty Acid (PUFA) found in cold water fish. Reduces joint inflammation through inhibition of the Arachadonic Acid pathway.[8] **Glycoflex** • Flavored chew for dogs and cats. • Given daily to every other day long-term depending on the size of the cat or dog. • Need a 4-6 week loading period where double the dose is given, and then continued long-term on a maintenance dose. • Not to be used in animals with a shellfish allergy. • Care should be taken when using in a diabetic patient. Glucosamine can interfere with blood sugar levels. • Ingredients ○ Glucosamine Hydrochloride ○ Methylsulfonylmethane (MSM) ○ Perna canaliculus – GlycOmega is a compound made from the green-lipped mussel from New Zealand. The product is anti-inflammatory and protects joint cartilage. The exact mechanism of action is not known. It does contain high levels of eicosatetraenoic acid (ETA) which is an Omega-3 Fatty Acid.[8] ○ N,N-Dimethylglycine HCl (DMG) – Compound made from the amino acid glycine which has been shown to be a potent anti-oxidant in the joint.[5] ○ Manganese – This mineral is essential in the formation of collage, GAGs, and proteoglycans, helping protect cartilage integrity and reducing damage.[5] ○ Antioxidants – Vitamin C, Vitamin E, Grape Seed Extract, Selenium, and L-Glutathione **Adequan** • Injectable polysulfated glycosaminoglycan (PSGAG) given under the skin (subcutaneously) or in the muscle (intramuscular) initially twice a week for 8

	doses and then the interval between dosing is gradually extended. Long-term the product is generally injected monthly. • The product can be given at the veterinary hospital or owners can be taught how to administer at home. • This product is expensive, especially for large and giant breed dogs. • PSGAGs inhibit enzyme degradation of GAGs allowing joint cartilage and connective tissue to maintain flexibility, compression resistance, and resiliency. PSGAGs also increase synthesis of GAGs reducing joint inflammation. Finally, PSGAGs also improve joint fluid health by increasing concentrations of hyaluronate, a chemical necessary for healthy joint fluid.[4] **Duralactin** • Soft chews and tables for dogs and cats. • Contains a patented dried milk protein (MicroLatin) from hyperimmunized cows. • MicroLatin reduces joint inflammation through inhibition of the Arachadonic Acid Pathway and decreases neutrophil (a specific type of white blood cell) activity within the joint. • Some Duralactin products also contain Glucosamine HCl and MSM.
Fish Oil	The 2 products I like best are Nordic Naturals Omega 3 Pet and Welactin.
Other Supplements	• **Boswellia** – My favorite is the Standard Process Boswellia. The NOW Boswellia is a fairly good alternative as well. The dose is generally 25-50 mg/kg every 12 hours[8]. • **Curcumin** – I like the Rx Vitamins and Ayush brand curcumin. Ayush has the product as a tablet for pets and a human drink mix. Personally I use the human drink mix for my dog because it contains medium chain triglycerides from coconut powder which aid in absorption. The dose is generally 5-50 mg/kg daily[8] (or 250 mg for a small dog, 500 mg for a medium dog, and 1000 mg for a large dog). • **Acetyl L-Carnitine** – An amino acid that reduces inflammation within the nervous system, improves nerve recovery, helps reduce nerve pain, and improves muscle function. The dose is 50-200 mg/kg/day[8]. There are numerous brands on the market. I do not have a favorite I recommend. • Antler Velvet – Usually Deer or Elk are used, and forceful removal of the antler can be painful on the animal. There is some evidence suggesting antler velvet provides growth factors which may improve muscle and joint health. Personally I do not recommend this product as the research is limited and the potential for animal injury in obtaining the product is distressing. • **CBD Oil** – There is a lot of controversy around CBD and Hemp Oil right now. In the state of Virginia a veterinarian cannot legally recommend CBD oil but they can advise clients on safe usage if they purchase it on their own. CBD oil has been show to reduce pain and inflammation through stimulation of endogenous (our own) cannabinoid receptors in the central nervous system and immune system. CBD and Hemp Oil should contain <0.3% delta-9-tetrahydrocannabinol (THC), the active psychoactive substance in marijuana. THC is the primary reason marijuana is toxic to animals. • **T-Relief Pain** – This is a combination of homeopathic remedies which help with pain, inflammation, and bruising. Dosing is generally ½ tablet twice daily for cats and small dogs, 1 tablet twice daily for medium dogs, 1-2 tablets twice daily for large dogs, and 2 tablets twice daily for giant dogs. This supplement can be given short or long-term. • **Chinese Herbal Formulas** – There a many Chinese Herbal Formulas which can help with pain and inflammation. Frequently herbal formulas help with multiple

	conditions at one time. Chinese Herbal Formulas should only be given under the supervision of a veterinarian trained, and preferably certified, in Chinese Veterinary Herbal Therapies (CVHM or GDCVHM).

There are numerous physical therapies available for the treatment of pain in veterinary patients.

PHYSICAL THERAPIES	
Rehabilitation	• Animal rehabilitation should only be done under the direction of a veterinarian and/or licensed veterinary technician certified in animal rehabilitation. • Can aid in regaining muscle strength, improving muscle tone, reducing muscle spasms, speed recovery from orthopedic surgeries, reduce pain (muscular and neurologic), promote weight loss, and improve geriatric wellness. • Rehabilitation frequently utilizes multiple treatment modalities. • Generally consists of multiple sessions with a certified technician and owners are given "home-work", exercises their dog should perform at home to speed recovery. • The frequency and number of rehabilitation sessions is dependent on the pet's condition.
Massage	• Veterinary massage should only be performed by certified individuals, frequently licensed veterinary technicians and/or veterinarians. Owners can be shown how to properly massage their pet at home. • Massage improves blood flow, reduces inflammation, relieves muscle tension, and prevents the formation of scar tissue (trigger points) within the muscle. • The frequency of massage depends on the pet's problem.
Acupuncture	**What is Acupuncture?** The term acupuncture is from the Latin, "acus" meaning 'needle' and "punctura" meaning 'to prick'. Acupuncture is the treatment of conditions or symptoms by the insertion of very fine needles into specific points on the body in order to produce a response. Acupuncture points can also be stimulated without the use of needles, using techniques known as acupressure, cupping, or by the application of heat, cold, water, and laser. The specific acupuncture points have been well charted for both humans and animals. There are 361 acupuncture points in humans and roughly 173 acupoints in animals. The points are connected with each other and various internal organs via meridians or channels. Many of these channels trace the paths of the body's major nerve trunks. Each acupuncture point has specific actions when stimulated. Which acupuncture points are stimulated, the depth of needle insertion, the type of stimulation applied to the needles, and the duration of each treatment session depends on the patient's tolerance, and the condition being treated. **What is the history of acupuncture?** Acupuncture is an ancient form of medical treatment that has been practiced in China and other countries for thousands of years. The first veterinary acupuncture book, *Bole's Canon of Veterinary Acupuncture*, was written by Dr. Bo Le between 659-621 B.C. **On which species of animals is acupuncture practiced regularly?** Acupuncture can be used on all species of animals, but it tends to be more frequently used in companion animal species such as the horse, dog and cat. Most animals

tolerate the treatments very well. It may be necessary to gently restrain the animal during the first treatment to minimize discomfort. Most animals relax and sit or lie quietly for subsequent treatments.

Who can practice veterinary acupuncture?
The American Veterinary Medical Association considers the practice of acupuncture to be the practice of veterinary medicine, and as such, should only be performed by a licensed veterinarian. A certified veterinary acupuncture training course is highly recommended. Certified Veterinary Acupuncturists have the initials CVA following their DVM.

How long are the treatments?
The needles remain in place for 15-30 minutes. All acupuncture appointments are at least 45 minutes long.

How many treatments are needed?
The frequency of acupuncture treatments depends on the nature and severity of the illness. Often acupuncture is initially performed once a week for 4-5 treatments. The time between treatments is then gradually increased until a maintenance program is established, often every 6 months, or until the condition resolves.

What conditions are most often treated with acupuncture?
In veterinary medicine, there is evidence for the success of acupuncture in treating disorders of the reproductive, musculoskeletal, neurologic, pulmonary, gastrointestinal and dermatologic systems. The most common conditions treated, include traumatic nerve injuries, intervertebral disk disease, degenerative myelopathy, epilepsy and other central nervous system disorders; gastrointestinal diseases, endocrine disease, cancer, asthma, allergic dermatitis, lick granulomas; and chronic pain such as that caused by degenerative joint disease. Any condition may potentially benefit from acupuncture. Acupuncture stimulates healing of some conditions, improves the overall function of the immune system, and provides effective pain relief.

How safe is acupuncture?
Acupuncture is a very safe medical procedure when administered by a qualified veterinary practitioner. Very few side effects have been found in clinical cases. Such reactions may include mild transient bruising or swelling at the needle insertion site; a mild worsening of the condition for a short time (usually 24 to 48 hours); difficulty removing needles because of muscle spasm; injury to an underlying tissue or organ; and infection at the needle site. Certain acupuncture points are contraindicated in pregnant animals. Caution is exercised if certain drugs such as narcotics or corticosteroids are being used, or if the animal has a clotting disorder.

What is the cost of acupuncture?
Comprehensive acupuncture treatment involves a thorough history and physical examination, followed by a patient assessment and formulation of a treatment plan. It rarely involves a single visit, and costs will vary according to the specific condition being treated, the equipment required, and the response of the patient.

(*Adapted from the American Holistic Veterinary*

	Medical Association Veterinary Acupuncture handout.)
Chiropractic	**What is Veterinary Spinal Manipulation Therapy?** Veterinary Spinal Manipulation Therapy is also known as Veterinary Chiropractic. The term chiropractic comes from the Greek words “cheir” which means ‘hand’ and “praxis” which means ‘practice’ or ‘done by’, and refers to the practice of manipulating the spine to treat disease. Chiropractors’ base their theories of disease on the connections between various body structures and the nervous system via the spinal column, and on the role of the spine in biomechanics and movement. Therapy is directed at the spine in order to modify the progression of disease. **What is the history of chiropractic medicine in veterinary medicine?** Spinal manipulation has been practiced for centuries in many cultures, including the early Chinese and Greeks. In its modern form, chiropractic theory and practice have developed within the last century. Veterinary chiropractic is a young profession that is undergoing rapid growth and evolution. **On which species of animals is chiropractic practiced regularly?** Chiropractic manipulation is frequently performed on horses, dogs, and cats, but can theoretically be performed on any vertebrate species. **Who practices veterinary chiropractic therapy?** In the state of Virginia only specially trained and certified Veterinarians can practice spinal manipulation on animals. The training is separate from veterinary school. Dr. McFaddin received a post-doctorate degree in Veterinary Spinal Manipulation Therapy (CVSMT) through The Healing Oasis in Wisconsin. Dr. McFaddin is also a fellow in the College of Animal Chiropractors (CCOAC). **What conditions are most often treated with spinal manipulation?** Conditions with a neurologic or biomechanical (musculoskeletal) origin are amenable to chiropractic manipulation. These conditions include degenerative joint diseases such as hip dysplasia and spondylosis; cervical instability; acute neck pain; intervertebral disk disease; autonomic nervous system problems such as urinary and fecal incontinence; musculoskeletal weakness or pain that resists conventional diagnosis and treatment; and chronic back and neck pain. **How can my pet benefit from spinal manipulation?** Chiropractic is one of the few modalities in veterinary medicine where results are frequently immediate, and are often seen within minutes of treatment. In general, improvements are defined as an improved gait and an apparent reduction in pain. In orthopedic conditions such as fractures or ligament tears, chiropractic care will not replace the need for surgery, but may be useful in correcting secondary problems caused by compensation or overcompensation to the injury. Animals used for athletic performance or other working purposes are ideal candidates for chiropractic treatment. By regularly assessing and maintaining maximum flexibility in these animals, injuries may be avoided. Animal athletes include horses used for racing, dressage or pleasure riding, and dogs used in racing, agility training or field trials. **How successful is spinal manipulation?** Veterinarians practicing spinal manipulation see the patient as a functional

	whole, rather than as a sum of its parts. Ensuring normal range of motion of the vertebrae helps optimize function of lymphatics, blood vessels and nerves, which communicate between the spine and various body structures, allowing the body to function optimally to the point that further interventions may not be required. Applied correctly, chiropractic adjustments can alleviate or eliminate the need for long-term drug treatments. The success of the treatment depends upon the degree and chronicity of the problem. **How safe is chiropractic?** When performed by an experienced, trained veterinary professional, chiropractic manipulation is generally considered to be safe. If adjustments are performed with the appropriate force, the patient will require a series of treatments, which will gradually result in restoration of health. However, if the force of an adjustment is excessive or the adjustment is applied at an incorrect angle, time, or location, serious damage to the patient could occur. Some animals may be a little stiff for 24 hours after the treatment. If this is noted encourage gentle movement periodically. **What is the cost of chiropractic?** Comprehensive chiropractic treatment involves obtaining a thorough history and physical examination, followed by patient assessment and formulation of a treatment plan. It rarely involves a single visit, and costs will vary according to the specific condition being treated and the response of the patient. The fees associated with chiropractic treatment are set by the individual practitioner, and will often reflect the experience and skill of the chiropractor. Chiropractic is usually very affordable, and is certainly a cost effective way of managing and resolving pain and weakness. **Can chiropractic be combined with other types of veterinary medicine?** Chiropractic therapy is often combined with other forms of traditional and integrative veterinary medicine. There appears to be a particularly strong synergy between acupuncture and chiropractic. When multiple types of treatments are used, it may be difficult to determine the efficacy of a chiropractic treatment, unless the treatments are performed at different times. Certified veterinary chiropractors have the knowledge and skill to understand the interactions between different forms of treatment and to interpret the patient's response to therapy. *This client information is based on material written by Steve Marsden, DVM ND MSOM LAc DiplCH AHG, Shawn Messonnier, DVM and Cheryl Yuill, DVM, MSc, CVH.*
Trigger Point Therapy	• Trigger points are painful or uncomfortable knots or taut bands affecting muscle and myofascial. • They occur from overuse, trauma, persistent muscle contractions, prolonged immobility, hypothyroidism, iron deficiency, vitamin B deficiency, and arthritis. • Trigger points are identified by palpating a knot or tight band within the muscle or noting a pain response when a specific segment of muscle is palpated. • Trigger points can be treated through vigorous massage or dry needling. • During trigger point needling the patient is sedated and larger-longer acupuncture needles are placed directly into the trigger point. This causes stimulation, initial tension, and then relaxation of the trigger point. • Trigger point therapy should only be performed by a licensed veterinarian or technician.

Cold Laser Therapy	• Laser stands for Light Amplification of the Stimulation of the Emission of Radiation. • Cold laser therapy uses low level lasers which send photons, or packets of light energy, deep into tissue without damaging it. These photons are absorbed within the mitochondria of the cells and induce a chemical change called "photo-bio-modulation". This light energy then inspires production of ATP in the cell. ATP is the fuel, or energy, cells need for repair and rejuvenation. Impaired or injured cells do not make this fuel at an optimal rate. Increased ATP production leads to healthier cells, healthier tissue, and healthier animals. (Taken from K Laser website = https://www.k-laser.com/veterinary-professionals/science.) • Most veterinary practices use either Class 3 or Class 4 cold lasers. • Sessions generally last 5-20 minutes depending on the number of sites being treated. • Cold laser therapy is usually performed 1-3 times a week. The frequency and number of treatments are determined by the patient's presenting problem and response to therapy.
Assisi Loop	• The Assisi Loop emits bursts of microcurrent electricity creating a field which evenly penetrates both soft and hard body tissue around the target area. This electromagnetic field causes a chemical cascade, which activates the Nitric Oxide cycle. Nitric Oxide is a key molecule in healing for humans and animals. The compound is released during exercise and injury, allowing the body to heal itself. • The Loop increases Nitric Oxide production to help speed healing of soft and hard tissues--that includes skin, tendons, ligaments, bones and organs. The Loop can be used to speed healing, reduce inflammation, and lower pain levels. Information obtained from Assisi Loop website: https://www.assisianimalhealth.com/.
Advanced Procedures	• **Platelet Rich Plasma (PRP)** uses the patient's own blood to create therapeutic injections of plasma with high concentrations of platelets. This solution is injected into affected joints. The platelets help reduce inflammation, slow down the progression of arthritis, increase the production of joint fluid, and reduce pain sensation. • **Stem Cell Therapy** use the patient's own fat cells specially prepared and injected into an affected joint. Stem cell therapy has similar effects as PRP. Both of these procedures must be done by a trained veterinarian and may require sedation of the patient during the injection.

As you can see the concept and development of pain is much more complicated than most people realize. And just as complex are the treatment options. This article was meant to shed light on your options when treating your pet's pain.

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