

VETERINARY PROLOTHERAPY FOR PAIN RELIEF by Dr Signe Beebe

Prolotherapy is an injection-based treatment for chronic musculoskeletal pain. Historically, prolotherapy dates back to the time of Hippocrates and modern prolotherapy was developed beginning in the 1930's by George Hackett MD, a general surgeon. Dr Hackett published one of the first textbooks on prolotherapy in 1956. Prolotherapy treatments are specifically designed to strengthen weakened or torn tendons, ligaments and cartilage. "Prolo" is short for proliferation, because the treatment induces the proliferation (growth, formation) of new connective tissue in damaged tendons, ligaments and cartilage.

Chronic musculoskeletal pain is thought to be due to inadequate repair of fibrous connective tissues that results in ligament and tendon weakness or laxity. It can be thought of as a deficiency of connective tissue with insufficient tensile strength or tightness. Because tendon and ligament have a poor blood supply they take longer to heal than other tissues of the body and incomplete healing is common after injury. Weight bearing of the affected joint during exercise then stimulates pain mechanoreceptors. As long as the ligaments and tendons are weak, these pain receptors continue to fire with use. If the tendons and ligaments weakness remain weak and are not sufficiently strengthened to stop pain receptor stimulation, then chronic pain, sprain or strain results.

Prolotherapy works to stimulate healing by increasing growth factor levels and or effectiveness to promote tissue repair and growth. There are a group of chemicals collectively called growth factors that are associated with the white blood cells and platelets of the body. These growth factors are what "turns on" the body's acute injury healing system. Over the past few decades more than 40 chemicals have been identified that cause growth factor release. Prolotherapy techniques in animals have largely been extrapolated from their use in humans and use injections containing a variety of solutions/chemicals that fully trigger this healing system. In essence, prolotherapy solutions and injection technique mimics acute injury; it fools the body into believing it has sustained an acute injury that causes an outpouring of growth factors that facilitate self-healing.

Prolotherapy can be used to treat many different types of chronic musculoskeletal pain conditions including: carpal/tarsal ligament sprain/strain, arthritis, spondylosis, chronic back and neck pain, cervical-vertebral instability, degenerative joint disease, canine hip dysplasia, elbow, shoulder and stifle dysplasia, performance induced ligament and tendon laxity/injuries and cranial cruciate ligament tears or ruptures. Prolotherapy can be successfully performed on both dogs and cats, however it is used most commonly on dogs. In humans, the use of prolotherapy to treat ligament injuries of the knee and osteoarthritis were studied and have been shown to be successful in recent double blind studies. There is emerging evidence that suggests that prolotherapy may stimulate the production of new articular (joint) cartilage.

Conventional prolotherapy technique involves injection of a proliferant solution into damaged ligaments and tendons to cause localized inflammation that triggers the normal healing cascade and directly stimulates the growth of new strong healthy ligament and tendon tissue. As the tendons and ligaments grow stronger and more capable of supporting and maintaining normal joint stability, the pain is alleviated. There are numerous types of prolotherapy solutions, however the most commonly used solutions contain hypertonic dextrose, (15% being the most common used) and a local anesthetic such as lidocaine or procaine. Other solutions that can be used in prolotherapy solutions include glucosamine HCL, MSM, vitamin B12 and Adequan. The choice of solution and number of injections depend on the animal's age, breed, weight and condition.

Prolotherapy may also be performed using ozone, this method of treatment is called prolozone. Ozone is a highly reactive molecule and when injected into the injured and weak soft tissues are able to stimulate the production of new collagen to strengthen damaged soft tissues similar to proliferant solutions. The use of prolozone depends on the individual case.

Prolotherapy treatments are typically performed on average once every 4-6 weeks. Based on clinical response, 4-6 monthly treatments are generally required. Larger breed dogs and those with significant joint laxity, severe arthritis or ligament rupture usually require more treatments. Most owners report a 50-

80% reduction in pain within the first two treatments. Prolotherapy is not a substitute for surgery and not all animals are candidates for this type of medical procedure. *Prolotherapy usually requires mild sedation* in order to accomplish an adequate number of injections and minimize unintended trauma to surrounding structures. The attendant risks of sedation are the same as for any other medical procedure. Some geriatric patients with poor organ function (liver and kidney) and perceived high anesthetic risk can receive prolo treatments using gentle restraint. Prolotherapy is typically performed as an outpatient procedure that is approximately 30-60 minutes in duration.

Prolotherapy is appropriate for: animals with chronic osteoarthritis pain that involves one or more joints, those with lameness involving the front and rear legs, geriatric animals with chronic arthritis or joint pain that are a high anesthetic risk, pets with injury or tears of one or both cranial cruciate ligaments (prolotherapy treatment can protect the cruciate ligament in the non-surgical leg from rupture in cases where one ligament has already been repaired), post-surgical genetic orthopedic disease (hip, shoulder and elbow dysplasia) that still have chronic lameness and pain despite surgical correction, performance animals (agility, working dogs) with ligament or tendon injuries and for animals that have had adverse reactions to non-steroidal conventional pain medication or for which these medications are no longer effective or minimally effective. Anti-inflammatory drugs of any type will interfere with and decrease the effectiveness of prolotherapy treatments; these include aspirin, steroids and non-steroidal anti-inflammatory drugs (NSAIDS). Owners are instructed to stop these medications at least one week prior to beginning prolotherapy.

Prolotherapy is considered to be a safe, low-risk procedure. The risks are far less than anesthesia, surgery and or taking non-steroidal anti-inflammatory drugs for life to relieve chronic pain. It is important to receive adequate training on prolotherapy technique in order to avoid iatrogenic trauma to the joint and surrounding tissues. Some animals may have local bruising around the injection sites as well as mild transient pain and stiffness for 2-3 days following prolotherapy. This is because the prolotherapy solutions intentionally induce an inflammatory response and the injections themselves cause mechanical injury to the tendons and ligaments and surrounding muscle. Prolotherapy contraindications include: any underlying condition that could interfere with healing such as cancer, active infection or immune deficiency.

Dogs and cats that have been taking steroids (prednisone) and NSAIDS (Deramaxx, Rimadyl, Metacam, aspirin etc) prior to prolotherapy may experience more pain by their owners than for those animals that have not taken these drugs. This is because of the lag time between the discontinuance of the NSAID's and the stabilizing pain relieving effects of the prolotherapy. Tramadol or Gabapentin can be prescribed to treat animals that exhibit significant pain as needed. Acupuncture for pain relief can also be performed in between the first two initial prolotherapy treatments.

Acupuncture is especially recommended for those animals that have a high degree of pain and lameness, multiple joint problems and for those animals that were taking high doses of NSAIDS prior to prolotherapy. In summary some pets may temporarily have more pain following prolotherapy, and this is a normal and expected result from prolo treatments and will typically resolve within 3 days of the procedure. Massage therapy, tuina and gentle stretching techniques can also help relieve pain.

Generally, light exercise can begin 24 hours after prolotherapy. Many younger pets (especially dogs) may have significantly *decreased* pain post-prolotherapy and may immediately want to become more active. It is important to prevent these animals from over exercising, or further damage, lameness and pain can result. It is recommended that dogs be prevented from running and jumping and leash walked only twice daily for short distances in the week following prolotherapy to promote normal blood circulation and healing of the joints. It is recommended to owners that they gradually work their pet into longer periods of exercise over time. No swimming is allowed for one-week post-prolotherapy to avoid infection of the injection sites.