

Treatment Options for Cranial Cruciate Tears

The Internet is often the first place people look these days for answers. When their dog suddenly starts limping, it is no different. After you diagnose a cruciate tear, that client will most likely go home and google it or join a Facebook group to discuss and ask more questions. You should be prepared for the different options your client will discover. Depending on the owner's goals, you may find a different approach has some benefit.

Inaction

There is an entire webpage based on this principle and the thought that surgery to correct this injury was developed just to make veterinarians rich. www.tiggerpoz.com This method is often still recommended for small dogs, less than 10 kg.

The body hates instability. When the cruciate ligament is injured, an inflammatory process is started and limping is obvious. Rest and anti-inflammatory drugs are started. Often in 6-12 weeks, the lameness resolves. While these dogs may seem cured without any treatment they are often just compensating with the three other non-injured legs. This period of improved lameness can be used as proof that alternative therapies work or that surgery is not needed. The process of degenerative joint disease has begun and can lead to crippling arthritis down the road.

Orthotic

Custom made and generic sizing are available. The goal of an orthotic or brace is to stabilize the joint and provide comfort when weight bearing. From the Orthopets website: "When the canine stifle joint presents with a partial or complete rupture of the CCL (canine ACL tear), the tibia is unrestrained and cranial tibial thrust results. This cranial (forward) thrust of the tibia creates instability of the stifle joint, which can lead to your pet limping. The stifle orthosis (dog knee brace) creates a biomechanical support that stabilizes the tibia by mechanically coupling the femur and tibia together through the hinges placed at the stifle joint. The hinges join the upper femoral shell with the tibial shell while allowing your pet to enjoy motion to sit, stand, walk, and play."

A recent survey of owners showed equal satisfaction with the outcome of surgery verses use of an orthotic. Depending on your client's goals, an orthotic may be a viable option. I find an orthotic is most useful in dogs that are older or cannot undergo surgery due to other medical reasons. Orthotics can be worn most of the day or just during times of high activity. It is recommended that patients participate in rehab therapy while adjusting to use of the brace.

Prolotherapy

Prolotherapy, also called proliferation therapy or regenerative injection therapy is an alternative medicine treatment that uses injection of an irritant solution into ligaments or tendon insertion in an effort to relieve pain. Originally, prolotherapy was thought of as dextrose injections into the joint. This therapy caused the inflammatory process to start again and often increased build of scar tissue and joint capsule thickening to stabilize the joint. Now, prolotherapy websites are claiming Platelet Rich Plasma and Stem Cell injections as a form of prolotherapy as well.

Prolotherapy is also known as nonsurgical ligament and tendon reconstruction, or regenerative injection therapy. Prolotherapy is often requested because it uses the "body's own natural healing mechanisms to repair injured musculoskeletal tissue". The treatment originated in the 1930's when Dr. Earl Gedney, an osteopathic surgeon, successfully treated his own

severe hand injury. Prolotherapy works by getting the body to use its own natural healing mechanisms to repair injured and painful joint areas.

Platelet Rich Plasma

Platelets are a source of many growth factors that are beneficial in healing. More specifically, transforming growth factor beta 1 (TGF-B1), platelet derived growth factor, and other proteins that modulate inflammation and wound healing. Platelet Rich Plasma, or PRP, isolates the platelets and ideally super-concentrates them, while eliminating red blood cells and white blood cells from the mix. There are multiple systems currently on the market, including Arthrex, PulseVet, and Companion.

PRP is injected into the stifle with the thought that it will help heal the ligament. If there is a partial tear, this can be beneficial. Recent studies have shown that PRP can stimulate healing of the cranial cruciate ligament histologically and biomechanically in canine models. Another study showed that the addition of PRP to the stifle joint at the time of surgery improved peak vertical reactive force and vertical impulse of the surgery leg at 90 days post surgery. Most likely for a complete tear, PRP will not do anything to stabilize the joint, but may help with delay the progression of osteoarthritis.

Stem Cell

Stem Cell treatment is part of the growing trend of regenerative medicine. Any treatment that enables the body to heal itself can be called regenerative medicine. Most commonly Stem Cells are derived from adipose tissue or bone marrow. Like PRP, the Stem Cells are injected directly into the site of injury. The belief is that Stem Cells can differentiate into many tissue types, induce repair, and stimulate regeneration.

Stem Cells have been shown to improve regeneration of removed meniscus and decrease the amount of arthritis progression in some species. It has not been studied in dogs. There are no studies looking at Stem Cells and healing of cranial cruciate ligament tears, but there are many studies showing the benefit of Stem Cell injection in arthritic joints.

Shockwave

Extracorporeal Shockwave Therapy or ESWT is a treatment used in physical therapy, orthopedics, urology and cardiology. The shockwaves are abrupt, high amplitude pulses of mechanical energy, similar to soundwaves, generated by an electromagnetic coil or a spark in water. Shockwave therapy can also be considered regenerative medicine, in that it triggers the body to start a healing process.

Shockwave was first used to treat orthopedic issues in the mid 1980s. It is used to treat nonunion fractures, tendon and ligament injuries, osteoarthritis, and non-healing wounds. No studies have shown that it can successfully treat cruciate injuries, but based on its use to treat tendon and ligament injuries and osteoarthritis, it is being used alone and in conjunction with other treatment methods. Shockwave has been demonstrated to stimulate tissue neovascularization, induce transforming growth factor beta (TGF-B), insulin-like growth factor I (IGF-I), and possibly increases collagen synthesis during healing. Shockwave treatment would most likely be chosen when a partial tear is suspected, the meniscus is intact, and the owner wants to avoid surgery, but not anesthesia.

Conservative Management

Conservative management includes hydrotherapy, laser therapy, and specific corrective exercise. Strict rest is instituted at home for 6 to 8 weeks while this therapy is instituted.

Hydrotherapy in the underwater treadmill has been proven to be beneficial after TPLO surgery. The underwater treadmill allows for 60% of weight bearing forces to be relieved off the joint and creates more resistance for the dog to walk against. Improving weight bearing allows for increased muscle strength and less compensation from the rest of the body.

Laser therapy is used to reduce inflammation, and therefore pain. It is also reported to speed healing by increasing mitochondrial cellular metabolism. Laser therapy would be applied to the injured stifle and other sites of pain.

Specific corrective exercise focuses on strengthening the muscles that support the stifle and help prevent tibial thrust. I use a twice weekly clinic treatment program with daily home exercise for four weeks, then reassess.

Adequan injections given twice a week for four weeks, then monthly. Adequan is used to prevent early onset arthritis and promote joint health in this scenario.

Surgery

Surgery is still considered the gold standard for correction of complete cranial cruciate injuries. The 3 most commonly recommended surgeries are TPLO, TTA, and Extracapsular stabilization. Up to 81% of large breed dogs remain lame without surgical correction. These surgeries result in an 85% to 95% improvement rate after surgery. Even with surgery, arthritis progression is not halted, but significantly slowed. Regenerative therapy treatments like Shockwave, Stem Cell and PRP injections can be combined with surgery to decrease onset of arthritis.

Conclusion

The normal pathophysiology of cranial cruciate ligament injury makes it difficult to know whether any of the alternative treatments help. When discussing and recommending any of the alternative treatments, you should be clear that surgery may be needed in the future, and most likely early arthritis should be expected.

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