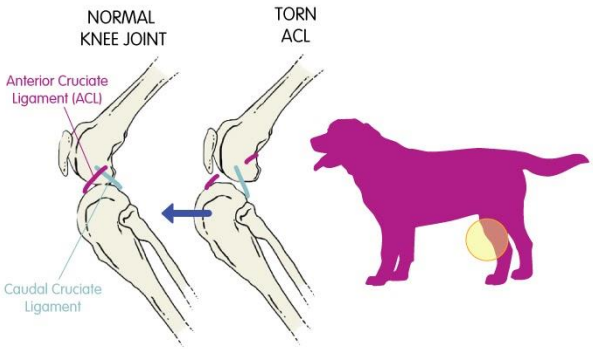
Blue Springs
ANIMAL REHABILITATION CENTER

Cranial Cruciate Ligament Rupture

The stifle (knee) is stabilized by an assortment of ligaments that allow this joint to maintain its normal range of motion. There are two cruciate ligaments that cross inside this joint: the cranial cruciate and caudal cruciate. They connect from one side of the femur on top to the opposite side of the tibia on the bottom. The cranial cruciate ligament prevents the tibia from slipping forward and out from under the femur during weight bearing.



Cruciate rupture

A ruptured cranial cruciate ligament is the most common orthopedic injury in dogs and will present as a chronic progressive or sudden hind limb lameness. Trauma-induced acute cruciate rupture typically occurs in young, large-breed, athletic dogs. These dogs present with a sudden non-weight bearing lameness of hind leg which usually improves over 1-2 weeks. The stifle will appear swollen initially and the pet will develop arthritis in the affected joint over time. The more common presentation of this injury, however, is associated with a chronic ligament degeneration. These dogs are usually middle aged, large-breed and often overweight. The ligament is weakened and stretched over time, resulting in small incomplete tears. This can present as an acute lameness with features of more chronic joint disease (thickening of the joint capsule, arthritic changes within the joint) or a more gradual and chronic lameness.

Larger, overweight dogs that have experienced a chronic cruciate rupture in one stifle will frequently rupture the cruciate ligament in their other stifle within the same year if preventative measures are not taken.

Diagnosis of a cruciate ligament rupture

Definitive diagnosis of a ruptured cruciate ligament is made by confirming the presence of a drawer motion - An abnormal motion within the stifle which allows the tibia to be moved forward, compared to the femur. Sedation is often needed to properly evaluate a patient for the presence of a drawer because tense muscles can temporarily stabilize the joint, decreasing this abnormal motion. Eliciting a drawer sign can also be difficult if the ligament is only partially torn.

If the condition is chronic, there will be thickening noted along the inner aspect of the stifle joint during physical examination. The is called a medial buttress and is a sign that arthritis has begun to develop within the affected joint.

Radiographs can be helpful to assess the degree of arthritis present within the affected stifle and to evaluate for the presence of bone fragments within the joint arises from the site of ligament rupture. The presence of arthritis prior to surgical repair will affect the pets expected outcome, however, further progression of arthritis can be slowed with surgery.

Conservative management of a cruciate rupture

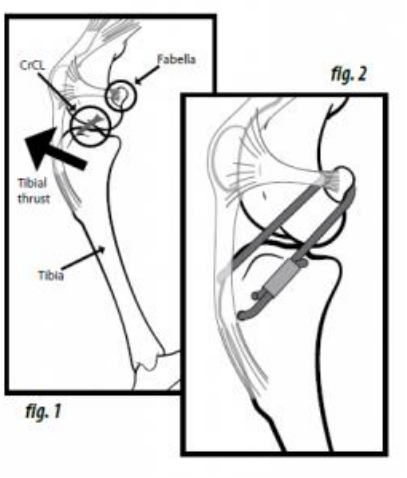
Surgery repair is accepted to be the treatment of choice following a cruciate ligament rupture, however, this may not always be possible due to patient or financial factors. Conservative management including strict exercise restriction for 4-8 weeks and pain management may be attempted when surgical repair is not an option, however, it is important to note that the progression of osteoarthritis will be greater. An external brace may be used to support the stifle and allow more comfortable weight bearing but their efficacy in dogs has not been proven and it is not clear that outcomes are improved. During the course of conservative management, the stifle will remain unstable until the body has formed enough scar tissue around the joint to stabilize it. This ongoing instability will result in damage to the cartilage and meniscus, decreased muscle mass and impaired joint range of motion. Over time, bone spurs called osteophytes will form, causing further pain and decreased range of motion. This process can begin as early as 1-3 weeks after the cruciate rupture.

Surgical repair of a cruciate rupture

There are several different surgical approaches to repairing a cruciate ligament rupture. These include:

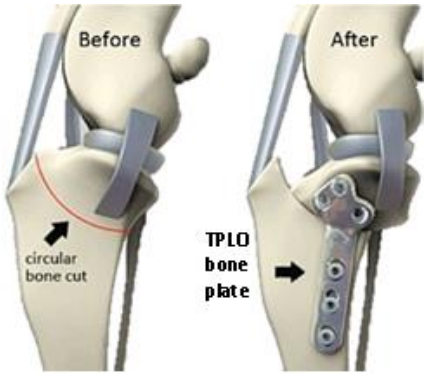
Extracapsular repair

This procedure represents the traditional surgical repair for the cruciate rupture. During surgery, the stifle joint is opened, inspected and the affected ligament is removed. Significant bone spurs can be addressed at this time as well. If the meniscus is noted to be torn, the damaged portion is removed. A large, strong synthetic suture is passed around the fabella behind the knee and through a hole drilled in the front of the tibia. This tightens the joint to prevent the drawer motion, effectively taking over the job of the cruciate ligament.



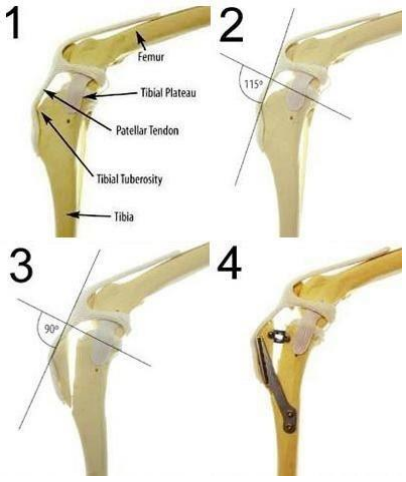
Tibial Plateau Leveling Osteotomy (TPLO)

This procedure alters the biomechanics of the stifle joint as opposed to implementing an artificial stabilizer as above. For this reason, TPLO (as well as TTA) is the preferred procedure for larger or more active dogs. The goal with a TPLO is to alter the angle at which the femur bears weight on the flat "plateau" of the tibia. The tibia is cut and rotated in such a way that the natural weight-bearing of the dog will stabilize the joint. The joint will be opened and damaged meniscus removed as above. The cruciate ligament remnants may or may not be removed, depending on the degree of damage.



Tibial Tuberosity Advancement (TTA)

The goal of a TTA is similar to a TPLO, using altered biomechanics of the stifle to stabilize the joint during weight bearing. During this procedure, the tibial crest is cut and repositioned at the patellar ligament attachment site. A titanium or steel "cage," "fork," and plate, as well as bone grafts, are placed to stabilize the new angle.



Optimizing recovery following a cruciate rupture

Confinement: Strict confinement to a crate or pen with gradual return to exercise over several months is recommended

Adequan injections: Can help with joint inflammation and lubrication

Glucosamine: Joint supplements contain cartilage building blocks to help the body repair cartilage damage

Weight management: Overweight dogs have an increased risk for arthritis. Weight loss can reduce the risk of rupturing the opposite cruciate ligament

Professional Rehab/Physical Therapy

Early physical rehabilitation therapy should be considered as part of the conservative or pre/postoperative management of a cruciate ligament rupture for optimal return to function. Prolonged immobilization can lead to loss of muscle and bone mass, as well as greater arthritic changes in the affected joint.

A customized rehabilitation program for conservatively managed patients or those following surgical stabilization of a cruciate ligament rupture has been proven to significantly improve muscle mass when compared to standard home care.

Post-operative rehabilitation programs also improve joint range of motion, reduce muscle spasms and associated discomfort, and improve weight bearing, resulting in significantly improved overall joint function. Many dogs undergoing post-operative rehabilitation will recover with near normal function, however, those with moderate to severe osteoarthritis at the time of diagnosis may require long-term management.

Benefits of Rehabilitation Following Cranial Cruciate Ligament Rupture

Increased speed of recovery

Post-op Extracapsular repair patients had normal stifle extension by 2 weeks with rehabilitation vs. no change by 3 months post-op without - Strong correlation between stifle extension and lameness scores

Increased strength and endurance

Post-op TPLO patients developed symmetrical hind limb muscle mass and improved range of motion by 6 weeks post-op with rehabilitation vs. >1 year without

Decreased pain

Following Transcutaneous Electrical Nerve Stimulation, patients increased weight bearing by 5% (similar to effect of NSAIDS)

The goals of rehabilitation are to control inflammation, maintain joint range of motion, decreased pain and strengthen muscle. In addition, weight management can be incorporated into a rehabilitation program if indicated. A customized rehabilitation program may include:

Manual therapy

Stretching and massage increase blood flow to muscles and decrease joint stiffness. When pets are not ambulating normally, their muscles become tight and joint range of motion can become compromised. Controlled and appropriate stretching promotes increased flexibility and comfort during physical activity and decreases the risk of future injury. Massage alleviates discomfort through releasing endorphins and by increasing blood and lymphatic flow to affected areas. These techniques will result in decreased pain and inflammation post-operatively.

Aquatic Therapy

Aquatic therapy may include swimming and/or the underwater treadmill. The buoyancy provided by the water helps to limit the concussive impact on joints, allowing these pets to move more comfortably then on land. The increased resistance created by moving through water promotes increased muscle strength and cardiovascular endurance. The implementation of aquatic therapy in a senior management program can help to maintain an ideal body weight, improve joint range of motion, and increase muscle strength and tone. This will result in joint stabilization and increased overall comfort.

Physical modalities

A variety of physical modalities, such as cold laser therapy, may be utilized to reduce the severity of clinical signs and reliance on medications to control pain and discomfort. Laser therapy is the painless use of light energy to generate a photochemical response in damaged or dysfunctional tissue. This will, in turn, decrease pain and inflammation while accelerating healing. This modality is non-invasive, fast, comfortable and effective.

Cryotherapy/Heat therapy

Cold therapy can be used post-operatively to decrease inflammation. It can also be used after exercise to sooth sore joints and tissues. Heat therapy can be used prior to stretching and exercise to warm up the muscles and prevent injury.

Cruciate ligament ruptures in pets are a common cause of lameness and can significantly impact mobility and long term quality of life. Early stabilization and a customized physical rehabilitation program will ensure an optimal outcome and rapid return to function, allowing our furry friends to get back to doing what they love. For further information about how rehabilitation can help your pet, please contact Blue Springs Animal Rehabilitation Center.

www.bluespringsanimalrehabcenter.com