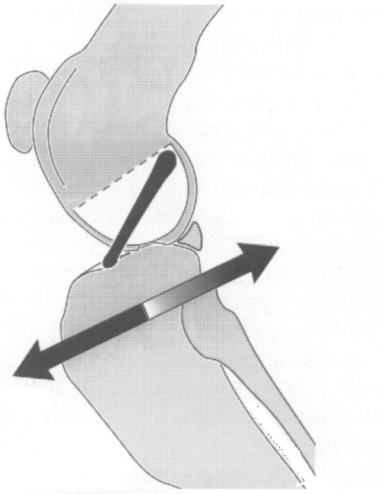
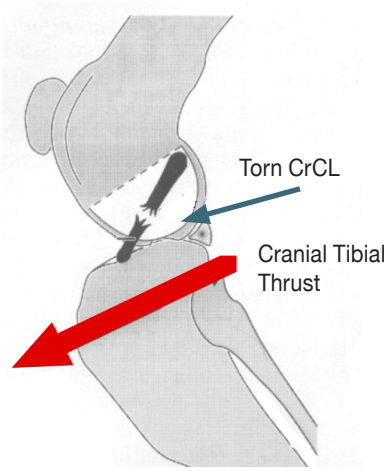
CRANIAL CRUCIATE LIGAMENT INJURY

Introduction

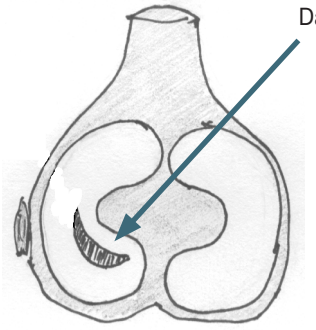
The stifle, or knee joint, is made up of the bones of the upper leg (femur) and the lower leg (tibia), as well as the supporting ligaments. Four major ligaments support and stabilize the stifle in the dog. The external stabilizers are the medial and lateral collateral ligaments. The two important internal stabilizers are the cranial and caudal cruciate ligaments. The two ligaments are the same as the anterior (ACL) and posterior (PCL) ligaments in people. These ligaments allow for normal range of motion while they prevent abnormal forward and backward sliding of the tibia, known as cranial and caudal tibial thrust, respectively.





Deterioration and tearing of the cranial cruciate ligament is one of the most common causes of hind limb lameness, pain and degenerative joint disease (osteoarthrosis) of the stifle in dogs. The condition is a degenerative one in dogs, with daily wear and tear resulting in damage to the ligament that cannot properly heal. Often a minor injury such as occurs after a twist and accelerate or hyperextension activity causes a partial or complete rupture of the cranial cruciate ligament. Once the cranial cruciate has even a partial tear (sprain), the daily strains on the stifle with any weight bearing activity will eventually result in complete cranial cruciate ligament rupture. Rupture of the cranial cruciate ligament results in instability and abnormal forward sliding of the tibia with every weight bearing step (cranial tibial thrust). Confirmation of this instability generally requires palpation of the joint under sedation. If the instability is not treated within a few weeks of the injury, irreversible osteoarthrosis begins to develop. Often, if the original injury was severe, or if the injury is very old (chronic), damage to other structures in the stifle may also occur.

Top View of Meniscal Pads



Certain breeds of dogs may have a body conformation (for example very straight hind legs or bow-legged hind legs) that predisposes them to rupture of the cranial cruciate ligament even with normal daily activity. Obesity may be one of the single most important contributing factors leading to osteoarthrosis, excessive strain and ultimately rupture of the cranial cruciate ligament.

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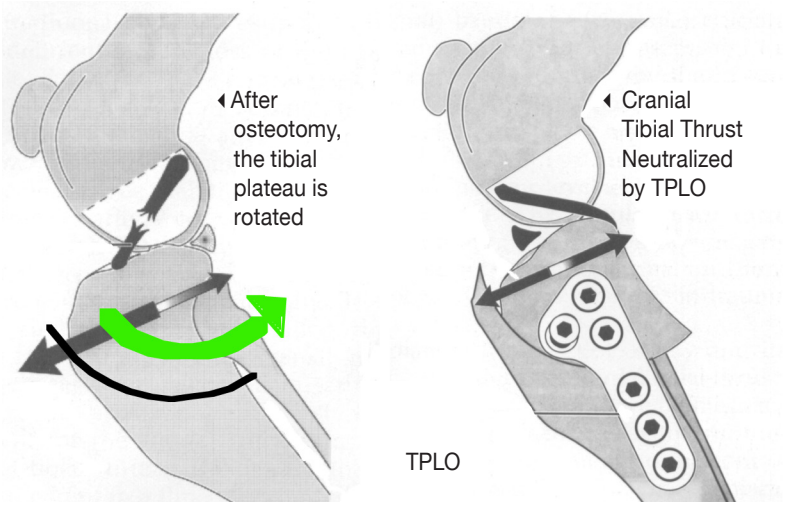
Damage to the medial meniscus (which is one of the two “shock absorbing” fibrocartilage pads) occurs in many of the patients with cranial cruciate ligament rupture. When present, the damaged areas of the meniscus must be resected (removed).

Treatment

Although a number of different surgical procedures may be employed depending on the patient’s size, conformation, age, temperament and activity level, the basic premise of treatment is to remove the damaged ligament and stabilize the stifle. Inspection and removal of the damaged structures can be done with an open incision (arthrotomy) or by less invasive arthroscopy. Stifle stabilization is generally accomplished using heavy suture material to counteract the cranial tibial thrust and allow scar tissue (fibrosis) to provide augmentation to the remaining ligaments. This technique is called Extracapsular Stabilization (ECS). The traditional suture for this technique is a monofilament nylon. Other less elastic braided suture materials may be used such as Fiberwire®, Tightrope®, SwiveLock®.



Alternatively,most patients with conformational predisposition to this injury would benefit from a procedure to neutralize the cranial tibial thrust (abnormal forward sliding.) This procedure, known as Tibial Plateau Leveling Osteotomy (TPLO), involves making a curved cut (domed osteotomy) in the tibia, rotating the top (plateau) to a more “level” position and stabilizing the rotation with a specially designed bone plate and bone screws. This is a force neutralization procedure and does not stabilize the stifle in the same way as Extracapsular Stabilization. The return to function seems much quicker and the progression of osteoarthritis appears to be much slower with this technique.

In cases, of excessive tibial plateau slope a wedge of bone may be removed in order to level the plateau. This is called a Tibial Wedge Ostectomy (TWO). Other leveling osteotomies, such as CORA Based Leveling Osteotomy (CBLO) and Tibial Tuberosity Osteotomy (TTO) have been described but are not yet proven procedures.

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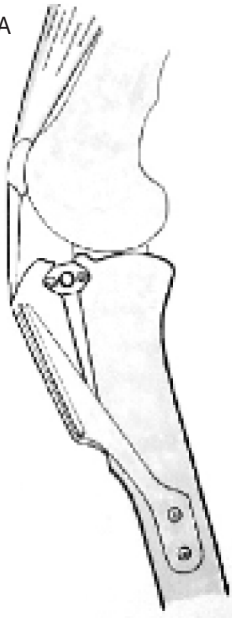
TTA



Tibial Tubercle Advancement (TTA) is a technique developed in Switzerland that reduces cranial tibial thrust, as well. This technique involves an osteotomy (cut) in the tibial crest and advances this segment forward/cranially. The advanced segment is held in place with a Titanium basket, bone plate and bone screws. Bone graft is applied to speed up the healing process. Surgeons at VMSG were involved during the early development of this technique and are leaders in this technique in Southern California.

Because of the predisposing conformations and forces causing a cranial cruciate ligament injury, replacing the damaged cruciate with a graft is not generally successful. However, the surgeons at VMSG are at the cutting edge of this field and always evaluating techniques, including graft replacement procedures, to improve outcome, lessen pain and decrease the progression of osteoarthritis.

Your pet's surgeon will discuss which procedures may be best for your pet.

After Care

Proper care of your pet at home after surgery is crucial to a successful outcome. Patients must be confined to a small pen or crate and not be allowed off leash for 3 months. A bandage or cast may be used for a few days to a few weeks. Physical therapy consisting of range of motion exercises, leash controlled walks and swimming is always advised an in some cases may be required. With TPLO, TWO and TTA, radiographs are required at 3 and 8 weeks after surgery to evaluate progression of healing of the osteotomy. Even though return to full function is expected by 3 months, a full six months to one year recovery period is necessary for all of the soft tissue structures (ligaments, tendons, muscles.)

New medications to prevent and treat osteoarthrosis (Slow Acting Disease Modifying Osteoarthritis Agents or SADMOAs) are available and may be recommended for some patients after surgery. Examples of these include hyaluronic acid (Legend®/Hi-Visc®), PS-GAGs (Adequan®), glucosamine/chondroitin, and omega-3, 6 essential fatty acids (EFAs).

Prognosis

Some osteoarthritis is expected in every case and some persistent or recurring stiffness and pain may require periodic or lifelong medical therapy.