BRANDYWINE VALLEY
Veterinary Hospital & Surgical Referral Service
Compassionate Pet Care through Client Communication

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TIBIAL TUBEROSITY ADVANCEMENT (TTA) SURGERY AND YOUR DOG

Perhaps the most common knee surgery in the dog is rupture of the Cranial Cruciate Ligament (CCL). While all dogs are at risk, this injury commonly affects middle aged, overweight, medium to large breed dogs. In most cases, the injury occurs as the result of a chronic and gradual tearing of the multiple fine fibers, which compromise the ligament. Like a fraying rope, once the majority of fibers have been damaged, the ligament may suffer a complete tear and rupture. Any damage to the ligament results in pain, inflammation, lameness, and instability of the knee (often called "cranial drawer" or "tibial thrust"). Additional structures within the knee may also be affected due to this damage. The natural "shock absorber" of the joint, called the meniscus, may also become torn. Once damaged, the meniscus may become harder (or mineralized), decreasing its ability to cushion the joint in its normal fashion. The result of these changes produce significant pain and arthritis in the dog. If left untreated, many dogs will stop using the limb completely, resulting in muscle wasting called atrophy.

Cruciate Ligament damage can only be corrected by surgery. While many different surgical techniques exist, the most common approaches are 1) Tibial Plateau Leveling Osteotomy (TPLO), 2) External Capsular Repair, 3) Fibular Head Transposition, and 4) Tibial Tuberosity Advancement (TTA). The TTA is in most cases the best choice of repair for large dogs. The strength of the TTA repair comes from its ability to changes in forces that exist within the knee. As a dog stands and walks, the forces within the knee are quite varied and dynamic. In a standing dog, there is a tendency for the femur bone to slide backwards over the sloped tibial plateau. This action is called "Tibial Thrust". Two procedures, the TPLO and the TTA, counter this force. The TPLO achieves reduction in this force by cutting the tibial plateau and rotating it into a flatter position. In positioning a portion of the tibia forward, the TTA manipulates the strong pull of the quadriceps muscles on the patellar tendon to counteract the force of tibial thrust. While both procedures decrease tibial thrust, the TTA has the advantage of also producing less rotational instability. Rotational instability may lead to the progression of additional arthritis as the dog ages.

The TTA operation is based on a technique developed almost 50 years ago for use in human knees by a Belgian orthopedic surgeon. The operation works by redirecting the force generated by the large quadriceps (upper thigh muscle) to compensate for the failed cruciate ligament. This is achieved by cutting free and moving forward, the part of the tibia (the tibial tuberosity) attached to the quadriceps muscle. The bone cut is called an osteotomy and the osteotomy is stabilized by using a modern orthopedic implant (plate, screws and wedge made of titanium) A bone graft at the site promotes rapid regrowth and healing, and this is key to the reduced convalescence and minimal pain seen with the TTA surgery.