

THE USE AND INTERPRETATION OF TIBIAL PLATEAU LEVELLING OSTEOTOMY (TPLO) IN DOGS IN CRANIAL CRUCIATE LIGAMENT LESIONS**Ümit Kaya*, Özlem Şengöz*, Ali Bumin*, Y. Sinan Şirin****

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ABSTRACT

In this study, 7 dogs of various breed, age and sex, which were referred to the Clinics of Orthopaedics and Traumatology in Ankara University, Faculty of Veterinary Medicine, were used as study materials. Clinical radiological and arthroscopic examinations revealed 7 dogs were having unilateral CCL lesions. Tibial plateau levelling Osteotomy operation was performed to stabilize the stifle joints. Operation results were evaluated clinically and radiological. According to the postoperative clinical and radiological examination. The TPLO technique with TPLO plate include locking screw mechanism was preferable for the treatment of cranial cruciate ligament ruptures of large breed dogs.

Introduction

The canine stifle joint is a hinge joint with two interdependent compartments; the femoro-patellar joint and the femoro-tibial joint. The major motion of this joint is flexion and extension in a para-sagittal plane. However, internal rotation of the tibia and a small degree of cranial tibial translation also occurs normally. These latter two motions are closely constrained by the two ligaments.

In dogs rupture of the CCL seems to occur in most cases due to prior degeneration of the ligament. There is a breed predilection to CCL rupture in dogs. Many large breeds such as Rottweiler and Mastiffs have a high incidence of rupture at an early age; 1-3 years of age.

The three mechanisms that put the greatest stress on the CCL are:

Hyperextension of the stifle joint

Cranial tibial thrust: could be produced by a blow to the patella

Internal rotation of the Tibia: produced by jumping on one hind leg with an outward twisting of the body, perhaps for example to catch a ball

The normal CCL has collagen fibers that are arranged longitudinally to resist tension stress. Most of collagen is type I. with degeneration, the matrix of the ligament tissue is remodelled and it consists of weaker and more immature collagen that is randomly oriented. In addition, there are often some parts of the ligament that have undergone chondroid metaplasia, i.e. look like island of cartilage.

Consequences of CCL rupture

Rupture of the CCL in dogs results in the rapid development and progression of secondary osteoarthritis. This can be evident within a few months. The rate of progression is greater in large and more active dogs. Loss of the CCL allows a so-called "cranial drawer" or "cranial tibial thrust" movement to occur during the stance phase of gait. This is a subluxation and the abnormal shear stresses on the articular cartilage initiate osteoarthritis.

Diagnosis of CCL rupture**Treatment of CCL rupture**

Medium and large breed dogs usually do not improve completely with medical therapy with a NSAID such as deracoxib. Currently the two most popular CCL reconstruction surgeries for the dogs are the lateral suture technique and tibial plateau levelling osteotomy.

Rationale for his procedure is that it eliminates cranial tibial thrust by levelling the tibial plateau to an angle of about 5 degrees. Normal TPA is 22 to 26 degrees. Excessive TPA (up to 45 degrees) will put more stress on the CCL and lead to rupture, but most dogs with CCL have a TPA in the normal range. CCL rupture in these cases is due to other, as unidentified causes.

For TPLO, the bone in the proximal metaphysis of the tibia is cut with a curved, oscillating saw. The plateau is rotated, and then fixed with a plate and six screws. This is preferred technique for dogs.

Meniscal injury

After CCL rupture, even if surgery is performed, there is high incidence of late meniscal injury. This manifests as joint pain and lameness.

Injuries of caudal pole of the medial meniscus are treated by resection. Although there will be some meniscal regeneration, this procedure also causes osteoarthritis.

Radiographic evaluation and planning for TPLO

Standard radiographic views of the stifle are not suitable for planning the TPLO procedure; specific "TPLO" views should be taken. As always, orthogonal views should be taken, but the entire tibia must be included, along with the distal ¼ of femur (femoral condyles) and the Tarsus.

It is critical that the radiographic beam is centered on the stifle joint, and this can be achieved using a "double exposure" technique.

Surgical technique of TPLO

The tibial plateau levelling procedure can be thought of as having three distinct stages.

Medial arthrotomy and examination of the stifle joint

Radial osteotomy and rotation of proximal tibial fragment to "level" the plateau

Stabilisation of the osteotomy using a bone plate

The patient should be anaesthetised and prepared routinely for aseptic surgery of the appropriate hind limb. The patient should be positioned in theatre in dorsal recumbency, with sandbags placed so that when the leg is rotated towards the table to make the osteotomy, the tibia is supported parallel to the table top. A hanging limb preparation is most useful, with placement of quarter drapes.

A medial skin incision is made starting approximately 2 cm proximal to the patella, and extending to the proximal 1/3rd of the tibia. The incision is extended through the subcutaneous tissues following a similar line using Metzenbaum scissors. The medial fascia is then incised using a scalpel, starting approximately 1 cm medial to the patellar ligament, at the level of the distal pole of the patella, and extending the incision distally to the tibia. A stab incision is then made into the joint capsule, at the proximal end of the incision.