

Tibial Plateau Leveling Osteotomy (TPLO)

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Cranial cruciate ligament (CCL) rupture is a very common injury in the dog. The cranial and caudal cruciate ligaments help to stabilize the stifle (knee) as the joint moves through a normal range of motion. The CCL can rupture due to trauma or as a result of degeneration of its structure. The meniscal cartilages also help to provide stability and act as shock absorbers in the joint. When the CCL is injured the femur is free to slide down the tibial slope and push the tibia forward or cranial. This results in pain, inflammation, increased joint fluid (effusion) and eventually arthritis in the joint. The medial meniscus can often be injured if the femur crushes it. Surgery is required to inspect for meniscal injury, stabilize the joint and return the limb back to function.



Tibial Plateau Leveling Osteotomy (TPLO) stabilizes the CCL deficient stifle by altering the biomechanical forces in the joint. It effectively transfers the stabilizing function of the CCL to its counterpart the caudal cruciate ligament. TPLO radiographs are obtained prior to surgery and the Tibial Plateau Slope (TPS) is found. The Tibial Plateau Angle (TPA) is the angle between the TPS and a line that is drawn perpendicular to the longitudinal tibial functional axis. The TPA is usually between 20 and 30 degrees.



A semicircular cut (osteotomy) is made in the tibia preserving the attachment of the patellar tendon. The bone segment is rotated a pre-determined number of degrees to "level" the tibial slope to approximately 6.5 degrees. The bone is then stabilized using a TPLO bone plate and screws. After surgery the patient is able to return to weightbearing on the leg in a few days. Physical therapy during this time helps to maintain and strengthen the muscles. The bone must heal completely though before resuming full activity. Off-leash activity, running and jumping must be avoided until the bone is healed (~10-16 weeks). Physical therapy is encouraged during this period.



TPLO can return the majority of dogs back to full activity. It can be most beneficial for medium or large breeds and active dogs who hunt, field trial, run agility, or those who just love to run and play.

Illustrations are reproduced from the following sources:

Image 1: Novartis Animal Health "An Illustrated Guide to Orthopedic Conditions"

Images 2 and 3: Palmer RH. Understanding tibial plateau leveling osteotomies in dogs. Vet Med 100: 426-436, 2005