A Review of Tibial Tuberosity Advancement

By Jeff Mayo, DVM
For Veterinary Practice News

Probably the most common cause of lameness in the hind limb of the canine is cranial cruciate ligament (RCCL) rupture.

Many different procedures have been proposed with varying degrees of success to stabilize the knee, although most lack sound evidence-based medicine to substantiate their usefulness in veterinary medicine.

Currently, most will agree that tibial plateau leveling osteotomy (TPLO) is the gold standard method of repair.

Based on stifle kinematics proposed by Nissell and Tepic, tibial tuberosity advancement, or TTA, was presented in 2002 as a viable surgical method for treating RCCL in dogs. Since its clinical release, I have performed more than 800 cases, and taught more than 150 veterinarians how to perform the procedure.

The proposed stifle kinematics that supports TTA suggests that there is a joint force approximately parallel to the patellar tendon.

As the knee progresses past 90 degrees of flexion into extension, there is a net cranial shear force, and when the knee flexes to less than 90 degrees there is a net caudal shear force in the stifle joint.

In the intact knee (no RCCL) these forces are countered by the cruciate ligaments. At exactly 90 degrees of flexion (or extension) the sum of these forces is neutral, a cross-over point, at which the patellar tendon should be 90 degrees to the tibial plateau.

Thus, the theory behind TTA is to advance the patellar tendon through a frontal plane sagittal osteotomy of the tibial tubercle and stabilize it with a commercially available advancement cage and tension band plate of predetermined sizes.

Equipment requirements include:

▶ Standard surgical pack suitable for orthopedics,
▶ A power sagittal saw and drill, and
▶ Two of every size of implant available (six sizes of plates and 12 sizes of cages are available).

Commercially available implants can stabilize stifles in patient sizes from 10 pounds and greater. These implants are available in steel or titanium. Screw sizes should include 2.4 mm in 10 mm to 40 mm lengths, 2.7 mm in 18 mm to 24 mm lengths, and 3.5 mm in 18 mm to 26 mm lengths.

It is recommended that surgeons have on hand at least two of every size screw recommended before performing the procedure.

Preoperative assessment of the stifle joint in preparation for surgery involves taking medial to lateral and craniocaudal views in a standing angle.

After assessment for concurrent skeletal problems, appropriate measurements are made for advancement cage and tension band plate size. Canine stifles with tibial plateau angles in excess of 30 degrees, or those with an obvious angular limb deformity, are deferred for the TPLO procedure.

TTA starts with a medial approach to the stifle and proximal tibia in a fashion similar to the TPLO, but with considerably less dissection of local tissues. The medial meniscus, an area of great debate, should be dealt with appropriately through a partial or complete meniscectomy if torn, or a releasing procedure if intact.

Appropriate assessment of the menisci include arthroscopic viewing or through a complete arthroscopy of the joint.

The cranialomedial tibial crest and proximal tibial shaft are exposed through an incision in the cranial third of the femoral condyles.

Complication rates have been very low, with the majority being easily dealt with.

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ate rehabilitation therapy may be sought under strict doctor guidance.

Patients return in two weeks for suture removal and re-evaluation, then again in eight weeks for follow up radiographs.

I have found clinical results to be exceedingly good. Most patients have gained maximum return to function in about 12 weeks with appropriate postoperative care and rehabilitation.\textsuperscript{5,6,7}

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Anecdotal clinical follow ups with this practitioner at two years on a number of cases have shown minimal arthritis involving operated joints. The procedure is exceedingly simple compared to TPLO, and is gaining popularity among many practitioners and surgeons throughout the U.S.\textsuperscript{8,9,10}

Jean Mayo, DVM, Dipl. AVBP, owns Mayo Veterinary Services in Mountlake Terrace, Wash. He travels regularly, consulting and teaching veterinarians TTA, TPLO, TBR and rigid endoscopy.

\textbf{REFERENCE}


