

Repair of Ruptured Anterior Cruciate Ligament in the Dog

by
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Rupture of the anterior cruciate ligament is a relatively common problem. Degenerative change and/or trauma accompanied with over extension of the stifle may result in complete or partial tears of the stifle ligaments. A diagnosis of a ruptured anterior cruciate ligament can be made by eliciting abnormal movement in the joint. With the stifle flexed to about 15 degrees and one hand placed proximal to and one hand distal to the stifle, the tibia can be displaced cranially if the ligament is torn or severely stretched; this displacement is known as drawer movement.² Excessive inward rotation of the tibia may also be seen when the stifle is slightly flexed. Radiographs are not necessary for diagnosis.

Secondary damage to the medial meniscus often accompanies a rupture of the anterior cruciate ligament. The medial and lateral menisci are fibrocartilagenous structures within the stifle joint which function to fill in the incongruity between the tibia and femur, aid in the gliding and rotating motions of the femur, and lubricate the intra-articular surfaces. Diagnosis of an injury to the menisci can occasionally be made by eliciting a snapping sound when flexing the stifle. If there is

calcification of the menisci, radiographs are helpful, but usually surgical exploration is necessary. Damage to the menisci is most easily corrected when repairing the ruptured anterior cruciate ligament.

The anterior cruciate ligament, also referred to as the lateral cruciate ligament, runs between the caudomedial aspect of the lateral condyle of the femur, diagonally across the cranial intercondyloid area of the tibia. The anterior cruciate ligament forms an X with the caudal cruciate ligament, which is responsible for the posterior stability of the stifle joint. When viewing the joint from the cranial aspect, the anterior cruciate extends distally from the lateral to medial surface of the intra-articular space and passes in front of the posterior cruciate legament.

Numerous methods have been tried to correct rupture of the anterior cruciate ligament with variable results. The method presently employed at the Iowa State University Small Animal Teaching Hospital, the Lembert suture technique, has been used with a high degree of success and can be done with a minimal number of orthopedic instruments.

With some methods of repairing a ruptured anterior cruciate ligament, it is not necessary to perform an arthrotomy as will be described here, however, damaged ligaments and menisci in the joint may calcify in time if not removed.

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Surgical Technique

With the animal anesthetized and the limb prepared for aseptic surgery, the dog is placed in dorsal recumbency with the legs extending over the edge of the table. Sterile drapes and an orthopedic stockinette are used to prevent contamination.

An anterior skin incision is made on the lateral side of the patella extending from 2–4 cm proximal to the patella, to just distal to the tibial tuberosity. The incision is extended through the fascia to expose the joint capsule. The joint capsule is opened by making a 1.5–2 cm incision just lateral to the straight patellar ligament near the tibial tuberosity. The incision is extended proximally by sliding a scissors through the joint capsule to about 2 cm proximal to the patella. The patella and straight patellar ligament are then reflected medially over the condyles of the femur. As the joint is then flexed, the femoral condyles and cruciate ligaments are exposed.

Any portions or remnants of the ruptured anterior cruciate ligament are then removed.

The menisci are examined next. Damaged menisci appear shredded, rough, fibrous, and may be calcified. After appraisal of the menisci, damaged portions are removed. If in doubt, it is advisable to remove the meniscus, however, complete excision can result in some instability of the joint.

Osteophytes, or exostosis on the femoral condyles are a common finding if the condition has persisted for a long period of time. A scalpel blade or bone rongeur is used to remove any exostosis.

After completing a thorough examination of the joint, flush it with warm sterile saline, return the patella to its original position and close the joint capsule with a row of Lembert sutures using a non-absorbable suture material.©

Stabilization of the joint is achieved by placing Lembert sutures in the fascia, again using non-absorbable suture material.© Starting lateral and 2 cm proximal to the patella, place the first portion of the suture one-third the distance from the anterior to posterior border of the stifle joint and the second portion of the suture just lateral to the patella. 6–8 similar Lembert sutures are placed in this first layer. All sutures should be placed before tying with a surgeon's knot.

If additional stability is desired, a second layer of 2–4 Lembert sutures are placed on the lateral side of the joint between the patella and tibial tuberosity. Tie the sutures after all have been placed.

If still further stabilization is needed, a layer of Lembert's are then placed on the medial side of the joint; 2–4 sutures are sufficient. Again all sutures should be placed before tying. Additional sutures may be used if necessary.

The subcutaneous fascia is closed with 00 chromic catgut. A layer of simple interrupted sutures, using a synthetic suture material, is used to close the skin. The joint does not need to be bandaged following surgery, however an elastic-type bandage will lend support and help prevent post-operative swelling. This should be left in place for 4 or 5 days.

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Bibliography

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Fig. 1. (P = Patella, TC = Tibial Crest) demonstrates method of eliciting a drawer movement. Displacement of the tibia anteriorly is diagnostic of a ruptured anterior cruciate ligament.

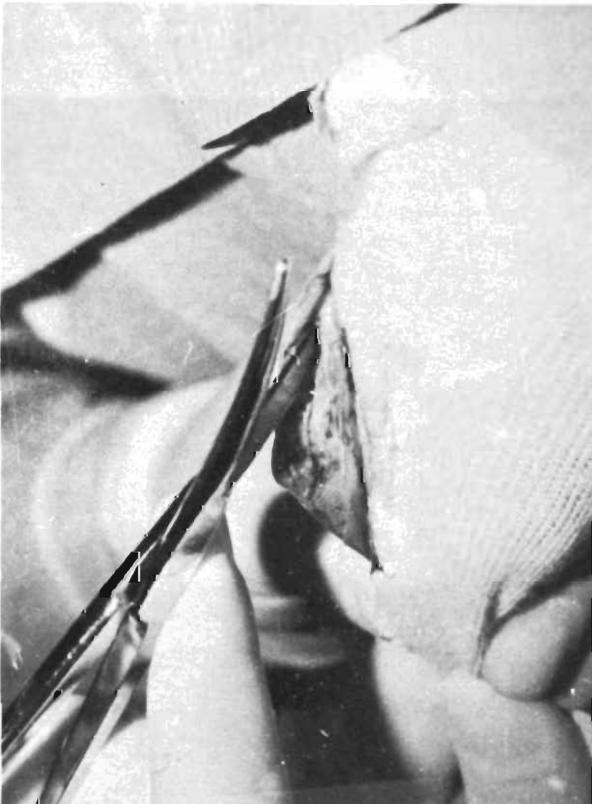
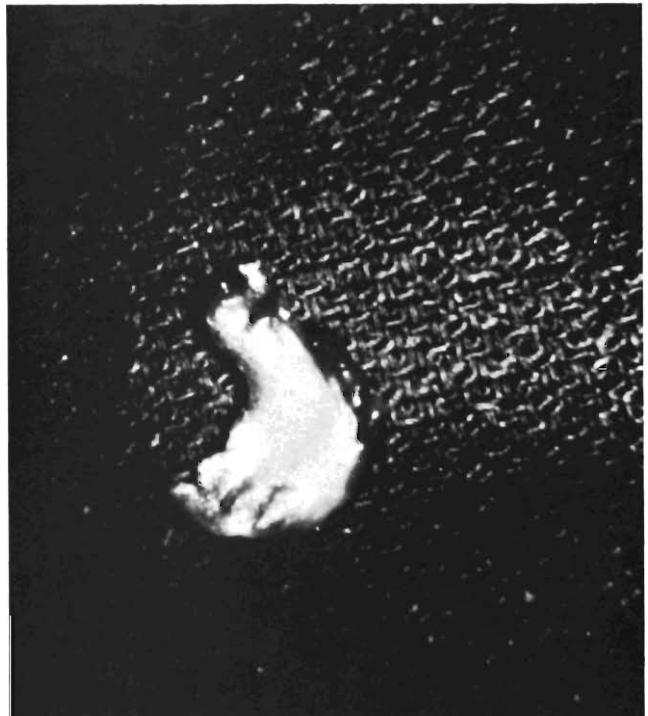


Fig. 2
A stab incision into the joint capsule is made with the scalpel. The incision is extended proximally by sliding the scissors, rather than by scissor action.



Fig. 3
Opened stifle joint. Exposure is greatly increased by flexing the stifle joint. Note osteophyte formation on the lateral aspect of the lateral condyle.

Fig. 4
Damaged meniscus removed from joint. Note rough appearance of the edge. Loose or rough edges or degeneration of the cartilage warrants removal of the meniscus. Presurgical diagnosis of a damaged meniscus can be made by eliciting a cracking or snapping sound when the stifle joint is flexed.



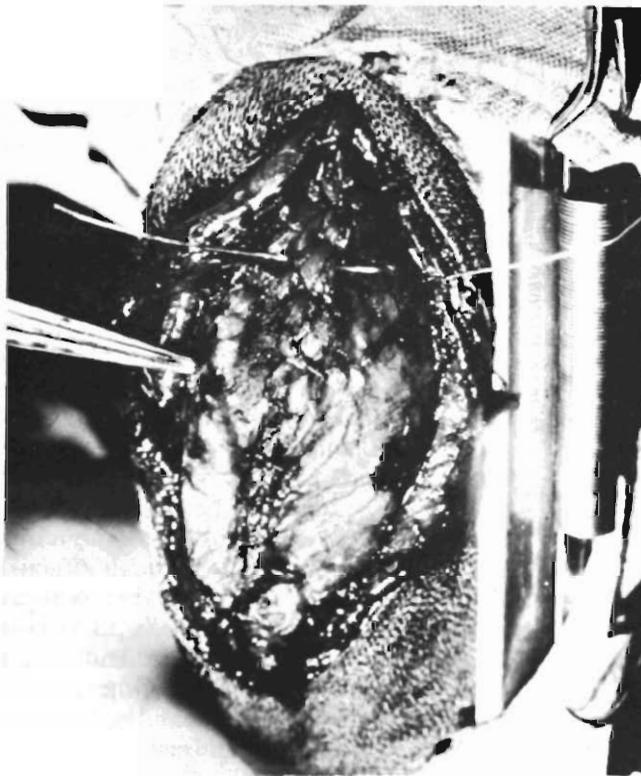


Fig. 5
Illustration of the placement of the first Lembert suture. Note the location in relation to the patella and the spacing of each portion of the suture. The hemostat is pointing to the straight patellar ligament.

Fig. 6
Note spacing of additional Lembert sutures. Placing all sutures before tying allows for a more even distribution both anteriorly-posteriorly and proximally-distally. Sutures should be pulled as tightly as possible. A surgeons knot is used to decrease the amount of slippage when tying.

