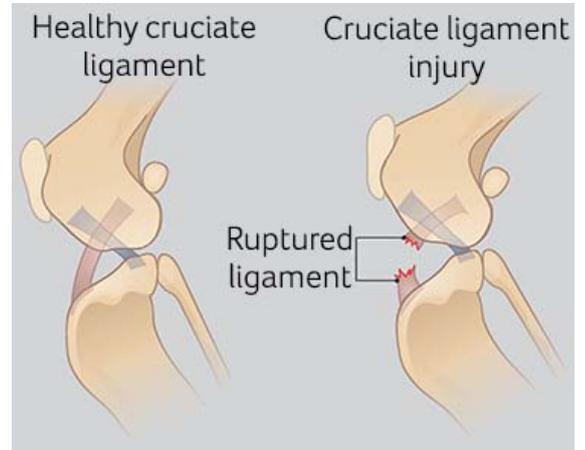




## **Cranial Cruciate Ligament Rupture**

### **What is the Cranial Cruciate Ligament?**

The Cranial Cruciate Ligament (CCL) is an important ligament inside the knee joints (stifle) of dogs. The ligament stabilises the stifle by preventing the shin bone (tibia) moving in front of the thigh bone (femur). In dogs the CCL tends to undergo progressive changes that weaken it prior to rupturing. This is different to humans, where rupture is often linked with a sports injury i.e. skiing or playing football. Due to these differences the treatment options for dogs are quite different to those for humans.



### **What are the Signs of Cranial Cruciate Ligament Rupture?**

The signs of CCL rupture can vary as rupture may be sudden and complete, or gradual and partial. Key signs include:

- Lameness in the hind limbs and stifle
- Knee joint pain
- Difficulty rising and jumping
- Occasionally 'clicking' noises.

### **How is Cranial Cruciate Ligament Rupture Diagnosed?**

During examination signs of muscle wastage may be uncovered, especially over the front of the thigh (the quadriceps muscles). Thickening of the knee joints is often noticeable. Through manipulation of the joint it may be possible to detect instability, whilst bending and extension of the joint may cause discomfort.

X-rays provide additional information during diagnosis, and can help to identify the presence and severity of osteoarthritis.

For some dogs it may be necessary to take a sample of fluid from the knee, which enables the detection of any inflammatory changes such as infection or rheumatoid arthritis.

In some dogs more advanced tests are used to diagnose the problem, such as arthroscopy of the joint, however these advanced procedures are rarely necessary.

### **How can Cranial Cruciate Ligament Rupture be Treated?**

Some smaller dogs with CCL rupture can be managed effectively without the need for surgery; this may be done through:

- Exercise; this needs to be restricted, hydrotherapy is often beneficial
- Diet; Dogs that are overweight benefit from being placed on a diet
- Medication; Painkillers may be suggested to make the dog more comfortable.

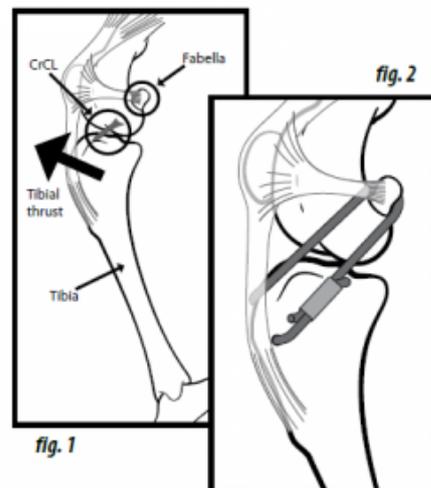
Many smaller dogs, especially if active and almost all larger dogs with CCL rupture benefit from surgery.

### CCL Replacement Surgery

Traditionally, surgery has been performed to replace the ligament with either a graft or an artificial ligament. These techniques as used in people to have been shown to not work as well in dogs due to the difference in the cause of the rupture mentioned earlier, so alternative operations have now been developed.

### Extracapsular stabilisation

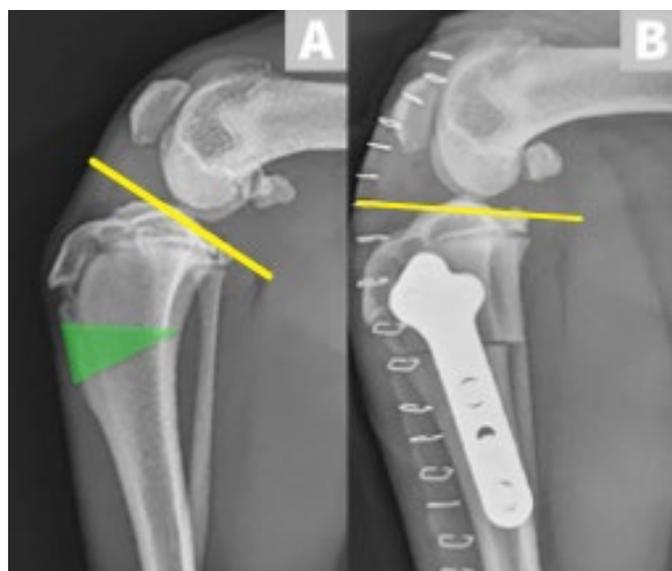
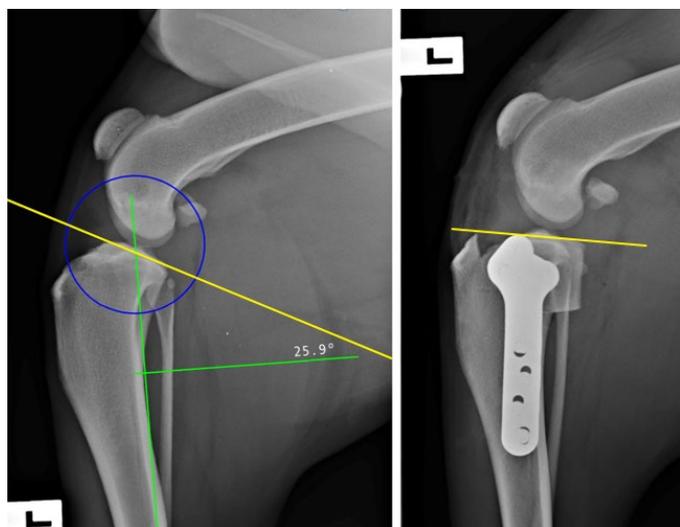
In simplest terms, a loop of a special type of suture material (an artificial ligament) is placed from the back of the knee joint around to the front, where it is anchored just below the knee. This suture material stabilizes the joint and prevents the tibia from slipping back and forth after the cruciate ligament has torn. These surgeries have been shown to be less effective than the bone reshaping surgeries mentioned below, but are suitable options for certain patients such as



### Osteotomy (bone cutting) techniques that eliminate the need for a Cruciate ligament

These surgeries alter the geometry of the affected knee joint in such a way that the CrCL is no longer necessary to maintain stability. There are several variations in technique, with all involving reshaping of the top of the shin (tibia) by cutting of the bone and fixing it in a new position.

- Tibial Plateau Levelling Osteotomy Surgery (TPLO) – TPLO involves changing the angle of the top of the shin bone (the tibial plateau) by cutting the bone, rotating it, and stabilising it in a new position with a plate and screws.
- Cranial closing wedge osteotomy (CCWO) – A wedge of bone is cut and removed from the tibia. The two edges of bone are then brought together (closed) and a metal plate is applied to secure and stabilize the osteotomy site. Similarly to TPLO, this results in a levelling out of the tibial joint surface, preventing the femur slipping backwards



Both TPLO and CCWO have comparable outcome and complication rates, so the decision of which to perform is often based on size (smaller dogs are often better suited for CCWO), shape of the tibia, and age of the patient (TPLO sometimes not advised in young patients with open growth plate)

### Meniscal (cartilage) Surgery

Cartilage injury, as with humans, can cause significant pain and lameness and so the damaged section needs to be removed. These cartilages are inspected at the time of surgery and if damaged, the torn portions are removed. This does not significantly affect the overall prognosis, but can delay the initial recovery and cause worse arthritis in the long term.

## **What does TPLO Surgery Involve?**

Very specific X-rays need to be obtained of the knee and shin bone. The presence and severity of osteoarthritis can be assessed and the angle of the top of the shin bone measured to allow planning prior to surgery. The position of the cut on the bone, the amount the bone needs to be rotated, and the size of plate necessary to stabilise the bone in its new position can be evaluated.

Surgery may be performed on the same as the investigations. Antibiotics and painkillers are administered at the time of anaesthesia and the hind leg is clipped from the level of the hip to the hock (ankle). Prior to performing the TPLO, a small incision or cut is made into the knee joint to enable inspection of the structures within it including looking for meniscal tears as discussed above. After cutting and rotating the top of the tibia, the bone is stabilised with a special plate that has been designed especially for TPLO surgery. Some of the screws are “locked” into the plate which makes the repair stronger.

X-rays are obtained at the end of the operation to assess the new angle of the top of the shin bone and check the position of the plate and screws. Most dogs can go home the day after surgery.

## **What can I Expect if my Pet Undergoes TPLO Surgery?**

Aftercare following TPLO surgery is very important, and rehabilitation can take several months. Courses of painkillers and sometimes antibiotics are prescribed at discharge. If the dog tends to excessively lick the wound it may be necessary to use a plastic collar. Visits to a local Vet are necessary within the first two weeks to check the wound and remove any sutures if present.

Exercise must be very restricted for the first few weeks to allow healing, and is primarily for toileting purposes. The dog must be kept on a lead or harness to prevent strenuous activities such as running, jumping or playing. At other times confinement to a pen or a small room is necessary with avoidance of jumping and climbing. After a few weeks, exercise may be gradually increased in a controlled manner (on a lead). Hydrotherapy may also be recommended.

A check-up will be carried out at six weeks after the operation, to monitor the function of the leg and knee. X-rays are obtained to evaluate healing of the bone cut (osteotomy). Depending on progress, advice will be given about increasing exercise.

## **What are the success rates of TPLO and CCWO**

As a general rule, over 90% of dogs return to normal activity after TPLO or CCWO. This generally means that dogs are so normal that owners are unable to detect lameness at home. We expect

dogs to return to unrestricted exercise without any requirement for ongoing medications. Working dogs such as gun dogs or agility dogs should be able to go back to work.

## **What are the potential problems or complications after cruciate ligament repair surgery?**

Fortunately, complication rates are low when experienced surgeons perform cruciate ligament repair surgery. The most common complication is infection, which is treated with antibiotics. In some cases, surgical irrigation is necessary and, in some cases where bacteria adhere to the implants, the implants must be removed after the bones have healed. Most of the time the implants remain in place for life and cause no problems.

Mechanical complications usually occur in dogs that exercise too much before the bones have healed. Many mechanical complications are managed with rest alone, although some problems require surgical revision. A rare complication of late injury to the menisci (buffer cartilages) within the operated knee joint can require treatment using open or keyhole surgery. Other rare complications including sprains and strains around the knee joint can generally be managed using physiotherapy alone. There are numerous large case studies of TPLO surgeries with a very low complication rate and very few requiring subsequent intervention.