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Canine cruciate ligament disease

A dog's knee is stabilised by two ligaments - the cruciate ligaments. These ligaments hold the thigh bone (femur) and the shin bone (tibia) in the correct position when the dog walks. It is common for one of these ligaments (the cranial cruciate ligament) to become torn.

What causes the cruciate ligament to become torn?

In people, this usually happens because of a sudden accident or injury (often whilst playing sports). Dogs can develop cruciate rupture after a sudden accident, but in most (over 90%) of cases in dogs, the ligament gradually frays over time as a result of wear and tear. This is partly due to genetics (some breeds of dogs, such as Labradors, Boxers and Rottweilers are more likely to develop cruciate ligament disease than others); partly due to size (large breed dogs develop ligament disease at an earlier age than small breed dogs; and any dog that is overweight for their breed is at increased risk); and partly due to the leg shape of that individual dog (many terrier breeds have very steeply angled knees that are under increased strain).

What are the symptoms of cruciate ligament disease?

When the cruciate ligament is damaged, the knee becomes unstable and cannot lock into position when the dog walks. Every time the dog tries to bear weight on the knee, the lower bone (tibia) slides forwards underneath the top bone (the femur). This sliding of the two bones over each other causes pain and swelling inside the knee joint. Over time it is likely to cause damage to the cartilage inside the knee, and cause arthritis to develop in the joint.

Dogs may be completely unwilling to stand on the leg (if the ligament is completely torn), or they may use the leg but with a limp that may improve with rest and recur with exercise. Dogs may also find it difficult to sit with the bad leg folded up beneath them and may choose to hold the affected leg out to the side when they sit down.

How will my vet diagnose cruciate ligament disease?

Cruciate ligament disease may be suspected by your vet after watching your dog walk, trot, and sit down. Palpation of the joint may reveal swelling, discomfort or instability.

To make a full diagnosis, your vet will need to anaesthetise your dog. Under anaesthesia, the following tests can be carried out:

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1. Manipulation of the joint now that your dog's muscles are relaxed - this allows your vet to test whether the cruciate ligaments are intact or not. Vets will carry out a 'tibial thrust' test, a 'cranial drawer' test and tests for patella luxation.

2. X-rays - these allow your vet to check that the femur and tibia are in the correct position; check for early signs of arthritis in the joint; and rule out other causes of lameness (such as hip dysplasia, bone disease, limb deformity). The X-rays are also vital for planning later surgery to treat the cruciate ligament disease.

How is cruciate disease treated?

In very small dogs that are elderly and will never be expected to do much exercise, it can be acceptable to provide anti-inflammatory pain relief, rest and physiotherapy in the hope that the ligament will heal with scar tissue and the knee will become reasonably stable again. These dogs do not return to normal (they often have a permanent lameness and cannot exercise very much) but this can be acceptable in old dogs with other health problems.

For all other dogs, surgery is recommended. A number of different surgical options exist:

1. LATERAL SUTURE REPAIR.

This operation involves replacing the ligament with a synthetic ligament made of nylon. This nylon thread is looped around the knee and through a hole drilled in the shin bone. The advantages of this procedure are that it is the cheapest surgical option for cruciate disease (costs around £2,700

00) and the risk of complications is fairly low. The disadvantages of this procedure are that the synthetic ligament is not as good as the original ligament, so dogs often continue to have some degree of lameness on the leg. In addition, the synthetic ligament is very likely to stretch or break in the future and the knee will become unstable again. In general, lateral suture repair is only performed on small breed dogs that do not exercise very much, that have reasons not to undergo the more effective types of surgery (for example if they have additional disease that makes more complicated surgery impossible, or if finances do not allow for the more complicated surgery to be performed). It is more suitable for dogs that have had a traumatic cause for their ligament rupture, rather than dogs with gradual degeneration of the ligament.

In the past 20 years, much work has been carried out to find better ways of treating cruciate ligament disease in dogs. Research has shown that a major difference between people and dogs is

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that people have a very flat, straight tibial surface within the knee, so the knee does not slide about much even if the cruciate ligament is ruptured. In dogs the tibial surface usually slopes quite steeply, so that without an intact cruciate ligament, the bones of the knee slide about a lot whenever the dog tries to stand on the leg. We now know that the most effective way to treat cruciate ligament disease in dogs is to concentrate less on the ligament itself, and more on altering the shape of the knee so that it becomes flatter and more stable. The following surgeries all do this in slightly different ways:

2. TIBIAL PLATEAU LEVELLING OSTEOTOMY (TPLO)

This surgery involves cutting a curved section of the tibia, rotating it so that the surface of the knee is nearly flat, and then using a plate and screws to hold the curved portion in the new position. Research suggests that this procedure is likely to give the best results for dogs over 15kg.

3. CRANIAL CLOSING WEDGE OSTEOTOMY (CCWO)

This surgery involves cutting a triangular wedge out of the front of the shin bone, and then using a plate and screws (and a small wire) to bring the bone edges together in the new position, again making the tibial surface flatter. This procedure is recommended mostly for dogs under 15kg, particularly those with a very steep knee angle (Westies and many other terrier breeds). This procedure is sometimes called 'TPLO by closing wedge'.

4. TIBIAL TUBEROSITY ADVANCEMENT (TTA)

This surgery involves cutting vertically down the front of the tibia and inserting a metal cage to push the front of the shin bone forwards. This also changes the forces that act on the knee, helping to prevent the knee from sliding. Currently, research suggests that this procedure tends to have slightly less successful outcomes than TPLO or CCWO. However, this depends on the shape of the knee and in some particular cases it is the technique of choice.

What else should be done at the time of cruciate ligament surgery?

Approximately 50% of dogs with cruciate ligament damage have also damaged the cartilage inside their knee (the meniscus). If this is not detected and treated, the dog will continue to have a painful knee, even if the rest of the surgery goes well. For this reason, every dog having any type of cruciate surgery should also have an inspection inside the knee joint to see if the meniscus is damaged. If the meniscus is damaged, the damaged portion should be removed.

What aftercare is required for dogs having cruciate ligament surgery?

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After cruciate surgery dogs generally require very strict rest for 6 weeks (usually inside a crate or small room) with very short lead walks for toilet purposes. This is followed by another 6 weeks of gradually increasing exercise. Physiotherapy is recommended to keep joints flexible and muscles strong. Anti-inflammatory painkillers are usually prescribed for 2-3 weeks after surgery. There will be stitches in the knee which the dogs must not be allowed to lick at - these are removed after 14 days.

It is recommended that dogs have a second anaesthetic and Xrays taken of the knee 6 weeks after surgery, to make sure that the shin bone is healing as expected.

What are the possible complications of surgery for cruciate ligament disease?

During the surgery, it is possible that the bone may fracture or split as it is cut and moved about. This seems to be most common with TTA surgery. A fracture of this type would cause very severe lameness and complicated corrective surgery at a specialist centre would be required.

Infection is another possible complication, made more likely if dogs do not take their antibiotic medication correctly after surgery, or if they lick at their wounds. If infection gets into the bone it can be very painful and prevent proper healing of the bone at the operation site.

With any surgery that involves cutting and re-fixing bone, there is a possibility that the shin bone may fail to heal in the new position, or the plates/screws may snap or come loose. If this happens, the dog would become very badly lame on the leg, and complicated surgery at a specialist centre would be required. This complication is most likely to occur if dogs are not rested properly after surgery, as this puts the bones and implants under additional strain.

Approximately 10% of dogs will develop damage to their meniscus (the cartilage inside the joint) AFTER successful treatment of the cruciate disease. This can develop months or years after the initial cruciate disease. These dogs typically do very well after their surgery and then suddenly go lame again many months later. Surgery to inspect the joint and remove the damaged cartilage is required to make these dogs comfortable again. The best way to inspect the cartilage in these cases is to refer dogs to a specialist for arthroscopy - where a tiny camera is put into the joint under anaesthetic.

It is fairly common for dogs with cruciate ligament disease in one knee to develop the same disease in the other knee. This happens in 60% of dogs within 12 months of the first cruciate rupture. The second knee should be treated in exactly the same way as the first. If both cruciate ligaments rupture at the same time, it is preferable to operate on each knee in turn, at least 3 months apart.



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If complications occur, they can be frustrating, time consuming and expensive to resolve. Some complications can be diagnosed and treated at Acorn House, but others require referral to a specialist surgeon.

What is the long term outlook for dogs having surgery for cruciate ligament disease?

Most dogs can return to normal exercise and activity following successful TPLO/ CCWO/ TTA surgery.

All dogs that have had cruciate ligament disease will develop some arthritis in the knee joint. If the cruciate disease was identified and treated quickly and successfully, this should be much less severe. Knee arthritis can cause pain and stiffness on rising and after exercise, particularly as dogs get older. It can be treated with anti-inflammatory medications, physiotherapy and diet.

Where should I take my dog for cruciate ligament surgery?

All cruciate surgery is complex surgery with a risk of potentially severe complications. Patients can be referred to an RCVS specialist surgeon for cruciate surgery, and it would be expected that this would minimise the complication rate. Specialist practices also have equipment such as CT, MRI and arthroscopy so would be best placed to investigate and treat any complications if they do occur.

Specialist practices in our local area include Davies Veterinary Specialists, East of England Referrals, and the Royal Veterinary College. CCWO/TPLO surgery generally costs around £3816-5459 at a specialist centre. Waiting lists vary - since the backlog created by COVID lockdowns, waiting lists have increased and are currently between 4 and 12 weeks (June 2021).

In 2018 Katharine completed her Post Graduate Certificate in Small Animal Surgery and undertook additional practical training in cruciate ligament surgery. Katharine is recognised by the RCVS as an Advanced Veterinary Practitioner in Small Animal Surgery. For clients that would prefer not to be referred, Katharine is able to offer cruciate surgery at Acorn House. Fees are as follows:

Lateral suture repair (infrequently recommended, see earlier notes) £2,700

CCWO (usually dogs below 15kg) £3350

TPLO (usually dogs over 15kg) £3700

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Extremely heavy / giant breed dogs cannot undergo TPLO surgery at Acorn House and should always be referred to a specialist centre.

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