

TPLO (Tibial Plateau Levelling Osteotomy) for Cranial Cruciate Ligament Injury with additional Sulcoplasty to stabilise a Dislocating Kneecap

Your vet has arranged for me to see your dog because they are concerned that there is an injury to the cranial cruciate ligament in their knee joint. This is a fairly common injury in dogs. You may have heard of cruciate ligament injuries in people – it's a common knee injury in footballers and other athletes. Your vet has also identified that in addition to the cruciate injury, your dog's kneecap is dislocating from the groove on the front of the thigh bone (femur). This is a fairly common problem in small breed and short-nosed (brachycephalic) breed dogs.

Although both dogs and people injure the cranial cruciate ligament, the cause of the problem appears to be quite different. In people, a structurally normal ligament is snapped by excessive force. In dogs it appears that the ligament gradually deteriorates over time, for reasons that we don't fully understand. This means that very often there is a period during which the knee is sore even though the ligament hasn't snapped, and when the ligament does give way, it may be during completely normal exercise without there being any accident/fall.

Although our understanding of the underlying reason for the ligament to degenerate is poor, what we know very clearly is that in dogs that are heavier than about 10-15kg, surgical treatment is usually required. Treatment without surgery is usually unsatisfactory and leads to a chronic lameness. Surgery may also be recommended in some smaller dogs if they have not recovered by themselves or sometimes where there are underlying problems with the bone which have contributed to the problem and need to be corrected.

The aim of surgery is to stabilise the knee. Damage to the cranial cruciate ligament results in instability of the knee in a forward/backward direction. When your dog is attempting to bear weight on the affected leg, the knee is giving way so they cannot push off that leg with any confidence. Historically, surgery consisted of a variety of different ways to replace the ligament, with wire/nylon/carbon fibre or with tissue taken from elsewhere in the body. Unfortunately many of these procedures were unsatisfactory, essentially because nothing does the job of a ligament as well as a ligament. Many of the materials we used to replace the ligament would stretch/break too quickly and the surgery would be unsuccessful.

About 15-20 years ago, a new approach to the problem was introduced, and has subsequently become the accepted gold-standard treatment for cruciate ligament problems in dogs. This approach consists of altering the way the knee works to make it stable without the ligament. This is achieved by making a cut in the top of the shinbone, rotating a piece of bone slightly, and fixing it back in place with a plate and screws. The benefits of this procedure are that once the bone has healed in the new position there is nothing to stretch or break, and the knee is stable for life. Since the procedure was introduced, many hundreds of thousands of dogs worldwide have been treated in this way and there is a large body of evidence demonstrating that it is effective. The downside of the procedure is that it is more technically demanding and requires a lot of specialised equipment, meaning that many general vets do not perform it and need to refer dogs to a specialist orthopaedic surgeon for this treatment.

The additional problem of the dislocating kneecap may have occurred as a result of additional joint instability caused by cruciate ligament rupture or it may have been already present before the cruciate injury and exacerbated by this. Kneecap dislocation usually starts with spontaneous dislocation happening during exercise, and the kneecap usually relocates fairly quickly. Although at this stage the problem is fairly minor, it can progress in a number of different ways. The kneecap can

stop relocating and end up permanently dislocated causing a persistent lameness. Other injuries to the knee may be more likely because of the extra strain on the joint. Osteoarthritis in the knee may develop. For this reason, surgery is usually recommended to stabilise the kneecap once it has started to dislocate by itself.

The Operation

Your practice will make arrangements with you to drop your pet off on the day of the surgery. Please don't give breakfast on the morning of the procedure. If they are receiving pain relief, they can have their pain relief the night before the operation, but if you normally give it in the morning then please don't give it on the day. Please let the nurse/vet admitting your dog know when they last had pain relief, and also if you will need a further supply of any medication. I will probably not meet you in person on the day of the procedure, but I will speak to you by phone if possible. If you have any questions based on the information in this sheet then please feel free to ask me then. When I arrive at the practice I will examine your dog and confirm the diagnosis and plan for surgery. If for any reason we need to alter the plan I will contact you to discuss it.

Your dog will be mildly sedated to minimise stress, and then anaesthetised. We may need some further x-rays prior to surgery to make measurements. Your dog's leg will be prepared for surgery. The leg will be shaved from hip to toe to give us a large clean zone to minimise the risk of infection.

The first part of the operation is to open the knee joint and remove the damaged remnants of the ligament. We also need to check structures called the menisci ("cartilages") which can also be damaged/torn. If the menisci are damaged then the damaged parts will be removed.

Once the joint has been inspected the groove that the kneecap should run in is deepened (sulcoplasty) and the tissues to the side of the knee are tightened to pull the kneecap over in the right direction (lateral imbrication).

Once the joint has been inspected and the groove for the kneecap has been deepened, the procedure to cut the bone, rotate the piece and reattach it with plate and screws will be performed. Then the incision will be closed with stitches and/or staples. The leg will not be bandaged, unless there is a concern about swelling.

X-rays will be taken after the procedure to ensure that everything is in a good position. Your dog will probably be anaesthetised for about 3 hours in total because of the preparation beforehand and for the x-rays and cleaning/dressing afterwards. I will call you with an update at the end of the operation.

In most cases your dog will be discharged from the practice the evening of the procedure. You will receive a printed discharge note from me which will give details of the procedure, medication and instructions for exercise. Your dog will receive an injection of painkiller immediately before going home and you will also generally have some further pain relief to give at bedtime. Nonetheless, on the night after a major operation like this you may find your pet is restless or agitated. You should make sure that you know how to contact your practice's out-of-hours service and also where you would need to go if your dog needed to be checked over, bearing in mind that this may not be at your usual practice

EXERCISE & RECOVERY

Before surgery, please obtain a crate or cage for your dog to be confined to. This should be about twice the size they need to lie down comfortably. It is sensible to familiarise your dog with the crate before surgery and you can help them feel settled inside by adding some of your worn clothing so the crate contains familiar smells. It is also beneficial to wash and clean all of their bedding that they will use so that this provides a cleaner environment for recovery after surgery.

Your dog will be strictly rested for the first 6 weeks after surgery, and it is very important that you enforce this at all times. They should be restricted within the cage when you are not with them or actively in control of them, and they should be kept on a short lead at all times when they are out of the cage. It is very important that they are not allowed to jump up on the furniture, play with other dogs, run around off the lead or go up any stairs.

A sling/towel under the abdomen can be used to aid mobility in the first few days after surgery, if required. This is more important for larger dogs or those who have problems with both back legs.

For the first 4 weeks after surgery your pet should only go out on a short lead for toileting to the garden 3-4 times per day for no more than 5-10 minutes. During weeks 5 & 6 after surgery they can start light exercise again and can be taken for two 10 minute walks a day always on a short lead. You should walk slowly to encourage them to use the leg as much as possible. Allowing too much exercise too soon during recovery is one of the most common causes of problems with the recovery from this surgery.

Physiotherapy is an excellent way to get the best possible recovery after orthopaedic surgery. We will provide some initial physiotherapy guidance after surgery, and your vet will be able to advise further on this, but I would also thoroughly recommend seeing a veterinary physiotherapist to help with rehabilitation.

It is important that your pet is not allowed to lick or interfere with their surgical wound until it has healed – please use a buster collar to prevent this if required. Licking, or handling, of the surgical area before the surgery wound is healed is the most likely way of introducing post-operative infection.

Your vet will arrange for your pet to have follow-up x-rays taken to assess healing of the surgery – this is normally performed about 6 weeks after the original procedure. We will assess these x-rays and provide further instructions at this time. In most instances, we hope for pets to be able to end crate restriction in the house after this time, although still being prevented from jumping/climbing/etc., and to be able to have their lead exercise gradually increased with the aim of being back at normal levels of lead exercise by 12 weeks after surgery.

Risks of Surgery

This is a procedure with relatively low risks, and it is a procedure that for us is very routine. However as you would expect for major surgery there are some risks.

1. Infection – Infection is a small risk of all surgery. We will take all the same precautions to avoid infection as I would take if I were performing the surgery at a specialist hospital (drapes, gowns, gloves etc). Your dog will receive antibiotics during surgery and will also have a short course of antibiotics after surgery. You should monitor the wound after surgery for any excessive redness, swelling or discharge. If an infection does develop it will generally resolve with further medical treatment. Very occasionally the area may need to be flushed. In very rare cases an infection may result in a poor outcome or may mean that the plate and screws need to be removed.
2. “Late Meniscal Injury” – if the cartilages in the knee are normal at the time of surgery, we will leave them in place, as they are important for knee function. Occasionally a cartilage tear will occur later on and result in a recurrence of lameness. A surgical procedure to treat the cartilage tear may be required.
3. Failure of surgery – Sometimes, the kneecap continues to dislocate despite the procedures to relocate it. If this happens, we will discuss whether there are further options available to remedy the problem. The procedure described here is normally very reliable.
4. Osteoarthritis – Some degree of “wear and tear” in the joint is inevitable following the injury and no surgical procedure has ever been demonstrated to stop this. However, surgical treatment now is the best way to minimise this, and many dogs will not be troubled by arthritis for many years.
5. Other leg affected – because this appears to be a “condition” rather than an injury in dogs, the other knee is very often affected within 1-2 years and the same treatment required. There is not a great deal that can be done to prevent this other than keeping your dog at a sensible weight.

There is a small risk associated with a general anaesthetic. Your vet may discuss with you whether you would like your dog to have a blood test prior to surgery to ensure that there are no underlying health problems that we were unaware of.

Canine Cruciate Registry

Our surgeon (Nick Goldfinch) is participating in the Canine Cruciate Registry. You may have been provided with an information sheet about this, but if not, further information can be found at <https://caninecruciateregistry.org/dog-owners/>. If you wish to participate, you must register your pet on the website.

Thank you for entrusting the care of your pet to us, and I look forward to speaking to you on the day of the procedure.

Dr Nick Goldfinch BVMS PhD PgC(Surg) GPCerts(SAS, SAM) MRCVS

RCVS Advanced Practitioner in Small Animal Surgery