

## Cranial Cruciate Rupture

A common injury to dog's knees (stifles) is tearing of the cranial cruciate ligament (CCL). This ligament is like the anterior cruciate ligament (ACL) in humans, and is a typical skiers or footballers injury. There are actually two cruciate ligaments inside the knee: the cranial cruciate ligament and caudal cruciate ligament. They are called cruciate because they cross over each other inside the middle of the knee.

When the CCL is partially or completely ruptured, the shin bone (tibia) slides forward with respect to the thigh bone (femur). This dynamic movement is known as a positive drawer sign or cranial tibial thrust. Most dogs with this injury will not be able to fully weight bear and they experience pain. The resulting instability damages the cartilage and surrounding bones, and leads to osteoarthritis.



Surgery is generally recommended to reduce permanent, irreversible joint damage and to relieve the dog's pain. There are several surgical options which have evolved over the years. Each procedure has its own advantages and disadvantages. Our vets will be able to talk you through the options and advise on the best surgical option for your dog.

Here we will discuss the TPLO;

## Tibial Plateau Levelling Osteotomy (TPLO)

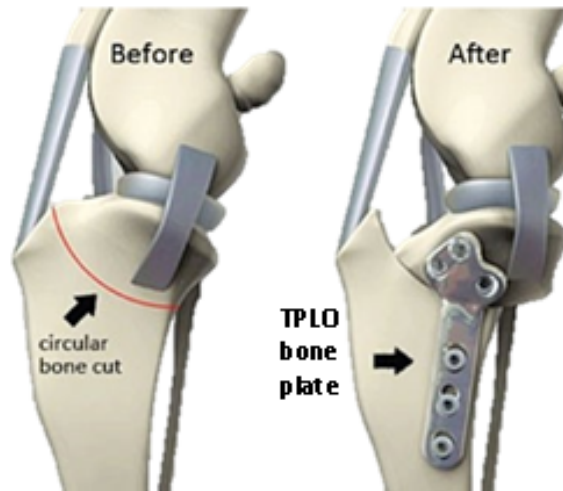
### What is a TPLO?

A Tibial Plateau Levelling Osteotomy (TPLO) is a surgical treatment for a torn cranial cruciate ligament (CCL).

TPLO aims to neutralise the cranial tibial thrust force by levelling the top of the tibia (tibial plateau) and changing the angle and relationship between the tibia and femur. The average angle of the slope is 21-24 degrees, but varies between dogs and can be as abnormal as 35 - 40 degrees. When the dog

is weight bearing during a stride, the intent of the surgery is to reduce the amount that the tibia shifts forwards by reducing the angle on the slope.

This is achieved by making a semicircular cut with a special surgical saw through the top of the tibia, rotating the top of the tibia, and using a bone plate to allow the tibia to heal.



This realignment of the surfaces within the knee (stifle) helps to provide stability during walking and helps to reduce future joint inflammation and osteoarthritis. By adjusting the angle or slope of the top of the tibia, we can create a more normal configuration of the knee joint and reduce mechanical stress.

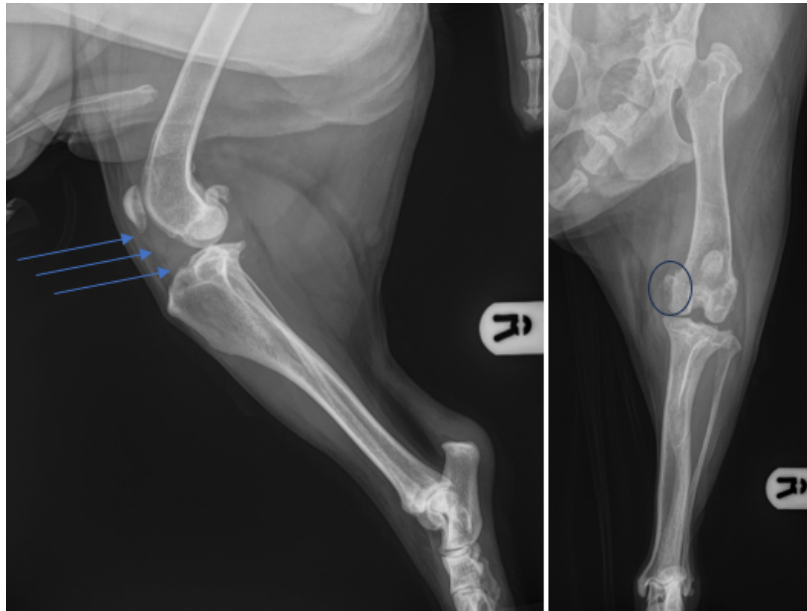
### The “wagon on a hill” analogy

A good analogy is a wagon tied to a post on the slope of a hill. If the rope holds, the wagon does not roll downhill. If we add excess weight (or downward force) to the wagon, the rope might break, and the wagon would roll down the hill. However, if the wagon is on level ground, it will not roll with added weight, even if the rope is broken.

The wagon is the femur, and it slides down the slope of the tibia when the CCL is ruptured. This instability leads to damage and destruction of the cartilage and bones of the knee joint. TPLO surgery levels the tibia to prevent the femur from sliding forward, thereby stabilising the joint.

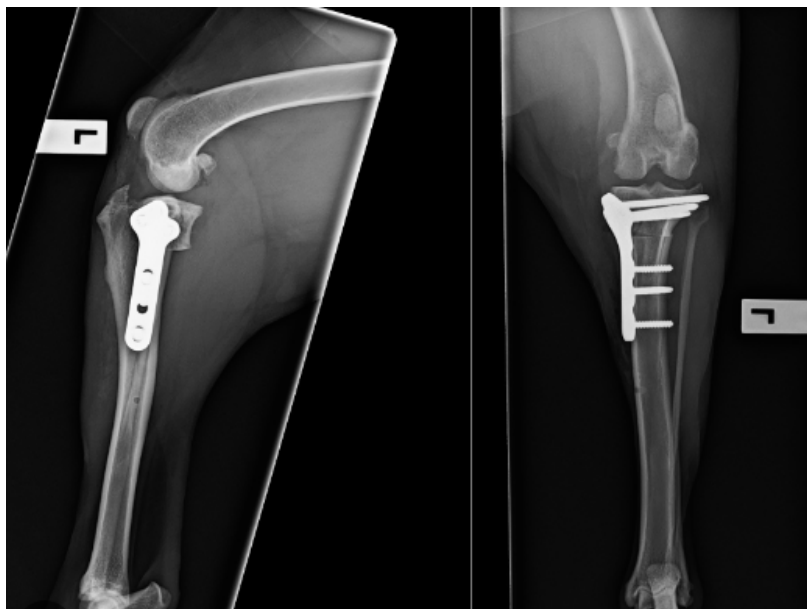
### The surgery

X-rays of the knees would be taken to confirm the presence of an effusion (fluid filled swelling in the joint - blue arrows) and to measure the angle at the top of the shin, called the tibial plateau angle.



Next the knee joint (stifle) is opened up surgically to inspect inside the joint itself. This allows the damaged cruciate ligament and the meniscus to be removed if damaged. The meniscus is a fibrocartilaginous pad in the joint which allows gliding movement in the knee. This can be damaged at the same time that the cruciate is torn, and it is another source of pain and lameness.

TPLO surgery involves making a curved cut in the tibia from the front to the back, like half a smiley face. The top of the tibia is then rotated backward until the angle between the tibia and femur is deemed appropriately level, aiming for an ideal angle of 5 degrees. The two sections of the tibia are then reduced and held in the desired position with bone holding forceps, while a metal plate and screws are applied to hold them in place, allowing the tibia to heal in its new position.



## Aftercare

- An Elizabethan (buster) collar should be worn at all times for the first 2 weeks.
- Pain relief (anti-inflammatories) will be prescribed for your dog for 4-6 weeks.
- Some surgeons will prescribe prophylactic antibiotics for the first week post operatively due to the presence of metal implants in the bone.
- Your dog should be rested in a cage at all times for the first 6 - 8 weeks, until the bone has healed. They can be taken out on short lead walks for toileting purposes only.

A post op check would be recommended about 5 - 7 days post surgery.

A recheck appointment is then recommended 6 weeks after surgery. Your dog will be sedated for X-rays to check that the bone is healing and there are no concerns with the implants.

If you have any problems before then, please contact your vet. It is better to have a recheck than miss a problem.

### Time after surgery:

|                |                                   |
|----------------|-----------------------------------|
| First 2 weeks  | 3 x 5 minute lead walks           |
| 2 - 4 weeks    | 3 x 10 minute lead walks          |
| 4 - 6 weeks    | 3 x 15 minute lead walks          |
| 6 - 8 weeks    | 3 x 20 minute lead walks          |
| 8 - 12 weeks   | Gradual return to normal exercise |
| After 12 weeks | Normal activity                   |

### Potential Complications

- **Surgical site infection or infected implants** - this is usually due to the dog licking their wound. It can also occur during surgery, recovery or through haematogenous spread (through the blood stream) e.g. if they have had diarrhoea.
- **Seroma formation** - this is relatively common, it is an insignificant fluid accumulation round the wound. It usually improves without any treatment.
- **Implant failure** - this is very rare and is normally due to extreme activity in the post op period or incorrect selection of bone plate.
- **Bone fracture** - this is also very rare and is again, normally due to extreme overactivity.
- **Late meniscal injury** - up to 6 months after the surgery, tears in the cartilage can form due to rotational forces still acting on the stifle.

## **Signs to watch out for;**

- Swelling, heat or redness around the wound after surgery; this is often a seroma but it is always worth having it checked by a vet.
- Any discharge from the wound, especially if smelly or yellow.
- Sudden worsening of the lameness that lasts for more than 12 hours.

## **Frequently Asked Questions**

### **Does my dog really need surgery? I have read that they will be fine without surgery.**

In small dogs, under 10kg, studies show that approximately 15% of dogs will recover reasonably good function of the leg without surgery. This is only because the joint becomes fibrosed and thickened about 6 weeks of them becoming lame. It will however lead on to worsening arthritis. For the majority of dogs, surgery is the only way to return them to good function, not braces, medications, supplements or physical therapy.

### **Which patients will benefit from a TPLO?**

Any size of patient, small or large, would benefit from a TPLO.

### **Why is TPLO so costly, especially when compared to other cruciate repair surgeries?**

A TPLO compared to other surgeries involves specialised equipment, including a specially designed curved blade, a bone plate and screws, several x-rays for planning and post operatively, and between 2 - 4 hours of preparation, surgical and recovery time per patient. A TPLO also requires a significant investment in time and money for the training of the surgeon.

### **Is TPLO really better than other surgical options?**

If your dog is larger, younger and active then yes a TPLO is regarded as the best choice of surgery. Around 90% of referral surgeons prefer this technique to all of the other available procedures. Research data shows that TPLO dogs return to function faster, they develop less joint arthritis, and they tend to return to better functional levels. Around 95% of patients get 90 % better with a TPLO surgery. Performance athletes such as agility or working dogs may see a small drop in performance, but most pets make a “near normal” recovery.