

Cranial Cruciate Disease

The stifle (knee) of a dog is a complex hinge joint which allows movement in mainly one plane (flexion and extension) but also in a small degree to other planes (inward rotation), it involves the end of the femur rotating over the top of the tibia and is held together by a number of structures.

- The collateral ligaments. These are two ligaments either side of the stifle and prevent the joint unhinging either side.
- The cruciate ligaments. These are two ligaments that run through the joint, crossing over in the middle. These prevent the joint rocking backwards and forwards.
- The menisci. These are two cartilages within the joint that act as buffers between the femur and tibia.
- The joint capsule and muscles around the joint.

The single most common cause of hindlimb lameness in the dog is caused by degeneration to the Cranial Cruciate Ligament (CCL). This will result in Osteoarthritis and this will often lead to the ligament rupturing or tearing. This is in contrast to the situation in people where this ligament becomes injured as a result of trauma (skiing, rugby, football injuries).

The condition has a variable presentation, most dogs are usually intermittently lame or stiff for some time before and then suddenly become very lame for no apparent reason (turning around in the garden) when they rupture the ligament however some dogs present with a very gradual worsening of lameness and some dogs present early on in the condition. Any breed of dog can develop this condition usually in middle age but some breeds of dog have become associated with the condition developing early in life (Rottweiler, Labrador, Newfoundland). In a very small number of cases the cruciate ligament may become ruptured through a traumatic incident and there are often other injuries at the same time such as damage to the collaterals and or the caudal cruciate ligament, in these cases the management will involve surgery to stabilise the joint but the prognosis is often very different.



Cross sectional image through a canine stifle showing the cranial cruciate ligament

The femur is at the top and the tibia on the bottom.

Instability

Because the cruciate ligament gives the stifle joint a great deal of stability, if it tears or ruptures then the joint becomes unstable, however the degree of instability will be affected by how slowly the cruciate ruptures and how the body has been able to adapt and also by how much the cruciate ruptures.

Therefore dogs with cruciate ligament disease failure present as a wide range of cases, those that have had a slow progression of the ligament failure will have developed significant thickening of the tissues around the stifle joint and although the ligament is ruptured the joint may not be particularly unstable. Those that have had a sudden failure of the joint may have a significant amount of instability and this may be easily appreciated and some may only have a very slight degree of instability because they have only partially torn their cruciate ligament.

All cases of cruciate ligament disease and rupture will have some degree of Osteo Arthritis develop and this will have to be managed long term.

Other injuries, the meniscus and joint cartilage

The two C shaped “cartilages” within the stifle are important buffers between the rounded femur and relatively flat tibia, when the stifle is unstable to any degree the medial (inside) meniscus is at particular risk of becoming torn. These tears are a source of considerable pain as the free torn portion will become trapped between the femur and tibia during normal movement. This torn part can also result in further damage to the articular cartilage which can alter the long term prognosis, it is vital that the meniscal cartilages are examined and any torn part removed, in some cases we may elect to “release” the meniscus so that it cannot become damaged in the future and in a very small number of cases the meniscus may be repaired, **arthroscopy or “key hole” surgery has been shown to be the most accurate way to assess the meniscus and the extent of damage within the joint** and is less invasive than a traditional arthrotomy.

Osteo Arthritis

Because the entire joint is diseased and the cruciate ligament has failed over a period of time Osteo Arthritis will have developed already. This is a disease which results in the articular cartilage layer becoming weak and damaged through abnormal metabolism and it will always be present and cannot be cured and so will need to be addressed as a long term management.

Determining the cause of the lameness is very important as it may be coming from one or more of three different sources:

- Gross instability of the stifle joint
- Osteo arthritis of the stifle joint
- Tearing of the meniscal cartilage
- Persistent micro instability leading to cruciate ligament straining

What can be done?

Investigations

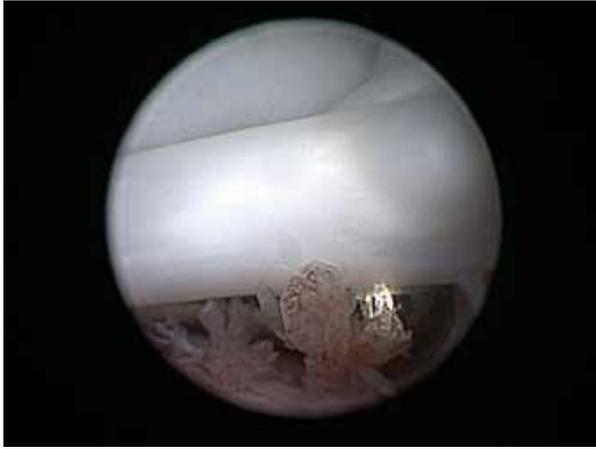
- Firstly the condition requires confirming, this involves a close physical examination and then usually an X ray under a general anaesthetic or sedative. The X ray allows us to determine that there is no other cause for the lameness, importantly to rule out possible sinister causes such as tumors (which are rare) but also to assess the extent of osteo arthritis and importantly measure specific joint angles which will have a direct impact on how we may need to proceed. These specifically positioned X rays would not normally be taken by your GP vets. We normally take X rays on the same day as examining your dog and on a separate day to surgery so that we can discuss the findings and the most appropriate surgery in advance.
- Assessment of stability under sedation compared with assessment whilst conscious, this helps us to determine to what extent your dog is able to stabilise its stifle itself.
- In some cases we may use ultrasound to examine some of the structures in the joint or collect fluid from within the joint to examine under a microscope.
- **All of these investigations help us to determine the best way of treating your individual dog, we do not believe that one size fits all in cruciate ligament treatment.**

Definitive Treatment

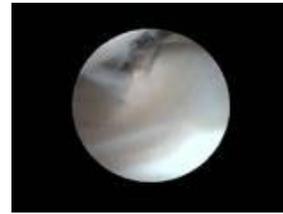
Because of the huge diversity of how dogs with CCL disease can present and the diversity of what is actually causing the lameness and the enormous diversity of the individual dog's requirements we try and provide the most appropriate surgery or treatment **for the individual patient**.

Joint examination

- Examination of the meniscus and treatment of tears is important, this is best done via a keyhole, arthroscopic.
- Confirmation of the degree of cruciate rupture is required in some cases. Arthroscopy is the Gold Standard for confirming cases that have very little instability but early tearing of the cruciate ligament.
- Traditionally the joint examination was performed via an open approach, this is more invasive than an arthroscopy but if there are financial restrictions then this is something that can be discussed.
- **Arthroscopy is the most accurate and least invasive way to examine the joint especially for assessing the extent of articular cartilage injury.**



Arthroscopic views of the same medial meniscus showing the importance of accurate assessment with a probe. In this case an important tear was detected at arthroscopy which could easily have been missed using a traditional arthrotomy.



Joint stabilisation

- Traditionally sutures were placed around bones at the back of the joint and through bone tunnels (the fabello tibial sutures), these provided crude stabilisation to the joint and due to the mechanics of the joint these sutures failed very quickly, they have been shown to be inferior to other methods of stabilisation in the short, medium and long term, it is not a technique that we feel we can offer routinely.
- A major refinement of this technique is to use sutures placed outside of the joint but into isometric points on the femur and tibia, these points have an equal distance between them in flexion and extension and so provide a huge advantage over the traditional technique. The fixation points are to bone rather than around soft tissues and **scientific testing has shown them to be far superior to the traditional fabellotibial sutures**. The suture is not designed to provide long term stabilisation and the technique relies on the dog developing its own long term stability through joint fibrosis and retraining of muscles and stability. It is vital that dogs are very closely confined for 8 weeks after this surgery however, as if they are not they will lose the initial stability before the long term stability is developed. The technique has advantages over other techniques in that it is relatively less invasive, medium and long term results are reasonable and this technique may be more appropriate for small dogs and older dogs with less athletic requirements. We have available Tightrope, Fastak and Swivelock implants to perform these techniques so that they can be applied to a huge range of patient sizes.
- Tibial osteotomies. These are surgeries that involve cutting the tibia and changing the mechanics of the stifle joint to that that cruciate ligament is not required to prevent the major instability. These surgeries are significant interventions.
- Essentially there are two types of tibial osteotomy, the Tibial Plateaux Levelling Osteotomy (TPLO) and Tibial Tubercle Advancement (TTA). Recent studies into these surgeries have shown some differences in both complication rate and eventual outcome and surprisingly the TPLO surgery which on the face of it appears more invasive has shown to provide a better long term outcome and has a slightly lower rate of complication. For this reason, currently (November 2015) we recommend the TPLO over the TTA and especially the TPLO over some of the more recently developed TTA surgeries (Modified Maquet Titanium wedge) which seem to have a worryingly high complication rate for some surgeons.
- In a small number of dogs the actual degree of instability is very slight, this is either because they have very early cruciate ligament disease (young Rottweilers this is common) or they have suffered a very gradual loss of cruciate ligament and they have been able to stabilise their stifles by laying down scar tissue and dynamically improving their muscle strength. In dogs with early partial cruciate tears the TPLO surgery has been shown to “save” the rest of the cruciate ligament and this is typically our suggested method of surgery after arthroscopic confirmation. In dogs with a chronic cruciate rupture and extensive secondary stabilisation the cause of lameness is often and meniscal tear and stifle arthroscopy to confirm this and debride the tear is all that is required.



Post op Radiographs of dogs that have had different stabilisation techniques

Far left Cranial closing wedge, middle TPLO and right a Fastak isometric suture in a small terrier

Physiotherapy

Properly supervised and demonstrated physiotherapy is of great benefit to your dog in the immediate post operative period. Some very simple things should be done in the first two weeks after surgery such as icing but after two weeks an appointment with the physio here (or we can provide you with list of suitably qualified physio in your area) has a number of benefits:

- Because we cannot ask your dog to walk in a controlled way (such as with crutches as we would be), we have to confine your dog to stop him or her doing too much. Starting some controlled static physiotherapy allows you to interact with your dog in some form of activity which is beneficial mentally to your dog.
- The static exercises are designed to maintain muscle tone and bulk, range of movement and joint function whilst your dog is recovering from surgery, preventing these from being lost means that the recovery is quicker and more effective.
- Because we are all different, we all have different requirements and so regular reassessment with the physio means that the rehab protocol can be tailored to your dog's personal requirements.

It is vital that physiotherapy is performed by a suitably qualified person, in appropriate physio is dangerous. **The only qualification we recognise** is that of a veterinary surgeon or an ACPAT Cat A physiotherapist.

POST SURGICAL CARE FOR TIGHTROPE PATIENT

We want your dog to have the best possible outcome after his/her TightRope surgery and your role in the postoperative care is CRITICAL to success! Please follow these instructions exactly and call us right away if you are having problems in doing so.

1. Please do not let your dog lick or chew at his/her incision sites at all. **An Elizabethan Collar MUST be worn at all times until the incisions have healed well and we are able to take the sutures out.** Please check the incisions each morning and evening for any swelling or drainage.
2. Your dog should be strictly confined for the first 8 weeks following surgery. 1) Your dog should be in a kennel, toilet sized room or crate 24/7. 2) You may take your pet outside on a short lead for toileting (100yds) into the garden and then back in. No other activities such as running, jumping, flexi-lead activity, stairs or playing of any type are allowed. These restrictions are necessary to allow the knee to heal well and provide the long term, pain free function we are working to achieve.
3. After the first initial 8 weeks you will have a check up appointment with Patrick Ridge, if your dog is using his/her leg well at that point the lead controlled exercise will be gradually built up over a period of another 6 to 8 weeks but the maximum exercise during this time should be no more than 15 minutes four times a day on the lead. Underwater **treadmill** should not be started with the physio until around week 10 having been able to comfortably achieve 10 minutes of lead walking three times a day.

If underwater treadmill is not available hydrotherapy as free swimming should not be allowed until 12

weeks under direct supervision of an ACPAT physio.

4. No unrestricted/off lead or unobserved activities are allowed until at least 16 weeks post op after which time a return to normal should be slow and over another 4 weeks

5. Do not expect your dog to be back to normal for at least 16 weeks

6. During the 8-week confinement period, it is recommended that your dog be given a reduced portion of his/her normal food amount to prevent weight gain.

7. It is very important that you complete the prescribed medication regimen when you go home. The medications help with inflammation and pain relief after surgery and decrease the risk for infection. If you feel that your dog suddenly becomes painful, has an abrupt change in limb use, or is experiencing side effects from the medications, please contact us as soon as possible.

POST SURGICAL CARE FOR TPLO

We want your dog to have the best possible outcome after his/her surgery and your role in the postoperative care is **CRITICAL** to success! Please follow these instructions exactly and call us right away if you are having problems in doing so.

1. Please do not let your dog lick or chew at his/her incision sites at all. **An Elizabethan Collar MUST be worn at all times until the incisions have healed well and we are able to take the sutures out.** Please check the incisions each morning and evening for any swelling or drainage.

2. Your dog should be strictly confined for the first 8 weeks following surgery. 1) Your dog should be in a kennel, toilet sized room or crate 24/7. 2) You may take your pet outside on a short lead for toileting (100yds) into the garden and then back in. No other activities such as running, jumping, flexi-lead activity, stairs or playing of any type are allowed. These restrictions are necessary to allow the knee to heal well and provide the long term, pain free function we are working to achieve.

3. After the first initial 8 weeks you will have a check up appointment with Patrick Ridge and an X ray will be taken under sedation or general anaesthesia, if the X ray shows good bony healing at that point the lead controlled exercise will be gradually built up over a period of another 6 to 8 weeks but the maximum exercise during this time should be no more than 15 minutes four times a day on the lead. Underwater **treadmill** or **hydrotherapy** should be started under direct supervision of an ACPAT physiotherapist.

4. No unrestricted/off lead or unobserved activities are allowed until at least 12 to 14 weeks post op after which time a return to normal should be slow and over another 4 weeks

5. Do not expect your dog to be back to normal for at least 16 weeks

6. During the 8-week confinement period, it is recommended that your dog be given a reduced portion of his/her normal food amount to prevent weight gain.

7. It is very important that you complete the prescribed medication regimen when you go home. The medications help with inflammation and pain relief after surgery and decrease the risk for infection. If you feel that your dog suddenly becomes painful, has an abrupt change in limb use, or is experiencing side effects from the medications, please contact us as soon as possible.