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REHABILITATION /LONG TERM CARE FOR THE FRACTURE PATIENT
Sandra Hudson, BS, MBA
Canine Rehabilitation and Conditioning Center
Round Rock, USA
sandra-hudson@austin.rr.com

Phase I Post-Operative Care
The first objective of post op fracture care is to reduce pain and swelling.

Cold should be applied for 20 minutes, 1 to 4 times a day for the first three days. Passive range of motion can be performed on joints that are not above and below the fracture. This usually helps to relax the dog and prevent muscle guarding. Massage therapy can also be used to relax the animal during the icing.

Ice and Massage for femur fracture
Small bags of peas can easily be fitted around external fixation devices

Passive range of motion may be the most important exercise for a dog recovering from a fracture due to the restrictive nature of the movement it allows. To be beneficial passive range of motion must be performed properly. Owners should review the steps carefully with the therapist and practice them before performing passive range of motion on their own.

Long Term Goal: Return to clinical function

Phase II Early Weight Bearing
The stability of the fracture should be determined before any rehabilitation can begin.

If the limb has been immobilized the muscle will atrophy, the bone will increase in bone resorption, and the ligament mass will decrease. The early weight bearing phase begins with limited stress on the bone joints, ligaments and muscles preparing the animal for progressively increased weight bearing exercises.

Exercises may include slow controlled walking for very short duration, physioball exercises, balance board and supported standing.

Phase III – Progressive Weight Bearing
Progressive weight bearing exercises include one leg stand, increased speed and length of walks, and exercise in the underwater treadmill.

One leg stand
Increase strength and endurance in underwater treadmill

Phase IV – Strength/Endurance
The strength and endurance phase may last several weeks. Increased length of walks and underwater treadmill provide excellent exercise for this phase.

Phase V – Gait Training
Gait training techniques and exercise focus on returning the dog to as near normal movement as possible.

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Complete or partial rupture of the cranial cruciate ligament (CCL) is a common injury of the canine stifle. Injury of the CCL allows cranial translation of the tibia resulting in stifle instability and hind limb lameness. It has been demonstrated that dogs with CCL deficient stifles cannot prevent cranial translation of the tibia either by altering hind limb gait or muscle forces across the stifle. As such, conservative treatment of CCL injury is generally unsuccessful leading to surgical stabilization as the preferred method of treatment. Numerous surgical techniques have been developed including placement of intra-articular grafts, insertion of suture material and/or advancement of periarticular structures outside the joint (extracapsular), and tibial osteotomies that alter joint mechanics. Although hind limb function and lameness can be improved with surgical intervention, to date, no one technique has been proven to be superior. Procedures that require placement of extracapsular sutures are technically less demanding than intra-articular or mechanic altering techniques and remain popular with veterinary surgeons and veterinary practitioners. The optimal extra-articular suture would be one which eliminated abnormal cranio-caudal translation and was placed such that the distance between the two points of attachment (femur and tibia) did not change through flexion and extension (isometric placement). Femoral and tibial sites commonly used for suture placement have increased suture tension through flexion. The method discussed here includes placement of an isometric prosthetic ligament. Isometric placement of sutures, new suture materials, and new suture anchors have become available to increase the chance of success and simplify the surgical technique.

**Prosthetic ligament placement:** The prosthetic ligament must be placed as isometrically as possible. Isometric positioning maintains similar tension on the ligament throughout the range of motion, decreases the chance of stretching or breaking the ligament, and allows more normal stifle movement. The color graph below shows change in distance between attachment points on the femur and tibia for different paired femoral/tibial sites. The bone model shows the location of attachment points on the femur and tibia. Clinically the author recommends placement of the suture at the F2-T3 paired site.

**Locating the F2 site:** The F2 site is located at the level of the distal pole of the fabella. Placement of the anchor is critical. The anchor must be placed in the femoral condyle as far distal and as far caudal as is possible. An anchor placed to far proximal or anterior is at risk for pull out or suture failure. To locate the correct placement site in the femoral condyle, palpate the distal pole of the fabella. Make a vertical incision through the capsular tissue to expose the joint line between the fabella and caudal margin of the femur. Locate the proper position for the anchor just distal to the fabella-femoral joint line and as far caudal as possible. A hole is pre-drilled at the correct anchor position; the size of hole is dependent upon the implant being used (FasTak, Corkscrew, SwivaLock, TightRope). The drill hole is directed lateral to medial toward the patella to eliminate the risk of penetrating the articular surface.

2.8mm FasTak with #2 Fiberwire        5mm Corkscrew with #5 Fiberwire

4.75 SwivaLock with 2mm FiberTape     TightRope with 2mm FiberTape

**Locate the T3 site at the proximal tibia.** First locate the protuberances cranial and caudal to the long digital extensor groove. Make a vertical incision through the capsular tissue overlying the extensor groove. Palpate and locate the protuberance just caudal to the extensor groove; this is the site for placement of the drill hole. The size of drill hole is dependent upon the implant being used. FasTak 1.5mm, Corkscrew 2mm, SwivaLock 2.5mm, TightRope 2.7mm) At this site beginning as proximal as is possible without entering the joint, insert a guide k-wire. The K-wire is directed to glide beneath the extensor groove to exit through the medial cortex of the proximal tibia. With the K-wire in place, place the appropriate cannulated drill bit over the wire to create the drill hole. Drill over the K-wire to exit through the medial cortex. Leave the drill bit in place and remove the K-wire. Through the cannulated hole in the drill bit, place a nytinol Arthrex suture passer to facilitate passing the suture. The suture is...
ARTHROSCOPY OF THE ELBOW JOINT IN DOGS
L.F.H. Theyse
DVM, PhD, ECVS
Department of Clinical Sciences Companion Animals,
Faculty of Veterinary Medicine, Utrecht University.
The Netherlands
l.f.h.theyse@uu.nl

In companion animal orthopaedics, arthroscopy is a valuable asset in diagnosing and treating joint disorders. The advantage of arthroscopy is that it is a minimally invasive technique which enables accurate inspection of joint structures in combination with visual amplification. In combination with one or more working portals surgical intervention within the joint is possible without the necessity of an invasive arthrotomy. This means the postoperative pain and discomfort can be reduced significantly. In dogs, arthroscopy of the elbow joint is the most frequently executed endoscopic intervention in orthopaedic surgery. The most common indication for elbow joint arthroscopy is coronoid dysplasia which can lead to fragmentation of the medial coronoid process (FCP). The presence of FCP can lead to a contact lesion of the cartilage and bone damage has been shown to be very low(2). The role of arthroscopy in diagnosing and possibly treating incongruity of the elbow joint is under debate, but may prove to be very valuable in young developing dogs(3).

The arthroscope itself consists of a rigid scoop which is protected by an arthroscopic sleeve. Most arthroscopes have a 25° to 30° degree viewing angle. The arthroscope is connected to a camera system enabling visualisation of the joint on a screen. A light source and light cable are connected to the arthroscope to provide illumination of the joint space. The arthroscopic sleeve has an irrigation tap for the inflow of fluid to distend and flush the joint. The sleeve is introduced into the joint space by the aid of a preferably blunt obturator. Once the sleeve is positioned within the joint the obturator is removed and the arthroscope inserted. An outflow cannula is necessary as the joint is irrigated during inspection. After inspection of the joint a working portal is established. An instrument sleeve is inserted to enable the introduction of arthroscopic instruments, including hooked probes, grasping and punching forceps, curettes, micro picks, hand burrs, motorized shaver blades, and radiofrequency probes. The standard arthroscopic approach to the elbow joint is from medial as elbow dysplasia mainly affects the medial joint compartment(4). As the elbow joint space is limited, the most common scopes diameters are 1.9 mm or 2.4 mm. The diameter of the sleeve adds approximately 0.9 mm to the total diameter of the scoop assembly(5). The standard approach for elbow arthroscopy is by introducing an ingress needle in the caudal joint space just craniodistal of the medial epicondylar crest. With this needle the joint can be distended with irrigation fluid prior to insertion of the arthroscopic sleeve and blunt obturator assembly. The sleeve assembly is introduced using a stab incision through the skin and antebrachial fascia approximately 1.5 to 2.0 cm caudodistal of the medial epicondyl. Abduction of the elbow joint opens up the medial compartment and can help positioning the sleeve assembly. Correct positioning of the sleeve can be checked by removing the obturator at which time irrigation fluid will exit from the sleeve. At this time the arthroscope can be placed and secured within the sleeve. By opening the irrigation tap on the arthroscopic sleeve visualisation of the elbow joint can begin. After close inspection of the joint a working portal should be established. A stab incision is made approximately 1.5 cm cranial and at the same level of the arthroscopic sleeve. Under arthroscopic visualisation a blunt switching stick is introduced within the joint. A instrument sleeve is then inserted over the switching stick until it enters the joint space. After removal of the switching stick this instrument or working portal can be used to introduce the...
hooked probe and other instruments to aid in determining the extent of the lesions. The size of the working portal typically is between 2.0 to 2.7 mm. After removing diseased cartilage and bone fragments from the joint the working portal is used to irrigate the joint thoroughly thus flushing out all small debris. Intra-articular analgesics are routinely used. The skin is closed with single interrupted sutures and a postoperative bandage is applied for 24 hours. Recovery after elbow arthroscopy usually is uneventful. Improvement of locomotion depends on the severity of the joint lesions and can take several weeks to months.

References