Stifle joint instability II- Caudal cruciate ligament injury, partial (Collateral injury) and complete stifle luxations

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Introduction:

The main causes of stifle instability other than CCLR are caudal cruciate ligament injury collateral ligament tears and stifle luxation.

Caudal cruciate ligament (CaCL) injury:

This is an uncommon isolated injury and generally occurs in association with complete stifle luxation [1]. Avulsion of the attachment site of the CaCL can occur with trauma but there are usually other injuries present [2]. Diagnosis of this injury is by history (? trauma), clinical signs (lameness and possible positive caudal draw upon palpation) and radiography (similar signs to CCLR). Treatment of isolated tears have been reported [3] though this has been considered unnecessary by most surgeons. It is important to diagnose a CaCL tear prior to performing a tibial plateau levelling osteotomy (TPLO) as TPLO places stress on the CaCL and would be contraindicated with this injury.

Partial and complete luxations:

The treatment of partial and complete luxations has generally focussed on reduction and stabilisation of the articular surfaces of the involved joint whilst healing of the surrounding soft tissues occurs. However reduction alone does not always ensure a good outcome as secondary osteoarthritic change in the long term is common. Therefore when managing joint luxations we should ensure our surgical principles help to minimise further long term complications. Remembering the AO principles will assist us in obtaining our ultimate goal of good return to joint function:

- Achieve anatomical reduction
- Restore stability
- Atraumatic surgical technique (Halstead principles)
- Early return to function (splint the involved joint and not the entire limb)

Collateral ligament injury:

Collateral ligament injuries of the stifle joint commonly occur secondary to trauma and usually in conjunction with damage to other ligamentous structures of the stifle joint (see next section on stifle joint luxation). Ligamentous injuries are classified as sprains and are categorised as first, second and third degree depending on the level of disruption. First degree tears involve mild stretching and minimal disruption and second degree tears involve
less than 50% disruption of ligament fibres with moderate instability. Third degree injury involves complete disruption and rupture of the ligament with marked instability.

**Anatomy:** The collateral ligaments act as major stabilisers of the stifle joint particularly with regard to valgus/varus and rotational movements [4]. The medial collateral ligament (MCL) originates on the medial femoral epicondyle and inserts on the proximal aspect of the medial tibia, it has attachments to the meniscus and medial joint capsule. The cranial fibres of the MCL are taut in the entire ROM of the stifle joint but the caudal fibres are taut only in extension. The lateral collateral (LCL) inserts on the lateral femoral epicondyle and has no attachments to the joint capsule or meniscus. It is taut in extension and lax in stifle flexion.

**Signalment, history and clinical signs:** Any breed of dog or cat can be affected but it usually large, athletic male dogs that are predisposed to this injury. It may be associated with a traumatic twisting incident. The clinical signs relate to the degree of ligament sprain and range from mild, intermittent lameness to acutely non-weight-bearing with swelling and angular limb deformity with complete ligament rupture and instability.

**Diagnosis:** It may be possible to detect gross joint stabilisation in the conscious patient but sedation is always required to make a full assessment of the unstable joint. Under sedation /general anaesthesia palpation of the stifle joint in varus and valgus whilst moving the joint through the full ROM is required. It is also important at this point to examine all other soft tissue structures around the joint such as the cranial cruciate ligament (CCL) and patellar tendon. Orthogonal radiographs and stressed radiographs are helpful for diagnosis and identification of concurrent injuries and avulsion fractures.

**Treatment:** This will depend on the severity of injury as first degree sprain can be treated with ice therapy, support dressing and rest. If moderate to marked instability is present then surgical management is preferred. If an isolated collateral tear is present then a surgical approach over the affect CL is advised. If there is a suspicion of other ligament injuries then an arthroscopy or arthrotomy is performed with full joint inspection. Treatment of an isolated collateral tear involves primary apposition of the ligament ends (if available) and then prosthetic ligament placement with non-absorbable suture material (4-5M nylon or prolene) and screws (2.0 or 2.7mm) or tissue anchors. For lateral collateral tears, the distal end of the prosthetic suture can be placed around the fibular head. Avulsion fractures may need to be treated if the fragment is large enough for implant placement. Following ligament reconstruction, the joint may need to be immobilised with external coaptation or external skeletal fixation (ESF) depending on the severity of injury and patient/owner compliance.

**Prognosis:** This will usually depend on the severity of injury but prognosis for return to function is usually good. Mild loss of function, reduced ROM and intermittent lameness may occur and owners should be warned that athletic dogs may not return to function.
**Stifle luxation:**

This is a very severe injury in cats and dogs occurring often if animals get suspended from a height such as a gate or a lateral blow from a RTA. Usually three or more of the major transarticular ligaments, the joint capsule and one or both of the menisci are damaged. The cranial, caudal and MCLs are most commonly involved as the trauma is usually applied laterally [1]. Some authors describe the LCL being more commonly injured with suspension from a gate [5]. It is important that due to the violent nature of the trauma involved in this injury that a complete assessment if performed of the joint and the surrounding neurovascular structures.

**Signalment, history, clinical signs:** Any age, breed of gender of dog or cat can be involved but it usually seen in young, male and large breed dogs. On initial examination the patient is non-weight-bearing, with stifle joint swelling, bruising and malalignment (genu valgum) evident.

**Diagnosis:** Once the patient is stabilised a complete assessment of the joint must be performed under sedation to check for valgus/varus, cranial and caudal abnormalities. Plain orthogonal views of the stifle are necessary to check for any other abnormalities such as avulsion fractures and stressed radiographs may also help with diagnosis of collateral injuries.

**Surgical management:** These cases will require surgical management and a lateral or medial arthrotomy is necessary for complete assessment of all soft tissue structures and joint compartments. Several techniques have been used usually involving primary fixation of the damaged ligaments/removal of damage menisci and then secondary stabilisation such as external coaptation or TESF depending on severity of damage, success of repair and owner and patient compliance. Primary repair will consist of reconstruction/replacement of the ligaments with screws and spiked washers and suture material, reattachment of avulsion fragments with screws or K wires. Secondary/supportive repair with external coaptation, TESF or transarticular pinning (from the lateral condyle to the tibial plateau –useful in cats) is often useful to support the primary repair. A recent study described the use of a temporary transarticular pin to give stifle joint stabilisation whilst primary repair of damaged ligaments is performed [6]. Stifle arthrodesis and amputation are salvage options.

**Prognosis:** The prognosis is variable: better in animals with subluxated joints than completely luxated joints and failure of secondary restraints [5]. However in a study of 13 animals –all treatments were successful (7 excellent and 6 good) with infrequent complications [1]. Severe lameness should be expected in animals that do not have surgical repair. The TAESF is usually removed in 4 weeks and complications usually involve pin tract discharge. Complications in cats with TAESF can be avoided with good pin placement techniques and ensuring strict confinement in a well padded cage [7].
Post-operative management of luxations:

- If there is marked swelling and bruising, ice therapy for first 72 hours following injury or surgical correction may be useful. Cover frozen veg or ice packs with a soft towel and apply for 2-5 minutes three –four times daily.
- Analgesia (opioids, NSAIDS) is important in the immediate post-operative period for comfort, to reduce swelling and to allow early return to function. If there has been a long term, chronic injury with joint instability then drugs like gabapentin may be useful for chronic pain.
- Strict rest should be advised for 4-6 weeks and then a gradual re-introduction to on-lead exercise is allowed
- Physical therapy including controlled passive range of motion exercise several times daily and encouraging early weight bearing- balancing on an exercise ball may be useful. There are several rehabilitation centres with veterinary surgeons and physiotherapists from whom I would obtain advice and/or therapy in the rehabilitation of these patients.

References: