Proceeding of the NAVC
North American Veterinary Conference
Jan. 8-12, 2005, Orlando, Florida

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MANAGEMENT OF JOINT LUXATIONS

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INTRODUCTION

These conditions involve luxation; instability from ligamentous disruption and fractures involving the joint surface. For your ease in understanding, they can be categorized under acquired degenerative joint disease. All of the involved joints will develop signs of Osteoarthritis (OA)/Degenerative Joint Disease (DJD), however this does not mean the dog or cat will ever show clinical manifestations of the disease.

DEFINITIONS

Sprain: a joint injury in which some of the fibers of a supporting ligament are ruptured but the continuity of the ligament remains intact. Strain: a term limited to injuries involving the muscle-tendon unit. This term is not interchangeable with sprain, although the two injuries may occur at the same time. Luxation (dislocation): complete displacement of the surfaces of a given joint which occurs with ligament rupture and the displacement of the normal relationship of the bones within the joint. Subluxation: an incomplete luxation; these are seen most frequently in the coxofemoral joint which is dysplastic and the trauma is to the vertebral spine. You may also see it in growth deformities primarily in the forelimb and trauma to the carpus and tarsus. Fracture-Luxation: displacement of the normal relationship of bones entering into a joint, with a concomitant fracture of the bone or articular cartilage.

PRINCIPLES OF DIAGNOSIS OF JOINT TRAUMA

Gentle palpation of the involved joint is the first and most important aid to diagnosis. Knowledge of normal anatomy and range of motion plus the comparison to the opposite uninvolved joint is important. Remember the soft tissue structures and articular cartilage are not apparent on radiographs. Bone displacement may be the only indication of capsular or ligamentous damage. Stress views are sometimes very important in demonstrating instability and a clue to ligament or capsule disruption. Joint disruptions usually occur in a predictable pattern (i.e. cranial-dorsal luxation of the coxofemoral joint and lateral luxation of the elbow). If an injury deviates from the normal, it is often an indication of an unusual mechanism of injury, and often a more severe injury. The eventual diagnosis in complex injuries may depend upon exploratory surgery.

PRINCIPLES IN THE TREATMENT OF JOINT TRAUMA

Early treatment and repair of a joint injury is mandatory to minimize the irreversible changes that have already occurred in the joint. The key steps are as follows: Reduce structures of the joint anatomically and restore stability, either by surgical repair or external support while the repair processes occur. Remember, dense collagenous tissues such as tendons and ligaments take at least 6 weeks of healing before any load can be reapplied. Then loads should be applied in a sequential pattern of increasing amounts of pressure. This will allow the collagenous tissues time to align themselves along lines of tension and to create cross-links which increase the strength of the tissues. Let us now briefly look at each of the major joints of the canine and feline appendicular skeleton and the luxations which most commonly occur.

SHOULDER LUXATIONS

Presentation of shoulder luxations may be lateral or medial. Lateral luxations usually occur with trauma and medial luxations are seen with minimal or no trauma in toy breeds. These luxations are usually present as a chronic lameness and many are probably congenital in toy breeds. The treatment of traumatic luxation is either external or internal. If you can reduce the luxations under anesthesia and they are stable through a full range of motion, chances are they will stay in place with an external bandage. The bandage you apply should be specific to the luxation. For lateral luxations use a Spica Sling (some people may use a velpeau but it places stress on the lateral aspect of the joint). For medial luxations a Velpeau Sling is recommended. For chronic luxations, (including congenital luxations), conservative treatment will not work [i.e. closed reduction and sling]. Surgical intervention is necessary with exploration and a Biceps Tendon Transposition is most commonly performed. In extremely chronic luxations, or in severe malformations, reduction may not be possible and arthrodesis or glenoid resection is required.

ELBOW LUXATIONS

Elbow luxations can be divided into three groups; Traumatic, Congenital and Secondary. Traumatic luxations present with lameness and pain at the elbow. These are usually lateral luxations. The limb is therefore slightly flexed and displaced laterally from the elbow, making the medial epicondyle very prominent. Radiographs are necessary to rule out distal humeral or proximal radial-ulnar fractures and are very helpful in visualizing ligamentous avulsions. Treatment may be conservative (closed) or surgical. Closed reduction is an option when treatment can be instituted early. Delay within 36 hours is essential for the success of closed reduction. Delay in treatment often requires surgery due to tremendous swelling and muscle contractions around the joint. Closed manipulation must be performed under general anesthesia. A brief description of the technique for reduction is as follows: Place the elbow in full flexion and place traction on the olecranon. Inward rotation of the forelimb is done next to hook the anconeus medial to the condyle. Now extend the joint which will lock the semilunar notch into the humeral intercondylar groove. The radial head must then be forced medially with pressure to “get by the lateral epicondyle.” This is the hardest part. Once reduced you must test the collaterals and if the joint easily re-luxates it will probably not stay. If it is stable, then place in a Spica splint for three weeks and then reduce to a Robert Jones type bandage for an additional 3 weeks. If you are unable to reduce or the joint is unstable, then open reduction is required. Open reduction is followed by primary suturing of the capsule and collateral ligaments and/or replacement of the collaterals. The overall prognosis for traumatic luxations is good.

Congenital luxations are seen in toy breeds and may be inherited. There is often increasing deformity with growth and interference of joint motion with varying amounts of pain. Treatment is surgical! The most common techniques are transarticular pinning and ulnar osteotomy and repositioning. These luxations carry a poor prognosis. Secondary luxations occur (as the name implies) secondary to growth plate disturbances. The dysfunction may be either premature radial physis closure or premature ulnar physis closure. Occasionally, they can occur secondary to radial-ulnar synostosis. Treatment for secondary luxations is surgical. The prognosis is usually guarded, but it is dependent on the amount of secondary...
changes already present in the joint.

CARPAL LUXATIONS AND LIGAMENTOUS INJURIES
Most carpal injuries result from a fall or jump, but auto trauma is also extremely common. These injuries may result in luxations or subluxations of a variety of joints depending on specific ligaments involved. There is a tendency to treat ligamentous injuries of the carpus very conservatively with cast immobilization, and hope for sufficient fibroplasia to stabilize the joint. This may be moderately successful in small, inactive breeds, but it rarely restores full function in large dogs. Randomly oriented collagen in scar tissue cannot withstand tensile stress and soon breaks down, leaving the joint permanently unstable. This instability soon leads to progression of degenerative joint disease. These cases usually present as non-weightbearing lamenesses with variable carpal swelling. Radiographs are mandatory and it is very important to obtain stress views to accentuate ligamentous injury. The use of oblique views will also aid in looking for avulsion fractures. Often surgery is required to make final diagnosis. Treatment depends entirely on the joint and/or ligamentous structures which are involved. If the radial collateral ligament is involved, then surgical repair may be sufficient. On the other end of the spectrum, Antebrachiocarpal luxation requires Panarthrodesis. Middle carpal luxation/subluxation may require a partial arthrodesis but in severe cases panarthrodesis will be required. Hyperextension of the carpus is among the more serious carpal injuries. Hyperextension results from damage to palmar ligaments and palmar carpal fibrocartilage, NOT from a flexor tendon injury. Animals will attempt to walk in a day or two following the injury and show a characteristic plantigrade stance. In order to select proper treatment, you must know the level of injury. (Thus radiographs and stress views are necessary). Treatment is usually arthrodesis. Conservative treatment by splinting or casting has little application since most animals break down following weightbearing.

COXOFEMORAL LUXATIONS
This is the most commonly luxated joint in dogs and cats. It is generally the result of external trauma. The luxated femoral head is almost always cranio-dorsal. Dysplastic dogs are more susceptible and often this will occur with seemingly minimal external trauma. On the other end of the spectrum, multiple fracture-luxation injuries occur with some frequency. An acute lameness with limited ROM and pain attributed to the hip is the most common presentation. Two easy assessments can be made without stressing the patient. First, assess the position of the greater trochanter. In cranio-dorsal luxations the greater trochanter will be more dorsal and prominent. In the normal limb there is a triangle formed by the tuber ischii, the cranial dorsal border of the ilium and the greater trochanter. With a cranio-dorsal luxation the triangle is gone. Second, examine the relationship between the greater trochanter and tuber ischii. Place your thumb tightly in the depression between these two points of prominence; then gently externally rotate the hip. If the hip is normal, the pivoting of the femoral head in the acetabulum will allow the greater trochanter to displace your thumb out of the depression. Always take radiographs. Look for predisposing causes (dysplastic animals) and/or avulsion fractures of the femoral head left in the acetabulum. Treatment for traumatic luxations may be open or closed. Closed reduction must be done under anesthesia and must be done quickly after the injury. First, apply prolonged traction (10-15 minutes). Then grasp the limb at the stifle region and rotate the femur externally and pull distally. At the same time, with the other hand, push the greater trochanter distally and then rotate the hip internally. Once reduced, move the joint through a normal ROM while applying pressure to the greater trochanter. This will force the fibrin clot and infolded joint capsule out of the joint space. Place in an Ehmer sling or an off-weightbearing sling (which has a wrap completely around the body), and keep the sling on for at least 10-14 days. Open reduction may require a single procedure or a combination. Suturing the capsule (capsulorrhaphy) is the most successful method of internal repair. If the joint capsule is not present or torn off the acetabulum, the use of screws placed in the acetabulum and large monofilament suture placed around them and attached to the femoral neck is necessary. This often called placement of a prosthetic capsule. Transarticular pinning can be used but is usually performed in smaller patients (under 40 lbs) and absolutely no movement is allowed until the pin is removed about 14 to 21 days later. Devita Pins are currently out of favor, with too many complications and questionable benefits. Alternative treatments for luxations are an FHO or a Total Hip Replacement.

STIFLE LUXATIONS AND LIGAMENTOUS INJURY
These injuries are always trauma induced. Depending upon ligaments damaged, signs may vary and instability may be obvious or somewhat subtle. Diagnosis is based upon palpation awake or anesthetized depending on pain. Also it is important to take radiographs!! Take medial and lateral stress views of the stifle. Often the exact nature and number of ligamentous and joint capsule injuries may not be known until surgery. Treatment is surgical and depends on the particular ligaments disrupted.

TARSAL LUXATIONS AND LIGAMENTOUS INJURIES
The most common injuries are those involving the collateral ligaments of the tarsocrural joint, the plantar ligaments and tarsal fibrocartilage. Also we see a tremendous number of shearing injuries involving the hock, especially the collateral ligaments. While most injuries involve trauma, many are from overstress (racing greyhounds), and even some present with no known trauma at all. Stress radiographs are mandatory to obtain an accurate diagnosis. The treatment once again is dependent upon the joint and/or ligamentous injury which has occurred. Tarsocrual Luxation and Subluxation require replacement of the collateral ligaments or internal fixation of malleoli fractures. Strongly consider external fixators in these cases. This is often the area for shearing injuries to complicate your management. Only in rare cases is arthrodesis required with severe injuries to the articular cartilage. Intertarsal and tarsometatarsal joints may require replacement of collaterals but arthrodesis is often necessary. Remember these joints have little normal movement in them and arthrodesis is often the most reliable treatment option. Hyperextension injuries occur primarily to the proximal intertarsal joint. Arthrodesis is required for these injuries. Regardless of type of repair, reconstruction or arthrodesis, protect with external coaptation for at least 6-8 weeks.