

Joint disorders:

Depending on the condition, joint disorders can affect the joint membranes, surrounding tendons, underlying bone, cartilage, bursae, and/or fluid within the joint (synovial fluid).

Arthritis refers to inflammation in a joint. All joint diseases that affect large animals produce some degree of inflammation. Important arthritic conditions include traumatic arthritis, osteochondritis dissecans, subchondral cystic lesions, septic (infectious) arthritis, and osteoarthritis (degenerative joint disease).

Traumatic arthritis occurs after an injury. It includes inflammation of the synovial membrane (synovitis) and joint capsule (capsulitis), chip fractures within the joint, tears (sprains) of ligaments near or within a joint, or meniscus (cartilage within the stifle) tears. Gradual loss of cartilage of the joints, known as osteoarthritis, can occur with any or all of these injuries. Traumatic arthritis may be seen in any horse but typically occurs in horses that are athletes. A similar condition occurs in human athletes that undergo traumatic or repeated injury of a particular joint, such as the knee.

Treatment of traumatic joint inflammation includes rest and physical therapy regimens such as cold water treatment, ice, passive bending of the joint, and swimming. Nonsteroidal anti-inflammatory drugs are routinely prescribed to relieve pain and inflammation; corticosteroids may be recommended in some cases. There are also a variety of additional medications that may help reduce inflammation and protect the joint cartilage. In more severe cases, a veterinarian will flush the joint to

remove any inflammatory or cartilage debris. This is more effective than joint drainage alone.

**Septic Arthritis:** Infectious, or septic, arthritis is usually caused by bacterial infection in a joint. Infection may occur after a traumatic injury, surgery, or injections, or it may enter the joint through the bloodstream. Bloodborne infections are more common in foals. A common example is called navel ill, in which the infection reaches the foal through the umbilical cord. Infections in a horse's digestive tract or lungs can also travel to a joint through the blood.

**Osteoarthritis:** which is sometimes called degenerative joint disease, is a progressive deterioration of the joint cartilage. It represents the end stage of most of the other diseases discussed above, such as traumatic arthritis involving the synovial membrane and joint capsule, joint fractures, traumatic damage to cartilage, osteochondrosis, cysts beneath cartilage, and infective arthritis.

**Bursitis :** A bursa is a small fluid-filled sac between a tendon and a bone (or other tissues that rub against one another) that reduces friction around the joint. Common in horses, bursitis is an inflammatory reaction within a bursa that can range from mild inflammation to infection. True bursitis involves inflammation of a natural bursa, for example, fistulous withers. In contrast, acquired bursitis is the development or inflammation of a bursa where none previously existed, as with capped elbow or hock.

Arthroscopy is the most useful tool for both diagnosis and treatment of joint, tendon sheath and bursal lesions in the horse.

It is a specialist procedure which requires considerable equipment and surgical skills.

Has completely superseded arthrotomy and other open surgical procedures in joints.

#### Uses

1. Diagnostic applications
2. Assessment of soft tissue structures of joints: ligaments, synovium, menisci, plicae and joint capsule.
3. Assessment of joint surface and bone: osteoarthritis, fractures, cartilage and subchondral lesions.
4. Tenosynovioscopy Tenosynovioscopy for examination of the internal structures of tendon sheaths including tendons, ligaments, synovial lining, sheath wall, vincula and mesotendon.
5. Evaluation of lesions within bursae including synovium, capsule, tendons, ligaments, cartilage surfaces and bone Bursoscopy: overview.

#### Therapeutic applications

1. Arthroscopically guided fracture repair of fractures within the joint or entering it.
2. Removal of osteochondral or osteochondrosis fragment(s).
3. Debridement of articular cartilage defects.
4. Joint lavage.
5. Treatment of synovial sepsis.

6. Debridement of intrasynovial soft tissue lesions such as meniscal or cruciate ligament tears, S/DDFT lesions, and retinacula tears in the intercalcaneal bursa.

### Carpus

1. To examine the midcarpal (intercarpal) Intercarpal: arthroscopy, antebrachiocarpal (radiocarpal) Radiocarpal: arthroscopy joints, dorsal and palmar pouches.
2. Surgical removal of osteochondral fragments/chip fractures  
Carpus: fracture - chip.
3. Debridement of subchondral bone defects.
4. Examination of the intercarpal ligaments and debridement of any tears.
5. Treatment of osteochondritis dissecans Bone: osteochondrosis and subchondral cystic lesions Bone: subchondral cysts.
6. Lag screw fixation of carpal slab fractures Carpus: fracture - slab  
Bone: slab fracture repair - lag screw and other carpal chip fractures.
7. Treatment of septic arthritis Joint: septic arthritis - adult and osteitis Bone: osteitis - septic.

### Elbow

1. Diagnostic evaluation of the joint in cases of lameness localized to the elbow joint Elbow: arthroscopy.
2. Surgical treatment of sepsis of the elbow joint, osseous cyst-like lesions, osteochondrosis, intra-articular fractures and osteoarthritis  
Elbow: osteoarthritis.

## Fetlock

1. Diagnostic procedures in the dorsal metacarpophalangeal joint, palmar or plantar fetlock joint Fetlock: arthroscopy.
2. Removal of osteochondral fragments of the dorsal aspect of the proximal phalanx.
3. Debridement of articular cartilage damage on the dorsal margin of the proximal phalanx
4. Treatment of developmental fetlock disorders including osteochondritis dissecans Bone: osteochondrosis and subchondral bone cysts MCP / MTP joint: developmental orthopedic diseases.
5. Treatment of traumatic damage to the joint and joint capsule.
6. Removal of the enlarged synovial plicae in chronic proliferative synovitis MCP / MTP joint: chronic proliferative synovitis.
7. Removal of apical, abaxial and basilar fragments of the proximal sesamoid bones Proximal sesamoid: fracture - arthroscopic removal.
8. Removal of osteochondral fragments associated with the palmar or plantar aspect of the proximal phalanx.
9. Repair of condylar metacarpal fractures MC / MT 3: fracture, fractures of the proximal phalanx Proximal phalanx: fracture and proximal sesamoid bones Proximal sesamoid: fracture.
10. Treatment of septic arthritis Joint: septic arthritis - adult and osteitis Bone: osteitis - septic.
11. Debridement of axial osteitis of the proximal sesamoid bones and lesions of the intersesamoidean ligament Intersesamoidean ligament: disease.
12. Debridement of avulsions of the suspensory ligament insertions.

## Stifle

1. Diagnostic procedures in the femoropatellar and femorotibial joints  
Stifle: arthroscopy.
2. Treatment of patellar fractures Patella: fracture and fragmentation  
of the distal patella Patella: fragmentation.
3. Treatment of femoropatellar osteochondrosis Stifle: femoropatellar  
osteochondrosis and femorotibial subchondral bone cysts Stifle:  
femorotibial subchondral bone cyst.
4. Diagnosis and treatment of cartilage lesions on the medial condyle  
of the femur.
5. Debridement of meniscal tears Stifle: trauma - meniscal injuries to  
the cruciate ligaments and meniscal cysts.
6. Treatment of fractures of the medial tibial intercondylar eminence.
7. Treatment of septic arthritis Joint: septic arthritis - adult and  
osteitis Bone: osteitis - septic.
8. Standing diagnostic arthroscopy of the stifle joints has also been  
published.

## Tarsus

1. Diagnostic procedures in tarsocrural joint Tarsus: arthroscopy.
2. Treatment of osteochondrosis in the hock Tarsus: osteochondrosis.
3. Treatment of cystic lesions of the proximal trochlea of the talus  
Bone: subchondral cysts.
4. Treatment of septic arthritis Joint: septic arthritis - adult and  
osteitis Bone: osteitis - septic.
5. Removal of lateral malleolar fractures.

6. Treatment of intra-articular fractures in the hock Tarsus: fracture.
7. Tears and avulsions of the joint capsule and collateral ligaments  
Tarsus: trauma - collateral ligament.

#### Shoulder

1. Diagnosis and treatment of scapulohumeral osteochondrosis  
Shoulder: arthroscopy.
2. Diagnosis and treatment of lameness localized to the scapulohumeral joint including osteoarthritis Shoulder joint: disease - overview and articular fractures Scapula: fracture.
3. Treatment of septic arthritis Joint: septic arthritis - adult and osteitis Bone: osteitis - septic.

#### Distal and proximal interphalangeal joints

1. Diagnostic and surgical arthroscopy is performed on the dorsal and palmar/plantar compartments of both joints.
2. In the distal joint indications for surgery include:
3. Osteochondral fragments of the extensor process of the distal phalanx, including removal and lag screw fixation.
4. Removal of abaxial articular fragments; treatment of cysts of the subchondral bone Bone: subchondral cysts of the distal phalanx or distal middle phalanx.
5. Arthroscopic visualization during repair of sagittal fractures of the distal phalanx Distal phalanx: fractures.
6. Repair of fractures of the middle phalanx Middle phalanx: fracture.
7. Sepsis of the joint Joint: septic arthritis - adult.
8. In the proximal joint indications for surgery include:

9. Removal of osteochondral fragments from the dorsal compartment.
10. Removal of fragments of the palmar/plantar margin of P2.

#### Coxofemoral joint

1. Diagnostic arthroscopy of the coxofemoral joint has been used to evaluate lameness localized to the joint, tearing of the ligament of the head of the femur, osteoarthritis, fracture of the acetabulum and osteochondrosis Coxofemoral joint: disease - overview.
2. Surgical treatment has been described for femoral head cartilage lesions, tearing of the ligament of the head, osteochondrosis, acetabular chip fractures and infectious arthritis.

#### Tenoscopy

1. Digital flexor tendon sheath for diagnostic and surgical cases including:
2. Longitudinal tears of the SDFT SDFT: tendinitis/DDFT DDFT: tendinitis.
3. Tears of the manica flexoria.
4. Complex tenosynovitis Digital sheath: tenosynovitis.
5. Palmar/plantar annular ligament desmitis Palmar / plantar annular ligament syndrome and desmotomy Annular ligament: transection - palmar / plantar.
6. Treatment of wounds and sepsis of the sheath.

Carpal sheath for diagnostic and surgical cases, including:



1. Removal of radial osteochondroma Carpus: osteochondroma and radial physeal exostoses; fractures of the accessory carpal bone affecting the sheath Accessory carpal: fracture.
2. Tears of the radial head of the DDFT.
3. Tears of the S/DDFT within the sheath.
4. Desmotomy of the accessory ligament of the SDFT and DDFT  
Accessory ligament SDFT: desmotomy Accessory ligament DDFT: desmotomy.
5. Carpal release procedure Palmar carpal retinaculum: section for carpal tunnel syndrome Carpus: sheath tenosynovitis.

Tarsal sheath for diagnostic and surgical cases, including:

1. Tearing of the lateral digital flexor tendon.
2. Removal of tenosynovial masses and resection of adhesions.
3. Debridement of the sustentaculum tali Tenosynovioscopy following traumatic injury.
4. Identification and treatment of synoviocèles.
5. Traumatic injury and sepsis of the sheath Tarsus: tarsal sheath tenosynovitis.

Carpal and tarsal extensor sheath for diagnostic and surgical cases, including:

1. Persistent tenosynovitis Carpus: sheath tenosynovitis Tarsus: tarsal sheath tenosynovitis after trauma.
2. Tearing of associated contained tendon; wounds and infection.

Bursoscopy

1. Calcaneal bursae are examined diagnostically and surgically for  
Calcaneal bursa: bursoscopy:
2. Tearing of the calcaneal insertions of the SDFT and unstable  
subluxation of the SDFT.
3. Osteolytic lesions and traumatic fragmentation of the calcaneus.
4. Sepsis of the bursae after penetration.

Intertubercular (bicipital) bursa is examined diagnostically and surgically  
for Humerus: bicipital bursa - bursoscopy:

1. Investigation of lameness localized to this site Humerus: bicipital  
bursa - disease.
2. Treatment of intrathecal fragmentation of the supraglenoid tubercle  
of the scapula and lateral tubercle of the humerus.
3. Injuries of the bicipital tendon.
4. Contaminated and infected bursa.

Podotrochlear (navicular) bursa is examined diagnostically and surgically  
for Navicular bursa: bursoscopy:

1. Lesions of the DDFT.
2. Lesions of the palmar fibrocartilage and subchondral bone within  
the bursa.
3. Penetrating injuries of the navicular bursa.

Advantages

1. Synovial structures can be examined in detail through small stab incisions.
2. New conditions and lesions have been documented that were not known or documented by imaging modalities.
3. Less surgical trauma to the joint and patient, and less post operative pain.
4. Considerable cosmetic and functional advantages over previous open surgeries.
5. Much less post operative care required and less complications mean owners and trainers are more likely to consider surgery in individual patients.
6. Decreased convalescence time, earlier return to work and improved results in some cases has proved very beneficial in the management of equine joint and synovial structure problems.
7. Decreased requirement for palliative therapy.

#### Disadvantages

1. Site of pain or lameness must be localized to specific joint or synovial structure before surgery is undertaken.
2. High degree of surgical training is required.
3. Considerable investment in equipment and facilities is required.
4. Usually performed under general anesthesia Anesthesia: general - overview although limited diagnostic arthroscopy is undertaken in some joints such as the stifle and fetlock.

## Obstructed field of view

### Hemarthrosis:

1. Often not a major problem, particularly with modern fluid supply systems. In the distal limb, dorsal recumbency and the use of an Esmarch bandage and tourniquet are often helpful, particularly where hemorrhage is anticipated.
2. Pre-existing pathology particularly severe synovial inflammation and hyperemia.
3. From debrided bone and particularly soft tissues.
4. Usually not a problem while the joint is distended but may become one when the joint is re-entered, after allowing the joint to collapse. Flush the cavity, and then close the outflow cannula and redistend.
5. Bleeding from subchondral bone is a useful indicator for the depth of debridement, so may need to release fluid pressure during procedure to assess surgery and hemorrhage.

### Synovial villi:

1. May be a localized or more general problem in individual cases.
2. The latter is usually due to inadequate fluid distension or loss due to an open outflow portal or instrument portal, particularly following removal of a large joint fragment.
3. Capsular fibrosis of the joint may limit distension as will subcutaneous extravasation of fluid.
4. To limit these problems the joint or other synovial structure should be thoroughly examined at the start of surgery and with a closed outflow portal.

## Total Hip Replacement in Dogs

What is hip dysplasia?

Hip dysplasia is a developmental condition of the hip joints which results in malformation of the hip joint and arthritic changes. Looseness of the hips in young dogs may result in arthritis of the joints over a period of months to years. The illustration right shows an arthritic hip (A) and a normal hip (N). Any breed can develop this condition, however large breeds are most commonly affected. Defective genes cause hip dysplasia. Looseness of the soft tissues and poor muscling allow the head of the femur to slip in and out of the hip when a dog runs and plays. This wears the cartilage off the head of the femur and socket (acetabulum) of the hip. In addition, the soft hip bones in puppies can become permanently deformed and the rim of the hip socket may develop small painful fractures.



### Signs of hip dysplasia

Dogs commonly are 5 to 8 months of age when signs appear, yet others are older than one year. Some dogs, however, are quite geriatric when the problem is first noted. Warning signs of hip dysplasia may include an awkward gait that is frequently dismissed as “a clumsy puppy”. Waddling of the hind quarters when walking, bunny hopping, stiffness when first getting up from a nap, a clicking sound heard from the hind end lameness on one or both hind limbs, shortened stride of the hind limbs, exercise

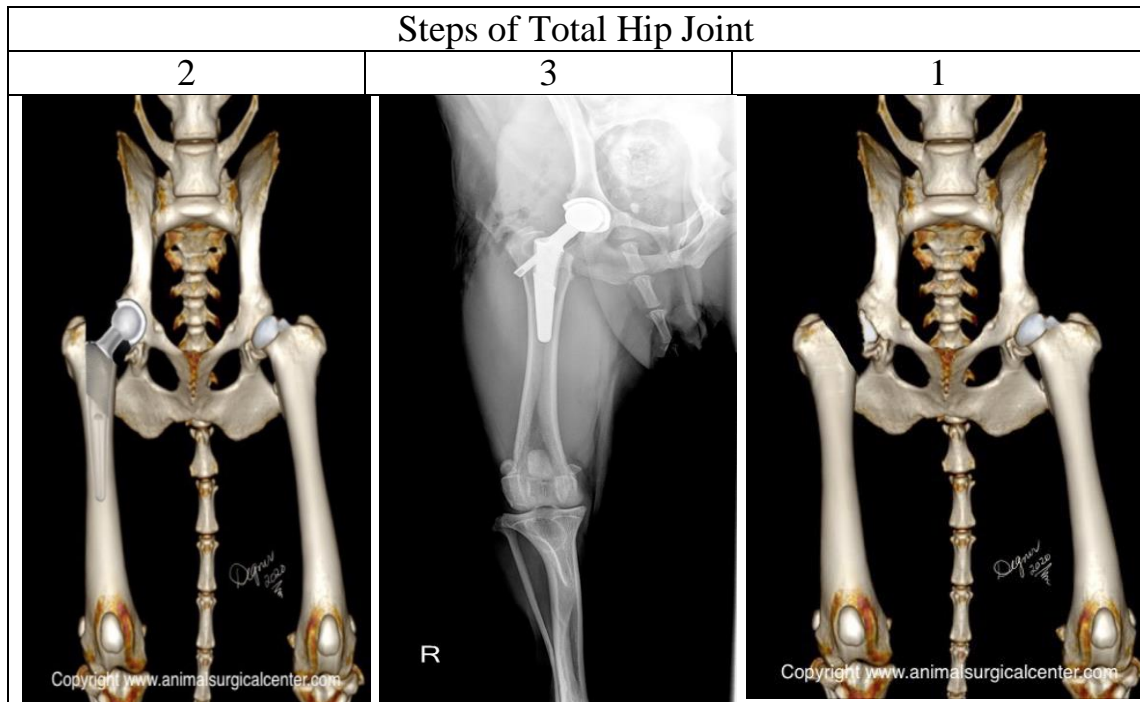
intolerance, crying out in pain when playing and pain upon petting the hip region are clinical signs that also can be seen by pet owners. Physical examination findings that your veterinarian may discover may include narrow-based gait, waddling gait, muscle atrophy of affected limb(s), pain on extension or abduction of the hips, crunchiness of the hips and limited hip extension. Your veterinarian may also detect looseness of the hips called the Ortolani sign. In some cases, this abnormality can only be detected when your dog is under the influence of twilight sedation.

### Diagnosis

The diagnosis of hip dysplasia is based on the evaluation of x-ray images of the pelvis. In order to obtain properly positioned x-ray images, your dog may need to be sedated. From these x-ray images, the surgeon will determine if your pet is a candidate for total hip replacement (THR). If the surgeon discovers that the hip is chronically dislocated or the bones are severely worn your pet likely will be denied the surgical procedure of THR. If your pet has been deemed a THR candidate, the bones will be measured to select the appropriately sized THR implants.

If a dog has skin infection, urinary tract infection, periodontal infection, flea infestation, chronic skin allergies or any other infection in the body, the pet may not be a candidate for THR. The pet owner must carefully evaluate the skin prior to surgery to make sure that there is no evidence of infection. During spring and summer, months, biting flies can cause skin infection that may temporarily deny your pet from THR until the skin condition resolves. Your pet should be healthy and free of serious internal organ diseases. Cruciate ligament tear, a common condition may mimic

signs of hip dysplasia and should be ruled out prior to THR. Any other orthopedic or neurologic cause of the lameness must also be ruled out prior to surgery.



## Treatment

The total hip replacement (THR) is the treatment of choice for medium to large breed dogs with clinical signs of hip dysplasia or other debilitating hip diseases. During the procedure, the head of the femur bone is removed to expose the hip socket. Next, the arthritic hip socket is reshaped with special reaming instruments and a metal cup lined with a very durable plastic is carefully positioned and impacted into the hip socket. Then the marrow cavity of the femur bone is opened and shaped



with reamers and broaches to receive a femoral metal implant. The metal implant is impacted down the marrow cavity to achieve a press-fit. A metal ball is then placed on the neck of the femoral stem implant and the hip replacement components are fit together to form the artificial ball and socket joint (see above left and above middle images). The joint capsule, which is vital to keep the hip together, is sutured closed.

If during surgery, your pet's degenerated hip is found to be unsuitable for THR, the surgeon will elect to perform a femoral head and neck ostectomy (FHO). This involves removal of the head and neck of the femur bone (see fig above right). Scar tissue will develop between the bones to form a false hip joint. Although FHO may not be the ideal treatment for a large breed dog, with aggressive rehabilitation therapy, an acceptable outcome may be achieved

## Care

Rehabilitation exercises can be done at your home or if you choose, by professionally trained therapists at an animal rehabilitation center. Rehabilitation therapy should be continued for 6 weeks after surgery. Your companion's surgeon will monitor the healing process with a follow-up examination at 2 weeks and 12 weeks after surgery. During the second evaluation, x-ray images of the pelvis will be evaluated for bony ingrowth onto the THR implants.