A Joint Approach
to managing Arthritis in your horse

XL Vets Equine


{Arth} Joint + {itis} Inflammation = Joint Inflammation

What is Equine Arthritis?

Arthritis is one of the most common causes of lameness in horses, resulting in poor performance, loss of athletic function and frequently early retirement.

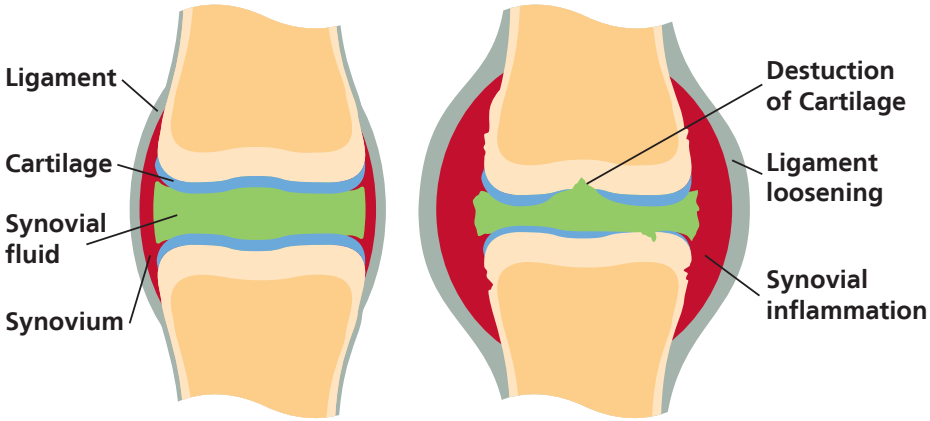
In simple terms, arthritis means inflammation of joints between bones. This is a description of a symptom rather than an individual disease.

There are a number of different conditions which cause arthritis, the most common and significant are:

- Osteoarthritis
- Septic arthritis
- Developmental arthritis

Anatomy of a Joint

In order to understand the processes involved in arthritis it is essential to have an understanding of the anatomy and function (physiology) of the joints.



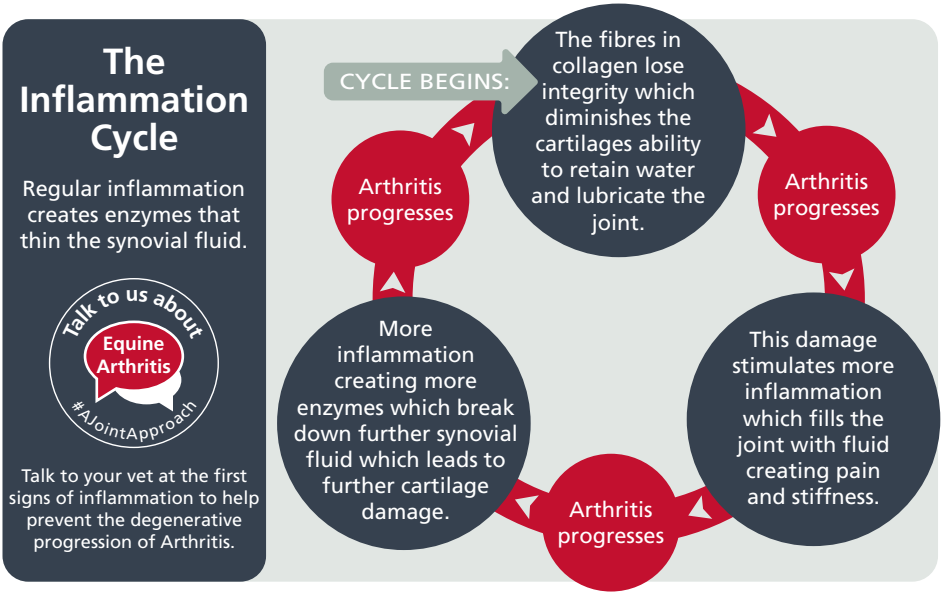
When we are considering arthritis we are primarily focusing on joints where cartilage is present.

Joints are highly complex consisting of bones covered with cartilage, surrounded by a capsule with a synovial layer lining, followed by a supporting fibrous layer including ligaments and tendons. The range of motion is limited by the structure and the support provided by strong fibrous ligaments and muscle.

When considering arthritis the most important tissue is the cartilage which provides a near frictionless surface with shock absorbing properties. Cartilage is composed of water, collagen and a matrix of molecules called proteoglycans. There are no nerves or blood vessels in adult cartilage, but there is a small concentration of cartilage producing cells called chondrocytes. The cartilage receives its nutrition from the thin, lubricating fluid layer secreted by the synovial lining called the synovial fluid.

Cartilage is in a balanced (Homeostatic) state of degeneration and regeneration. When degeneration out-weighs regeneration, cartilage is eroded leading to damage to the underlying bone and surrounding capsular tissues.

Balance is influenced by a vast number of interacting enzymes many of which are secreted by the synovial lining of the joint. When the joint is damaged an inflammatory cascade is stimulated releasing an array of destructive enzymes.



Osteoarthritis (OA)

A disease process where there is a disturbance between the normal balance of damage and repair of cartilage and its underlying bone.

Including:

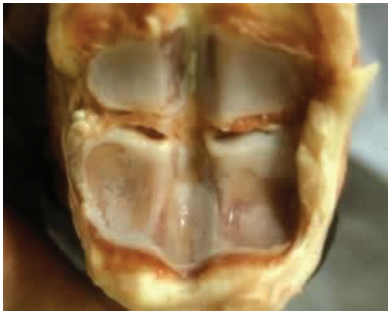
- OA in high motion joints (eg Fetlocks)
- OA in low motion joints (eg Small Hock joints)
- OA secondary to other identified problems (Direct trauma or developmental joint disease)

How does the cartilage become damaged?
Trauma is suggested as the main cause of the damage and erosion of the cartilage. Either by a single event trauma or "use trauma".

"**Use Trauma**" describes continuous overloading exceeding the healthy capacity of the joint.

Factors known to contribute to excessive loading include:

- poor conformation
- poor foot balance
- poor surface for exercise
- continuous hyper-extension or flexion of the joints.



Post mortem of fetlock joint. Articular cartilage is white, pink areas show where erosion has occurred.

In simple terms excessive wear and tear.

Trauma results in a loss of the ability of the cartilage to withstand shock and friction which triggers the inflammatory cycle of degeneration in the surrounding synovial lining accelerating further cartilage degeneration.

The condition is not reversible but treatment can manage the condition and prevent further degeneration.

Septic Arthritis

Infection of joints with bacteria and occasionally fungus produces an acute inflammatory reaction which releases degrading enzymes that quickly damage and erode the cartilage. This leads to rapid inflammation of the synovial lining and thickening of the surrounding tissues.

There are two main routes of infection:

- Trauma to the joint and penetration by foreign objects
- Spread of bacteria in the blood stream to the joints.

Minor wounds which penetrate a joint will quickly lead to severe consequences for any horse if bacteria is found in the wound.

The spread of bacteria in the blood stream is rare in adult horses but common in foals, particularly those who have not received adequate immunity via the mares colostrum.

Septic arthritis is a genuine equine emergency which requires quick and effective treatment. If you are worried your horse has septic arthritis, call your vet immediately.

Lame foal with joint effusion

Developmental Arthritis

This occurs in the growing (or developing) horse. In the context of arthritis the resultant osteoarthritis is a consequence of the damage caused by these conditions.

The pathway for the development of osteoarthritis is the same and results from fragments of articular cartilage becoming dislodged from the underlying bone leading to inflammation and the secretion of cartilage damaging enzymes from the synovial lining. Abnormal joint loading in angular limb deformity will lead to early osteoarthritis.

The commonest developmental joint diseases are;

- Osteochondrosis (OCD)
- Angular limb deformity

Osteochondrosis is a common breed related condition, where the layer of bone immediately underlying the articular cartilage is deranged leading to detachment of cartilage fragments.

Particular sites in particular joints are affected with the hocks and stifles in warmbloods and the fetlocks in thoroughbreds most commonly implicated. Hereditary factors and nutrition in the developmental stages play a significant role in this condition.

Treatment of developmental joint disease will not be discussed in detail here, but failure to treat will often lead to the early development of Osteoarthritis.

Radiograph of OCD stifle

Carpel valgus, a form of ALD, in a foal

Angular limb deformity is a congenital or acquired conformational abnormality in foals that are a few weeks to several months old.

The cause is multifactorial, resulting in asymmetric joint pressures and growth imbalance at the line of bone growth (physis), eg fetal malposition, premature birth, ligament laxity, incomplete ossification of carpal/tarsal bones, trauma, sepsis favouring loading of the non-lame limb.

If uncorrected before long bone growth is complete, the resultant abnormal stresses on the joints lead to early development of osteoarthritis.

Recognise the signs of Osteoarthritis

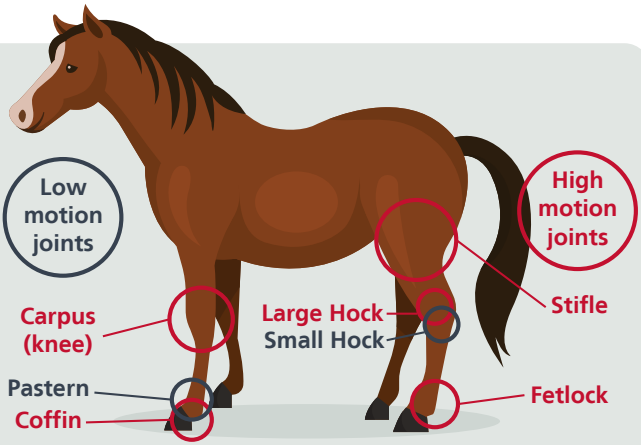
OA is most frequently a slowly progressive lameness which can often be bilateral.

What are the symptoms I should look out for?

- Behavioural change e.g not wanting to jump.
- Stumbling and tripping.
- Abnormal shoe wear.
- Increased time to warm up.
- Decreased performance.
- Warm, stiff, swollen or painful joints.
- Lameness.

If you recognise any of the above symptoms, speak to your vet..

Which joints are most commonly affected by Arthritis?



Diagnosing Osteoarthritis

Clinical Examination

Will begin with a conversation with your vet to talk through the history of the problem and any symptoms you have seen. Followed by a physical examination and/or gait assessment, which can include a trot up, lunging on firm and soft ground or potentially a ridden assessment.

Careful clinical examination may pinpoint the area of pain or discomfort and stressing the joint by active flexion (flexion test) may highlight the lameness.

Flexion Test

Lunging

To confirm the exact location of pain and lameness, a local anaesthetic may be required to act as nerve and joint blocks.

Nerve blocks and intra-articular anaesthetic

Locating an area of subtle pain may require more investigation, including nerve blocks and intra-articular anaesthetic. Responses to local anaesthesia can be variable in OA as the nerves lie in the bone below the cartilage and in the surrounding joint capsule. The damaged cartilage has no nerve supply and so may experience significant changes without pain. OA is frequently bilateral and local anaesthesia of the suspected joint may reveal lameness in the opposite (contralateral) joint.

Once the site of pain has been localised the vet may move on to imaging in order to make a diagnosis and provide the best course of action.

Imaging the Joint

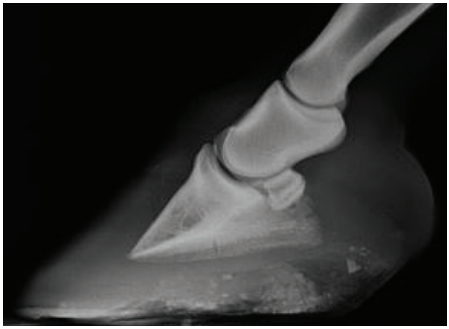
Radiography

Radiography is the most frequently used imaging procedure for the investigation of OA. The procedure is non-invasive, relatively inexpensive and takes minimal time to complete.

Cartilage does not directly show up on radiographs; therefore, the key areas to investigate are narrowing of the joint space, increased areas of bone density (sclerosis) beneath cartilage damage, areas of bone loss and new bone at the joint margins.

The disadvantage is that these changes frequently occur late in the disease process beyond the stage that early treatment can suppress further cartilage damage. There is also a poor correlation between the severity of the radiographic changes and the symptoms of pain.

Radiograph being taken as part of a lameness assessment



Radiograph, a healthy pastern joint

Radiograph, Osteoarthritis of the pastern joint

Diagnosing Osteoarthritis cont.

Ultrasound

The use of ultrasound in the diagnosis of joint disease has significantly increased in recent years alongside the common availability of high quality ultrasound machines in equine practice. The use of ultrasound is non invasive, safe and relatively quick to perform.

Experience in ultrasonographic interpretation of joint disease is increasing. It is now common to use ultrasound alongside radiography in the initial diagnostic work up of equine joint disease.

Ultrasound machine

Magnetic Resonance Imaging (MRI)

MRI provides detailed and accurate images of cartilage, ligaments, tendons, joint capsule, muscle and bone. It is therefore very useful in providing information in the early stages of OA when intervention can have the most beneficial effects.

The power of the magnets required to produce the images limits equine MRI to the distal limb in most cases. The equipment is costly and limited to a small number of referral centres where interpretation of the images is a specialised skill.

Scintigraphy or bone scan

Scintigraphy is frequently used when it has been difficult to localise the area of pain with examination and local anaesthetic blocks. Scintigraphy is performed by injecting a radioactive marker which localises in areas of active bone remodelling. It is far less detailed and specific than radiography but can pinpoint an area of interest for further detailed study by radiography or MRI. It has the advantage that damage not visible on other imaging techniques can be noted such as early stress fractures.

Following scintigraphy, horses must be isolated until their radiation levels have returned to safe limits. Hospitalisation is required, equipment and facilities are costly, and radiation safety procedures are stringent.

The gamma camera conducting a bone scan

Diagnosing Osteoarthritis cont.

Arthroscopy (Keyhole surgery)

Arthroscopic examination is where a fibre optic scope attached to a video camera is inserted into a joint. It allows direct visualisation of the cartilage, synovium and intra articular ligaments. It is very sensitive in identifying early degeneration in the cartilage. It is limited by requiring general anaesthesia of the horse, expensive equipment and an experienced surgeon. A number of low motion joints commonly affected by OA are not accessible to arthroscopic examination.

Arthroscopy is usually limited to cases where surgical treatment following diagnostic examination is expected.

Arthroscopic examination of the carpel joint

Synovial Fluid and Serum Markers

Although it is appreciated that there are a large number of changes in the composition of synovial fluid in arthritic joints, in practice the use of synovial fluid analysis and blood biochemistry is mostly used to determine the presence of infection within the joint. Elevated white cell (defence cell) counts within the fluid above measured thresholds are an indicator of joint sepsis. Blood within the joint can also be readily appreciated with a sterile joint tap.

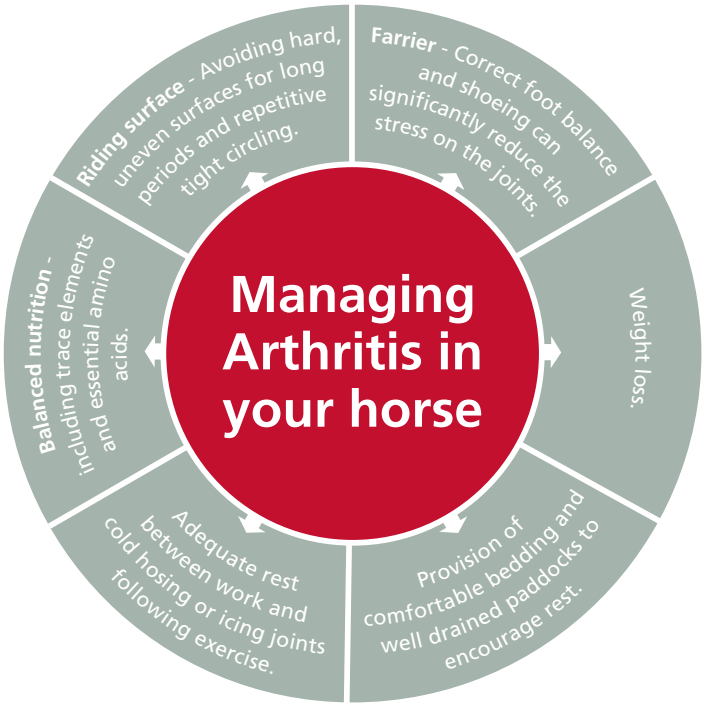
Treating Osteoarthritis

In most cases, OA is a slowly progressive condition and cannot be cured, but it can be well managed allowing continued athletic function in many horses.

Like many diseases it is important to consider all aspects of treatment that your vet can recommend, including nutrition, management, farriery and physiotherapy that work in partnership with the medical and surgical therapy.

Managing Arthritis

Appreciating the likely cause of the OA and making changes to management are essential, this includes;



Speak to your vet, who will help formulate a plan for the management of your horse.

Treating Osteoarthritis cont.

Anti-inflammatory Medication

Anti-inflammatory drugs are the mainstay of most treatments for OA. They act by reducing inflammation and provide pain relief. Most of their action is in blocking some of the inflammatory mediators produced in affected joints.

There are 2 main types:

NSAIDS; (Non steroidal anti-inflammatories) eg Phenylbutazone, Meloxicam, Flunixin. These provide pain relief and act principally by blocking the production of chemicals called cyclo-oxygenases which contributes to pain, swelling and vasodilation. They are relatively inexpensive and can be given orally. Long term use has potential side effects, principally colitis.

Corticosteroids Glucocorticoids have ant-inflammatory activity by inhibiting inflammatory mediator and destructive enzyme production, reducing vascular permeability and blocking the migration of inflammatory cells in to the joints. There are a number of corticosteroids with differing strengths and properties. In the treatment of OA they are principally used by direct injection in to affected joints under strict aseptic conditions. There are a number of potential side affects which must be considered by the vet but they are very effective in managing OA in many horses.

Vet administering anti-inflammatory medication

Joint Supplements (Nutraceuticals)

There is a vast number of joint supplements on the market making various claims of their effectiveness, the regulation of these claims is far less stringent than for regulated veterinary medications.

There are two main substances which have had good scientific investigation. Glucosamine (usually as the Glucosamine Hydrochloride salt) and Chondroitin Sulphate . Research has shown that only a small amount of these substances is absorbed by the equine intestine and much of that which is absorbed is metabolised and used in other sites. However there is some good evidence of long term beneficial effects. It is always worth asking your equine vet for advice on the most effective and cost effective supplement to use.

As you can appreciate, Equine Arthritis is a complex condition requiring detailed diagnosis and tailored intervention. XLEquine practice vets are always engaged in continuous education to remain at the fore-front of treating these conditions.

Hyaluronate

The action of sodium hyaluronate is not fully understood but is thought to be involved in the restoration of normal viscosity of synovial fluid. It also blocks one of the inflammatory mediators and reduces the infiltration of inflammatory cells in to the joint and reduces the loss of part of the cartilage matrix. It can be administered by injection in to the joint but is more commonly given by intra-muscular injection. Its main use is in high motion joints.

PSGAGs (Polysulphonated glycosaminoglycans)

Glycosaminoglycans are molecules which form a significant part of the cartilage matrix. Their use in treating OA works by binding to damaged cartilage inhibiting the rate of breakdown and stimulating the production of new glycosaminoglycans. It also inhibits a range of damaging enzymes. They are primarily given by a series of 6 injections at 4 day intervals.

Treating Osteoarthritis cont.

IRAP

IRAP is one of the new biological treatments utilising the patient's own biochemical proteins to suppress the inflammatory reaction in osteoarthritic joints.

Interleukin-1 receptor antagonist protein (IRAP) is a collection of proteins derived from a blood sample taken from the horse being treated. It is ant-inflammatory and counteracts damaging proteins produced in the inflamed joint and helps restore some of the components of cartilage.

Blood is collected in special tubes containing medical glass beads which induce the production of IRAP when incubated for 24 hrs. The plasma derived from centrifuging the blood product can be stored frozen. It is injected under strict aseptic conditions in to the affected joint. Several treatments (2-4) are commonly given at 10-14 day intervals.

Its use in competition horses is important as there are currently no competition restrictions.

A patients blood is collected under sterile conditions in to the IRAP processing vial

IRAP tube collection

Bisphosponates

Bisposhonates are medications which suppresses the action of the bone reabsorbing cells (Osteoclasts) and subdues the mediators in joint inflammation and destruction. They are used in low motion joints such as the distal hock joints (Bone Spavin) and navicular disease.

The injection is given into the muscle (Osphos) or into the vein (Tildren). Improvement frequently lasts for several months and can be repeated under veterinary advice.

Stem Cells

Mesenchymal stem cells are cells capable of changing into different cell types. Their use in the repair of tendons is well documented as is their use in many other tissue regenerative therapies. Previously stem cells have been harvested from a patient's bone marrow, multiplied and injected into damaged tissue. A new equine therapy employs the cells from the blood of donor horses who have low cell rejection characteristics. The donated stem cells are cultured and processed to develop into cartilage manufacturing cells (chondrocytes) which can be injected into joints undergoing early arthritic changes. Here they release potent anti-inflammatory mediators. This is a new treatment in synovitis (early OA) and offers exciting advances in the repair of damaged joints.

Talking to us when you notice the earliest signs of Arthritis will help to improve the prognosis and treatments available for your horse.

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