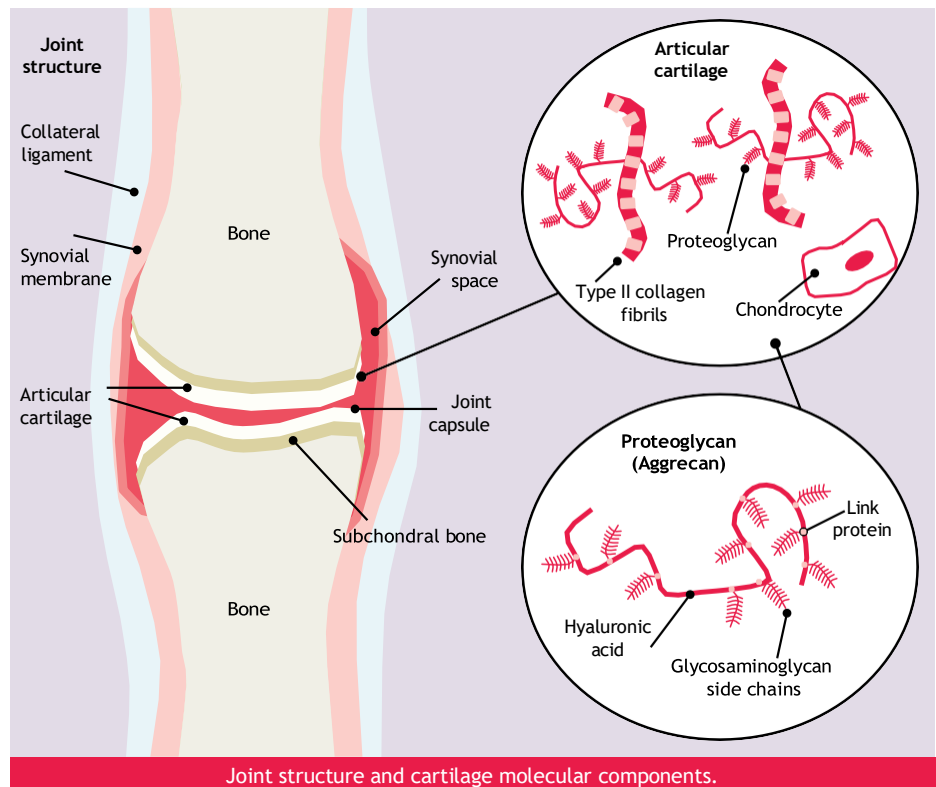


OUT OF JOINT

Osteoarthritis in the Horse

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Joint structure and cartilage molecular components.

Osteoarthritis (OA) is a common condition in all species including dogs, horses and humans. It is a common cause of lameness and poor performance in the horse, contributing to issues in the elite equine athlete, both the younger and older horses and also in the general riding horse and equine pets. The welfare of the horse can be impacted as the condition can be very painful as it progresses.

OSTEO - refers to bone, **ARTHRO** - refers to joints and **ITIS** - means inflammation. It is also known as **Degenerative Joint Disease (DJD)** or arthritis.

Here, we are going to have a quick review of joint anatomy, the different causes and factors implicated, clinical signs, diagnosis and the different treatment and management options.

Joint anatomy

A joint is the structure between two or more bones of the skeleton. There are different types in the horse, but the **Synovial Joints (Diarthrodial Joints)** are the most mobile and the ones affected by osteoarthritis (OA).

The bones are held together by strong collateral ligaments, which stabilise the joint. The bones have **subchondral bone** at their ends, which is covered by a thin layer of **articular cartilage**. There is a **fibrous capsule** that encloses the joint, the inner layer of which is a **synovial membrane**. The synovial membrane produces **synovial fluid**, which is a specialised fluid that reduces friction between the two surfaces of the bones - it is a **lubricant** and also provides nutrition for structures within the joint. Synovial fluid is made up of many different chemical components, including hyaluronan and lubricin.

Articular cartilage is a highly specialised connective tissue that acts like a shock absorber and is capable of withstanding very high loads during physical activity. It is composed largely of water (70-80%), type II collagen fibrils, proteoglycan molecules such as aggrecan, chondrocytes (cartilage cells), which synthesise and regulate the cartilage matrix, and a variety of other important molecules. **Proteoglycans** are large molecules that are a mixture of proteins and long chains of sugar that attract large amounts of water but repel each other and play a pivotal role in the function of articular cartilage.

The progressive destruction of articular cartilage in synovial joints is known as **Osteoarthritis** which is a major cause of lameness in the horse.

OUT OF JOINT

Definition of Osteoarthritis

Osteoarthritis (OA) is progressive destruction of articular cartilage accompanied by changes in bones and soft tissues of a joint.

What is the classification of equine osteoarthritis?

Equine osteoarthritis has been classified in several ways, but the following is a simple classification that is often used:

1 Primary OA

- Likely to be due to chronic repetitive trauma to joints
- Risk factors may include breed, age, sex, conformation and occupation/discipline

2 Secondary OA

- The consequence of other joint diseases including
 - i. Traumatic arthritis
 - ii. Fractures
 - iii. Osteochondrosis
 - iv. Septic/infective arthritis

What is the pathogenesis?

The pathogenesis of OA includes mechanical disruption to the articular surface and destruction by a number of chemical mediators. It is a complex cascade of cellular and molecular reactions, and research is still learning more about what occurs - it is a key research area in both human and equine medicine! The chemical mediators are many and varied and include cytokines, enzymes (e.g., collagenases, metalloproteinases), inflammatory mediators (e.g. prostaglandins, leukotrienes) and free radicals.

The initial results of these reactions are the breakdown and loss of the proteoglycans from the articular cartilage. The articular cartilage loses its stiffness and becomes soft and, in a vicious cycle, allows more mechanical disruption and allows the destructive mediators access.

Osteoarthritis is generally accepted to be a slowly progressive disease and is considered a complex, multifaceted disorder.

What occurs in the joint with osteoarthritis?

Cartilage degeneration
Synovial inflammation
Impaired chondrocyte activity
Thickening and subsequently scarring of the joint capsule
Bone proliferation at the joint margins - Osteophytes
Bone proliferation at the attachment of ligaments - Enthesophytes

What are the clinical signs of osteoarthritis?

Lameness of varying degrees
▶ It may be subtle initially
▶ May progress over time
Poor performance
▶ Dressage movements may deteriorate
▶ Refusal to jump
▶ Resistance
▶ Reluctance to perform activities
▶ Reluctance to travel up or downhill
▶ Stiffness
Pain on manipulation of the joint
Positive response to joint flexion
Swelling
Reduced range of movement
Crepitus

How is osteoarthritis diagnosed?

When evaluating a horse with a suspicious diagnosis of OA, there may be several different techniques used in confirming the diagnosis and to instigate the best options for the management of a particular horse. The techniques that your veterinarian may use include:

• Lameness examination

The key is a lameness examination by a veterinarian; such an examination involves a very thorough evaluation of the horse at rest with palpation of the joints and evaluation dynamically. The horse is commonly examined at the walk and the trot in hand, and on the

lunge, flexion tests are likely to be performed. On occasion, the horse may be examined under saddle, and in some cases, a lameness locator may be useful, especially if multiple legs and multiple sites within a leg are involved.

• Nerve blocking

Often, there are no precise localising signs evident, particularly early on, and so the use of nerve blocking (local anaesthesia) is often required to ascertain which joints are involved.

• Radiology

The changes that may be seen include:

▶ New bone formation - osteophytes and enthesophytes
▶ Changes in the subchondral bone density
▶ Narrowed joint spaces

It should be noted that radiological changes occur later in the disease process, and there isn't always a good correlation with clinical signs.

• Gamma scintigraphy (bone scan)

It may be useful in horses with multiple legs involved and multiple sites within legs and in horses that are difficult to nerve block.

• Magnetic resonance imaging (MRI)

This imaging modality provides good contrast and enables pathological changes in cartilage, subchondral bone, ligaments, tendons, and the joint capsule to be evaluated.

• Arthroscopy

This enables the cartilage to be directly visualised with a camera.

“Osteoarthritis is generally accepted to be a slowly progressive disease and is considered a complex, multifaceted disorder.”





OA in the carpus.



OA in the pastern and coffin joint.

What is the treatment for osteoarthritis?

Unfortunately, given the complex nature of osteoarthritis, there isn't a "one treatment fixes all" option; most of the treatment options are, in fact, management options, and there isn't a miraculous cure. Usually, a combination of management options is advised and are tailored to the individual horse and their specific problems.

Some of the treatment options include:

- 1 A period of rest followed by controlled exercise
- 2 Ensure that the horse is not overweight

3 Correct foot imbalance issues

4 Analgesics

Non-steroidal anti-inflammatory drugs (NSAIDs) may be used judiciously in some cases, particularly in non-competition horses. Such medications may include phenylbutazone and firocoxib.

5 Intraarticular medications

Traditionally, joints with osteoarthritis may be medicated directly with corticosteroids and hyaluronic acid. There is still a place for this in the management of OA, but there are also other options, some of which are discussed below.

6 Systemic joint supplementation

There are many systemic joint supplements available on the market, with various levels of research into them and varying effects. Some of the more commonly used and efficacious ones include injectable medications containing pentosan, which helps increase proteoglycan content, hyaluronic acid injections or oral medication, oral glucosamine and chondroitin and oral epiitalis. Your veterinarian will help you navigate the different options available.

7 Surgical options

Sometimes surgical options may be indicated, such as arthroscopy to clean up cartilage and flush the inflammatory mediators from the joint. Some low-motion joints may be fused (arthrodesis), e.g., lower hock joints and pastern joints.

8 Physiotherapy

Just as in people, physiotherapy is a very useful adjunct in the horse with osteoarthritis to maintain functionality. Engaging the service of a qualified physiotherapist can be very supportive in managing the horse with OA; they will recommend various exercises, joint mobilisation and manipulations and may suggest therapeutic ultrasound, extracorporeal shock wave therapy, proprioceptive rehabilitation, acupuncture or laser.

Please ensure that you use a qualified physiotherapist who has undergone appropriate professional training.

What is new in the treatment of equine osteoarthritis?

As our knowledge of this complex disease expands, so too do treatment options. In recent years, the use of **biologics** has seen an increase. These are products that are produced from the horse's own tissues using special equipment and then injected into the joint. Examples include IRAP (Interleukin-1 Receptor Agonist Protein), PRP (Platelet Rich Plasma), Prostride and stem cells.

Another product that has become available in recent years is Arthramid, which is a pioneering treatment injected into the joint. Arthramid is a hydrogel that acts as a bioscaffold and helps in the regeneration of joint tissues.

The future in the treatment of osteoarthritis in the horse is exciting but taking it's time to come to fruition!

Summary

Osteoarthritis (OA) is a common cause of lameness and poor performance in the horse. OA is the progressive destruction of the articular cartilage of joints accompanied by changes in bones and soft tissues. Diagnosis involves a very thorough evaluation of the musculoskeletal system of the horse and usually involves radiography. Treatment modalities aim at maintaining joint health and functionality, reducing the progression of the disease and minimising pain - rather than curing the disease; it is management. A treatment plan is best tailored to the individual horse and their underlying disease rather than a one-treatment-fits-all approach. If you have concerns that your horse may have osteoarthritis, then speak to your veterinarian about the options for investigation and management. ↩



Systemic medications for DJD.



Intraarticular medications for DJD.



A kit for production of biologic agents for OA.