

Osteoarthritis in Dogs and Horses

“Osteoarthritis can be described as the failed repair of damage that has been caused by excessive mechanical stress on joint tissues.”^{R1}.

Osteoarthritis (OA), or degenerative joint disease, is the most common chronic musculoskeletal disorder in dogs, horses and humans. While not life-threatening, osteoarthritis can be a major factor in quality of life and health care economics for humans, pets and athletic animals.

•In 2001, the estimated cost for the management and treatment of osteoarthritis in humans was \$89.1 billion dollars.¹⁴

- It is estimated that 20% of dogs greater than one year of age are affected by osteoarthritis.¹³
- There are about 7.3 million horses in the United States, and veterinary researchers estimate that osteoarthritis accounts for approximately 60% of lameness problems in horses.¹⁰

Osteoarthritis can be treated and/or managed but there is no true cure. Effective management of osteoarthritis is important from both an economic and an animal welfare point of view.

Osteoarthritis is a disease process characterized by pain and lameness. It is associated with pathological changes in the tissues of synovial joints, including the loss of articular cartilage.⁶ Joint pain is the definitive symptom of osteoarthritis and yet it is relatively under-studied.¹⁴ The most common complaint from human patients with osteoarthritis is joint pain, although radiographic changes compatible with osteoarthritis occur much more frequently than joint pain.⁷ Veterinarians that perform survey radiographs as a part of equine pre-purchase examinations are very familiar with the conundrum presented by radiographic evidence of osteoarthritis in a clinically sound horse.

Joints are complex structures with multiple components. They include cartilage, joint capsule, ligaments, synovial lining, synovial fluid, and subchondral bone.⁴ Multiple biomechanical and inflammatory factors occur as a part of the development of osteoarthritis, but the original, inciting event is mechanical i.e. impact or trauma to the joint. This can be a single event or multiple events of micro-trauma. Everything that follows is like a cascade or a cycle as the body attempts to repair the damage and restore



normal joint function. ¹⁴ Synovial inflammation or synovitis is an important part of the body's response to the initial trauma. The inflammation and swelling due to synovitis trigger both the mechanoreceptors in the joint capsule, and the pain receptors through chemical mediators. ¹⁴

Without question, the most important management tool for osteoarthritis, particularly in the early stages is rest. Reduced mechanical strain of the affected joint will give the joint and synovium time to heal. In addition to rest and decreased work load, there are a variety of other therapies that may be useful in the management of osteoarthritis. When one considers systemic therapies such as drugs and nutraceuticals there are two broad categories.

1. 'Symptom-modifying' agents' are drugs or nutritional supplements that are used to decrease the clinical signs of osteoarthritis. These are not thought to affect the progression of the disease but may alleviate the clinical signs, most commonly pain and inflammation.¹¹ The most commonly used drugs in this category are the non-steroidal anti-inflammatory drugs (NSAIDs). NSAIDs reduce both pain and inflammation; two of the most important and obvious clinical features seen with osteoarthritis. NSAIDs and other analgesics have an important role in the management of osteoarthritis, although the reduction of pain can be a double edged sword. "Pain relief alone may have a favorable (short- to midterm) clinical effect, but could have adverse effects on the underlying disease process and hence on long-term outcome if overall management of the athletic horse is not altered (i.e., exercise regimes adjusted accordingly) and/or if analgesia is not combined with other strategies that target the underlying degenerative process." In most instances, reducing inflammation will have a positive affect on articular cartilage by inhibiting the release of catabolic factors. ¹⁴

2. 'Structure-modifying' agents or disease modifying agents of osteoarthritis (DMOAD) are defined as agents that are capable of delaying, stabilizing or even repairing osteoarthritic lesions. ¹² Although there is no cure for osteoarthritis at this time, this is an area of active research interest. These drugs are thought to improve chondrocyte anabolism and extracellular matrix synthesis within the joint. ¹¹ Many of these drugs are used both in horses with diagnosed osteoarthritis and in a preventative manner in the sound, athletic horse.

Drugs and nutraceuticals within this category include:



- Polysulfated glycosaminoglycans (PSGAG) such as Adequan® are approved for use in the horse and in the dog. PSGAG's are also referred to as "chondroprotective" agents. They are thought to diminish, or even possibly reverse, cartilage lesions associated with osteoarthritis. In 1996 there was a study published describing a survey of 1,522 equine veterinarians regarding the perceived efficacy of PSGAGs. Subjectively, it was felt that PSGAGs were more effective than HA in the treatment of sub-acute osteoarthritis. ³
 - Sodium hyaluronate or hyaluronan (HA) is approved for use in the horse. It is widely used both intra-articularly and intravenously. Reasonable studies have demonstrated its efficacy to treat experimentally induced joint inflammation.
 - Pentosan polysulfate is a drug which is approved in the United States for use in human medicine for the treatment of interstitial cystitis. It is approved in Australia for use as a DMOAD in horses. There have been studies on its use for osteoarthritis in dogs that show some benefit.⁵ There is a great deal of interest in this drug for use in horses.
- The oral nutraceuticals are widely used although there is not enough evidence concerning their efficacy. These products may contain chondroitin sulfate, glucosamine, hyaluronate, MSM, and other proprietary ingredients. The efficacy debate frequently centers around the absorption and bio-availability of the DMOAD components of these oral supplements.⁹

As any orthopedic surgeon, sports medicine specialist, performance horse veterinarian, or aging baby boomer can tell you, there is no cure or magic bullet for osteoarthritis at this time. Researchers are looking into a variety of possible future treatments for acute and chronic osteoarthritis. As could be expected, the emphasis is on slowing the progression of the disease, decreasing inflammation and joint damage, alleviating pain, and increasing joint health. Three of the newer treatments are chemically modified tetracycline antibiotics for systemic use, stem cell therapy for intra-articular use, and platelet rich plasma for intra-articular use.⁴ Remarkable progress has been made in our understanding and treatment of osteoarthritis but it remains a major economic and welfare concern both in humans and in our animals.



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