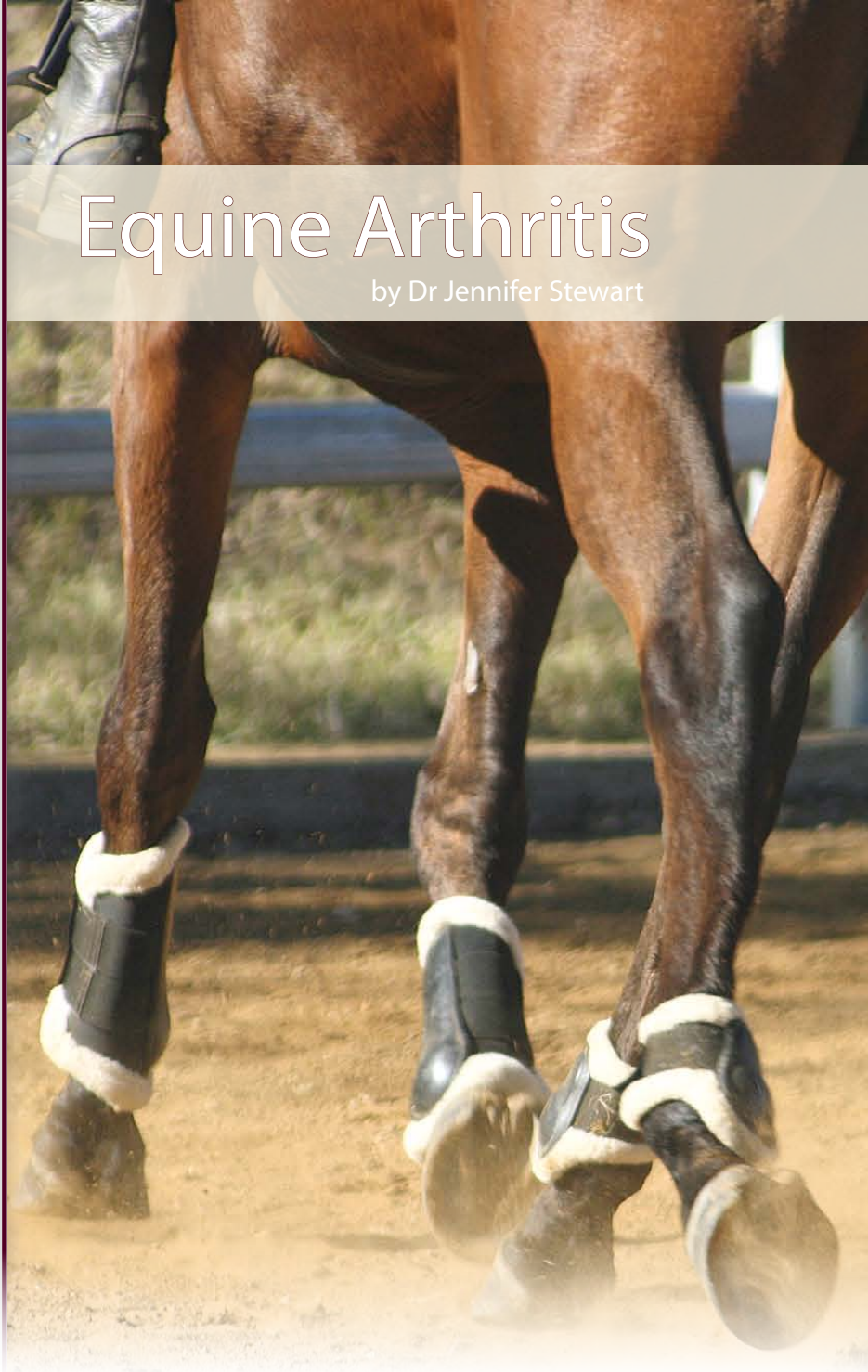


PAIN IN THE JOINTS

Arthritis in equines is similar to that in humans in that it is a degeneration of the articular surfaces of the joint caused by inflammation. Over time, this wear and tear on the joints leads to an erosion of joint structures. It can occur in horses of any age but is more commonly found in older horses.

The complexity of joints means the causes of arthritis are many. Generally, changes to the joint structures are progressive. Alongside the changes come varying degrees of pain and reduced range of motion, progressing over time to reduced mobility, range of motion and muscle mass. Muscle loss further reduces joint stability and alters joint, cartilage and bone loading forces. *Continued*

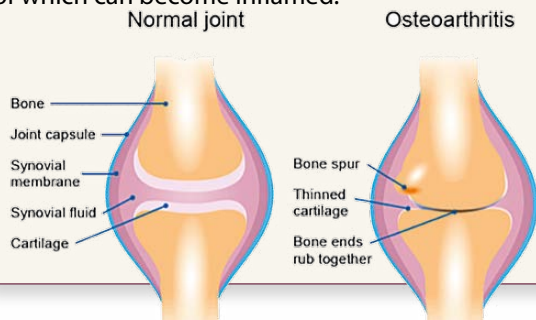


Equine Arthritis

by Dr Jennifer Stewart

WHAT IS A JOINT?

A joint is where two or more bones come together for movement and shock absorption – and with 205 bones in their skeleton, horses have many, all of which can become inflamed.



THERE ARE 3 TYPES OF JOINTS:

Synovial joints – such as the fetlocks, knees, hocks, hips and shoulders – enable movements such as flexion, extension or rotation.

Cartilaginous joints – between the vertebrae allow limited movement and shock absorption and the bone ends are connected by cartilage.

Fibrous joints – those between the bones in the head – don't allow for movement.

Arthritis is most common in synovial joints. These joints are complex structures involving bone, the smooth cartilage covering the ends of the bones, the subchondral bone that underlies the cartilage, a joint capsule and the surrounding soft tissues – any single structure or combination of structures can become inflamed.

Shock - absorbing cartilage

Articular cartilage is a stiff, shock-absorbing material that distributes loads and allows gliding with minimum friction.

The cartilage is a sponge-like matrix of collagen and polysulphated glycosaminoglycans (PSGAGs) that functions to draw in and hold water. Within this matrix lie the chondrocytes that produce collagens and proteoglycans, as well as other factors that influence cartilage maintenance and degradation.

Beneath the cartilage is subchondral bone, which is thinner than other bone and quickly responds to loading and exercise.

Surrounding and enclosing the joint is the capsule that with tendons and ligaments, stabilises the joint and prevents it from exceeding its normal range of motion.

The joint capsule is lined with synovia – the membrane that produces the lubricating joint fluid as well as hyaluronic acid and collagen. This sensitive membrane also produces a powerful inflammatory response if it is injured.

Normal joint function requires that each component and structure be healthy and working properly.

Pain in the Joints continued...

Damage to cartilage or bone results in a roughening of the smooth surfaces and associated inflammation, swelling, pain and restriction of movement. Injury to the joint capsule and its ligaments also triggers inflammation, resulting in thickening and reduced elasticity of the capsule, thinning and reduced lubricating ability of the joint fluid.

Repeated stress or trauma from exercise (and the wear and tear of everyday life!) can damage the synovial membrane and joint capsule. If untreated, the joint damage progresses to arthritis. With time new bone is formed to replace damaged bone however it doesn't have a protective cartilage covering, leading to more pain, inflammation and restriction of movement, as the condition advances to become chronic arthritis.

Arthritis occurs as a consequence of traumatic injury or, in most cases, chronic wear and tear, and runs the spectrum from mild discomfort to crippling.

It is a common, progressive and painful degenerative joint disease responsible for 60% of all lameness. Contributory factors include age; poor conformation; injury; regular training, repeated actions and high-impact work; hard ground; exaggerated gait movements and a long career of jumping.

Signs of arthritis

The signs of arthritis are many and highly variable between horses. Some horses will have relatively severe changes but cope well and others will not tolerate relatively minor changes.

- reduced range of motion of the joint
- pain
- swelling
- lameness
- changes in performance: shortness of stride, hollowing of the back, raising of the head, stiffness that they warm out of, uneven gaits, difficulty picking up or maintaining canter leads, reluctance to engage in work they had previously done comfortably
- unwillingness to flex affected joints and soreness after farrier work
- behavioural/personality changes and unwillingness to work due to pain
- abnormal shoe/hoof wear
- frequent weight shifting when standing
- more frequent lying down
- reluctance to lie down – this may present as narcolepsy (sudden falling asleep) as the horse has extremes of tiredness if normal sleep patterns are affected
- extreme cases may have weight loss due to bullying by other horses
- mild soft swelling and/or bony swelling around the joints
- increased respiratory rate at rest and during exercise – a sign of pain.



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Types

There are many types of arthritis affecting horses of any age, breed and discipline. Most common is osteoarthritis or degenerative joint disease (DJD) - the progressive deterioration of the articular cartilage accompanied by changes in the soft tissue and bones of the joint.

Others include immune-mediated, septic (due to infection of the joint) and inflammation due to trauma. Risk factors include poor conformation; congenital limb deformities; improper shoeing; injury; regular work that requires high-speed, sharp turns, quick stops, gaits with exaggerated range of motion, and hard ground.

Arthritis can occur in any joint but, depending on what the horse does for a living and its breed conformation traits, it can occur in predictable locations. Hock joints are common sites in both English and western pleasure horses.

A condition associated with development of a bony bump on the inside of the knee and increasing lameness has been described in older horses, most commonly Arabians. Called carpometacarpal syndrome and resulting in instability of the knee joint, affected horses have abnormal connection between the cannon and inside splint bone. This decreases the ability to withstand normal wear and tear and increases the risk of age-related arthritis.

Equine juvenile arthritis can occur in one-to-four-year-old horses - but is caused by joint damage much earlier in life. It is characterised by inflammation and degeneration within a joint and can involve the cartilage, capsule, bones and ligaments. Caused by cartilage and/or bone injury/concussion and rapid growth spurts, prevention requires not overworking young horses as they begin training and preventing excessive weight gain and growth spurts in foals, weanlings and yearlings

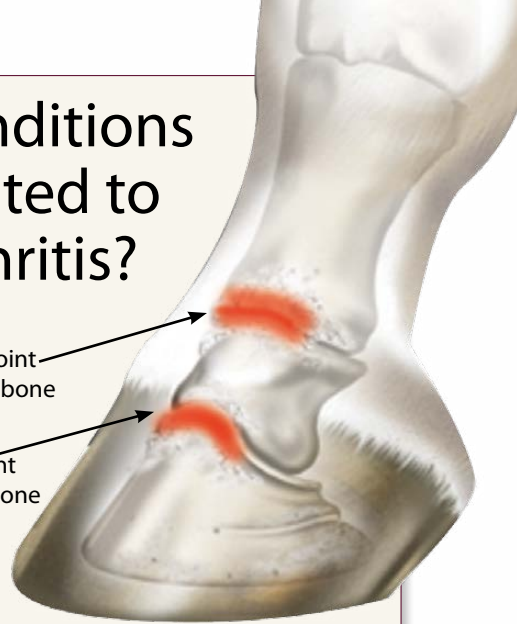
Acute septic arthritis is a veterinary emergency. Caused by bacterial infection from a penetrating injury to the joint or via the bloodstream, it is extremely

Continued

Conditions related to arthritis?

Pastern joint
high ringbone

Coffin joint
low ringbone



High ringbone, low ringbone, true ringbone, false ringbone, articular ringbone, bone spavin, bog spavin, jack spavin, high spavin, occult spavin, carpalis, tarsitis, capsulitis, coxitis, gonitis, osteophytes, osselets, popped knees, spondylitis, synovitis, windpuffs, windgalls, DJD, DOD, OCD and joint mice are some of the many terms you may hear in discussions concerning equine joints.

The link they share is to arthritis - inflammation of the joint.

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dangerous and if not quickly controlled can cause severe destruction of the joint surfaces. It can also be difficult to treat as it is hard to get antibiotics into the joint capsule. It is a major concern in young foals, especially if they didn't receive sufficient, good quality colostrum, have compromised immune systems or systemic disease. It is a risk for any horse that sustains an injury near a joint. Any suspicion or sign of a joint issue in foals and adults requires prompt veterinary assessment. Early intervention can make the difference between a successful and a disastrous outcome.

At the earliest signs of arthritis a complete physical examination is important to rule out other causes of lameness, especially infectious diseases. The veterinary assessment can include a series of observations and investigations and your veterinarian may watch the horse move and evaluate the effect of exercise and ground surface during the lameness exam and the next day. They will usually perform a lameness evaluation and palpation, flexion tests and often nerve and joint blocks to isolate localized pain. To confirm the arthritic changes, your veterinarian may take x-rays - however the degree of change on the x-ray is not always proportional to the signs and symptoms. Horses are good at hiding pain to avoid exciting predators, yet an x-ray may show significant disease. Ultrasound, CT-scans, MRI, nuclear scintigraphy, arthroscopy and/or thermography are additional techniques that may be required to reach a definitive diagnosis



in individual horses and can also be useful to direct and assess the most appropriate treatment.

Incurable but treatable

Arthritis is incurable, but treatment - often with a combination of measures - can slow the disease progress. There are many ways we can help horses with osteoarthritis and what this help looks like is tailored to the individual horse and owner combination. Initial approaches incorporating rest, topical liniments, warm

Some oral nutraceuticals used in ARTHRITIS	Dose (data from published studies and manufacturer's recommendations)	NOTES
Chondroitin	3 - 7.5 grams/day	*binds to and inactivates destructive enzymes in joints *may increase cartilage production and stimulate hyaluronic acid, which makes joint fluid thick, cushioning and protective *after horse responds, try reducing by 1 - 2 grams/day to 3.5 grams/day - if symptoms return or workload rises, increase to 7.5 grams/day *results improve when combined with chondroitin sulphate, glucosamine, manganese, vitamin C, copper and s-adenosyl methionine
Ground cartilage	7 - 10 grams/day	*usually bovine or avian in origin
Bioflavonoids	22 grams/day	Boost actions of vitamin C
Copper	75mg/day	*essential for connective tissue framework in cartilage, ligaments, tendon and bone *copper deficiency has a role in the development of arthritis, tendon, ligament and hoof quality problems *research on bone & joint issues shows requirements may be 4 - 5 times NRC *total amount of copper is more important in horses than the copper:zinc ratio which is not a significant problem for horses
Zinc	150 - 500mg/day	*part of anti-oxidant defence, anti-inflammatory and immune systems - requirements increased with inflammation
Manganese	100-250mg/day	*part of anti-oxidant defence system *used by the horse to produce chondroitin *common dietary deficiency especially with hay and hay-grain diets *NRC minimum requirements (which are based on data from other species) too low for high performance horses
Vitamin C	10 - 50 grams/day	*high dose range for clinical arthritis *older horses, those in intense training and horses with no pasture have increased levels
Glucosamine sulphate/hydrochloride	9 - 10 grams/day	*moderates inflammation, stimulates cartilage and hyaluronic acid production *complements chondroitin sulphate, perna mussel, copper, manganese, methylsulphonylmethane (MSM), s-adenosylmethionine and GAGs *forms the basis of glycosaminoglycan production *increased demand in arthritis and in older horses *optimum effect if combined with sulphur as methionine, s-adenosylmethionine or MSM
Flaxseed oil (linolenic acid and Omega 3)	45 - 100ml/day	*regulation of inflammation especially in chronic arthritis *requirements increase with ageing *deficiencies in essential fatty acids are common with low-fat and all-hay diets
Grape seed extract	2.2mg/kg = 1 gram/day for 500kg horse	*very high in antioxidants such as bioflavonoids and polyphenols (proanthocyanidin is 20 - 50 x more active than vitamins C and E)
Green-lipped mussel (<i>Perna Canaliculus</i>)	5 - 10 grams/day	*precursor for joint cartilage synthesis *very high in omega-3 fatty acids *combined therapy with glucosamine, chondroitin sulphate, vitamin C, MSM, manganese and copper *after horse responds reduce dose over 5 days to 3.5 - 5 grams/day *if symptoms return or work load increases, revert back to 5 - 10 grams/day
Herbal combinations	select reputable products backed by research, follow manufacturers advice	*may include tumeric, curcumin, devil's claw, cat's claw, boswellia, white willow and yucca
Methylsulphonylmethane (MSM)	10 - 20 grams/day	*often used in combination with other nutraceuticals
Hyaluronic acid	100mg/day	*20mg/day on combination products
Combination oral joint supplement	British Equine Vet Assoc Congress 2013	*chondroitin sulfate 1.62 g/100 kg, glucosamine 1.9 g/100 kg, vitamin C 0.8 g/100 kg, methyl sulphonyl methane 2.56 g/100 kg, DHA 0.66 g/100 kg, EPA 0.34 g/100 kg bwt

poultices, heat bandages, icing flare-ups and anti-inflammatory drugs may be sufficient. Ensuring correctly balanced mineral and anti-oxidant intake; body weight management; consistent, appropriate exercise; working closely with your farrier to find a shoeing/trimming combination that best suits your horse, and in some cases massage and other therapies, are easily done.

Your veterinarian is best-placed to advise on more precise treatments, which will depend on the structures involved - therapy for joint capsule involvement is different to treatments for cartilage damage. Surgery and radiation therapy are recommended with other types of arthritis and in some cases, joint medication is the treatment of choice. Injections either into the muscle, vein or joint may be beneficial and your veterinarian will advise on the best options – which will vary from horse to horse.

Newer treatments and regenerative therapies such as extracorporeal shockwave treatment (ESWT), bisphosphonates, gene therapy, interleukin-1 receptor antagonist protein (IRAP), platelet-rich plasma (PRP), stem cells and using the horse's own blood or bone marrow to produce an anti-inflammatory product that is injected directly into the joint are now more widely available.

There are many nutritional joint supplements available on the market and a lot of clinical evidence to support their use.

They are recommended to protect joint health before signs of arthritis develop and may contain glucosamine, hyaluronic acid, MSM, vitamin C and herbal products such as devil's claw and

yucca. Your veterinarian may also suggest epitalis, a plant extract which has been shown to help regenerate damaged cartilage as well as reducing inflammation, protecting healthy cartilage in affected joints and minimising joint degradation.

In humans and animals, work continues to improve arthritis diagnostics so the most appropriate treatment can be started before the disease advances too far. Arthritis can be a challenging condition to manage, as no single solution is suitable for every joint, every horse, every discipline or every owner. Although there is no standard treatment protocol, when arthritis does occur, early intervention will be much more effective than any treatment instituted once the horse becomes debilitated. By doing something about it earlier rather than later you can definitely improve your horse's well-being and long-term prognosis.

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Dr Jen Stewart has been an equine veterinarian for more than 40 years and an equine nutritionist for more than 10 years. Jen has been developing premium formulas for studs, trainers and feed companies in Australia and around the world and regularly consults to leading international studs and trainers in various countries. Jen has spent a fair bit of time researching and being involved in nutritional management of developmental orthopaedic diseases, colic, tying-up, laminitis, performance problems, post-surgery and other conditions. And is currently the only practicing equine veterinarian and clinical nutritionist in Australia.

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