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Joint treatments for osteoarthritis

Following on from November's newsletter discussing osteoarthritis, this month we discuss the options for treating OA, focusing on treatments that go directly into the joints themselves (intra articular). We will also discuss some of the injectable preparations that are for intravenous or intramuscular use. Then in January, oral joint supplements will be considered.

What are we aiming to achieve by using intra articular treatments in OA?

Inflammation of the joint and its surrounding soft tissue structures are part of the condition of OA. Rapid resolution of this inflammation is vital in the treatment of OA as the inflammation sets up a vicious cycle of further cartilage damage and breakdown. In treating the joints we are aiming to return the joint to its normal state as quickly as possible along with preventing the occurrence of or reducing the severity of OA. The treatments are aimed at reducing pain and thus lameness and minimizing the progression of joint deterioration.

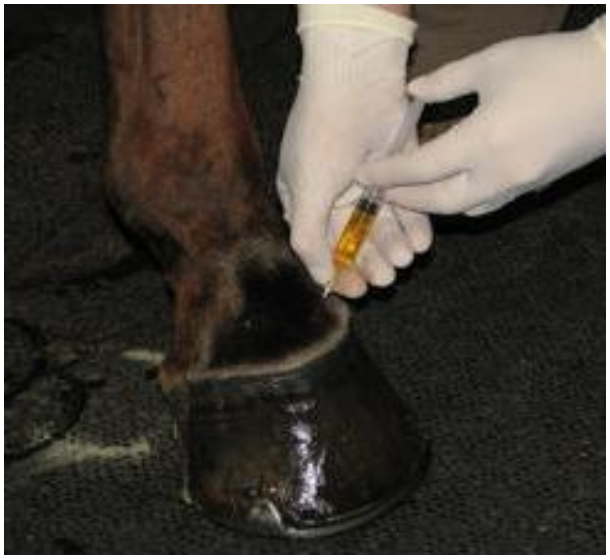
Please take note that it is important that timely removal of chip fragments, removal of OCD lesions, accurate diagnoses of soft tissue structure injuries associated with the joints and appropriate management of fractures involving joints is vital to successful management of OA.

There are 2 main classes of drugs to be used in joints, those that are disease modifying (DMOAD's) and those that provide pain relief but have an undefined therapeutic action, symptom modifying (SMOAD's).

Corticosteroids

The use of corticosteroids for OA has been around for a long time. It was previously thought that corticosteroids into joints were themselves damaging to cartilage, but this was due to the use of the wrong kind of steroids at too high a dosage. Much more recent research has shown that using certain steroids at the correct doses is actually beneficial to the joint and protects the cartilage. The corticosteroids are potent anti inflammatories so they will attempt to return the diseased joint to normal by reducing inflammation, thus reducing pain and therefore improving lameness, as well as protecting the cartilage.

There are concerns that the use of steroids can induce laminitis and this has been a subject for debate for many years. A review of studies conducted shows that there is a lack of evidence linking the use of steroids with laminitis, with an incidence of about 0.15% (3 horses in 2000). Your vet may discuss testing your horse for Metabolic Syndrome and insulin resistance if there are any concerns, prior to steroid treatment.



Intra articular treatment into the coffin/DIP joint

Hyularonan (HA)

HA is a vital component of joint fluid and joint cartilage in normal joints. HA found in joint fluid is produced by the cells that line the joint called **synoviocytes.** HA found in joint cartilage is produced by the cells of the cartilage called **chondrocytes.** HA has been proven to have several vital roles within the joint including;

viscoelasticity of joint fluid
lubrication of the joint
moderate pain relief
moderate anti inflammatory properties

There is little evidence to show though that it can help damaged articular cartilage heal.

It is common practice to combine HA with corticosteroids when treating joints, to gain the benefits of both drugs.

It is now known that the immediate effects of using HA into joints is not as quick or dramatic as the use of corticosteroids, but the long term disease modifying abilities are accumulative and of great benefit.

Therefore, the use of HA can be recommended for prophylactic/preventative use.
For example HA may be used post surgically, following arthroscopic surgery, it may be used in highly talented young sport horses when trying to preserve their athletic career is paramount.

HA has also now been shown to be beneficial if given INTRAVENOUSLY. From a personal experience view and now clinical data, the iv use of HA improves lameness. There is uncertainty in the mechanism of action

but it is hypothesized that it gathers within the joint membrane. Again, it has an accumulative effect. It can be used in this was as a prophylactic measure or direct treatment of OA.

There are many preparations of HA available and care has to be taken when selecting which are to be used for intra articular and intravenous use. Your veterinarian can advise upon this.

Some of the HA products in South Africa are known as 'Legend' or the human preparation 'Suplasyn'.

Polysulphated Glycosaminoglycans (PSGAG's)

Polysulfated glycosaminoglycan (PSGAG) belongs to a group of polysulfated polysaccharides. The most common PSGAG is Adequan®g. They are chondroprotective, or as in the more recent definition, DMOADs.
PSGAG has been traditionally used where cartilage damage is considered to be present. Therapy with such drugs is either meant to prevent, retard, or reverse cartilaginous lesions of osteoarthritis. The principal GAG present in PSGAG is chondroitin sulfate, and the product is made from an extract of bovine/cow lung and trachea.
The most common time to use PSGAG's is after arthroscopic surgery where chip fragments have been removed and unhealthy joint cartilage has been debrided away by the surgeon, leaving areas of exposed subchondral bone.
It may also be used preventatively, either into the joints or given intramuscularly. But there is very little scientific evidence to prove its use when given into the muscle. Several studies have shown that it does not reach any therapeutic level within the joints themselves. However, one study has shown the use of PSGAG to produce increased amounts of HA within joints (presumably stimulating the cells to produce more HA naturally).
As with all joint injections, there are always risks, with the most severe risk being joint infection *(see info see on synovial sepsis)*. There are several studies to show there is a higher risk than normal with using Adequan into joints.

Pentosan Polysulphate

Pentosan polysulphate is also a PSGAG. It is a DMOAD.
Although pentosan has no direct pain relieving properties, eg. like corticosteroids, it has many benefits and initial research in the States has shown very promising, favourable results. It reduces cartilage damage, improves lameness and reduces joint swelling. It has been shown to increase natural joint HA production and stimulate the chondrocytes. It also has a unique property in that it is anti thrombotic. This in theory, means that it may help prevent subchondral bone damage due to a lack of blood supply.
Pentosan is best to be given by the intramuscular route, given at weekly intervals for best response.
Pentosan is highly recommended as a treatment and a preventative measure, especially in young competition horses.
There is also some evidence that pentosan can help in the healing of tendon injuries.

There is currently research going on into a new oral derivative of pentosan, showing excellent absorption levels so watch this space!

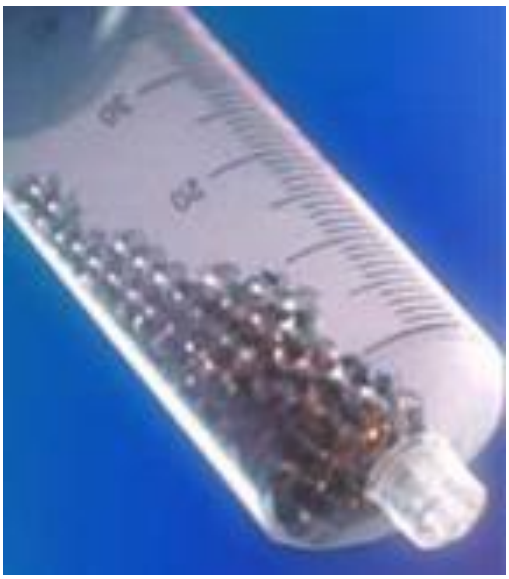
IRAP (Interleukin Receptor Antagonist Protein)

The damage to the cartilage in OA releases many inflammatory proteins and chemical signals including Interleukin I, which is a cytokine. A cytokine is a chemical secreted by the cells of the immune system to attack infections and apoptotic (damaged or dying) cells. The presence of this in the joint results in further cartilage degeneration. The inflammatory process if not regulated by the body eventually becomes harmful as these cytokines stimulate further cartilage damage and inflammation thus creating a vicious circle.

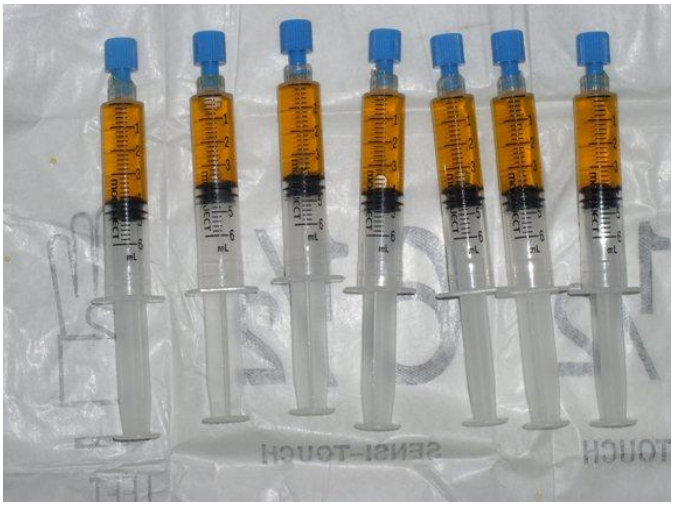
Treatment with Interleukin-1 Receptor Antagonist Protein (IRAP) utilizes progressive gene therapy to combat osteoarthritis in your horse. Interleukin-1 (IL-1) is a type of cytokine and is secreted by many types of cells. IL-1 is an important part of the inflammatory response but in the case of your horse's joints,

sometimes can be detrimental. The joint fluid carries a protein called interleukin-1, which plays an important role in inflammation and accelerates the deterioration of tissues like joint cartilage. Interleukin-1 Receptor Antagonist Protein (IRAP) blocks IL-1 from binding to tissues and inhibits the damaging consequences of IL-1.

The procedure begins with drawing blood from the horse that will be treated into a syringe. The syringe is specially prepared with glass beads that stimulate production of the antagonist protein, resulting in up to 27000 times more IRAP to be produced.



The blood is harvested, incubated and centrifuged to separate the plasma (abundant with IRAP) from the blood. Typically, IRAP treatments are once a week for three weeks and usually, after that time, the horse can return to normal work. Treatment protocols can vary though and this is very case dependent. The harvested IRAP can be frozen and stored for repeat treatments. One harvesting session usually yields 8-14 treatments.



The reason IRAP is so exciting is its' potential for a long-term effect on battling osteoarthritis. Whereas some of the therapies listed above might only have short-term effect, IRAP has the potential to stop the cartilage matrix from being degraded and increase healing. IRAP has the ability to stop the inflammation cycle. The research on IRAP is ongoing but the results have been very encouraging.
IRAP cannot reverse permanent damage that often exists in joints with osteoarthritis already present, but it will prevent further inflammation and reduce progression of the disease. Therefore early treatment is recommended. Other therapeutics may also be required in conjunction with IRAP. A further benefit of IRAP is that it has no withdrawal time for racing and competition as it is a natural product, so if used on its own it can be used into competitions if so required.

Joint Fusion

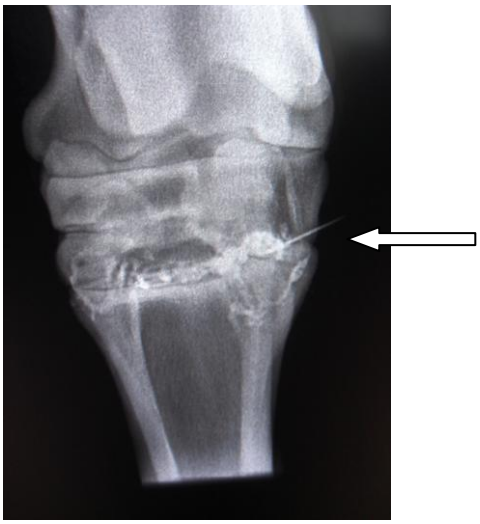
Finally, to mention joint fusion. This is a completely different kind of treatment to the abovementioned drugs, but should be considered for completeness.

The end stage of OA in joints can be ankylosis or joint fusion. This is when the joint cartilage is eroded away by the arthritic processes and the bone fuses naturally. Often once the bone has fused, the joints become much less painful.

In low motion joints (e.g. pastern and small hock joints) where OA is severe and the joints are now failing to respond to the abovementioned therapies, joint fusion may be considered. There are several ways to achieve this including, surgical fusion, laser fusion and injection of chemicals to fuse the joint (sodium monoiodoacetate).

A relatively new approach is to inject ETHYL ALCOHOL into the joints. This aims to speed up the process of natural joint fusion. Initial results are very promising with most joints treated fused completely by 12 months with some fusing as early as four months. Once fused these joints have remained pain free, with much improved lameness scores in all horses treated.

Prior to injecting the alcohol, a needle is placed into the joint and a three way tap attached. Radio opaque dye is then injected to make sure that the needle is placed correctly into the joint and that there is no communication from the small hock joints into the large hock joints.



A needle in the small hock joint (TMT) with radio opaque dye seen entering the joint.