JOINTS AND TENDONS – REPAIR AND MAINTENANCE

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When we consider the lifestyle and utilisation of horses by man for either recreation or to participate in competitive sports, it is important to recognise those elements of the body which may need extra attention. Nature is amazing in that it has refined the development of man and animals so that they can grow, reproduce, complete their life cycle and maintain their status quo when eating satisfactory nutritional resources. In the equine field, when a feed company that sells horse food - registers their product with the regulatory authority – Act 36/1947, they are required to supply details concerning how their products are formulated. The regulatory authority requires that the company has to supply a label for their product which is approved by the regulatory authority. This label requires the declaration of certain specific nutrients which are as follows:

COMPLETE FEED

AS PER ACT 36

MANDATORY DECLARATIONS	OPTIONAL DECLARATIONS
* Protein	* Amino Acids
* Fat	* Minerals
* Fibre	* Vitamins
* Moisture	* Energy
* Phosphorus	* Others

It should be recognised that under normal conditions, where there is not excessive strain placed on the body through e.g. extra performance, the body is capable of replacing and repairing most tissues as long as the animal is consuming a complete and balanced feed. When the body is expected to perform under performance conditions, this increases the stress as well as the amount of typical repair and maintenance inside the body - for the animal to continue competing. Under these circumstances, complete feeds are often supplemented by additional nutrients which may be provided to the competitive animals. Typical examples of supplements are as follows:

SUPPLEMENTS

* Energy
* Proteins
* Amino Acids
* Vitamins
* Herbs
* Probiotics
* Electrolytes
* Antacids
* Plant Extracts
* Fat
* Antioxidants
* Nutriceuticals
* Non protein
* Nitrogen

Some of these supplements might be a combination of the various ingredients as set out above, while other are specific in that they supply one category of supplement e.g. vitamins. When we consider a horse that is participating in competitive sports, then the nutritional requirement will change. Typical examples of what could be considered a normal horse or performance horse are set out below:

NORMAL HORSE

* Wild
* Leisure
* Breeding

PERFORMANCE HORSE

* Racing
* Endurance
* Polo
* Saddle
* Eventing
* Jumping
* Polo Cross

It is assumed that those horses indicated as normal horses are the animals that in all likelihood would be able to derive satisfactory nutrition from complete feeds, although when horses are breeding, there is an increased requirement – particularly in pregnant mares - for more nutrients. In the case of the various different types of performance horses, the activity of these horses, in virtually every case, has an impact upon the skeletal structure because of the performance requiring the horse to exercise its mobility as dictated by the particular sport.

A particular area of the locomotive system which is subjected to pressure during performance, is the joints and tendons. When we specifically consider joints and tendons, there are certain characteristics which should be recognised as playing an important role in the health and maintenance of these structures.

Joints and tendons consist of collagen and cartilage. Cartilage is a type of connective tissue composed of mucopolysacharides (e.g. chondroitin sulphate), protein substances, calcium, sulphur and collagen. Collagen is one of the proteins found in most connective tissues including cartilage, bone and skin. Gelatin is a form of collagen commonly used in foods, and preliminary reports suggest that consuming gelatin can improve the structure and health of hair and hooves.

An important factor concerning both joints and tendons is that the blood supply to these structures is limited. It is often for this reason that treatments that need to be applied to joints are injected directly into the joint. If the treatment had been applied systemically to the animal, the penetration of that treatment ingredient into the joints is limited by the blood circulation to joints and tendons. For this reason, when injuries occur to joints or tendons, it is recognised that a major requirement for recovery from those injuries - is rest and/or controlled exercise.

In our attempts to assist in the repair and maintenance of injured joints or tendons, the treatments that are normally applied include rest, massage (– to increase the blood circulation to an injured area), electrical stimulation (– to achieve the same objective as massage) and then anti-inflammatory treatments. Anti-inflammatory can be simply the utilisation of alternating hot and cold water to an area where there is swelling. In general where there is swelling in joints or tendons, this is often associated with pain and is indicative of an accumulation of liquid either in the joint or tendon. If infections occur in these areas, this is particularly problematical. Again this is related to the limited blood supply to that area and may require antimicrobial treatment directly into the affected area. Veterinary treatment always includes the use of anti-inflammatories.

However, there are some specific nutrients which can be supplemented in the diet that supply the body with immediate nutrients that contribute to repair and maintenance. The best known of these nutrients are chondroitin sulphate, glucosamine (as one of its salts) and MSM.

An associated industry where the level of nutrition is considered very high, is pet nutrition. If one examines some of the more expensive and sophisticated pet foods – particularly those brands that are sold through the veterinary profession, and one specifically looks at the label of the product, it is interesting to note that several of the different brands of dog food are now including the nutrients mentioned above. In addition there are several other nutrients that are also included in pet foods like antioxidants, dental care enhancers, immune stimulants, etc. This indicates that although the level of sophistication of dog foods has reached a high level, the companies producing those foods still consider it beneficial to supplement the foods with e.g. chondroitin sulphate, glucosamine and/or MSM.

In considering these 3 nutrients, there are some interesting aspects to them. Chondroitin sulphate consists of repeating chains of molecules called glycosaminoglycans (GAG's). Chondroitin sulphate is also a major constituent of cartilage and it is also rich in sulfur plus it is related to glucosamine. The only significant crude source of chondroitin sulphate is to extract it from animal cartilage (primary sources being either shark or bovine cartilage). However, it should be recognised that the body does make chondroitin and therefore it is doubtful whether there is any dietary deficiency. However, once pressure is placed on joints and tendons, the requirement for increased quantities of chondroitin sulphate in the body -to allow for repair and maintenance - is undisputed. In humans, oral chondroitin sulphate is rapidly absorbed when it is dissolved in water prior to ingestion. However, approximately 12 % of the chondroitin sulphate taken by mouth becomes available to joint tissues from the blood[1].

Glucosamine is an important building block needed by the body to manufacture specialised molecules called glycosaminoglycans (GAG's). Glucosamine as such is not present in significant amounts in most diets. The typical supplemental sources are derived from shells of shrimp, lobster and crab (or this nutrient is manufactured synthetically). Glucosamine is available in several forms, e.g. glucosamine sulphate, glucosamine hydrochloride and other salts, but in humans - glucosamine sulphate is the only form clearly shown in clinical trials to be effective for osteoarthritis.[5,6,7,8,9,10,11,12,13] Glucosamine is a much smaller and simpler molecule than chondroitin sulphate and is readily water soluble.

Methyl-sulphonyl-methane (MSM) is a naturally occurring, organic, sulphur containing compound related to another sulphur-containing substance, di-methylsulphoxide (DMSO) – which is also a well known active ingredient that promotes the absorption of chemicals through the skin. MSM is found in small amounts throughout nature and has been detected in small amounts in the blood and urine of humans. A precursor of MSM is formed initially by ocean plankton and released into the atmosphere, where it interacts with ozone and sunlight and returns to earth as MSM in rainfall. MSM can be taken up by plants and incorporated into their structure, but no measurement of MSM content of foods has been done. Animal studies have shown that sulphur from oral supplements of MSM is incorporated into body proteins[2]. Animal studies have also reported that joints affected by osteoarthritis have lower sulfur content and mice with arthritis given MSM, experience less joint deterioration.[3,4]

Stride Distributors CC markets two formulations that include the nutrients chondroitin sulfate, glucosamine sulfate and MSM. These are RIGLY GLUCO LUBE which is a waterbased solution

containing chondroitin sulfate and glucosamine sulfate. RIGLY MSM PLUS is a waterbased gel that contains MSM plus 4 herbs. Both products are readily acceptable to horses and convenient to dose.

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