Clinical Research on Hyaluronic Acid (HA)

This review of clinical research includes three topics:

1) Treatments where increased HA relieves pain or accelerates healing, and
2) Cases where reduced HA concentration appears to cause a problem
3) Cases where excess HA is associated with disease processes.

1) Treatments where increased HA relieves pain or accelerates healing

Accelerated healing and reduced scarring: A study on wound healing shows that “increased levels of HA as observed during fetal wound healing or as achieved by the topical application of HA during wound dressing are associated with brisker healing and reduced scarring.” Med Hypotheses 1996 Oct;47(4):273-5


Reduced adhesions: A mesh made from HA, applied to the surgery site in repair of hernia, reduced adhesion formation. Surgery 1999 Feb;125(2):211-6

Temperomandibular joint resolution: Injection with HA provided 73% clinical resolution of patients with non-reducing disk displacement of the temperomandibular joint, compared to 36% of the control group. Oral Surg Oral Med Oral Pathol Oral Radiol Endod 1007 Sep;84(3):241-4

HA applied to damaged or osteoarthritic cartilage “completely protected human cartilage in explant culture and facilitated a full restoration of proteoglycan in damaged cartilage.” J Orthop Res 1999 Nov;17(6):858-69

Accelerated wound healing: “The rapid production of hyaluronic acid by fibroblasts in the early stages of wound healing may be of crucial importance as hyaluronic acid stimulates the migration and mitosis of mesenchymal and epithelial cells.” Med Hypotheses 1996 Oct;47(4):273-5

Prevention of contracture formation: Joint stiffness secondary to immobilization was reduced by 50% by intra-articular HA injection. Clin Orthop 1985 Jun;(196):306-11

2) Cases where reduced HA concentration appears to cause problems

Premature aging: Biochemical analysis showed that HA was decreased in skin showing premature aging, but was normal in normal skin on the same patient. Dermatologica 1986;172(5):241-4

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Disuse atrophy — Joint Immobilization: When the knee joint was immobilized no decrease in HA was found, but when a ligament was cut, causing joint instability, HA content dropped by 80%.

Retinal Detachment: Whereas the HA concentration in the vitreous body of normal patients was 92%, it decreased to 82% in patients with detached retina. In addition, the HA was of low hydrodynamic size (low viscosity) Biochem Int 1991 Oct;25(3):397-407

Glaucoma: Primary open-angle glaucoma may be a HA deficiency disease. Med Hypotheses 1998 Dec;51(6):483-4

3) Cases where excess HA is associated with disease processes.

In an extraordinary development, six studies show an excess of HA in disease processes where deficiency in HA in the diseased tissue would seem more likely to be a causative factor. In all these studies, the excess HA was found outside the diseased tissue and HA levels within the diseased tissues were not measured. We hypothesize that, when a tissue becomes traumatized, it stops producing its own HA. In an attempt to compensate, other tissues throughout the body increase their production of HA, but the local trauma causes tension which restricts the transport of HA to the local area in need.

In corneal disease, excess HA production was attributed to “non-specific tissue response to wounding” and “is seen in virtually the entire spectrum of corneal disorders” Invest Ophthalmol Vis Sci 1994 May;35(6):2774-82

In mitral valve prolapse, thickening at the rough zone and spongia layer indicated increased HA while the fibrosa layer (the highly flexible hinge areas which take most of the stress) showed decrease in thickness or disappeared. J Cardiol 1993;23(1):69-77

In Marfan syndrome and Ehlers-Danlos syndrome, fibroblasts are measured to produce 3 to 10 times the HA of normal fibroblasts. A study of premature aging showed elevated urinary HA. J Biol chem. 1979 Dec 10;254(23):12199-203 and Acta Derm Venereol 1985;65(6):489-94

A fibromyalgia study found that this disease is characterized by elevated HA in the blood, yet the pain and rigidity associated with this disorder clearly suggests that the traumatized tissue is deficient in HA and that the HA which is present is tightly coiled. J Rheumatol 1997 Nov;24(11):2221-4

While these last four studies suggest that excess HA production might cause the problem, it seems possible, at least in some of the above cases, that the high HA production may be the body’s attempted way to increase HA in local tissue, but that poor HA transport prevents effective HA delivery, and that the real problem may be that the local tissue is traumatized so that the tissue is not producing HA, and that the remaining HA coils tightly, creating unnecessary hardness and weakness of traumatized soft tissue.

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SUMMARY OF THE BENEFITS OF TREATMENT WITH THE EQUISONIC QGM 4.0 UNIT UPON THE HOCKS (TARSOCRURAL JOINT) OF THE RACING STANDARDBRED.

The standardbred athlete travels numerous miles during the course of training and racing. These miles are accomplished over a fairly resilient surface that results in concussive forces to all of the anatomical structures of the limb, especially the hock. These constant daily concussive forces (trauma) during exercise predispose the equine athlete to inflammation within the joint itself and all surrounding anatomical structures.

Infrasound therapy has proved to reduce the inflammation within these structures and provide analgesia to the equine athlete. The benefit of this is an improved athletic performance and a better quality of life for the animal.

The following benefits have been proven scientifically and the same results have been repeated in other studies.

THE HYALURONIC ACID CONCENTRATION WITHIN THE JOINT INCREASED:

A reduction within the inflammatory response within the synovial membrane allowed for these cells to naturally produce their own hyaluronic acid. The reduction within the inflammatory state within the joint also prohibited the breakdown of the hyaluronic acid already present within the joint.
THERE IS A REDUCTION IN THE PROTEIN CONTENT OF THE SYNOVIAL FLUID:

When a joint is not inflamed, the large molecular weight proteins present within the circulation are excluded from the synovial fluid. When the synovial membranes become inflamed, these protein molecules readily “leak” into the synovial fluid. This is termed joint effusion. Infrasound therapy reduced the inflammation present within the synovial membrane, which resulted in a reduction within the protein values measured in the synovial fluid.

THERE IS A REDUCTION WITHIN THE AST AND CK LEVELS WITHIN THE CIRCULATION DUE TO A DECREASE IN THE INFLAMMATION WITHIN THE MUSCLE TISSUES:

Even though these animals are in hard training and are competing each week, the inflammation within the muscle tissues is decreasing. This reduction in these serum chemistry values has been repeated in numerous studies.