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Chondroitin Sulfate Research Update 1999

By G. Douglas Andersen, DC, DACBSP, CCN

Last spring in the May 4, 1998 edition of *Dynamic Chiropractic*, I wrote an article on chondroitin sulfates (CS). I stated: When comparing the scientific literature on the absorption and positive human trials of CS to glucosamine, glucosamine is far and away superior. Remember that glucosamine is a precursor to chondroitin, so by taking glucosamine, the production of CS should be increased. Interest in CS began to heat up with Luke Bucci's 1995 book *Pain Free,*[1] and really took off with Dr. Theodosakis's 1997 book *The Arthritis Cure.*[2] Both authors felt that purified CS could benefit the connective tissues when taken orally in adequate amounts.

At the time I was hopeful that the publicity garnered from these books would stimulate more research on CS. For patients with limited funds who could not afford to take both CS and glucosamine sulfate, I recommended that glucosamine was the way to go. Although research in the United States continues to be slow, studies from Europe are looking good. These studies have utilized CS taken orally, as opposed to the injectable forms, the method used most often in the early research.

For those of you who missed last year's article (see *www.chiroweb.com/archives*), CS can be defined two ways. First, they are one of six glycosaminoglycans (GAGs), formerly knows as mucopolysaccharides. They are composed of an amino sugar, galactosamine (the immediate precursor of which is glucosamine), and a sugar acid (glucuronic). CS are long chains of repeating disaccharides that are sulfated. Two other GAGs are also sulfated, keratan and dermatan. Sulfated GAGs have negative charges which cause them to repel each other and attract water, which in turn fills space in three dimensions and enables cartilage to absorb shock. The chains of CS are much longer than the other sulfated GAGs. This is one of the reasons some people feel that CS is the most important GAG. The second way CS can be defined is as a dietary supplement in a new category called chondroprotective nutraceuticals.

Research Update

Belgium

In a double-blind, placebo-controlled trial of 119 patients with osteoarthritis of the fingers, the group which received oral CS at 400 mg three times a day had no progression of osteoarthritis in their fingers, unlike the placebo group, who had evidence of continuing degeneration.[3]

France

In a three-month study of 127 patients with knee osteoarthrititis, patients who took CS at 1,200 mg a day (either in divided doses or at one time) had less pain and more mobility in their knee joints. The researchers concluded that not only did CS help subjective and objective factors of knee arthritis, but that it did not matter whether it was taken all at once or three times per day.[4]

Hungary

A six-month trial was performed on 80 patients with osteoarthritis of the knee. The age range was from 39 to 83. Subjects took 800 mg of oral CS or a placebo. At the end of the trial, the CS group was able to walk faster than the placebo controls. Furthermore, the patients who were on the CS required less pain medication during the course of the study.[5]

Italy

In a short trial, 24 patients with osteoarthritis were given CS in a single dose of 800 mg daily for 10 days. Joint aspiration revealed an increase in hyaluronic concentration and joint viscosity, and a decrease in phospholipase A2, a marker of inflammation. Researchers also stated that the CS group displayed a decrease in collagenolytic activity. This paper demonstrated that oral administration of chondroitin sulfate reaches target tissues (synovial fluid and cartilage) at levels that can be objectively measured in less than two weeks.[6]

Switzerland

Forty-two patients with knee osteoarthritis, ages 35-78 years, took 800 mg of oral CS a day or a placebo for one year. At the end of the trial, the chondroitin group had less pain, better mobility, and a stabilization of joint space narrowing. Arthritis in the placebo group progressed over the 12 month trial.[7]

Conclusions This is an impressive set of studies which show that standing alone CS can help patients suffering from osteoarthritis. Based on these studies, oral ingestion of chondroitin sulfate is safe, well tolerated, and is equally effective when taken all at once or in divided doses. It appears that chondroitin sulfate helps patients in three ways: the first being metabolic by increasing joint viscosity; the second is in an antidegradative fashion by reducing collagenolytic activity; and the third is by reducing inflammation, which was demonstrated in the Ronca paper by showing decreased levels of phospholipase A2 in inflamed joints. In turn, this leads to less pain, greater mobility and an apparent retardation of joint space erosion. Although none of these trials included people with spinal arthritis, I do not feel it would be wrong to extrapolate that CS supplementation would benefit this group as well.

When patient funds are tight and a choice has to be made, I will still recommend glucosamine over chondroitin sulfate based on the literature available.[8] But with this month's CS research review, I am strongly advising my patients with arthritis to take both. I will continue to report any research (positive or negative) on CS, both alone and in concert with glucosamine.

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