Glucosamine HCl and Chondroitin Sulfate Nutritional Support for Connective Tissues

Painful Osteoarthritis Now Affects More Than 40 Million Americans

Painful osteoarthritis, characterized by joint degeneration, loss of cartilage and alterations of subchondral bone, now affects more than 40 million Americans. There is a 35% incidence in the knees as early as age 30 and the incidence increases dramatically with age, affecting 80% of persons over 50.[3] Many more are affected by rheumatoid arthritis, tendonitis, bursitis, sports or other connective tissue injuries. Until now standard treatment has focused on relieving the pain as much as possible, while the tissues continue to deteriorate.

G/C 1000™

Glucosamine HCl with Chondroitin Sulfate

Product No. 723	Fill Size: 60 Capsules
Product No. 7232	Fill Size: 250 Capsules

Each capsule contains:		% Daily Value
Glucosamine Hydrochloride	750 mg.	*
Chondroitin Sulfate	250 mg.	*
Manganese Ascorbate	75 mg.	*
Manganese (from manganese ascorbate)	15 mg.	750%
Vitamin C (from manganese ascorbate)	60 mg.	100%

Other ingredients: gelatin, magnesium stearate.

* Daily Value not established

Recommended Use: Two capsules daily.

Damaged and Worn Cartilage Can Be Repaired and Rebuilt

Due to normal wear and tear, tissues are constantly being broken down and replaced or restructured. When aging, disease or injury makes conditions less than ideal, tissues are broken down faster than they can be regenerated. There is increased turnover of the cartilage matrix in osteoarthritic joints compared to normal joints. When the amount of matrix degraded by chondrocytic enzymes exceeds the amount of new matrix synthesized, cartilage naturally degenerates. If this process continues, destruction of cartilage is followed by hardening and formation of bone spurs in the joint margins. The result is pain, deformity and limited movement in the joint.

However, research has shown that, by supplying the body with natural substances that inhibit cartilage breakdown and promote cartilage repair, damaged cartilage can be replaced by healthy new cartilage.[1-8] These effects have been confirmed with electron micrography.[8]

Chondroitin Sulfate Is the Ground Substance of Connective Tissues

Proteoglycans are a group of proteins that make up what is known as the "ground substance" of cartilage. This is what gives joints their strength and resilience. **Chondroitin sulfate**, a glycosaminoglycan (GAG) which is a type of proteoglycan, is predominant in the ground substance of cartilage, bone and blood vessels, but also occurs in other connective tissues.

In test tubes, chondroitin sulfate stimulates the production of cartilage and inhibits degradative enzymes that destroy it.[1] Clinical trials have demonstrated improved joint function and mobility, reduced pain and inflammation and an actual reversal of joint degeneration as detected by radiographs. This reversal includes observed improvement in the volume and quantity of the joint connective matrix and synovial fluid.[5]

In addition to these improvements, another surprise benefit has been observed. Over long periods of supplementation, astherosclerotic changes took place and death from cardiovascular disease was nearly eliminated.[5] Chondroitin sulfate also forms the ground substance of blood vessels.

Since chondroitin sulfate is a very large molecule, some people claim that it cannot be absorbed and is of no value as a supplement. However, animal studies using radioactively tagged chondroitin sulfate have shown that, after being broken down into its components and absorbed, the metabolites are reassembled into new chondroitin sulfate molecules and added to the GAG supply needed to maintain healthy joints and other connective tissues.[6]

Glucosamine Is Both Precursor and Stimulant to Cartilage Synthesis

Glucosamine, a naturally occurring amino sugar made up of glucose and the amino acid glutamine, is both a precursor and a stimulant of proteoglycan synthesis. The availability of glucosamine is the key, rate-limiting step in GAG and proteoglycan synthesis. If sufficient glucosamine is available, then synthesis of proteoglycans can proceed.[2]

In several clinical studies, glucosamine has been shown to help relieve the joint pain and stiffness of osteoarthritis. With continued use, it was even more effective than ibuprofen for joint pain. Tested against ibuprofen in an 8-week double-blind study involving 40 patients with unilateral degeneration of knee joints, pain scores decreased faster in the ibuprofen group, but by the eighth week, glucosamine proved to be much more effective.[7]

Perhaps the most significant study on glucosamine and osteoarthritis comes from Pavia, Italy, where 80

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patients were hospitalized for 30 days. They received rest and physical therapy, but no drugs. Half the patients were given glucosamine and the other half a placebo. As in other studies, big improvements were found in the glucosamine-treated group. Ten became symptom-free. No such improvements were seen in the control group. Near the end of the study, samples of cartilage were taken from some of the subjects. When the cartilage samples were examined by scanning electron microscopy, damage and destruction of cartilage typical of osteoarthritis were found in the control subjects. Cartilage from the glucosamine-treated patients looked more like healthy cartilage. Since all of the patients had severe osteoarthritis before the study, this study provided direct physical evidence of the ability of oral glucosamine to regenerate damaged cartilage.[1,8]

Glucosamine, a much smaller molecule than chondroitin sulfate, is easily and rapidly absorbed by the body. At physiological pH, 75% of glucosamine is not ionized and, therefore, easily crosses membranes. Absorption studies in both animals and humans indicate that glucosamine is rapidly absorbed and selectively taken up by articular cartilage.[2]

More Glucosamine in HCl Form

There are three basic forms of glucosamine commercially available: N-acetyl glucosamine, glucosamine hydrochloride and glucosamine sulfate. Which is best? Basically, what you want is glucosamine and any form is good; however, there are some differences.

N-acetyl glucosamine (NAG) is metabolized differently from other forms. It is selectively taken up by the liver and other tissues to make proteins, so it is less available to repair cartilage. Since pure glucosamine breaks down upon exposure to air and water, sodium chloride (salt) or potassium chloride is often used as a stabilizer in glucosamine sulfate, accounting for 30% of its weight. Sulfate accounts for 20% of the weight, so many glucosamine sulfate supplements are only half glucosamine.[1]

Glucosamine HCl, on the other hand, is 83% glucosamine, more stable than glucosamine sulfate and is sodium-free. Although many of the successful clinical trials used glucosamine sulfate, animal studies and cartilage culture studies all indicate that glucosamine HCl is better than other forms of glucosamine for enhancing cartilage production.[1]

Manganese, a Necessary Cofactor

Manganese is also important as a necessary cofactor for the enzyme glycosyltransferase which is needed for the uptake of sulfate in the synthesis of proteoglycans. Manganese deficiency has been associated with decreased GAG in discs as well as lack of tone in ligaments and tendons. In animals, manganese deficiency inhibits proteoglycan production and results in deformed bones and joints.[4]

Standard Treatment Suppresses Symptoms...Worsens the Condition

Standard medical treatment for osteoarthritis is aspirin or other non-steroidal anti-inflammatory drugs (NSAIDs) which may relieve the pain, but do nothing to arrest the degenerative process. In fact, there is evidence that long-term use of NSAIDs can cause further joint damage and accelerate the progression of osteoarthritis by inhibiting synthesis of proteoglycans.[3] Supplementary glucosamine and chondroitin sulfate may counteract this effect to some degree; however, use of NSAIDs should be discontinued as soon as possible.

Pain Relief Is Slower but Lasts Longer

The natural products, chondroitin sulfate and glucosamine HCl, are not analgesics in the same sense as aspirin, other NSAIDs and corticosteroids. Pain relief is seen with continued use as damaged tissues are repaired and rebuilt. In the comparison study with glucosamine and ibuprofen, it took 8 weeks for the glucosamine group to show less pain and more mobility than the ibuprofen group. However, their relief lasted for up to a month after the supplements were discontinued.[4,7] That is not possible with pain relief medications.

By taking these natural supplements prophylactically, it may be possible to avoid, or at least postpone, joint degeneration indefinitely. It is definitely important to begin supplementation at the first sign of injury or degeneration. If the disease is allowed to progress until no cartilage remains, there is nothing left to repair.

REFERENCES

1. Bucci, Luke PhD, **Pain Free**, The Summit Group.
2. Bucci, Luke PhD, **Nutrition Applied to Injury Rehabilitation and Sports Medicine**, CRC Press.
3. Pizzorno, J, "Natural Medicine Approach to Treating Osteoarthritis", *Alt & Comp Ther*, Jan/Feb, 1995;93-95
4. McCarty, M, "The Neglect of Glucosamine as a Treatment for Osteoarthritis — A Personal Perspective", *Medical Hypotheses* (1994) 42;323-327.
5. "Chondroitin Sulfate - Cartilage Compound Confounds Joint Problems", *HCN*, Spring/Summmer 1997.
6. Conte, A, et al, "Biochemical and Pharmocokinetic Aspects of Oral Treatment with Chondroitin Sulfate", *Arzneimittelforschung* 45:8, 918-925, Aug. 1995.
7. Lopez, V, "Double-blind clinical evaluation of the relative efficacy of ibuprofen and glucosamine sulfate in the management of osteoarthrosis of the knee in outpatients", *Curr Med Res Opin*, 9:145-149, 1982
8. Drovanti, A, et al., "Therapeutic activity of oral glucosamine sulfate in osteoarthrosis: A placebo-controlled double-blind investigation", *Clin Ther* 3(4):260-272, 1980.
9. Goodheart, G., "A Presentation of a New Approach to Correction of Disc Lesions", *ACA Journ. Chiro.*, Dec., 1954, p. 36-37.

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