

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.

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 microscopy.⁽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

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.	

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, atherosclerotic 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

