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DISCAT Plus

for cartilage and joint repair and regeneration with
Glucosamine Sulfate and Perna Canaliculus (pure chondroitin sulfate)

HISTORY OF DISCAT

for the care of osteoarthritis & disc degeneration; to potentially regenerate damaged cartilage in the disc

Discat was originally formulated in the early 1970's by Dr. James M. Cox based on the research of Cole, Ghosh and Taylor in their textbook on the nutrition of the disc. Over the years, more research on the spinal disc and its nutrition, nerve supply, and function has increased attention to preventive and nutritive interventions to caring for the disc.

The disc degenerates due to injury and/or age. Such degeneration may be determined by genetics as well. When the disc degenerates, its cartilage loses its nutrient supply as well as its cushion of the vertebrae, the bones in the spine. Pain may well result.

Patients report results in a matter of a few days to several weeks. Some notice changes in knee pain reduction as knees are cushioned by cartilage as well. Your results will vary. Consult your physician with any questions.

GLUCOSAMINE SULFATE IS PREFERRED OVER GLUCOSAMINE HCl. [29]

- GS HCl lacks the sulfur compound which is an essential nutrient for joint tissue. [29]
- The sulfur compound restrains the enzymes which lead to cartilage destruction in osteoarthritis. [29]
- GS has many clinical studies proving its effectiveness; GS HCl lacks such studies. [29]

THE INGREDIENTS

Glucosamine sulfate and **chondroitin sulfate** [a form of **glycosaminoglycan**] are naturally occurring substances that are essential for cartilage maintenance, as well as necessary for cartilage regeneration. Together, they help chondrocytes within cartilage form new cartilage. The amount of proteoglycans formed depends upon the amount of glucosamine present. The more glucosamine available, the more proteoglycans can be made. [11]

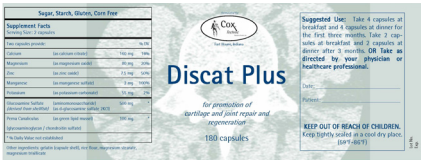
"The amount of proteoglycans formed depends upon the amount of glucosamine present."

Glucosamine forms proteoglycans that are found within the joints while **chondroitin sulfates** act like "magnets" that attract fluid into the proteoglycan molecules. This is important because the fluid acts as a shock absorber and sweeps nutrients into the cartilage. [8] They are both tied to the **sulfate** compound. In a dog study, it was found that sulfate and glycosaminoglycan act as chondroprotective agents. [30] Sulfur is an essential nutrient for joint tissue as it stabilizes the connective tissue matrix of cartilage, tendons, and ligaments. It inhibits the enzymes that lead to cartilage destruction in osteoarthritis. Healthy people have low serum sulfate levels; osteoarthritic people have even lower levels. Arthritic persons are commonly deficient in sulfur. [29] In the posterior anulus and nucleus in degenerative disc disease, chondroitin is undersulfated. [31]

Discat Plus is formulated with these important points in mind.

THE FORMULA & USAGE

The ingredients in DISCAT are formulated to rebuild the disc.



Discat PLUS Formula
(*per 2 capsule serving*)

500 mg Glucosamine Sulfate
(aminomonosaccharide)
100 mg Perna Canaliculus
(as green lipid mussel)
(source of chondroitin sulfate / Glycosaminoglycan)

Other nutrients which are found in the normal disc are included in this formula:
7.5 mg **Zinc Oxide**
2 mg **Manganese Sulfate**
80 mg **Magnesium Oxide**
160 mg **Calcium Citrate**
55 mg **Potassium Carbonate**

Sugar and Starch Free

Other ingredients: gelatin (capsule shell), magnesium stearate, talc)

Suggested Use:

Take 4 capsules at breakfast and 4 capsules at dinner for the first three months.
Take 2 capsules at breakfast and 2 capsules at dinner after three months.
OR
Take as directed by your physician.

Disclaimer: No claims are being made, either expressed or implied, that these products will cure disease, replace prescribed medications, or replace sound advice from a physician.

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DRUGS HARMFUL TO DISCS

Damaging Factors of Cartilage and Glycosaminoglycan Processing

ANTIDEPRESSANTS ENDANGER BONE and JOINTS

Ray: Cyclic antidepressants may increase hip fracture risk. J of Manipulative Medicine (12/91):46

STEROIDS CAUSE BONE LOSS, INCREASE FRACTURE RISK

Bockman RS et al: Steroid induced osteoporosis. Ortho Clin of N Amer 21(1):97

Fries: Prednisone greatly increases fracture risk. J of Musculoskeletal Med (6/92):16

Mitchell: [Steroid use causes osteodegenerative arthritic hips]. Radiology 1987; 62(3):709

Fessler: [Chronic steroid use leads to epidural lipomatosis.] Spine 1992; 17(2)

NON-STEROIDAL ANTI-INFLAMMATORY DRUGS (NSAIDs) DEPRESS GAG PRODUCTION and SYNTHESIS, DESTROY CARTILAGE

Yoo: Suppression of proteoglycan synthesis in chondrocyte cultures derived from canine intervertebral disc. Spine 17(2):221-224

Newman: Lancet 1985; pgs. 11-14

VanDerKraan et al: High susceptibility of human articular cartilage glycosaminoglycan synthesis to changes in inorganic sulfate availability. J of Ortho Research 1990; 8(4):565-71

Whittaker: Arthritis drugs actually cause cartilage destruction! Health & Healing 3(6):1-4

SALICYLATES (aspirin) DEPLETE GAG SYNTHESIS in DISC, LEAD to OSTEOARTHRITIS, WEAKEN BONE

Palmoski: Arthritis and Rheumatism 1985; 28:548;

DeVries: Arthritis and Rheumatism 1985; 28:922-9;

Laan: Arthritis and sciatica drug weakens vertebrae. Backletter 1994;9(2):22

HEALING PROPERTIES FOR DEGENERATED OR DAMAGED DISCS AND CARTILAGE

Glucosamine Sulfate
Perna Canaliculus *[pure chondroitin sulfate – the green lipped mussel source of GAG]*

Glucosamine sulfate and ***chondroitin sulfate*** [a form of ***glycosaminoglycan – GAG***] are naturally occurring substances that are essential for cartilage maintenance, as well as necessary for cartilage regeneration. Together, they help chondrocytes within cartilage form new cartilage. The amount of proteoglycans formed depends upon the amount of glucosamine present. The more glucosamine available, the more proteoglycans can be made. [11]

Glucosamine forms proteoglycans that are found within the joints while ***chondroitin sulfates*** act like "magnets" that attract fluid into the proteoglycan molecules. This is important because the fluid acts as a shock absorber and sweeps nutrients into the cartilage. [8] They are both tied to the ***sulfate*** compound. In a dog study, it was found that sulfate and glycosaminoglycan act as chondroprotective agents. [30] Sulfur is an essential nutrient for joint tissue as it stabilizes the connective tissue matrix of cartilage, tendons, and ligaments. It inhibits the enzymes that lead to cartilage destruction in osteoarthritis. Healthy people have low serum sulfate levels; osteoarthritic people have even lower levels. Arthritic persons are commonly deficient in sulfur. [29] In the posterior anulus and nucleus in degenerative disc disease, chondroitin is undersulfated. [31]

"The amount of proteoglycans (GAG's) formed depends upon the amount of glucosamine present."

*P*erna Canaliculus *[*from green lipped mussel (shellfish); those allergic to shellfish should be cautious*]* is *pure chondroitin sulfate* which is one form of glycosaminoglycan – GAG for short – in Discat and Discat Plus. It is reportedly the "single most effective" item for relief of joint pain and inflammation as occurs with disc herniations, osteoarthritis, and rheumatoid arthritis.

- may decrease (or eliminate) pain of rheumatiod and osteoarthritis
- may help restore mobility to degenerated joints/cartilage
- may decrease joint distortion from degeneration of joint tissue

Further, one of the most popular and effective substances used by doctors in Europe for arthritis is *chondroitin sulfate* A (CSA). CSA is naturally found in bones, cartilage, tendons, ligaments, vertebral discs as well as in many plants. [17] In one study, ***77% of those taking CSA reported reduced inflammation*** – over 42% higher than those receiving NSAIDs. ***It repairs degraded bones, increases the absorption and replacement of calcium and diminishes the disease and begins rebuilding the damaged area with none of the health risks of NSAIDs.***

Perna canaliculus extract has proven to be the single most effective preparation ever encountered for the treatment of osteo- and rheumatoid arthritis. Perna canaliculus extract did have genuine anti-inflammatory effects. [17]

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GLUCOSAMINE SULFATE

may prevent degeneration & promote regeneration of cartilage

improves mobility and relieves pain with significantly less side effects than NSAIDs

has good tolerability

maintains its good benefits even if there is an interruption in taking them compared with drug therapy which relieves pain only while taking the drug

Glucosamine sulfate (GS) is a naturally occurring part of joint cartilage and forerunner for and stimulant of **proteoglycan synthesis and the making of GAG which is necessary for development of the white fibrocartilage of the disc**. Unlike NSAIDs which relieve symptoms of and, over time, accelerate the destruction of, degenerative joint and disc disease, **glucosamine** has been shown in experiments to ***slow the progression of the degenerative disease and promote repair of affected cartilage***:

Two similar yet separate experiments[6,7] were conducted and gained similar results: *patients receiving GS improved by 71% compared to a placebo group.*[6]

A comparison[8] of 2 groups —one receiving ibuprofen and one GS three times per day (total of 1500 mg) for 30 days—showed that **the GS group reported less pain on rest, standing, and exercise. The GS group's improvement was more pronounced, lasting for a period of 6 to 12 wks after the treatment ended.**

In a double-blind study[9] of people suffering from osteoarthritis of the knees compared a placebo group to a GS group. The **GS group showed significant reduction in pain, joint tenderness, and swelling treated with 1500 mg GS daily.**

Findings by electron micrographs of cartilage of persons receiving GS compared to a placebo[10] show:

Placebo results - typical of osteoarthritis;

GS results - more similar to healthy cartilage.

GS is able to stimulate proteoglycan synthesis by chondrocytes and has mild anti-inflammatory properties. In a clinical trial, GS was tested against ibuprofen. 35% of the ibuprofen group complained of adverse effects throughout the treatment, with seven dropping out of the study. Only six of the 100 patients in the GS group experienced adverse effects. Therefore, GS was as effective as ibuprofen.[18]

GS is the preferred form of glucosamine (over GS HCl, for example) and the only form of glucosamine subjected to over 300 scientific investigations & 20 double-blind studies. [29]

The absorption rate for GS is about 98%. [24,25]

GS is extremely non-toxic, and its therapeutic margin is 10-30 times better than NSAIDs [26] **When taken orally**, it is more effective than placebo and at least as effective as NSAIDs in relieving the symptoms of osteoarthritis. [28]

2% of 1500 patients were unable to tolerate GS: peptic ulcer and diuretic use were associated w/increased risk of side effects, most commonly: gastric upset (3.5%), heartburn (2.7%), diarrhea and nausea (1%). [27]

CHONDROITIN SULFATE

Glycosaminoglycan (GAG)

may stop destruction of & even enhance the regeneration of cartilage

Supplemented ***chondroitin sulfates*** work like naturally occurring chondroitins found in cartilage:

stop enzyme starvation of cartilage and build proteoglycans, glycosaminoglycans, and collagen, the building blocks for healthy new cartilage. [13]

protect existing cartilage from premature breakdown by inhibiting the action of certain "cartilage chewing" enzymes. [12]

work synergistically with glucosamine.[14]

The central event in osteoarthritis and degenerative disc disease is the loss of the proteoglycans from the disc. [32]

Low GAG precedes degenerative disc disease; injured and adjacent discs show less GAG and increased collagen. [33]

Osteodegenerative arthritis shows increased release of GAG. [34]

Arthrosis shows a loss of glycosaminoglycan. [35]

Bucci reports that ***OSTEOARTHRITIS CAN BE REVERSED*** by chondroprotective agents - GAGs - if use of analgesics (aspirin, nonsteroidal drugs) is minimal.[1] Further, he states that *oral administration of GAGs is better than injection because constant higher levels can be maintained in the bloodstream instead of short periods of elevation by shots.*

Cole, Ghosh & Taylor wrote that mature beagle dogs, when given GAG over a 26 wk period, showed cartilage improvement.[2] *These findings were the first to suggest that GAG administration might be of value in management of degenerative disc disease.*

A 50% loss of GAG from rabbit articular cartilage when arthritis of the joint was reported in one study. This caused the cartilage matrix to be less capable of restoring the proteoglycan content of the cartilage and resulted in loss of joint stiffness and resistance to the compression.[3]

In rabbits with osteoarthritis of the knee, injection of ***sulfated GAG inhibited enzymes that destroy cartilage*** and ***promoted repair of the defects***. GAG had been found to increase proliferation of the hyaline cartilage of the hip joint in mice and the femoral condyles, femur and tibia of rabbits. Furthermore, ***Puhl and Dustmann*** induced regeneration of damaged cartilage in rabbits. [5]

120 patients suffering from osteoarthritis of the knees and hips were either given oral chondroitin sulfates or a placebo. After three months, ***the group given the oral chondroitin in the morning and the evening reported a reduction in pain and pain movement***. There were no reported side effects. In addition, there was *a 60-day carry-over effect* when administration was stopped. Results appeared within 2 to 8 weeks. [16]

(Continued on page 4)

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(Continued from page 3)

50 patients suffering from osteoarthritis of the knee were given oral chondroitin sulfate or a pain medication. Cartilage tissue samples were taken after three months of therapy. Results showed that ***the chondroitin group had repaired the cartilage to a significant degree***. [15]

Eismont showed circulation into the disc when he reported that antibiotics reach the nucleus pulposus following 8 hours of intramuscular administration.[4]

Dogs given GAG showed ***less osteophyte formation, less disc space narrowing, better disc injury repair, and prevention of experimental disc degeneration***. [36]

Trentham et al [19] (of Harvard University) report in *Science* on a new way to help rheumatoid arthritis (RA) sufferers: oral tolerization. This procedure involved a liquid solution of cartilage/collagen and orange juice. Dr. Trentham states that this seems to "teach" the body's immune system to stop inflaming the tissue around the joints. This appears to arrest the progress of RA. In a three month trial, 28 patients — all of whom were taken off all other drugs — got relief from RA; 4 went into remission. Thirty-one patients on a placebo became worse. Basically, this study finds that ***the immune system can be helped to relieve joint and disc pain and inflammation with cartilage.***

"Dr. Arthur Grayzel, senior vice president of medical affairs of the Arthritis Foundation, said he was quite encouraged by the [Trentham] study" that such a solution may have the ***potential to halt rheumatoid arthritis***. [20]

NEW! 42 patients with osteoarthritis (OA) of the knee were given 800 mg of oral chondroitin sulfate. The chondroitin sulfate patients showed less pain, better mobility, stabilization of joint space narrowing whereas the placebo patients' OA progressed. [37]

NEW! A 6 month trial compared 800 mg of chondroitin sulfate and a placebo given to 80 patients with OA of the knee. Results showed that the patients had reduced use of pain medications and walked faster. [38]

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CHIROPRACTIC & GLUCOSAMINE SULFATE FOR OSTEOARTHRITIS

Gottlieb MC: Conservative Management of Spinal Osteoarthritis with Glucosamine Sulfate and Chiropractic Treatment. JMPT 1997; 20(6):400-14
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Objective:
To evaluate the rationale behind the most commonly used treatments of osteoarthritis, including nonsteroidal anti-inflammatory drugs (NSAIDs), and to assess more effective conservative treatment options.

Summary of Background Data:
This review includes a description of the pathophysiology and prevalence of osteoarthritis, joint physiology and NSAID treatment of osteoarthritis, as well as side effects on joints, the gastrointestinal tract, kidneys and liver. Several studies of conservative treatment, consisting of supplementation of glucosamine sulfate (which occurs naturally in the human body), exercise and the use of chiropractic treatment for maintaining joint function and preventing further destruction, are reviewed.

Data Sources:
A computerized search of Medline using the key indexing terms osteoarthritis, degenerative joint disease, nonsteroidal anti-inflammatory drugs, glucosamine sulfate, chiropractic and manipulation.

Results:
Numerous studies were obtained under each subheading and reviewed by category. Human and animal-model studies are described.

Conclusion:
The *rationales for using NSAIDs in the treatment of osteoarthritis is controversial and openly contested*. Given the detrimental effects of NSAIDs on joints and other organs, *their use should be discouraged and their classification as a first choice conservative treatment should be abolished.* A truly effective and conservative approach to the treatment of osteoarthritis should include chiropractic manipulation, essential nutrient supplementation, exogenous administration of glucosamine sulfate and rehabilitative stretches and exercises to maintain joint function. Because there is no correlation between pain levels and the extent of degeneration detected by radiographic or physical examination, conservative treatment should be initiated and sustained based on functional, objective findings and not strictly on how the patient feels. The use of NSAIDs should be limited to the treatment of gross inflammation and analgesics should only be used in the short-term when absolutely necessary for pain palliation. The present conservative approach could lead not only to a better quality of life but also to the saving of health care dollars by reducing the iatrogenic morbidity and mortality associated with NSAID use.

LOSS OF GLYCOSAMINOGLYCAN FROM THE NUCLEUS PULPOSUS LEADS TO INTERNAL STRESS CHANGES IN THE DISC LEADING TO DEGENERATION

Boxberger, JI; Sen, S; Yerramalli, CS; Elliott, DM: Nucleus pulposus glycosaminoglycan content is correlated with axial mechanics in rat lumbar motion segments. JOURNAL OF ORTHOPAEDIC RESEARCH 2006; 24 (9):906-1915

The unique biochemical composition and structure of the intervertebral disc allow it to support load, permit motion, and dissipate energy. With degeneration, both the biochemical composition and mechanical behavior of the disc are drastically altered, yet quantitative relationships between the biochemical changes and overall motion segment mechanics are lacking. This study showed that moderate decreases in nucleus glycosaminoglycan content consistent with early human degeneration affect overall mechanical function of the disc. These decreases may expose the disc to altered internal stress and strain patterns, thus contributing through mechanical or biological mechanisms to the degenerative cascade.

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CHONDROITIN SULFATE—A discussion of the oral and injected forms.

Pepitone VR: Chondroprotection with chondroitin sulfate. *Drugs in experimental and clinical research* 1991;17(1):3-7

50 patients with ODA of the knee were given 8-1200 mg of chondroitin sulfate daily or 500 mg of pain medication

In 3 months, **biopsy showed repair of the patients taking chondroitin sul**fate.

Olivero U et al: Effects of treatment with matrix on elderly people with chronic articular degeneration. *Drugs in experimental and clinical research* 1991;17(1):45-51

120 ODA of hip and knee patients given chondroitin sulfate or placebo

3 months, chondroitin sulfate patients had reduced pain.

Take am and pm.

Results in 2-8 weeks.

Bucci L, Poor G: Efficacy and tolerability of oral chrondroitin sulfate as a symptomatic slow-acting drug for osteoarthritis in the treatment of knee osteoarthritis. *Osteoarthritis and Cartilage* 1998;6(A):31-6

6 month trial of 800 mg chondroitin sulfate versus placebo

80 patients with osteoarthritis of knee

Reduced pain medication and walked faster.

Ronca F: Anti-inflammatory activity of chondroitin sulfate. *Osteoarthritis and Cartilage* 1998;68(A):14-21

24 patients with osteoarthritis

Given 800 mg chondroitin sulfate a day for 10 days

Joint aspiration showed decreased phospholipase A2, increased hyaluronic acid concentration

Decreased collagen enzyme breakdown

Oral chondroitin sulfate reaches target tissues in less than 2 weeks

Uebelhart D: Effects of oral chondroitin sulfate on the progression of knee osteoarthritis: a pilot study. *Osteoarthritis and Cartilage*.1998;6(A):39-46

42 patients with osteoarthritis of knee

Given 800 mg **oral chondroitin sulfate** a day

Chondroitin patients showed less pain, better mobility, stabilization of joint space narrowing

Placebo patients progressed

Bucci LR: Reversal of osteoarthritis by nutritional intervention. *ACA J Chiro* 11/90

Glycosaminoglycan is chondroprotective if aspirin and NSAIDS are minimal

Oral administration is best as serum level is constant with GAG

Shostak NA et al: Low back pain in spinal osteochondrosis: experience of treatment with chondroprotective drug. *Terapevtichjeskii Arkhiv 2002;* 74(8):67-69

30 PATIENTS WITH LBP (MEAN AGE 51)

GIVEN CHONDROITIN SULFATE (DRUG NAME: STRUCTUM) 1G/DAY FOR 24 WEEKS

73% OF PATIENTS SHOWED PAIN RELIEF AND IMPROVED SPINAL FUNCTION

INCLUDED IN TREATMENT OF LOW BACK PAIN AS CHONDROPROTECTIVE DRUG

Mazurov, VI; Belyaeva, IB: Structum in combined treatment of low back pain syndrome. *TERAPEVTICHESKII ARKHIV* 2004; 76 (8):68-71

Aim. To assess duration of a clinical response and tolerance of structum in patients with low back pain (LBP) and co-morbid cardiovascular disease.

Results. To the end of the first treatment months structum significantly relieved pain intensity, spinal motility, increased exercise tolerance. Excellent and good response to structum were observed in 71% patients, noresponse was in 29%. Tolerance of the drug was good in 23 (92%) patients. The effect persisted for 3 months. CHD characteristics did not change while arterial pressure went down noticibly.