



Glucosamine and Chondroitin for Osteoarthritis

What's the Bottom Line?

How much do we know about glucosamine and chondroitin supplements?

- We have some information about the safety and usefulness of glucosamine and chondroitin from large, high-quality studies in people.

What do we know about the effectiveness of glucosamine and chondroitin supplements?

- Research results suggest that chondroitin isn't helpful for pain from osteoarthritis of the knee or hip.
- It's unclear whether glucosamine helps with osteoarthritis knee pain or whether either supplement lessens osteoarthritis pain in other joints.

What do we know about the safety of glucosamine and chondroitin supplements?

- Studies have found that glucosamine and chondroitin supplements may interact with the anticoagulant (blood-thinning) drug warfarin (Coumadin). Overall, studies have not shown any other serious side effects.
- If you take glucosamine or chondroitin supplements, tell your health care providers. They can do a better job caring for you if they know what dietary supplements you use.

What Are Glucosamine and Chondroitin?

Glucosamine and chondroitin are structural components of cartilage, the tissue that cushions the joints. Both are produced naturally in the body. They are also available as dietary supplements.

Glucosamine and Chondroitin for Osteoarthritis

Researchers have studied the effects of these supplements, individually or in combination, on osteoarthritis, a common type of arthritis that destroys cartilage in the joints.

Cartilage is the connective tissue that cushions the ends of bones within the joints. In osteoarthritis, the surface layer of cartilage between the bones of a joint wears down. This allows the bones to rub together, which can cause pain and swelling and make it difficult to move the joint. The knees, hips, spine, and hands are the parts of the body most likely to be affected by osteoarthritis.

For more information about osteoarthritis, visit the [National Institute of Arthritis and Musculoskeletal and Skin Diseases Web site](#). For more information on complementary health approaches for osteoarthritis, see the National Center for Complementary and Integrative Health (NCCIH) fact sheet [Osteoarthritis and Complementary Health Approaches](#).

What the Science Says About Glucosamine and Chondroitin for Osteoarthritis

For the Knee or Hip

Glucosamine

Major studies of glucosamine for osteoarthritis of the knee have had conflicting results.

- A large National Institutes of Health (NIH) study, called the Glucosamine/chondroitin Arthritis Intervention Trial (GAIT), compared glucosamine hydrochloride, chondroitin, both supplements together, celecoxib (a prescription drug used to manage osteoarthritis pain), or a placebo (an inactive substance) in patients with knee osteoarthritis. Most participants in the study had mild knee pain.
 - Those who received the prescription drug had better short-term pain relief (at 6 months) than those who received a placebo.
 - Overall, those who received the supplements had no significant improvement in knee pain or function, although the investigators saw evidence of improvement in a small subgroup of patients with moderate-to-severe pain who took glucosamine and chondroitin together.
 - For more information on the trial, see the NCCIH Web page [Glucosamine/Chondroitin Arthritis Intervention Trial \(GAIT\)](#).
- In several European studies, participants reported that their knees felt and functioned better after taking glucosamine. The study participants took a large, once-a-day dose of a preparation of glucosamine sulfate sold as a prescription drug in Europe.
- Researchers don't know why the results of these large, well-done studies differ. It may be because of differences in the types of glucosamine used (glucosamine hydrochloride in the NIH study vs. glucosamine sulfate in the European studies), differences in the way they were administered (one large daily dose in the European studies vs. three smaller ones in the NIH study), other differences in the way the studies were done, or chance.

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Chondroitin

In general, research on chondroitin has not shown it to be helpful for pain from knee or hip osteoarthritis.

- More than 20 studies have looked at the effect of chondroitin on pain from knee or hip osteoarthritis. The quality of the studies varied and so did the results. However, the largest and best studies (including the NIH study discussed under the heading “Glucosamine” above) showed that chondroitin doesn’t lessen osteoarthritis pain.

Joint Structure

A few studies have looked at whether glucosamine or chondroitin can have beneficial effects on joint structure. Some but not all studies found evidence that chondroitin might help, but the improvements may be too small to make a difference to patients. There is little evidence that glucosamine has beneficial effects on joint structure.

Experts’ Recommendations

Experts disagree on whether glucosamine and chondroitin may help knee and hip osteoarthritis. The American College of Rheumatology (ACR) has recommended that people with knee or hip osteoarthritis not use glucosamine or chondroitin. But the recommendation was not a strong one, and the ACR acknowledged that it was controversial.

For Other Parts of the Body

Only a small amount of research has been done on glucosamine and chondroitin for osteoarthritis of joints other than the knee and hip. Because there have been only a few relatively small studies, no definite conclusions can be reached.

– Chondroitin for osteoarthritis of the hand.

A 6-month trial of chondroitin in 162 patients with severe osteoarthritis of the hand showed that it may improve pain and function.

– Glucosamine for osteoarthritis of the jaw.

One study of 45 patients with osteoarthritis of the jaw showed that those given glucosamine had less pain than those given ibuprofen. But another study, which included 59 patients with osteoarthritis of the jaw, found that those taking glucosamine did no better than those taking a placebo (pills that don’t contain the active ingredient).

– Glucosamine for chronic low-back pain and osteoarthritis of the spine.

A Norwegian trial involving 250 people with chronic low-back pain and osteoarthritis of the lower spine found that participants who received glucosamine fared the same at 6 months as those who received placebo.

What the Science Says About Safety and Side Effects

- No serious side effects have been reported in large, well-conducted studies of people taking glucosamine, chondroitin, or both for up to 3 years.
- However, glucosamine or chondroitin may interact with the anticoagulant (blood-thinning) drug warfarin (Coumadin).
- A study in rats showed that long-term use of moderately large doses of glucosamine might damage the kidneys. Although results from animal studies don’t always apply to people, this study does raise concern.

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- Glucosamine might affect the way your body handles sugar, especially if you have diabetes or other blood sugar problems, such as insulin resistance or impaired glucose tolerance.
- If you use dietary supplements, such as glucosamine and chondroitin, read and follow the label instructions, and recognize that “natural” does not always mean “safe.”
- The U.S. Food and Drug Administration regulates dietary supplements, but the regulations for dietary supplements are different and less strict than those for prescription or over-the-counter drugs.
- Some dietary supplements may interact with medications or pose risks if you have medical problems or are going to have surgery. Most dietary supplements have not been tested in pregnant women, nursing mothers, or children.

For more information, see NCCIH’s fact sheet [Using Dietary Supplements Wisely](#).

More to Consider

- If your joints hurt, see your health care provider. It’s important to find out what’s causing your joint pain. Some diseases that cause joint pain—such as rheumatoid arthritis—may need immediate treatment.
- If you take warfarin or have blood sugar problems, make sure you talk to your doctor about potential side effects if you are considering or taking glucosamine or chondroitin supplements.
- If you’re pregnant or nursing a child, it’s especially important to see your health care provider before taking any medication or supplement, including glucosamine or chondroitin.
- Help your health care providers give you better coordinated and safe care by telling them about all the health approaches you use. Give them a full picture of what you do to manage your health.

To Find Out More

NCCIH Clearinghouse

The NCCIH Clearinghouse provides information on NCCIH and complementary and integrative health approaches, including publications and searches of Federal databases of scientific and medical literature. The Clearinghouse does not provide medical advice, treatment recommendations, or referrals to practitioners.

Toll-free in the U.S.: 1-888-644-6226

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National Institute of Arthritis and Musculoskeletal and Skin Diseases (NIAMS)

NIAMS supports research into the causes, treatment, and prevention of arthritis and musculoskeletal and skin diseases; the training of scientists; and the sharing of research-based information.

Web site: www.niams.nih.gov

Toll-free in the U.S.: 1-877-226-4267

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MedlinePlus

To provide resources that help answer health questions, MedlinePlus—a service of the National Library of Medicine (NLM)—brings together authoritative information from NIH as well as other Government agencies and health-related organizations.

Web site: www.nlm.nih.gov/medlineplus/

Information on osteoarthritis: www.nlm.nih.gov/medlineplus/osteoarthritis.html

PubMed®

A service of NLM, PubMed contains publication information and (in most cases) brief summaries of articles from scientific and medical journals.

Web site: www.ncbi.nlm.nih.gov/pubmed

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