

Joint supplements

Brands to try and brands to avoid

Consumers spend hundreds of millions of dollars a year on dietary supplements to relieve osteoarthritis symptoms, says the *Nutrition Business Journal*, which tracks the industry. But our analysis of the research and our interviews with arthritis experts indicate that it may be worth trying only one such supplement, **glucosamine plus chondroitin**.

We also found that not all glucosamine-chondroitin products are alike. Some of them contain less of the active ingredients than their label says. Nor are they all expensive: An appropriate dose can cost as little as 25 cents a day.

Confusion about these supplements is understandable. In February 2006, for example, *The Wall Street Journal* and *The New York Times* published contradictory headlines about the results of a new clinical trial on the effectiveness of glucosamine and chondroitin pills for treating osteoarthritis of the knee. To help resolve the confusion, we not only evaluated the evidence on arthritis supplements, but also tested the amount of glucosamine and chondroitin in 17 mainstream and 4 dollar-store products. Here's what we found:

- Four brand-name or store-brand products contained less—in two cases significantly less—than the labeled amount of glucosamine or chondroitin.
- Four products recommended daily doses smaller than those that were used in successful clinical trials.
- The chondroitin level was inadequate or only marginally adequate in three of the four dollar-store products. One product from those stores failed to warn people who are allergic to shellfish that glucosamine is derived from shells.
- The cost of the acceptable mainstream

products varied greatly, from 25 cents to \$1.25 a day (or \$7.50 to \$37.50 a month).

MAKING SENSE OF THE STUDIES

Osteoarthritis pain is caused by the breakdown of the bone-protecting cartilage pad in the joints. In theory, glucosamine helps prevent that breakdown by stimulating production of cartilage-building proteins, while chondroitin may fight inflammation and inhibit the production of cartilage-destroying enzymes.

Recent clinical trials in which knee X-rays were studied found that glucosamine and chondroitin may each slow the loss of joint cartilage. But other trials have yielded conflicting results about whether those substances reduce symptoms.

Even the recent study of glucosamine and chondroitin, funded by the National Institutes of Health (NIH), produced mixed results. That rigorous trial compared glucosamine, chondroitin, and a combination of both with the pain reliever celecoxib (Celebrex) or a placebo in

nearly 1,600 patients with knee osteoarthritis. After six months, only celecoxib performed significantly better than the dummy pills for the group as a whole.

But in the 354 people with moderate-to-severe pain, 79 percent reported at least some relief with the glucosamine-chondroitin combination. That was the only treatment that worked significantly better than the placebo. Those results "are notable but not definitive," said Daniel O. Clegg, M.D., the study's lead investigator. The NIH is now considering another large study to clarify the findings.

Until definitive results are published, our experts say osteoarthritis sufferers may want to give the combination a try, in part because it seems to have no serious adverse effects on most people. But individuals allergic to shellfish should avoid glucosamine. Those with diabetes should closely monitor their blood-sugar level, which in theory might be raised by glucosamine. People who have a clotting disorder or take a prescription anti-clotting

Jury is out on other supplements

There's not enough information on long-term safety and efficacy to recommend trying osteoarthritis supplements other than glucosamine/chondroitin. Here's an update on the research plus the approximate monthly cost of the dosages that studies have linked with apparent benefits.

Avocado/soybean oils may reduce the need for painkillers to treat osteoarthritis of the hip but not the knee. The oils have protected joint cartilage in animal research. *Cost:* \$20 to \$30.

Ginger contains chemicals that may have pain-relieving and anti-inflammatory properties. In short-term clinical trials, supplements containing purified ginger extract

reduced osteoarthritic knee pain moderately. *Cost:* \$1.50 to \$2.

MSM (methylsulfonylmethane), a compound containing sulfur, may decrease pain and swelling and improve joint function. *Cost:* \$5.50 to \$12.

SAM-e (s-adenosyl-methionine), a natural body chemical, increased the production of new cartilage in animals, and reduced people's pain. *Cost:* \$60 to \$95.

Vitamin D helps promote cartilage and bone growth in animals. Human studies have linked low vitamin-D levels with osteoarthritis progression. The first clinical trial of the vitamin for osteoarthritis will soon be underway. *Cost:* \$1 to \$1.50.

drug may want to avoid chondroitin, which may increase the risk of bleeding.

If you take these supplements, keep a daily diary of your pain and physical limitations. If you see no improvement after about three months, it's unlikely that you will benefit, our experts said.

HOW TO CHOOSE

If you want to try the supplements:

Check the Ratings. Pick a product at the lowest price that supplies 1,500 milligrams of glucosamine and 1,200 milligrams of chondroitin per day, the doses used in successful clinical trials. Research suggests that it doesn't matter whether you choose a combination product containing glucosamine sulfate or glucosamine hydrochloride.

Opt for just glucosamine and chondroitin. Nine of the mainstream products claim to contain added ingredients. But there's not enough evidence on the long-term safety and efficacy of those substances to warrant recommending them to treat arthritis.

CR Quick Recommendations

Choose the least expensive brand you can find in the main section of the table, marked "adequate." Then take the number of pills that the table says will supply the daily dosages that worked in successful clinical trials. See the **Quick Picks** for the least expensive brands. If you have trouble swallowing, consider smaller pills. If you value convenience, consider those that require fewer pills per day.

QUICK PICKS

Least expensive:

1 Kirkland Signature (Costco)

Costs just 25 cents a day. If you keep taking the pills, the savings on this product alone would recoup Costco's annual \$45 basic membership fee in 10 months or less.

Others less than 50 cents a day:

2 Spring Valley (Wal-Mart)

3 Target

4 Vitamin World

5 Vitasmart (Kmart)

These cost 40 to 45 cents a day. Note that Spring Valley, Vitamin World, and Vitasmart have smaller pills than the other Quick Picks, though you have to take three rather than two per day.

Be wary of dollar-store brands.

One of those four brands, OsteoRestore Glucosamine Chondroitin Complex Double Strength, had unacceptably low chondroitin levels (less than 80 percent of the labeled content). Two others, Fred's Joint Support Formula Glucosamine Chondroitin and Nutra Choice Glucosamine Chondroitin

Complex Double Strength, had only marginally acceptable amounts (80 percent to 90 percent). And Fred's Joint Support didn't warn about allergies. Our February 2006 tests found many dollar-store multivitamins were substandard. While the current sample was very small, our experience suggests mainstream brands may be more reliable.

Ratings arthritis supplements

• **Availability** Most products available at stores through September 2006.

Within categories, in order of increasing cost, or in alphabetical order when cost is same.

Blue key numbers indicate Quick Picks.

Key number	Product (tablets, except where footnoted)	Pills/bottle	% of labeled amount ⁽¹⁾		Pills/day		Cost/day ⁽¹⁾
			Glucosamine salt	Chondroitin salt	Label dose	Clinical-trial dose	
ADEQUATE Contains at least 90 percent of labeled amount of glucosamine and chondroitin.							
1	Kirkland Signature Extra Strength Glucosamine HCl and Chondroitin Sulfate (Costco)	170	115%	105%	2	2	\$0.25
2	Spring Valley Glucosamine & Chondroitin Double Strength (Wal-Mart) ⁽²⁾	120	105	100	3	3	0.40
3	Target Triple Strength Glucosamine & Chondroitin Complex ⁽²⁾	120	110	95	2	2	0.45
4	Vitamin World Glucosamine Chondroitin Double Strength	120	105	100	3	3	0.45
5	Vitasmart Double Strength Glucosamine & Chondroitin (Kmart) ⁽²⁾	240	110	100	3	3	0.45
6	Now Glucosamine & Chondroitin Extra Strength	120	110	95	2	2	0.55
7	GNC Glucosamine 750/Chondroitin 600	120	95	95	1-2 ⁽³⁾	2	0.60
8	Safeway Select Double Strength Glucosamine Chondroitin ⁽²⁾	200	110	95	3	3	0.65
9	CVS Glucosamine & Chondroitin Double Strength ⁽²⁾	180	95	95	3	3	0.70
10	Walgreens Finest Natural Glucosamine & Chondroitin Double Strength ⁽⁴⁾	180	110	90	3	3	0.80
11	Osteo Bi-Flex Glucosamine Chondroitin Triple Strength Complex ⁽²⁾	80	95	100	2	2	0.90
12	Nature's Bounty Extra Strength Glucosamine & Chondroitin Complex ⁽⁵⁾	60	100	100	3	3	1.00
13	CosaminDS Joint Health Supplement ⁽⁴⁾	108	110	100	1-3 ⁽³⁾⁽⁷⁾	3	1.25
MARGINALLY ADEQUATE Contains 80 to 90 percent of labeled glucosamine or chondroitin.							
14	21st Century Triple Strength Glucosamine & Chondroitin 3X	150	80	80	1-2 ⁽³⁾	3	0.60
15	Glucoflex Glucosamine & Chondroitin Sulfate Triple Strength ⁽²⁾	60	105	85	2	2	1.20
INADEQUATE Contains less than 80 percent of labeled chondroitin.							
16	FlexAble Glucosamine & Chondroitin Sugar Free Chewables with Vitamin C ⁽⁶⁾	60	110	60	2	⁽⁸⁾	⁽⁸⁾
17	Trader Darwin's Glucosamine Chondroitin (Trader Joe's) ⁽²⁾	90	110	10	1-3 ⁽³⁾	⁽⁹⁾	⁽⁹⁾

⁽¹⁾ Rounded to nearest 5 (percent or cents). ⁽²⁾ Caplets. ⁽³⁾ Labeled range likely to permit dosage that may be inadequate. ⁽⁴⁾ Capsules. ⁽⁵⁾ Soft gel/tablet. ⁽⁶⁾ Wafer. ⁽⁷⁾ Label recommends starting with 3 pills a day, then tapering off to 1 or 2. ⁽⁸⁾ Formulated with only 100 mg of chondroitin and contains less than that amount, so requires too many pills to supply clinical-trial dose. ⁽⁹⁾ Contains less than labeled amount, so requires too many pills to supply clinical-trial dose.

Guide to the Ratings

We commissioned two laboratories that specialize in testing supplements to analyze these mainstream products. **Glucosamine salt** tells the percent of glucosamine salt (glucosamine plus sulfate or hydrochloride) that our tests found per pill, compared with the labeled amount. (The tests determined the amounts of glucosamine alone; the salt values were calculated from those amounts.) **Chondroitin salt** tells the percent of that salt (chondroitin plus sulfate) that our tests found per pill, compared with the labeled amount. **Label dose** gives the number of pills per day recommended on the label. **Clinical-trial dose** tells the number of pills needed to obtain close to 1,500 milligrams of glucosamine and 1,200 mg of chondroitin, the daily dose used in the successful trials. **Cost per day**, based on the approximate retail prices of the bottles we bought, gives the daily cost of the number of pills needed to supply the clinical-trial dose.