Osteoarthritis

En Español (Spanish Version)

Principal Proposed Natural Treatments
• REDUCING SYMPTOMS AND SLOWING THE PROGRESSION OF THE DISEASE: Chondroitin Sulfate; Glucosamine; Fatty Acids; Acupuncture
• REDUCING SYMPTOMS ONLY: S-Adenosylmethionine (SAMe); Avocado/Soybean Unsaponifiables; Cetylated Fatty Acids

Other Proposed Natural Treatments
• HERBS AND SUPPLEMENTS: Ayurveda; Boswellia; Bromelain; Capsaicin; Cat's Claw; Chinese Herbal Medicine; Comfrey (topical); Devil's Claw; Ginger; Green-lipped Mussel; Krill Oil; Methyl Sulfonyl Methane (MSM); Multimineral Supplement; Niacinamide; Proteolytic Enzymes; Rose Hips; Velvet Antler; White Willow; Zinc
• THERAPIES: Balneotherapy; Bee Venom; Magnet Therapy; Manual Therapy; Prolotherapy; Relaxation Therapies; Tai Chi; Yoga

Probably Ineffective Treatments
• Mesoglycan; Vitamin E

In osteoarthritis, the cartilage in joints has become damaged, disrupting the smooth gliding motion of the joint surfaces. The result is pain, swelling, and deformity.

The pain of osteoarthritis typically increases with joint use and improves at rest. For reasons that aren't clear, although x-rays can find evidence of arthritis, the level of pain and stiffness experienced by people does not match the extent of injury noticed on x-rays.

Many theories exist about the causes of osteoarthritis, but we don't really know what causes the disease. Osteoarthritis is often described as "wear and tear" arthritis. However, evidence suggests that this simple explanation is not correct. For example, osteoarthritis frequently develops in many joints at the same time, often symmetrically on both sides of the body, even when there is no reason to believe that equal amounts of wear and tear are present. Another intriguing finding is that osteoarthritis of the knee is commonly (and mysteriously) associated with osteoarthritis of the hand. These factors, as well as others, have led to the suggestion that osteoarthritis may actually be a body-wide disease of the cartilage.

During one's lifetime, cartilage is constantly being turned over by a balance of forces that both break down and rebuild it. One prevailing theory suggests that osteoarthritis may represent a situation in which the degrading forces get out of hand. Some of the proposed natural treatments for osteoarthritis described later may inhibit enzymes that damage cartilage.

When the cartilage damage in osteoarthritis begins, the body responds by building new cartilage. For several years, this compensating effort can keep the joint functioning well. Some of the natural treatments described below appear to work by assisting the body in repairing cartilage. Eventually, however, building forces cannot keep up with destructive ones, and what is called end-stage osteoarthritis develops. This is the familiar picture of pain and impaired joint function.

The conventional medical treatment for osteoarthritis consists mainly of anti-inflammatory drugs, such as naproxen and Celebrex. The main problem with anti-inflammatory drugs is that they can cause ulcers. Another possible problem is that they may actually speed the progression of osteoarthritis by interfering with cartilage repair and promoting cartilage destruction. In contrast, two of the treatments described below might actually...
Principal Proposed Natural Treatments

Several natural treatments for osteoarthritis have a meaningful, though not definitive, body of supporting evidence indicating that they can reduce pain and improve function. In addition, there is some evidence that glucosamine and chondroitin might offer the additional benefit of helping to prevent progressive joint damage.

Glucosamine

Inconsistent evidence hints that glucosamine can reduce symptoms of mild to moderate arthritis; a small amount of evidence indicates that regular use can slow down the gradual worsening of arthritis that normally occurs with time.

Symptom Relief

Glucosamine is widely accepted as a treatment for osteoarthritis. However, the supporting evidence that it works is somewhat inconsistent, with several of the most recent studies failing to find benefit. Two types of studies have been performed: those that compared glucosamine against placebo and those that compared it against standard medications.

In the placebo-controlled category, one of the best trials was a 3-year, double-blind study of 212 people with osteoarthritis of the knee. Participants receiving glucosamine showed reduced symptoms as compared to those receiving placebo.

Benefits were also seen in other double-blind, placebo-controlled studies, enrolling a total of more than 800 people and ranging in length from 4 weeks to 3 years. Other double-blind studies enrolling a total of more than 400 people compared glucosamine against ibuprofen and found glucosamine equally effective as the drug.

However, most recent studies have not shown benefit. In four studies involving a total of almost 500 people, use of glucosamine failed to improve symptoms to any greater extent than placebo. And the list goes on. A study involving 222 participants with hip osteoarthritis, 2 years of treatment with glucosamine was no better than placebo at improving pain or function. Another study involving 147 women with osteoarthritis found glucosamine to be no more effective than home exercises over an 18-month period. A third study evaluated the effects of stopping glucosamine after taking it for 6 months. In this double-blind trial of 137 people with osteoarthritis of the knee, participants who stopped using glucosamine (and, unbeknownst to them, took placebo instead) did no worse than people who stayed on glucosamine. In a fourth, very large (1,583-participant) study neither glucosamine (as glucosamine hydrochloride) nor glucosamine plus chondroitin was more effective than placebo. Another study also failed to find benefit with glucosamine plus chondroitin. And finally, in a systematic review including 10 randomized trials involving 3,803 patients with osteoarthritis of hip or knee, researchers found that glucosamine alone, chondroitin alone, or the combination of glucosamine and chondroitin did not improve pain.

It appears that most of the positive studies were funded by manufacturers of glucosamine products, and most of the studies performed by neutral researchers failed to find benefit.

Many popular glucosamine products combine this supplement with methylsulfonylmethane (MSM). One study published in India reported that both MSM and glucosamine improve arthritis symptoms as compared to placebo, but that the combination of MSM and glucosamine was even more effective than either supplement separately. However, India has not yet achieved a reputation for conducting reliable medical trials.

Slowing the Disease
Two studies reported that glucosamine can slow the progression of osteoarthritis. However, as with the positive studies of glucosamine for reducing symptoms, both of these studies were funded by a major glucosamine manufacturer.

A 3-year, double-blind, placebo-controlled study of 212 individuals found indications that glucosamine may protect joints from further damage. Over the course of the study, individuals given glucosamine showed some actual improvement in pain and mobility, while those given placebo worsened steadily. Furthermore, x-rays showed that glucosamine treatment prevented progressive damage to the knee joint.

A separate 3-year study enrolling 202 people found similar results. Furthermore, a follow-up analysis 5 years after the conclusion of the above two studies found suggestive evidence that use of glucosamine reduced the need for knee replacement surgery.

However, the aforementioned study involving 222 patients with osteoarthritis of the hip failed to show any significant change on x-ray findings following 2 years of glucosamine treatment compared to placebo.

How Does Glucosamine Work?

Glucosamine appears to stimulate cartilage cells in the joints to make proteoglycans and collagen, two proteins essential for the proper function of joints. Glucosamine may also help prevent collagen from breaking down.

For more information, including dosage and safety issues, see the full Glucosamine article.

Chondroitin Sulfate

As described in the previous section, the supplement chondroitin is often combined with glucosamine. Several studies have evaluated chondroitin used alone, as well, with some positive results, both for improving symptoms and slowing the progression of the disease. On balance, however, the evidence for chondroitin’s effectiveness for osteoarthritis remains inconsistent.

Symptom Relief

According to some but not all double-blind, placebo-controlled studies chondroitin may relieve symptoms of osteoarthritis.

One study enrolled 85 people with osteoarthritis of the knee and followed them for 6 months. Participants received either 400 mg of chondroitin sulfate twice daily or placebo. At the end of the trial, doctors rated the improvement as good or very good in 69% of those taking chondroitin sulfate but in only 32% of those taking placebo.

Another way of comparing the results is to look at maximum walking speed among participants. Whereas individuals in the chondroitin group were able to improve their walking speed gradually over the course of the trial, walking speed did not improve at all in the placebo group. Additionally, there were improvements in other measures of osteoarthritis, such as pain level, with benefits seen as early as 1 month. This suggests that chondroitin was able to stop the arthritis from gradually getting worse.

Good results were seen in a 12-month, double-blind trial that compared chondroitin against placebo in 104 individuals with arthritis of the knee, as well as in a 12-month trial of 42 participants.

Another interesting study evaluated intermittent or “on and off” use of chondroitin. In this study, 120 people received either placebo or 800 mg of chondroitin sulfate daily for two separate 3-month periods over a year. The results showed that even when taken this way, use of chondroitin improved symptoms.

Benefits were also seen in two short-term trials involving a total of about 240 individuals.
Generally positive results were also seen in other studies, including one that found chondroitin about as effective as the anti-inflammatory drug diclofenac.\textsuperscript{40-42}

However, a very large (1,583-participants) and well-designed study failed to find either chondroitin or glucosamine plus chondroitin more effective than placebo.\textsuperscript{153} When this study is pooled together with the two other best designed trials, no overall benefit is seen.\textsuperscript{185} Yet another study also failed to find benefit with glucosamine plus chondroitin.\textsuperscript{187} It has been suggested that chondroitin, like glucosamine, may primarily show benefit in studies funded by manufacturers of chondroitin products.

**Slowing the Disease**

Some evidence suggests that, like glucosamine, chondroitin might slow the progression of arthritis.

An important feature of the study of 42 individuals mentioned previously was that the individuals taking a placebo showed progressive joint damage over the year, but among those taking chondroitin sulfate no worsening of the joints was seen.\textsuperscript{43} In other words, chondroitin sulfate seemed to protect the joints of osteoarthritis sufferers from further damage.

A longer and larger double-blind, placebo-controlled trial also found evidence that chondroitin sulfate can slow the progression of osteoarthritis.\textsuperscript{44} One hundred and nineteen people were enrolled in this study, which lasted a full 3 years. Thirty-four of the participants received 1,200 mg of chondroitin sulfate per day; the rest received placebo. Over the course of the study researchers took x-rays to determine how many joints had progressed to a severe stage.

During the 3 years of the study, only 8.8% of those who took chondroitin sulfate developed severely damaged joints, whereas almost 30% of those who took placebo progressed to this extent.

Similar long-term benefits were seen in two other studies, enrolling a total of more than 200 people.\textsuperscript{45,122}

Additional evidence comes from animal studies. Researchers measured the effects of chondroitin sulfate (administered both orally and via injection directly into the muscle) in rabbits, in which cartilage damage had been induced in one knee by the injection of an enzyme.\textsuperscript{46} After 84 days of treatment, the damaged knees in the animals that had been given chondroitin sulfate had significantly more cartilage left than the knees of the untreated animals. Taking chondroitin sulfate by mouth was as effective as taking it through an injection.

Looking at the sum of the evidence, it does appear that chondroitin sulfate may actually protect joints from damage in osteoarthritis. However, the scientific record suffers from a paucity of truly independent researchers.

For more information, including dosage and safety issues, see the full Chondroitin article.

**S-adenosylmethionine (SAMe)**

A substantial body of scientific evidence indicates that S-adenosylmethionine (SAMe) can relieve symptoms of arthritis.\textsuperscript{50,203} Numerous double-blind studies involving more than a thousand participants in total suggest that it is approximately as effective for this purpose as standard anti-inflammatory drugs.

One of the best double-blind studies enrolled 732 patients and followed them for 4 weeks.\textsuperscript{51} Over this period, 235 of the participants received 1,200 mg of SAMe per day, while a similar number took either placebo or 750 mg daily of the standard drug naproxen. The majority of these patients had experienced moderate symptoms of osteoarthritis of either the knee or of the hip for an average of 6 years.

The results indicate that SAMe provided as much pain-relieving effect as naproxen and that both treatments were significantly better than placebo. However, differences did exist between the two treatments. Naproxen worked more quickly, producing readily apparent benefits at the 2-week follow-up, whereas the full effect of SAMe was not apparent until 4 weeks. By the end of the study, both treatments were producing the same level of benefit.
In a double-blind study that compared SAMe against the new anti-inflammatory drug Celebrex (celecoxib), once more, the drug worked faster than the supplement, but in time both were providing equal benefits. 123

Evidence regarding slowing the progression of arthritis is, at present, limited to studies involving animals rather than people. 52,53

For more information, including dosage and safety issues, see the full SAMe article.

**Avocado/Soybean Unsaponifiables (ASUs)**

Special extracts of avocado and soybeans called avocado/soybean unsaponifiables (ASUs) have been investigated as a treatment for osteoarthritis with very promising results in studies enrolling a total of several hundred people. 85-92,125

For example, in a double-blind trial, 260 individuals with arthritis of the knee were given either placebo or ASU at 300 or 600 mg daily. 21 The results over 3 months showed that use of ASU significantly improved arthritis symptoms as compared to placebo. There was no significant difference seen between the two doses tested.

Thus far, however, it does not appear that ASU can slow the progression of osteoarthritis. 126

**Cetylated Fatty Acids**

A type of naturally occurring fatty acid called cetylated fatty acids have shown growing promise for osteoarthritis. It is used both as a topical cream and as an oral supplement.

Three double-blind placebo-controlled studies have found cetylated fatty acids helpful for osteoarthritis. Two involved a topical product, and one used an oral formulation.

In one of the studies using the cream, 40 people with osteoarthritis of the knee applied either cetylated fatty acid or placebo to the affected joint. 128 The results over 30 days showed greater improvements in range of motion and functional ability among people using the real cream than those using the placebo cream. In another 30-day study, also enrolling 40 people with knee arthritis, use of cetylated fatty acid cream improved postural stability, presumably due to decreased pain levels. 145 In addition, a 68-day, double-blind, placebo-controlled study of 64 people with knee arthritis tested an oral cetylated fatty acid supplement (the supplement also contained lesser amounts of lecithin and fish oil). 147 Participants in the treatment group experienced improvements in swelling, mobility and pain level as compared to those in the placebo group. Inexplicably, the study report does not discuss whether or not side effects occurred. While this is a promising body of research, it is far from definitive. Current advertising claims for cetylated fatty acids go far beyond the existing evidence. For example, a number of websites claim that cetylated fatty acids are more effective than glucosamine or chondroitin. However, no comparison studies have been performed upon which such a claim could be rationally based.

For more information, including dosage and safety issues, see the full Cetylated Fatty Acid article.

**Acupuncture**

Acupuncture has shown inconsistent benefit as a treatment for osteoarthritis. 72,102,108,109,148,154,169,171,179,191,192,200

A 2006 meta-analysis (systematic statistical review) of studies on acupuncture for osteoarthritis found 8 trials that were similar enough to be considered together. 192 A total of 2,362 people were enrolled in these studies. The authors of the meta-analysis concluded that acupuncture should be regarded as an effective treatment for osteoarthritis.

However, as it happens, one study comprised almost half of all the people considered in this meta-analysis, and it failed to find real acupuncture more effective than sham acupuncture. In this study, published in 2006, 1,007 people with knee osteoarthritis were given either real acupuncture, fake acupuncture, or standard therapy over 6 months.
weeks. Though both real acupuncture and fake acupuncture were more effective than no acupuncture, there was no significant difference in benefits between the two acupuncture groups. In general, larger studies are more reliable than small ones. For this reason, it is always somewhat questionable when meta-analysis combines one very large negative study and a number of smaller positive ones to come up with a positive outcome.

Another review, published in 2007, nuanced its conclusions differently. It concluded that real acupuncture produces distinct benefits in osteoarthritis as compared to no treatment, but that fake acupuncture is very effective for osteoarthritis too. When comparing real acupuncture to fake acupuncture, the difference in outcome—while it might possibly be statistically significant—is so trivial as to make no difference in real life. In other words, virtually all of the benefit of acupuncture for osteoarthritis is a placebo effect.

For more information, see the full Acupuncture article.

**Other Proposed Natural Treatments**

**Other Treatments**

A 6-week, double-blind, placebo-controlled study of 247 individuals with osteoarthritis of the knee evaluated a combination herbal product containing ginger and the Asian spice galanga (*Alpinia galanga*). The results showed that participants in the ginger/galanga group improved to a significantly greater extent than those receiving placebo. However, despite news reports claiming that this study proves ginger effective for osteoarthritis, it only provides information on the effectiveness of the herbal combination. The two double-blind studies performed on ginger alone were small and produced contradictory results. Furthermore, another study found that massage combined with the topical application of essential oils made from ginger and orange was no better than massage plus olive oil in patients with osteoarthritis of the knee.

A 3-week double-blind study of 220 people with osteoarthritis of the knee found that use of a cream containing the herb comfrey reduced symptoms significantly more than a placebo cream.

The herb white willow contains the aspirin-like substance salicin. A 2-week, double-blind, placebo-controlled trial of 78 individuals with arthritis found evidence that willow extracts can relieve osteoarthritis pain. However, another double-blind study enrolling 127 people with osteoarthritis found white willow less effective than a standard anti-inflammatory drug and no more effective than placebo. Again, the likely explanation for these contradictory results is that white willow at usual doses provides relatively modest benefits.

As noted above, the supplement methyl sulfonyl methane (MSM) has shown promise for osteoarthritis when taken along with glucosamine. Besides that study, benefits were also seen in a 12-week, double-blind, placebo-controlled trial of 50 people with osteoarthritis, utilizing MSM at a dose of 3 g twice daily. However, in a comprehensive review of 6 studies involving 681 patients with osteoarthritis of knee, researchers concluded it is not yet possible to convincingly determine whether or not either DSMO or MSM is beneficial.

Other treatments with incomplete supporting evidence from double-blind trials include Ayurvedic herbal combination therapy, boswellia, cat's claw, a proprietary complex of minerals with or without cat's claw, devil's claw, proteolytic enzymes, rose hips, soy protein, and vitamin B3.

Traditional Chinese herbal medicine has also shown some promise for osteoarthritis. However, one study that compared a commonly used Chinese herbal product (Duhuo Jisheng Wan) to the drug diclofenac found that the herb worked more slowly than the drug, yet produced about an equal rate of side effects.

Growing but definitive evidence suggests that the natural substance hyaluronic acid may help reduce osteoarthritis symptoms when it is injected directly into an affected joint. However, there is absolutely no reason to believe that oral hyaluronic acid should help, and one study failed to show any significant
benefit.

Incomplete and inconsistent evidence from human and animal studies only weakly suggests that green-lipped mussel might alleviate osteoarthritis symptoms.\textsuperscript{82-84,130-136,167} A badly designed human study hints that krill oil might be helpful as well.\textsuperscript{184}

One double blind study involving dogs found some evidence of benefit with elk velvet antler.\textsuperscript{137}

Numerous other herbs and supplements sometimes recommended for osteoarthritis include: beta-carotene, boron, cartilage, chamomile, copper, dandelion, D-phenylalanine, feverfew, molybdenum, selenium, turmeric, and yucca. However, there is little to no evidence as yet that these treatments are effective.

Other studies provide limited evidence that certain supplements proposed for osteoarthritis do not work. For example, a 2-year, double-blind study of 136 people with knee arthritis found vitamin E ineffective for either reducing symptoms or slowing the progression of the disease.\textsuperscript{118} In addition, a 6-month, double-blind, placebo-controlled trial of 77 people with osteoarthritis failed to find any symptomatic benefit with vitamin E.\textsuperscript{96} Similarly, in a large (almost 400-participant) 5-year, double-blind, placebo-controlled study, use of injected mesoglycan failed to slow the progression of osteoarthritis.\textsuperscript{119} A fairly small study failed to find the enzyme bromelain helpful for reducing symptoms.\textsuperscript{173}

Prolotherapy is a special form of injection therapy that is popular among some alternative practitioners. A double-blind, placebo-controlled study evaluated the effects of 3 prolotherapy injections (using a 10% dextrose solution) at 2-month intervals in 68 people with osteoarthritis of the knee.\textsuperscript{110} At 6-month follow-up, participants who had received prolotherapy showed significant improvements in pain at rest and while walking, reduction in swelling, episodes of “buckling,” and range of flexion, as compared to those who had received placebo treatment. The same research group performed a similar double-blind trial of 27 individuals with osteoarthritis in the hands.\textsuperscript{111} The results at 6-month follow-up showed that range of motion and pain with movement improved significantly in the treated group as compared to the placebo group.

Several double-blind, placebo-controlled studies suggest that pulsed electromagnetic field therapy, a special form of magnet therapy, can improve symptoms of osteoarthritis.\textsuperscript{112-115} One small study provides extremely weak supporting evidence for the more ordinary form of magnet therapy: static magnets.\textsuperscript{124} A subsequent much larger study of static magnets failed to find real magnets more effective than placebo magnets, but a manufacturing error may have obscured genuine benefits (some people in the placebo group were accidentally given active magnets).\textsuperscript{149} In yet another placebo-controlled trial, the use of a magnetic knee wrap for 12 weeks was associated with a significant increase in quadriceps (thigh muscle) strength in patients with knee osteoarthritis.\textsuperscript{201}

Limited evidence supports the use of bee venom injections for osteoarthritis.\textsuperscript{168} Hot water therapy (balneotherapy),\textsuperscript{176-180,186} relaxation therapies,\textsuperscript{172} and various forms of exercise, including hatha yoga and tai chi, have also all shown some promise.\textsuperscript{117,113,183,193} However, for none of these therapies is the supporting evidence convincing.

In a 2011 review of the literature, researchers analyzed 4 studies investigating the benefits of manual therapy (including massage therapy, joint mobilization, and manipulation) for osteoarthritis of the hip or knee.\textsuperscript{204} The results were inconclusive. Although one of the studies (involving 68 people) did find that massage therapy helped to improve pain and function, it was compared to no intervention rather than another treatment or a placebo.

For a discussion of homeopathic approaches to osteoarthritis, see the Homeopathy Database.

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**Herbs and Supplements to Use Only With Caution**

Various herbs and supplements may interact adversely with drugs used to treat osteoarthritis. For more information on this potential risk, see the individual drug article in the Drug Interactions section of this database.
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