

Arthritis: Cures your doctor won't tell you about

Glucosamine, chondroitin and other alternative supplements offer new hope for arthritis sufferers.

article by Rosemary Ann Ogilvie, from Nature & Health, Australia, Oct/Nov 1998.

Chances are that doctors have told you there is not much they can do for your osteoarthritis. You may have been prescribed a non-steroidal anti-inflammatory (NSAID) medication such as ibuprofen - pills that help ease the pain and inflammation, but do nothing to stimulate the body's healing pathways. They may, in fact, lead to further joint degeneration by inhibiting cartilage formation. And, if used for extended periods, NSAIDs can cause undesirable side effects including gastrointestinal bleeding, ulcers, kidney damage, and toxicity to auditory nerve cells.

Nearly two million Australians suffer from osteoarthritis, a disease which loves to take up residence in the knees, hips, spine, finger joints, the joints at the base of the thumb and the big toe. Women are affected twice as much as men. Ageing is the chief cause of primary arthritis, which targets people over age 45; around one-third of people past age 65 show symptoms. Other common causes are obesity, poor-quality diet and heredity.

Ballet dancers, baseball pitchers and pneumatic drill operators and other occupations or sports involving excessive repetitive stress or impact loading also fall into the high-risk category for secondary osteoarthritis, another form of arthritis that usually strikes people under 40. Joint infection, joint laxity such as a 'trick' knee, chronic use of certain medications, and metabolic imbalances such as gout or calcium deposits can all lead to the development of secondary osteoarthritis, although trauma is the main cause. 'Trauma may be acute, as in a sudden, serious injury, or it may be chronic, leading to cumulative damage to the joint over a long period.

Osteoarthritis is the most common form of arthritis, and the most common chronic condition of old age. It's a 'wear and tear' disease, causing the breakdown of cartilage in the joints which leads to stiffness and pain. Compared to rheumatoid arthritis, there is minimal inflammation involved.

Articular cartilage is the smooth, blue-white substance attached to the ends of bones the same substance you

see on the end of a chicken drumstick bone. Comprised mainly of water (65 to 80 per cent), the cartilage is like a super-slick padding which allows the bone tips to slide easily across each other without catching or slowing. The effect is rather like two ice cubes rubbing together; except the cartilage surface is perhaps eight times more slippery than ice. Unlike other human tissues, cartilage does not contain any nerves or blood supply; its nutrients come from the synovial fluid that bathes the surrounding joint.

Forming the cartilage matrix are two other substances. A 'mesh' of collagen threads, arranged in a criss-cross pattern four layers thick, endows cartilage with its elasticity and shock-absorption powers. Anchored securely in the spaces within the collagen netting are proteoglycans, large and abundant molecules made up of proteins and sugars which wrap themselves over, under, around and through the collagen threads.

Proteoglycans are essential for healthy cartilage: they give it the resiliency that allows it to stretch out and bounce back during movement. They also attract and hold many times their weight in water; essential to both nourish and lubricate the cartilage. Proteoglycans release water when pressure is placed on the joint, re-absorbing it when that pressure is released. The effect is similar to holding a sponge under water, squeeze it and the water is expelled, but relax your grip and immediately the sponge fills with water.

Also dotted throughout the cartilage matrix are miniature factories - called chondrocytes - that continually work to replenish the supply of collagen and proteoglycan molecules. They also release enzymes that destroy aged collagen and proteoglycan molecules that are no longer effective.

As we age, we start to lose those water-attracting proteoglycans. Erosions may develop, with the cartilage becoming uneven and pitted, possibly even wearing through completely. Without their cushioning tip of smooth, healthy cartilage, the bones may start to rub together; producing severe pain.

Small fractures may appear in the cartilage. Normally this prompts the body to produce cartilage to fill in the gaps. The replacement cartilage, however; is often inferior; lacking the ability to cushion the bone-ends against impact. This in turn can lead to changes in the bone ends:

they lose some of their shock-absorbing power and ability to bend when subjected to stress. To compensate, the body may produce excess bone material for the bone ends, resulting in rough surfaces. Once the joint loses its smooth contours - whether the cartilage or the bone - fluid, pain-free motion becomes impossible.

As the joint degenerates, the synovium - or joint lining- becomes inflamed, shooting off pain messages to the brain from its numerous pain receptors and nerve endings. The response is to produce more and more synovial fluid, which floods the joint space and causes swelling and still more pain.

Glucosamine

A number of studies - conducted chiefly in Europe - have shown that there is a nutritional supplement that not only eases the debilitating pain of osteoarthritis, but actually goes to work repairing damaged cartilage. This was the consistent conclusion reached in of 20 clinical trials of glucosamine, both short and long term, involving more than 6,000 patients.

Naturopaths, nutritionists and some of the more open-minded medical doctors are now recommending their osteoarthritis patients take glucosamine. Most are delighted with the positive results. Glucosamine is comprised of glucose and an amino acid called glutamine. It is a major building block of those water loving proteoglycans found in collagen, necessary for the manufacture of glycosaminoglycans which are the proteins that bind water in the cartilage matrix. Its presence acts as a stimulus to the chondrocytes, those cells in the cartilage that keep up the supply of fresh, young collagen and proteoglycan molecules. More than that, glucosamine is responsible for deciding

just how many proteoglycans the chondrocytes will produce: if there is plenty of glucosamine present, production is stepped up. When glucosamine levels are low, production of proteoglycans is curbed. Good levels of glucosamine therefore mean there are large numbers of proteoglycans to entrap lots of water; if levels of glucosamine drop, it follows that there will be fewer proteoglycans available to attract and hold that precious, shock-absorbing water.

Research has shown that glucosamine - whether made by the body or taken as a supplement - also helps reduce pain and improve joint function. This is not something that happens immediately, but which occurs over time; some patients report relief after a few days, others become aware that the pain is ebbing only after a few months. Glucosamine doesn't work like NSAIDs, which only temporarily mask the pain without addressing the cause of it: glucosamine actually goes to work repairing the damage. The World Health Organisation has accepted glucosamine as a superior long term strategy and officially classified it as a slow-acting drug in treating osteoarthritis.

Chondroitin

Increasingly, glucosamine is being given in combination with another nutritional product: chondroitin. Chondroitin works differently from, but synergistically with, glucosamine. As we saw, glucosamine stimulates the production of proteoglycans. Chondroitin attracts nutrient-rich, shock-absorbing fluid into the proteoglycan molecules. Additionally, chondroitin stimulates the production of the cartilage matrix molecules: proteoglycans, glycosaminoglycans and collagen. It protects cartilage from breakdown by inhibiting the action of some cartilage-chewing enzymes and, by cutting off the transport of nutrients, interferes with other enzymes that try to starve cartilage.

We obtain some chondroitin from our food. It is present in most animal tissue, mainly in the gristle around joints; some of this is absorbed intact and incorporated into our tissues, including articular cartilage. As with glucosamine, supplemental chondroitin works as effectively as that occurring naturally in the cartilage.

Taken together in a formulation, glucosamine and chondroitin enhance cartilage repair and improve joint function. When osteoarthritis strikes, something happens to the cartilage matrix. The building blocks of cartilage:

proteoglycans and collagen, aren't manufactured rapidly enough to maintain cartilage health. Concurrently enzymes are chomping away, trying to destroy any healthy cartilage still present. Glucosamine and chondroitin work synergistically at a cellular level, stimulating the manufacture of new cartilage and inhibiting the action of the cartilage destroying enzymes, thus halting the disease process and encouraging the body to heal itself.

Glucosamine & Chondroitin: how to take them

The recommended dosages for glucosamine and chondroitin supplements relate to body weight; the following have proven to be effective. Ideally, split the amount into two or more doses taken with food through the day. The effectiveness of glucosamine and chondroitin is enhanced when taken with the antioxidant vitamin C (500 to 4000mg per day) and manganese (50mg per day), a mineral needed for the synthesis of cartilage components.

Weight	Dosage
Under 55 kg	Glucosamine 1000 mg
	Chondroitin 800 mg
55 - 90 kg	Glucosamine 1500 mg
	Chondroitin 1200 mg
Over 90 kg	Glucosamine 2000 mg
	Chondroitin 1600 mg

Once positive results start to manifest, experiment with reduced dosages; if the pain returns, take the higher dose for a few more weeks. Ultimately, aim for a maintenance dose of one-third of the above amounts, taken once a day.

Other Treatments

Of course, taking a supplement of glucosamine and chondroitin is not enough in itself to beat osteoarthritis; lifestyle factors play an important role too.

Weight loss. If you are overweight, you can prevent osteoarthritis developing in weight-bearing joints such as knees and hips by shedding excess kilos. One study performed at Chicago's Cook County Hospital found that obesity was common in osteoarthritis patients. Many of the subjects had put on weight just before they started suffering with the disease; 50 per cent had been overweight for 3 to 10 years before the onset of osteoarthritis.

Joints bear the impact of your bodyweight scores of times throughout

the day; if you gain just 5 kilos, your joints may have to cope with an increased force of anything up to 50 kilos.

Diet. There is some evidence that a vegetarian diet can help osteoarthritis patients. One study conducted by the Institute of Immunology and Rheumatology at the National Rheumatism Hospital in Oslo, Norway, found that patients who became vegetarians enjoyed improved grip strength, as well as less pain, joint swelling, tenderness and morning stiffness within just one month.

Many foods can trigger arthritis: it can be caused by natural chemicals such as those found in beef and dairy, or additives such as preservatives. An elimination diet, supervised by a naturopath or dietitian, can unmask the culprit.

Eat healthy, whole unprocessed foods.

Try to eat 30 different foods every single day to maximise your intake of all the essential vitamins, minerals, antioxidants and phytochemicals we need for optimal health. Include lots of whole grains, fruits and vegetables, legumes and pulses, nuts and seeds and green tea. Two or three times a week, serve fatty cold water fish such as trout, salmon, mackerel, sardines for their inflammation-fighting omega-3 fatty acids. Replace butter with plant oils such as soybean, flaxseed, corn, safflower and sunflower for their linoleic acid, which raises the body's levels of EPA, a substance that blocks the production of harmful prostaglandins. Minimise meat, poultry, dairy products and egg yolks with their inflammation-producing arachidonic acid.

Exercise. If you are in pain with osteoarthritis, the temptation is to slow down, to stop moving - and it's the worse thing you can do. Exercise helps keep our joints healthy. It fights the debilitating effects of osteoarthritis by encouraging the flow of nourishing synovial fluid in and out of the cartilage, keeping it moist and healthy. It also strengthens the muscles, tendons and ligaments that support the joints, and increases their range of motion, flexibility and shock absorption, helping them to cope with the constant loads they must bear.

You may need to adapt your programme, perhaps replace jogging with walking, cycling, swimming or aquaerobics (wonderful for people with arthritis). Resistance training keeps muscles strong, and stretching or yoga retains flexibility.