

Supplements for Joint Support

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Understand that Tendons, Ligaments and Cartilage do not have a direct supply of blood and so they cannot be quickly repaired. They depend on the diffusion of nutrients over a period of time to repair them.

Chondrocytes are cells responsible for the repair and regeneration of the cartilage tissues, both its removal when damaged and its synthesis. Enzymes produced by the chondrocytes tear down cartilage, just as proteoglycans synthesized by the chondrocytes renew cartilage. Both steps are necessary for joint health and a balance needs to be maintained. The process of synthesis is heavily dependent upon adequate nutrition which is slowed with advancing age.

The key limiting step is production of glycosaminoglycans (GAGs), for which glucosamine is the basic building block.

Glucosamine Sulfate - is a building block of water loving proteoglycans and hyaluronic acid and is found in high quantities in the joints.

Glucosamine increases the synthesis of these key elements of cartilage which indicates that it may actually help repair cartilage. It provides the rate limiting substrate for glycosaminoglycans (GAGs), and hyaluronic acid..

Chondroitin - is a perfect complement to Glucosamine - it acts like a biological version of a “liquid magnet” attracting fluid into proteoglycans. This fluid acts as a shock absorber and it also brings nutrients with it into the cartilage. It modulates the effects on enzymes that degrade cartilage. It along with Glucosamine stimulates the production of proteoglycans and collagen that are needed for healthy new cartilage.

MSM - Is a very bioavailable form of sulfur. Sulfur-bearing amino acids like methionine, cysteine and taurine are essential to normal metabolism, and are building blocks for skin, cartilage, ligaments and tendons. MSM enhances the synthesis of chondroitin sulfate and hyaluronic acid. MSM reduces inflammatory cytokines which attacks the joint cartilage. It can help prevent cartilage destruction. It has anti-oxidant properties. It is not a direct free radical scavenger, It works on a different mechanism. Joints with lower levels of cartilage also have low sulfur content.

Hyaluronic Acid - HA - is available in regular and vegan forms - helps with creating the fluid cushion within the joints that allows for compression as the joint changes shape with movement, yet prevents the ends of the bones from grinding against one another. (Lubrication). Hyaluronan is one of the main components of the synovial fluid of the joints and the discs in the spine. Cartilage consists primarily of water. The 20 to 35% of cartilage not made up of water consists of collagen and proteoglycans. Together these form the cartilage matrix. Collagen provides the structure of the cartilage matrix.

Collagen facts: The body needs to make 1lb. of collagen every 4 to 5 days. After 21 humans lose about 1% of their collagen stores per year. The amounts of collagen in certain tissues of the body are very high: Tendons 80%, Ligaments 90%, Bones 30% - *the quality of the collagen in the bone accounts for 80% of its strength.* Cartilage 70% Blood Vessels 40% there are 60,000 miles of blood vessels and capillaries in the body, Skin 75%

Bio-Sil - activates enzymes in the body that support the production of collagen, elastin and keratin. Coline stabilized orthosilicic acid. Bio-Sil doesn't need to be digested. It has 20 years of research and proven to enhance the production of collagen. It is used to support the health of joints, cartilage, tendons, ligaments, bones, skin, hair and nails.

Collagen Type I, II, - There are 10 different types of Collagen - Types I & II are involved with tendons, ligaments and cartilage. **Type I** is by far the most abundant, and almost always considered to be the strongest type of collagen found in the human body. It is made up of eosinophilic fibers that form tendons, ligaments, organs and skin. Type I helps form bones and can be found within the GI tract. It is very important for wound healing, giving skin its stretchy and elastic quality and holding tissues together.

Type II collagen primarily helps build cartilage which is found in connective tissues. The health of our joints relies on cartilage made of type II collagen.

Sources of Collagen: Bovine - found in the cartilage, bones and hides of cows, provides a healthy dose of types I and III collagen, the major components of skin, hair, nails, muscles, tendons, ligaments, bones, gums, teeth, eyes and blood vessels. **Chicken Collagen** - is primarily type II - used for joint - arthritis, back and neck pain. **Egg membrane collagen** - see info below on NEM. **Fish Collagen** - is primarily type I collagen and is known to have the best absorption and bioavailability due to its smaller particle size compared to other animal collagens. It is absorbed up to 1.5X

more efficiently into the body. It is considered to be the best collagen source for medicinal purposes.

UC II - (Solgar 7) Undenatured Collagen type II - works in a very unique way to support joint health. The small dose travels intact to the Peyer's Patch in the small intestine where it interacts with immune cells in the gut. There it activates regulatory T cells to recognize type II collagen. When the T-cells recognize it they release bioactive compounds like TGF-beta and IL-10. These compounds then signal to the body to rebuild and repair joint cartilage. (Solgar advertises that people will experience benefit in 7 to 10 days after taking it - just 1 small capsule taken at bedtime)

SAM-E - is called activated methionine formed by the combination of ATP and methionine. SAM-E lowers homocysteine by enhancing methylation. and is involved with over 40 biochemical processes. It is a biochemical workhorse one of which is enhancing cartilage formation. Research has shown that regular SAM-e supplementation helps improve joint health, and is used in Europe by physicians for the management of knee pain.

Egg Shell Membrane - NEM raw material - Natural Eggshell Membrane: The membrane film on the inside of an eggshell is made of the exact ingredients that human joints are made of. It is a true, natural source of hyaluronic acid, glucosamine, and chondroitin. People often get results in 7 days of using it. In a more extensive study, 39 patients received 500 mg of NEM, once daily, for 30 days. After only seven days, patients described an improvement in flexibility of 27.8%. After thirty days, a 43.7% improvement in flexibility was denoted. These percentages are based on Ontario and McMaster University's osteoarthritis index. After a month, the average reduction in general pain was 72.5%. [2] - *patients with egg allergies should avoid this product.*

Avocado Soy Unsaponifiables - ASU - combines 1/3 avocado oil with 2/3 soybean oil. It works by blocking pro-inflammatory chemicals and preventing the deterioration of the cells that line the joints. It may also help regenerate connective tissue. A European study found that it slowed cartilage breakdown and helped repair cartilage.

Cucumber Extract - newest on the scene is Q-Actin. It works by TNF-a - Tumor Necrosis Factor which is an inflammatory cytokine produced during acute inflammation. When this is elevated in the joints - joint destruction is initiated. Cucumber extract at a dose of 10mg - 2x day lowers TNF-a resulting in lower joint pain.

Boron - is a mineral involved in bone health serum boron is lower in persons with osteoarthritis and rheumatoid arthritis and may be supportive in the health of the joints.

Vitamin C - is a required co-factor of enzymes that facilitate collagen hydroxylation. Vitamin C combines with the amino acid Proline and Lysine to create the pro-collagen molecule. When these are all present this ensures secretion of collagen from the cell.

Manganese - works with Proline in the synthesis of proline-rich collagen. This reaction is also thought to be the rate-limiting step in the collagen biosynthetic process. It supports the ability to form polysaccharides such as glycosaminoglycans found in connective tissue, cartilage and tendons.

Pain Relief - Inflammation as a driver for joint destruction

CBD - topical creams and oral CV Science,

Curcumin - Curamin (Terry Naturally)

Ginger

Boswellia

Products:

Vibrant Health - *Joint Vibrance*

Redd Remedies - *Joint Health with NEM - eggshell membrane*

Natural Factors - *BioSil*

Heathy tendons and ligaments - *Terry Naturally*

Country Life - *Maxi Collagen & Maxi Skin products*

Ancient Nutrition - *Collagen protein powders*

Collagen products - *Vital Proteins - Collagen Peptides*

Jarrow Formulas - *Hyaluronic Acid - Hybest, MSM (Opti MSM), Glucosamine, Chondroitin, MSM, Joint Builder.*

Check for products by: *NOW Foods, Source Naturals, Reliance, Bluebonnet Nutrition and many other quality companies.*

Bone Broth - *available from many companies - make sure its organic !*

References:

Jarrow Formulas Quick Reference Guides: Healthy Living through Science and Education.

Collagen information - Dr. Axe

Bio Sil - lectures from Richard Passwater Jr. on Health Quest Podcast - Steve Langford - Health Quest Podcast

Lonza UC II

NEM - Eggshell Membrane

Cucumber Extract - 4/21 Vitamin Retailer Magazine - Gene Bruno