



Rebuild Joint Cartilage with Glucosamine Sulfate

It is possible to rebuild joint cartilage with glucosamine sulfate, although how quickly that occurs could depend upon what you take with it. First, though, an understanding of exactly why cartilage deteriorates will be useful in your understanding of how glucosamine sulfate can help towards repairing the damage.

Cartilage has several roles to play in your body, an example of which is to form curved body parts that would otherwise be unsupported, such as the external contours of your ears or a large part of your nose. Without cartilage your ears and nose would flop around a lot, and it is also contained in the spine, to prevent your discs from grinding against each other.

However, the part that we are interested in is as a shock absorber between the bones of your joints. It allows bones to slide over one another without damage, either through friction or shock, and is also nature's shock absorber, helping to support your weight while you are active. Thus, your cartilage protects from impact damage when you are running or jumping down from a height. This type of cartilage, known as articular cartilage, is bathed in a lubricating fluid known as synovial fluid, which introduces its own problems when your cartilage becomes damaged.

This damage can occur in several ways: as the result of a fall, for example, or direct contact with the joint when playing a physical contact sport such as football or soccer. It can also become damaged through wear and tear over a period of time, such with long distance runners or soccer players (again), and is also associated with age. Many years of continual use, especially amongst those with active rather than sedentary occupations, eventually lead to wear and damage.

Problems with the joint structure itself, known as osteoarthritis, can also damage the cartilage, as can being overweight for a lengthy period. You can also experience cartilage damage if you are bedridden or other wise immobile for long periods, because the cartilage needs regular movement to function correctly. This is connected with the blood supply, which will be discussed shortly.

Cartilage is constructed of cells known as chondrocytes that generate a fibrous matrix known as collagen, a mixture of amino acids known as elastin that allows the cartilage to return to its original shape after deformation, and non-collagenous matrix tissue containing proteins, water and proteoglycans that contain sulfated glycosaminoglycan chains. That last mixture is often referred to as 'ground substance.'



One of the problems with cartilage is its lack of a direct blood supply, and it relies on the compression and decompression of the articular cartilage, or on the flexing of elastic cartilage, to create a pumping action that drives blood to the chondrocytes. This is why inactivity can cause cartilage damage, due to a lack of blood supply, and why it is repaired more slowly than other body components.

Once an injury or wear and tear damages a joint, the body's natural defense, the immune system, is activated, and the major part of that involved in cartilage damage is the inflammatory response. The joint becomes inflamed, the quantity of synovial fluid is increased to provide more protection and swells the joint, and enzymes (hyaluronidase) are produced which, although part of the natural defense system, actually degrade the synovial fluid and the cartilage.

This increases the amount of inflammation and the process becomes self-perpetuating, leading to the condition known as degenerative joint disease (DJD) because the body is unable to produce enough glucosamine to generate the proteoglycan needed for repair.

This is where glucosamine sulfate enters the scene. Glucosamine is a precursor for glycosaminoglycans (GAG), which as mentioned as above are components of proteoglycans in the cartilage matrix ground tissue. It has been shown to stimulate the biosynthesis of proteoglycan, and analysis has shown its presence within articular cartilage after administering it orally to patients with cartilage disease. It therefore makes its way to the right place.

Glucosamine is administered in the form of glucosamine sulfate, the highly electrically charged sulfate groups believed to aid in the compression properties of cartilage. It is rapidly absorbed into the bloodstream, although only about a quarter of the oral dose is eventually available to the body, and high concentrations accumulate in the liver, kidneys and in articular cartilage where it is used in the biosynthesis of GAG.

When in solution, glucosamine sulfate separates into ions: sulfate and glucosamine. Glucosamine ions are involved in the synthesis of GAG, that then combine with proteins to form proteoglycans, a component of the non-collagenous matrix of the cartilage. Although glucosamine is the major active component, there is evidence that the sulfate group contributes the stability of the matrix of the connective tissue since the uptake of sulfate ions increases with the amount of glucosamine sulfate used.

Another consideration here is that sulfate is an important part of proteoglycans, and glucosamine sulfate promotes not only the synthesis of glycosaminoglycans, but also of proteoglycans in general. Glucosamine is also active in regenerating the lubricating properties of the synovial fluid, and in hindering the activity of hyaluronidase, the enzyme that breaks down the hyaluronic acid in the synovial fluid.



Some people find that glucosamine, taken either alone or in conjunction with chondroitin sulfate and/or methyl sulfonyl methane (MSM), is more effective than the non-steroidal anti-inflammatory drugs (NSAIDs) used to reduce inflammation (e.g. Aspirin and Ibuprofen) and without the side effects of these substances. MSM contains dietary sulfur, which is necessary for cell structure and healthy cell repair. Methyl sulfone methane is know to be beneficial for painful conditions such as arthritis, and also improves the blood circulation. It might also play a part in helping glucosamine sulfate get to the site of the cartilage damage.

Glucosamine is a large molecule, however, and finds it difficult to make its way to the area around the joint due to the lack of a direct blood supply. It is therefore taken in relatively large doses to ensure that sufficient amounts get to where it is needed. Many people insist that glucosamine sulfate is very effective in reducing, or even eliminating, their pain, and it is finding increasing popularity in the treatment of arthritis and other conditions involving cartilage damage.



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