Unloading the Joint

Maintain Ideal Conditions for Cartilage Health

By William E. Nordt III, MD

I'll bet you want to live a long and active life. Although there are many elements to fulfilling this equation, one of the key components is healthy cartilage — at least for the active part.

Articular cartilage is the gristle surface that caps the end of the bones within a joint. It is firm, smooth, and a bit rubbery as well. It provides a slippery, gliding surface for joint motion. It also absorbs the shock of joint impact during activities such as walking and running.

Cartilage is enduring. It can withstand millions of miles of activities while showing little signs of wear. No other substance can outperform the properties of cartilage.

Cartilage is made of as much as 80% water. Upon weight bearing, the fluid contained within the substance of cartilage is compressed, which creates a cushion effect. This shock absorption allows for walking and running without jarring discomfort. A thin layer of liquid called synovial fluid lubricates the joint, allowing near-frictionless gliding of the joint surfaces.

Pressure Overload

There is, however, a dark side to cartilage. It doesn't heal well. Once this smooth surface is damaged, it continues to worsen over time. Cartilage damage is commonly the result of pressure, specifically "pressure overload." Should a small area in your knee experience pressure overload, the cartilage surface will degrade. This tends to take years to occur.

There are a variety of reasons why a joint might get pressure overload. Obesity is a common reason. Anything that causes the joint to be slightly misshaped, such as trauma to the surface, can cause an area of overload. Misalignment, bowlegs, or knock-knee deformities cause joint overload just like a tire that is out of alignment. A knee with a bad meniscus generates high-pressure areas, and a knee with torn ligaments can experience episodes of pressure overload. It only takes a small spot of pressure overload to initiate the process that slowly brings a knee joint to its demise.

Looking inside a joint that is undergoing cartilage degeneration, the process seems to begin superficially and progressively wears through the full thickness of cartilage, until the underlying bone is exposed. Medically, this is referred to as chondrolysis or chondromalacia.

Cartilage degeneration is a precursor to arthritis. Arthritis occurs when the accumulation of cartilage damage leads to a worn and deformed joint. This is detectable on x-ray, which commonly shows bone spurs and even bone-on-bone wear and tear.

Prevent Cartilage Damage

Your orthopaedic priority is to maintain healthy cartilage in your joints. The key is to unload rather than overload a joint. Most importantly, stay trim and in good condition. Weight creates joint pressure. Your muscles are natural shock absorbers, so maintain your muscle tone through exercise. It is also important to have flexibility. This increases the effective surface area of your joints and decreases joint reactive forces. So stretch daily.

Be careful of overuse pain and injuries. Avoid prolonged activities that cause joint discomfort. Wear shock-absorbing shoes. Cross train and incorporate lower impact activities into your routine, such as biking, elliptical training, and swimming. Balance and hip strengthening are important. Braces and arch supports are helpful in some circumstances.

Cartilage Restoration

In the event that cartilage damage does occur, you have to double your efforts to unload your joints. Weight loss and increased flexibility become all the more critical. An organized exercise program or the help of a physical therapist is desirable. Diet programs, such as Weight Watchers, might be necessary.

Anti-inflammatory medications, such as ibuprofen or Aleve®, are a means to maintain your activity level and minimize discomfort. Your physician may suggest a prescription-strength medication. Cortisone injections can reduce pain and swelling, sometimes for many months, though the effects tend to be temporary. Oil-like lubricants, which are injected into knees to improve joint comfort and function, are also available.

In the event these conservative measures fail, surgery may become a consideration. In cases involving minor cartilage damage, removing rough, unstable flaps and edges and polishing uneven patches is often helpful. This is often done as a simple arthroscopic procedure. If the damage is deeper, down to exposed bone, we typically transplant plugs of cartilage from one part of the knee to another with positive outcomes.

There are occasions when we transplant sterilized cadaver cartilage to fill large defects in the patient's bone. If the joint is poorly aligned, such as in those with severely bowed legs, it is sometimes preferable to realign the joint, thereby redistributing the joint pressures. Yet another option is to regrow and replace worn cartilage. This is a two-stage procedure in which cartilage cells from the knee are harvested to expand the volume of cells, and the new cells are then implanted into the knee during a second procedure.

Joint Replacement Surgery

In those unfortunate cases where arthritis is severe, it may be necessary to consider joint replacement surgery. If the joint damage is localized to one specific compartment, a partial joint replacement is often indicated. For widespread arthritic damage, a total joint replacement is often the best option. Success rates of 90% after 20 years have been reported with certain prostheses.

The key to a long-lasting joint is healthy cartilage. One of the more important principles of joint longevity is to begin the process early; that is, address those factors that are damaging the cartilage before the joint structure is irreparably distorted. Although science promises new techniques for cartilage restoration, your best bet is to begin now.

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