Carticel® Reimplantation: A New Procedure to Prevent Osteoarthritis of the Knee

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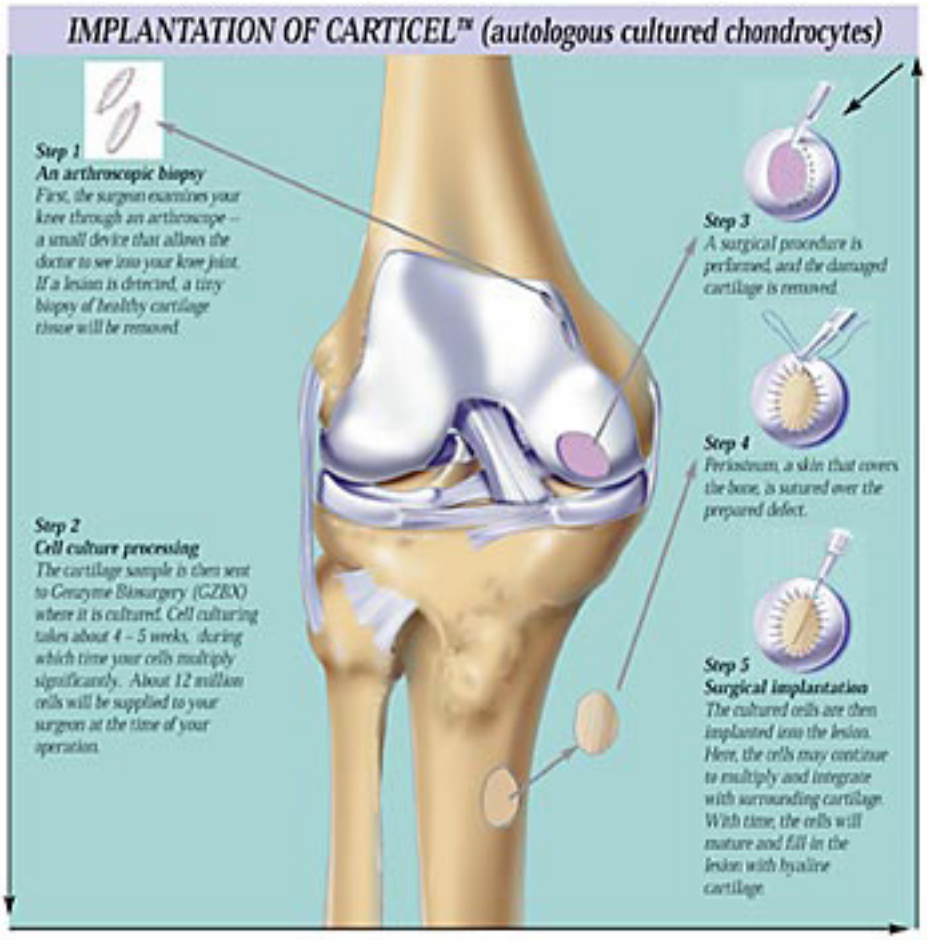

A healthy knee needs to have a good supply of articular cartilage covering the femur (thigh bone), tibia (shin bone) and patella (kneecap). This articular cartilage acts as a cushion and provides a slippery surface (like Teflon) between the bones so that as the knee is bent and straightened, there is fluidity and ease of movement. The ligaments around the knee help maintain proper alignment of the bony structures inside. Also, there are many muscles and tendons that enhance joint stability.

One of the most common cartilage injuries is a torn meniscus. The meniscus is a C-shaped cushion between the femur and the tibia. The meniscus acts like a shock absorber between the bones and absorbs the impact from walking and running. If you tear your meniscus, it is easily repaired by an arthroscopic procedure where the torn piece of meniscus is sewn back in place or trimmed away. You may also be familiar with ligament surgery where we replace ligaments, such as anterior cruciate ligaments (ACLs).

The problem that is sometimes encountered with knee injuries occurs when a section of articular cartilage, the slippery surface covering the internal knee structure, is completely sheared off. What is important to remember about articular cartilage, however, is that once it is destroyed it will not grow back! Over time this type of defect can cause osteoarthritis of the

knee and a degenerative or premature aging of the knee. The deterioration occurs because the normal smooth surface has been disrupted. Now when you move the knee there are rough areas that will get rougher with time, causing more loose pieces of cartilage to occur. The rougher the area becomes, the more pain the person will experience. Eventually a total knee replacement becomes the only way to alleviate the pain.

In the past, treatment of cartilage injuries was handled basically in one of two ways. The first consisted of the arthroscopic procedure mentioned previously where a damaged piece of cartilage was shaved away. The second treatment requires placing small holes (microfractures) in the underlying bone in an attempt to promote the body to produce scar tissue to cover the deficient area, since the body is unable to produce new healthy cartilage. While these two treatment modalities have worked for most patients, there are many patients in whom they have failed. These folks are left without any options, other than an eventual knee replacement.

Now fortunately, there are new treatment options for patients with articular cartilage injuries. Imagine taking a plug of fresh, healthy grass to fill in a bare spot on your lawn. In the procedure called an osteochondral transfer, a plug of cartilage and bone from an area of the knee where it is not needed is transferred to the injured area. This is a good technique for many people, but it is limited by the size of the plug you can take and fill. If the injured area of cartilage is too large this technique cannot be used.

An exciting new procedure is now available called articular cartilage reimplantation (Carticel procedure). At the time of the initial arthroscopy, the area of injury is assessed to make sure the patient's knee is a good candidate for this procedure. If the patient is a good candidate, cartilage cells are removed arthroscopically from the patient. The cells are then sent to a laboratory where they are grown to increase their numbers. The next step involved is reimplanting them into the injured area of the knee.

First, an incision is made on the knee to expose the injured area. The edges of the injured area are made sharp and the area is essentially cleaned of loose cartilage. Then another smaller incision is made along the tibia and a piece of tissue (periosteum) is taken from the tibia. The periosteum is then sewn over the area of injured cartilage. The cartilage cells that were previously grown in the lab are then injected underneath the new patch of tissue. Then, over a period of time the cells adhere and mature to create new cartilage and the previous defect matures into a more normal cartilage covering the knee.

After the procedure, the rehabilitation process with physical therapy starts almost immediately. Initially the patient works on restoring motion, then gradually they increase their weight bearing and strengthening.

My personal experience with this procedure has been very rewarding. Numerous patients who had previously undergone six to eight arthroscopic surgeries and had persistent pain and problems with the knee have found that the Carticel reimplantation has allowed them to lead a more normal lifestyle with little or no pain! For this reason, articular cartilage transfers and reimplantations.