

The goal of articular cartilage restoration is to:

- Relieve pain
- Allow better joint function
- Delay or prevent the onset of arthritis

## Team approach

Our sports medicine specialists work closely with physical therapists and athletic trainers, as well as with primary care physicians, human performance experts, and sports nutritionists to coordinate care and optimize an athlete's recovery.

### ABOUT OUR TEAM

- Dedicated team of specialists working to evaluate and treat patients coping with sports-related injuries.
- Fellowship-trained surgeons experienced in performing some of the most complex procedures available.
- Nationally-recognized educators in the practice of sports medicine.
- Cutting-edge research dealing with the care of athletes recognized by multiple national awards.
- **Be treated like a pro** — our sports medicine physicians are the official team physicians for the St. Louis Blues hockey team, so patients will receive the highest-quality, advanced clinical care.

#### On the cover:

Osteochondral autograft transfer (OATS) is an articular cartilage restoration procedure that involves the transfer of a plug of healthy bone and cartilage into the cartilage defect.



TEAM PHYSICIANS FOR THE  
ST. LOUIS BLUES AND YOU.

**BE TREATED LIKE A PRO.**



Cartilage defect of the knee.

ORTHOPEDICS

#### Schedule an appointment:

 (314) 514-3500

 [ortho.wustl.edu/ACR](http://ortho.wustl.edu/ACR)



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## Orthopedics



Physicians

NATIONAL LEADERS IN MEDICINE

## Articular Cartilage Restoration

BARNES-JEWISH HOSPITAL  
WASHINGTON UNIVERSITY PHYSICIANS

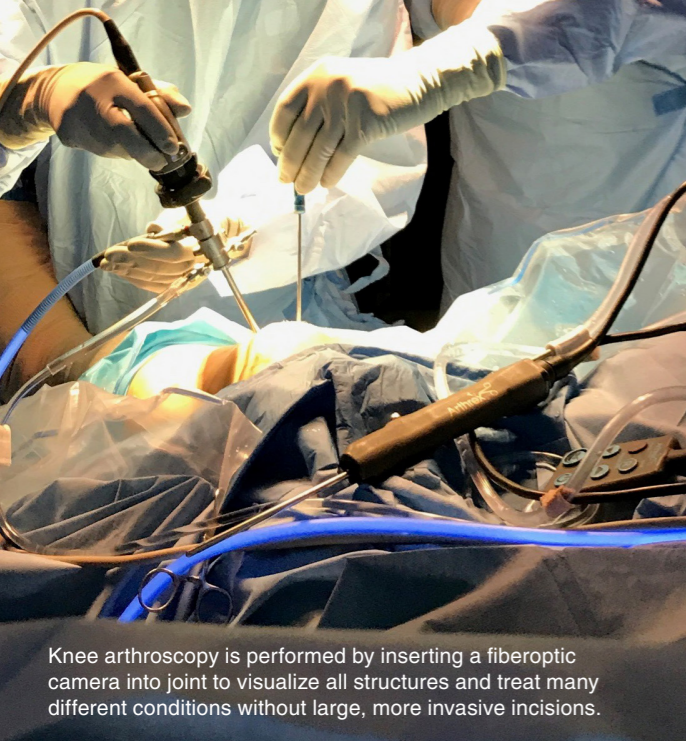
## Overview

Articular cartilage is the smooth, white tissue that covers the ends of bones where they come together to form joints. Healthy cartilage in our joints makes it easier to move, allowing the bones to glide over each other with very little friction.

Articular cartilage can be damaged by injury or normal wear and tear. Because cartilage does not heal itself well, surgical techniques have been developed to stimulate the growth of new cartilage.

## Patient eligibility

Most candidates for articular cartilage restoration are young adults with a single injury, or lesion. Older patients, or those with many lesions in one joint, are less likely to benefit from the surgery.



Knee arthroscopy is performed by inserting a fiberoptic camera into joint to visualize all structures and treat many different conditions without large, more invasive incisions.

## Treatment options

### ARTHROSCOPY VERSUS OPEN INCISION

Many procedures to restore articular cartilage are done arthroscopically. During arthroscopy, three small puncture incisions are made around the joint using an arthroscope.

Some procedures require the surgeon to have more direct access to the affected area, requiring longer, open incisions. Sometimes it is necessary to address other problems in the joint, such as meniscal or ligament tears, while cartilage surgery is being done. We discuss options with patients to determine what kind of procedure is right for them.

## COMMON PROCEDURES FOR ARTICULAR CARTILAGE RESTORATION

### Microfracture

**Goal:** Stimulate the creation of a blood clot into the cartilage defect. The cells in the clot have the potential to mature into new cartilage cells that ultimately fill the defect.

**Candidates:** Patients ages 40 years and under with an acute, isolated cartilage defect without surrounding arthritis.

**Technique:** Holes are made in the subchondral bone beneath the cartilage. This action creates a healing response. New blood supply can reach the joint surface, bringing with it new cells that will form the new cartilage.

### Abrasion Arthroplasty

**Goal:** Stimulate the creation of a blood clot that contains cells with the potential to form new cartilage within the defect.

**Candidates:** Candidates for abrasion arthroplasty are similar to that of microfracture.

**Technique:** High speed burrs are used to remove the damaged cartilage and reach the subchondral bone in order to stimulate blood cells that create a healing response. Abrasion arthroplasty can be done through arthroscopic visualization.

### Autologous Chondrocyte Implantation (ACI)

**Goal:** Regenerate cartilage using the patient's own cells.

**Candidates:** Most useful for younger patients who have single defects larger than two cm in diameter.

**Technique:** ACI is a two-step procedure in which the patient's normal cartilage cells are harvested, grown and expanded in a laboratory, and then re-implanted into the cartilage defect. The advantage of using the patient's own cells is that there is no danger of a patient rejecting the tissue. It does have the disadvantage of being a two-stage procedure that requires an open incision for implantation. It also takes several weeks to complete.

### Osteochondral Autograft Transplantation

**Goal:** Healthy cartilage is transferred from one part of the joint to another.

**Candidates:** Individuals with smaller cartilage defects.

**Technique:** A healthy bone and cartilage plug, or graft, is taken from an area of the bone that is non-weightbearing. The graft is taken as a cylindrical plug of cartilage and subchondral bone (osteochondral autograft). It is then matched to the surface area of the defect and impacted into place. This leaves a smooth cartilage surface in the joint. A single plug of cartilage may be taken or a procedure using multiple plugs, called 'mosaicplasty', may be performed.

### Osteochondral Allograft Transplantation

**Goal:** Healthy cartilage is transferred from a donor into the joint.

**Candidates:** Individuals with a large cartilage defect greater than two cm in diameter.

**Technique:** A larger tissue graft comprised of intact bone and cartilage is taken from a cadaver donor. In the laboratory it is sterilized and prepared, and tested for any possible disease transmission. It can be shaped into a cylindrical graft that fits the exact contour of the defect and then press fit into place. Allografts are typically done through an open incision.

### New Techniques for Cartilage Restoration

**Goal:** Healthy pieces of minced or freeze-dried cartilage are transferred from a donor into the joint.

**Candidates:** Individuals with a large cartilage defect greater than 2 cm in diameter.

**Technique:** Pieces of minced cartilage or freeze-dried cartilage paste is taken from a cadaver donor. In the laboratory the cartilage specimen is finely minced or ground into a fine powder that is mixed with the patient's plasma to form a cartilage paste. The grafts are then shaped to fit the exact contour of the defect and 'glued' into place with a biologic glue. This is typically performed through an open incision.

## Recovery and outlook

After surgery, the joint surface must be protected while the cartilage heals. If the procedure was done on the knee or ankle, the patient may not be able to put weight on the affected leg. Crutches can be used to move around for the first two or three months after surgery.

After surgery, we provide physical therapy to help restore mobility and strength to the affected joint. During the first weeks after surgery, patients may begin continuous passive motion therapy. A continuous passive motion machine constantly moves the joint through a controlled range of motion.

As healing progresses, therapy focuses on strengthening the joint and the muscles that support it. It may be several months before a patient can safely return to sports activity.

**+** To schedule an appointment, call **(314) 514-3500** or visit **[ortho.wustl.edu/ACR](http://ortho.wustl.edu/ACR)**.

