



Arnold & Cox Knee and Shoulder Center
OSTEOARTICULAR TRANSPORT (OATS) PROCEDURE INFORMATION
Dr. Christopher Arnold

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. It allows 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, doctors have developed surgical techniques to stimulate the growth of new cartilage. Restoring articular cartilage can relieve pain and allow better function. Most importantly, it can delay or prevent the onset of arthritis.

Surgical techniques to repair damaged cartilage are still evolving. It is hoped that as more is learned about cartilage and the healing response, surgeons will be better able to restore an injured joint.

Cartilage Damage

Hyaline Cartilage

The main component of the joint surface is a special tissue called hyaline cartilage. When it is damaged, the joint surface may no longer be smooth. Moving bones along a tough, damaged joint surface is difficult and causes pain. Damaged cartilage can also lead to arthritis in the joint.

The goal of cartilage restoration procedures is to stimulate new hyaline cartilage growth.

Identifying Cartilage Damage

In many cases, patients who have joint injuries, such as meniscal or ligament tears, will also have cartilage damage. This damage may be hard to diagnose because hyaline cartilage does not contain calcium and cannot be seen on an X-ray.

If other injuries exist with cartilage damage, doctors will address all problems during surgery.



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Patient Eligibility



Articular cartilage in the knee damaged in a single, or focal, location.

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.

The knee is the most common area for cartilage restoration. Ankle and shoulder problems may also be treated.

Surgical Procedures

Many procedures to restore articular cartilage are done arthroscopically. During arthroscopy, Dr. Arnold makes three small, puncture incisions around your joint using an arthroscope.

Some procedures require Dr. Arnold to have more direct access to the affected area. Longer, open incisions are required. Sometimes it is necessary to address other problems in the joint, such as meniscal or ligament tears, when cartilage surgery is done.

In general, recovery from an arthroscopic procedure is quicker and less painful than a traditional, open surgery. Your doctor will discuss the options with you to determine what kind of procedure is right for you.

The most common procedures for cartilage restoration are:

- Microfracture
- Drilling
- Abrasion Arthroplasty
- Osteochondral Autograft Transplantation
- Osteochondral Allograft Transplantation



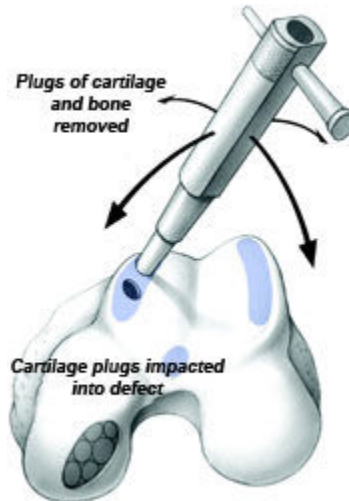
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Osteochondral Autograft Transplantation

In osteochondral autograft transplantation, cartilage is transferred from one part of the joint to another. Healthy cartilage tissue - a graft -- is taken from an area of the bone that does not carry weight (non-weightbearing). The graft is taken as a cylindrical plug of cartilage and subchondral bone. It is then matched to the surface area of the defect and impacted into place. This leaves a smooth cartilage surface in the joint.



Mosaicplasty type osteochondral autograft transplantation procedure.

A single plug of cartilage may be taken or a procedure using multiple plugs, called mosaicplasty, may be performed.

A single plug of cartilage may be transferred or a procedure with multiple plugs, called mosaicplasty, may be done.

Osteochondral autograft is used for smaller cartilage defects. This is because the healthy graft tissue can only be taken from a limited area of the same joint. It can be done with an arthroscope.

Osteochondral Allograft Transplantation

If a cartilage defect is too large for an autograft, an allograft may be considered. An allograft is a tissue graft taken from a cadaver donor. Like an autograft, it is a block of cartilage and bone. In the laboratory it is sterilized and prepared. It is tested for any possible disease transmission.

An allograft is typically larger than an autograft. It can be shaped to fit the exact contour of the defect and then press fit into place.

Allografts are typically done through an open incision.



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Allograft Safety

A screening process is done before selecting a possible donor. Someone who knows the donor well is interviewed to help identify risk factors that would prevent the use of the donor tissue.

Once selected, the donor tissue undergoes many tests. The safety of the tissue is monitored by the American Association of Tissue Banks and the United States Food and Drug Administration. The tissue is tested for viruses like those that cause HIV/AIDS, West Nile virus, hepatitis B and C, as well as for bacteria.

Rehabilitation

After surgery, the joint surface must be protected while the cartilage heals. If the procedure was done on the weight bearing surface of your knee you will not be able to put weight on the affected leg. You will need to use crutches to move around for the first four weeks after surgery. If the procedure was performed on the undersurface of your kneecap, then you will be given a brace to limit the motion that your knee can flex to. Although you may put as much weight as you feel comfortable on the leg, you should always have your brace on when you are up and around.

During the first weeks after surgery, you will begin continuous passive motion therapy. A continuous passive motion machine constantly moves the joint through a controlled range of motion. You will be sent home with a motion machine to promote blood flow to the site. You should use this machine a minimum of 6 hours per day.

You will need to undergo physical therapy. This will help restore mobility to the affected joint.

Stem Cells and Tissue Engineering

Current research focuses on new ways to make the body grow healthy cartilage tissue. This is called tissue engineering. Growth factors that stimulate new tissue may be isolated and used to induce new cartilage formation.

The use of mesenchymal stem cells is also being investigated. Mesenchymal stem cells are basic human cells obtained from living human tissue, such as bone marrow. When stem cells are placed in a specific environment, they can give rise to cells that are similar to the host tissue.

The hope is that stem cells placed near a damaged joint surface will stimulate hyaline cartilage growth.

Tissue engineering procedures are still at an experimental stage. Most tissue engineering is performed at research centers as part of clinical trials.