Cartilage Replacement: Why It's an Option for You

Talking to your doctor about cartilage damage, the possible treatments discussed will likely include the option of fresh osteochondral allografts. During this conversation, you will likely have questions about the process and what option is best. These are some of frequently asked questions that may help you learn more about these treatment options.

Common questions from patients:

What is cartilage?

Cartilage is a flexible connective tissue that covers the ends of the bones forming a joint. Cartilage is very smooth and allows our joints to move freely and without clicking or catching. Cartilage is often thought of as a cushion or shock absorber between our bones and it acts like a coating on the surface of non-stick pan to dissipate the forces our joints experience during the activities of daily living.

Why is cartilage so important?

Cartilage is very important to ensure normal joint motion. When undamaged, cartilage allows our joints to move smoothly and allows us to walk, run, and function properly. Interestingly, cartilage has very limited ability to recover or "heal" when damaged. For that reason, it is important to treat cartilage defects early. Often the first symptoms of a cartilage defect are joint pain, a mechanical clicking, or the sensation of catching in the joint, all of which can cause discomfort. If left untreated, cartilage defects and, in some cases, the underlying cause of the cartilage defect, can lead to a condition called arthritis.

What can cause cartilage damage?

There are many reasons cartilage damage can occur. Common causes are sudden or traumatic injuries, often from sports or other accidents. Even repetitive daily activities over time can wear on the cartilage surface. Many patients have pain and swelling at the time of injury, but some don't experience issues with joint pain for years after the original injury. A patient's individual anatomy and even underlying medical conditions may place them at higher risk of cartilage damage over the course of their lifetime.

Can the body heal cartilage once it is damaged?

The body has a limited ability to heal cartilage once it is damaged. Our bodies rely on robust blood supply to aid the normal healing process. Bone, for instance, has a good blood supply and typically heals well following an injury. In contrast, cartilage has a limited blood supply. Because of this, when damaged, cartilage defects tend not to heal as well and ultimately this can lead to pain and limit our ability to move the joint. If left untreated, these symptoms will usually worsen over time. If you are experiencing joint pain, it is important to see your doctor to discuss the options you may have to improve the function of the joint and reduce or eliminate your pain. Keep in mind that you're not alone; cartilage damage is the most common reason that patients visit a doctor for joint pain.

What are the symptoms of cartilage damage?

Symptoms of cartilage damage range from pain and swelling to popping, clicking, or catching of the joint. Some patients may experience locking or instability as well. Depending on the extent of cartilage damage, symptoms can vary and be constant or they may appear infrequently depending on your activity level.

What is the best way to evaluate cartilage damage?

Your doctor may start with an x-ray to learn more about the joint spacing and alignment. Your doctor may order an additional diagnostic study called an MRI (magnetic resonance imaging) to learn more about the cartilage damage and the surrounding structures. For instance, in the knee joint, doctors will look at the overall joint health, considering the meniscus and ligaments of the knee and whether there is swelling or inflammation in your joints. It is also common for the doctor to recommend an arthroscopy. This is a minor surgical procedure to look into the joint with a small camera called an arthroscope. This allows the doctor to see and inspect the joint surface for damage firsthand.

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What determines the best treatment for my cartilage damage?

Treatment of cartilage damage is a complex decision process for doctors and many factors are considered when developing a treatment plan. Doctors often consider factors outside of your joint such as: your age, type of work, desired athletic activities, joint alignment, weight, and overall health. Doctors also consider factors inside your joint such as: the size and depth of the cartilage damage, other damage, or injuries to the surrounding ligaments or tissues.

What are the options for treatment of cartilage damage?

There are many options for treatment of cartilage damage; it is best to consult with your doctor to gain a complete and thorough answer that is right for you. Each patient has a unique set of reasons for the cause of their joint pain. Doctors often weigh multiple treatment options to select an approach that is best for each individual patient. The complexity of this answer can be simplified into the following treatment categories:

- Symptomatic *treatment*: treatment that may involve minor cleanup, also known as debridement, of the cartilage to remove damaged tissue.
- *Reparative treatment*: treatment that may involve stimulating the bone beneath the cartilage defect to bleed and thus improve blood supply to the area, often referred to as marrow stimulation or microfracture.
- *Restorative treatment*: treatment that involves replacing the damaged cartilage and underlying bone with a donor cartilage graft. This is called an osteochondral graft. The graft may come from the patient (autograft) or from a donor (allograft).

What is cartilage replacement?

Cartilage replacement involves taking healthy cartilage and bone from one area and using it to replace the damaged area of cartilage in your joint. Doctors will often call the borrowed bone and cartilage a graft. Grafts can be taken from your own joints to replace small areas of cartilage damage. However, because we have a limited amount of cartilage in our joints to borrow, if the area of cartilage damage is larger, the graft will be taken from a cadaver or living donor. If the graft is taken from your body, it is called an autograft. If the graft is taken from another person, it is called an allograft or osteochondral allograft. “Osteo” means bone and “chondral” means cartilage. “Allo” means other than your body and “graft” means inserting tissue into your body.

Am I a candidate for cartilage replacement?

This depends on many factors, some of which are your age, desired activity level, overall health, and the size and cause of your cartilage damage. There are several factors involved in this decision and you should discuss all of the available options with your doctor.

What does the process of allograft or donor cartilage involve?

The process of cartilage replacement with an osteochondral allograft or donor cartilage involves measuring the size of the damaged area of cartilage in your joint and matching it to a donor with healthy cartilage. Due to the complexities of recovering donated tissue and ensuring an appropriate graft is located for you, the process of matching a graft to a patient can take some time. Tissue allograft donors undergo extensive testing to ensure your safety. As osteochondral allografts are living tissues, this means once a graft is matched, the procedure it is used for must be performed in a matter of days to a few weeks at the most. Following the procedure, it is common to participate in a structured physical therapy regimen to give the graft the best opportunity for success.

Are osteochondral allografts a safe and successful option for cartilage replacement?

Yes, osteochondral allografts are a safe and effective option for cartilage replacement. The process of replacing cartilage with an osteochondral allograft has been used for many years. It is well adopted in modern medical practices and it is supported by extensive published research.

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What are the chances that my body will reject the donated tissue and do I need to take medication to prevent rejection?

Unlike organ transplants, patients are not required to take anti-rejection medication when receiving an osteochondral allograft. Tissue rejection is much less of a concern with bone and cartilage transplantation. However, as with any surgical procedure, there are risks and it is important to discuss these risks with your doctor in detail.

What should I expect after cartilage replacement surgery with an osteochondral allograft?

This depends on the size of the damaged area in your joint. If the damaged area is small and easy to reach, the procedure may be completed with the use of a small camera through a few small incisions. This would be considered an arthroscopic procedure. If the damaged area is larger, your surgeon may have to make a larger incision and do the procedure through what is referred to as an arthrotomy. The surgery is often done as an outpatient procedure and can occur in either a hospital setting or in a same-day surgery center. Most patients will go home the same day. The goal of the procedure is to allow the osteochondral allograft to incorporate into the surrounding tissue; this may lead to a slower rehabilitation program at first that may advance faster with time. Patients should expect a significant physical therapy plan to regain full motion and strength. Speak with your doctor to learn more about the anticipated time to return to work, sports, and activities of daily living.

Is joint replacement an option for my cartilage damage?

Joint replacement involves replacing the damaged portions of your joint with metal and plastic components. The decision to have a joint replacement is complex and you should discuss this option with your physician. Joint replacement may be a better option based on your age, the amount of cartilage damage, your general health, and your expectations after surgery. Generally, doctors only recommend joint replacement when other cartilage repair procedures are no longer appropriate.

The process of osteochondral allograft transplantation typically follows a pathway similar to this:

- You and your doctor decide that you are a candidate for an osteochondral allograft. This may include several office visits, pre-operative images such as x-rays, MRI or CT scans, as well as a possible diagnostic arthroscopic procedure.
- Your doctor sends your imaging studies to a registered tissue bank to request a matched allograft. At the same time, your doctor's office will work with you on obtaining insurance approval for the procedure.
- You will be placed on a waiting list until a matching graft becomes available.
- It is important to work with your doctor and their office to coordinate your availability for surgery prior to a graft being located. To help ensure a successful outcome with the graft placement, the procedure will likely be scheduled within days of matching for a graft.
- All allografts undergo extensive testing to ensure they are safe for transplantation and pose minimal risk to you.
- Once an allograft is matched, the tissue bank will speak with your doctor's office to make them aware of the timeline for graft availability.
- The surgery date is then finalized with you and the procedure can move forward in the next several days.

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Additional Resources:

- OrthoIllustrated Patient Education
  https://www.orthoillustrated.com/orthobiologics/cartilage#AllograftOATSProcedure
- Fresh Osteochondral Allografts:
  An Introduction for Patients
  https://www.arthrex.com/resources/presentation/iLusgd_Eo0uPNAFymNiqxA/fresh-osteochondral-allografts-an-introduction-for-patients
- Fresh Osteochondral Allografts:
  Ordering Process for Healthcare Providers
  https://www.arthrex.com/resources/presentation/yFmuxPtPxE6phAFzSoH8ZQ/fresh-osteochondral-allografts-ordering-process
- Fresh Osteochondral Allograft Techniques
  https://www.arthrex.com/knee/allograft-oats-technique

Tissue Bank Partners:

- JRF Ortho
  www.jrfortho.org
- LifeNet Health
  www.lifenethealth.org