

Do you have articular cartilage defects? We have the solution.



ChondroFiller





## Dear Patient,

do you suffer from pain in the knee, ankle or shoulder joint for example - an articular cartilage defect is diagnosed? If the defect is unable to heal on its own, it should be treated as early as possible. If this doesn't happen, secondary damages may occur. For example an early arthrosis could develop or finally an artificial joint would have to be inserted.

Only a few surgical procedures exist which will improve your reduced mobility and relieve you from pain. We want to give you some information about articular cartilage defects and introduce you to our novel regenerative treating method.

## What is articular cartilage?

Articular cartilage is a pressure resistant connective tissue which covers the articular surface of bones and is responsible for low friction movements. It works like a protective shock absorber which handles a load multiple times as heavy as the own body weight daily. The healthy articular cartilage - hyaline cartilage - consists of water and structure proteins, collagen and aggrecan for example. Compared to other tissue cartilage, it is cell-poor and not supplied with blood. Normally changes to the articular cartilage caused by injuries or illness are unable to heal on their own.

## What leads to cartilage defects?

Cartilage defects arise spontaneously or develop over many years. Over 5 million people sustain a cartilage defect just in the knee joint. Other joints like the shoulder or ankle can be affected as well. Affections like the Osteochondrosis dissecans can lead to an ablation of bone-cartilage fragments. Especially for young and active people incorrect weight lifting and accidents lead to damages which may become worse if left untreated.

Arthrosis - a degenerative affection - leads to an ablation from the cartilage surface to the bone plate. If this stage exists on an extensive level, only an artificial joint replacement can sustain the movement of the joint.

## What treatment methods are available?

### Hyaluronic Acid

Injections with hyaluronic acid are mostly a temporary solution to treat the symptoms until a surgery becomes necessary. The increasing friction of the joints caused by the cartilage defect can be reduced by an hyaluronic acid treatment for some months. The disorders become alleviated, the cartilage defect stays the same.

### Mikrofracturing

Microfracturing is the most commonly used method for treating cartilage defects up to 2 cm<sup>2</sup>. The bone becomes perforated in spaces of 2-5 mm with the help of special chisels and trephines. This leads to bleeding in the affected area. The included stem cells form a scar-like tissue of poor quality, which is softer and less reliable compared to native cartilage.

### Autologous Osteochondral Cylinder Transplantation (OCT)

This operation technique is also named bone-cartilage-transplantation. With a punch, whole cylindrical pieces of bone-cartilage are extracted from a less burdened area of the joint and transplanted into the cartilage defect. When several cylinders are placed side by side it resembles a mosaic. That's why this technique is also named mosaic-plastic. It's problematic that gaps reside between the implanted cylinders, which can not be closed and hence cannot fill up the cartilage defect. Additionally disorders and even degenerative changes can occur at the extraction areas.



### Autologous Chondrocyte Transplantation (ACT/MACT)

For more than 10 years the transplantation of autologous cartilage cells has been successfully practised. During the first surgical procedure (arthroscopy) a biopsy of cartilage tissue is taken. The included cartilage cells are isolated and multiplied in a special laboratory. In general the cells are attached on an implant matrix which will be reimplanted during a second surgery 3 weeks after. As time goes on, the cells will rebuild the matrix into a hyaline-like cartilage tissue. The production costs are expensive and sometimes are not covered by health insurances.

### Artificial joint replacement

If the cartilage defect is in an advanced stage which none of the treatments mentioned above can treat, the last therapeutic treatment is the implantation of an artificial joint made of metal or plastic. The durability of an artificial joint replacement is confined. It is necessary to have enough structural bone for a successful anchoring. Prostheses cannot just simply be replaced, because the bone substance decreases after the first implantation. Because of that this method should be applied only to older patients.

## What solution does Amedrix offer?

The Amedrix GmbH's biological implants connect the regenerative potential of the ACT/MACT with the convenience of the microfracturing method. That is what we specialise in.

## What is ChondroFiller?

ChondroFiller is the newest generation of biologic cartilage implants! It consists of highly pure collagen and works without cell-breeding in laboratories. That means only a one-step surgery is necessary! The implantation occurs arthroscopically or minimally invasive, so that you will quickly regain your strength. Collagen is the most abundant natural structure protein of the human body and the main component of skin, tendons and cartilage. Because of that it is qualified like no other biologic substance to treat cartilage defects. In our preclinical study we showed that autologous cells can grow into the implant and rebuild new healthy cartilage tissue. The cartilage defect can be filled completely and the joint becomes resistant again.



## What are the advantages of ChondroFiller?

Compared to the conventional surgical treatment methods, ChondroFiller offers many advantages. These are summarized in the following table:



Defekt size	Your advantage with ChondroFiller 	Current treatment method	Disadvantage of current treatment
Independent	<p>Collagen implant stable in form</p> <p>Complete filling of the defect zone and tissue regeneration</p>	Hyaluronic Acid	<p>Rapid reduction of hyaluronic acid</p> <p>Limited alleviation of symptoms</p> <p>Cartilage defect remains</p>
Small	<p>Regeneration instead of scar-like cartilage tissue</p> <p>No damaging of healthy cartilage</p> <p>Suitable for large defects</p>	Mikrofracturing	<p>Forming of poor quality, scar-like cartilage tissue</p> <p>Only suitable for small defect sizes</p>
Medium	<p>No damaging of healthy cartilage and bone</p> <p>Complete filling of the defect zone</p>	Mosaic-plastic	<p>Damaging of healthy cartilage and bone necessary</p> <p>No gapless filling of defect zone</p>
Large	<p>One step surgery</p> <p>Costs covered by health insurance</p>	ACT/MACT Autologous Chondrocyte Transplantation	<p>Two step surgery</p> <p>Expensive and extensive treatment</p>



## Why should you choose ChondroFiller?

Our competence is based on our long standing experience and collaboration with the Fraunhofer Institute for Interfacial Engineering and Biotechnology as well as our significant know-how in the development and production of this new generation of biologic implants. That is why we can provide you with very high quality products. You are in safe hands with us and our partners. The sooner you treat a small cartilage defect with ChondroFiller the lower the risk of developing an early arthrosis or having to implant an artificial joint is.

Our implants are individually customized to your clinical requirements.

Not only can you regenerate your cartilage defect with ChondroFiller but you can also improve your quality of life.



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