

# Asymptomatic Osteonecrosis of the Femoral Head

## Treatment of Asymptomatic Osteonecrosis of the Femoral Head

Treatment of holes in the articular cartilage of the knee has taken a decided turn in the last 15 years. Surgeons have found ways to either repair or replace the cartilage. Results have steadily improved so the question now is: which method works best?

In this systematic review, surgeons from the Sports Medicine Center at Ohio State University compare autologous chondrocyte implantation (ACI) against other surgical treatment techniques for this problem.

Here's a little more background information to help you understand the importance of this study. First, there are different kinds of cartilage and locations. The articular cartilage is the one that lines the joints and makes it possible for the joint to slide, glide, and twist smoothly during movements like flexion, extension, and rotation.

Damage to this layer of cartilage can cause pain, swelling, and eventually degenerate into arthritis. It doesn't have the ability to heal itself when damaged, so these new treatments to repair or replace the cartilage are very helpful. Repair techniques involve marrow stimulation such as abrasion arthroplasty, drilling, and microfracture. Replacing the cartilage defect with healthy donor cartilage consists of autologous chondrocyte implantation, osteochondral autograft, and mosaicplasty.

Second, a systematic review means they have taken a look at all the studies published about repair or restoration of the articular cartilage. By combining the data from all similar, high-quality studies, some patterns in results can be observed and some conclusions drawn about what works, how well it works, and how long the results last. In this review, they found 13 studies that could be included with a total of 917 cases. The statistical significance of findings is much greater with this large a number of patients.

Now, what is autologous chondrocyte implantation (ACI)? It is a restorative (not a repair) procedure. Autologous means the cells are harvested for the implantation from the patient who needs the repair. In other words, you donate your own chondrocytes (cartilage cells). They usually are taken from an undamaged area of the knee that doesn't bear as much load as the damaged spot.

This procedure is done when there are full-thickness defects in the articular surface of the joint. Essentially, there has been an injury that has pulled off a piece of the layer of cartilage that lines the joint. Full-thickness means the defect goes all the way down to the first layer of bone (subchondral bone).

Studies so far have shown some pretty good results with autologous chondrocyte implantation (ACI). But how does it compare to other restorative techniques used? And now that surgeons have found a variety of different ways to do the ACI procedure, which one works best? Those are the main questions this systematic review was meant to answer.

The four reviewers involved in this study looked at all published studies from 1950 to 2010 using any method of ACI (e.g., periosteal cover, collagen-membrane cover, three-dimensional scaffolds, and different methods of fixation or attachment of the cartilage graft). The surgeries could be done with an open incision or by using an arthroscope with incisions small enough to insert the scope. Only patients having knee

cartilage treated were included and follow up was at least one year.

For anyone interested in the methods used, the level of quality of studies included, or more specifics about the patients in the studies, the authors provide a detailed description of each. Type of surgery done, age of patients, and length of time from symptom development to diagnosis to surgery are summarized and reported. Details about the surgical tools and techniques used are also provided.

And, of course, a comparison of results for each surgical technique was summarized. The researchers also took the time to evaluate which patient factors (e.g., age, activity level, duration of symptoms) affected the outcomes for each procedure. In a separate analysis, they also looked at defect factors (e.g., size, depth, location) influencing the results. Complications reported such as infection, blood clot, continued symptoms were compared from one technique to another.

All-in-all this systematic review was thorough and very comprehensive. And here's a brief summary of the in-depth findings reported by the authors:

Autologous chondrocyte implantation has the most durable results. The repair tissue that forms holds up better than other repair techniques. Autologous chondrocyte implantation has better short-to medium-term results than microfracture but equal results with osteochondral autograft transplantation. Long-term results aren't available yet to show a clear front-runner of the various restorative techniques. Outcomes have been improving over time as the surgical techniques improve.

Microfracture is still the best repair choice for small lesions in young, active adults.

The method used to cover the graft (periosteal, collagen, scaffolds) and protect it doesn't seem to matter. Results are comparable among the various choices.

Certain patient characteristics do make a difference. Younger, more active patients have the best results, especially if they have the surgery early when the lesion is small.

The best outcomes occur in patients who have not had any previous knee surgeries and who don't have any other injury or damage to the knee ligaments or other knee cartilage.

In conclusion, the authors note that the quality of studies in this area have improved but still remain lacking. Their hope is that future studies will continue to use the design and statistical methods of the most recently reported studies. For those researchers interested in conducting studies of patients having surgery for cartilage defects, the authors provide many suggestions for carrying out a high-quality, effective study.

Reference: Joshua D. Harris, MD, et al. Autologous Chondrocyte Implantation. A Systematic Review. In The Journal of Bone and Joint Surgery. September 15, 2010. Vol. 92-A. No. 12. Pp. 2220-2233.