

# Treating Cartilage Defects in the Knee

Articular cartilage, which lines the bony surface of the knee, can be damaged through injury or degeneration. These defects often fail to heal on their own, causing pain, loss of function, disability and potential long-term complications such as osteoarthritis. Commonwealth's surgeons are specially trained in a number of procedures to regenerate hyaline-like cartilage and restore knee function. Two of the options currently available include cartilage implantation and cartilage transfer.

## Autologous Chondrocyte Implantation (ACI)

ACI is a procedure in which healthy cartilage cells are harvested from an injured joint, grown and multiplied in a lab, and re-implanted in the injured area of the joint.

"By implanting healthy cartilage cells in the traumatized area, the cells often incorporate with the surrounding healthy cartilage to heal the injured area and restore joint function," explains Andrew Parker, MD, who performs the ACI procedure at Commonwealth. "Good candidates are physiologically young patients with a normal BMI who have traumatic injuries to the articular cartilage of the knee joint. ACI has not been shown to regenerate cartilage loss resulting from arthritis."

ACI is typically performed for a full thickness defect on the joint surface of the femoral condyles (the round bony protrusions at the bottom of the femur). The procedure is often used after non-surgical and other treatments have failed. Using an arthroscope to see inside the knee joint, the surgeon identifies the area of cartilage damage and removes a small sample of healthy cells. These cells are sent to a lab, where they are duplicated over the next four to six weeks. A second procedure is then performed to implant the new cartilage into the joint.

Rehabilitation can take as long as six months, so patients must be motivated to follow the protocol, says Ben Kittredge, MD, who performs the ACI procedure at Commonwealth. "If this is done on the weight-bearing surface of the knee, the patient will need to be non-weight bearing for six weeks. After that, he or she must undergo a physical therapy program to restore full function to the treated area. It's important that patients have reasonable expectations following surgery. Running a marathon, for example, may not be realistic."

## Osteochondral Autograft Transfer System (OATS)

OATS replaces damaged cartilage in the knee with small plugs of healthy cartilage from another area of the joint, relieving pain and restoring movement and function. The procedure is ideal for patients with small areas of cartilage damage that can be easily repaired with a graft.

A good OATS candidate is a relatively young patient who has a full thickness loss of cartilage from the knee, ideally from the femoral condyle, and no sign of arthritis.



"A good candidate is a relatively young patient who has a full thickness loss of cartilage from the knee, ideally from the femoral condyle, and no sign of arthritis," says Daniel Weingold, MD, who performs the OATS procedure at Commonwealth. "Most lesions are between 1 and 2.5 centimeters. They occur as a result of an injury or a disorder known as osteochondritis dissecans, when a teenager loses a piece of cartilage covering the bone."

During the OATS procedure, which is performed arthroscopically, the surgeon takes a cylinder of cartilage and bone from a non-weight bearing area of the knee and inserts it into the damaged part. This transplanted cartilage and bone fills the deficient area and helps restore the knee's ability to bear weight in day-to-day activities.

Rehabilitation typically involves a lengthy physical therapy program to restore range of motion and relieve pain and swelling. Most patients use crutches for six weeks and progress to weight bearing after that. Long-term follow-up care is required to maintain results.



**Ben W. Kittredge, IV, MD,** earned an undergraduate degree from the University of Virginia and a Masters degree in Physiology from Georgetown University,

Dr. Kittredge returned to the University of Virginia to attain his medical degree. He then completed a general surgery internship at Roanoke Memorial Hospital and an orthopaedic residency at the University of Virginia. Additionally, Dr. Kittredge completed a fellowship in sports medicine at Jefferson Medical College and Pennsylvania Hospital in Philadelphia.



**D. Andrew Parker, MD,** earned a BS in Biology and Chemistry from Wake Forest University. Dr. Parker then graduated magna cum laude from medical school

at the University of Louisville. He then moved to Chicago where he completed his internship and residency in orthopaedic surgery at Northwestern University. Dr. Parker concluded his formal medical education by completing a fellowship in sports medicine at the Baylor Sports Medicine Institute in Houston, Texas.



**Daniel E. Weingold, MD,** earned an undergraduate degree at Duke University in Durham, North Carolina. He completed his medical degree at the University of

Maryland School of Medicine and finished his surgical internship and orthopaedic residency training at George Washington University Medical Center in Washington, DC.

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