Cartiform®
Viable Osteochondral Allograft

Osteochondral defect successfully treated with Cartiform®

Surgical protocol, case study, and rehabilitation protocol courtesy of James K. Hoffman, MS, MD FAAOS

Cartiform® is a cryopreserved, osteochondral allograft composed of viable chondrocytes, chondrogenic growth factors and extracellular matrix proteins. While maintaining an intact cartilage structure, the bony portion of Cartiform is reduced and the graft is porated to offer unique handling characteristics and simple fixation techniques. Cartiform combines the safety and success of fresh osteochondral allografts with ease of use by being trimmable and flexible to match any lesion size and contour. Cartiform serves as an active biological matrix to treat focal osteochondral defects and promote articular cartilage repair.

PRE-CARTIFORM IMPLANTATION

Patient

In March of 2013, a 32-year-old active female, former field hockey player with previously reported but untreated knee injury, subsequently presented with complaints of right knee pain. She woke with a painful swollen knee and noted pain and clicking when bending the knee. She had no fever or chills and no signs of a rash or fatigue.

She was provided crutches and instructed to follow-up with an orthopedic surgeon for further evaluation of her right knee.

The orthopedic surgeon ordered magnetic resonance imaging (MRI), which showed evidence of an osteochondral defect in the posterior aspect of the medial femoral condyle, likely due to the earlier knee injury (Figure 1). A computed tomography scan was then ordered to further evaluate the defect (Figure 2). Surgical options were discussed.

Pre-injury status

The patient was very active, running approximately 10 miles per day.

Patient's surgical history

No previous knee surgeries.

Patient's expectations

Patient wished to continue her lifestyle of running and playing sports.

Diagnosis

Osteochondral defect in the medial femoral condyle of the right knee (2 cm x 1.5 cm), loose body in the right knee

CARTIFORM IMPLANTATION

Procedure performed

Diagnostic arthroscopy of the right knee
Removal of loose body
Open ostechondral allograft and abrasion arthroplasty with drilling in the medial femoral condyle of the right knee

Procedure in detail

In May of 2013, the patient underwent a diagnostic arthroscopy of the right knee. Evaluation of the medial compartment revealed a full thickness hyaline cartilage and subchondral bone defect in the posterior portion of the medial femoral condyle. There was a very large cartilaginous body, which appeared to have been dislodged from the defect. The loose body was removed. Intra-operatively, the defect measured 2 cm x 1.5 cm. The decision was made to repair the defect with Cartiform.

A longitudinal incision was made on the anterior aspect of the right knee and a medial parapatellar incision was made. The patella was everted to allow for evaluation of the knee joint, and the knee was flexed to view the osteochondral defect. The loose, unstable hyaline cartilage was removed by curettage back to a point of stability until it measured 20 mm in diameter. The base of the defect was then drilled with a 0.062 Steinman pin. A 20 mm Cartiform allograft was thawed in room temperature sterile saline followed by immersion in a sterile saline bath. The 20 mm allograft fit the defect perfectly. The graft was then sutured in position with 4-0 absorbable sutures placed through the healthy, contiguous hyaline cartilage surrounding the defect. Fibrin glue was then utilized around the edges of the graft to secure the graft onto the surrounding hyaline cartilage (Figure 3). The fibrin sealant was kept free from the central portion of the allograft so it would not impede blood flow. The knee was then reduced in position into extension. The knee was closed in a routine fashion. The lower extremity was placed in an articulated knee immobilizer locked in extension. The patient was given instructions for deep venous thrombosis prophylaxis.

POST-CARTIFORM IMPLANTATION

Rehabilitation

Patient was immobilized for a total of six weeks in an articulated knee immobilizer. Gravity assisted range of motion exercises were initiated at three weeks. At six weeks, full weight bearing and strengthening were initiated.

Radiographic evaluation

Magnetic resonance imaging was ordered 16 months following the repair. The image demonstrates healing of the cartilage and bone (Figure 4).

Clinical results

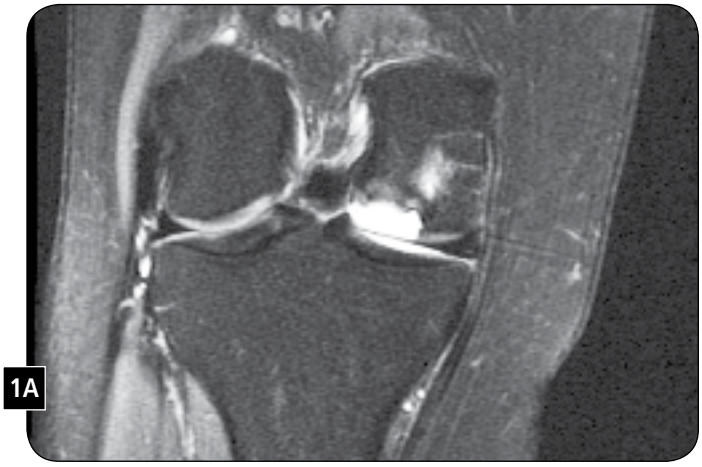
Patient is pain free and has returned to unrestricted activity.

Improvement in activities of daily living

No limitations.

Patient satisfaction

The patient is very pleased with the results.



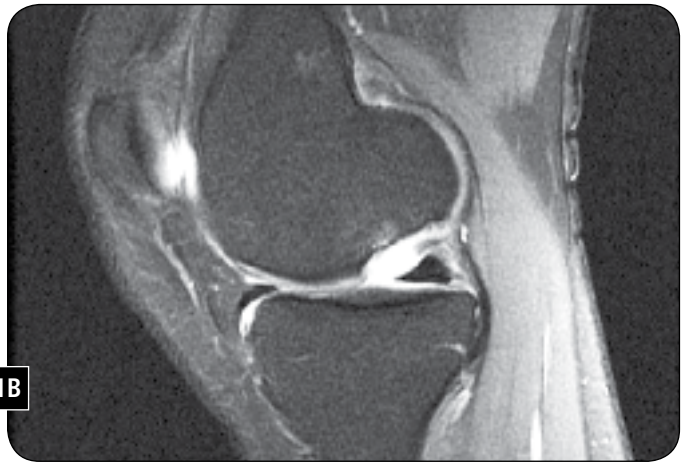
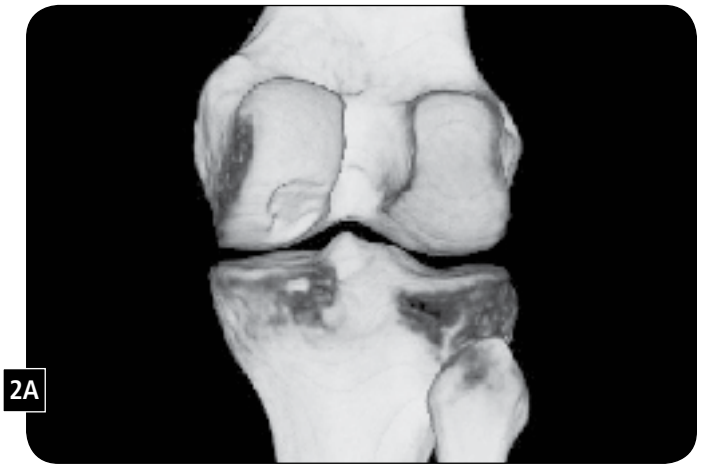


Figure 1. *Preoperative MRI. The anteroposterior (A) and lateral (B) images demonstrate a prominent 1.5 cm medial lateral x 2.0 cm anterior-posterior x 0.4-0.5 cm deep osteochondral defect. The majority of the mid to lateral and mid to posterior weight-being undersurface of the medial femoral condyle is involved. There is evidence of some remodeling, underlying subchondral bone marrow edema, and cystic change.*



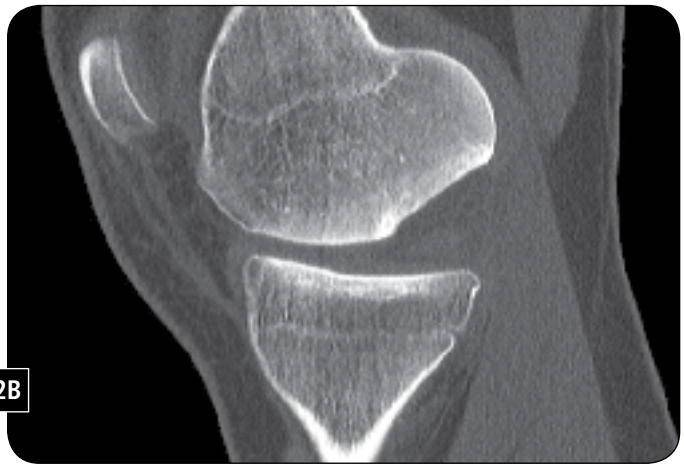


Figure 2. *Preoperative computed tomography scan. The anteroposterior (A) and lateral (B) images demonstrate the osteochondral defect on the posterior medial aspect of the femoral condyle.*

Figure 3. *Intraoperative image. Application of the Cartiform allograft into the defect space. Sutures and fibrin glue were used along the peripheral edge of the allograft to secure it to the surrounding hyaline cartilage. Blood can be seen filling the pores in the allograft.*

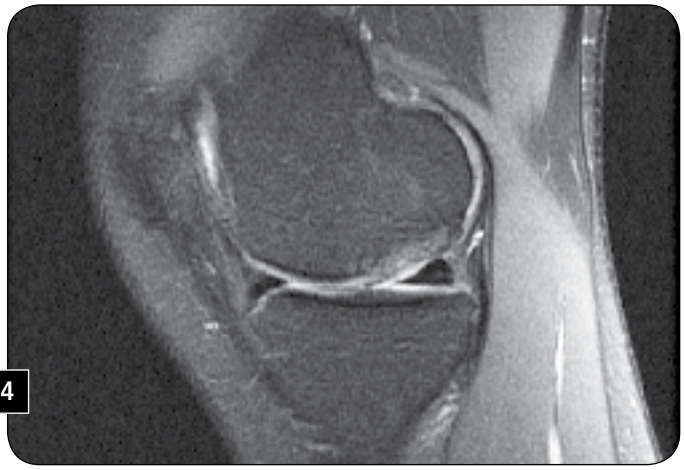


Figure 4. *Postoperative MRI. The image demonstrates healing of the bone and cartilage, 16 months following the cartilage repair.*

Cartiform®

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Cartiform is regulated by the FDA under 21 CFR Part 1271 Human Cells, Tissues and Cellular and Tissue-based Products (HCT/Ps). Osiris Therapeutics, Inc. is registered with the FDA as a tissue establishment and accredited by the American Association of Tissue Banks (AATB).

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