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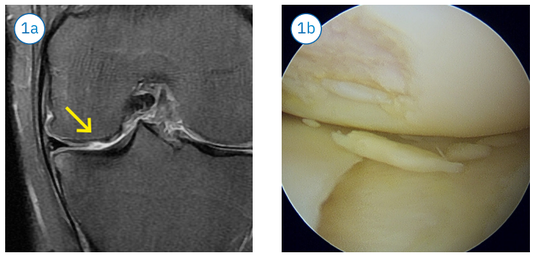
AMIC® Procedure with Bone Marrow Aspirate Concentrate (BMAC)

Professor Du-Han Kim, MD, PhD
Prof. Du-Han Kim graduated from Keimyung University in South Korea, where he specialized in orthopedic surgery. He currently works as a surgeon and professor in the Department of Orthopedic Surgery at Keimyung University (Daegu, South Korea). Prof. Kim has extensive experience as a team physician at various editions of the FIBA Basketball World Cup and presently holds the position of Non-Executive Director at EIM Republic of Korea, an initiative aimed at promoting physical activity and exercise nationwide.

His clinical expertise focuses on knee and shoulder surgery, areas in which he is also deeply engaged in research. Prof. Kim has authored several publications as first author and contributed as co-author in national and international publications in the fields of arthroscopy, trauma, and sports medicine, with a particular emphasis on upper limb and knee disorders.

Selected memberships:
- The Korean Orthopedic Association
- The Korean Society of Sports Medicine
- The Korean Orthopedic Society for Sports Medicine
- The Korean Knee Society
- The Korean Arthroscopy Society
- ISAKOS



Preoperative Magnetic Resonance Imaging (MRI) (Fig. 1a) and arthroscopic image (Fig. 1b) of an untreated cartilage defect in the medial femoral condyle

For further information:
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Materials Used
- General knee arthroscopy instruments
- Curettes
- 1.2 mm diameter K-wire
- Chondro-Gide® membrane (Geistlich Pharma AG)
- Greenplast® fibrin glue
- Syringe and needle for BMAC
- TriCell BMC Kit (iMEDd)

Knee

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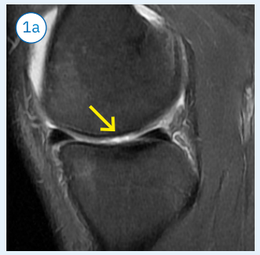
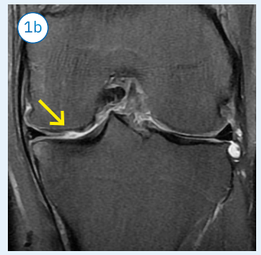
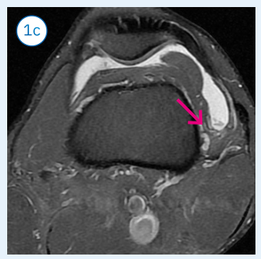
Clinical Problem
Untreated cartilage defects often lead to progressive joint deterioration, severely affecting patients' mobility and quality of life. For Prof. Kim, promoting cartilage regeneration is therefore a top priority.
The BMAC procedure combined with a Chondro-Gide® membrane described here supports the restoration of damaged articular cartilage and promotes effective healing and recovery.

Medical History and Diagnosis
A 29-year-old male professional basketball player experienced progressive left knee pain for approximately 2 years. The preoperative physical exam revealed symptoms of painful effusion for 6 months, minimal osteophyte formation, and bilateral knee varus deformity (5°).

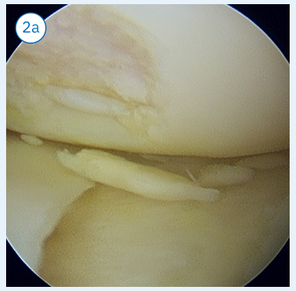
Preoperative Imaging
On sagittal (Fig. 1a), coronal (Fig. 1b), and axial (Fig. 1c) MRI scans, a medial femoral condyle cartilage defect (yellow arrow) and multiple loose bodies (magenta arrow) were detected.

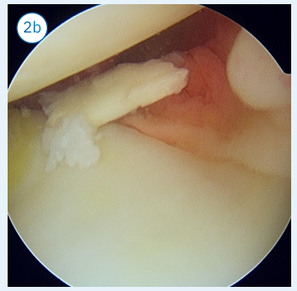


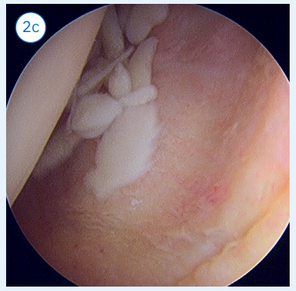


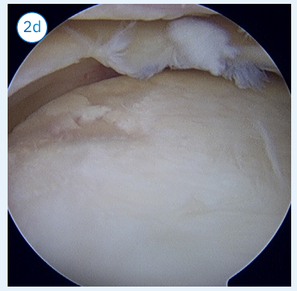


Focal Cartilage Defect with Multiple Loose Bodies
The arthroscopic evaluation demonstrated the presence of a medial femoral condyle cartilage defect (Fig. 2a), multiple intra-articular loose bodies (Fig. 2a-2c) and a medial tibial cartilage defect (Fig. 2d). The meniscus appeared intact without significant pathology.



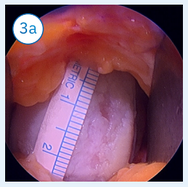


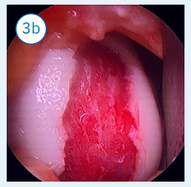




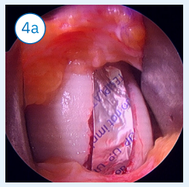
Step-by-Step Surgical Technique

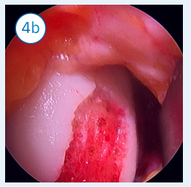
Cartilage Defect Measurement & Preparation
Prior to BMAC application, the size of the cartilage defect was carefully measured (Fig. 3a) and thoroughly debrided using a curette and shaver until a vascularized subchondral bone was exposed and a stable peripheral cartilage margin was achieved (Fig. 3b).

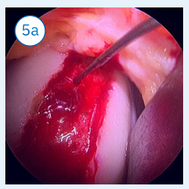


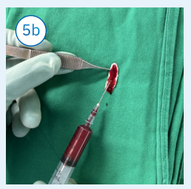


Templating & Micro-Drilling
After accurate templating of the cartilage defect (Fig. 4a), micro-drilling using a 1.2 mm diameter K-wire was performed perpendicular to the exposed subchondral bone (Fig. 4b). Multiple holes were created to induce marrow stimulation and stem cell migration for promoting cartilage repair.







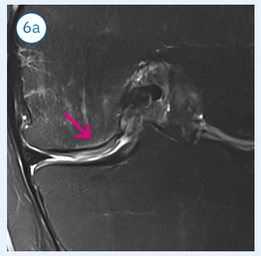


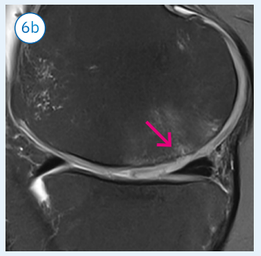
BMAC Application & Insertion of the Chondro-Gide® Membrane
After preparing the cartilage defect, the BMAC harvested from the anterior superior iliac spine is evenly spread on the defect and on the Chondro-Gide® collagen membrane (Fig. 5a-5b). The membrane is then placed over the defect site to protect the coagulate and keep cells and growth factors in place (Fig. 5c). Finally, the Chondro-Gide® is secured and sealed with Greenplast® fibrin glue to enhance fixation and prevent displacement.

The surgery was completed by closing the wounds in layers. After waiting 5 minutes, a range-of-motion test was performed to confirm the stability of the implanted construct. A sterile and compressive dressing was applied.

Postoperative Rehabilitation
Postoperative ROM exercises and isometric strengthening with elastic bands were started immediately as tolerated. Weight bearing (WB) was initially restricted with crutches, progressing to partial WB at 2 months and to full WB at 3 months. Open kinetic chain exercises with low resistance began at 1 month, followed by closed kinetic chain strengthening at 3 months once full WB was achieved. At 4 months, running and basketball-specific drills were introduced. The patient gradually resumed individualized sports activities at 6 months and returned to team training by 9 months. Full participation in all practices was achieved at 12 months, and the patient successfully returned to international competition at 18 months.

After 6 Months
Follow-up MRI (Fig. 6a-6b) at 6 months postoperatively demonstrated evidence of progressive cartilage regeneration at the defect site.





After 12 Months
At 12 months postoperatively, MRI confirmed complete restoration of the cartilage lesion with continuity of the articular surface (Fig. 7a-7b).