Case Study: Combined Use of SmartShot® and S-Core® for Osteochondral Defect Repair

Surgeon: Dr. Derek Dee, FAAOS

Diagnosis:

⇒ Osteochondral defect, medial femoral condyle (MFC)
⇒ Osteochondrosis, medial femoral condyle
⇒ Grade IV cartilage defect, medial tibial plateau

Patient Profile:

⇒ 67-year-old female
⇒ Mechanism of injury: Slip and fall
⇒ Failed conservative treatment: Physical therapy, PRP injections, bracing, and activity modification

Imaging Findings (MRI):

⇒ 50% joint space narrowing in the medial compartment
⇒ Medial meniscus extrusion with a complex radial tear
⇒ Osteochondral defect of the MFC measuring 7 x 14 mm
⇒ Associated subchondral bone changes and bone marrow edema

Surgical Procedure

Arthroscopic evaluation confirmed the presence of grade II to IV osteochondral defects on the medial femoral condyle, as well as a large grade IV lesion on the medial tibial plateau. The total affected area measured approximately 8 x 20 mm. The osteochondral repair was performed using the S-Core® implant (7 mm diameter) to address the focal lesion on the medial femoral condyle. To augment biological healing and provide additional structural support, a 10 x 10 mm dermal matrix was applied over the repair site.

Marrow stimulation was then performed using the high-angle SmartShot® Marrow Access Device. Access channels were created both anterior and posterior to the S-Core® implant on the medial femoral condyle, as well as on the medial tibial plateau. The SmartShot® device enabled a controlled, perpendicular approach to these challenging areas—particularly the far posterior regions—through simple inversion and rotation of the handpiece. This allowed for one-handed use with excellent precision and stability. Deployment resulted in immediate bleeding and marrow content extrusion, indicating effective access and activation of the subchondral environment to support healing.

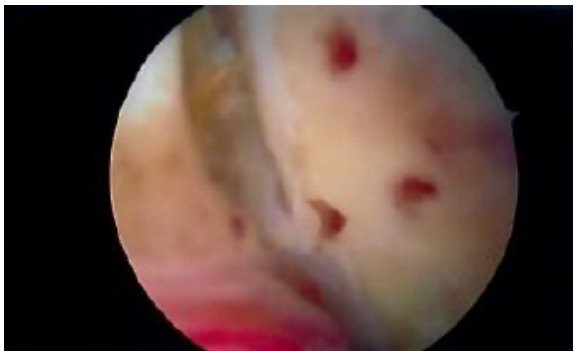


Figure 1. Marrow stimulation channels of 1mm diameter with 8mm depth along the femoral condyle anterior and posterior to the S-Core implant.

Figure 2. The SmartShot Marrow Access Device with a 55-degree distal angle was used to create marrow stimulation channels on the tibia plateau

Summary

This case illustrates the effective use of the SmartShot® marrow stimulation device in combination with the S-Core® osteochondral repair system for treating complex cartilage defects in the medial compartment of the knee. The SmartShot® system enabled precise, minimally disruptive marrow access, while the S-Core® implant and matrix augmentation provided a stable foundation for cartilage restoration.

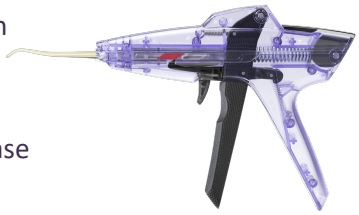
About the Author

Dr. Derek Dee, FAAOS, is a fellowship-trained, board-certified orthopedic surgeon specializing in sports medicine and complex arthroscopic reconstruction of the knee, shoulder, hip, elbow, and ankle. He practices in Huntington Beach and Downtown Los Angeles.

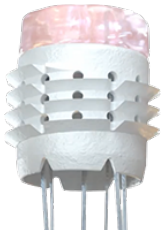
Disclosure: Dr. Dee is a cofounder of **Subchondral Solutions**, the developer of the S-Core® implant used in this case.

Technology Highlights

SmartShot® Marrow Access Device (Marrow Access Technologies, Eden Prairie, MN):
SmartShot® is a next-generation marrow stimulation device designed for precision and control. Featuring a 1 mm diameter needle, controlled depth, and a spring-loaded deployment mechanism, it allows reproducible access to the subchondral marrow while preserving bone architecture. The high-angle version used in this case enables access to challenging posterior condylar, talar, and plateau lesions.



S-Core® Implant (Subchondral Solutions, Huntington Beach, CA):
The S-Core® implant is a subchondral support implant used for osteochondral repair. Designed to restore mechanical support beneath cartilage defects, it integrates into subchondral bone while providing a scaffold for biological healing. Its application in this case, combined with dermal matrix augmentation and marrow stimulation, supports cartilage regeneration and joint surface restoration.



See the respective websites for device indications, warnings, and precautions for SmartShot (https://marrowaccess.com) and S-Core (https://subchondralsolutions.com).