

Technical Note

Osteochondritis Dissecans of the Knee: Pearls and Pitfalls of Anatomical Reduction and Secure Fixation

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Abstract: Osteochondritis dissecans of the knee is characterized by sterile necrosis of the subchondral bone and typically affects skeletally immature patients. When left untreated, osteochondritis dissecans can lead to early-onset osteoarthritis, resulting in pain and disability. This study shows the pearls and pitfalls of an arthroscopic technique of fixation performed successfully using a bioabsorbable nail for unstable osteochondritis dissecans lesions located in the medial femoral condyle of the knee.

Osteochondritis dissecans (OCD) of the knee is characterized by sterile necrosis of the subchondral bone and typically affects skeletally immature patients.¹ The condition can lead to a wide array of symptoms, from stable asymptomatic lesions to loose multiple fragments, leading to swelling and locking of the joint. When left untreated, OCD can lead to early-onset osteoarthritis, resulting in pain and disability.²

Previously, researchers have reported favorable long-term outcomes after the surgical fixation of unstable fragments (grades III and IV according to the International Cartilage Repair Society).³ Thus, the arthroscopic fixation of partially detached fragments (grade III) or salvageable loose bodies (grade IV) is typically recommended.⁴ In multiple published studies, different

surgical techniques have been used to treat unstable OCD lesions in the knee.^{5,6}

The purpose of this study is to show the pearls and pitfalls of an arthroscopic technique of fixation performed successfully using a bioabsorbable nail for unstable osteochondritis dissecans lesions located in the medial femoral condyle of the knee.

Surgical Technique (With Video Illustration)

This Technical Note presents a one-stage technique for the arthroscopic fixation of unstable osteochondritis dissecans of the knee with bioabsorbable nails (Video 1). The pearls and pitfalls of this technique are presented in Table 1.

Step 1: Positioning and Diagnostic Arthroscopy

The patient is placed supine on the operating table in the standard arthroscopy position with lateral support at the level of the padded tourniquet and a foot roll to maintain 90° of knee flexion. After anterolateral and anteromedial portals are established, diagnostic arthroscopy is performed, and the statuses of the cartilage and menisci are noted. The lesion is identified based on the arthroscopic appearance of the cartilage, and its stability is tested with an arthroscopic hook (Fig 1).

Step 2: OCD Fragment Detachment and Subchondral Bone Preparation

Once the lesion is delineated, the lesion is hinged open with a Smillie meniscotome, leaving one side attached to avoid losing the fragment in the joint (Fig 2). Once the lesion is hinged, it is detached using a blunt instrument. The subchondral bone is exposed,

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Table 1. Tips and Tricks for the Arthroscopic Fixation of Unstable OCD Lesions

	Pearls	Pitfalls
OCD fragment detachment	Keep the unstable lesion hinged at one side to simplify the reduction of the fragment.	Avoid detaching the OCD fragment and losing it in the joint.
Preparation of the subchondral bed	Retract the lesion using a scope for a better view and access to the subchondral surface.	Avoid excessive bone loss due to overdebridement.
OCD fragment reduction	Excise the overlapping cartilage tissue that prevents an anatomical reduction of the fragment.	The removal of overlapping cartilage tissue will lead to anatomical fixation of the fragment.
OCD fragment fixation	Use multiple absorbable nails for fixation to create a wide pressure distribution. Use an accessory transpatellar portal to obtain perpendicular insertion of the nails.	The use of conventional portals can result in an oblique positioning of the nails.

OCD, osteochondritis dissecans.

and all the sclerotic tissue is debrided and removed using a motorized burr and a curette (Fig 3A). The backside of the fragment is also debrided of sclerosis.

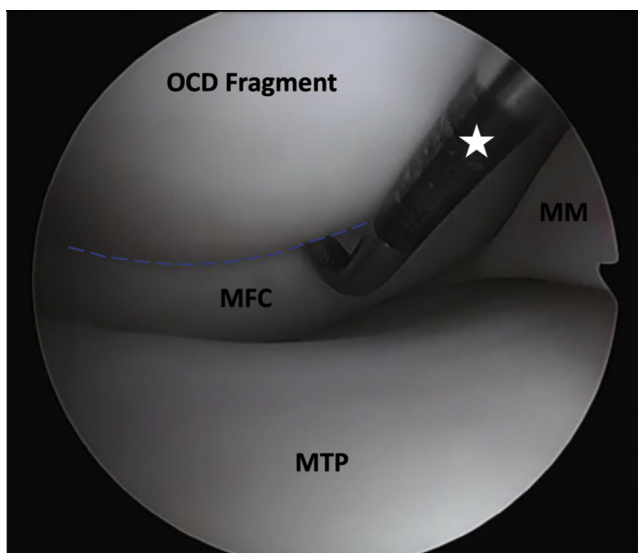


Fig 1. Fragment stability test. White star indicates arthroscopic hook; blue dotted line shows fragment outline. (MFC, medial femoral condyle; MM, medial meniscus; MTP, medial tibial plateau; OCD, osteochondritis dissecans.)

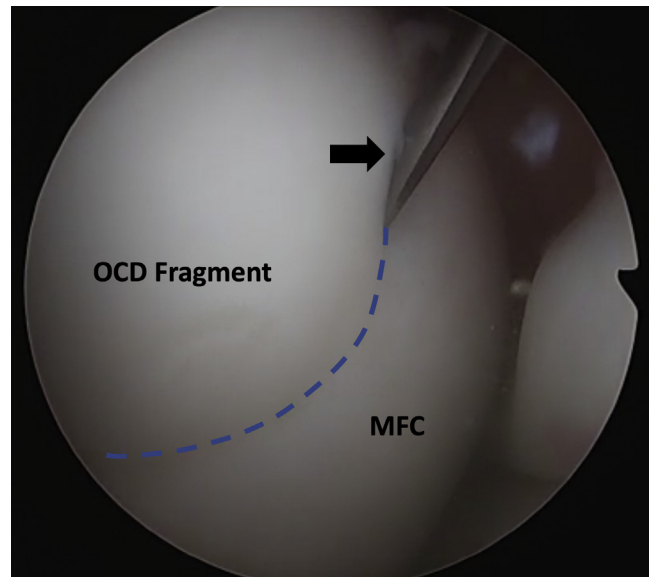


Fig 2. Detachment of the hinged fragment. Blue dotted line shows fragment outline; black arrow indicates Smillie meniscotome. (MFC, medial femoral condyle; OCD, osteochondritis dissecans.)

After the subchondral bed is prepared, microfractures are created to increase vascularity to the OCD fragment and promote bone healing (Fig 3 B and C). The tourniquet is released at this point to confirm that the microfractures had reached the proper depth, which is reflected by the presence of blood through the holes previously made.

After the debridement and microfracture steps, the fragment is reduced, and any overlapping cartilage that prohibited anatomical reduction of the fragment is trimmed (Fig 3D). An additional transpatellar portal is used, if necessary, to insert a K-wire for provisional fixation of the reduced fragment.

Step 3: OCD Fragment Fixation

The chondral fragment and subsequent subchondral bone are then drilled with a 2.4-mm arthroscopic drill (Fig 4A). Aa bioabsorbable SmartNail nail (Linvatec Corporation, Largo, FL) is inserted (Fig 4B). The nail is buried in the cartilage to prevent opposing cartilage wear (Fig 4C), and 3 other bioabsorbable SmartNail nails are inserted to provide compression and rotational stability (Fig 4C). In cases of large subchondral bony defects, autogenous cancellous autografts can be harvested from the ipsilateral tibia. Finally, the fixation status is checked to ensure that SmartNail nails are not protruding, which can cause cartilage wear (Fig 4C).

Postoperative Rehabilitation

The postoperative rehabilitation program consists of full knee range of motion exercises, straight-leg lift exercises, and toe-touch weight-bearing ambulation for 6 weeks.

Fig 3. Detachment of the hinged fragment. (A) Preparation of the subchondral bed with a motorized burr. (B and C) Microfractures. (D) Fragment reduction. White star shows a motorized burr; black arrow shows the Chondral Pick (Arthrex, Naples, FL). (OCD, osteochondritis dissecans.)

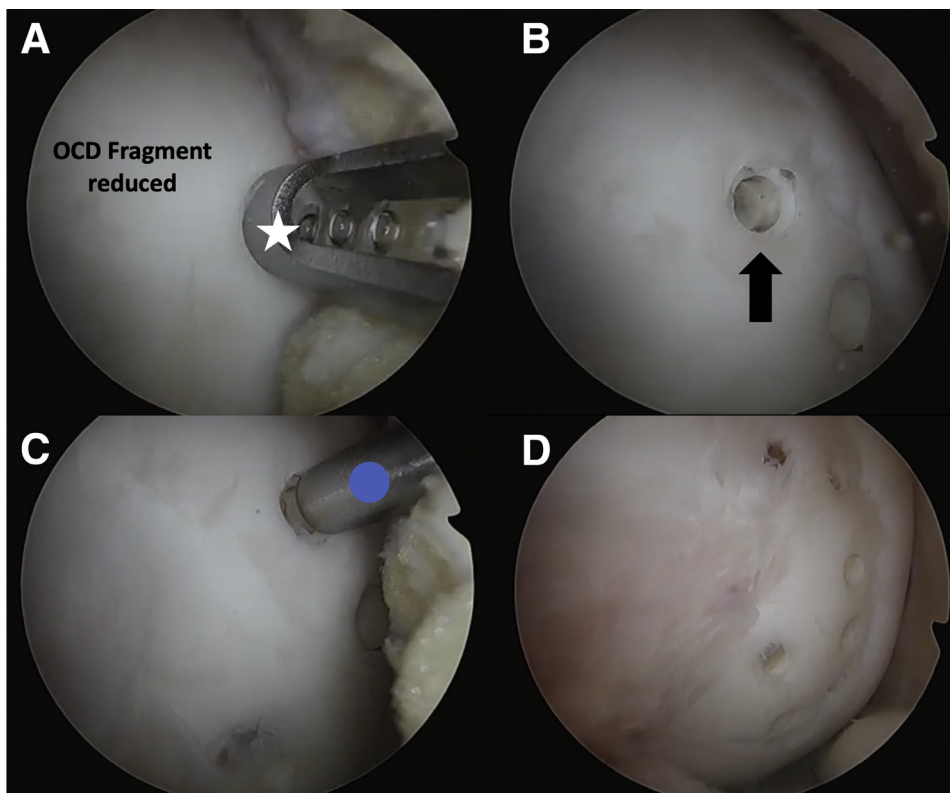
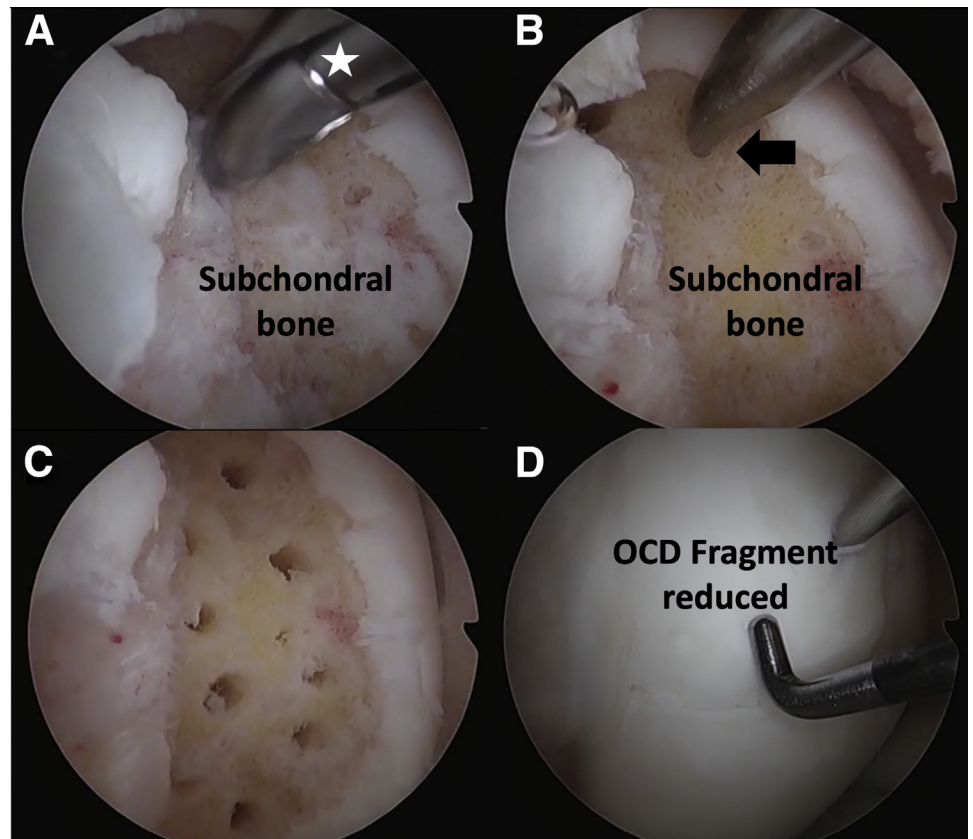


Fig 4. Fragment fixation. (A) SmartNail drilling White star indicates SmartNail guide. (B) Bioabsorbable nail fixation. Black arrow shows bioabsorbable nail. (C) Nails buried in the cartilage with a screwdriver—blue dot. (D) Final aspect of the osteochondritis dissecans fragment fixation. (OCD, osteochondritis dissecans.)

Discussion

There are many advantages of the described technique. First, it is an arthroscopic technique that is less invasive than open surgery. In addition, it preserves the fragment instead of removing it, and the trap door technique simplifies the reduction of the fragment and its fixation.

The use of screws, whether they are metallic or bioabsorbable, has been widely used in treating unstable OCD lesions of the knee.^{3,7} The use of bioabsorbable nails prevents the future need for arthroscopy for hardware removal and is less traumatic to the cartilage.⁸

The use of a motorized shaver or curette to stimulate the bed of the lesion in combination with microfracture of the subchondral bone has already been described in the literature.^{5,9} Keeping the OCD lesion hinged will facilitate the reduction of the fragment for fixation. During the reduction of the lesion, it is important to ensure that no cartilage is overlapping, which can prevent anatomic reduction of cartilage and cause impingement with the tibial plateau. Overlapping cartilage tissue can be excised to ensure anatomic reduction.

Multiple bioabsorbable nails can be used for fixation of the fragment to distribute the pressure broadly, allowing an aggressive postoperative rehabilitation program to be implemented, with immediate range of motion exercises and partial weight-bearing.

Although less traumatic for the cartilage, this technique is not without its limitations. Damage to the cartilage during the nail drilling stage and lack of described long-term clinical results are the main limitations.

In summary, this study presents an arthroscopic technique for unstable osteochondritis dissecans lesions

using a bioabsorbable nail, which is less invasive than open surgery and prevents the future need for hardware removal being less traumatic to the cartilage.

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