

Basic Knee Arthroscopy Part 4: Chondroplasty, Meniscectomy, and Cruciate Ligament Evaluation

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Abstract: Knee arthroscopy is an important diagnostic and therapeutic tool in the management of disorders of the knee. In a series of 4 articles, the basics of knee arthroscopy are reviewed. In this article (part 4), the basics of operative knee arthroscopy are reviewed including chondroplasty and meniscectomy. Evaluation of the cruciate ligaments is also reviewed. Mastery of these techniques is critical for the treatment of the most common pathology encountered during knee arthroscopy.

Knee arthroscopy is the most commonly performed orthopaedic procedure. Indications include diagnostic arthroscopy, meniscectomy, loose body removal, chondroplasty, microfracture, irrigation and debridement, and ligament reconstruction. In this series of articles, we present a comprehensive review of the complete surgical technique for basic knee arthroscopy.^{1,2}

Two of the most commonly found pathologies on arthroscopy are chondromalacia and meniscal tears. Chondroplasty refers to the smoothing of degenerative cartilage and trimming of unstable cartilage flaps to stabilize and treat chondral lesions. Partial meniscectomy involves trimming unstable flaps of a torn meniscus to establish a stable remnant meniscus. These 2 techniques are critical for performing basic operative knee arthroscopy. Cruciate ligament evaluation is also covered in this article. Examination of the integrity and attachments of the posterior cruciate ligament (PCL) and anterior cruciate ligament (ACL) is part of a complete diagnostic knee arthroscopy.^{3,4}

Surgical Technique

The 2 most frequent operative procedures in knee arthroscopy are meniscectomy and chondroplasty (Video 1). A critical skill to be mastered for both procedures is triangulation. This refers to the triangle that is formed by the instrument and the arthroscopic camera. The ability to insert instruments into the knee so that they appear within the camera's field of view is critical to master so as not to damage cartilage. Areas of cartilage degeneration or damage can be treated with chondroplasty. Rough and unstable cartilage lesions are treated with the use of an oscillating shaver, curettes, and other debridement tools. A curved shaver can reach more places within the knee and can be very useful for treating lesions of the patella. A small amount of suction is used on the shaver to remove the debris without decreasing the intra-articular pressure from over-sucking, resulting in bleeding. Curved shavers clog more frequently, and a technical pearl is to maintain strong suction with the use of a pressure- and flow-controlled pump to maintain joint distension while preventing clogging. Unstable cartilage is removed, with care taken neither to damage healthy cartilage nor to expose bare bone. Advanced techniques for treating cartilage damage include microfracture, abrasion arthroplasty, and osteochondral autograft or allografts and adjuvants.

Meniscal tears are the most frequently encountered pathology on knee arthroscopy. These are most commonly treated with partial meniscectomy when they occur in the inner avascular region. There are different techniques to remove the torn portion of the meniscus, or "partial meniscectomy." Often, the most effective method to start the meniscectomy is to use a biter and then use a shaver to remove the morsels (Fig 1). As described

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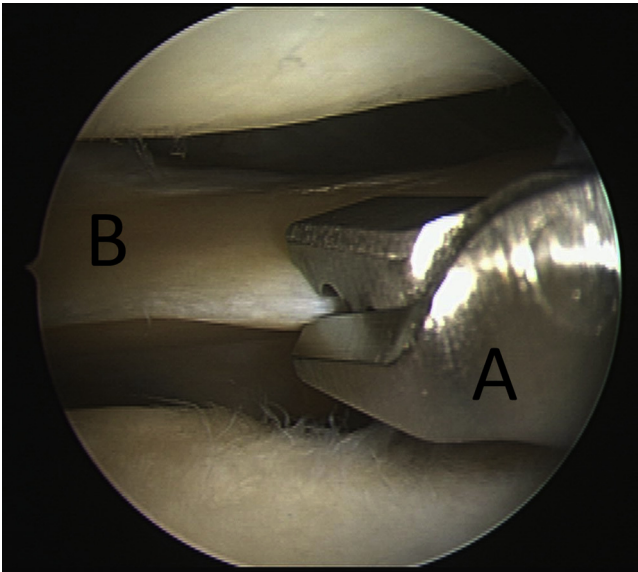


Fig 1. Lateral compartment of a left knee viewed from the anterolateral portal. An arthroscopic biter (A) is seen removing pathologic torn meniscus tissue from the lateral meniscus (B). The biter can be used to sharply remove torn meniscus tissue to leave a stable rim of residual tissue. The biter produces free-floating morsels that must be removed with the shaver to prevent them from becoming loose bodies.

earlier, the shaver has suction that will remove loose pieces (Fig 2). The suction also pulls the torn tissue into the shaver so that the shaver blade can remove the damaged tissue. It tends to remove damaged meniscus

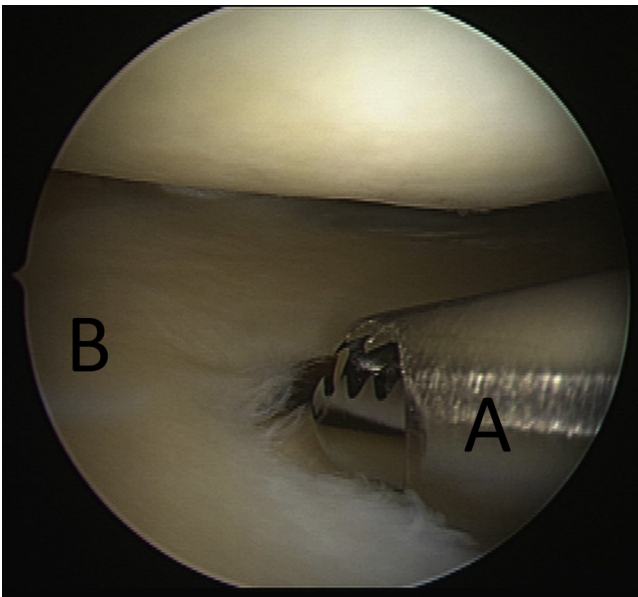


Fig 2. Lateral compartment of a left knee viewed from the anterolateral portal. An arthroscopic shaver (A) is used to remove torn and pathologic parts of the lateral meniscus (B). The shaver uses suction to bring loose and frayed tissue into the oscillating teeth that then sharply debride the tissue.

but spare healthy meniscus as long as the surgeon controls the technique. Morselization is a technique that combines the biter with the shaver to remove pathologic tissue. The morsels are little pieces that are created when the biter is used to remove meniscus. After the biter is used, the surgeon lets go of the biter, resting it gently on the back of the knee, and turns the fluid off to prevent the pieces from floating away and creating a loose body. The biter is gently removed, and the shaver is immediately inserted and the suction turned on to remove the morsels and smooth the rim. The biter and shaver are used to remove the tear and create a smooth transition zone back to normal meniscus.

An important part of diagnostic arthroscopy is evaluating the cruciate ligaments. With the arthroscope viewing the intercondylar notch, the ACL and PCL can be seen forming a triangle. The ligaments should be probed to check for laxity. Often, a torn ACL will scar to the PCL and will lose its normal attachment to the lateral wall. Patients with a torn ACL will have an empty lateral wall.

Discussion

Knee arthroscopy is a valuable diagnostic and therapeutic procedure for the treatment of various knee disorders. Chondroplasty is a basic treatment option for articular cartilage pathology found on diagnostic arthroscopy. Key points include removing rough and unstable cartilage with the shaver and curettes to establish a stable lesion without exposing subchondral bone. Meniscal tears are the most common reason for knee arthroscopy. Treatment with partial meniscectomy is appropriate when the tears occur in the avascular inner two-thirds of the meniscus. Key points include morselization with the biter and prevention of loose bodies by quickly inserting the shaver to remove the morsels. The shaver is also used to create a smooth transition to normal meniscus tissue. Mastery of chondroplasty and meniscectomy will allow the surgeon to effectively treat 2 of the most common pathologies encountered on knee arthroscopy.

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