

# First, Do No Harm: Protect the Articular Cartilage When Performing Arthroscopic Knee Surgery!



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**Abstract:** It is not uncommon to damage the articular surface when performing routine arthroscopic surgical procedures of the knee. The article reviews the background, literature, and technique of performing a partial medial collateral ligament release in a tight knee when attempting to access the posterior medial compartment.

*See commentary on page 2175*

As has been quoted in multiple prior articles, William Hunter, published an article in 1743 entitled “The structure and diseases of articulating cartilages,” where he stated that “we find that an ulcerated cartilage is universally allowed to be a very troublesome disease and that when destroyed, is not recovered.”<sup>1</sup> Leidy, in 1849, confirmed this principle stating that “a rupture of cartilage fragments is never united and that articular cartilage lacks regenerative power and the joint becomes filled with tough fibrous tissue.”<sup>2</sup> Despite decades of research in attempting to transplant cloned chondrocytes without having them dedifferentiate into fibrocartilage, implanting stem cells with the hope that they differentiate into normal hyaline cartilage, or injecting PRP, hyaluronic acid, or stem cells into the arthritic joint to improve the biochemistry of existing cartilage cells, the fact remains that we are still incapable of fostering the growth of 100% hyaline cartilage cells within the human knee joint.<sup>3-6</sup> The only procedures that maintain hyaline cartilage integrity after implantation are osteochondral autografts and fresh osteochondral allografts. It is therefore important to maintain the integrity of our virgin hyaline cartilage

joint surfaces whenever possible to avoid the development of osteoarthritis that has genetic, environmental, and traumatic etiologies.<sup>7</sup>

Approximately 60% of all orthopaedic procedures performed in the United States annually are arthroscopic meniscectomies. When performing a medial meniscectomy, it is not uncommon to encounter a tight medial compartment requiring significant valgus stress to reach the posterior horn of the medial meniscus with an upbiting punch or meniscal shaver. Even then, the compartment may not open widely enough with valgus stress applied to the knee during surgery to avoid damaging the articular surface of the femur when using mechanical biters and/or motorized shavers to remove meniscal tissue.

The articular cartilage of the knee is approximately 2.5 to 3 mm in thickness, and because it is aneural, alymphatic, and avascular, it has no capability of healing once injured. It consists of hyaline cartilage that is unable to regenerate.<sup>8</sup> It is thus critical to avoid “arthroscraping” or “scuffing” the articular cartilage of the femoral condyle (Fig 1) when performing a meniscectomy. If valgus stress is unsuccessful in allowing for sufficient widening of the medial compartment during surgery, it is helpful to partially release the medial collateral ligament (MCL) to allow for increased space in the medial compartment to access the posterior horn of the medial meniscus without damaging the articular surface. Otherwise, progression of arthritis in the medial compartment will be assured (Figs 2 and 3).

When placing the knee holder on the leg, it is important to position it no more than 2 fingerbreadths above the superior pole of the patella (Figs 4 and 5); otherwise it is very difficult to apply a valgus stress on the knee during the procedure. There are 3 different techniques for performing a partial release of the MCL.

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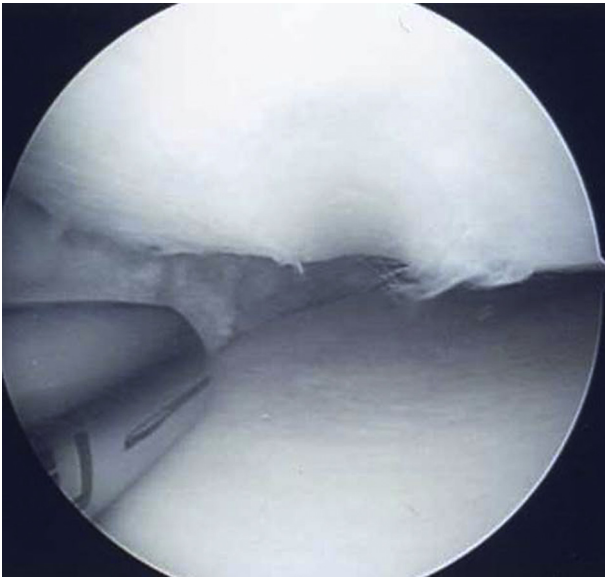
*The author reports the following potential conflict of interest or source of funding: J.M.B. receives support from Smith & Nephew, Sanofi, Pacira, and Zimmer-Biomet.*

*Received July 11, 2016; accepted July 15, 2016.*

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0749-8063/16661/\$36.00*

*<http://dx.doi.org/10.1016/j.arthro.2016.07.023>*



**Fig 1.** Right knee, medial femoral condyle with an arthroscope in the anterolateral portal and a meniscal shaver in the anteromedial portal. Note iatrogenic injury to the medial femoral condyle at the time of meniscectomy.

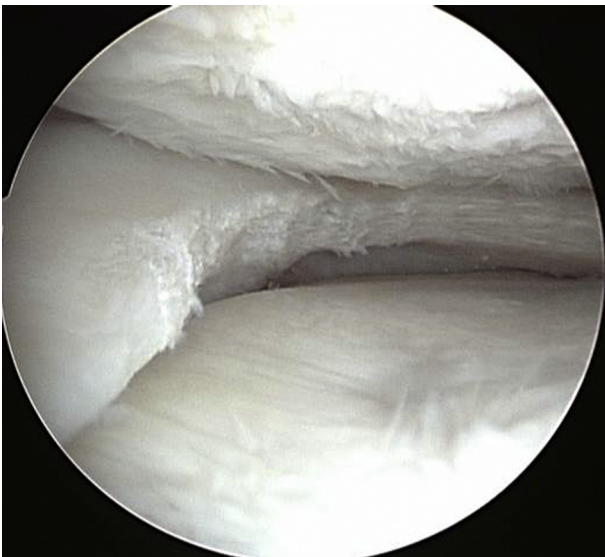


**Fig 3.** Right knee, medial compartment, anterolateral portal view with an arthroscopic probe in the anteromedial portal: 38-year-old male 3-year status after routine partial medial meniscectomy. Note iatrogenic grade III and grade IV chondromalacia changes on the femoral condyle and tibial plateau resulting from the primary surgery.

The “pie crust” technique can be performed with an 18-gauge needle superior to the medial joint line by repetitively puncturing the MCL from anterior to posterior (Fig 6). This can be visualized arthroscopically (Fig 7) by the surgeon performing the release. The second technique is the use of an arthroscopic hook

normally used for lateral retinacular release (Fig 8). When performing this technique, the surgeon must make certain to begin the release 7 to 8 mm superior to the meniscal rim progressing from anteriorly to posteriorly. The third technique is performed using the microfracture pick inferior to the meniscus at the meniscocapsular junction (Fig 9).

When performing any one of these techniques, constant valgus stress should be placed on the lower leg



**Fig 2.** Right knee, medial compartment, anterolateral portal view: 42-year-old man 4-year status after routine partial medial meniscectomy. Note iatrogenic grade II and grade III chondromalacia changes on the femoral condyle and tibial plateau resulting from the primary surgery.



**Fig 4.** Right knee, anterior view: note placement of a circumferential leg holder above the patella (circled).

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