

In-Office Diagnostic Needle Arthroscopy

mi-eye 2™

(<https://tricemedical.com/mi-eye/>)



Sean McMillan, DO, FAOAO (pictured), and Elizabeth Ford, OMS-1, Lourdes Medical Center, Willingboro, NJ.

Over the past decade, magnetic resonance imaging (MRI) has been the gold standard for identification of intra-articular soft tissue pathology of the knee. Limitations, however, do exist for the use of MRI in diagnosing injuries. Various studies have reported MRI sensitivity and specificity to be 86% and 91% in diagnosis of knee pathology.¹ These numbers can be lower in the setting of previous surgery. Furthermore, some patients cannot have MRIs, while for others, MRIs would be inconclusive. This includes patients who are morbidly obese, claustrophobic, renally impaired, have implanted medical devices, have metal within their bodies, or have had previous surgical intervention to the affected joint.

As an alternative to MRI, in-office needle arthroscopy offers a cost-effective, minimally invasive tool that can provide similar or greater diagnostic accuracy.^{2,3} The ability to provide real-time dynamic visualization of the patient's anatomy allows for more accurate decision making by the physician and can potentially reduce the time from injury to diagnosis to recovery.⁴ It can be performed in a variety of joints, including the knee, shoulder, elbow, and ankle. Indications for use include patients with suspected meniscal tears, anterior cruciate ligament (ACL) tears, loose bodies, rotator cuff tears, and labral tears, as well as pre-arthroplasty evaluations and second-look evaluations of cartilage procedures.

The mi-eye 2™ (Trice Medical) is an in-office diagnostic needle arthroscope that can provide immediate diagnostic capabilities (**Figure 1**).

The handpiece comes as a sterile packaged disposable unit that connects to a Microsoft Surface tablet. It provides a 120° field of visualization and produces an image that is 0° when viewing, as opposed to the standard arthroscopic 30° view. The tip of the handpiece contains



Figure 1. mi-eye 2™ (Trice Medical) unit.

a 14-gauge outer sheath that is retractable upon entry to the joint to allow for the optics and light source to be deployed. The interface between the handpiece and the tablet can allow for still pictures and video recording (**Figures 2A-2C**). These images are transferable to a memory stick.

For billing purposes, the procedure is coded as a diagnostic arthroscopy of the affected joint. Should the diagnostic evaluation reveal pathology that requires surgical intervention, a modifier 58 code can be attached to allow for full reimbursement of both the in-office procedure and the surgical procedure.

Surgical pearl: It is important to properly position the patient in order to efficiently access the knee. For examination of the knee, we recommend positioning the patient's knee flexed at either 45° with a bump beneath the knee, or at 90° with the knee off the end of the bed. I begin to

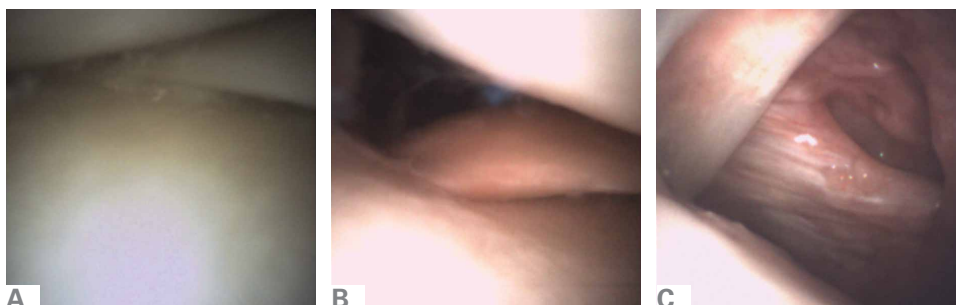


Figure 2. Still pictures of (A) medial meniscal tear, (B) meniscal root, and (C) subscapular and biceps taken by the mi-eye 2™ (Trice Medical).

anesthetize by placing 10 cc of 1% lidocaine into the joint. Additionally, I use 5 cc of 1% lidocaine to create a skin wheel around the anticipated portal of entry. I allow 5 to 7 minutes for anesthetization prior to performing the procedure. During this time I routinely move to another patient examination room to prevent a delay in patient flow.

When entering the knee joint I recommend placing the portal 1 cm above the joint line and 1 cm medial or lateral to the patellar tendon. This will aid in avoiding the fat pad upon entry. When entering the joint I aim toward the notch and use the ACL as my reference point before moving into the medial or lateral compartment. I typically enter through the side of suspected pathology, and then continue on with the remainder of the evaluation. For focused evaluation of the patellofemoral joint, a suprapatellar portal can be utilized. Dynamic evaluation can be performed by manipulating the leg. If a bloody field is encountered (acute ACL tears), the field of view can be cleared through irrigating the joint with 30 cc sterile saline flushes. I inject the fluid into the joint through the leer lock access and

then withdraw it back into the same syringe. This fluid can be discarded and the steps repeated as necessary. At the conclusion of the procedure it is recommended to drain the joint of the injected saline. Through the leer lock, a steroid or platelet-rich plasma injection can be delivered if desired by the physician.

Authors' Disclosure Statement: Dr. McMillan reports that he is a consultant for Trice Medical. Ms. Olson reports no actual or potential conflict of interest in relation to this article.

References

1. Crawford R, Walley G, Bridgman S, Maffulli N. Magnetic resonance imaging versus arthroscopy in the diagnosis of knee pathology, concentrating on meniscal lesions and ACL tears: a systematic review. *Br Med Bull.* 2007;84:5-23.
2. Voigt JD, Mosier M, Huber B. Diagnostic needle arthroscopy and the economics of improved diagnostic accuracy: a cost analysis. *Appl Health Econ Health Policy.* 2014;12(5):523-535.
3. Gramas DA, Antounian FS, Peterfy CG, Genant HK, Lane NE. Assessment of needle arthroscopy, standard arthroscopy, physical examination, and magnetic resonance imaging in knee pain: a pilot study. *J Clin Rheumatol.* 1995;1(1):26-34.
4. O'Donnell JF. Trice Medical Literature. #4-10-0032 Rev A.