

## Diagnosing a Meniscus Tear

Warren Hammer, MS, DC, DABCO

This article is written with the idea of attempting to diagnose by physical examination whether a meniscus tear is present. Often patients complain of vague knee pain which most tests do not detect and the cause is a degenerated, torn meniscus. There is no one reliable test that specifically says that a meniscus is torn. Strobel and Stedtfeld list 20 tests that may indicate that a meniscus tear exists.<sup>1</sup> They state that the percentage of a correct diagnosis is between 60-95 percent. If there is an associated anterior cruciate ligament deficiency, a lateral meniscus tear can only be diagnosed by physical examination in eight percent of the cases and a medial meniscus tear in 32 percent of the cases.<sup>2</sup> "In patients with a chronic anterior cruciate ligament tear of more than three years' duration, tears of both menisci are very common."<sup>2</sup>

In order to understand meniscus testing, it is important to appreciate some of the functional aspects of the meniscus. Most meniscus tests usually create a positive response from the patient due to a "compression or entrapment of the meniscus between the femur and tibia."<sup>1</sup> It is important to understand that one function of the menisci is to limit extreme knee flexion and extension. In extreme knee extension during the screw-home motion, the menisci are forced anteriorly and the anterior horns of the menisci block further extension. In full flexion, the posterior horns of the meniscus are driven posteriorly and block knee flexion.<sup>3</sup> As the knee flexes, the menisci move posterior partly due to the contraction of the semimembranosus and popliteus which attach to the posterior medial and lateral menisci respectively. Contraction of the quadriceps by its effect on the patellofemoral mechanism pulls both menisci forward with knee extension.<sup>3</sup> Therefore, during meniscus testing, if the pain or snapping occurs near maximum knee flexion, the posterior horns are probably involved, and if the pain or clunk occurs toward knee extension, the middle to anterior portion of the meniscus is probably involved. Ellison<sup>4</sup> describes testing for a tear of the anterior horn by having the standing patient internally and externally rotate on an extended knee.

Strobel and Stedtfeld<sup>1</sup> feel that examiners should learn three to five meniscus tests and use them on every patient since individual tests by themselves are inconclusive. For example, the validity of individual tests shows that Apley grinding test is 46 percent accurate, painful hyperextension 43 percent, Steinmann I sign 42 percent, and McMurray test only 35 percent. Interestingly, the most reliable sign is palpatory tenderness on the meniscus at the joint line (60-80 percent). According to Kapandji<sup>5</sup>, rotating the tibia internally will cause the medial portion of the meniscus to move anteriorly. The opposite will occur with tibial external rotation. Kromer<sup>1</sup> puts his finger tip in the joint line at the tender area and percusses the finger with his middle finger as in percussing the chest wall in order to elicit tenderness. Sometimes a local swelling may appear on the joint line which may be a meniscal cyst. This usually occurs on the lateral meniscus. Fifty percent of cysts coexist with a meniscal tear.<sup>1</sup>

Three excellent tests to learn besides palpating for tenderness are:

1. McMurray: Patient is supine with the knee flexed completely on the flexed hip. Examiner rotates foot externally and slowly extends the knee while creating a varus force with the other hand on the medial knee. An attempt is made to reproduce the painful snap which the patient may be complaining of. This is supposed to be putting pressure on the medial meniscus tear from the medial femoral condyle, but another test called Fouche's sign contradicts this conclusion. In Fouche's test the tibia is internally rotated to stress the medial meniscus. The theory behind this test is that as the tibia is slowly extended from the flexed position, the meniscus moves anteriorly and "almost catches between the femur and tibia before abruptly slipping back posteriorly, producing a snap."<sup>1</sup> This test is considered almost pathognomonic for a posterior meniscal tear.
2. Steinmann I Sign: With the knee near extension, the examiner can forcefully rotate the tibia in external or internal rotation and slowly flex the knee. The forced rotation moves the meniscus in such a way as to stretch it anteriorly and compress it posteriorly. As the knee is slowly flexed with rotation, painful tears may be elicited at various sites. It is thought as with the McMurray test that lateral rotation of the tibia stresses the medial meniscus and medial rotation stresses the lateral meniscus.<sup>1</sup>
3. Steinmann II Sign: Since the meniscus moves posteriorly with knee flexion and anteriorly with knee extension, if you palpate a tender meniscus in the joint line and slowly flex the knee, the portion palpated will probably lose its tenderness if a meniscus is involved. If the tenderness remains during knee flexion, the problem might be due to a collateral ligament lesion.

In tests such as McMurray and Steinmann I, it is important to first rule out collateral ligament sprain since these tests involve rotation and twisting which may aggravate the injured ligament giving a false positive meniscus lesion.

According to Clancy<sup>6</sup>, as far as palpation for meniscal pain in the joint line is concerned, medial meniscal injury usually causes posterior medial joint line pain and mild medial joint line pain, while lateral meniscus injuries usually cause midlateral pain rather than posterolateral pain. Isolated anterior medial pain is usually not a sign of a meniscal tear since anterior horn tears represent less than one percent of meniscus tears.

While manipulation of the knee has been successful in releasing a locked knee due to an acute torn meniscus, often times conservative treatment is disappointing. Longitudinal tears that occur near the periphery of the meniscus where there is adequate circulation will heal<sup>7</sup>, since the peripheral meniscal blood supply is capable of producing a reparative response similar to other connective tissue. To aid the circulation, deep heat (diathermy) may also help if healing is to occur. But to really know the status of a meniscal tear, arthrography, arthroscopic evaluation or MRI is often necessary.

In an acute situation, it is difficult to immediately determine if the meniscus is involved, especially if there is associated collateral ligamentous sprain. If the meniscus is the primary injury, effusion may not occur until the next day. The knee usually gives way and locks in extension, but unless the patient remembers that he could not immediately extend the knee after the injury, loss of extension could be due to hamstring spasm, pain or hemarthrosis due to other causes. While this article is emphasizing the meniscus, it is important to be able to evaluate the knee for ligamentous instability and other problems including the patellofemoral joint.

A patient with a chronic degenerative meniscus tear may complain of catching or grinding or may only complain of intermittent pain at the joint line. Occasionally, meniscus testing and other tests may reveal no symptoms at all. By having the patient perform deep knee bends, the meniscus may loosen so testing can be validated.

### *References*

1. Strobel M, Stedtfeld HW: Diagnostic Evaluation of the Knee. New York: Springer-Verlag, pp 166-182, 1990.
2. Henning CE, Lynch MA, Glick KR: Physical Examination of the Knee: in Nicholas JA, Hershman EB: The Lower Extremity and Spine in Sports Medicine. Vol I, St. Louis: CV Mosby, pp 765-800, 1986.
3. Renstrom P, Johnson J: Anatomy and biomechanics of the menisci. Clinics in Sports Med., 9:523-538, 1990.
4. Ellison AE: Athletic Training and Sports Medicine. Chicago: American Academy of Orthopedic Surgeons, 1985.
5. Kapandji IA: The Physiology of the Joints. New York: Churchill Livingstone, 2: 1970.
6. Clancy WG: Evaluation of acute knee injuries in: Finerman G: Symposium on Sports Medicine, The Knee. St. Louis: CV Mosby, 185-193, 1985.
7. Weiss C, Lundberg M, Hamberg P, et al: Non-operative treatment of meniscal tears. J Bone Joint Surg, 71A: 811-822, 1989.

*Warren I. Hammer, M.S., D.C., DABCO  
Norwalk, Connecticut*

### Editor's Note:

Dr. Hammer will conduct his next soft tissue seminar on June 20-21, 1992 in Calgary, Ontario, Canada. You may call 1-800-359-2289 to register.

Dr. Hamme's new book, Functional Soft Tissue Examination and Treatment by Manual Methods: The Extremities, is now available. Please see the Preferred Reading and Viewing list on page xx, Part #T126 to order your copy.

JULY 1992