Meniscal, Plica, Patellar, and Patellofemoral Injuries of the Knee

Updates, Controversies and Advancements

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KEYWORDS

• Athletic knee injuries • Meniscus tears and cysts • Patellar tendonitis
• Patellofemoral pain syndrome • Plica

KEY POINTS

- Knee injuries common in athletes include meniscus tears and cysts, patellar tendonitis, patellofemoral pain syndrome (PFPS) and plica.
- Peripheral tears and certain vertical and horizontal tears of the meniscus are easy to repair surgically and have good outcomes.
- Radial tears, flap tears, and ragged complex tears are technically more difficult to repair and are less likely to have good outcomes.
- Nonoperative treatment of PFPS, properly focused on the causative factors, can be expected to be successful in most cases.
- The best evidence to date supports the use of physical therapy in the treatment of PFPS with some additional benefit to be expected, at least in the short term, from taping and orthoses.

MENISCUS TEARS AND CYSTS

Epidemiology

The incidence of meniscal tears ranges from 60 to 70 per 100,000 individuals per year.[1,2] They are more common in males (2.5–4:1 males/females)[1] and more than one-third of those in the athletic population are associated with anterior cruciate ligament (ACL) injuries.[3] Lateral meniscal tears are more frequent in cases of acute ACL rupture, whereas chronic ACL deficiency leads more commonly to medial meniscal tears.

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Meniscal Anatomy and Function

The medial meniscus covers 50% of the tibial plateau in the medial compartment and is firmly attached to the medal collateral ligament. The lateral meniscus covers 70% of the contact area on the lateral side, is more mobile, is not attached to the lateral collateral ligament, and is therefore (except in the case of ACL injury) less likely to be injured than the more fixed medial meniscus.[4] The meniscus functions chiefly as a shock absorber during activity with the lateral meniscus bearing 70% of the load in the lateral compartment, and the medial meniscus bearing 50% of the load in the medial compartment. The meniscus also functions in joint lubrication and plays a significant part (secondary to the ACL) in preventing forward translation of the tibia on the femur. This latter function of the meniscus is especially important in ACL-deficient knees[5] and may explain why ACL-deficient patients have a high incidence of medial meniscus tears. (More stress is borne by the meniscus when the ACL is not present.)[6]

The peripheral meniscus is mainly made up of fibrocartilage (80%); the innermost portion is made up of both hyaline cartilage (60%) and fibrocartilage (40%).[7] The collagen fibers are oriented mainly in a circumferential pattern; however, some radially (perpendicular) oriented fibers do exist, especially along the meniscal surface, and are believed to function in resisting shearing stress and as restraints to longitudinal tearing.

In adults, only the peripheral 25% to 30% of the meniscus is supplied by microvasculature.[8] The remaining inner portion is avascular and thus less likely to heal in repair attempts.

Nerve fibers are also more abundant along the periphery, explaining why peripheral injuries are often more painful than lesions located in the inner portions.[9]

Mechanism of Injury

Tears occur most frequently from noncontact forces (acceleration/deceleration in conjunction with rotation that catches the meniscus between the tibia and femur) but obviously can also occur with contact, especially in conjunction with medial collateral ligament or ACL injuries.[10] In younger patients (<40 years), trauma or twisting injury on a fixed foot is the usual mechanism of injury. Older patients, on the other hand, often get degenerative tears with minimal or no known trauma.[11]

Most acute meniscal tears are longitudinal (vertical), tearing along the natural circumferential lines of the fibrocartilage ring (**Fig. 1**). Radial tears, which tear perpendicular to the natural collagen fiber alignment, generally require a higher impact.[4]

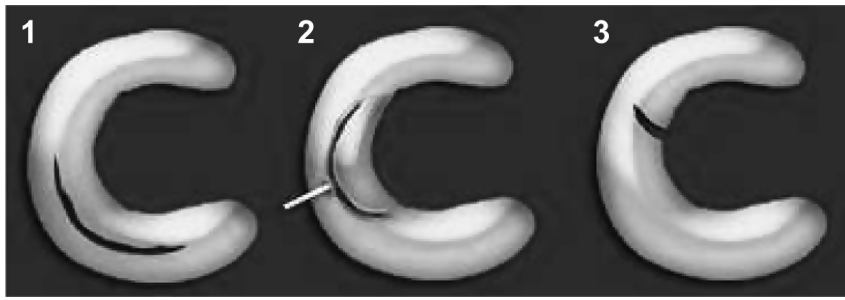

Fig. 1. (1) Vertical/vertical longitudinal; includes bucket handle tears; (2) horizontal tears; (3) radial/transverse/oblique/parrot beak tears.