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Meniscal disorders
Normal, discoid, and cysts

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Understanding the functional importance of menisci has been evolutionary. In 1897, Bland-Sutton characterized the menisci as "functionless remnants of intra-articular leg muscles" [1]. This sentiment was highly regarded through the 1970s, and menisci routinely were completely excised despite data from Fairbanks who, in 1948, published the first long-term follow-up of patients after total meniscectomy [2]. His article warned that radiographic evidence of degenerative changes followed meniscectomy in a substantial proportion of patients. Several reports have since established the deleterious consequences of total and even partial meniscectomy [3–13]. Nowhere are these sequelae more important than in children and adolescents in whom long-term effects of meniscectomy are magnified by activity level and longevity.

Development

Menisci become clearly defined by 8 weeks of embryologic development [14]. By intrauterine week 14, they assume their normal mature anatomic relationships. At no point during their development are menisci discoid-shaped [14]. Discoid menisci represent anatomic variants, not vestigial remnants. Meniscal vasculature was studied extensively by Clark and Ogden [15]. Meniscal blood supply arises peripherally; the entire meniscus is vascularized throughout the embryonic and fetal periods. During postpartum development, the vasculature recedes and, by 9 months, the central third is avascular. This decrease in vascularity continues until approximately age 10 when the menisci assume an adult vascular pattern. Injection studies in adults by Arnoczky et al showed that only the peripheral 10% to 30% of the medial, and 10% to 25% of the lateral meniscus receive vascular nourishment [16].

Anatomy

The medial meniscus is C-shaped, its posterior horn larger in anterior-posterior width than the anterior horn. The medial meniscus covers approximately 50% of the medial tibial plateau and is attached firmly to the medial joint capsule through the meniscotibial and coronary ligaments. The deep medial collateral ligament (MCL) is characterized by a discrete midpoint capsular thickening. The inferior meniscal surface is flat and the superior surface, concave, to conform with its respective tibial and femoral articulations. To maintain this conformation, the medial meniscus translates 2.5 mm posteriorly as the femoral condyle rolls backward during knee flexion [17,18].

The lateral meniscus is more circular and covers a larger portion, approximately 70%, of the lateral tibial plateau. The lateral meniscus is more loosely connected to the lateral joint capsule, usually with no

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attachments in the area of the popliteal hiatus and fibular collateral ligament. Accessory meniscofemoral ligaments exist in up to two thirds of cases and arise at the posterior meniscus. If this ligament inserts anterior to the posterior cruciate ligament (PCL), it is known as the ligament of Humphrey and, if it inserts posterior to the PCL, it is termed the ligament of Wrisberg. Because of the lack of constraint, the lateral meniscus translates 9 to 11 mm on the tibia with knee flexion. This excursion accounts for the lower incidence of lateral meniscal tears. Both menisci are joined anteriorly by the anterior transverse intermeniscal ligament [17,18].

The meniscal blood supply arises from superior, inferior, medial, and lateral geniculate arteries that form a peripheral perimeniscal synovial vascular plexus. There may be an additional contribution from the middle geniculate artery. King, in the 1930s, published classic research indicating that the peripheral meniscus did communicate with the vascular supply and was capable of healing [19]. It is believed that the inner two thirds of the meniscus receives its nutrition through diffusion.

Menisci are composed primarily of type I collagen which represent 60% to 70% of their dry weight. Lesser amounts of types II, III, and VI collagen are present. The collagen fibers are oriented mainly in a circumferential pattern, parallel to the long axis of the meniscus [17,18]. Radial, oblique, and vertically oriented fibers resist hoop stresses. Proteoglycans and glycoproteins are present in smaller concentrations than in articular cartilage. The menisci contain mechanoreceptors and type I and II sensory fibers. Dye demonstrated that probing the peripheral meniscus caused pain, but that stimulation of the central meniscus elicited little or no discomfort [20]. Given the presence of their neural elements, it is theorized that menisci play a proprioceptive role as well.

Function

It is now appreciated that menisci serve many functions, including increasing contact area and congruency of the femoral-tibial articulation. The menisci load-share and reduce contact stresses across the joint. It is estimated that menisci transmit up to 50% to 70% of the load in extension and 85% in 90° of flexion [21]. Baratz and Fu showed that, following total meniscectomy, the contact area decreased by 75% and contact stresses increased 235% [22]. They also documented deleterious effects of partial meniscectomy, demonstrating that contact stresses increased in proportion to the amount of meniscus removed. Excision of narrow bucket-handle tears of the medial meniscus increased contact stress by 65%, and 75% resection of the posterior horn increased contact stresses equivalently to that of total meniscectomy [22]. Repair of meniscal tears reduced contact stresses to normal. Other studies corroborate the mechanical importance of the meniscus [17,18].

Meniscal tissue is about one half as stiff as articular cartilage, allowing it to participate in shock absorption. Shock-absorption capacity in the normal knee is 20% higher than in the meniscectomized knee [23,24]. The medial meniscus has a role in joint stability. In an ACL-deficient knee, the posterior horn of the medial meniscus provides passive stability, and medial meniscectomy leads to a 58% increase in anterior translation at 90° of flexion [23,25].

Meniscal tears

Epidemiology

The exact incidence of meniscal injuries in children and adolescents is unknown. Meniscal injuries under age 10 are rare unless associated with a discoid meniscus. The incidence of meniscal and other intra-articular disorders increases with age [26]. In adolescents, increased size, speed, and athletic demands cause higher-energy injuries and an increase in intra-articular damage.

Meniscal injury patterns differ in children from adults. Longitudinal tears comprise 50% to 90% of meniscal tears in children and adolescents [5], and displaced bucket-handle tears are not uncommon (Fig. 1). In these age groups, meniscal injuries are often associated with ACL injuries [4,6,27,28]. The

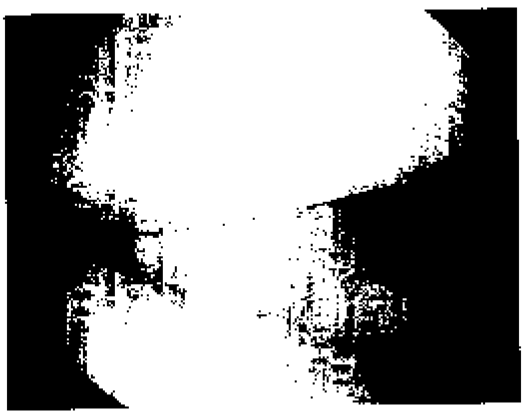

Fig. 1. Bucket-handle displaced lateral meniscus tear in a 13-year-old female athlete.

incidence of medial meniscal tears is greater than lateral meniscal tears in the pediatric and (especially) the adolescent age groups [29]. The reported relative increased incidence of lateral tears in preadolescents reflects the presence of lateral discoid menisci in that age group [5].

Cannon estimated that reparable meniscal tears occur in 30% of all knees with acute ACL rupture, and in 30% of patients under age 20 [27]. Approximately two thirds of reparable meniscal tears are associated with ACL rupture.

History

Injury to nondiscoid menisci is virtually always traumatic in children and adolescents. Multiple studies show that 80% to 90% of meniscal injuries in children and adolescents occur during sporting activities [6,17, 18,29,30]. These numbers may be lower in the preadolescent age group. Meniscal tears most commonly occur with twisting motions—the types frequently occurring during football, soccer, and basketball. Pain is the chief complaint. Other symptoms include swelling, snapping, giving way, and, less frequently, intermittent catching and locking.

Differential diagnosis

Differential diagnosis of acute meniscal tear in the pediatric patient includes discoid meniscus, popliteus tendonitis, pathologic plica, osteochondritis dissecans, loose body, patellofemoral instability, arthritis, tibial eminence avulsion fracture, and chondral or osteochondral injury [5].

Physical exam

Clinical examination is the primary diagnostic tool for intra-articular and meniscal injuries. The most common findings, similar to those of adults, are joint-line tenderness and effusion [7,31]. Because of the diversity of pathology and the difficulty of examination in children in an acute setting, the diagnostic accuracy of clinical exam for meniscus tear has been shown to be as low as 29% to 59% in series with multiple examiners [5,32]. In children, anteromedial or anterolateral joint-line pain may be caused by patellofemoral pain, patellar instability, iliotibial band friction, osteochondritis dissecans, or other lesions. Sensitivity of McMurray and Apley tests is estimated to be 58% with even lower specificity [5]. Two recent studies, by examiners with significant pediatric sports medicine experience, showed the diagnostic accuracy of clinical exams to be 86.3% and 93.5% overall [32,33]. When medial meniscus tears were looked at alone, sensitivity and specificity of clinical exams were 62.1% and 80.7%, respectively [32]. Sensitivity and specificity for lateral meniscal tears were 50% and 89.2%, respectively [32].

Imaging

Plain radiographs can rule out pathology that mimics meniscal tears such as osteochondritis dissecans and loose bodies. MRI is considered the most useful adjunctive study to diagnose intra-articular knee disorders. Sensitivity and specificity of 83% and 95%, respectively, have been shown in skeletally immature patients [32,33]. Kocher et al found that MRI diagnoses of medial meniscal tear sensitivity and specificity were 79% and 92%, respectively [32]. For lateral meniscal tear, these numbers were 67% and 83%, respectively [32]. Specificity for medial meniscal tear was significantly higher with MRI compared with clinical exam [32]. The sensitivity and specificity of MRI decrease in younger children compared with older adolescents [32,33]. Recent studies that compared diagnostic accuracy of clinical exam versus MRI documented clinical exam rates equivalent or superior to MRI [32,33]. These authors recommended judicious use of MRI to evaluate intra-articular knee disorders and emphasized that MRI should not be used as a routine screening test.

Normal signal changes exist in the posterior horn of medial and lateral menisci in children and adolescents [32–35] and should not be considered a tear if the signal does not extend through the superior or inferior articular surfaces of the meniscus. Most signal change probably represents vascular developmental changes [5]. When interpreting the MRI of an immature knee, care must be taken to identify a meniscal tear only when linear signal changes extend to the articular surface, and this finding correlates with clinical evaluation as well.

Treatment

Some small, nondisplaced meniscal tears in the outer vascular region may heal spontaneously or become asymptomatic [5,17,18]. Nonoperative treatment consists of rehabilitation of the injured knee with the avoidance of pivoting and sports for 12 weeks.

The majority of meniscal tears in pediatric patients are large and require surgical treatment [5,17,18]. Arthroscopic management is standard with partial menisectomy (Fig. 2) or meniscal repair using outside-in, all inside (Fig. 3), or inside-out techniques (Fig. 4) [17,18,36]. We believe that, in children and

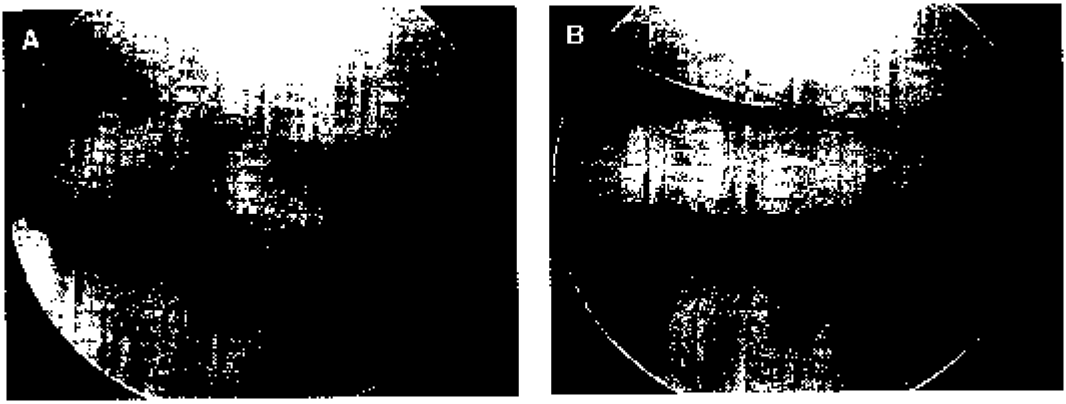

Fig. 2. (*A*,*B*) Partial meniscectomy of a complex medial meniscus tear in a 14-year-old male athlete.

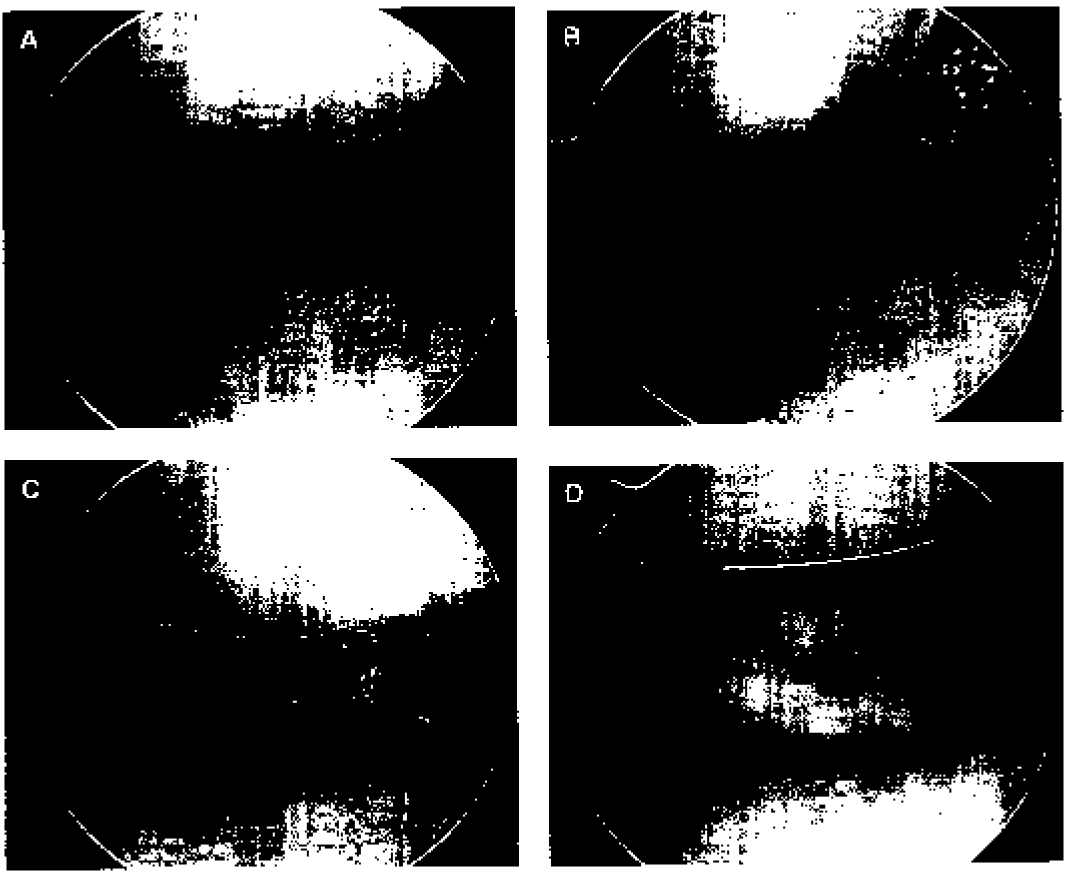

Fig. 3. All-inside meniscal repair of a posterior horn lateral meniscus tear in a 14-year-old female athlete. (*A*) Meniscus tear. (*B*) Reduction and suture cannula placement. (*C*) Meniscal repair device. (*D*) Completed repair.

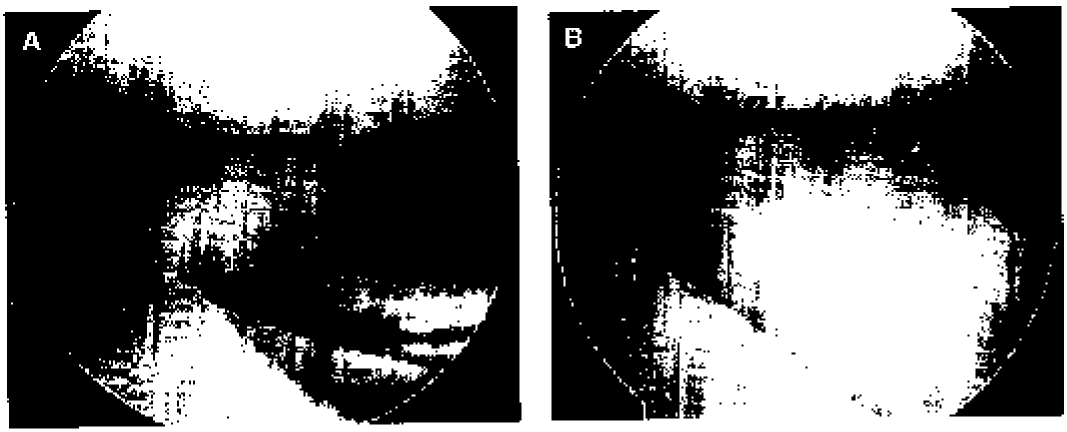

Fig. 4. Inside-out suture meniscal repair of a displaced medial meniscus tear in a 15-year-old male athlete. (A) Displaced meniscus tear. (B) Cannula and suture placement.

adolescents, meniscal repair should be attempted, instead of partial meniscectomy, for middle third and outer third meniscal tears because of the theoretical greater healing potential at this age. Long life span and poor results of total and near-total meniscectomy, and lack of longer-term results of partial meniscectomy, encourage meniscal salvage attempts. Inside-out techniques are useful for anterior horn medial or lateral meniscal tears (Fig. 4). Meniscal-body and posterior-horn tears are repaired in the traditional inside-out repair with vertical or horizontal sutures. Zone-specific cannulas can direct the flexible suture needles to appropriate positions to avoid neurovascular structures. We routinely make an incision posteromedially or posterolaterally to identify and retrieve the suture needles and tie the sutures at the joint capsule, protecting the saphenous nerve and vein medially and the peroneal nerve laterally. Newer all-inside devices have facilitated meniscal repair in adults (Fig. 3). Reports of articular cartilage damage from heads of bioabsorbable arrows and darts exist [17,18] and many of the devices extend too far through the capsule in a pediatric knee, with potential for pain and neurovascular injury. We prefer more recent all-inside low-profile suture devices for posterior horn tears in adolescent knees. For smaller tears without substantial displacement, we use these devices alone. For larger tears with displacement, eg, bucket-handle tears, we use them in a hybrid manner with inside-out sutures (Fig. 5). Regardless of instrumentation used, surgical principles are important to maximize meniscal healing and include preparation of the repair site using abrasion or trephination, anatomic reduction of the meniscal tear, adequate strength and durability of repair devices, and protected knee mobilization.

Results of total or near-total meniscectomy in pediatric patients are poor with early arthrosis [3–13]. There have been few long-term studies of results of meniscal repair in children and adolescents. Mintzer and Richmond reported meniscal repair in 29 patients under age 18, 25 of whom had closed physes and 17 of whom had concomitant ACL reconstruction. They found 100% clinical healing at an average follow-up of 5 years [37]. Noyes and Barber-Westin reviewed repair of meniscal tears extending into the avascular zone in patients under age 20 [38,39], 88% of whom were skeletally mature and most of whom had concomitant ACL reconstruction. The success

Fig. 5. Hybrid meniscal repair using inside-out sutures and all-inside device for a displaced lateral meniscus tear in a 13-year-old female athlete.

rate was 75%, with a higher rate of meniscal healing with concomitant ACL reconstruction. Eggli et al found an overall healing rate of 88% for repair of isolated meniscal tears in patients under age 30 compared with 67% in patients over age 30 [4]. Johnson et al had a 76% healing rate at an average follow-up of greater than 10 years in a group that was 20 years old on average at surgery [40]. Factors shown to correlate with increased healing of meniscal repairs include younger age, decreased rim width (peripheral tears), repairs of the lateral meniscus, concomitant ACL reconstruction, time from injury to surgery of less than 8 weeks, and tear length of less than 2.5 cm [4,17,18,27,39,41,42].

Rehabilitation

No consensus exists on rehabilitation following meniscal repair. Because most meniscal repairs are done in conjunction with ACL reconstruction, rehabilitation must take this into account. For isolated meniscal repair, most surgeons prefer to restrict initial weight bearing and knee range of motion postoperatively to decrease joint-compressive and shear forces that could potentially disrupt the meniscal repair. Progressive mobilization, range of motion, strengthening, sport-specific rehabilitation, and return to sports follow. Studies show no compromise of meniscal healing with concurrent ACL reconstruction.

Our postoperative protocol for isolated meniscal repair involves touch down-weight bearing for 6 weeks postoperatively. Range of motion is restricted from 0° to 30° for the first 2 weeks and increased to 0° to 90° for the next 6 weeks. Progressive mobilization, strengthening, and sports-specific therapy are performed according to a physical therapy protocol. Return to sports is allowed 3 months postoperatively if there is full range of motion, adequate strength, no symptoms (pain, swelling, locking), and resolution of physical examination findings (joint-line tenderness, McMurray positive maneuvers, terminal-range joint line pain). A follow-up MRI is performed in patients with persistent symptoms or with appropriate findings on physical examination. Meniscal repair with ACL-reconstruction usually allows a return to sports 6 months postoperatively.

Discoid meniscus

Since its first description by Young in a cadaveric specimen in 1889 [43], discoid lateral meniscus has become a well-recognized meniscal abnormality in children. Although often synonymous with the so-called "snapping knee syndrome," discoid lateral menisci may manifest in a variety of ways. The true incidence of discoid lateral menisci is unknown. Many children remain asymptomatic, and few present with a snapping knee. The incidence is estimated to be 3% to 5% in the general population [5,44–46] and slightly higher in Asian populations [5,44–46]. Discoid morphology occurs almost exclusively in the lateral meniscus, but medial discoid menisci have also been reported [5,44–46]. The incidence of lateral bilateral abnormality is reported to be as high as 20% [47–50].

Etiology

Debate exists over the etiology of a discoid lateral meniscus. Smillie hypothesized that discoid morphology represented an arrest in embryologic development with failure of central meniscal resorption [50]. This theory has been disproven because during no stage of meniscal development is the meniscus found to be discoid [14,15]. Additional theories claim increased meniscal mobility and repetitive microtrauma to the meniscus, causing morphology and degenerative changes [51]. Early studies show that discoid menisci are more prone to mechanical stresses because they are thicker, less vascular, and often lack peripheral capsular attachments [15]. Other authors point out that hypermobility does not explain the etiology of very commonly seen stable discoid meniscus with intact peripheral attachments [52]. Most authors now consider a discoid meniscus as an anatomical variant with a propensity for tearing caused by increased mechanical stresses and hypermobility from meniscocapsular separation secondary to increased shear stress [5,52,53]. Reports of familial transmission and occurrence among identical twins support a congenital theory of origin [45].

Classification

The most widely documented classification system is by Watanabe et al who described three types of discoid lateral menisci based on arthroscopic appearance (Fig. 6) [54]. Discoid menisci with intact peripheral attachments are complete (type I) and cover the entire tibial plateau, or incomplete (type II) and cover less than 80% of the tibial surface. Type III discoid lateral menisci, the so-called "Wrisberg-ligament type," are more normal in morphology except for a thick posterior horn, and they lack posterior capsular attachments other than the posterior meniscofemoral ligament. This type of discoid meniscus is thought to produce the classic "snapping knee" [44].

Fig. 6. Watanabe classification of discoid lateral meniscus. Type I: complete variant; type II: partial variant; Type III: Wrisberg variant.

Recent reports describe variability not only in the size and shape of lateral menisci but also in their peripheral rim stability and attachment [45,46,52,55]. Jordan suggests a classification based on peripheral stability, type of discoid meniscus (complete or incomplete), presence of a meniscal tear, and presence or lack of symptoms (Table 1) [45,46].

The true incidence of the Wrisberg-type ligament is difficult to determine. Previous series documented a huge range of 0% to 33% oin unstable symptomatic discoid menisci [11,14,49,56,57]. Variability in morphology, the subjective nature of assessing hypermobility and reporting stability remain problematic. In our recent review of 128 cases of discoid menisci, 28% had peripheral rim instability, 47% of which were detached along the anterior third. We suggest a classification system based on type of discoid (complete or incomplete), presence of peripheral rim instability (stable or unstable), and associated meniscal tear.

Diagnosis

Clinical presentation of a discoid lateral meniscus can be highly variable. Symptoms are related to the type of discoid present, its peripheral stability, and presence or absence of an associated meniscal tear [44,45,52,53,55,58,59]. Stable discoid menisci without associated tears often remain asymptomatic, identified only as incidental findings on MRI or arthroscopy. Unstable discoid menisci more commonly present in younger children and produce the so-called "snapping knee." In such instances, a painless palpable, audible, or visible snap is produced with knee motion, especially near terminal extension. This snap is thought to be secondary to reduction of the unstable meniscus as the joint space widens with knee extension. This is an uncommon presentation because most discoid menisci are peripherally stable.

Table 1
Jordan classification of discoid lateral meniscus

Classification	Correlation	Tear	Symptoms
Stable	Complete/incomplete	Yes/no	Yes/no
Unstable with discoid shape	Wrisberg type	Yes/no	Yes/no
Unstable with normal shape	Wrisberg variant	Yes/no	Yes/no

In children with stable discoid lateral menisci, symptoms present when an associated tear is present. Unlike acute tears in normally shaped menisci, symptoms may present insidiously without previous trauma. Signs and symptoms of a meniscal tear include pain, swelling, catching, locking, and limited motion. On physical examination, there may be joint-line tenderness, popping, limited motion, effusion, terminal motion pain, and positive provocative McMurray and Apley tests. Degenerative horizontal cleavage tears are the most common tear, reported in 58% to 98% of symptomatic discoid menisci in large series [47–49].

Imaging

Radiographic evaluation is occasionally helpful in diagnosis. Standard plain radiographs should be obtained, including anteroposterior, lateral, skyline, and tunnel views. Characteristic findings on plain radiographs are subtle and uncommonly seen but may include a widened lateral joint line, calcification of the lateral meniscus, squaring of the lateral condyle with cupping of the lateral tibial plateau, mild hypoplasia of the tibial eminence, and elevation of the fibular head.

On MRI, one of the three criteria define a discoid meniscus: continuity between anterior and posterior meniscal horns on three or more successive sagittal slices, a transverse meniscal diameter of more than 15 mm, or more than 20% of the tibial width on transverse images. MRI can detect the presence of an associated meniscal tear. MRI has a very high positive predictive value for discoid meniscus [32], ie, when the MRI is positive, a discoid meniscus is almost always present. MRI, however, has low sensitivity for discoid meniscus [32], ie, a discoid meniscus may still be present despite negative imaging. Complete discoid menisci are more easily detected than partial discoid menisci. Normal-morphology menisci with detachment (Wrisberg-type) can be very difficult to detect on MRI. MRI techniques to improve the detection of discoid menisci include newer meniscal sequences, finer cuts, and increased experience with pediatric MRI interpretation. When a strong clinical suspicion for discoid meniscus exists despite a negative MRI, the diagnosis should still be considered and, if symptoms warrant, arthroscopy should be performed.

Treatment

Treatment options exist if diagnosis of a discoid lateral meniscus is confirmed. Asymptomatic discoid lateral menisci, usually found incidentally at arthroscopy, are not treated. For symptomatic stable, complete, or incomplete discoid menisci, partial meniscal "saucerization" is the treatment of choice. If meniscal instability exists, meniscal stabilization can be performed. Traditionally, total meniscectomy by open or arthroscopic means was recommended for such lesions. Long-term results of complete meniscectomy and near-total meniscectomy in children are poor [3–13]. There may be rare instances where salvage of a discoid meniscus is not obtainable, but improved arthroscopic technology and techniques make meniscal preservation through saucerization and repair the gold standard.

Arthroscopic saucerization debrides the discoid meniscus to a peripheral rim of 6 to 8 mm (Figs. 7 and 8) [5,55–57,60–62]. An indentation on the lateral femoral condyle often guides the depth of resection needed. If a meniscal tear is present, concurrent debridement is performed. Most tears are horizontal cleavage types, primarily in the posterior central zone. These tears can be debrided with adequate saucerization. If the tear extends into the peripheral vascular zone, repair should be attempted. Saucerization can be challenging to the inexperienced arthroscopic surgeon because visualization and instrument manipulation in the lateral joint space is limited by the thickened meniscus and the small knee size in pediatric patients. Saucerization is best begun with the knee in flexion by a straight biter or scissor punch. Smaller baskets are available and appropriate for pediatric knees. A meniscal or cartilage knife can aid in contouring the abnormal meniscus. The knee then can be placed in the figure of four position for further work. A combination of small arthroscopic shavers and biters facilitate saucerization. With horizontal cleavage tears, the smaller of the meniscal flaps is debrided, leaving an intact peripheral rim. Resection to widths greater than 8 mm is thought to increase the risk of recurrent tear.

A methodical assessment of peripheral rim stability and attachment is performed following saucerization. The frequency of peripheral rim instability mandates systematic probing of the remnant meniscus at all peripheral attachments. Unlike the pos-

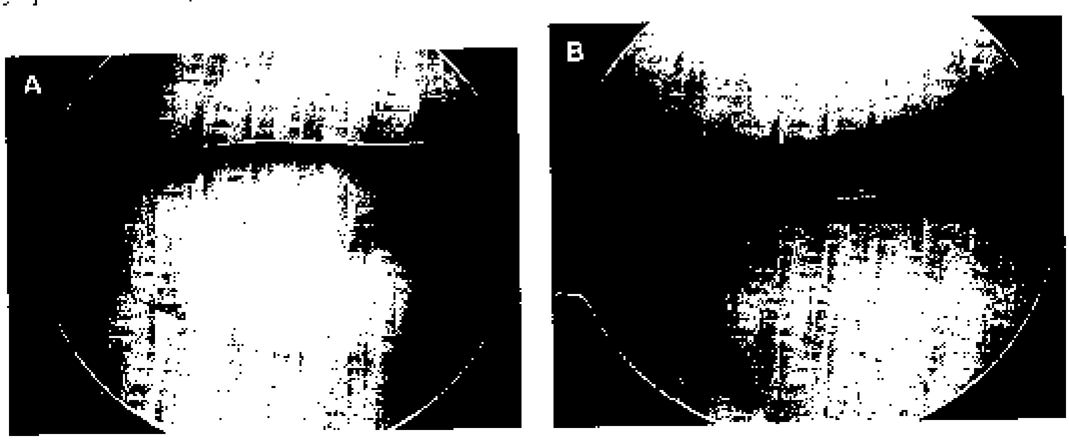

Fig. 7. Saucerization of a partial discoid lateral meniscus. (*A*) Presaucerization. (*B*) Postsaucerization.

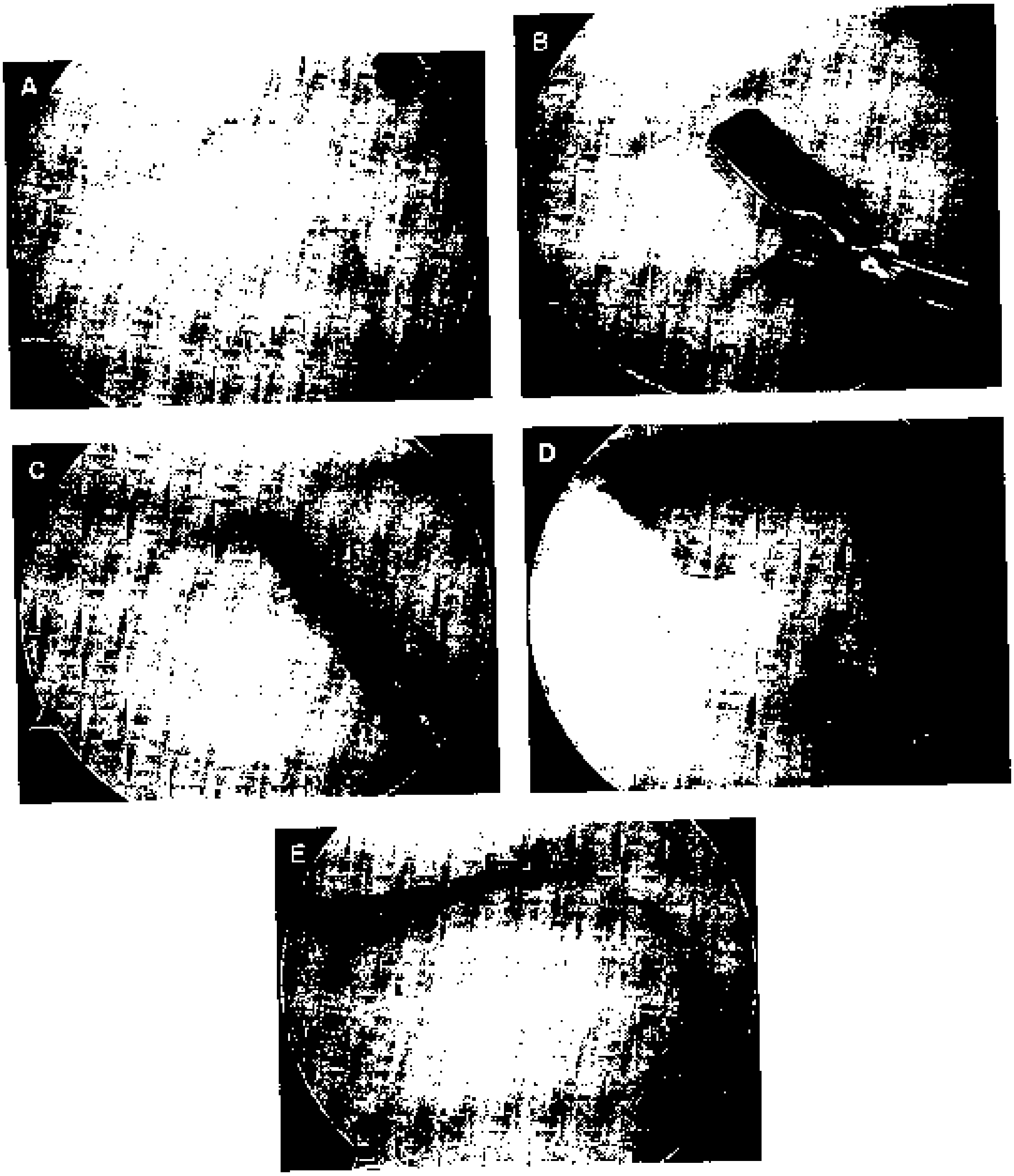

Fig. 8. Saucerization of a complete discoid lateral meniscus. (*A*) Presaucerization. (*B*) Excision of the central portion in the flexed knee position. (*C*) Probe within the horizontal cleavage tear. (*D*) Arthroscopic knife excision of the excess anterior horn. (*E*) Postsaucerization.

teriorly unstable Wrisberg type of discoid meniscus, anterior peripheral detachment can also be seen. If peripheral instability is identified, meniscal stabilization is indicated. We prefer meniscal repair using numerous inside-out sutures via zone-specific cannulae and a posterolateral incision to identify, retrieve, and tie the sutures, protecting the peroneal nerve. All-inside devices may be inappropriate for discoid lateral meniscus repair, given the extreme meniscal instability and the size of the implants.

Postoperatively, protected motion and weight bearing followed by progressive mobilization and rehabilitation are conducted and may be challenging in younger children who are unable to ambulate effectively with crutches or comply with motion and weight-bearing restrictions.

Results of arthroscopic saucerization with or without repair have not been documented in large series with any significant follow-up. Rosenberg et al presented a case of arthroscopic attachment of a free posterior edge in a normally shaped, Wrisberg-type lateral meniscus in a young adult with good results at 1 year follow-up [53]. Woods et al described four patients with unstable, discoid lateral menisci and lack of posterior capsular attachment [52]. All patients underwent repair, and three of four had good results at 37.5 months follow-up. Neushwander et al identified six lateral meniscal variants that underwent arthroscopic repair of their posterior detachment, and four had excellent results at limited follow up [54].

Cysts

Popliteal ("Baker's") cysts can occur in children. They present at the posteromedial knee at the popliteal crease as a painless, asymptomatic mass in children who are 4 to 8 years old [5]. Parents are concerned about tumors. Large cysts can cause pain in the posterior knee and a flexion contracture.

On examination, the cyst is more prominent with knee extension. Unlike solid tumors, the cyst transilluminates. Radiographs are normal or show a soft tissue mass. Diagnosis can be confirmed by ultrasound. MRI delineates the cyst and can identify a rare intra-articular problem.

The typical popliteal cyst arises in the space between the medial gastrocnemius head and semimembranosis tendon. Unlike popliteal cysts in adults, pediatric cysts only very rarely are associated with intra-articular pathology [32]. In the vast majority of cases, the natural history of pediatric popliteal cysts is spontaneous resolution over 12 to 24 months [5]. Treatment involves reassurance and follow-up clinical examination if concern arises. Surgical excision is reserved for rarely seen large cysts that become symptomatic from secondary local pressure effects. Cyst recurrence rates postexcision are quite high, ie, 30% to 40% [5].

Summary

Meniscal injuries in children and adolescents are being seen with increased frequency. Meniscal tears are typically traumatic injuries in adolescents. Because of increased healing potential and the younger age of these patients, attempts at meniscal preservation should be emphasized for outer and middle third tears. Discoid meniscus typically presents as a snapping knee in younger children or as a meniscal tear in older children. Again, meniscal preservation by saucerization is emphasized. Careful attention should be given to the need for additional meniscal repair. Popliteal cysts typically present as a painless mass. Because they are usually not associated with an internal pathology and often resolve spontaneously, the preferred treatment is observation.

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