Lateral Meniscal Variants: Evaluation and Treatment

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Abstract

The normal lateral meniscus is morphologically more variable than the medial meniscus. The abnormal lateral meniscus also varies with respect to size, shape, and stability. Variations can occur in patients of all ages. The underlying causes of lateral meniscal abnormalities are multifactorial. The spectrum of abnormalities includes the most common variant, discoid lateral meniscus, as well as less common conditions, such as a lateral meniscal variant with absence of the posterior coronary ligament. Treatment should be based on the severity of symptoms and the type of pathologic lesion.

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The exact prevalence of lateral meniscal abnormalities is unknown because many of those found are incidental to the primary cause of symptoms. The spectrum of pathology includes menisci with abnormal shape and normal attachments and those with normal shape and abnormal attachments. Most commonly, these lesions are classified as discoid menisci, as originally described by Watanabe.[1] This review analyzes the existing knowledge about these lesions and draws conclusions about their etiology, pathology, and treatment.

Anatomy and Classification

The size, thickness, shape, and mobility of the normal lateral meniscus are more variable than those of the normal medial meniscus.[2] This variability is probably inherent to the different types of lateral meniscal abnormalities. Normally, the lateral meniscus is nearly circular and covers a large portion of the tibial plateau (Fig. 1, A). It has an average width of about 12 mm and a height of 4 to 5 mm. There are usually firm anterior and posterior tibial attachments, including an attachment to the popliteal tendon, but there is no attachment to the lateral collateral ligament. The normal lateral meniscus has more mobility than the medial meniscus, allowing an increased excursion of the lateral femoral condyle, which is important to terminal extension (i.e., the "screw-home" mechanism). When present, the anterior and/or posterior meniscofemoral ligaments (the ligaments of Humphry and Wrisberg, respectively) connect the posterior horn of the lateral meniscus to the medial femoral condyle.

The most common lateral meniscal variant is discoid in shape, which implies greater coverage of the tibia and usually increased thickness. This variant may involve only part of the meniscus (in which case it is called an anterior or posterior megahorn), or it may involve the entire meniscus. Other variants can be normal in shape but hypermobile or abnormal in shape, such as the recently described circular meniscus.[3] Circular menisci have also been found in animals other than man.[4] The magnitude of hypermobility of an abnormal meniscus is related to the presence or absence of the tibial attachments (most commonly the posterior) and the meniscofemoral ligaments. Mobility may also be altered by injuries, such as a tear in the meniscus or posterior capsular separation.[1,4-10]

The most commonly used classification system is that of Watanabe,[1] which is based on arthroscopic appearance. Recently, Jordan et al[11] proposed a new classification based on both arthroscopic and clinical findings, which describes more completely the various lateral meniscal types and how they influence treatment (Table 1). Watanabe classified discoid menisci with normal tibial attachments as either complete or incomplete, depending on how much of the tibial plateau was covered. The spec-

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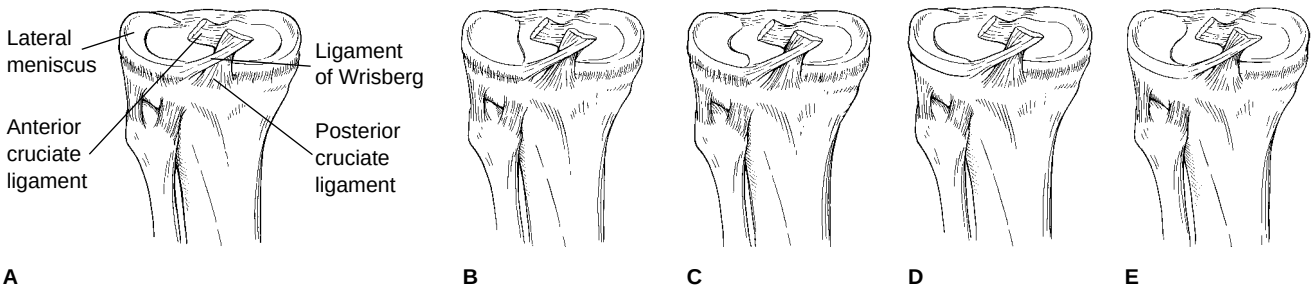


Fig. 1 Posterior views of menisci. **A,** Normal meniscus. Note the normal shape and posterior tibial attachment. The presence or absence of a meniscofemoral ligament is variable. **B,** Complete discoid meniscus. **C,** Incomplete discoid meniscus. Note the intact posterior tibial attachments in both discoid types. **D,** Wrisberg-type meniscal variant with near-normal shape. **E,** Wrisberg variant with discoid shape. In Wrisberg variants, the posterior tibial attachment is lacking, leaving the Wrisberg ligament as the posterior attachment.

trum ranged from "more than normal" to a complete sheet of meniscus (Fig. 1, B and C). Jordan et al suggested that, while complete and incomplete discoid menisci do differ in the amount of tibial plateau coverage, they have the same firm anterior and posterior tibial attachments, regardless of the presence of a meniscofemoral ligament attachment. Therefore, they were classified as stable types and then subclassified as symptomatic or asymptomatic and as torn or not torn.[11]

The unstable types of lateral meniscal variants are less well defined. Watanabe[1] originally pictured the Wrisberg type as a meniscus of near-normal shape but with hypermobility due to a lack of posterior tibial attachment (attachment is by a meniscofemoral ligament). He considered the Wrisberg type a discoid meniscus despite its near-normal shape. Since then, other unstable menisci, both normal and discoid in shape, have been included as Wrisberg types (also termed Wrisberg variants).[1,4,5,7,10] Documentation of the presence or absence of the meniscofemoral ligament has been variable, but the essential finding is hypermobility (Fig. 1, D and E).

Neuschwander et al[5] recently described a "lateral meniscal variant with absence of the posterior coronary ligament." This is a lateral meniscus that is nearly normal in morphology but lacks a posterior tibial attachment, which results in hypermobility. The authors considered this lesion an anomaly, not a true discoid meniscus, but were unable to document the presence or absence of a meniscofemoral ligament.

Jordan et al[11] grouped all unstable lesions together because their clinical presentation and treatment should be similar, whether or not they have a discoid shape or posterior meniscofemoral (Wrisberg) ligament attachment. These unstable types were further subclassified as discoid or normal in shape, symptomatic or asymptomatic, and torn or not torn. For the remainder of this review, the terms Wrisberg variant, Wrisberg type, and unstable type will be used synonymously.

Table 1
Proposed Classification of Discoid Menisci*

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

* Adapted with permission from Jordan MR, Duncan JB, Bertrand SL: Discoid lateral meniscus: A review. *South Orthop J* 1993;2;4:239-253.
† Watanabe originally depicted the Wrisberg "type" as normal in shape; however, the authors believe that the unstable type with a normal shape is more a Wrisberg "variant" than a true discoid meniscus.
‡ Stable and unstable types can be further subclassified on the basis of whether there is a tear and whether there are symptoms.

Epidemiology

The reported prevalences of discoid lateral meniscus vary, depending on the method of investigation, the selection criteria, and the patient population. The prevalences in two studies of symptomatic patients who underwent open meniscectomy ranged from 2% to 5%.[1,6] Arthroscopic studies have recorded prevalences varying from 0.4% to 16.6%.[5,10,12-14] These studies may be a more accurate portrayal of the true prevalence, in that asymptomatic discoid menisci are also included. Cadaveric studies suggest a prevalence ranging from 0% to 7%.[7,15,16] Thus, a reasonable prevalence in the United States is approximately 4% to 5% (the prevalence in Japan may be higher). Bilateral occurrence has been reported in 20% of patients with discoid lateral menisci.[17]

The proportion of Wrisberg (unstable) discoid menisci is reported to be between 0% and 33%.[4,6,9,14,18-20] However, this estimate may be misleading, because accurate intraoperative identification can be very difficult. It seems likely that the unstable type with abnormal attachments is much less common than the stable type.

Etiology

There are several theories about the etiology of the aberrant lateral meniscus. Smillie[6] hypothesized that the discoid meniscus results from the lack of resorption of a central cartilaginous disk during normal development. This theory was later disputed by Kaplan,[4] as well as Clark and Ogden,[2] because they could not identify a discoid meniscus at any stage of embryonic development. Soren[21] did find "the presence of a thick plate-shaped blastema, which lasted for only a very brief period of embryonic development," supporting Smillie's view that a discoid meniscus could result from arrested development.

Kaplan[4] proposed that the discoid shape in humans results when a normally shaped meniscus has abnormal attachments (attachments of the kind found in animals other than man), which causes repeated trauma from abnormal medial-to-lateral motion and results in a change in shape. The meniscus subluxates posteromedially into the notch on extension due to tension in the meniscofemoral ligament and then reduces into the joint on flexion due to the pull of the popliteus and capsule and the relaxation of the meniscofemoral ligament.[4] The implication is that in man the abnormal lack of a posterior tibial attachment could be a failure of formation due to phylogenetic incompletion.

The recent description of a circular meniscus[3] could be further evidence of the possibility of phylogenetic incompletion. The problem with this theory is that stable discoid menisci with normal attachments have been identified. Woods and Whelan[7] concluded that Kaplan's hypothesis could not account for the more common stable types with no evidence of meniscal trauma. They and others[2] favor a congenital origin. On the basis of observations at surgery, Woods and Whelan explain the unstable discoid-shaped type as being a congenitally stable discoid-shaped meniscus that became unstable by posterior capsular separation due to increased shear forces.

The causes of the other unstable types are even less clear. Originally, Watanabe[1] pictured the Wrisberg type as normal in shape with abnormal attachments. Since then, other unstable variants have been included in this category; these probably represent several subtypes and as many different origins.[1,4,5,10,14,18-20] There are a number of situations that could lead to an unstable meniscus, often resulting in the "snapping knee" syndrome. In the first, described by Kaplan,[4] a normally shaped meniscus with abnormal attachments is deformed by repetitive trauma. In the second situation, a stable discoid-shaped meniscus becomes detached posteriorly due to stress, as described by Woods and Whelan[7] and by Hayashi et al.[19] A third possibility is a congenital discoid-shaped meniscus without posterior tibial attachments.[10] A fourth type suggested by Neuschwander et al[5] is a normally shaped meniscus with a congenital lack of posterior tibial attachments. These possibilities suggest a wide range of anomalies presenting with similar symptoms.

It remains unclear whether all unstable types have the presence of the meniscofemoral ligament in common, which would allow subluxation and reduction to occur, accompanied by snapping. If a stable (incomplete or complete) meniscus without a meniscofemoral ligament attachment becomes detached posteriorly due to shear, it should behave more like a torn meniscus rather than like an unstable meniscus in snapping knee syndrome. The same would be true of a normal or discoid meniscus formed without posterior tibial or meniscofemoral ligament attachments. I believe the primary pathology derives from neither the discoid shape nor the presence of a meniscofemoral ligament per se, but rather from the lack of a posterior tibial attachment in the presence of a meniscofemoral ligament attachment. The meniscofemoral ligament would then act as a checkrein, allowing subluxation and reduction rather than dislocation.

Evaluation

The presentation of a patient with a lateral meniscal variant can be highly variable and usually depends on the type of meniscus, as well as the presence or absence of a meniscal tear.[1,4,5,7,8,10,12,17-20,22-24] The classic presentation is snapping-knee syndrome (Fig. 2); however, this is probably the least common. This syndrome is more likely associated with an unstable variant and presents more often in children and young adolescents. The onset is usually insidious, and there is no history of trauma. The patient or his or her family may report an audible, visible, or palpable snap or "clunk" at the terminal limits of flexion and extension. Pain, clicking, swelling, locking, and popping may also be reported. Physical findings may include blocks to motion, traumatic adjustment of the knee at the limits of flexion and extension, ambulation with a flexed stance, quadriceps atrophy, or a noticeable bulge at the anterolateral joint line with full flexion. Woods and Whelan[7] noted that adjustment of the knee during extension opens the lateral joint, allowing reduction of the displaced meniscus.

Many stable lateral meniscal variants are asymptomatic and are found incidentally. If these variants become symptomatic, it is usually due to a substance tear. In these cases, the presentation is similar to that of any other meniscal tear, with variability in duration and type of symptoms, as well as in physical findings. There may be a long history of mild symptoms, and there may be a history of trauma. If such a lesion becomes unstable due to posterior detachment, it can behave like an unstable meniscus, particularly when a meniscofemoral ligament is present.

Radiographic abnormalities are usually subtle, if they are present at all. A widened lateral joint space is the best-known finding, but there are many other possibilities, which are probably related to the type of meniscal lesion and the duration of symptoms.[10,17,23,24] Reported radiographic findings include lateral joint lipping, cupping of the lateral tibial plateau, flattening of the lateral femoral condyle, calcification of the meniscus, obliquity of the joint space, degenerative changes, and abnormalities of the lateral malleolus.[7] If a lateral meniscal variant is suspected, the diagnosis may be confirmed by arthrography[24] or magnetic resonance (MR) imaging,[9,25] Arthroscopy may also be required.[1,6,9,17,19,24]

On MR imaging, the presence of a discoid meniscus is suggested when three or more contiguous 5-mm sagittal sections demonstrate continuity of the meniscus between the anterior and posterior horns. Normally, this black "bow tie" appearance would be seen only on two contiguous sagittal sections (Fig. 3).[9,25] Although this is a useful sign, the finding will be absent

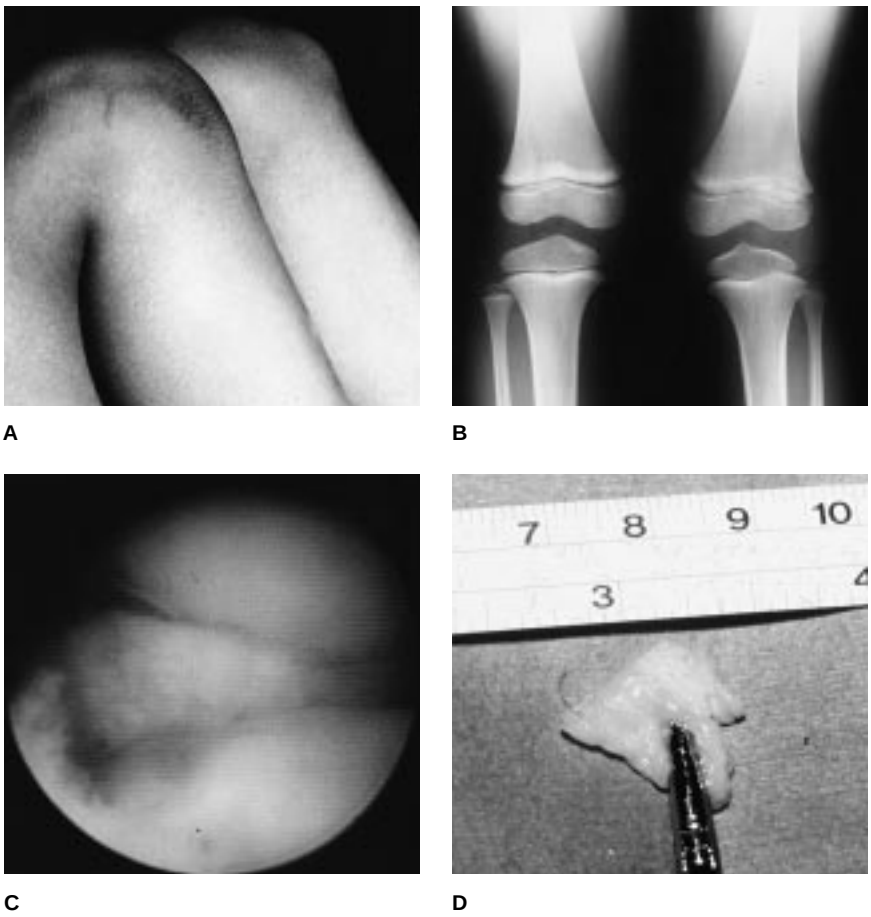


Fig. 2 **A,** Large anterolateral bulge at the joint line with full flexion in a 4-year-old girl with symptoms of snapping-knee syndrome and pain for 1 year. **B,** Radiograph shows subtle findings of a widened lateral joint space, flattened and sclerotic lateral tibial epiphysis, and suggestion of a large lateral soft-tissue mass. **C,** Arthroscopic view of traumatized meniscus that is destroying the joint. **D,** Gross specimen obtained by arthroscopic excision shows abnormal shape and size.

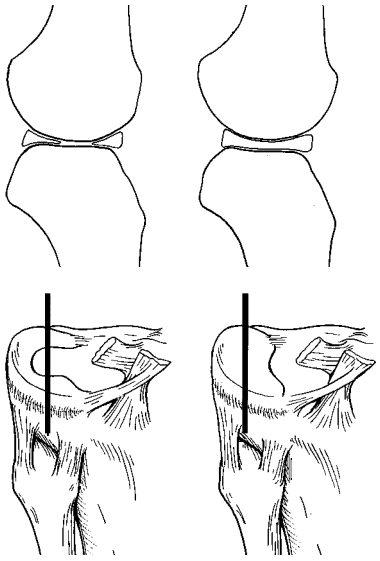


Fig. 3 Diagrammatic representations of MR images **(top)** obtained in sagittal planes indicated **(bottom)** in normal lateral **(left)** and discoid lateral **(right)** menisci.

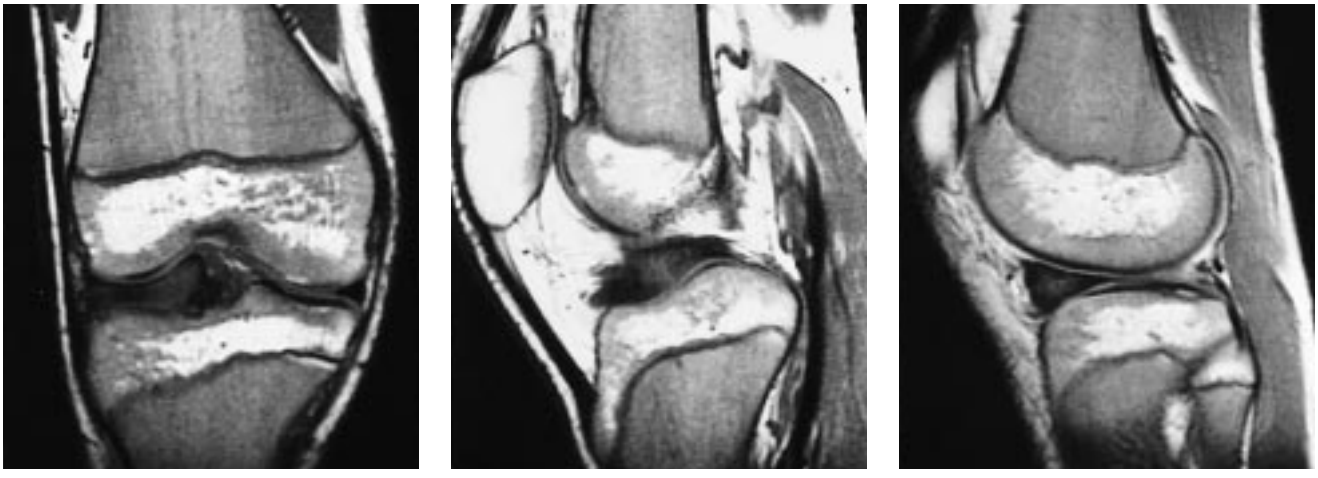
in the unstable type if the meniscus has a normal shape. The presence of a discoid shape can be further confirmed if a coronal view demonstrates increased width of the midanteroposterior diameter; one may also note an increase in thickness of the anterior horn, the posterior horn, or the entire meniscus (Fig. 4). However, the presence or absence of a meniscofemoral ligament attachment may be elusive.

Arthroscopy offers the easiest confirmation of the diagnosis, but complete evaluation may not be possible.[17,19,22,23,26] Abnormal thickness and width of the meniscus may make the joint space and posterior aspect difficult to assess, and the presence of a meniscal tear or meniscofemoral ligament may not be detected (Fig. 5). A posterior portal may be required to examine the posterior joint. While stability of the meniscus can usually be evaluated during arthroscopy, many tears begin on the undersurface or in the midsubstance and may therefore be difficult to appreciate. In such cases, MR imaging may be more helpful.

It has been shown that MR imaging offers more reliable information than arthroscopy about intrasubstance degeneration of discoid menisci in symptomatic patients. In one study,[26] MR imaging studies of all 21 symptomatic patients showed intrasubstance high signal intensity or flattening, but not surface disruption. Patho-logic examination also revealed degeneration in all cases, but only 3 patients had arthroscopic evidence of degeneration. It was suggested that flattening or grade II signal changes (indicating degeneration) were more clinically important in symptomatic discoid lesions because motion between the halves of the abnormal meniscus can cause symptoms, which would not be a problem in the morphologically normal meniscus.

Treatment

The treatment options for the various lateral meniscal variants include observation, partial meniscectomy (which in an unstable type requires reattachment), total meniscectomy, and reattachment (for a normally shaped unstable lesion). The recommended treatments have depended on the type of lateral meniscus, the age of the patient,



A **B** **C**

Fig. 4 **A,** Coronal MR image shows increased midanteroposterior diameter and extension to notch. **B,** Sagittal MR section of a discoid meniscus shows increased thickness and asymmetry. **C,** Sagittal MR image depicts anterior megahorn type.

Fig. 5 The arthroscopic findings in a 16-year-old boy who had had snapping-knee symptoms for 6 years but whose knee became painful only 5 years previously. **A,** Anterior view illustrates the thickness and difficulty of visualizing posteriorly. **B,** Wrisberg ligament attachment as seen through the notch. **C,** Gross specimen obtained by arthroscopic excision.

the duration and severity of symptoms, and the absence or presence and extent of an associated tear. Unfortunately, most of the published reports of results are based on small numbers of patients who vary with respect to age, presentation, pathologic lesion, treatment, and length of follow-up. In addition, most of the studies have been retrospective, as well as being reported at various stages of the evolution of the technology of arthroscopy, making the accurate drawing of conclusions difficult.

An incidentally found asymptomatic variant meniscus should be observed (Fig. 6),[7,10,13,14,17-19,22] but the optimal treatment of the symptomatic lateral meniscal variants is still unclear. Historically, the preferred treatment of a stable symptomatic lesion was open excision.[6,24] Today, however, some believe that preservation of a stable rim is desirable, even though it may be composed of abnormal tissue (Fig. 7).[7,10,12,17,22] Others feel that complete excision is the treatment of choice, because the residual abnormal tissue may not function appropriately.[14,23,27] Like tears in normal menisci, many tears in abnormal menisci may be unsalvageable, leaving meniscectomy the only reasonable option.

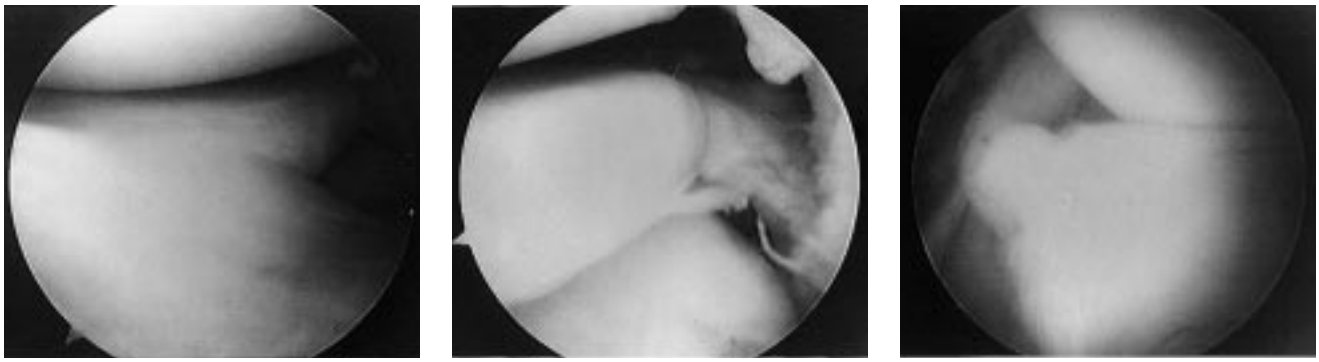
In children, the risk of lateral degenerative arthritis after meniscectomy is greater than in adults. This has led some to particularly recommend arthroscopic partial excision of torn symptomatic stable discoid menisci, leaving an intact rim. Both Fujikawa et al[12] and Bellier et al[17] have reported good short-term results with this form of treatment.

Based on their own findings and those in other reports in the Japanese literature, Hayashi et al[19] believe that good results can be obtained with total meniscectomy for discoid menisci in children. Kurosaka et al[28] reported that 90% of their patients had subjective good results after 20 years, despite radiographic evidence of degeneration in all knees. Moderate to severe arthritic changes were noted in 75% of those knees.

In adults, support can be found for both arthroscopic total meniscectomy[14,27] and partial meniscectomy[10,13,18,29] in patients with torn, symptomatic stable discoid menisci. Good to excellent subjective results were reported by half the patients of Vandermeer and Cunningham,[18] who were treated by partial excision. Factors associated with an unsatisfactory outcome included persistent degenerative changes, increased age, and female gender.

Ikeuchi[14] analyzed 49 stable discoid lateral menisci and concluded that arthroscopic treatment of the torn discoid meniscus is difficult and that total, rather than partial, meniscectomy is more likely to be successful. He also noted the requirement for a longer period of rehabilitation for patients with torn discoid menisci compared with patients with tears in morphologically normal lateral menisci. Lateral instability was also more common. He concluded that the overall results in patients treated by total meniscectomy were better than those in patients treated by partial meniscectomy.

Sugawara et al[27] also recommended complete or subtotal meniscectomy as better than partial meniscectomy because of a higher rate of reoperation. Partial resection of stable menisci with increased thickness was thought to result in high shear forces concentrated at the resected margin due to the incongruity between meniscus



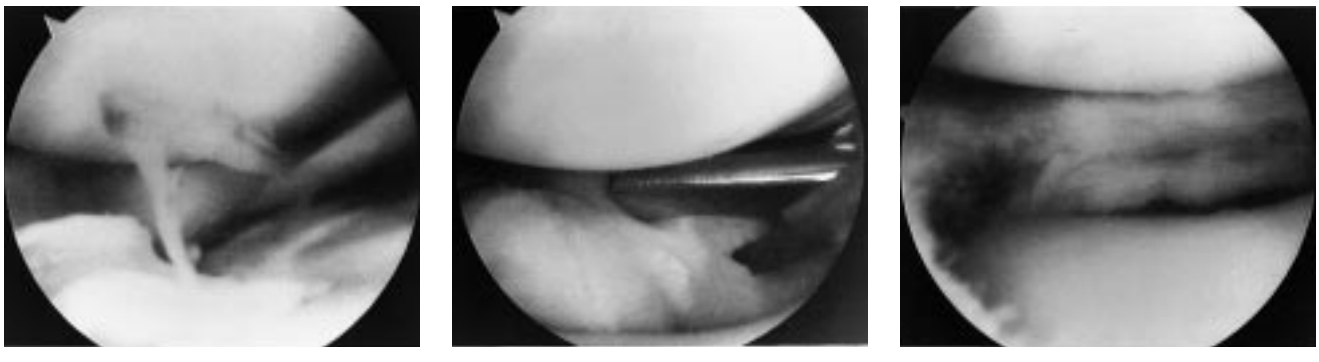
A B C

Fig. 6 **A,** Asymptomatic complete discoid meniscus in a 35-year-old woman, which was noted during arthroscopy for a torn medial meniscus. **B,** Note the thick posterior horn and meniscofemoral attachment. **C,** Posterior view (through the notch) shows the meniscotibial attachment and an abnormal ligament attachment. The meniscotibial attachment makes this a stable type regardless of the presence or absence of a meniscofemoral ligament attachment. No formal treatment was indicated.

and articular surface, which predisposed the abnormal meniscus rim to retear. They also suggested that unrecognized degeneration could extend to the periphery, compromising function after partial meniscectomy.

As previously noted, MR imaging may help delineate which menisci will respond most favorably to partial meniscectomy. Hamada et al[26] have reported on the usefulness of MR imaging in evaluating intrasubstance tears and degeneration in symptomatic stable discoid lateral menisci. They found that MR imaging more accurately correlated with the histopathologic findings than arthroscopy and recommended total meniscectomy for MR-documented degeneration extending to the peripheral rim and partial meniscectomy for degeneration or flattening limited to the central avascular portion.

Smith et al[30] recently reported on the treatment of 43 knees in 41 patients with discoid lateral menisci but did not specify whether they were stable or unstable. They found the results after meniscectomy to be unpredictable and recommended that surgery be approached cautiously. On the basis of short-term (average, 23 months) results, they recommend MR imaging followed by diagnostic arthroscopy with partial or subtotal meniscectomy for symptomatic stable lesions. They recommend a rim width of 6 to 8 mm, which was also recommended by Hayashi et al,[19] who noted retears in larger rims after partial meniscectomy. Smith



A B C

Fig. 7 **A,** The arthroscopic findings in a 22-year-old woman with an unsalvageable torn, symptomatic stable discoid meniscus. **B,** Arthroscopic saucerization was performed. **C,** Stable rim after saucerization.

et al[30] concluded that total meniscectomy should be reserved for complex, unsalvageable tears.

There is considerably less information on the treatment of unstable menisci, but most surgeons have traditionally recommended total excision.[1,4,10,14,18,23,28,29] Since this type tends to occur in young patients, the risk of arthritis has prompted attempts to salvage the meniscus. Ikeuchi[14] treated three patients with peripheral tears in discoid menisci with partial meniscectomy and reattachment. Rosenberg et al[22] were the first to report saucerization and reattachment of discoid unstable menisci. Woods and Whelan[7] also recommend saucerization and reattachment on the basis of their results in five patients. As noted previously, Neuschwander et al[5] reported the presence of a lateral meniscal variant with absence of the posterior coronary ligament in seven patients (four children, three adults). Six of six patients were successfully treated with arthroscopic suture of the near-normal meniscus to the capsule. An average of 32 months after arthroscopic treatment, four patients had excellent results, and one each had good and fair results.

Discussion

The treatment of a lateral meniscal variant depends on many factors. The lesions encountered may dictate the course of the treatment taken (e.g., if the lesion is considered unsalvageable); however, the age of the patient, the anatomy of the lesion, the duration and extent of the symptoms, and the amount of joint destruction should all be considered. One must realize that the patient with a lateral meniscal variant usually has an abnormal knee at the outset. There may be no good treatment option; rather, the only choice may be the lesser of two evils. The goal is to create a stable meniscus (or rim) that has function resembling normal, which could necessitate further reconstructive procedures. Given that many stable discoid menisci are found incidentally, it is reasonable to observe asymptomatic patients and counsel them regarding an increased risk of having to undergo surgical treatment in the future. However, it should also be pointed out that the joint probably has adapted and could continue to function reasonably well.

The optimal treatment of the adult with a symptomatic stable discoid meniscus hinges on whether partial resection leaves a rim that can function adequately. Although some authors have reported good results,[10,13,18,29] others believe that the abnormal thickness will lead to recurrent tears or symptoms, necessitating further surgery.[14,27] The thickness of the meniscus, the amount of degenerative arthritis, and the patient's age, activity level, and willingness to undergo a second arthroscopic procedure are all important factors.

In children, the risk of early arthritis is more worrisome. While the risk is well documented after removal of a normal meniscus, it has not been clinically proved in the patient with a discoid meniscus. Studies have shown acceptable short-term results after complete discoid meniscectomy.[19,23] Even though Kurosaka et al[28] noted moderate to severe radiographic changes in 75% of their patients 20 years after total meniscectomy, 90% of their patients had good subjective results. Hayashi et al[19] explained their better results after complete meniscectomy on the basis of both the capability of the child's abnormal knee to adapt and the complete removal of abnormal tissue.

Aichroth et al[23] found that a pseudomeniscus rim covered the popliteus in three of four knees in patients who underwent second-look arthroscopy an average of 18 months after surgery. However, most authors believe that this should not occur because of the avascularity of the popliteal area. Even though there are reports of good or better results after complete meniscectomy, common sense suggests that we should try to save some or all of the meniscus. Saucerization with or without reattachment is technically demanding, especially when performed arthroscopically. Thus, the debate continues: Is the child better off with an abnormal meniscus or no meniscus at all?

The best treatment for unstable types is less clear. Although the historical treatment has been complete removal, more recent reports of saucerization of a discoid meniscus and reattachment present other options.[5,14,22] Certainly, it seems reasonable to try to reattach a normally shaped but unstable meniscus; however, saucerization and reattachment of a discoid meniscus brings us back to the question of the function of abnormal tissue.

While the treatment of asymptomatic stable discoid menisci should be observation and counseling for increased risk of tear, how should one handle the minimally unstable or asymptomatic unstable type in a child or young adult? I recommend aggressive evaluation, including MR imaging and/or diagnostic arthroscopy to assess the meniscal anatomy as well as the amount of joint destruction. Complete excision seems acceptable if a destroyed meniscus is traumatizing the joint; however, observation is possibly warranted for an unstable discoid meniscus if little or no trauma is noted in both the meniscus and the joint surface. Reattach-

ment would be reasonable, especially in the case of a normally shaped meniscus.

The final treatment option for debate is that of meniscal transplant. While its role in the treatment of routine arthritis in the young adult is still being defined, the use of an allograft for the treatment of a discoid meniscus remains controversial. Allografting entails some degree of risk, and there is no evidence in the literature that a transplanted normal meniscus functions appropriately in an abnormal knee.

Summary

Lateral meniscal aberrants include several pathologic entities, which vary with respect to size, shape, and attachments. This variability is likely due to a multifactorial origin, with probable congenital and developmental influences. The normal lateral meniscus is highly variable, as are the anomalies that have been reported in the literature to date. Therefore, a better descriptive term is "lateral meniscal variants," with subgrouping depending on stability, shape, and the presence of tears and symptoms. Jordan et al[11] recently presented a classification system that illustrates this point.

Each lesion should be evaluated and treated on an individual basis, depending on the patient's age and symptoms, the pathologic characteristics, and the surgeon's expertise. The goal is to provide adequate function while delaying arthritis and the early need for further major intervention. In-depth evaluation, including MR imaging and/or diagnostic arthroscopy, may be helpful in selecting treatment. In addition to confirming the diagnosis, this evaluation should give information regarding the size, shape, and stability of the meniscus, as well as the presence and extent of tearing and joint destruction. Treatment options include observation for asymptomatic or minimally symptomatic patients; partial meniscectomy with or without reattachment, depending on stability; reattachment for unstable types with normal shape; and complete meniscectomy. Because most symptomatic menisci are torn and unsalvageable at presentation, meniscectomy may be the option with the most predictable results.

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