Discoid Medial Meniscus Completely Coalesced With the Anterior Cruciate Ligament

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abstract

Discoid meniscus is an abnormality of the knee in which the meniscus is discoid rather than semilunar in shape. Medial discoid menisci are rare, and no specific associated symptoms suggest this condition. Several medial meniscus anomalies, including discoid variants, have been reported in the literature. This article describes a rare case of medial discoid meniscus completely coalesced with the anterior cruciate ligament (ACL).

A 22-year-old man presented with intermittent right knee pain of 6 months’ duration. Physical examination revealed mild wasting of the quadriceps with medial joint line tenderness but no effusion. Radiographically, hypoplasia of the lateral tibial spine, increased medial joint space, and increased concavity of the medial tibial condyle were noted in both knees. Arthroscopic examination revealed a complete discoid medial meniscus that was contiguous with the ACL. On probing, a horizontal tear in the medial meniscus was noted. A meniscectomy was performed, and deep longitudinal furrows with exposed subchondral bone were noted underlying the posteromedial tibial condyle. At the patient’s 6-month follow-up visit, he had no knee symptoms and had returned to his daily activities, which included jogging.

Discoid medial meniscus is a rare anomaly, and this case represents only the second reported in the literature of discoid medial meniscus completely coalesced with ACL. This case supports the theory that the ACL and menisci can be differentiated from 1 mesenchyme.

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Discoid meniscus is an abnormality of the knee in which the meniscus is discoid rather than semilunar in shape. The discoid meniscus is believed to be congenital in origin, and it may or may not be symptomatic. Discoid meniscus was first described in the lateral meniscus by Young in 1889. Most discoid menisci are lateral and can be associated with snapping knee syndrome. Medial discoid menisci are rarer, and no specific associated symptoms suggest this condition. The reported incidence of medial discoid meniscus ranges from 0.06% to 0.3%, with bilateral cases being rare.

Several medial meniscus anomalies including discoid variants and anomalous insertion have been reported in the literature. However, only a single report of medial discoid meniscus completely coalesced with anterior cruciate ligament (ACL) has been reported previously in the literature. The current article presents a case of medial discoid meniscus completely coalesced with ACL.

**CASE REPORT**

A 22-year-old man presented to the authors’ institution with intermittent right knee pain of 6 months’ duration. The patient reported onset of the pain was insidious but the pain gradually became worse during the past 2 months and was aggravated on squatting. He jogged regularly but was unable to continue due to pain.

Physical examination revealed mild wasting of the quadriceps with medial joint line tenderness but no effusion. McMurray test was positive. Apley’s grinding, Lachman, anterior drawer, and varus and valgus stress tests were negative. The patient had full pain-free range of motion. Radiographs showed hypoplasia of the lateral tibial spine, increased medial joint space, and increased concavity of the medial tibial condyle in both knees (Figure 1).

Arthroscopic examination revealed a complete discoid medial meniscus that was contiguous with the ACL (Figures 2, 3). No discontinuity existed between the discoid medial meniscus and the ACL. On probing, a horizontal tear in the medial meniscus was noted. The meniscus was carefully cut with cautery just lateral to the ACL to create a hole, and then a meniscal punch was used to trim and balance the medial meniscus (Figure 4). The underlying posteromedial tibial condyle had deep longitudinal furrows with exposed subchondral bone (Figure 5).

Active quadriceps and hamstring exercises were started on the first postoperative day, with weight bearing as tolerated beginning on the second postoperative day. At 6-month follow-up, the patient reported no symptoms, and he had returned to his daily activities, including jogging.

**DISCUSSION**

Discoid medial meniscus is a rare anomaly, and this case represents the second reported case of discoid medial meniscus completely coalesced with ACL. Watanabe and Takeda classified discoid meniscus as complete, incomplete, and Wrisberg type. The first 2 categories vary only in the extent to which the menisci are discoid in appearance. In the third category, the Wrisberg type, the discoid meniscus is hypermobile and lacks posterior coronary ligaments and...
capsular attachments. This type of pathology is not generally associated with medial menisci.

Smillie suggested that the menisci existed as a cartilaginous disk at an early stage of development and that the congenital discoid meniscus was attributable to the persistence of the disk-shaped meniscus arrested at varying stages of embryologic development. He divided the different types of meniscus into primitive, intermediate, and infantile and suggested that horizontal cleavage in the primitive type of meniscus is due to continuous movement of the superior and inferior surfaces. Kaplan suggested that discoid lateral meniscus develops gradually after birth and is a result of abnormal motion due to the absence of posterior tibial attachment in such cases. Clark and Ogden suggested that mild to moderate instability may lead to filling in of the central area normally surrounded by lateral meniscus.

Development of the cruciate ligaments, meniscus, and other knee ligaments starts from a blastema/dense interzone between the developing femur and tibia at approximately stage 19 of fetal development (approximately 7 postovulatory weeks) and is complete by stage 23 (approximately 8 postovulatory weeks). Ross et al suggested that in some synovial joints, the intermediate mesenchymal plate or blastemal matrix breaks down to form space between 2 bones, whereas in others it persists to form intra-articular structures. No embryological evidence suggests that this undifferentiated meniscus normally goes on to form a complete disk of fibrocartilage in which the central portion is later absorbed to form an adult semilunar shape. The central portion of meniscus is absorbed while the joint is developing, and from the commencement of differentiation, the meniscus has a basic adult-like form. The discoid meniscus cannot truly be said to be the persistence of a normal phase of development because from the time of differentiated meniscus, the meniscus has a semilunar shape.

The current case supports the theory that ACL and menisci are differentiated from 1 mesenchyme. It seems that at a certain point during development, a failure occurs in the separation of the mesenchyme along with nonabsorption of the central part, leading to the development of the whole complex as a discoid medial meniscus coalesced to the ACL.

Such discoid menisci are likely to be less mobile and thus more prone to tears. Dickason et al in an analysis of 8040 patients, reported a 0.12% incidence of discoid medial meniscus. They found 4 cases of longitudinal tears, 1 case of a horizontal tear, and 1 case of a bucket-handle tear in a series of 8 cases. Min et al also described a longitudinal tear along with a similar presentation of discoid medial meniscus completely coalesced with the ACL. The current patient had a horizontal tear. Similar to the current case, Min et al also reported obtaining good results after sauerization of the discoid meniscus.

**CONCLUSION**

This rare case of discoid medial meniscus completely coalesced with the ACL supports the development theory of the meniscus and the ACL from mesenchyme. Such cases have good results after sauerization of the meniscus.

**REFERENCES**