

# Discoid Lateral Meniscus in Clinical Practice: From Diagnosis to Treatment

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Received: 05 April 2025; Revised: 10 June 2025; Accepted: 12 July 2025

## Abstract

Discoid meniscus is the most common congenital anomaly affecting the lateral meniscus. Although many individuals remain asymptomatic, others may present with symptoms such as knee pain, swelling, and limited range of motion (ROM). Magnetic resonance imaging (MRI) is the diagnostic modality of choice, often supplemented by radiographic evaluation. The condition is classified into three types: complete, incomplete, and Wrisberg variants. In asymptomatic cases, surgical intervention is generally not indicated. However, for symptomatic individuals, arthroscopic surgery is typically recommended. The primary goals of treatment include stabilization of the meniscus, repair of any tears, and reshaping of the abnormal meniscus through a procedure known as saucerization, often performed using arthroscopy. Treatment options include partial meniscectomy, suture repair, and, in severe cases, total meniscectomy or meniscus allograft transplantation. Postoperative rehabilitation protocols are individualized, taking into account the patient's age, activity level, and the specific surgical procedure performed.

**Keywords:** Meniscus; Pediatrics; Magnetic Resonance Imaging; Therapeutics; X-Rays

**Citation:** Ayati Firoozabadi M, Salkhori O, Rezaee H, Tabatabaei Irani P, Razzaghof M, Mortazavi SMJ. **Discoid Lateral Meniscus in Clinical Practice: From Diagnosis to Treatment.** *J Orthop Spine Trauma* 2025; 11(3): 95-9.

## Background

The discoid meniscus, the most common congenital disorder of the lateral meniscus, is more prevalent in East Asians and women, with over 79% of cases observed bilaterally. While most individuals are asymptomatic, some may experience various symptoms (1). Magnetic resonance imaging (MRI) is the preferred diagnostic method for discoid menisci (2). Surgery is unnecessary in asymptomatic cases but is recommended in symptomatic cases. It is worth noting that total meniscectomy, once a standard treatment approach, is now rarely performed. The primary focus of current treatment is on stabilization, repair of the torn meniscus, and restoration of the normal shape of the meniscus through a procedure called saucerization, typically using arthroscopic techniques (3).

## Epidemiology

Discoid lateral meniscus (DLM) is disc-shaped and covers more than 70% of the lateral plateau. Its prevalence in Western societies ranges from 3% to 5%, whereas in Asia, this percentage is between 10.9% and 16.6%. The likelihood of encountering a discoid meniscus in both knees is more significant than that seen unilaterally, with percentages varying between 79% and 97% (4). This high prevalence in both knees has substantial implications for patient care, as it may necessitate bilateral treatment strategies (5).

## Etiology

The exact cause of discoid meniscus remains unclear, but several theories have been proposed, including acquired factors, genetic influences, and congenital development issues (4, 6). This type of meniscus is prone to tearing and degeneration due to its wide shape, abnormal distribution of mechanical stress, instability of the peripheral rim, irregular arrangement of collagen fibers, and inadequate blood supply (1). The discoid meniscus can also occur in specific syndromes such as

Turner syndrome, achondroplasia, and hypoplasia of the anterior cruciate ligament (ACL) (4, 6).

## Physical Examination

The clinical presentation of DLM varies depending on the type, the presence of meniscal tears or instability, and the patient's age (7). Most cases were observed during adolescence. Younger children may show spontaneous intermittent clunking during full knee flexion, whereas older children typically present with symptoms related to acute DLM tears (1). Consequently, it may lead to symptoms such as pain, swelling, snapping, locking, limited range of motion (ROM), and a sensation of giving way. However, many discoid menisci remain asymptomatic and are often discovered incidentally on MRI (8).

A thorough knee examination, including visual inspection, palpation, ROM assessment, neurovascular evaluation, ligament stability tests, and meniscus-specific special tests, is crucial (8). These special tests for meniscal pathology include palpation of the medial or lateral joint line to check for tenderness, along with McMurray's test, Apley's compression test, and Thessaly's test. Given the high incidence of bilateral pathology in symptomatic DLM, it is essential to assess the contralateral knee (9). Overall, the sensitivity of the clinical examination for diagnosing DLM is approximately 88.9% (10).

## Classification

Various classifications have been proposed for discoid menisci. This section discusses the classifications of Watanabe (11), Ahn et al. (12), and Pediatric Research in Sports Medicine (PRISM) (13).

### Watanabe Classification

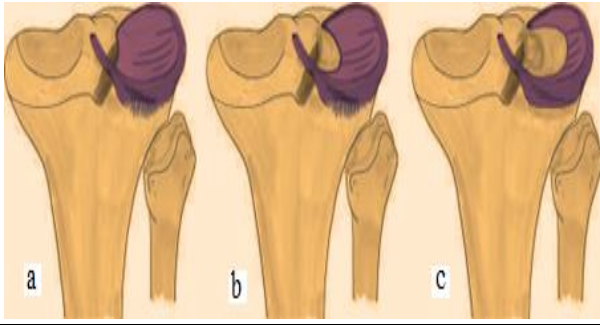
The Watanabe classification (11) defines three types of DLM (Figure 1):

a) Complete: This type has a full disk morphology covering the entire tibial condyle,



b) Incomplete: This variation is characterized by an increased width while retaining a semilunar shape,

c) Wrisberg variant: In this type, the lateral meniscus may appear normal or thickened but lacks the peripheral attachments of the posterior horn (the coronary ligaments). Thus, the Wrisberg meniscofemoral ligament is the only posterior stabilizer of the meniscus.

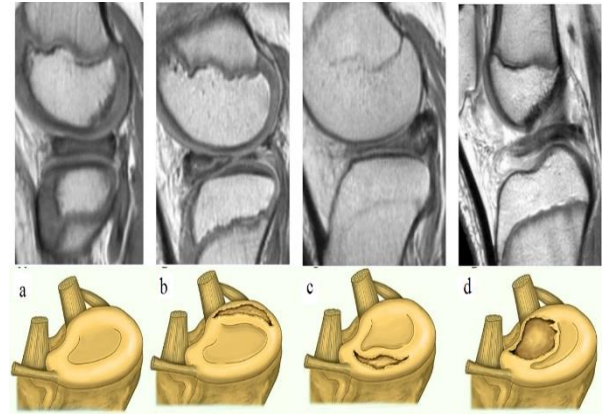


**Figure 1.** a) Complete; b) Incomplete; c) Wrisberg variant  
This figure was reproduced from Saavedra et al.'s article (11).

### Ahn Classification

Ahn et al. (12) introduced a classification system based on a "meniscal shift" from peripheral detachment using MRI (Figure 2), categorizing it into four types: no shift, anterocentral shift, posterocentral shift, and central shift.

Their findings showed that shift-type DLMs were less common but had a higher incidence of peripheral tears and were more often repaired than the no-shift type.



**Figure 2.** a) No shift; b) Anterocentral shift; c) Posterocentral shift; d) Central shift  
This figure was reproduced from Kim et al.'s article (14).

### PRiSM Classification

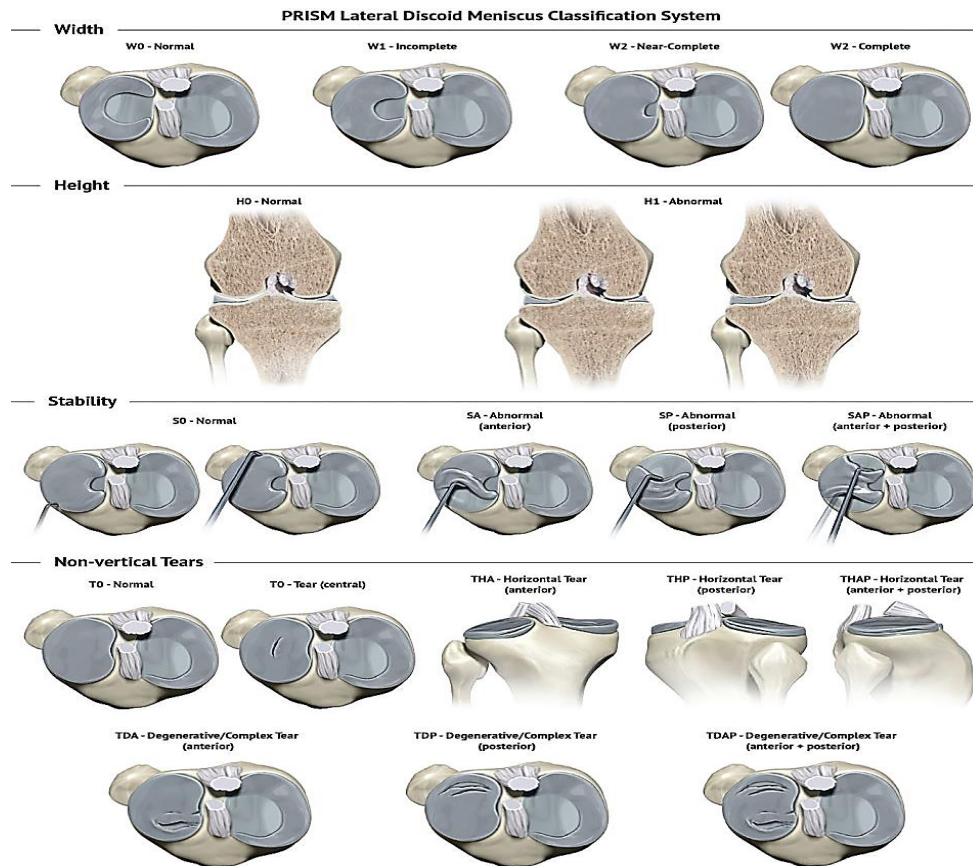
The PRiSM organization (13) uses a classification system for DLM injuries that includes four main elements (Figure 3):

1. Meniscal width:

- W0: Normal coverage
- W1: Partial coverage
- W2: Near-complete coverage (> 90% of the plateau),

2. Meniscal height:

- H0: Normal height
- H1: Thicker than normal,



**Figure 3.** PRiSM classification system for lateral discoid menisci  
This figure was reproduced from Lee et al.'s article (13).

### 3. Stability:

- SO: No instability
- SA: Anterior half instability
- SP: Posterior half instability
- SAP: Both anterior and posterior instability,

### 4. Tear classification:

- TO: No tear
- THA/THP: Horizontal tears (anterior/posterior)
- THAP: Horizontal tear throughout
- TDA/TDP/TDAP: Degenerative, complex, or radial tears.

This system aids in understanding meniscal injuries in pediatric patients.

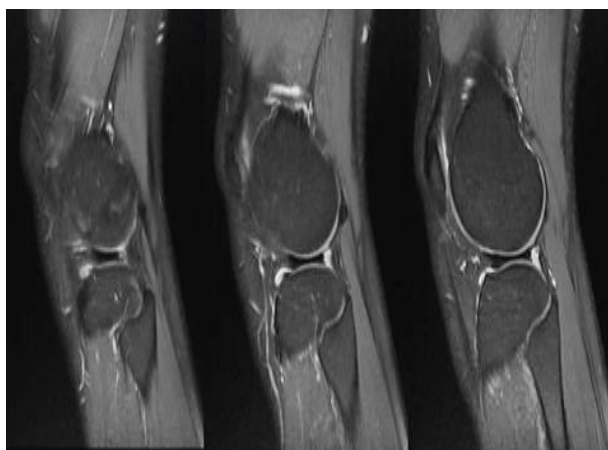
## Discussion

When a discoid meniscus is suspected, simple radiography is the first diagnostic step after a thorough patient history and clinical examination. Although X-rays may appear normal, they must be ruled out for other conditions, such as osteochondritis dissecans, fractures, and tumors (13).

On plain radiography, several indirect signs may indicate the presence of a discoid meniscus, including block-shaped femoral condyle (often referred to as "squaring"), increased concavity of the tibial plateau, widened joint space of more than 6 mm, hypoplasia of the lateral tibial spine, meniscal calcifications, and increased convex angle of the lateral condyle (15, 16). These features can provide valuable information for diagnosing a discoid meniscus.

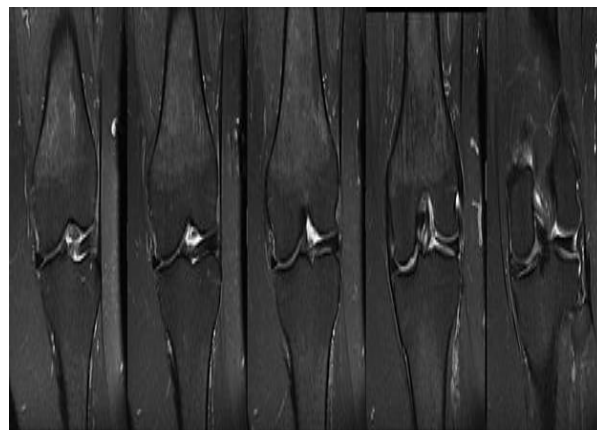
The preferred diagnostic method for DLM is knee MRI. When interpreting MRI findings, special attention should be given to the following features in the sagittal, coronal, and axial views, as their presence can help confirm the diagnosis of a discoid meniscus (17).

In sagittal sections, three or more 5-mm slices show continuity between the anterior and posterior horns (referred to as the "bow-tie sign") (Figure 4). Moreover, there are differences in size between the anterior and posterior horns; they are usually symmetrical.



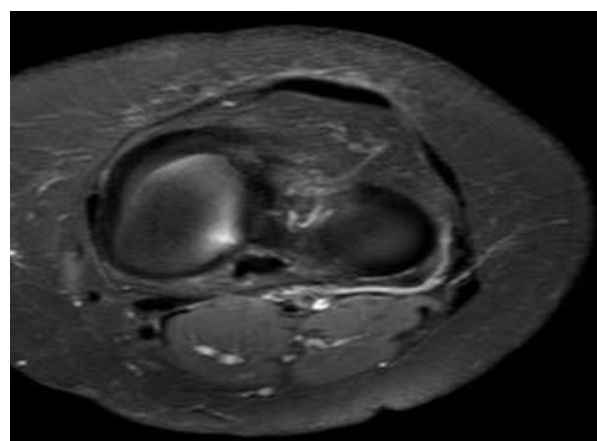
**Figure 4.** The sagittal view of the knee showing the continuity of lateral menisci in three sequential slices (bow-tie sign)

In the coronal section, a complete meniscus should be visible in all sections from anterior to posterior through the knee (typically, it is only present in the anterior and posterior sections), and a transverse diameter measuring  $\geq 15$  mm or more than 20% of the total tibial width (Figure 5).



**Figure 5.** The coronal view of the knee showing a continuity of lateral menisci in sections from anterior to posterior

Axial sections show distinct discoid morphology of the lateral meniscus, which should cover over 80% of the lateral tibial plateau (Figure 6).



**Figure 6.** The coronal view of the knee showing the continuity of lateral menisci in sections from anterior to posterior

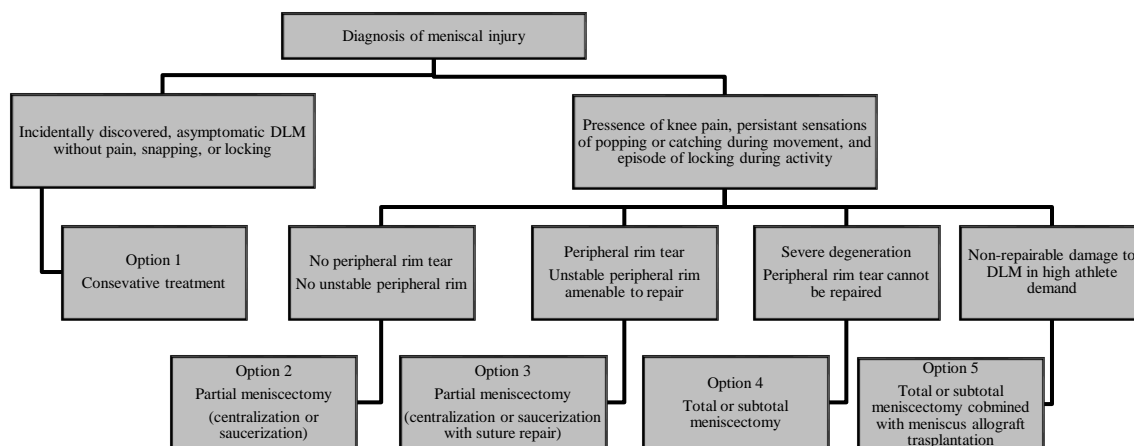
It is crucial to pay special attention to the following two items in the MRI of the Wrisberg type (18): The anterior subluxation of the posterior horn of the lateral meniscus and a hyperintense signal between the lateral meniscus and the capsule on T2-weighted sections.

## Treatment

For the treatment of a discoid meniscus, the wait-and-see strategy is recommended in the following situations: Incidentally discovered and asymptomatic DLM without pain, snapping, or knee locking (11, 19). Surgical treatment should be considered when there is knee pain, persistent sensations of popping or catching during movement, and episodes of locking during activity (6, 20).

Various surgical methods for treating a discoid meniscus depend on the severity of the tear, stability, extent, and quality of the meniscus. These methods include:

- 1) Partial meniscectomy, referred to as "Centralization" or "Saucerization", which is currently the preferred approach for treating patients with symptomatic stable DLM,
- 2) Suture repair is recommended for peripheral rim tear or instability following saucerization, particularly for DLM lesions with an unstable peripheral rim that are amenable to repair,



**Figure 7.** Treatment algorithm for discoid lateral menisci (DLM)

3) Total or subtotal meniscectomy is indicated for severe degeneration or a peripheral rim tear that cannot be repaired (significant risk of wear on the articular cartilage),

4) Total or subtotal meniscectomy combined with meniscus allograft transplantation is recommended for younger patients with DLM damage and higher athletic demands (Figure 7) (6, 11, 21).

#### Rehabilitation

Postoperative programs are tailored to reflect patients' age, the necessity for meniscal repairs or reattachments, and surgeons' preferences, ensuring optimal recovery and outcomes for each individual (11). The postoperative protocol for each surgery is briefly indicated in table 1 (7, 22).

#### Conclusion

DLM is a common congenital condition that exhibits varying degrees of symptoms, from asymptomatic cases to those that require surgical intervention. Early and accurate diagnosis, especially through MRI, is crucial for effective treatment planning. Conservative management is suitable for asymptomatic individuals, while symptomatic cases benefit from surgical options like saucerization, meniscectomy, and meniscal repair. The choice of treatment should be determined by the severity of the meniscus tear, the degree of instability, and the patient's individual needs, including age and activity level.

Postoperative rehabilitation is essential for achieving successful outcomes and a return to normal function. As our understanding of this condition advances, ongoing research and improved treatment protocols will enhance

clinical management, providing patients with the best possible outcomes.

#### Conflict of Interest

The authors declare no conflict of interest in this study.

#### Acknowledgements

None.

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**Table 1.** Postoperative protocol for various treatments of discoid menisci

Procedure	Immediate postoperative care	The initial phase of physical therapy	Progression timeline	Return to sports
<b>Saucerization or total meniscectomy</b>	Weight-bearing and knee movement are allowed immediately	Ice application for swelling reduction	Quadriceps strength training starts at 2 weeks post-surgery; full knee ROM and strength regained	Eight weeks after the procedure
<b>Saucerization with meniscal repair</b>	Protected weight-bearing with limited knee ROM using a brace	The gradual introduction of progressive weight-bearing	Full motion and weight-bearing within 6 to 8 weeks; typically, it takes 3 to 4 months	There is no specific timeline; subjective criteria determine the return
<b>Total or subtotal meniscectomy with allograft transplantation</b>	Partial weight-bearing with the knee fully extended with a brace by 3 weeks after surgery	The gradual introduction of progressive weight-bearing with a crutch	Full weight-bearing and no-crutch ambulation within 6 to 12 weeks	There is no specific timeline; subjective criteria determine the return

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