# Unstable Type III Wrisberg-type Lateral Discoid Meniscus: All-inside Arthroscopic Repair

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**Background:** The Type III Wrisberg-type represents the rarest subtype of discoid meniscus. It exhibits a normal non-discoid ''C''-shape with possible posterior horn hypertrophy, but meniscotibial ligaments and capsular restraints are lacking, leading to a clinical scenario of knee pain, popping, and catching due to meniscal hypermobility. Moreover, concomitant tears can be present due to repeated meniscal traumas.

**Indications:** Type III Wrisberg-type lateral discoid meniscus with hypermobility, dislocation, or tear.

**Technique Description:** Through standard arthroscopic portals, the meniscus is reduced in its anatomical position (if displaced). Abnormal mobility and anatomy should be noted. All-inside sutures are used in the posterior horn and body to stabilize the meniscus to the capsule and popliteus tendon. In the case of radial tears, horizontal stitches are used.

**Results:** Patients are expected to return to sport approximately 4 to 5 months after the procedure with relief of pain, popping sensation, and knee locking.

**Conclusion:** Arthroscopic all-inside repair is an effective treatment for unstable and displaced Type III Wrisberg-type lateral discoid meniscus. However, the diagnosis can be challenging, especially without frank meniscal dislocation.

**Keywords:** meniscus; lateral; discoid; unstable; Wrisberg-type

## VIDEO TRANSCRIPT

In this video, I will present an overview on the Type III Wrisberg-type discoid meniscus, with its diagnosis and management. Moreover, the detailed description of an all-inside repair and stabilization of the lateral discoid meniscus with a complex radial tear will be presented as well.

The Type III Wrisberg-type represents the rarest subtype of discoid meniscus, with an arthroscopic prevalence of 0.2%. It exhibits a normal non-discoid "C"-shape, with possible posterior horn hypertrophy and altered structure. But the main anatomical feature is lack of meniscotibial ligaments and capsular restraints, with meniscofemoral ligaments as the only posterior stabilizers. The absence of normal posterior attachments predisposes the posterior horn to hypermobility, subluxation, and even real dislocation within the intercondylar notch.

Under normal conditions, the anterior translation of the lateral meniscus is nearly 4 mm. After sectioning the anterior and postero-superior popliteo-meniscal fascicles, the anterior meniscal translation increases nearly 3 mm, however, without being locked in the joint. Only after sectioning the meniscotibial ligaments can the posterior horn of the lateral meniscus be dislocated anteriorly. This situation leads to a suggestive clinical presentation of pain, popping, and fixed irreducible locking.

Generally, the symptoms onset is not well defined, and abnormalities are reported since childhood or adolescence without recalling any traumatic event; moreover, bilateral presentation is possible.

The magnetic resonance imaging (MRI) presentation of the Wrisberg-type discoid meniscus is not specific, and the diagnosis with the meniscus in situ is challenging. Subtle abnormalities can be the lack of meniscotibial ligaments,

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Bracketed and italicized text indicates information not included in the video narration.

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Submitted March 5, 2021; accepted March 10, 2021.

One or more of the authors has declared the following potential conflict of interest or source of funding: S.Z. is an unpaid consultant for Smith & Nephew, Stryker, and DePuy. AOSSM checks author disclosures against the Open Payments Database (OPD). AOSSM has not conducted an independent investigation on the OPD and disclaims any liability or responsibility relating thereto.

Video Journal of Sports Medicine, 1(3), 26350254211006717
DOI: 10.1177/26350254211006717

not visible popliteomiscal fascicles, hypertrophic posterior horn, and intrameniscal signal alteration. When the meniscus is anteriorly displaced, no peripheral rim is present.

*[Several differential diagnosis can be made. The Type I and II discoid meniscus present abnormal meniscal shape, altered MRI signal, and complex lesion patterns. Popliteomeniscal fascicles tears present history of trauma, possible concomitant injuries such as anterior cruciate ligament (ACL) and posterolateral corner (PLC), intact meniscotibial ligaments, and no meniscal displacement. Displaced bucket handle tears present history of trauma, possible concomitant injuries such as the ACL, and the presence of a peripheral meniscal rim.*

*Several treatments have been suggested, such as total meniscectomy, partial meniscectomy, open repair, thermal shrinkage, inside-out suture, all-inside suture with hooks, and all-inside suture with devices.]*

Here, the case of a 16-year-old male football player is presented. The patient had a history of popping and catching since the age of 14 years, no history of major knee sprains or traumas, 1 previous inconclusive arthroscopy, and similar but less severe complaints in the contralateral knee.

The patient presented at our department after an episode of irreducible knee locking occurred during a normal tackle while playing football.

In the coronal view, it is possible to observe the complete displacement of meniscal posterior horn within the intercondylar notch and against the ACL. No peripheral meniscal rim is present, but the capsule is stretched inside the joint. In the sagittal view, the posterior horn is displaced anteriorly bulging against the anterior horn. Alteration of intrameniscal signal is also present, while a posterior peripheral meniscal rim is lacking. On the axial view, it is possible to see the folded meniscus.

No meniscal tissue is present posteriorly and at the level of popliteal hiatus. The shape of the meniscus together with the course of the popliteus tendon resembles the Superman logo. This aspect, which can be named as Superman Sign, can be considered indicative of displaced Wrisberg-type discoid meniscus.

An MRI performed 15 months before is reviewed as well. In the coronal view, a normal meniscal shape and location are noted, but with an incomplete radial tear at the level of the meniscal body. Moreover, meniscotibial connections are not seen. Rather, the space between the meniscus and the capsule present a not homogeneous structure and hyperintense signal. Alteration of intrameniscal signal is also seen. On the sagittal view, the radial tear of the body and the altered signal of posterior horn are seen. On the axial view, the lateral meniscus presents a normal shape; however, a hyperintense film separates the posterior horn from the popliteus tendon, and a small linear tear is seen at the level of meniscal body.

Finally, the MRI of contralateral knee is assessed. On the coronal view, a radial tear is present, mirroring the aspect of contralateral knee. Moreover, lack of meniscotibial ligament and altered peri-capsular signal is present as well. On the sagittal view, the same pattern of tear and intrameniscal signal alteration is seen in both knees. On the axial view, the linear tear is present in the exact same location of contralateral knee. This area can be interpreted as the fulcrum of meniscal folding during meniscal subluxation or dislocation episodes. Therefore, the diagnosis of displaced Wrisberg-type discoid meniscus with a concomitant radial tear is made.

Preoperatively, the patient presents a lack of extension of nearly 30°, with a hard stop, even under anesthesia. Surgery is performed with the patient in supine position, using a standard 30° arthroscopic set and water pump. A supero-medial portal is used for water inflow, a high antero-lateral portal for scope, and a standard antero-medial portal for instruments. All-inside repair is performed with curved Ultra Fast-Fix (Smith & Nephew) and 24° Truespan (Mitek).

At first inspection, the meniscus is seen impinging posteriorly against the ACL. Moving the scope in the lateral gutter with the knee in extension, the classic view of the popliteus tunnel is not seen. Rather, a stretched and inflamed synovia is seen protruding below the lateral femoral condyle.

With the knee in the figure-of-4 position and varus stress, a blunt trocar is used to relocate the displaced meniscus in its anatomical position. The normal "C"-shape of the meniscus excluded the diagnosis of Type I or II discoid meniscus.

A radial tear of the meniscus body is seen, and the partial remodeling of the tear edges suggests a chronic nature, despite the recent dislocation episode. Inspecting the meniscal periphery anteriorly to the popliteal hiatus, a round and smoothed superior margin is noted. Moreover, an inflamed tissue is seen in the location where the anterior popliteo-meniscal fascicle should be normally identified. At this level, abnormal laxity is also seen.

Moving the scope in the lateral gutter, a hypothrofic and irritated popliteus tendon is seen.

However, the popliteomiscal fascicles cannot be identified, and a pathological separation between the popliteus tendon and meniscal rim is seen, filled with inflamed synovia.

The meniscal repair and stabilization address the radial tear. After debriding the tear edges, a curved Fast-Fix is used to perform an all-inside horizontal stitch. The posterior flap is pinched at the level of the popliteus tendon, in order to approximate the tear margins and also firmly stabilize the meniscus, preventing its displacement. After tightening the stitch, the stability of the repair is checked and considered satisfactory upon probing. Placing a suture through the popliteus tendon firmly stabilizes the meniscus.

Second, the posterior horn is checked, and excessive anterior motion is addressed. Another all-inside horizontal stitch is performed, midway between the hiatus and posterior root. The antero-medial portal is used to avoid the injury of neurovascular structures. Attention should be paid to not overtighten the suture. The posterior horn is checked for stability, which is in this case satisfactory. The placement of too many sutures should be avoided in order to not excessively tighten the meniscus, restricting its physiological motion and predisposing to tears.

Finally, a 24° Truespan is used to perform another horizontal suture, anteriorly to the popliteal tendon. The needle curvature of this device eases the suture at the level of the most anterior portion of the meniscus; however, other similar devices can be used.

The meniscus is debrided from any irregularities with a 4.5 mm shaver. The final aspect of the repair and the stability of the sutures are checked. The use of all-inside devices allow to stabilize this hypermobile meniscus approximating the results of an inside-out technique, however, without the needs of additional incisions.

At the end of the procedure, the aspect of the popliteus tunnel is restored. The procedure is completed with the debridement of the synovitis around the ACL and the anterior meniscal root and with microfractures in the intercondylar notch to stimulate the meniscus healing.

Full extension is finally achieved.

At the end of the procedure, the knee is placed in an extension brace. From week 0 to 6, protected weightbearing is prescribed, while passive range of motion (ROM) exercises from 0° to 90° are initiated 10 days after surgery. From week 7 to 12, full ROM and weightbearing are achieved, and muscle strengthening initiated. Return to running was allowed after 3 months, while return to football practice after 5 months. Nearly 2 years after the repair, no further dislocation episodes occurred and pain or popping symptoms were absent. An MRI performed 1 year after the repair showed the anatomical placement of the lateral meniscus on both sagittal and coronal planes, with no peripheral signal alterations and complete healing of the radial tear.

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