

## Fusion of the Posterior Cruciate Ligament with the Meniscomfemoral Ligaments: A Very Rare Anatomical Variant

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### Introduction

Anatomic variations of the Posterior Cruciate Ligament (PCL) are uncommon conditions often associated with other anatomical variations of knee ligaments. These include accessory ligaments,

variations in insertion and origin, agenesis, and the exceedingly rare condition of PCL fusion with the meniscomfemoral ligaments, reported only once in the literature.

## **Objectives**

This study aims to present a clinical case describing the appearance of an extremely rare variant involving the fusion of the posterior cruciate ligament with the meniscomfemoral ligaments. This contributes to enhancing understanding of the diagnostic and surgical management of this condition.

## **Materials and Methods**

Data for this study were obtained through a review of the patient's electronic medical records. A literature review was conducted using the PUBMED and ScienceDirect databases.

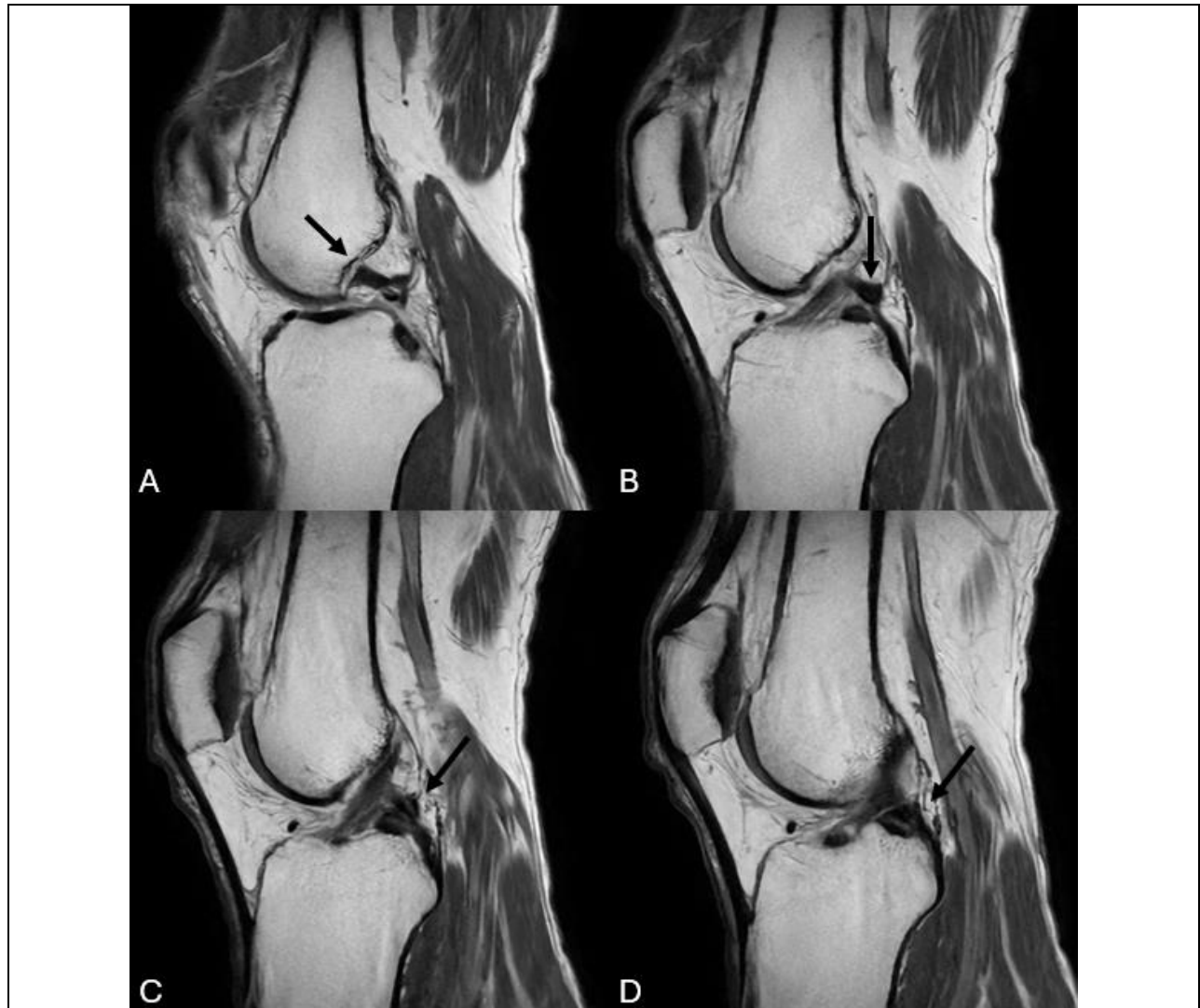
## **Case Presentation**

Male patient, 56 years old, presented to the rheumatology service with complaints of "large lumps" that appeared approximately 3 months ago. Current medical history includes mechanical pain in the elbows and lumps in the extensor region, with worsening on the right side; mechanical pain in the knees and lumps in the medial region, worsening on the left side; chronic mechanical pain in the hip, and difficulty walking due to pain in the lower limbs. The patient also reports irritation in both eyes and increased tearing, denies episodes of red eyes, skin with scattered whitish spots on the upper limbs, denies typical psoriasis skin lesions, denies respiratory symptoms, edema, synovitis, or arthritis. He reports loss of appetite with reduced food intake, normal bowel habits. The patient is a long-time smoker, smoking one pack per day, and frequently consumes alcohol. He denies having hypertension, diabetes, thyroid disorders, anemia, or coagulopathies, but mentions a diagnosis of Chronic Spondylitis 10 years ago, treated with a compounded medication. He also reported having had viral

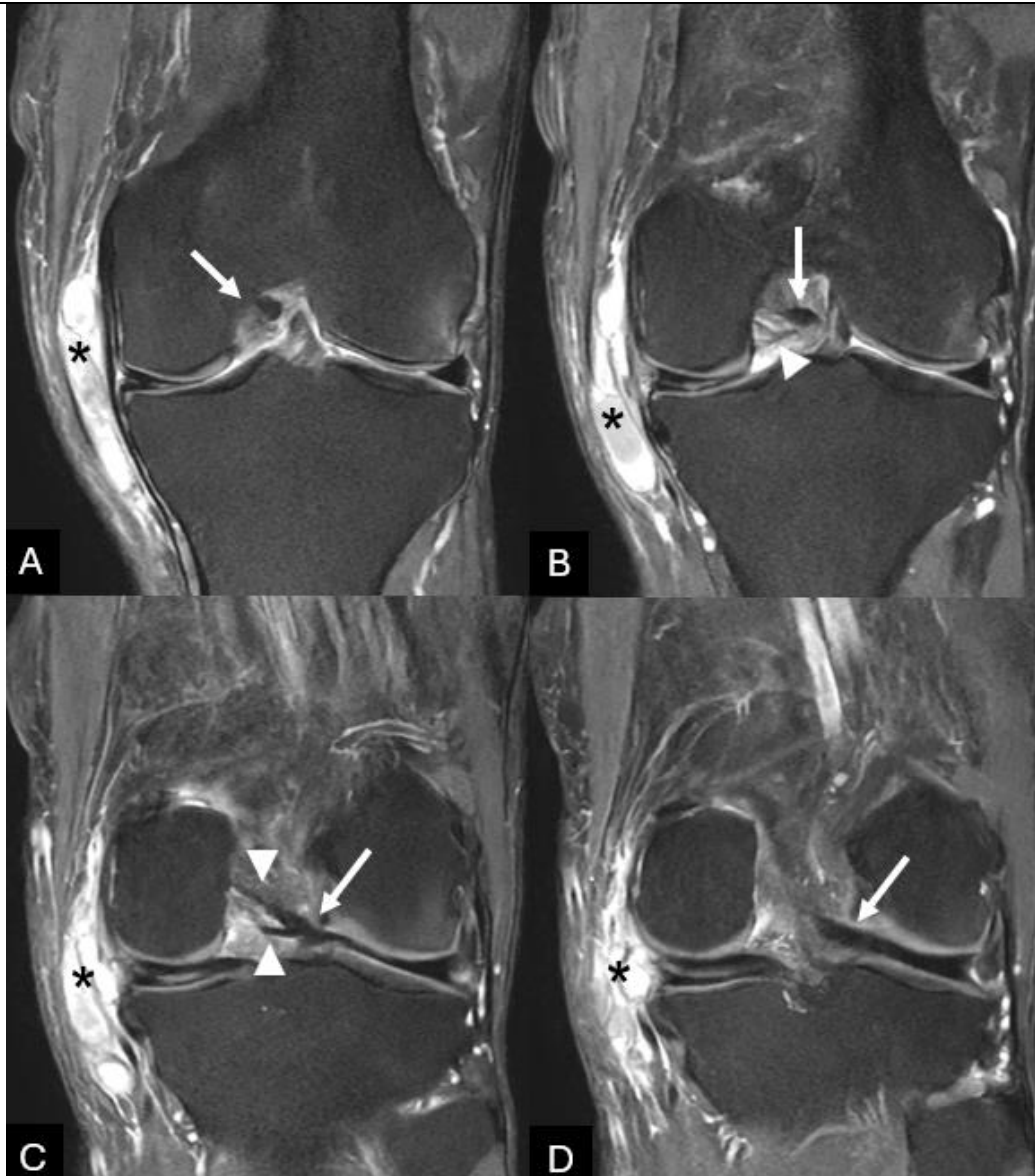
hepatitis in childhood but is unsure of the type, and denies any medication allergies. Laboratory tests were requested, revealing HLA-B27 Positive. On physical examination, the patient is underweight, weighing 52 kg, with a height of 1.55 cm, BMI 21.64, elevated blood pressure, with generalized and pronounced muscle hypotrophy, without edema or synovitis, accentuated dorsal kyphosis, and mild scoliosis. There was pain upon palpation and mobilization of the elbows and knees, slight hyperemia in the left hallux, firm nodules in the right elbow and medial region of the left knee, and a positive Faber's maneuver for the left hip. The diagnostic conclusion was Chronic Ankylosing Spondylitis, HLA-B27 positive, arthralgia, and periarticular nodule in the left elbow and left knee. The prescribed treatment was Dexalgen NF (dexamethasone phosphate with B-complex vitamins) intramuscularly, 3 doses. Magnetic Resonance Imaging (MRI) of the pelvis and knee, as well as an articular ultrasound, was requested. The MRI of the left knee showed a medial meniscus lesion with parameniscal cysts. One of these cysts extended superficially to the medial collateral ligament. Chondral erosions were also observed in the medial femorotibial compartment, with cysts and subchondral bone edema. Additionally, an anatomical variation of the posterior cruciate ligament was noted, with its usual origin at the inner edge of the medial femoral condyle, merging with the fibers of the meniscomfemoral ligaments in its middle third. This fiber complex, in its distal third, is oriented laterally, merging with the posterior root of the lateral meniscus. The exam did not show signs of synovitis or enthesitis. Given the medical findings, the patient was referred to a specialized orthopedic center for surgical correction of the ligaments to establish

adequate knee stability and improve quality of life

(Figure 1 and 2).



**Figure 1:** Sagittal images weighted in PD, in consecutive slices (A-D). A normal-appearing origin of the posterior cruciate ligament (arrow in A) is observed, which, however, shows fusion with the meniscofemoral ligaments (arrow in B). The combined fibers of the posterior cruciate ligament and the meniscofemoral ligaments extend toward the posterior root of the lateral meniscus (arrow in C), where they insert (arrow in D).



**Figure 2:** Coronal T2-weighted images with fat saturation, in consecutive slices (A-D). The posterior cruciate ligament shows a typical origin at the internal portion of the medial femoral condyle (arrow in A). In the posterior slices, it exhibits fusion with the menisofemoral ligaments (arrowheads in B and C). The combined fibers of the posterior cruciate and menisofemoral ligaments display a lateral orientation in their distal portion, with subsequent fusion with the posterior root of the lateral meniscus (arrows in C and D). The image also shows a large paramenisal cyst (asterisks in A-D), associated with a medial meniscus tear.

## Results

Some anatomical variants of the knee may be asymptomatic and are reported as incidental findings

that can significantly impact long-term patient morbidity (1-10).

## Conclusion

This case underscores the critical importance of diagnostic imaging research and surgical follow-up to establish proper knee stability.

**Keywords:** Anatomical variant; Posterior cruciate ligament; Meniscomfemoral ligaments; Fusion; MRI

## Ethical Statement

Informed consent has been provided by the patient for publication of this case report.

## References

1. [Johansson E, Aparisi T. Congenital absence of the cruciate ligaments: A case report and review of the literature. Clin Orthop Relat Res. 1982;\(162\):108-11.](#)
2. [Manner HM, Radler C, Ganger R, Grill F. Dysplasia of the cruciate ligaments: Radiographic assessment and classification. J Bone Joint Surg Am. 2006;88\(1\):130-7.](#)
3. [Liu Y, LI Y, March ME, Kenny N, Xu K, Wang F, et al. Copy number variation in CEP57L1 predisposes to congenital absence of bilateral ACL. Hum Genomics. 2015;9:31.](#)
4. [Katz MP, Grogono BJ, Soper KC. The etiology and treatment of congenital](#)

- [dislocation of the knee. J Bone Joint Surg Br. 1967;49\(1\):112-20.](#)
5. [Gardner E, O'rahilly R. The early development of the knee joint in staged human embryos. J Anat. 1968;102\(2\):289-99.](#)
6. [Anderson CJ, Ziegler CG, Wijdicks CA, Engebretsen L, Laprade RF. Arthroscopically pertinent anatomy of the anterolateral and posteromedial bundles of the posterior cruciate ligament. J Bone Joint Surg Am. 2012;94\(21\):1936-45.](#)
7. [Arthur JR, Haglin JM, Makovicka JL, Chhabra A. Anatomy and biomechanics of the posterior cruciate ligament and their surgical implications. Sports Med Arthrosc Rev. 2020;28\(1\):e1-e10.](#)
8. [Kaelin A, Hulin PH, Carlioz H. Congenital aplasia of the cruciate ligaments. A report of six cases. J Bone Joint Surg Br. 1986;68\(5\):827-8.](#)
9. [Tolo VT. Congenital absence of the menisci and cruciate ligaments of the knee. J Bone Joint Surg Am. 1981;63\(6\):1022-4.](#)
10. [Manner HM, Radler C, Ganger R, Grill F. Dysplasia of the cruciate ligaments: radiographic assessment and classification. J Bone Joint Surg Am. 2006;88\(1\):130-7.](#)

## Citation of this Article

Ruppen IC, Otani LH, de Araujo JD, Ibuki Otani FS, Olivari do Carmo VA, Dallaqua Bitiati LB, Petermann G, da Costa Rosa AR, Cruz GV, Gois GA, Piccoli LR, Duarte VH, Chitolina HM, Panissa LMN, Filho JCP, Macedo AN, Damas Garcia JH, Rodrigues Flamengo PH, Figueiredo Morelli PC and Melo Bandeira ARP. Fusion of the Posterior Cruciate Ligament with the Meniscomfemoral Ligaments: A Very Rare Anatomical Variant. Mega J Case Rep. 2025;8(1):2001-2006.

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