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Clinical Image
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The "Fourth Compartment" of the Knee - A New Paradigm

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Clinical Image

Anatomically the knee is divided to three compartments. Anterior compartment-patellofemoral, medial and lateral tibio-femoral compartments. The traditional tri-compartmental description is referring to the cartilaginous articulating surfaces. Nevertheless, it is not less important to recognize the posterior intra-articular nonarticulating part of the knee as integral to the compartmental division. The anatomic structures bordering the fourth compartment include: posteriorly the joint capsule, anteriorly the intercondylaer notch of the femur and posterior condyls, medially and laterally the gutters, respectively. The presence of the posterior capsule as a thick fibrous divide between the fourth compartment and the extra-articular popliteal fossa with its neurovascular contents further clarify the importance of this new definition [1]. Emphasis on presence and delineation of the fourth compartment may contribute to better understanding of the challenges facing arthroscopic surgery with the inborn difficulties regarding operation in this compartment, as well as contribution to open surgery performed at the back of knee and popliteal fossa, both with a tight interface, yet very different and with meaningful importance [2]. MR imaging clearly demonstrates the limited freedom of instrument maneuvering as demonstrated by the axial image at the level of the joint line (Figure 1). In the next section, only 3.5 mm proximally, the femoral condyls are already visible, creating a tight surgical environment. Arthroscopy in the fourth compartment per say, is rare (Figure 2 and 3). The procedure is published in the literature mostly as technical notes or case reports. Open approach to the fourth compartment in the back of the knee, as in on-lay graft PCL reconstruction, ORIF of PCL avulsion fracture and various SOLs, are reported anecdotally [3]. Therefore, it is important to integrate the concept of the fourth compartment in all basic education so by the time practical skills are applied the picture of its presence content and difficulties are clear [4].

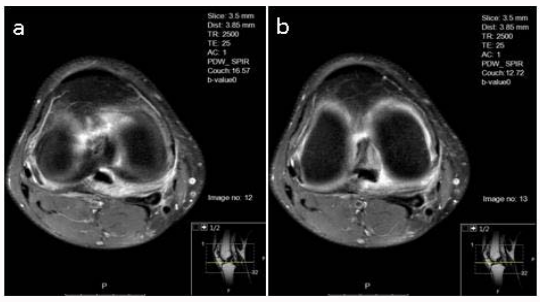

Figure 1: (a) Axial CT at the level of the joint line demonstrating the limited space available at the fourth compartment. **(b)** The following cut 3.5 mm proximally, the femoral condyls are already prominently visible, further limiting the manipulation of instruments.

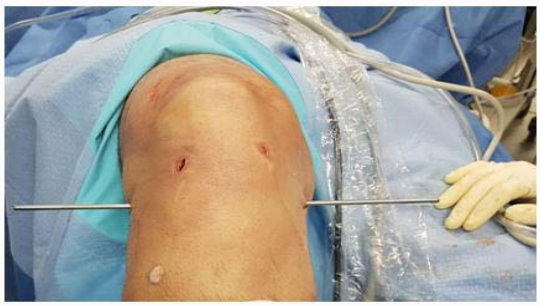

Figure 2: A Wissinger rod introduced from the postero-medial portal to the postero-lateral portal in scope of creating a continuous and interchangeable possibility to inspect the fourth compartment of the knee.

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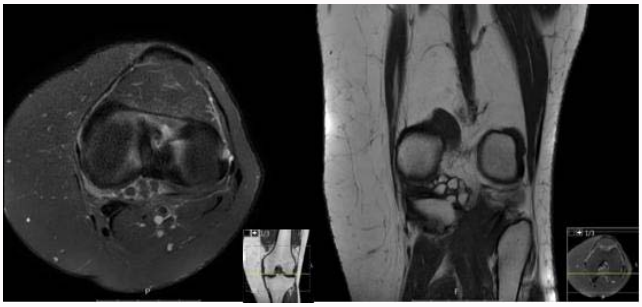

Figure 3: A PDW axial and T1 Coronal MRI demonstrating pathology located entirely in the fourth compartment, an arthroscopy of the fourth compartment" per say" may provide a complete solution.

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