

DIAGNOSTIC VALUE OF MR IMAGING IN INTERNAL DERANGEMENT OF THE KNEE

ESSAY

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By
Nihad Ahmed Hannoura
M.B., B.Ch.

Supervisors

Prof. Dr. Abdel Zaher Hassan
*Professor of Radiodiagnosis
Faculty of Medicine
Ain Shams University*

Dr. Mohamed Zaki
*Lecturer of Radiodiagnosis
Faculty of Medicine
Ain Shams University*

**Faculty of Medicine
Ain Shams University
1993**

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ABSTRACT

This study was designed to determine the diagnostic value of Magnetic Resonance Imaging in internal derangement of the knee.

At first, we started by anatomy of the knee joint, technique of examination, MRI anatomy, pathological spot lights, MRI manifestations then summary and conclusion.

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INTRODUCTION AND AIM OF THE WORK

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- Internal derangements of the knee are very common. Accurate assessment of the nature of these derangements is a prerequisite for appropriate therapy.
- The clinical diagnosis of internal derangements of the knee is difficult and diagnosis is usually performed by means of plain radiography, arthrography, computed tomography and magnetic resonance imaging.
- Magnetic resonance imaging (MRI) proved to be superior in providing soft tissue contrast and in the evaluation of the knee for a wide range of pathological conditions.
- MRI of the knee is a rapid, safe and highly accurate means of non-invasively assessing the status of the knee joints (*Mink et al.; 1988*).

THE AIM OF THIS WORK is to emphasize the role of MR imaging as an accurate means for non-invasive assessment of the internal derangement of the knee.

ANATOMY

ANATOMY OF THE KNEE JOINT

The knee is a synovial joint between the femur and the tibia. The joint can flex or extend like a hinge.

Extension is for propulsion and flexion is used prior to this and also to absorb the shock (by quadriceps) in landing.

In addition, the flexed knee can rotate as in change of direction at speed. This active rotation is a matter of choice, and is not to be confused with the passive and inevitable rotation that occurs in straightening the knee in the "screw-home" mechanism.

During all these movements, the knee is adapted to be weight-bearing and stable in any position (*Last, 1978*).

1- Bony Contours:

The plateau of the tibia possesses two separate articular facets, each slightly concave. The medial facet lies wholly on the upper surface of the condyle, but the lateral facet curves back over the posterior margin of the tibial condyle. This bevelled margin allows withdrawal of the lateral meniscus by the popliteus muscle. The femur has two condyles, separated by a deep notch, but fusing anteriorly into a groove for articulation

with the patella. The lateral ridge of the trochlear groove is very prominent. The curve of the femoral condyles is coma-shaped (in lateral profile). It is flatter on the end of the femur and more highly curved at the free posterior margin of each condyle. The distal surface of the medial condyle is narrower, longer and more curved than the lateral condyle. This is for the screw-home movement. The articulation surface of the patella is divided by a vertical ridge into a large lateral and a small medial surface. The latter is further divided by a vertical ridge into two smaller areas. The large lateral surface glides around in contact with the lateral condyle of the femur in all ranges of flexion. In extension, the area next to it lies on the trochlea, and the most medial of the three surfaces is not in articulation with the femur. In flexion, this surface glides into articulation with the medial condyle, and the middle of the three surfaces lies in the intercondylar notch of the femur (*Last, 1978*).

2- Capsule of the knee joint:

The capsule is a fibrous membrane of variable thickness containing areas of thickening that may be referred to as discrete ligaments. (Fig.1.2) (*Insall, 1984*)

a) Posteriorly:

The capsule consists of vertical fibers that are attached:

- * Above to the margins of the femoral condyles and the posterior margin of the intercondylar fossa.
- * Below to the posterior margins of the tibial condyles and the posterior border of the intercondylar area.

This part of the capsule is blended above on each side with the origin of the corresponding head of gastrocnemius.

Centrally, it is augmented by fibers derived from the tendon of the semimembranosus forming the oblique popliteal ligament. The attachment of the capsule to the posterior surface of the lateral tibial condyle is interrupted and perforated by popliteal tendon (*Gray, 1976*).

b) Anteriorly:

The fibrous capsule is completely absent above the patella and over the patellar area. Elsewhere, it blends indistinguishably with expansions from the vastus medialis and lateralis. The expansions are attached to the margins of the patella and ligamentum patellae and extend backwards on each side as far as the corresponding collateral ligament and downwards to the condyles of the tibia. They form the medial and lateral patellar retinaculae, and the later is further strengthened by the iliotibial tract.

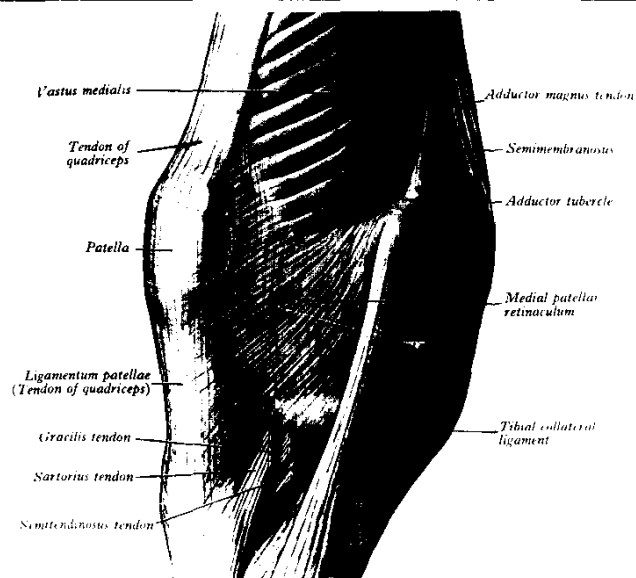


Fig.1: The right knee joint: anteromedial aspect.
(Quoted from Gray, 1976).

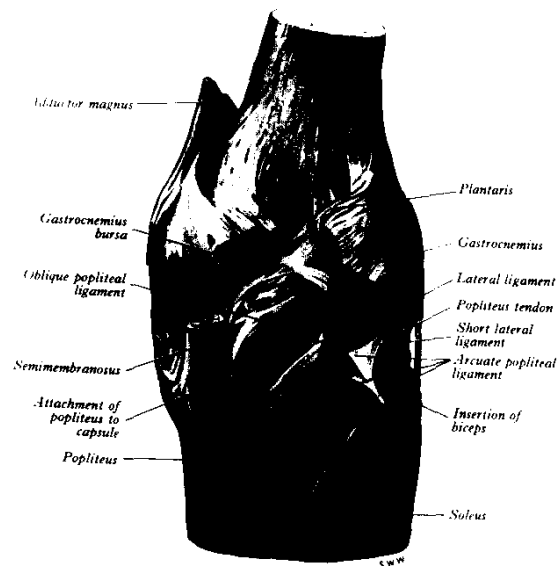


Fig.2: The right knee joint: posterior aspect.
(Quoted from Gray, 1976).