UNIVERSITÄTS KLINIKUM Jena

The world of dynamic knee MRI

Different ways in which kinematic parameters are extracted

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Meniscal Displacement

List of papers:

- Oeveleen , 2024 -> Requires one full lowerlimb scan.
  - Measured: 3D meniscal position and deformation at 0°, 30°, 60°, 90° flexion
  - Method: Static 3D MRI scans at each angle + full lowerlimb scan
  - Used statistical shape models to predict meniscal geometry
  - Calculated point-to-point distances between flexion angles
- Cance , 2024 ->
- Measured: Direction and magnitude of discoid lateral meniscus shift
- Method: Two static MRI scans - after 'clock' and 'pop' movements
- Compared meniscus position between scans to classify instability type
- Validated findings with arthroscopic examination

The relation between meniscal dynamics and tibiofemoral kinematics

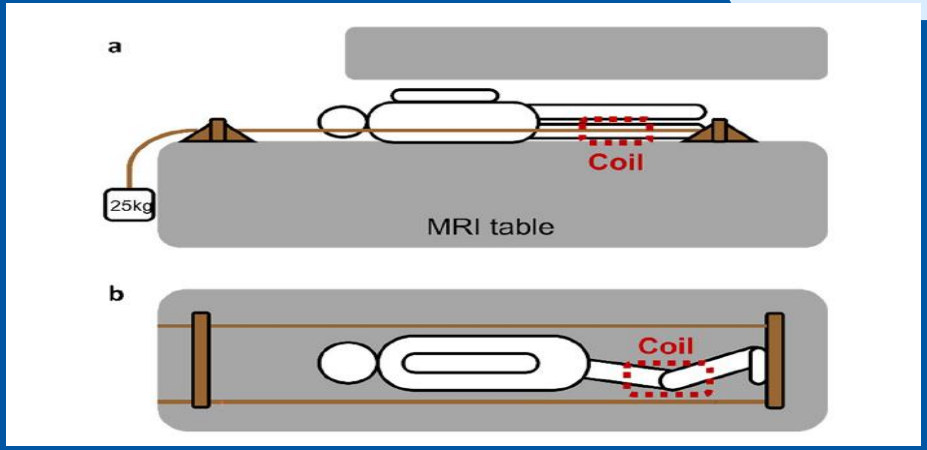
A. Van Oevelen[1,2,3], M. Peiffer[1,2], A. Chevalier[4], J. Victor[1,2], G. Steenackers[3], E. Audenaert[1,2,3,5]✉ & K. Duquesne[1,2,6]

- Proton density weighted 3D sequence
- (0.3571 , 0.3571, 1.5) mm
- Additional coronal overview scans
- (0.7308, 0.7308, 3)
- This overview scan needs the full lowerlimb to create full bone models later

- Medial meniscus anterior horn, lateral meniscus anterior horn and lateral meniscus posterior horn displacement at different degrees of knee flexion (0, 30, 60, 90)

- Subjects positions in lateral decubitus (lying on their sides) on the MRI table
- Foot of the dominant leg pressed against a wooden bar
- A weight of 25 kgs attached to the wooden bar to simulate knee joint loading
- Scans were taken at four angles.
- Knee flexion angle was approximated using a goniometer**
- Additional coronal scan taken at 0 degree flexion

Oeveleen, 2024



- Proton density weighted 3D sequence
- (0.3571 , 0.3571, 1.5) mm
- Additional coronal overview scans
- (0.7308, 0.7308, 3)

- Use of Statistical Shape Models
- Use the overview scan and SSM .. Fit them to the MRI data to obtain full bone models.
- Use the full bone models to analyse the partial scans.

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