

## Does Medial Meniscal Extrusion Precede the Onset of Radiological Osteoarthritis of the Knee? A Case Cohort Study of 946 Knees. Data From the Osteoarthritis Initiative.

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### Summary:

This case cohort study using prospectively gathered data from the Osteoarthritis Initiative demonstrates that MRI evidence of meniscal extrusion can be used as an early warning flag to detect people at risk of developing radiological OA of the knee in the next 48 months.

### Abstract:

#### Background:

In cross sectional studies of patients drawn from large longitudinal cohorts of patients followed for knee symptoms, meniscal tears and damage are found to be as high as 60% in those with asymptomatic knees but radiological signs of arthritis. In those with symptomatic and radiological knee arthritis the incidence rises to 63%. Longitudinal human studies in those who have had surgical partial meniscectomy suggest that the development of medial compartment OA is more common than in controls. Animal models show that defunctioning the medial meniscus leads to the development of medial compartment OA. Some studies have suggested a relationship between extrusion and knee pain in those with knee OA but others have found no correlation between degree of extrusion and volume of cartilage loss. These studies suffer from their retrospective nature, small numbers, lack of prospective sequential imaging, and lack of normal controls. The chronological sequence of meniscal extrusion in the development of radiological OA has not been determined. The primary aim of this study was to determine the whether medial extrusion precedes the radiological development of knee OA.

#### Methods:

A case cohort study using prospectively gathered data from the Osteoarthritis Initiative. We identified a cohort of 384 patients with no evidence of radiological OA at recruitment who developed radiological OA knee as defined by the Kellgren and Lawrence Classification over a 48 month period (Cases). A power analysis was performed based on pilot data and these Cases were matched to 562 non progressors (Controls) who had no radiological evidence of OA at recruitment and did not develop OA over the 48 month period. MRI scans of all knees were obtained at recruitment and at 48 months. Two observers who were blinded to the radiological OA status of the knee used a validated assessment MRI analysis technique of meniscal extrusion to determine the meniscal extrusion at baseline and 48 months in all knees. A 2x2 table was constructed and a Chi squared analysis was performed.

#### Results:

The presence of Meniscal Extrusion in normal knees predicts the onset of radiological OA at 48 months ( $p=0.000$ )

#### Discussion:

This study suggests that meniscal extrusion precedes the development of osteoarthritis of the knee. Until now the

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chronological relationship between meniscal extrusion and knee osteoarthritis has not been defined. Studies suffer from being underpowered and having a lack of prospective sequential imaging. This study, using data from the largest prospective sequential MRI imaging cohort currently being followed, has been able to overcome some of these obstacles and demonstrates the chronological relationship between the onset of radiological OA and medial meniscal extrusion over a 48 month period. This study suggests that MRI evidence of meniscal extrusion can be used as an early warning flag to detect people at risk of developing radiological OA of the knee in the next 48 months.