

## Intraarticular Contact Pressures After Anterior Horn Lateral Meniscus Tear, Repair and Meniscectomy

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### Summary:

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### Abstract:

#### Background:

The purpose of this study was to describe the effect of anterior horn lateral meniscus (AHLM) tears on tibiofemoral contact forces and the ability to restore normal parameters with repair in contrast to meniscectomy.

#### Hypothesis:

We proposed that tears of the AHLM would cause a significant increase in peak contact force in the lateral compartment of the knee. We suspected that by repairing the meniscal tear, the peak contact forces would be restored to pre-tear levels and that partial meniscectomy would also be expected to increase peak contact forces and pressures.

#### Study Design:

Our study is a biomechanical controlled laboratory study.

#### Methods:

Ten fresh-frozen cadaveric knees (49.1 years; +/- 5 years) were used. Two knees were used to finalize the test setup, leaving a total of eight knees. A Tekscan 4011 pressure sensor was sutured in the lateral and medial compartments of the knee joint. The specimens were fixed to an ElectroPuls E10000 test system (Instron, Norwood, MA) and subjected to a load of 1000 N at 0° and 30° of flexion. The test was repeated for the intact knee, simulated tear, repaired meniscus, and partial meniscectomy in that sequence. A 2 cm peripheral meniscal tear was simulated in the anterior horn of the lateral meniscus. Vertical tears were repaired in each knee using a knotless bony anchor device with a technique used by the senior author in practice. Data was analyzed by Student's paired t-test ( $p < 0.05$ ). Peak pressure, peak force and contact area were recorded for each specimen in its various conditions. Results: Peak force in the lateral compartment was significantly increased at 0° of knee flexion from 37 N intact to 47 N after the tear ( $p = 0.046$ ) and 56 N ( $p = 0.001$ ) post meniscectomy. It was also increased at 30° flexion from 37 N intact to 55 N ( $p = 0.003$ ) after meniscectomy. There was no significant difference in peak force between the intact and repaired states. That is, meniscal repair restored peak force to the intact state. At 0° of knee flexion, the peak pressure of the lateral meniscus was significantly increased from 1.1 Mpa in the intact state to 1.9 Mpa after meniscectomy ( $p = 0.022$ ). Contact area was significantly decreased in both the repaired and meniscectomy groups ( $p < 0.05$ ). The peak force in the medial compartment was significantly increased at 0° of knee flexion from 29 N intact to 48 N after partial lateral meniscectomy ( $p = 0.041$ ).

#### Conclusions:

This cadaveric study exhibited a significant increase in tibiofemoral peak forces with both AHLM tears as well as resection of the torn tissue. We also showed an increase in peak contact pressure after meniscectomy. An increase in peak contact pressure has been described as a likely cause of cartilage degeneration. With a knotless bony anchor repair technique, the pre-injury condition peak forces were restored to normal, suggesting the importance of repairing tears of the AHLM when possible.