

Complete Hip Labral And Capsular Repair May Not Be Sufficient To Restore Normal Distractive Stability

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INTRODUCTION: It is unclear what the hip capsule's and labrum's relative contributions are towards distractive stability. The purpose of this study was to evaluate the change in hip distractive stability after a capsulotomy, labral tear, and simultaneous repair of both structures. The hypothesis was that a complete capsular repair and labral repair would restore the hip distractive stability to near-normal levels.

METHODS: Institutional ethics review board approval was obtained required for the laboratory investigation of deidentified cadaveric specimens (HSREB #121404). Ten fresh-frozen human cadaveric hips were analyzed using a materials testing system to measure the distractive force and distance required to disrupt the hip suction seal in sequential conditions including (1) a native intact capsule and labrum, (2) 2 cm or 4 cm interportal capsulotomy (IPC; 5 hips each), (3) labral tear, (4) T extension, (5) labral repair, (6) T extension repair, and (7) IPC repair. Each specimen was examined at 0° flexion, 45° flexion, and 45° flexion with 15° internal rotation. Statistical analysis was conducted through a two-way mixed repeated measures model to determine the effect of the soft tissue condition, hip position and length of IPC on the distractive force required to disrupt the suction seal.

RESULTS SECTION: There was a significant main effect of soft tissue condition on hip distractive stability ($P < 0.001$). Fixed pairwise comparisons revealed a significantly higher distractive force required to rupture the suction seal in the intact condition compared to all other conditions. The IPC condition required significantly higher distractive force in isolation compared to when combined with a labral tear, T extension, or labral repair. There was no significant main effect of hip position, ($P = 0.159$) or length of IPC ($P = 0.465$). The distractive distance did not demonstrate a clear pattern between soft tissue condition or hip position.

DISCUSSION: The main finding of this study was that the distractive stability of an intact hip capsule and labrum could not be completely restored once the soft tissues were violated, despite complete repair. Limitations were those common to all biomechanical cadaveric studies such as no tissue healing potential and iatrogenic pathologic tissue states. In the biomechanical cadaveric model, the distractive resistance of an intact hip capsule and labrum was not restored once the soft tissues were violated, despite complete repair.

SIGNIFICANCE/CLINICAL RELEVANCE: Complete capsular repair with concomitant labral repair may not be adequate to restore distractive hip stability following hip arthroscopy. Therefore, post-operative precautions should continue to be utilized to reduce distractive forces applied to the joint in the early post-operative period.

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