Capsular defects, if not reconstructed, can lead to less stable hips

Lorenzo Fagotti
Bryson R. Kemler
Hajime Utsunomiya
Hunter W. Storaci
Joseph J. Krob
Alex W. Brady
Travis Lee Turnbull
Marc J. Philippon

Video Abstract

Keywords: capsule, capsular reconstruction, iliotibial band allograft, distractive stability, hip joint, AJSM, ligaments, labrum, labral suction seal, Steadman Philippon Research Institute, biomechanics, biomechanical, capsular insufficiency, iatrogenic instability, hip arthroscopic surgery, force-displacement curve, distraction, distractive force, hip instability, hip suction seal

Posted Date: September 20th, 2019

DOI: <https://doi.org/10.21203/rs.2.15045/v1>

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Abstract

Hip arthroscopy has gained worldwide popularity, but to achieve the best patient outcomes, some aspects of the surgery still need improvement. That includes better understanding of intraoperative labral and capsular management, particularly in the setting of a capsular defect. A new study in The American Journal of Sports Medicine aims to fill this gap. In the study, a research team from the Steadman Philippon Research Institute looked at the roles of the capsule and labral suction seal in maintaining distractive stability of the hip. The researchers specifically focused on the biomechanics of capsular reconstruction. To create a biomechanical model, capsular defects were made in eight cadaveric hips. Each defect was reconstructed using an iliotibial band allograft. Distractive stability was tested in the intact state, followed by the capsular defect state and subsequent capsular reconstruction state. Distractive stability was defined as the force needed to axially distract the femoral head out of the acetabulum. The team found that hips bearing a capsular defect showed significantly less distractive stability compared to the same hips in the intact state. But reconstruction restored approximately 76% of the resistance to axial distraction – to a level that didn't significantly differ from the intact state. They also found that hip distractive stability occurs through two separate phases: a labral suction seal phase and a capsular stability phase. These phases can be clearly visualized on a force-displacement curve with the labral suction seal providing the primary restraint at small displacements and the capsule taking over at larger displacements. In the setting of a capsular defect, the end of the labral suction seal phase corresponded to an audible squelch, along with an abrupt separation of the labrum and femoral head, suggesting a rupture of the labral suction seal. Overall, in the setting of an irreparable capsular defect, the findings support that surgical reconstruction of the hip capsule is needed to provide robust resistance to distractive forces. This conclusion has important implications for postoperative rehabilitation and the prognosis of patients undergoing hip arthroscopy. To achieve the best outcomes, capsular reconstruction should be considered a viable option for patients with irreparable or symptomatic capsular defects.