

Patient-Reported Outcomes of Capsular Repair Versus Capsulotomy in Patients Undergoing Hip Arthroscopy: Minimum 5-Year Follow-up—A Matched Comparison Study

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Purpose: To elucidate whether capsular closure during hip arthroscopy affected patient outcomes over midterm follow-up. **Methods:** Between 2008 and 2011, data were prospectively collected and retrospectively reviewed on patients who underwent hip arthroscopy. Patients were then matched for age, gender, worker's compensation, body mass index, and acetabular coverage. The inclusion criteria were capsular repair or unrepaired capsulotomy, lateral-center edge angle $\geq 18^\circ$, and minimum 5-year follow-up. The exclusion criteria were previous hip surgery or conditions and Tönnis grade > 1 . Patient-reported outcome scores (PROs) included modified Harris hip score (mHHS), nonarthritic hip score, hip outcome score sport-specific subscale, and visual analog score for pain, which were collected preoperatively, at 3 months, and annually thereafter. Minimal clinical important difference (MCID) and patient acceptable symptomatic state (PASS) for both groups were analyzed. Patient satisfaction was noted as well as any complications, secondary surgery, and conversion to arthroplasty. **Results:** Minimum 5-year follow-up was available for 82.5% (287 of 348) hips that met the inclusion criteria and were eligible for matching. Ultimately, 65 patients who underwent capsular repair could be matched in a 1:1 ratio to 65 patients with release. Both groups had significant improvements in all mean PROs. The repair group had significant improvement of mean PROs, visual analog score, and patient satisfaction at both 2-year and minimum 5-year follow-up. The unrepaired group had a significant decrease in mHHS ($P = .001$) and patient satisfaction ($P = .01$) between 2- and 5-year follow-up. Despite decreasing mHHS in the repair group between 2- and 5-year follow-up, both groups met the MCID and PASS criteria with no significant difference between them. More patients in the release group required conversion to hip arthroplasty (18.5% vs 10.8%). Subgroup analysis considering various perioperative factors confirmed this trend. Rate of revision arthroscopy was the same in both groups (15.4%). Complication rate was low (4.6% vs 6.4%) in both groups. **Conclusions:** Patients undergoing hip arthroscopy and who have minimal or no arthritis have significant short-term improvement, whether the capsule is closed or left unrepaired. However, at midterm follow-up, patients who had unrepaired capsules had deterioration in mHHS as well as a higher rate of conversion to arthroplasty, even when controlling for various perioperative variables. Despite this, patients in both groups met the MCID and PASS criteria. This study suggests that routine capsular closure may lead to more consistently durable outcome in patients undergoing hip arthroscopy, but also that individual patient pathology may dictate capsular management. **Level of Evidence:** Level III, retrospective comparative study.

Stability of the hip joint relies on an intricate relation between the capsuloligamentous restraints, the labrum, and bony morphology of the proximal femur and

acetabulum.¹⁻⁴ Routine access to the hip joint during arthroscopy commonly involves selective capsulotomy and even capsulectomy.⁵⁻⁸ Anatomic studies have shown

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that anterior, interportal capsulotomy traverses the width of the iliofemoral ligament.⁹ This results in increased hip range of motion and potential instability of the joint.^{10,11} This has been emphasized in studies showing capsular deficiencies as a potential reason for revision surgery¹² and iatrogenic instability.¹³⁻¹⁵ There continues to be debate as to the role of capsular repair as an essential part of an arthroscopic hip procedure.^{16,17} Many authors have shown that capsular repair or plication has resulted in improved hip stability, biomechanics, and normalization of hip range of motion.^{10,11,17,18} Still, other studies suggest that leaving a capsulotomy unrepaired does not necessarily result in worsened clinical outcomes.¹⁹ Furthermore, unrepaired capsulotomy and capsulectomy may, in some instances, be therapeutic in the management of contracture or adhesive capsulitis and for osteoarthritis of the hip.²⁰⁻²³ The purpose of this study was to elucidate whether capsular closure during hip arthroscopy affected patient outcomes over the midterm. We hypothesized that patients with unrepaired capsulotomies after hip arthroscopy would have progressive deterioration of initial improvements and potentially higher conversion to hip replacement.

Methods

Patient Selection

Between February 2008 and February 2011, data were prospectively collected and retrospectively reviewed for all consenting patients who underwent hip arthroscopy at our institution. The inclusion criteria were as follows: patients of all ages who underwent hip arthroscopy for the treatment of labral tear who had documented capsular release or closure (repair or plication), with plication defined as placement of 3 or more capsular sutures, a lateral-center edge angle (LCEA) $\geq 18^\circ$, and who had a minimum of 5-year follow-up. The exclusion criteria included previous ipsilateral hip surgery or hip conditions such as Legg-Calve Perthes disease, avascular necrosis, slipped capital femoral epiphysis, or preoperative Tönnis osteoarthritis grade >1 . This study was granted approval by the Institutional Review Board.

Matching Process

Patients who underwent capsular plication were pair-matched to patients who underwent capsular release. The matching criteria are summarized in [Table 1](#) and are as follows: age at surgery within 5 years, gender, body mass index within 5 points, worker's compensation, and one of the 3 groups based on preoperative LCEA (18° to 25° , 26° to 39° , and $>39^\circ$). Patients were systematically matched until no further matches could be made.

Intraoperative Findings and Procedures Performed

All hips were treated arthroscopically in a modified supine position as previously described by Domb

et al.²⁴ Routine, transverse, interportal capsulotomy was performed between the mid-anterior and anterolateral portals for visualization and instrument access. Systematic evaluation of the joint was performed and recorded. In the early stage of the senior author's (B.G.D.) practice, routine capsular closure was not undertaken as it was in the latter stages. Capsular plication was generally performed for patients with generalized ligamentous laxity as defined by Beighton's criteria or in patients with borderline acetabular dysplasia (LCEA 19° to 24°). The intraoperative finding of femoroacetabular impingement, as defined by cam or pincer morphology, or both, was documented. The type of labral tear was evaluated and graded according to the Seldes classification.²⁵ The acetabular cartilage was evaluated and graded according to the acetabular labrum articular disruption (ALAD) classification.²⁶ This classification grades the acetabular labral integrity from 0 to 4 as follows: 0, intact labral cartilage; 1, wave sign or carpet delamination; 2, early peel or small cartilage flap; 3, large cartilage flap; 4, complete cartilage loss with exposed bone. Femoral head articular cartilage was graded according to the Outerbridge classification.²⁷ The ligamentum teres was evaluated according to Villar and Domb classifications.^{28,29} In addition to capsular management, arthroscopic procedures performed included labral repair, partial debridement, resection, and reconstruction. Additional procedures performed included acetabuloplasty, femoroplasty, ligament teres debridement, iliopsoas fractional lengthening, loose body removal, trochanteric bursectomy, microfractures, and gluteus medius repair.

Outcomes Collection

Patients were prospectively assessed preoperatively and postoperatively using the modified Harris hip score (mHHS), nonarthritic hip score (NAHS), and hip outcome score sport-specific subscale (HOS-SSS) at 3 months, 12 months, and annually thereafter. Pain was documented on the visual analog scale (VAS) (0, no pain; 10, extreme pain). Patient satisfaction with the surgery was recorded (0, not satisfied at all and 10, completely satisfied). Complications that occurred after surgery were recorded. Need for revision arthroscopy and conversions to total hip arthroplasty (THA) were compared.

Table 1. Matching Criteria

Age \pm 5 yr
Gender
BMI \pm 5
Worker's compensation case
Preoperative LCEA (Group I: 18° to 25° , Group II: 26° to 39° , Group III: $>39^\circ$)

BMI, body mass index; LCEA, lateral-center edge angle.

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