Patients Undergoing Hip Arthroscopy with Either Periportal or Puncture Capsulotomy Demonstrate Favorable Outcomes: A Systematic Review

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INTRODUCTION: When performing hip arthroscopy, capsulotomy is first required to gain access to the hip joint. Common techniques include interportal and T-capsulotomies. However, these capsulotomies inevitability disrupt the iliofemoral ligament, which can result in capsuloligamentous instability and increase the risk for complications including dislocation, pain, microinstability, and heterotopic ossification if not properly repaired. An alternative approach, periportal or puncture capsulotomy, provides access to the hip joint through small portals, largely preserving the capsule and iliofemoral ligament. In periportal capsulotomy, two portals are slightly dilated but not connected, while in puncture capsulotomy, four to five punctures of the capsule are created without any dilation. These techniques may provide a capsulotomy option that preserves the structural integrity of the hip capsule while still providing full access to the joint. However, few studies that have reported outcomes of these techniques. The purpose of this review was to provide an aggregate of outcomes in patients undergoing hip arthroscopy using either periportal or puncture capsulotomy.

METHODS: This review followed the Preferred Reporting Items for Systematic Reviews and Meta-Analysis (PRISMA) guidelines. This study was registered in Prospero prior to initiation. Pubmed, Cochrane Trials, and Scopus were searched in October of 2023 using the following string: (capsul* OR puncture OR periportal) and (hip OR femoroacetabular impingement) AND (arthroscop*). Articles were included if they reported pre-operative and minimum 2-year follow-up patient-reported outcomes (PROs) in those who underwent periportal or puncture capsulotomy and were written in English. Animal studies, biomechanical studies, case reports, opinion articles, review articles, technique articles, and articles that did not report minimum 2-year PROs were excluded. PROs that were reported in three or more studies underwent further analysis with forest plots and heterogeneity was evaluated with I^2.

RESULTS: Five studies were included in this systematic review, with four utilizing periportal capsulotomy and one reporting on puncture capsulotomy. All studies were conducted between 2013 and 2019, and average age of patients ranged from 29.7 years to 37.9 years. Three studies reported mHHS, and of those, the average pre-operative modified Harris Hip Score (mHHS) ranged from 54.6 to 67.5, while the minimum 2-year follow-up scores ranged from 84.9 to 88.5. Improvement in mHHS ranged from 21 to 32.6. Heterogeneity was calculated for the mHHS, with I^2 being 97%. Clinical benefit rates for patients undergoing puncture capsulotomy were 81.6%, 64.4%, and 50% for the minimal clinically important difference, patient acceptable symptom state, and substantial clinical benefit for the mHHS, respectively.

DISCUSSION: This systematic review found that patients undergoing periportal or puncture capsulotomy demonstrate improved outcomes at minimum 2-year follow-up. All three studies that reported mHHS demonstrated statistically significant improvement at 2-year follow-up. However, certain limitations must be acknowledged. First, the studies were retrospective and demonstrated considerable levels of heterogeneity. Second, two studies were from the same institution with overlapping study periods, and it is possible that there was patient overlap. Third, low levels of evidence included in this review may introduce bias and warrant randomized control trials to confirm initial findings.

CLINICAL RELEVANCE: Periportal and puncture capsulotomy are effective capsulotomy options in hip arthroscopy in select patient populations.

IMAGES AND TABLES:

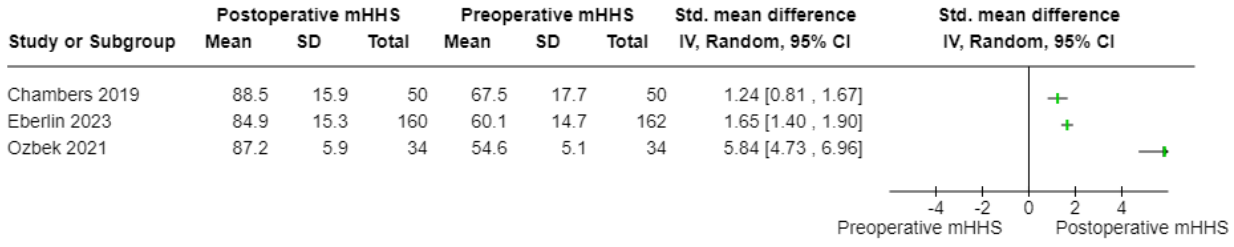

Figure 1. Forest Plot for mHHS after periportal (Chambers and Ozbek) or puncture (Eberlin) capsulotomy