# Influence of Capsular Repair Versus Unrepaired Capsulotomy on 2-Year Clinical Outcomes After Arthroscopic Hip Preservation Surgery

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**Purpose:** The primary objective of this study was to determine whether capsular management technique influences clinical outcomes at a minimum of 2 years after arthroscopic hip preservation surgery. **Methods:** A retrospective review of prospectively collected data was conducted to determine the relative influence of 2 capsular management strategies on clinical outcomes: unrepaired capsulotomy (group A) and capsular repair (group B). Four hundred three patients who had undergone arthroscopic hip preservation surgery met the inclusion criteria and had 2-year outcome data available. All patients completed 4 patient-reported outcome (PRO) questionnaires preoperatively and at a minimum of 2 years' follow-up. These included the Hip Outcome Score—Activities of Daily Living (HOS-ADL) and Hip Outcome Score—Sport-Specific Subscale (HOS-SSS) subsets, Non-Arthritic Hip Score (NAHS), and modified Harris Hip Score (mHHS). **Results:** Group A included 235 patients and group B, 168. The mean age of all patients at final follow-up was 36.9 years. Patients in group A were significantly older (42.3 years *v* 29.4 years, $P < .0001$) and had a significantly higher body mass index (26.8 kg/m$^2$ *v* 22.9 kg/m$^2$, $P < .0001$) compared with group B. In addition, female patients were more likely than male patients to undergo capsular repair (136 female patients *v* 32 male patients, $P < .0001$). Patients in group A also showed greater chondral damage by acetabular labrum articular disruption classification ($P = .0081$) and reduced preoperative PROs (HOS-ADL of 60.5 *v* 66.0, $P = .087$; HOS-SSS of 37.0 *v* 46.4, $P = .0002$; NAHS of 54.6 *v* 62.2, $P < .0001$; mHHS of 58.7 *v* 64.4, $P = .0009$; and visual analog scale score of 6.3 *v* 5.84, $P = .028$). All PROs showed statistically significant improvements for both groups at a minimum follow-up of 2 years (HOS-ADL, 60.5 to 82.2 in group A and 66 to 86.1 in group B; HOS-SSS, 36.9 to 67.3 and 46.4 to 71.2, respectively; NAHS, 54.6 to 79 and 62.2 to 82.8, respectively; visual analog scale score, 6.3 to 3.1 and 5.8 to 2.9, respectively; and mHHS, 58.7 to 81 and 64.4 to 83.8, respectively; $P < .0001$ for all differences). Furthermore, group B showed greater overall improvements than group A for the HOS-ADL ($P = .03$) and NAHS ($P = .03$) on uncorrected univariate analysis, but significance was lost once we controlled for confounding variables. **Conclusions:** Arthroscopic capsular repair, used in conjunction with arthroscopic hip preservation surgery, appears to be safe and did not negatively influence clinical outcomes in this study. When confounding variables were controlled for, the use of capsular repair did not show clinically relevant superiority over the use of unrepaired capsulotomy. **Level of Evidence:** Level IV, therapeutic case series.

The hip joint capsule is a vital contributor to native joint stability, complementing osseous constraints and periarticular soft-tissue stabilizers, which provide static restraint and dynamic force coupling to the intact hip joint.[1-9] The capsuloligamentous envelope is composed of the iliofemoral, pubofemoral, and ischiofemoral ligaments, in addition to the zona orbicularis and iliocapsularis.[1-9] Capsular anatomy has been extensively mapped out, and its biomechanical role defined, in several anatomic studies.[3-5,7-9]

The relative importance of the hip joint capsule is believed to depend largely on the volume, morphology, and version of the quasihemispheric acetabulum and

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proximal femur, as well as the biology of the surrounding connective tissues.[1,2,6,10] This marriage of complementary bony and soft-tissue restraints has been used to define a "stability index," which has been used to predict microinstability and attrition of the ligamentum teres.[11,12] Structural instability of the hip, resulting from acetabular dysplasia or alterations in proximal femoral version, may further potentiate capsular attenuation by increasing demand on the capsuloligamentous constraints.[13] Capsular insufficiency and altered joint mechanics may then lead to an augmented shear vector across the articular cartilage and contribute to early joint degeneration.[1,2,6,13] In clinical studies, unaddressed capsular laxity represents a common cause for failure of primary arthroscopic hip surgery and a frequent indication for revision surgery.[14-16]

Traditionally, hip arthroscopists have used strategic capsulotomies or focal capsulectomy for atraumatic entry into the joint and effective mobility within the central and peripheral compartments.[17] Some surgeons use only a longitudinal 12- to 3-o'clock incision, made primarily through the iliofemoral ligament, whereas others extend their capsular incision in a T or H fashion to gain further access to the more distal aspect of the femoral neck.[18,19] Subsequent debridement of capsular leaflets produces a focal triangular capsulectomy.

Capsular entry points have historically been left unrepaired, without significant concern for iatrogenic instability. Arguments supporting the use of unrepaired capsulotomy include a lack of convincing evidence that doing so negatively influences patient outcomes and a belief that a "pseudocapsule" re-forms, helping to maintain native joint stability. Furthermore, proponents of unrepaired capsulotomy cite a potential therapeutic advantage gained by capsular release, as well as concern for postoperative stiffness after an attempt at repair.[20-24]

Recently, there has been a growing focus on preserving or restoring capsular integrity through a more judicious approach to capsular management or through arthroscopic repair techniques.[1,2,4-7,21,25-27] Advocates of capsular repair argue that even if a pseudocapsule forms, it is composed largely of fibrous scar tissue, with poorer compliance and biomechanical properties. A growing number of iatrogenic instability events are emerging in the literature, ranging from joint subluxation to frank dislocation to "rapidly progressive osteoarthritis" after hip arthroscopy.[28-32] Furthermore, Myers et al.[26] showed that labral repair alone does not adequately restore native hip joint mechanics without concomitant capsular repair. Thus any biomechanical advantage gained through labral repair is minimized or negated without proper capsular integrity and tension.

Although many clinical outcome studies report favorable short-term results after hip preservation surgery, there is a demonstrable decline with longer-term follow-up.[33] As surgeons strive to produce a more durable long-term solution for nonarthritic or early arthritic adult hip pain, it is plausible that surgeon choice of a particular capsular management strategy may play a role in determining clinical outcomes. The primary objective of this study was to determine whether capsular management technique influences clinical outcomes at a minimum of 2 years after arthroscopic hip preservation surgery. We hypothesized that the use of capsular repair performed at the conclusion of arthroscopic hip preservation surgery would positively affect patient-reported clinical outcomes compared with those undergoing no capsular repair.

## Methods

A retrospective review of prospectively collected data was conducted to determine the relative influence of 2 capsular management strategies on clinical outcomes. Institutional review board approval was granted before data collection and analysis. All patients within the senior author's (B.D.G.) database, from the time of its inception, were considered for the study if they satisfied the inclusion and exclusion criteria. Four hundred three patients who had undergone arthroscopic hip preservation surgery met the inclusion criteria and had 2-year outcome data available. The inclusion criteria were as follows: patients able to consent to participation in the study, age 18 to 65 years, English speaking, intra-articular hip pathology amenable to arthroscopic treatment as a primary procedure, follow-up of at least 2 years, and clear documentation in the available operative notes of which capsular procedure was selected. The exclusion criteria were as follows: extra-articular work only without concomitant access to the intracapsular joint space; non—English speaking; follow-up of less than 2 years; age younger than 18 or older than 65 years; inability or objection to participation; previous hip condition (prior surgery, acetabular fracture, avascular necrosis, Legg-Calvé-Perthes disease, or global morphologic abnormality requiring surgical dislocation); fibromyalgia; documented systemic connective tissue disease (e.g., Ehlers-Danlos syndrome); generalized or focal neuromuscular disorder; synovial chondromatosis; Tönnis grade of 2 or greater; labral reconstruction; or ligamentum teres reconstruction.

The associations of patient characteristics and surgical procedures with 2-year outcome measures were evaluated. Primary patient-reported outcomes (PROs) included the modified Harris Hip Score (mHHS), Hip Outcome Score—Activities of Daily Living (HOS-ADL) and Hip Outcome Score—Sport-Specific Subscale (HOS-SSS) subsets, Non-Arthritic Hip Score (NAHS), visual analog scale (VAS), and patient satisfaction scale. Information on grade of chondral injury (femoral or acetabular sided) and acetabular labrum articular disruption classification were also included. Cohort groups were identified based on capsular management strategy. Group A was defined as the cohort of patients who underwent arthroscopic hip preservation surgery with unrepaired capsulotomy, whereas group B included patients who were treated with capsular closure at the conclusion of the procedure. Good and excellent scores were defined according to established values (mHHS ≥81, excellent, or 71 to 80, good).[34]

### Surgical Procedure

The preferred arthroscopic technique of the senior author and capsular closure method have been published previously.[21] In brief, an arthroscopic approach was initiated in traction with the patient in a supine position. Anterolateral and modified midanterior portals were established using a safe access technique.[35] An interportal capsulotomy was performed using a beaver blade, incising the capsule parallel to the acetabular rim from the 12- to 3-o'clock position, as previously published.[21] A central-compartment diagnostic arthroscopy was then performed, with attention paid to respective patterns of injury. Central- and peripheral-compartment procedures were performed as indicated, commonly including treatment of labral tears, femoroacetabular impingement, and chondral damage. If a ligamentum teres tear was present, a debridement was performed as described by Byrd and Jones.[36]

At the conclusion of the intra-articular procedures, closure of the capsulotomy was performed if indicated. Factors influencing the decision to perform capsular closure, as well as technical aspects of capsular repair, have previously been described and illustrated.[21] For all patients, capsular closure was carefully considered. Preservation of native capsular tissue was routinely optimized in all cases, and aggressive capsulectomy was avoided at all costs. When closure was considered to be indicated, an attempt to close the entire capsule was always entertained, using as many sutures as necessary to achieve near complete closure while avoiding excessive tension on the capsule. However, surgeon discretion allowed for judicious partial closure if inadequate tissue was retained or if complete closure risked iatrogenic overconstraint. The decision to leave the capsule unrepaired was also left to surgeon judgment and was based on factors outlined in a previously published study.[21] When the decision was made to leave the capsulotomy open or unrepaired, no suture material was placed into the native capsular tissue. For purposes of this study, patients were considered to have undergone capsular repair if they had documentation of between 50% partial closure and 100% complete closure. Patients who exhibited capsular properties for which repair was not indicated or who underwent repair of less than 50% of the capsule were stratified into group A (unrepaired capsulotomy). Patients with increased physiological laxity and who showed elements of atraumatic instability and were treated with capsulorrhaphy or capsular volume reduction were categorized within the group B cohort.

### Statistical Methods

The variables of interest were looked at in a univariate manner, using $t$ tests, without or with the Satterthwaite approximation of the standard errors, or using the $\chi^2$ or Cochran-Armitage test of trends, as appropriate to the data. Given the potential for surgical procedure selection bias, as well as intercorrelations among a large number of the variables, a propensity analysis was evaluated to characterize the probability of receiving capsular repair versus unrepaired capsulotomy. The propensity score derived from the analysis, as well as the procedure used, was included in the regression models with outcomes of interest. All analyses were carried out using SAS/STAT software, version 9.3 of the SAS System on a Windows 7 platform (SAS Institute, Cary, NC).

## Results

A total of 403 patients were included in the final analysis and were stratified into group A or B according to the previously defined criteria. Group A included 235 patients and group B, 168. The mean age of all patients at final follow-up was 36.9 years. Patients who underwent capsular repair were significantly younger ($P < .0001$) and had a significantly lower body mass index (BMI) ($P < .0001$) (Table 1). At a minimum follow-up of 2 years, improvements were found for all PROs (Tables 2 and 3): HOS-ADL, 60.5 to 82.2 in group A and 66.0 to 86.1 in group B; HOS-SSS, 37.0 to 67.26 and 46.4 to 71.2, respectively; NAHS, 54.6 to 79.0 and 62.2 to 82.8, respectively; mHHS, 58.7 to 81.0 and 64.3 to 83.8, respectively; and VAS score, 6.3 to 3.1 and 5.8 to 2.9, respectively. Univariate analysis showed greater improvement in the capsular repair group (group B) over the unrepaired capsulotomy group (group A) in the NAHS ($P = .03$) and HOS-ADL ($P = .03$) (Table 3, Figs 1 and 2). No statistically significant differences were noted for any of the other PRO measures (HOS-SSS, mHHS, VAS, and patient satisfaction) (Table 2). Furthermore, the probability of reporting good or excellent outcomes was statistically greater in patients undergoing capsular repair (group B) for the mHHS ($P = .05$), HOS-ADL ($P = .04$), and NAHS ($P = .04$) (Table 3). When expressed as odds radios, statistical trends similarly favored capsular repair (group B) for the HOS-SSS, VAS, and patient satisfaction (Table 3).

Potential biases were encountered for several preoperative measures (Table 1). Age, BMI, gender, preoperative PROs, and degree of chondral damage were all found to differ significantly between groups. Patients in group A were significantly older ($P < .0001$) and had a significantly higher BMI ($P < .0001$) compared with group B. In addition, female patients were more likely than male patients to undergo capsular repair ($P < .0001$). Patients in group A also showed greater chondral damage by acetabular labrum articular

**Table 1.** Preoperative Comparisons

| Variable | Release (Group A) (n = 235) Mean or n (%) | SD | Repair (Group B) (n = 168) Mean or n (%) | SD | *P* Value |
|---|---|---|---|---|---|
| Age at surgery, yr* | 42.3062 | 12.3860 | 29.4026 | 12.3579 | <.0001 |
| BMI, kg/m$^2$† | 26.7532 | 4.9127 | 22.9437 | 3.8361 | <.0001 |
| HOS-ADL* | 60.4690 | 21.3646 | 65.9939 | 19.8387 | .0087 |
| HOS-SSS* | 36.9108 | 26.1862 | 46.3769 | 23.5884 | .0002 |
| NAHS* | 54.5909 | 19.0897 | 62.1801 | 18.3258 | <.0001 |
| VAS* | 6.3229 | 2.0900 | 5.8434 | 2.1517 | .0277 |
| mHHS* | 58.7243 | 17.2638 | 64.3310 | 15.5377 | .0009 |
| Flexion* | 116.5° | 16.7980° | 122.3° | 17.3616° | .0008 |
| Internal rotation* | 18.4549° | 13.7784° | 29.3373° | 14.5908° | <.0001 |
| External rotation* | 47.7039° | 15.4036° | 54.9398° | 13.8059° | <.0001 |
| Abduction† | 42.4123° | 9.3919° | 49.1867° | 49.1867° | <.0001 |
| Joint space med, mm† | 3.6005 | 0.7740 | 3.7273 | 0.6292 | .0963 |
| Gender‡ | | | | | <.0001 |
| Male | 138 (81%) | | 32 (19%) | | |
| Female | 97 (42%) | | 136 (58%) | | |
| ALAD class§ | | | | | .0081 |
| 0 | 102 (47%) | | 11 (7%) | | |
| 1 | 24 (11%) | | 50 (32%) | | |
| 2 | 28 (13%) | | 74 (48%) | | |
| 3 | 39 (18%) | | 16 (10%) | | |
| 4 | 22 (10%) | | 3 (2%) | | |
| AC damage* | | | | | <.0001 |
| 0 | 28 (14%) | | 15 (12%) | | |
| 1 | 36 (18%) | | 57 (44%) | | |
| 2 | 40 (20%) | | 45 (35%) | | |
| 3 | 39 (19%) | | 8 (6%) | | |
| 4 | 62 (30%) | | 5 (4%) | | |

AC, acetabular articular cartilage; ALAD, acetabular labrum articular disruption; BMI, body mass index; HOS-ADL, Hip Outcome Score—Activities of Daily Living; HOS-SSS, Hip Outcome Score—Sport-Specific Subscale; med, medial; mHHS, modified Harris Hip Score; NAHS, Non-Arthritic Hip Score; VAS, visual analog scale.

*Data compared using *t* test without Satterthwaite correction.

†Data compared using *t* test with Satterthwaite correction.

‡Data compared using $\chi^2$ test.

§Data compared using Cochran-Armitage test.

disruption classification (*P* = .0081) and reduced preoperative PROs (HOS-ADL, *P* = .087; HOS-SSS, *P* = .0002; NAHS, *P* < .0001; and VAS score, *P* = .028). When potentially confounding variables were controlled for, there was no statistically significant difference in HOS-ADL, HOS-SSS, NAHS, VAS score, mHHS, and 2-year satisfaction rating between the 2 management strategies. The following variables were found to be highly predictive of the type of capsular management strategy used for a given patient: age at the time of surgery (*P* < .0001), gender (*P* = .0004), preoperative abduction (*P* = .02), and degree of chondral damage (*P* < .0001). Furthermore, statistically significant differences encountered in the univariate analysis are likely not clinically significant in the context of multiple potential biases between the patient groups and potential influence of surgeon discretion in capsular procedure selection.

**Table 2.** Unadjusted Postoperative Comparisons

| Variable | Release (Group A) Mean | SD | Repair (Group B) Mean | SD | *P* Value |
|---|---|---|---|---|---|
| HOS-ADL* | 82.2186 | 18.5467 | 86.1085 | 17.2680 | .0336 |
| HOS-SSS* | 67.2580 | 29.3959 | 71.2470 | 27.7415 | .1719 |
| NAHS* | 79.0024 | 17.8038 | 82.8395 | 17.1327 | .0314 |
| VAS* | 3.1197 | 2.3772 | 2.8623 | 2.5172 | .2976 |
| mHHS† | 80.9783 | 18.2270 | 83.8485 | 15.5996 | .0906 |
| Satisfaction (1-10)* | 7.9485 | 2.2335 | 7.9818 | 2.2264 | .8834 |
| Follow-up time, yr† | 2.2283 | 0.3645 | 2.0857 | 0.2559 | <.0001 |

HOS-ADL, Hip Outcome Score—Activities of Daily Living; HOS-SSS, Hip Outcome Score—Sport-Specific Subscale; mHHS, modified Harris Hip Score; NAHS, Non-Arthritic Hip Score; VAS, visual analog scale.

*Data compared using *t* test without Satterthwaite correction.

†Data compared using *t* test with Satterthwaite correction.

## Discussion

Our results indicate that capsular repair does not have a clinically significant influence on PROs after arthroscopic hip preservation surgery. In the uncorrected univariate analysis comparing capsular repair versus unrepaired capsulotomy, statistically significant differences were uncovered (HOS-ADL and NAHS) that favored capsular repair. However, when confounding variables were controlled for, these differences were no longer significant. In addition, the relative percentage of patients reporting a good or excellent result was significantly

**Table 3.** Unadjusted Outcomes for Patients With Good or Excellent Results Versus Those With Less Than Good Results

| | Good or Excellent Results | | | | | |
|---|---|---|---|---|---|---|
| 2-Yr Variable | Release (Group A) | Repair (Group B) | OR | 95% LL | 95% UL | *P* Value |
| mHHS | 145 of 235 (62%) | 119 of 168 (71%) | 1.507 | 0.986 | 2.304 | .0579 |
| HOS-ADL | 155 of 235 (66%) | 126 of 167 (75%) | 1.586 | 1.018 | 2.472 | .0417 |
| NAHS | 141 of 235 (60%) | 116 of 166 (79%) | 1.547 | 1.014 | 2.359 | .0428 |
| HOS-SSS | 100 of 234 (43%) | 82 of 166 (49%) | 1.308 | 0.877 | 1.951 | .1877 |
| Satisfaction ≥7 *v* <7 | 187 of 235 (80%) | 135 of 168 (80%) | 1.,050 | 0.640 | 1.723 | .8467 |
| VAS ≥9 *v* <9 | 3 of 234 (1%) | 4 of 167 (2%) | 1.890 | 0.417 | 8.556 | .4089 |

HOS-ADL, Hip Outcome Score—Activities of Daily Living; HOS-SSS, Hip Outcome Score—Sport-Specific Subscale; LL, lower limit; mHHS, modified Harris Hip Score; NAHS, Non-Arthritic Hip Score; OR, odds ratio; UL, upper limit; VAS, visual analog scale.

greater in the capsular repair group. Nonetheless, there were no clear findings that showed the clinical superiority of 1 capsular procedure over another.

We attempted to statistically control for confounding variables using regression analysis and propensity scoring. After statistical adjustment, we found that patient age at the time of surgery, gender, and degree of chondral damage were predictive of the type of capsular management strategy used for a given patient. In addition, with respect to treatment groups, significant differences were encountered in age, BMI, gender, preoperative PROs, and degree of chondral damage. After we corrected for multiple potentially confounding variables, no statistically significant differences in clinical outcomes remained between the comparison groups. This finding suggests that there is a strong influence of surgeon discretion in the application of a particular capsular management strategy. In addition, patients who underwent capsular plication were stratified into group B, which could potentially influence the analysis between groups. It appears, from our data, that the decision to repair or not to repair the capsule may be based on patient demographic characteristics and the demands of a particular clinical scenario. It can thus be concluded that in the proper clinical setting, both the use of capsular closure and the use of unrepaired capsulotomy can yield successful clinical results. Patient-related variables (age, BMI, gender, and degree of chondral damage) may be a particularly useful guide to aid surgeon discretion in selecting an optimal capsular management strategy. In the presence of capsular contracture and normal osseous constraint, there is evidence to suggest that capsulotomy or focal capsulectomy may, in fact, be therapeutic.[20,22-24] In real clinical practice, this scenario would most often be encountered in older men with greater degenerative changes. In some cases, reduced preoperative PROs may

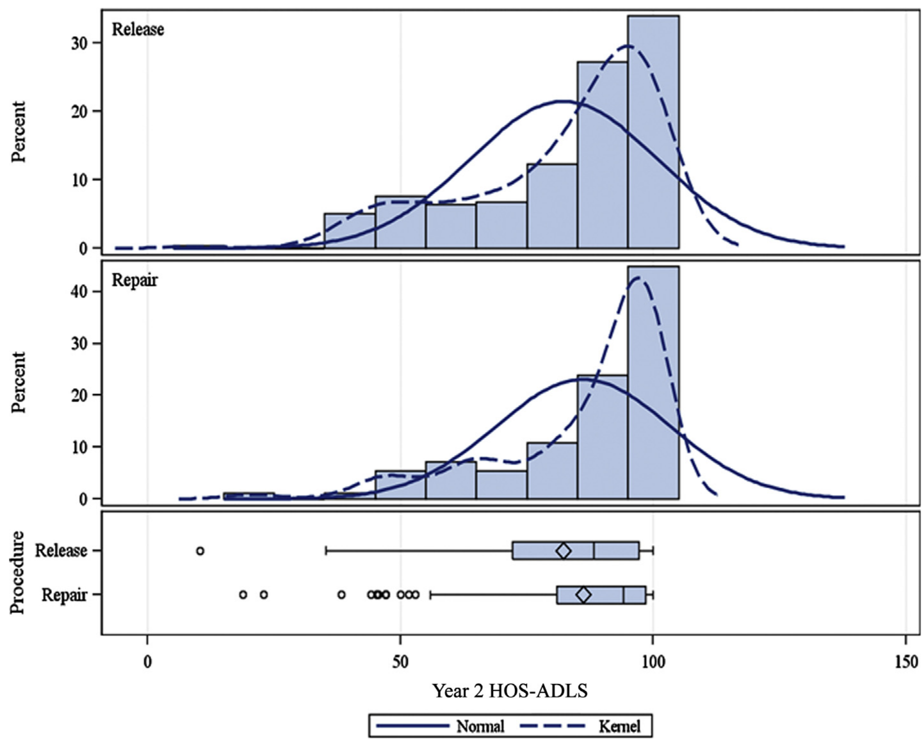


**Fig 1.** Unadjusted univariate analysis showed greater improvement of capsular repair (group B; bottom panel) over unrepaired capsulotomy (group A; top panel) for the Hip Outcome Score—Activities of Daily Living subset (HOS-ADLS).

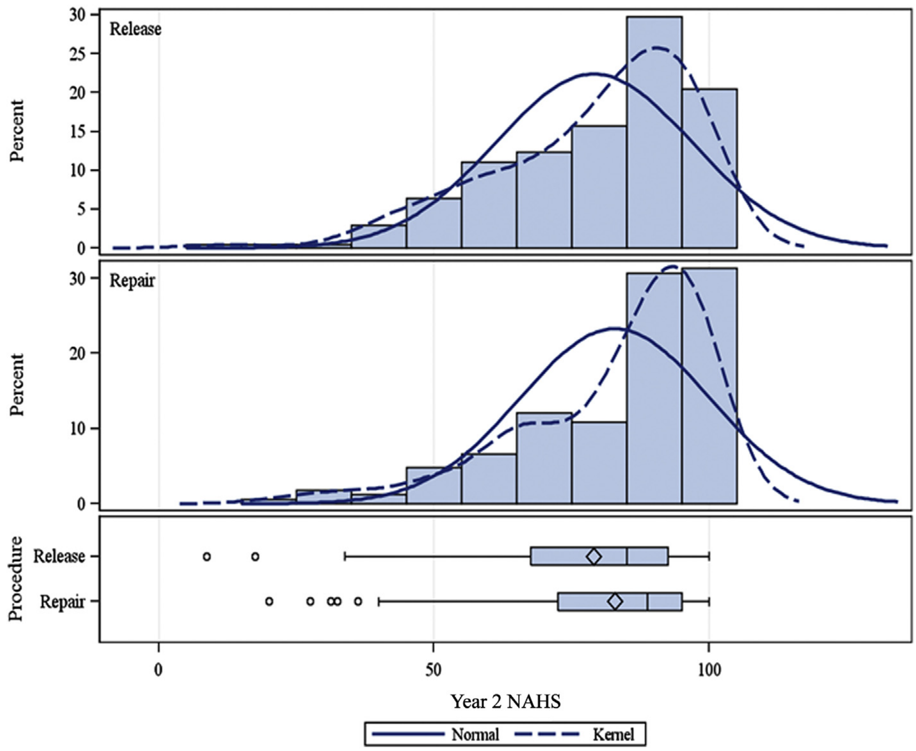


**Fig 2.** Unadjusted univariate analysis showed greater improvement of capsular repair (group B; bottom panel) over unrepaired capsulotomy (group A; top panel) for the Non-Arthritic Hip Score (NAHS).

be an indicator that the joint has undergone a greater degree of chondral damage, heightening concern for postoperative stiffness. In this study capsular management was left to surgeon discretion and determined in a case-by-case fashion based on previously described and published indications.[21] A randomized study would help minimize potential biases but may not be appropriate in a sample size with a wide range of intra-articular joint pathologies and clinical scenarios.

Although early outcomes after hip arthroscopy have generally been favorable for well-selected patients, longer-term studies have shown a decline in outcome measures.[18,19,37] It is plausible to consider that this may, in part, be due to injudicious capsular management strategies. Further study will determine whether continued efforts toward restoration of capsular integrity will result in improved long-term outcome measures. Labral repair has been shown, in midterm outcome studies, to produce superior outcomes compared with debridement.[38] Technical evolution and surgeon experience may play a significant role in this longitudinal study. Similarly, trends toward more thoughtful capsular management may also reflect an evolutionary pattern that enhances long-term outcomes. Even an attempt to partially repair the joint capsule represents a dogmatic shift in attitude concerning proper arthroscopic technique.

## Limitations

Limitations of this study include a lack of randomization and the retrospective nature of the study design. Further limitations included potential biases for several preoperative measures (Table 2). Age, BMI, gender, preoperative PROs, and degree of chondral damage were all found to differ significantly between groups. These biases should be considered in the proper context when interpreting results. We allowed surgeon discretion to dictate the type of capsular management strategy used. Our results indicate that doing so introduces potential bias; however, as we have noted, a customized approach to capsular management may, in fact, be more prudent in real-world scenarios. The inclusion of multiple variables in this study allowed critical evaluation of their potential influence on surgical outcomes. However, it is difficult to determine which component of treatment imparted the most influential effect on those outcomes. Therefore it would be an overstatement to presume that capsular management alone led to the outcome recorded for a particular patient. Inclusion of patients with physiological laxity or atraumatic instability in group B may impart further bias into our results and should be viewed as a limitation of the study. The diagnosis of atraumatic instability remains a clinical challenge because the state of capsular compliance exists on a spectrum, from contracted to “normal” to hyperlaxity. Because there are limited radiographic and clinical data to clearly distinguish among the various states of capsular compliance and there is no current method to quantify the extent of capsular volume reduction achieved with closure or capsulorrhaphy, we chose to include both capsular closure and capsulorrhaphy patients together in group B.

Interpretation of our results should therefore be made with the understanding that group B includes patients with a wide spectrum of capsular compliance states and that this may influence outcomes. Furthermore, with respect to the type of capsular procedure chosen, we used 50% as an arbitrary threshold when defining whether a particular capsular procedure constituted "repair" versus "no repair." Because demarcating exactly 50% of the capsule is difficult, we bring the reader's attention to the fact that there is a degree of subjectivity in making this determination.

## Conclusions

Arthroscopic capsular repair, used in conjunction with arthroscopic hip preservation surgery, appears to be safe and did not negatively influence clinical outcomes in this study. When confounding variables were controlled for, the use of capsular repair did not show clinically relevant superiority over the use of unrepaired capsulotomy.

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