

Background

Hip arthroscopy with labral repair achieves excellent outcomes in patients with femoroacetabular impingement syndrome (FAIS). Management of capsular tissue after capsulotomy is an ongoing area of investigation. Studies have demonstrated hypermobility and microinstability upon transection of the iliofemoral ligament without subsequent repair. The periportal capsulotomy was developed to avoid fully transecting the iliofemoral ligament without necessitating capsule closure. Patients with generalized ligamentous laxity (GLL) have demonstrated variable results after treatment with hip arthroscopy. These patients have an increased risk for post-operative pain and joint laxity after hip arthroscopy, especially in cases where larger capsulotomies transecting the iliofemoral ligament are utilized without subsequent capsular closure. The purpose of this study is to assess the 2-year outcomes of arthroscopic treatment with periportal capsulotomy closure for FAIS in patients with GLL.

Periportal Capsulotomy Closure

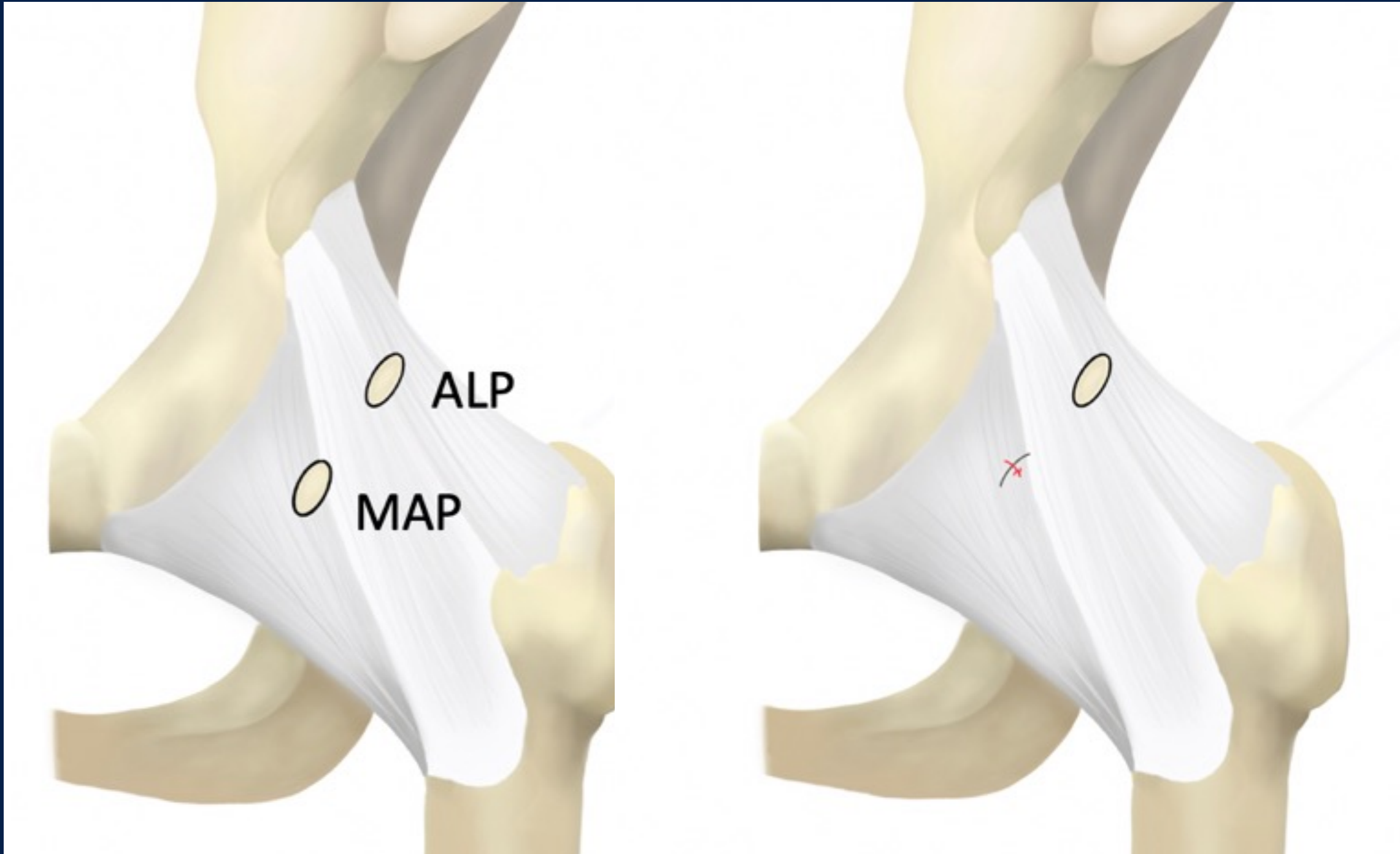


Figure 1. Illustration depicts the anterolateral and mid-anterior portal utilized for periportal capsulotomy within the anterior hip capsule of a left hip (A). The anterolateral portal is placed between the iliofemoral and ischiofemoral ligaments, the “capsular interval”, so therefore does not necessitate closure (B). In cases of generalized ligamentous laxity, the mid-anterior portal was closed given its location within iliofemoral ligament and goal of maintaining full integrity of the joint capsule. (ALP, anterolateral portal; MA mid-anterior portal).

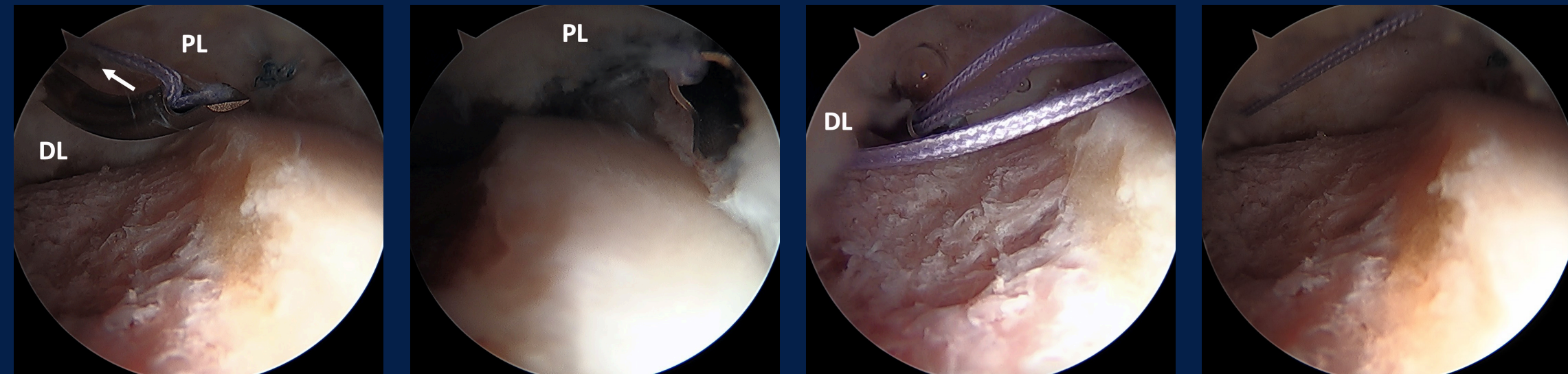


Figure 2. Intraoperative arthroscopic images of a left hip, viewing from the anterolateral portal, demonstrating (A) entrance of a 70 degree suture passer (SlingShot; Stryker) into the joint through the mid-anterior portal (white arrow). (B) The suture passer is then passed into the proximal leaflet of capsular tissue from outside-in, and a #2 nonabsorbable high tensile suture is unloaded within the joint. (C) The suture passer is then removed from the proximal leaflet and subsequently passed through the distal leaflet of capsular tissue before retrieving the unloaded suture from within the joint. (D) Both limbs of the suture are now retrieved through the mid-anterior portal and tied using a knot pusher in a simple suture pattern configuration on the outside of the capsule to close down the space where the MAP was located. (PL, proximal leaflet; DL, distal leaflet).



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Hypermobile Patients with Femoroacetabular Impingement Syndrome can be Effectively Treated Utilizing Hip Arthroscopy with Periportal Capsulotomy Closure: A Matched Cohort Analysis Compared to Patients without Joint Hypermobility

Kylen K. J. Soriano, BS¹, Matthew J. Hartwell, MD¹, Thu Quynh Nguyen, BS¹, Sergio E. Flores, MD¹, Alan L. Zhang, MD^{1*}
¹Department of Orthopaedic Surgery, University of California– San Francisco, San Francisco, California, USA.

Methods

A retrospective analysis was performed from a prospectively collected database of FAIS patients undergoing hip arthroscopy. FAIS patients with GLL were identified as having Beighton score ≥ 4 . FAIS patients with GLL were treated with arthroscopic labral repair, osteochondroplasty via periportal capsulotomy with subsequent capsular closure. These patients were matched by age, sex and BMI with a cohort of FAIS patients without GLL who underwent the same procedure via periportal capsulotomy without capsular closure. Pre- and 2 years post-operatively, patients completed patient reported outcomes (PRO) scores including the Hip Disability and Osteoarthritis Outcome Score (HOOS), 12-item Short-Form survey (SF-12) and visual analog scale (VAS).

Results

40 hips (5 male, 35 female) with FAIS and GLL were included (age 29.7 ± 9.0 , BMI, 23.3 ± 4.1). FAIS patients with GLL demonstrated similar significant PRO score improvements compared to a matched cohort of FAIS patients without GLL at 2 years after surgery (VAS Pain, (-2.5 ± 3.0) , (-2.7 ± 2.7) ; SF-12 PCS 17.7 ± 14.2 , 16.7 ± 15.0 ; HOOS-Symptoms, 26.3 ± 24.0 , 20.6 ± 18.1 ; HOOS-Pain, 29.8 ± 20.4 , 24.4 ± 19.0 ; HOOS-ADL, 24.9 ± 18.4 , 22.0 ± 19.9 ; HOOS-Sports, 43.6 ± 26.1 , 33.1 ± 29.8 ; and HOOS-QOL, 44.2 ± 27.6 , 41.7 ± 27.1 , respectively). Both cohorts achieved minimal clinically important differences (MCID) for each HOOS sub-score at equivalent high rates (70-88%).

Conclusion

1) The clinical improvements that patients with GLL experienced in this study are similar those seen in other published series on patients with GLL that utilize alternative approaches to capsular management. 2) The current study identified excellent PRO improvements for the matched FAIS patients without GLL undergoing arthroscopic treatment using the periportal technique without closure. 3) Our study demonstrated that both the GLL and matched cohort can achieve similarly significant improvements in all PRO scores after hip arthroscopy, a comparison with limited support in the literature to date.

Patients with GLL in the setting of FAIS can be effectively treated with arthroscopy via periportal capsulotomy and capsular closure.

Tables

TABLE 1 Demographics and Intraoperative Findings for Capsule Closure and Matched Groups ^a			
	Capsule Closure (n = 40)	Matched (n = 40)	P- Value ^b
Demographics			
Sex, male/female	5/35	5/35	1.000
Age, mean $\pm$ SD, y	29.7 $\pm$ 9.0	30.4 $\pm$ 9.2	0.734
Body mass index, mean $\pm$ SD, kg/m ²	23.3 $\pm$ 4.1	23.8 $\pm$ 3.9	0.577
Side involved, right/left	25/15	22/18	0.496
Tonnis grade, median	0	0	
LCEA, mean $\pm$ SD, deg	32.4 $\pm$ 6.6	34.0 $\pm$ 5.2	0.239
Alpha angle, mean $\pm$ SD, deg	58.0 $\pm$ 5.4	59.1 $\pm$ 4.9	0.344
Intraoperative findings			
Labral tear	40	40	
Wave sign	28	26	
Acetabular cartilage grade, median	2	2	
Femoral cartilage grade, median	1	1	
Labral grade, median	2	3	
Acetabuloplasty	23	30	
Femoroplasty	40	40	
Labral repair	40	40	
Microfracture	2	2	
Capsule Repair	40	0	
Chondroplasty	3	3	
Subspine Decompression	2	2	
^a Values are presented as No. of patients unless otherwise specified. ^b Student unpaired-samples t test for mean values and chi-square test for categorical values.			

TABLE 2 Preoperative and 2-Year Postoperative Patient-Reported Outcome Scores for Capsule Closure and Matched Groups ^a			
	Preoperative	Postoperative	P-Value ^b
Capsule Closure Group			
VAS pain	4.0 $\pm$ 2.6	1.5 $\pm$ 2.3	<.001
SF-12 PCS	30.7 $\pm$ 11.8	48.4 $\pm$ 12.8	<.001
SF-12 MCS	48.4 $\pm$ 15.4	47.8 $\pm$ 13.1	0.798
HOOS-Symptoms	51.6 $\pm$ 18.9	77.9 $\pm$ 17.2	<.001
HOOS-Pain	57.9 $\pm$ 18.8	87.6 $\pm$ 15.2	<.001
HOOS-ADL	66.7 $\pm$ 19.1	91.7 $\pm$ 13.7	<.001
HOOS-Sports	38.0 $\pm$ 24.9	81.6 $\pm$ 22.5	<.001
HOOS-QOL	26.7 $\pm$ 18.7	70.9 $\pm$ 26.6	<.001
Matched Group			
VAS pain	4.2 $\pm$ 2.4	1.5 $\pm$ 2.1	<.001
SF-12 PCS	33.8 $\pm$ 11.8	50.5 $\pm$ 12.3	<.001
SF-12 MCS	49.0 $\pm$ 14.1	48.6 $\pm$ 11.3	0.861
HOOS-Symptoms	56.3 $\pm$ 19.5	76.9 $\pm$ 19.2	<.001
HOOS-Pain	60.3 $\pm$ 17.7	84.7 $\pm$ 16.8	<.001
HOOS-ADL	69.5 $\pm$ 20.5	91.5 $\pm$ 15.4	<.001
HOOS-Sports	43.4 $\pm$ 21.8	76.6 $\pm$ 23.5	<.001
HOOS-QOL	28.3 $\pm$ 15.9	70.0 $\pm$ 26.3	<.001
^a Values are presented as mean $\pm$ SE. ADL, Activities of Daily Living; HOOS, Hip disability and Osteoarthritis Outcome Score; MCS, Mental Component Summary; PCS, Physical Component Summary; QOL, Quality of Life; SF-12, 12-item Short-Form Health Survey; VAS, visual analog scale. ^b Student paired-samples t test.			

TABLE 3 Mean Difference in Patient-Reported Outcome Scores for Capsule Closure and Matched Groups ^a			
	Capsule Closure	Matched	P-Value ^b
VAS pain	(-2.5 $\pm$ 3.0)	(-2.7 $\pm$ 2.7)	0.847
SF-12 PCS	17.7 $\pm$ 14.2	16.7 $\pm$ 15.0	0.764
SF-12 MCS	(-0.6 $\pm$ 14.7)	(-0.4 $\pm$ 13.8)	0.947
HOOS-Symptoms	26.3 $\pm$ 24.0	20.6 $\pm$ 18.1	0.240
HOOS-Pain	29.8 $\pm$ 20.4	24.4 $\pm$ 19.0	0.230
HOOS-ADL	24.9 $\pm$ 18.4	22.0 $\pm$ 19.9	0.500
HOOS-Sports	43.6 $\pm$ 26.1	33.1 $\pm$ 29.8	0.100
HOOS-QOL	44.2 $\pm$ 27.6	41.7 $\pm$ 27.1	0.684

TABLE 4 Minimal Clinically Important Difference Thresholds					
	MCID		Percent Attained		P- Value ^c
	Capsule Closure	Matched	Capsule Closure	Matched	
VAS pain	1.5	1.4	62.5	70	0.262
SF-12 PCS	7.1	7.5	67.5	70	0.703
SF-12 MCS	7.3	6.9	25	30	0.428
HOOS-Symptoms	12.0	9.1	75	70	0.428
HOOS-Pain	10.2	9.5	75	80	0.397
HOOS-ADL	9.2	9.9	72.5	75	0.688
HOOS-Sports	13.1	14.9	82.5	77.5	0.377
HOOS-QOL	13.8	13.5	87.5	82.5	0.322
^a Values are presented as percent attained. ADL, Activities of Daily Living; HOOS, Hip disability and Osteoarthritis Outcome Score; MCS, Mental Component Summary; PCS, Physical Component Summary; QOL, Quality of Life; SF-12, 12-item Short-Form Health Survey; VAS, visual analog scale. ^b Student unpaired-samples t test. ^c Chi-square test for categorical values					

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