Evaluating the Relationship Between Morphology and Chondrolabral Damage in Patients with Staged Bilateral Hip Arthroscopies

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Introduction

- Femoroacetabular impingement (FAI) is a frequent source of hip pain that may predispose one to early chondrolabral damage.

- Hip arthroscopy has become an increasingly favored option for treatment of FAI after failure of conservative measures.[1,2]

- It has been shown that a significant portion of patients undergoing single-sided hip arthroscopy have bilateral FAI morphology.[3-6]
    - A portion of these patients eventually require bilateral intervention.[3-6]

- *Study Aim*: Investigate the correlation between radiographic measurements, intraoperative hip pathology, and arthroscopic procedures performed between hips of patients who underwent staged bilateral hip arthroscopy.

Methods

Study Design

- A retrospective analysis on a prospectively maintained multicenter registry of patients undergoing bilateral staged hip arthroscopy for FAI was performed.

- Patients were separated by their first and second surgery.

- Intra-patient correlations were determined for demographic data, preoperative PROs, radiographic findings, intraoperative pathology, and arthroscopic procedures performed.

- In total, 60 patients were included in the study.

Methods

Statistical Methods

- Univariate Analysis: Pearson Chi-Square and Fisher exact tests for categorical variables & Independent T-tests for continuous variables.

- Pearson's product-moment and point-biserial tests were used to determine correlations.

Results

Table I: Preoperative Radiographic Measurements

Parameter, n (%)	Total n=120	First Procedure n=60	Second Procedure n=60	T-Test P-Value	Pearson Correlation	P-value
Tönnis Grade > 0	8 (0.08)	3 (0.06)	5 (0.10)	0.715	1	<0.001*
Alpha Angle High (deg), Avg ± SD	69.3 ± 12.1	69.0 ± 12.6	69.6 ± 11.6	0.578	0.776	<0.001*
Lateral Center Edge Angle (deg), Avg ± SD	32.9 ± 7.0	33.1 ± 7.2	32.6 ± 6.8	0.551	0.543	<0.001*
Tönnis Angle (deg), Avg ± SD	5.4 ± 3.8	4.8 ± 3.4	5.7 ± 3.4	0.044*	0.704	<0.001*

Preoperative Data

Demographics and PROs

- Demographic data (**age, sex, BMI**) at the time of each surgery was strongly correlated.
- **Pain** and **function** of each hip were similar before each surgery.

Radiographic Findings

- **Tönnis Grade**, **Alpha Angle**, **Lateral Center Edge Angle**, and **Tönnis Angle** between hips demonstrated strong correlations.

Results

Intraoperative Pathology

- **Labral Tear Complexity**, **Length**, and **Degeneration** were moderately to strongly correlated.

- **FAI type**, extent of **Articular Cartilage Damage** (BECK), and **Acetabular Chondrosis** were strongly correlated.

Parameter, n (%)	Total n=120	First Procedure n=60	Second Procedure n=60	T-Test P-Value	Pearson Correlation	P-value
Labral Tear	113 (0.94)	55 (0.92)	58 (0.97)	0.243	-0.056	0.671
Cam-Type Impingement	88 (0.73)	41 (0.68)	47 (0.78)	0.215	0.425	<0.001*
Pincer-Type Impingement	79 (0.66)	37 (0.62)	42 (0.70)	0.336	0.606	<0.001*
Articular Cartilage Damage				0.363	0.805	<0.001*
BECK Grade 0-2	41 (0.55)	18 (0.50)	23 (0.61)			
BECK Grade 3-4	33 (0.45)	18 (0.50)	15 (0.40)			
Acetabular Chondrosis	6 (0.05)	4 (0.07)	2 (0.03)	0.679	0.323	0.012*
Femoral Head Chondrosis	1 (0.01)	1 (0.01)	0	1	-	-

Table II: Intraoperative Findings

Results

Table III: Operative Procedures Performed

Parameter, n (%)	Total n=120	First Procedure n=60	Second Procedure n=60	T-Test P-Value	Pearson Correlation	P-value
Acetabuloplasty	92 (0.77)	46 (0.77)	46 (0.77)	1	0.627	<0.001*
Acetabular Chondroplasty	60 (0.50)	29 (0.48)	31 (0.52)	0.715	0.602	<0.001*
Acetabular Microfracture	3 (0.03)	2 (0.03)	1 (0.02)	1	-0.024	0.855
Femoroplasty	110 (0.92)	56 (0.93)	54 (0.90)	0.743	0.356	.0005*
Femoral Chondroplasty	21 (0.18)	10 (0.17)	11 (0.18)	0.81	0.482	<0.001*
Synovectomy	100 (0.83)	52 (0.87)	48 (0.80)	0.327	0.335	0.009*
Ligamentum Teres Debridement	13 (0.11)	4 (0.07)	9 (0.15)	0.239	0.449	<0.001*
Loose Body Removal	6 (0.05)	4 (0.07)	2 (0.03)	0.697	0.695	<0.001*
Subspine Decompression	3 (0.03)	2 (0.03)	1 (0.02)	1	-0.024	0.855
Labral Treatment				0.883	0.224	0.091
Debridement	4 (0.03)	2 (0.03)	2 (0.03)			
Repair	109 (0.092)	56 (0.93)	53 (0.91)			
Reconstruction	5 (0.04)	2 (0.03)	3 (0.05)			
Capsulotomy Type				0.366	0.907	<0.001*
Interportal	60 (0.55)	30 (0.57)	30 (0.52)			
Extended Interportal to Level of Psoas	2 (0.02)	0	2 (0.03)			
T-Type	48 (0.44)	22 (0.42)	26 (0.45)			
Capsular Treatment				0.888	0.898	<0.001*
Release	34 (0.30)	18 (0.32)	16 (0.28)			
Closure	38 (0.33)	18 (0.32)	20 (0.35)			
Plication	43 (0.37)	21 (0.37)	22 (0.38)			

Arthroscopic Procedures Performed

- Surgical interventions were congruent between sides.

Conclusions

- There was a **high degree of correlation** in **radiographic findings**, **intraoperative pathology**, and **procedures performed** between hips of patients undergoing staged bilateral hip arthroscopy.

- These findings may help inform surgical planning in patients undergoing staged bilateral hip arthroscopies.

- Further studies are needed to correlate clinical outcomes for patients undergoing staged bilateral hip arthroscopies

References

1 Zusmanovich M et al. The Incidence of Hip Arthroscopy in Patients With Femoroacetabular Impingement Syndrome and Labral Pathology Increased by 85% Between 2011 and 2018 in the United States. Arthroscopy 2022;38:82-87.
2 Bozic K et al. Trends in Hip Arthroscopy Utilization in the United States. The Journal of arthroplasty 2013;28:140-143.
3 Klingenstein GG et al. Prevalence and Preoperative Demographic and Radiographic Predictors of Bilateral Femoroacetabular Impingement. The American journal of sports medicine 2013;41:762-768.
4 Leong NL et al. Risk Factors for Bilateral Femoroacetabular Impingement Syndrome Requiring Surgery. JAAOS Global Research & Reviews 2018;2:e070.
5 Allen D et al. Prevalence of associated deformities and hip pain in patients with cam-type femoroacetabular impingement. Journal of bone and joint surgery. British volume 2009;91:589-594.
6 Azboy I et al. Bilateral Femoroacetabular Impingement: What is the Fate of the Asymptomatic Hip? Clinical orthopaedics and related research 2019;477:983-989.