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Relationship between Joint Hypermobility and Outcomes at 2 Years Following Hip Arthroscopy for Femoroacetabular Impingement

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- TJS, SMC, JCR have nothing to disclose

- JJR: Consultant Smith & Nephew

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BACKGROUND

- Traditionally, the Beighton score has been used to test for the presence of and quantify the level of hyperlaxity in various joints
- Generalized joint laxity (GJL), or joint hypermobility has been widely studied and found to be a risk factor for musculoskeletal injuries such as shoulder dislocation, patellar and ankle instability, and anterior cruciate ligament tears
- Less is understood and reported in the literature on the effects of hypermobility on the hip joint

Generalized ligamentous laxity may be a predisposing factor for musculoskeletal injuries.

Bin Abd Razak HR, et al. *J Sci Med Sport*. 2014. PMID: 24315955



Table 1

The Beighton score is a simple system to quantify generalized joint laxity. It uses a simple 9 point system, where the higher the score the higher the laxity. A score of more than 4 indicates generalized joint laxity.

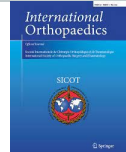
Joint	Finding	Points
Left little (fifth) finger	Passive dorsiflexion > 90°	1
Right little (fifth) finger	Passive dorsiflexion > 90°	1
Left thumb	Passive dorsiflexion to the flexor aspect of the forearm	1
Right thumb	Passive dorsiflexion to the flexor aspect of the forearm	1
Left elbow	Hyperextension > 10°	1
Right elbow	Hyperextension > 10°	1
Left knee	Hyperextension > 10°	1
Right knee	Hyperextension > 10°	1
Forward flexion of trunk with knees fully extended	Able to rest palm and hands flat on the floor	1

Validation of a self-reported **Beighton** score to assess hypermobility in patients with femoroacetabular impingement.

Naal FD, Hatzung G, Müller A, Impellizzeri F, Leunig M.

Int Orthop. 2014 Nov;38(11):2245-50. doi: 10.1007/s00264-014-2424-9. Epub 2014 Jul 5.

PMID: 24993650



BACKGROUND

- Hip capsular laxity and hypermobility has been hypothesized to be associated with hip instability due to
 1. Increased hip flexion during trunk movement
 2. Imbalance of rectus and gluteus medius muscles
- Such increased hip joint motion places greater force and tension on the hip capsule, ultimately predisposing the hip to microinstability events
- Pathologic contact between the proximal femur and pelvic structures can lead to bony impingement deformities

Patients With Generalized Joint Hypermobility Have Thinner Superior Hip Capsules and Greater Hip Internal Rotation on Physical Examination.

Turner EHG, Markhardt BK, Cotter EJ, Hetzel SJ, Kanarek A, Lang MH, Mintz DN, Spiker AM. *Arthrosc Sports Med Rehabil.* 2022 Jul 5;4(4):e1417-e1427. doi: 10.1016/j.asmr.2022.04.031. eCollection 2022 Aug.

Arthroscopic capsulotomy, capsular repair, and capsular plication of the hip: relation to atraumatic instability.

Domb BG, Philippon MJ, Giordano BD. *Arthroscopy.* 2013 Jan;29(1):162-73. doi: 10.1016/j.arthro.2012.04.057. Epub 2012 Aug 15. PMID: 22901333 Review.

Hypermobile Disorders and Their Effects on the Hip Joint.

Clapp IM, Paul KM, Beck EC, Nho SJ. *Front Surg.* 2021 Mar 25;8:596971. doi: 10.3389/fsurg.2021.596971. eCollection 2021.

Generalized Joint Hypermobility Is Predictive of Hip Capsular Thickness.

Devitt BM, Smith BN, Stapf R, Tacey M, O'Donnell JM. *Orthop J Sports Med.* 2017 Apr 19;5(4):2325967117701882. doi: 10.1177/2325967117701882. eCollection 2017 Apr.

BACKGROUND

• While previous studies have documented both the prevalence of ligament laxity among patients undergoing hip arthroscopy, there is a paucity of large clinical studies detailing PROs and survivorship comparing those with GJL to those without laxity.

Prevalence of Generalized Ligamentous Laxity in Patients Undergoing Hip Arthroscopy: A Prospective Study of Patients' Clinical Presentation, Physical Examination, Intraoperative Findings, and Surgical Procedures.

Saadat AA, Lall AC, Battaglia MR, Mohr MR, Maldonado DR, Domb BG.

Am J Sports Med. 2019 Mar;47(4):885-893. doi: 10.1177/0363546518825246. Epub 2019 Feb 12.

PMID: 30753088



- GJL was most commonly found in younger patients, females, and those with lower BMI

Outcome of Hip Impingement Surgery: Does Generalized Joint Hypermobility Matter?

Naal FD, Müller A, Varghese VD, Wellauer V, Impellizzeri FM, Leunig M.

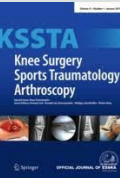
Am J Sports Med. 2017 May;45(6):1309-1314. doi: 10.1177/0363546516688636. Epub 2017 Jan 31.

PMID: 28141941



Improvement in pain and patient-related outcome measures following hip arthroscopy in patients with femoroacetabular impingement syndrome and concomitant generalized ligamentous laxity: a systematic review.

Zhu XM, Toobaie A, Iansavichene A, Khan M, Degen RM.



- There was a weak inverse between Beighton scores and preoperative PROM values
- There were no significant associations between Beighton scores and postoperative PROM values or subjective failure rates
- Patients who objectively failed had lower Beighton scores than did nonfailures

Table 1 Patient information with pre- and postoperative outcomes

Study	Number of patients (number of hips) Number of female patients	Mean age (years)	Average follow-up	Study design	VAS		mHHS		HOS-ADL		HOS-SS		HOOS-ADL		HOOS-SS	
					Pre	Post	Pre	Post	Pre	Post	Pre	Post	Pre	Post	Pre	Post
Larson 2015 [11]	12 (16) 11F	26	45 months	Case series	6.5	1.6	45.6	88.5	-	-	-	-	-	-	-	-
Larson 2020 [10]	63 (77) 61F	21.2	36 months	Case series	6.0	2.4	60.0	85.6	-	-	-	-	72.5	91.5	49.7	79.6
Maldonado 2020 [20]	57 50F	32.9	24 months	Prospective cohort	5.3	2.5	61.0	83.9	-	-	41.17	75.51	-	-	-	-
Pontiff 2016 [21]	35 35F	25.7	6 months	Prospective cohort	-	-	-	-	60.6	81.9	-	-	-	-	-	-
Stone 2019 [29]	25 25F	18	24 months	Prospective cohort	-	-6.0	-	+28.5	-	+31.3	-	+35.1	-	-	-	-
Ukwuani 2019 [30]	21 21F	19.9	24 months	Case series	7.8	0.9	57	90*	40.3	96.7*	40.3	88.2*	-	-	-	-

mHHS modified Harris Hip Score, HOS-ADL Hip disability and osteoarthritis activities outcome, activities of daily living subset, HOS-SS Hip disability and osteoarthritis activities outcome, sports subset, GLL generalized ligamentous laxity, VAS visual analogue scale

*These postoperative values combine the outcomes for patients with and without GLL

± symbol—this denotes change compared with pre-operative score

PURPOSE

- To evaluate the association between preoperative Beighton scores measuring joint laxity and patient reported outcomes (PROs) after hip arthroscopy for femoroacetabular impingement

METHODS

Study Design: Retrospective cohort study

Patient Selection:

- Underwent primary hip arthroscopy with labral repair for treatment of FAI between January 2016 and December 2018
- Eligible for minimal 2-year follow-up

Exclusion Criteria:

- Prior ipsilateral hip surgery
- Presence of advanced osteoarthritis (Tonnis grade >1 or joint space <2 mm)

Outcome Measurements:

- PROs: mHHS, HOS-ADL, HOS-Sport, WOMAC, SF-12 MCS, SF-12 PCS, Tegner Activity score, patient satisfaction
- Revision surgery
- Conversion to total hip arthroplasty (THA)

- Joint laxity measured by Beighton Score
- Patient outcomes were compared between:
 - Hypermobility group (HM) – Beighton Score ≥ 5
 - Non-hypermobility group (NHM) – Beighton Score < 5

RESULTS

- Of the 278 patients that met inclusion criteria, 226 (81%) were available for 2-year follow-up
- Beighton exam was completed on all patients
 - 197 non-hypermobile (NHM) group – Beighton score < 5
 - 24 hypermobile (HM) group – Beighton Score \geq 5.
- One patient (4.5%) in the HM group required a subsequent surgery (THA) and 13 (7%) in the NHM group had a subsequent surgery (1 PAO, 5 revisions, 7 THA)

	NHM	HM	p-value
Age	33 \pm 10	32 \pm 10	0.35
Sex (Females:Males)	99:98	22:2	<0.01
BMI	23.3 \pm 3.4	22.6 \pm 2.4	0.18

- Mean follow-up
 - NHM group - 3.8 \pm 1 years
 - HM group -3.5 \pm 1 years

RESULTS

- There was no significant difference in post-operative PROs or patient acceptable symptomatic state (PASS) rates between patients with joint laxity and those without joint laxity
- Median patient satisfaction
 - HM – 9 (range: 1 – 10)
 - NHM – 10 (range: 3 – 10)
- Median Tegner Activity score
 - HM – 4 (range: 2 – 8)
 - NHM – 5 (range: 2– 9)

	NHM	HM	p-value
SF 12 PCS	52.0 ± 8.5	50.9 ± 9.5	0.59
SF12 MCS	52.9 ± 8.1	54.3 ± 7	0.39
mHHS	86.2 ± 15.7	87 ± 12.5	0.84
HOS ADL	90.7 ± 13.8	86 ± 19.7	0.29
HOS Sport	80.8 ± 24.8	74 ± 30.7	0.36
WOMAC	10 ± 12	11 ± 12	0.71

PASS at 2 years			
	NHM	HM	p-value
HOS ADL	149/183 (81%)	19/23 (83%)	0.89
HOS Sport	133/183 (73%)	17/23 (74%)	0.90
mHHS	150/183 (82%)	20/23 (87%)	0.55

CONCLUSION

- The prevalence of a positive Beighton exam in patients undergoing primary hip arthroscopy was 10.6%.
- There was no difference in PROs or failure rates when comparing patients with Beighton scores <5 and those patients with Beighton scores ≥ 5 undergoing hip arthroscopy with labral repair and capsular plication.
- These findings indicate that patients with GJL can expect a similar outcome following primary hip arthroscopy as those patients without GJL.

THANK YOU!



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