Indications for Hip Arthroscopy in the Athlete

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Disclosure

I have no actual or potential conflict of interest in relation to this presentation

Indication: Definition

From Wikipedia:

 In <u>medicine</u>, an indication is a valid reason to use a certain test, medication, procedure, or surgery

In this presentation we will explore different hip conditions and how they are indications for hip arthroscopy and endoscopy

Anatomy



http://morphopedics.wikidot.com/femoroacetabular-impingement

Anatomy

Peripheral compartment

Peritrochanteric compartment —



Central
 compartment

Causes of Hip Pain

Lumbar radiculopathy
Abdominal

Inguinal hernia
Sports hernia

Extra-articular hip conditions
Intra-articular hip conditions

My personal journey with hip arthroscopy

1994-1995: Fellowship training with Dr. JW Thomas Byrd

- "God father of hip arthroscopy"
- Most of the cases involved intra-artcular debridement
- Most of current indications for hip arthroscopy and endoscopy not yet described

Hip Arthroscopy: Set up



Hip Arthroscopy: Traction



Hip Arthroscopy





Indications for Hip Arthroscopy in 1995/

- Mostly focused on Intra-articular (central) compartment pathology Debridement of labral tears Debridement of osteoarthritis Removal of loose bodies Synovectomy Chondroplasty
 - Debridement of ligamentum teres tears

20 year old basketball player fell and landed on lateral aspect of hip
8 months of mechanical pain and popping in the hip
Could not jump or dunk basketball

 Xrays unremarkable
 MRI revealed signal in medial aspect femoral head



- Hip arthroscopy offered to pt to avoid open procedure with hip dislocation
 - Arthroscopic findings
 - Full thickness unstable cartilage flap
 - Flap displaced from medial side of femoral head



Excision of flap
 Resolution of symptoms
 Returned to dunking basketball

Case Presentation: Loose bodies

- 17 year old boy 2 years s/p acetabular fracture
 - Mechanical hip joint symptoms
 - Pain localized to groin area
 - Catching
 - Sensation of giving way

Case Presentation : Loose bodies

Radiograph



Case Presentation : Loose bodies

Arthroscopic removal of loose bodies



35 year old man injured hip in motorcycle accident
 14 year history of intermittent pain, catching and giving way of hip
 Between episodes asymptomatic
 Gave up as a construction worker

Physical Examination
 Flexion combined with rotation of the hip caused a painful pop within hip joint
 Xrays and CT scan were normal

 Arthroscopic findings
 Complex tearing of anterior half of labrum
 Labral tissue displaced into weight bearing portion of the joint



Arthroscopic debridement Resolution of symptoms

Evolution of Hip Arthroscopy

- Concept of femoroacetabular impingement popularized (R. Ganz et al., 2003)
- Arthroscopy of the peripheral intra-capsular compartment developed
- Endoscopy of peritrochanteric hip compartment
- Recognition and treatment of non-FAI causes of hip impingement
- More complex reconstructive procedures

Trends in Hip Arthroscopy Alexis Chiang Colvin, MD, John Harrast, PhD, and Christopher Harner, MD J Bone Joint Surg Am. 2012;94:e23(1-5)

- Candidates taking Part II of the ABOS examination submit a case list in 2nd year of practice
 - Examined number of hip arthroscopy cases performed by ABOS candidates 1999 to 2009
- Number of hip arthroscopy procedures performed increased eighteenfold between 1999 and 2009

Hip Arthroscopy Surgical Volume Trends and 30-Day Postoperative Complications Gregory. Cvetanovich L, Chalmers PN, Levy DM, et al. *Arthroscopy*, Vol 32, No 7 (July), 2016: pp 1286-1292

- American College of Surgeons NSQIP database
 - Data on patients undergoing inpatient or outpatient surgery at over 400 hospitals
 - January 1, 2006 to December 31, 2013
- Hip arthroscopy 25 times more common in 2013 than 2006 (P < .001)</p>

Femoroacetabular impingement: a cause for osteoarthritis of the hip Clin Orthop. (417)112-20, 2003 Dec Ganz R, Parvizi J, Beck M, Leunig M, Notzli H, Siebenrock KA

- Femoroacetabular impingement (FAI) is the mechanism for development of early osteoarthritis for most nondysplastic hips
 - Purpose of surgical treatment of FAI
 - Alleviates femoral abutment against the acetabular rim
 - Provides relief of symptoms
 - May decelerate the progression of degenerative process

Fypes of Femoroacetabular Impingement

Cam impingement
 Pincer Impingement
 Combination of both

Cam Impingement

 Abnormally shaped femoral head
 Nonspherical
 Increased radius

Parvizi J, Leunig M, Ganz R, Femoroacetabular Impingement, J Am Acad Orthop Surg 2007;15:561-570

Cam Impingement: Alpha Angle

 Cam Lesion

 0 9 1.9 mm*

 769

Abnormal is > 55 degrees

Cam Impingement

Repetitive mechanical conflict between femoral head and acetabulum with hip motion



Parvizi J, Leunig M, Ganz R, Femoroacetabular Impingement, J Am Acad Orthop Surg 2007;15:561-570

Pincer Impingement

Over coverage of the femoral head Abnormal contact between the acetabular rim and the femoral neck Causes labral injury



Current Concepts: Arthroscopic Treatment of Femoroacetabular Impingement Carlos A. Guanche, M.D., and Aaron A. Bare, M.D. Arthroscopy: The Journal of Arthroscopic and Related Surgery, Vol 22, No 1 (January), 2006: pp 95-106

Femoroacetabular Impingement

Typical location of impingement: anterior and superior aspect of hip joint



http://morphopedics.wikidot.com/femoroacetabular-impingement

Mechanism: FAI Leading to Osteoarthritis

- Morphological abnormalities
 - Cam lesion
 - Developmental
 - Slipped capital femoral epiphysis (SCFE)
 - Legg-Calve-Perthes disease
 - Prior femoral neck fracture
 - Pincer lesion
 - Acetabular retroversion
 - Coxa profunda (deep acetabulum)

Parvizi J, Leunig M, Ganz R, Femoroacetabular Impingement, J Am Acad Orthop Surg 2007;15:561-570

CAM Impingement

Initial stage: Separation of labrum from cartilage





CAM Impingement

Progressive labral detachment and adjacent cartilage delammination





CAM Impingement

Cartilage continues to fragment and peel off bone leaving exposed bone




CAM Impingement

Severe loss of acetabular cartilage, complete detachment of labrum, femoral side cartilage wear





Prevalence of increased alpha angles as a measure of cam-type femoroacetabular impingement in youth ice hockey players. Philippon MJ, Ho CP, Briggs KK, *et al. Am. J. Sports Med.* 2013; vol. 41, 6: pp. 1357-1362

- Compared 61 asymptomatic youth ice hockey players (aged 10-18 years) and 27 youth skiers (controls) (aged 10-18 years)
 - Hockey players were 4.46x more likely to have α angle of ≥55° than skiers
- Hockey players: significant correlation
 between age and *α* angle (*r* = 0.421; *P* <. 001)
- Skiers: no significant correlation between age and α angle (r = -0.258; P = .254).

Prevalence of increased alpha angles as a measure of cam-type femoroacetabular impingement in youth ice hockey players. Philippon MJ, Ho CP, Briggs KK, *et al. Am. J. Sports Med.* 2013; vol. 41, 6: pp. 1357-1362

Conclusion:

 "Properties inherent to ice hockey likely enhance the development of a bony overgrowth on the femoral neck, leading to cam FAI."

A Cam Deformity Is Gradually Acquired During **Skeletal Maturation in Adolescent and Young Male** Soccer Players: A Prospective Study With Minimum 2-Year Follow-up Agricola R, Heijboer MP, Ginai AZ et al. Am. J. Sports Med. 2014, vol 42, No. 4, pp. 798-806 Soccer players (N = 63; mean age 14.43) years, range 12-19 years) \blacksquare Mean follow-up was 2.4 \pm 0.06 years At baseline and follow-up • α angle measured Anterosuperior head-neck junction classified as normal, flattened, or having a prominence.

A Cam Deformity Is Gradually Acquired During Skeletal Maturation in Adolescent and Young Male Soccer Players: A Prospective Study With Minimum 2-Year Follow-up

Agricola R, Heijboer MP, Ginai AZ et al. Am. J. Sports Med. 2014, vol 42, No. 4, pp. 798-806

Significant increase in prevalence of cam deformity during follow-up

- With open growth plate at baseline, prevalence of prominence increased from 2.1% to 17.7% (P = .002)
- After closure of proximal femoral growth plate, no increase in prevalence or increase in severity of cam deformity.

A Cam Deformity Is Gradually Acquired During Skeletal Maturation in Adolescent and Young Male Soccer Players: A Prospective Study With Minimum 2-Year Follow-up

> Agricola R, Heijboer MP, Ginai AZ et al. Am. J. Sports Med. 2014, vol 42, No. 4, pp. 798-806

Conclusions:

- Cam lesions gradually develop during skeletal maturation
- Cam lesions probably stable from time of growth plate closure
- Formation of a cam deformity might be prevented by adjusting athletic activities during period of skeletal growth
- Major effect on prevalence of hip osteoarthritis.

FAI: Examination

Limitation of motion, particularly the internal rotation and adduction in flexion
 Positive hip impingement test
 C-sign



FAI: Examination "Hip Impingement Sign"

 Patient supine
 Hip in 90° of flexion
 Internal rotation & adduction recreates the symptoms



Indications for FAI Surgery

Failure of conservative treatment Relative rest and activity modification **NSAIDs** PT to improve neuromuscular control around hip Stretching may exacerbate symptoms Clinical evidence of a mechanical problem consistent with imaging Concern for progression of arthritis

CAM Lesion Excision



JW Thomas Byrd, editor, *Operative Hip Arthroscopy*, 3rd edition, Springer, 2013

CAM Impingement: Femoroplasty



Pincer Impingement: Acetabuloplasty

Pre-op





Hip Labral Repair: Knotless Anchor



https://www.arthrex.com/resources/surgical-technique-guide









Hip Arthroscopy in Athletes: 10-Year Follow-Up

J. W. Thomas Byrd,* MD, and Kay S. Jones, MSN, RN From the Nashville Sports Medicine Foundation, Nashville, Tennessee The American Journal of Sports Medicine, Vol. 37, No. 11, 2009

- Early history of hip arthroscopy, early to mid 1990's
 Femoroacetabular impingement had not yet been described
 Methods of labral repair had not been developed
- 15 patients developed symptoms in the course of athletic activities
- Arthroscopic debridement
 - Chondral damage (8)
 - Labral tear (7)
 - Arthritis (5)
 - Avascular necrosis (1)
 - Loose body (1)
 - Synovitis (1)

Hip Arthroscopy in Athletes: 10-Year Follow-Up J. W. Thomas Byrd,* MD, and Kay S. Jones, MSN, RN From the Nashville Sports Medicine Foundation, Nashville, Tennessee The American Journal of Sports Medicine, Vol. 37, No. 11, 2009

Good results at 10-year follow-up
 Median improvement in modified Harris hip score was 45 points (51 preoperatively to 96 at final follow-up), P=0.004
 87% returned to previous level of sport
 Poorer results in patients with hip arthritis

Hip Arthroscopy for Femoroacetabular Impingement in Adolescents 10-Year Patient-Reported Outcomes Travis J. Menge, MD, Karen K. Briggs, MPH, Michael D. Rahl, BS, and Marc J. Philippon, MD AJSM Vol. 49, No. 1, 2021

60 pts younger than 18 y/o (16 ± 1.2 years)
Symptomatic FAI and labral tear
Hip arthroscopy with labral repair
Mean 12 y f/u (range, 10-14 y)

Hip Arthroscopy for Femoroacetabular Impingement in Adolescents **10-Year Patient-Reported Outcomes** Travis J. Menge, MD, Karen K. Briggs, MPH, Michael D. Rahl, BS, and Marc J. Philippon, MD AJSM Vol. 49, No. 1, 2021 10% required revision hip arthroscopy All female pts with global laxity, sxs > 1 year Non-revision pts, significant improvement HOS-ADL (from 64 to 92; P < .01)</p> • HOS–Sport (from 40 to 86; P < .01) • mHHS (from 56 to 88; P < .01) Median patient satisfaction 10 out of 10

Cutting sports

- Require repeated changes of direction and cutting
- High rotational loads across the hip joint Impingement sports
 - High flexion, adduction, and internal rotation motions
 - Recreate impingement hip position

Flexibility sports

- Require supraphysiological ranges of hip motion
- Hip impingement maty occur with minimal impingement morphology
- Asymmetric/overhead sports
 - Clear side-to-side differences in mechanical/functional hip motion

Contact sports Increased likelihood for impingementinduced instability Traumatic lateral impact Endurance sports Require extended periods of repetitive hip motion and hip flexor firing

Cutting	Flexibility	Contact	Impingement	Asymmetric/ Overhead	Endurance
Soccer	Dance	Football	Ice hockey	Baseball	Track and field
Basketball	Gymnastics	Rugby	Crew/rowing	Softball	Cross-country
Lacrosse	Yoga	Wrestling	Baseball catcher	Tennis	Other running
Field hockey	Cheer		Water polo	Golf	Cycling
	Figure skating		Equestrian polo	Volleyball	Swimming (not breaststroke)
	Martial arts		Breaststroke swimmer	Field events (javelin, discus, shot put, hammer throw)	

Nawabi, Danyal H. et al, Arthroscopy: The Journal of Arthroscopic and Related Surgery, Vol 30, No 3 (March), 2014: pp 398-405 Cutting, Impingement, Contact, Endurance, Flexibility, and Asymmetric/Overhead Sports: Is There a Difference in Return-to-Sport Rate After Arthroscopic Femoroacetabular Impingement Surgery? A Systematic Review and Meta-analysis

Ioanna K. Bolia, MD, MS, PhD, Hansel Ihn, MD, Hyunwoo P. Kang, MD, Cory K. Mayfield, MD, Karen K. Briggsy MPH, Asheesh Bediz MD, Shane Jay Nho, MD, MS, Marc J. Philippon, yMD, and Alexander E. Weber, II MD

Investigation performed at the USC Epstein Family Center for Sports Medicine at Keck Medicine of USC, Los Angeles, California, USA

The American Journal of Sports Medicine, September 10, 2020

Return to Sport After Hip Arthroscopy Bolia et al, AJSM, Sept 10, 2020

RTS rate and avg time to RTS

- Flexibility sports (94.1%, 6.1 months)
- Endurance sports (93.6%, 5.4 months)
- Impingement sports (91.2%, 6.2 months)
- Asymmetric/overhead sports (89.2%, 6.6 months)
- Cutting sports (87.6%, 8.5 months)
- Contact sports (87.0%, 6.4 months)
- Trend but no statistical difference

Arthroscopic Hip Labral Reconstruction

Outcomes After Arthroscopic Hip Labral Reconstruction A Systematic Review and Meta-analysis Michael D. Rahl, DPT, Collin LaPorte, BS, Gabrielle K. Steinl, BS, Michaela O'Connor, BA, T. Sean Lynch, MD, and Travis J. Menge, MD The American Journal of Sports Medicine 2020;48(7):1748–1755 Acetabular labrum critical functions • Hip stability Preservation of hip fluid seal Arthroscopic hip labral reconstruction for irreparable labral damage Clinically significant improvements in patientreported outcomes

Primary and Revision Circumferential Labral Reconstruction for Femoroacetabular Impingement in Athletes: Return to Sport and Technique. Scanaliato J, Chasteen J, Polmear MM, Salfiti C, Wolff AB *Arthroscopy, Vol. 41, No. 10, 2013*





Results of Arthroscopic Labral Reconstruction of the Hip in Elite Athletes Boykin RE, Patterson D, Briggs KK, Dee A, Philippon MJ The American Journal of Sports Medicine, Vol. 41, No. 10, 2013



Act – acetabulum. LG – labral graft. FH – femoral head

Results of Arthroscopic Labral Reconstruction of the Hip in Elite Athletes Boykin RE, Patterson D, Briggs KK, Dee A, Philippon MJ The American Journal of Sports Medicine, Vol. 41, No. 10, 2013

21 elite athletes (23 hips)
Avg age 28.0 years (range, 19-41)
2 revisions for lysis of capsulolabral adhesions

Results of Arthroscopic Labral Reconstruction of the Hip in Elite Athletes Boykin RE, Patterson D, Briggs KK, Dee A, Philippon MJ The American Journal of Sports Medicine, Vol. 41, No. 10, 2013

21 Return to play 85.7% (18/21)
 81% (17/21) returning to a similar level
 Significant improvements in mHHS and HOS Sport subscore

Median satisfaction with outcome was 8.2 (range, 3-10). Primary and Revision Circumferential Labral Reconstruction for Femoroacetabular Impingement in Athletes: Return to Sport and Technique. Scanaliato J, Chasteen J, Polmear MM, Salfiti C, Wolff AB *Arthroscopy, Vol. 41, No. 10, 2013*

30 of 30 (100%) achieved substantial clinical benefit on VAS pain score
26/30 (86.7%) able to return to play
Avg time to return to play was 6.6 months (SD=2.4 months)

Extra-articular hip impingement syndromes

Q

Extra-articular hip impingement syndromes Fundamentally different from FAI Unique and separate entities Ischiofemoral impingement (IFI) Subspine impingement (SSI) Greater trochanteric/pelvic impingement (GTPI) Psoas impingement (PI) Cause pain and limited function in young, nonarthritic patients

Ischiofemoral Impingement

- Abnormal narrowing of ischiofemoral space (A) and (B)
 Abnormal contact between the ischium (I) and the lesser trochanter (LT) in:
 - Extension
 - Adduction
 - External rotation



Marín-Peña O.R., Sierra-Madrid, P., Lax-Perez, R., Ferrero-Manzanal, F. Extrarticular hip impingement. *Hip Int*, 2016; 26 (Suppl 1): S14-S16

Ischiofemoral Impingement

- Compression of the quadratus femoris muscle
 Irritation of the sciatic nerve
- Deep gluteal pain



Spencer-Gardner et al., *Knee Surgery, Sports Traumatology, Arthroscopy*, 25, no. 1 (2017): 55-61

Ischiofemoral Impingement

Exam Long-stride walking test Palpation of the ischiofemoral space Ischiofemoral impingement (IFI) test

Diagnosis and 2-Year Outcomes of Endoscopic Treatment for Ischiofemoral Impingement Hatem MA, Palmer,IJ, and Martin HD, *Arthroscopy*, Vol. 31, Issue 2, p239–246, 2015
Ischiofemoral Impingement

Long stride walking test

- Provokes impingement between lesser trochanter and ischium with hip extension
- Positive if the posterior pain is reproducible
- Pain alleviated with short strides or hip abduction

Ischiofemoral Impingement: Exam



LT – lesser trochanter HT – hamstring tendon IFS – ischiofemoral space QFS- quadratus femoris space

wt bearing

WITH 15 DEG CAUD

LT – lesser trochanter HT – hamstring tendon IFS – ischiofemoral space QFS- quadratus femoris space



 Patient with IFI
 Narrowing of IFS on MRI



Edema of quadratus muscle





QFM – quadratus femoris muscle SN – sciatic nerve



LT - lesser trochanter QFM – quadratus femoris muscle



LT - lesser trochanter QFM – quadratus femoris muscle



Pre and post-op x-rays after Lesser trochanteric decompression



Ischiofemoral Space Decompression Through Posterolateral Approach: Cutting Block Technique Howse EA et al, <u>Arthroscopy Techniques</u>, <u>Volume 3</u>, <u>Issue 6</u>, December 2014, Pages e661-e665

Subspine Impingement

Subspine Hip Impingement

Extra-articular impingement between femoral neck and hypertrophic AIIS Chronic avulsion injury of rectus femoris Developmental AIIS prominence **Repetitive and extreme hip flexion leads** to soft tissue injury Tendon of direct head of rectus femoris Anterior joint capsule • Anterior labrum.

Functional Results of Arthroscopic Treatment in Patients With Femoroacetabular and Subspine Impingement Diagnosed With a 3-Dimensional Dynamic Study Aguilera-Bohórquez B, Ramirez S, Cantor E Arthroscopy, Sports Medicine, and Rehabilitation, Vol 2, No 1 (February), 2020: pp e39-e45



Subspine Hip Impingement

- Common association of FAI and AIIS hypertrophy
 - Patient presentation
 - Look for history of hip flexor or quadriceps injury including AIIS avulsion
 - Painful and decreased hip flexion ROM
 - Compensatory hip abduction and external rotation during hip flexion

Anterior inferior iliac spine deformity as an extraarticular source for hip impingement: A series of 10 patients treated with arthroscopic decompression Hetsroni I, Larson CM, Dela Torre K, et al. *Arthroscopy*, 2012; 28:1644-1653



Anterior inferior iliac spine deformity as an extraarticular source for hip impingement: A series of 10 patients treated with arthroscopic decompression Hetsroni I, Larson CM, Dela Torre K, et al. *Arthroscopy*, 2012; 28:1644-1653

Mean f/u time was 14.7 months (6 to 26)
Mean age was 24.9 years
Hip flexion 99°±7° before surgery to 117°± 8° after surgery (P < .001).
mHHS 64±18 before to 98±2 after surgery (P < .001)

Snapping Hip Syndrome

Snapping Hip Syndrome

Three types

- Internal
 - Iliopsoas Snaps over Iliopectineal Eminence or Femoral Head
- External
 - Most common type
 - ITB snaps over greater trochanter
 - Trochanteric bursitis

Intra-articular: loose bodies, labral tears

Internal Snapping Hip

Exam

Snap and pain elicited by moving hip from <u>AB</u>ducted, Externally Rotated and Flexed to <u>AD</u>ducted, Internally Rotated and Extended

 lliopsoastmoves from Lateral to Medial crossing femoral head and iliopectineal eminence



Iliopsoas Tendon Release for Internal Snapping Hip

A: release through the joint B: release outside the hip joint





Iliopsoas Tenotomy During Hip Arthroscopy A Systematic Review of Postoperative Outcomes Gouveia K, Shah A, Kay J, et al. *American Journal of Sports Medicine*, July, 2020

21 studies, 824 patients Overall reported success rate in resolving snapping hips was 93.0% Post-operative hip flexion strength (6 studies) Complete recovery in 4 studies Mild decreases in 2 studies

External Snapping Hip Exam

 Palpate for snap or crepitus over greater trochanter as patient flexes and extends hip in lateral decubitus position
 Ober test

- Lateral decubitus position
- Abduct, extend hip and flex knee
- (+) test: pt can not adduct across baseline

Endoscopic Iliotibial Band Tendoplasty for External Snapping Hip

Bursectomy Excision IT Band



Gluteal Tendon Tears

Gluteal Tendon Anatomy

 Rotator cuff of the hip
 Gluteus medius and gluteus minimus



Gluteal Tendon Tears

Exam findings
Pain and tenderness lateral hip
Trendelenberg gait
Pain and weakness with resisted hip abduction





Gluteal Tendon Tears

- Gluteus medius tears often respond well to conservative treatment
 - anti inflammatory medication
 - physical therapy
 - steroid injections
 - recalcitrant cases are candidates for surgical treatment
 - Open vs Endoscopic surgery
 - No large or randomized clinical studies have been performed to date to evaluate the efficacy of endoscopic technique compared to open repair







Nazal MR et al., Endoscopic Repair of Full-Thickness Gluteus Medius and Minimus Tears: Prospective Study With a Minimum 2-Year Follow-Up, Arthroscopyy, Vol 36, No 8, 2020

Endoscopic Repair of Gluteal Tendon Tear



Nazal MR et al., Endoscopic Repair of Full-Thickness Gluteus Medius and Minimus Tears: Prospective Study With a Minimum 2-Year Follow-Up, Arthroscopyy, Vol 36, No 8, 2020

Hip Microinstability

Microinstability of the Hip Gaining Acceptance Marc R. Safran, MD J Am Acad Orthop Surg 2019;27: 12-22

Hip microinstability increasingly recognized as potential cause of pain and disability in young patients Extraphysiologic hip motion Similar in concept to multidirectional instability of shoulder Pain with or without symptoms of hip joint feeling unstable

Microinstability of the Hip Gaining Acceptance Marc R. Safran, MD J Am Acad Orthop Surg 2019;27: 12-22

Causes of hip microinstability

- Bony deficiency
 - Hip dysplasia: acetabular under coverage
- Soft tissue damage or loss
 - Labral tear
 - Hip capsule, residual laxity after traumatic dislocation
 - Ligamentum teres
 - Connective tissue disorders, Ehlers Danlos

Hip Anterior Instability Exam

Patient prone
Hip placed in ER, knee flexed 90°
Anterior force applied
(+) test: anterior hip pain or apprehension



Rosinsky PJ, Annin S, Maldonado DR et al. *Arthroscopy*, Vol 36, No 8, 2020: pp 2170-2182

Hip Posterior Instability Exam

Patient supine
Hip and knee flexed 90°
Posterior force applied
(+) test: posterior hip pain or apprehension



Rosinsky PJ, Annin S, Maldonado DR et al. *Arthroscopy*, Vol 36, No 8, 2020: pp 2170-2182

O'Donnell Test: Ligamentum teres tear

- Hip flexed 70° and abducted 30°
 Hip ER and IR applied
- (+) test: pain at end range of ER and IR



Rosinsky PJ, Annin S, Maldonado DR et al. *Arthroscopy*, Vol 36, No 8, 2020: pp 2170-2182
Microinstability of the Hip Gaining Acceptance Marc R. Safran, MD J Am Acad Orthop Surg 2019;27: 12-22

 Surgical treatment of hip microinstability
Pelvic osteotomy for severe bony abnormalities
Hip arthroscopy

- Capsular plication
- Labral repair/reconstruction
- Reconstruction of ligamentum teres

Ligamentum Teres

- Historically considered a vestigial structure
- Role in stabilizing the hip becoming more recognized



Ortho Bullets: Hip Anatomy

Arthroscopic Ligamentum Teres Reconstruction: Minimum 2-Year Patient-Reported Outcomes With Subanalysis of Patients With Ehlers-Danlos Syndrome Rosinsky PJ, Annin S, Maldonado DR et al. Arthroscopy, Vol 36, No 8, 2020: pp 2170-2182

Ligamentum Teres Reconstruction



Rosinsky PJ, Annin S, Maldonado DR et al. *Arthroscopy*, Vol 36, No 8, 2020: pp 2170-2182

