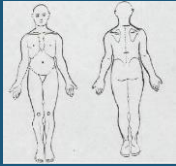


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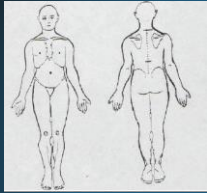
HIP CASE STUDY 1



Orthopaedic Manual Physical Therapy Series
Charlottesville 2017-2018

Eric Magrum DPT, OCS, FAAOMPT

Orthopaedic Manual Physical Therapy Series 2017-2018



Body Chart - Initial Hypothesis:

- Groin/ADD Strain
- Gluteal Tendonopathy
- Athletic Pubalgia
- Psoas Strain
- Osteitis Pubis
- Femoral Neck Stress Rxn --> Fracture
- Labral Tear
- FAI

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Professional Middle distance runner
2004 Olympic Trials in the 800 meters, where he missed the final by .04 of a second.
Two time All-American indoors
Two time NCAA outdoor championships qualifier
Latter part of his collegiate, and recent post collegiate experience was marked by injury

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SUBJECTIVE EXAM

**** Subjective Asterisks Signs/Symptoms ****
(Aggravating/Easing Factors, Description/Location of symptoms, Behavior, Mechanism of injury)

- 3 month - Insidious onset - Training
- "Deep non specific" Anterior, groin, lateral, posteriolateral (L) Hip pain
- "C sign"
- Occasional "catching"
- Pain with Running faster, Jumping/basketball, lifting/carrying
- Rest - No running x 2.5 months; Stretch/yoga
- PMHx: (L) fibular, @ tibial stress fracture
- X-ray (-)
- Referral to PT




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Primary HYPOTHESIS after Subjective Examination:

- Labral Pathology



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Differential List: (List in ranking order to screen/clear - Rule out)

- Fem Neck Stress Fracture
- Lumbar referral
- FAI
- OA/DJD
- Osteitis Pubis
- Athletic Pubalgia
- Gluteal tendinopathy




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Diagnostic accuracy of clinical tests of the hip: a systematic review with meta-analysis *Br J Sports Med* (2012)

Michael P Reiman,¹ Adam P Goode,¹ Eric J Hegedus,² Chad E Cook,³ Alexis A Wright²

Diagnostic test	Number studies sample size (n)	SN (95% CI)	SP (95% CI)	-LR (95% CI)	+LR (95% CI)
Femoral Fracture	3 (n=782) ⁵⁰⁻⁵²	95 (92 to 97)	96 (78 to 92)	0.07 (0.03 to 0.13)	6.11 (3.73 to 10.0)




(-)

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- Testing for femoral shaft stress fractures

Fulcrum Test



- (+) Reproduce pain at Femoral shaft

SN/SP (95% CI)	LR+	LR-
93 (NR)/75 (NR)	3.7	0.09
88 (NR)/13 (NR)	1.0	0.92

(-)

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Lumbar Clearing

- Full AROM
- Quadrant
- (-) Neuro Exam
 - SLR/Slump

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Evidence-Based Diagnosis and Treatment of the Painful Sacroiliac Joint

MARK LASLETT, FNZCP, PhD, Dip MT, Dip MDT

TABLE 1. Comparison between Laslett M et al¹⁾ and van der Wurff et al²⁾ studies of the validity of multiples of positive pain provocation SIJ tests.

Diagnostic accuracy statistic	Number of positive provocation SIJ tests									
	1 or more		2 or more		3 or more		4 or more		5 or more	
	ML	PvW	ML	PvW	ML	PvW	ML	PvW	ML	PvW
Sensitivity %	100	100	93	93	91	85	6	26	27	0
Specificity %	44	42	66	58	78	79	1	82	88	100
Positive LR	1.8	1.7	2.7	2.3	4.3	4.0	3.2	1.4	2.1	0
Negative LR	0.0	0.0	0.10	0.13	0.08	0.15	0.49	0.91	0.84	1.00

Notes:
 1. LR = likelihood ratio, ML = Laslett M et al 2005, PvW = van der Wurff et al 2006
 2. The shaded cells represent the optimal number of positive SIJ provocation tests producing the highest positive likelihood ratio, i.e., 3 or more.
 3. The tests included in this study are distraction, compression, thigh thrust, Gaenslen's test, sacral thrust, and Patrick's FABER test.

THE JOURNAL OF MANUAL & MANIPULATIVE THERAPY ■ VOLUME 16 ■ NUMBER 3

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Development of a Clinical Prediction Rule for Diagnosing Hip Osteoarthritis in Individuals With Unilateral Hip Pain

- Squat - Aggravates Sx (+)
- Active Flexion < 115 (-)
- (+) Scour - Lateral Hip/Groin pain (-)
- (+) Pain with active hip EXT (-)
- Passive IR < 25 (-)

Number of Predictors Present	Positive Likelihood Ratio (95% CI)	Negative Likelihood Ratio (95% CI)
	5	7.3 (1.1 to 49.1)
≥4	24.3 (4.4 to 142.1)	.53 (.35 to .80)
≥3	5.2 (2.6 to 10.9)	.33 (.17 to .66)
≥2	2.1 (1.4 to 3.3)	.31 (.13 to .78)
≥1	1.2 (.99 to 1.4)	.27 (.04 to 2.0)

J Orthop Sports Phys Ther 2008;38(9)

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THE AMERICAN COLLEGE OF RHEUMATOLOGY CRITERIA FOR THE CLASSIFICATION AND REPORTING OF OSTEOARTHRITIS OF THE HIP

Table 4. Clinical (history, physical examination, laboratory) classification criteria for osteoarthritis of the hip, classification tree format*

(+)	1. Hip pain and
	2a. Hip internal rotation <15° and
(-)	2b. ESR =45 mm/hour (if ESR not available, substitute hip flexion ≤115°) or
(-)	3a. Hip internal rotation ≥15° and
	3b. Pain on hip internal rotation and
(-)	3c. Morning stiffness of the hip ≤60 minutes and
(-)	3d. Age >50 years

* This classification method yields a sensitivity of 86% and a specificity of 75%. See Figure 1 for graphic depiction of this classification tree. ESR = erythrocyte sedimentation rate (Westergren).

Arthritis and Rheumatism, Vol. 34, No. 5 (May 1991)

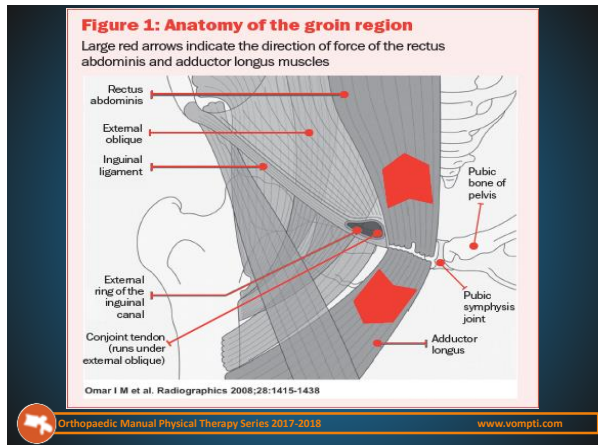
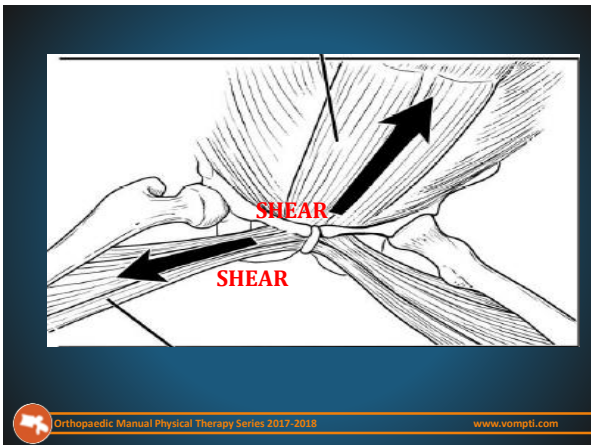
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Athletic Pubalgia/"Sports Hernia"

- Males > Females
- Deep, intense unilateral Pain - Lower ABD/Groin - referral to perineum, inner thigh, scrotum
- High level athlete - Cutting, jumping, kicking, running sports (10-15% soccer)
- Repetitive overload > Specific Mechanism
- Aggs: Sudden accel/decel, twist/turn/cut; kick; sit ups, cough/sneeze
- (+) Pain with resisted Sit up +/- ADD
- Ease: rest - usually can play through with limitations, does not improve with rest (sxs return with return to sport)



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Diagnostic accuracy of clinical tests of the hip: a systematic review with meta-analysis Br J Sports Med (2012)

Michael P Reiman,¹ Adam P Goode,¹ Eric J Hegedus,² Chad E Cook,³ Alexis A Wright²

Table 6 Summary of articles reporting on the diagnostic accuracy of OSTs for pathologies of the hip: sports related chronic groin pain

Test, authors	Subjects	Age (mean, SD)	Gender	Pathology	Symptom description	SN/SP (95% CI)	LR+/LR-	Q	Criterion standard	Reliability
Single Adductor Test										
Verrall et al ¹⁴	89 Australian Rules football players	NR	89 M	Bone marrow oedema	NR	30 (NR)/91 (NR)	3.3/0.66	7	MRI 78 (NR)/88 (NR) ¹⁴	NR
Squeeze Test										
Verrall et al ¹⁴	89 Australian Rules football players	NR	89 M	Bone marrow oedema	NR	43 (NR)/91 (NR)	4.8/0.63	7	MRI 78 (NR)/88 (NR) ¹⁴	NR
Bilateral Adductor Test										
Verrall et al ¹⁴	89 Australian Rules football players	NR	89 M	Bone marrow oedema	NR	54 (NR)/93 (NR)	1.2/0.49	7	MRI 78 (NR)/88 (NR) ¹⁴	NR



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Physical Therapy in Sport 14 (2013) 3-16

Contents lists available at SciVerse ScienceDirect

Physical Therapy in Sport

ELSEVIER journal homepage: www.elsevier.com/pts

Masterclass

A suggested model for physical examination and conservative treatment of athletic pubalgia

Eric J. Hegedus^a, Ben Stern^b, Michael P. Reiman^c, Dan Tarara^d, Alexis A. Wright^{a,*}

Orthopaedic Manual Physical Therapy Series 2017-2018 www.vompti.com

Diagnostic accuracy of clinical tests of the hip: a systematic review with meta-analysis Br J Sports Med (2012)

Michael P Reiman,¹ Adam P Goode,¹ Eric J Hegedus,² Chad E Cook,³ Alexis A Wright²

Table 8 Pooled diagnostic properties and for the diagnosis of labral tear, femoral fracture and gluteal tendinopathy

Diagnostic test	Number studies sample size (n)	SN (95% CI)	SP (95% CI)	LR (95% CI)	+LR (95% CI)
Labral Tear					
FADDIR (MRA)	4 (n=128) ^{40,41,43,44}	94 (88 to 97)*	8 (2 to 20)*	0.48 (0.20 to .16)	1.02 (0.96 to 1.08)
FADDIR (Arthroscopy)	2 (n=157) ^{42,43}	99 (95 to 100)	7 (0 to 34)	0.15 (0.01 to 2.24)	1.06 (0.92 to 1.21)
Flexion IR	3 (n=42) ⁴⁵⁻⁴⁷	96 (82 to 100)	17 (12 to 54)	0.27 (0.03 to 2.34)	1.12 (0.83 to 1.51)

Orthopaedic Manual Physical Therapy Series 2017-2018 www.vompti.com

Diagnostic accuracy of clinical tests for the diagnosis of hip femoroacetabular impingement/labral tear: a systematic review with meta-analysis

M P Reiman,^{1,2} A P Goode,¹ C E Cook,¹ P Hölmich,^{3,4} K Thorborg^{3,5}

CONCLUSION

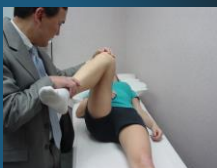
Owing to the low quality and biased sampling of patients with high probability of disease, hip physical examination tests do not appear to currently provide the clinician any significant value in altering probability of disease with their use. Currently, only the FADDIR and Flex-IR tests are supported by the data as valuable screening tests for FAI/LI pathology. Further studies involving high quality designs across a wider spectrum of hip pathology patients are necessary to discern the confirmed clinical utility of these tests.

Br J Sports Med 2015;49:811

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Impingement Test/FADDIR

- Flex knee 90 degrees – FLEX, ADD, INT Rot + Overpressure
- (+) Groin Pain
- Pain with IR = Anterior labrum



SN/SP (95% CI)	LR+/LR-
100/all (+) (FAI): 99 (NR)/25 (NR) (labral tear)	NA/NA (FAI): 1.3/0.04 (labral tear)
99 (NR)/5 (NR)	1.0/0.2
97 (NR)/13 (NR)	1.1/0.23
78 (59 to 89)/10 (3 to 29)	0.86/2.2
100/all (+) (FAI): 97 (NR)/4 (NR) (labral tear)	NA/NA (FAI): 1.0/0.75 (labral tear)
59 (NR)/75 (NR)	2.4/0.55

(+)



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Scour Test

- Circumduction of hip - multidirectional
- Axial force - Compression
- (+) Hip Pain (-)
- Hip OA



SN/SP (95% CI)	LR+/LR-
50 (26 to 74)/29 (12 to 51)	0.70/1.72

Br J Sports Med (2012)



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Quadrant Test

- Flexion, ADDuction, IR
- Axial Compression
- (+) Hip Pain
- Intra articular Pathology



SN/SP (95% CI)	LR+/LR-
75 (19 to 99)/43 (18 to 72)	1.3/0.58

(+)

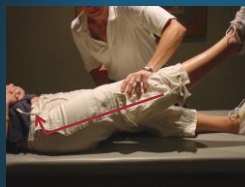


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Active/Resisted SLR

- Palpate post aspect Greater Trochanter
- (+) Poor dynamic stability - Psoas/Illiacus (facilitated TFL) secondary to Incr Ant Fem head translation
- Resisted SLR at 30 degrees – Stinchfield Test
- (+) Reproduce groin pain, suspect labral pathology



(+)




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Log Roll Test

- Used to assess labral pathology/loose body (+ mechanical signs/sxs)
- Maximally IR & ER
- Eliciting a click or popping sensation
- Also screen capsular laxity




(-)

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Fitzgerald/McCarthy Test


- Assess Anterior Labrum
- Flexion, EXT Rot, ABD →
- IR Rot, ADD, EXT
- (+) reproduce pain, popping or catching
- Sn = 98% (+)



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Thomas Test

- Bilateral knee flexion
- Lumbar spine flat/no lordosis
- Knee flexed to 90 - Extend Hip
- Assess EXT, ABD/ADD, Rotation
- Hip EXT < 10 EXT = Psoas/capsule tightness/dysfunction (end feel)
- Hip EXT > 10 EXT = Anterior capsule laxity
- Assess Rectus Fem - extend knee increased Hip EXT
- Assess TFL/ITB tightness/dysfunction - ABD increase hip EXT



(+)

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Systematic review

The validity and accuracy of clinical diagnostic tests used to detect labral pathology of the hip: A systematic review Manual Therapy (2011)

Roanna M. Burgess^{a*}, Alison Rushton^b, Chris Wright^b, Cathryn Daborn^a


- **Studies - Poor methodology**
- **“Cluster of Tests”**
- Anterior groin Pain
- Mechanical Symptoms
- (+) Quadrant Test
- (+) IMP/FADDIR Test (Sn = 75%, Sp = 43 - 100%)
- (+) Fitzgerald Test (Sn = 98%)
- (+) Modified Thomas Test (Sp = 92%)

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Biomechanical Screen

(+) Step Down Test:

**Trendelenberg, Femoral
ADD/IR, Early heel rise**




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Biomechanical Screen

(+) Swing Test:


**(L) - Poor stability; ®
Decreased Hip EXT,
Excessive Pelvic ant
rotation, Lumbar rotation
at terminal swing**



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**** Physical Exam "Asterisks" Signs/Symptoms ****
(Special Tests, Movement/Joint Dysfunction, Posture, Palpation, etc.)


- Full pain free Lumbar AROM
- (-) Neuro Exam (SLR, Slump, Ely's)
- (-) SIJ provocation cluster
- (+) FADDIR
- (+) Quadrant
- (+) Resisted SLR
- ROM limitations: IR, Flexion, ER, EXT – capsular tightness
- TTP: Psoas (hypertonic); Glut tendon



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Are the relationships between the areas on the body chart, the interview, and physical exam consistent?
"Do the "Features Fit" a recognizable clinical pattern?" – If "Yes" – what : _____

Labral Pathology – Partial Tear with FAI



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CLINICAL PRACTICE GUIDELINES

KEELAN ENSEKI, PT, MS • MARCIE HARRIS-HAYES, DPT, MSCI • DOUGLAS M. WHITE, DPT • MICHAEL T. CIBULKA, DPT
JUSTIN WOEHRLE, PT, PhD • TIMOTHY L. FAGERSON, DPT • JOHN C. CLOHSEY, MD

Nonarthritic Hip Joint Pain

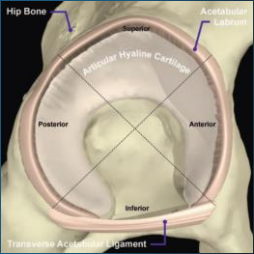
Clinical Practice Guidelines Linked to the International Classification of Functioning, Disability and Health From the Orthopaedic Section of the American Physical Therapy Association

J Orthop Sports Phys Ther. 2014;44(5):A1-A32. doi:10.2559/jospt.2014.0302

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Labral

- **Mechanism**
 - Traumatic: Twist/Pivot
 - EXT ROT in EXT
 - Repetitive micro trauma
 - Normal degeneration
- **Presentation**
 - Anterior>Lateral>Posterior Hip pain
 - Mechanical Signs/Sxs (catching, locking, giving way)
 - "Instability" - Rotational mvts (laxity); "Pinching" pain - Sitting/hip flexion (FAI)



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- Inner 2/3 is **Avascular**, only outer 1/3 potential to heal
- Labrum is **Innervated**, potential for pain generator
- Tears can be degenerative, dysplastic, traumatic and idiopathic
- Most labral tears are **Anterior-Superior**

Labrum



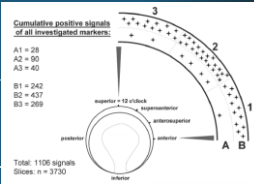
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The distribution of nociceptive innervation in the painful hip

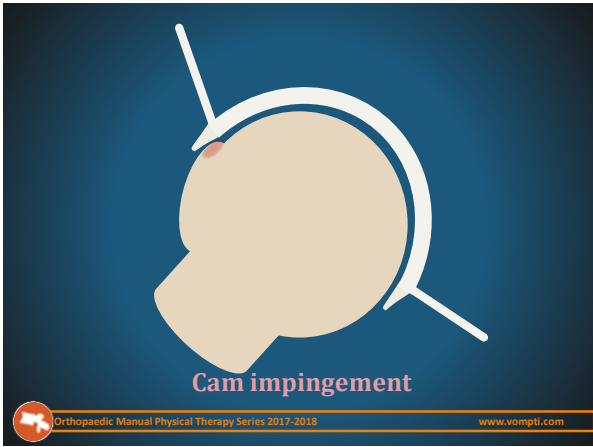
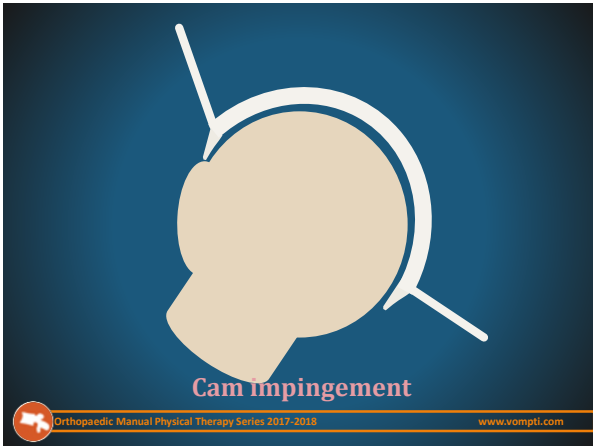
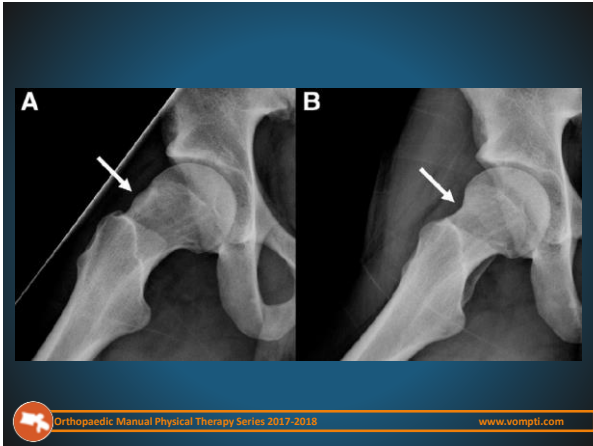
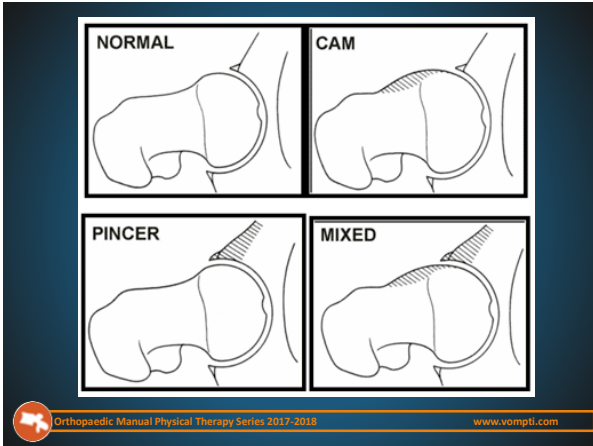
Bone Joint J 2013;95-B:770-6.

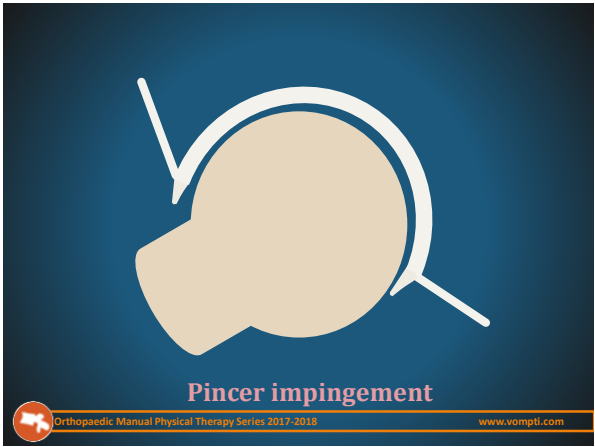
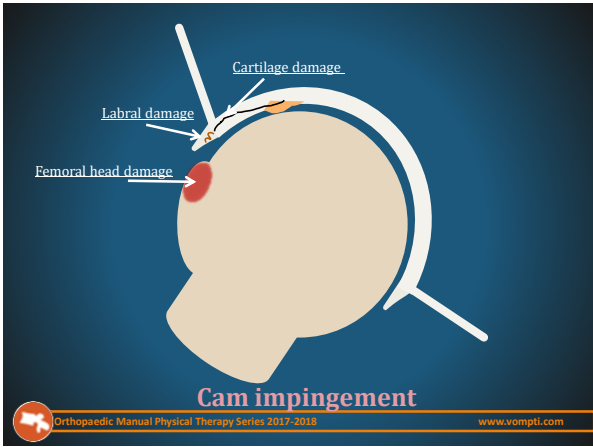
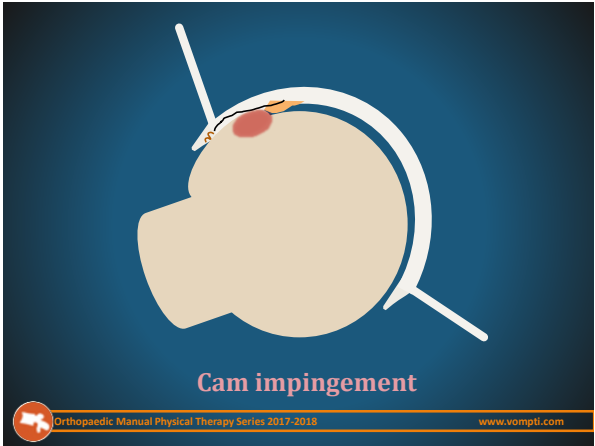
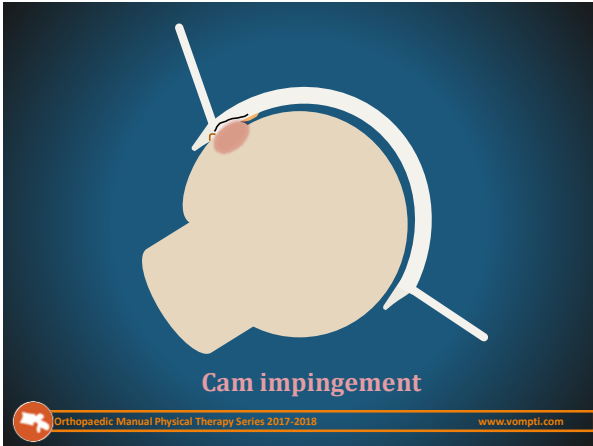
A HISTOLOGICAL INVESTIGATION

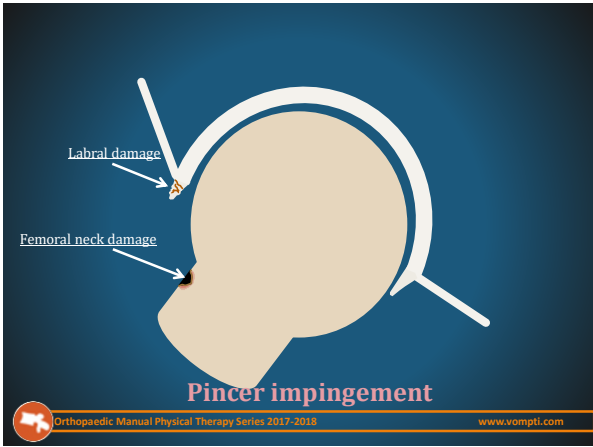
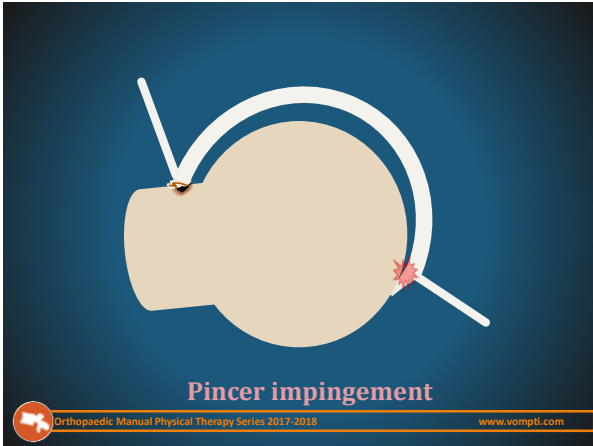
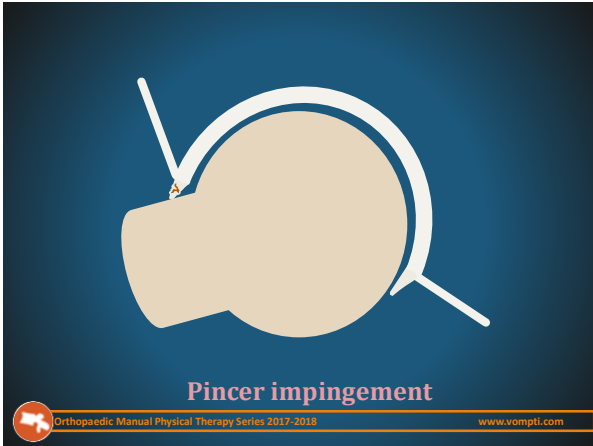
- Labrum contains nerve fibers for **nociceptive and proprioceptive**
- Small proportion of pain-specific positive signals (nociception and substance P)
- Larger number of unspecific somatosensory-related positive signals
- Proprioceptive function for the labrum
- The highest concentration of somatosensory-associated marker expression can be found close to the acetabular attachment.



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Inflammation and Neovascularization in Hip Impingement

The American Journal of Sports Medicine, Vol. 43, No. 8













Not Just
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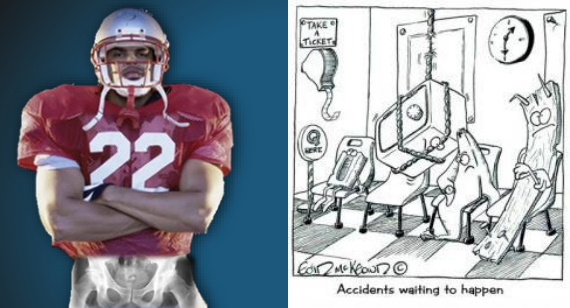
cell infiltrate in
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these cellular
y reveal novel
therapeutic approaches to the management of early hip impingement.

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Who is at risk?

Morphology	Activity	Trouble?
Normal 	Normal 	
Normal 	Supraphysiologic 	
Abnormal 	Normal 	
Abnormal 	Supraphysiologic 	

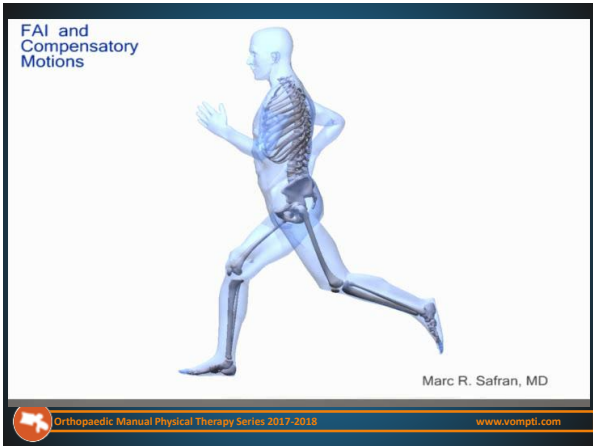
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Accidents waiting to happen

Athlete with high risk morphology

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Physical Therapy Plan

- **Manual Therapy**
- **Exercise Prescription: Progression**
 - Hip ERs: Activation/Timing
 - Lumbo Pelvic Stability
 - Neuromuscular Re-education
 - Lower Quarter Alignment
 - Eccentric Strengthening
- **1x/week x 8 weeks**

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Contents lists available at ScienceDirect

Physical Therapy in Sport

journal homepage: www.elsevier.com/ptsp

Masterclass
Conservative management of femoroacetabular impingement (FAI) in the long distance runner

Janice K. Loudon¹, Michael P. Reiman
Physical Therapy Division, Duke University, Durham, NC 27706, USA

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Response/ Re assess	Treatment	Running
	1st: Manual Therapy- Hip mobilizations (Post, Lat, Inf) STM - Psoas, Gluts PROM Hip ER activation	None
Decreased anterior hip sx's. Eliminate posterior hip pain Increased ROM Flexion, Ext, IR, ER	2 nd : Manual - Hip mobs STM/MFR - Psoas, Gluts Lumbopelvic Stabilization. Dynamic hip stabilization	Run 15 minutes pain free
(-)FADDIR Increased anterior hip pain following basketball	3 rd : Manual - Hip mobs; STM - Psoas, Gluts. Progress dynamic hip stabilization	Run 20 minutes pain free

Pelvic Rotation in Femoroacetabular Impingement Is Decreased Compared to Other Symptomatic Hip Conditions

J Orthop Sports Phys Ther 2016

CONCLUSION

RESULTS FROM THIS STUDY SUGGEST that people with symptomatic FAI with cam deformity have decreased posterior pelvic rotation during active hip flexion when compared to people with other symptomatic hip conditions and people with healthy hips. Limited posterior pelvic rotation during hip flexion may be an underlying mechanism of symptom onset in people with FAI with cam de-

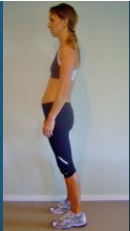
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Effect of Changes in Pelvic Tilt on Range of Motion to Impingement and Radiographic Parameters of Acetabular Morphologic Characteristics

Am J Sports Med 2014 42: 2402

James R. Ross,^{1,††} MD, Jeffrey J. Nepple,⁶ MD, Marc J. Philippon,⁶ MD, Bryan T. Kelly,¹ MD, Christopher M. Larson,¹ MD, and Asheesh Bedi,^{1‡} MD

- 10 degrees increased Anterior pelvic tilt reduced IMP free ROM of IR 5 - 9 degrees
- Posterior pelvic tilt increased the IMP free ROM



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Posterior Rotation Innominate – Mobilization/MET



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Femoral Anterior Glide with Medial Rotation



2) Imprecise spinning of femoral head during hip flexion

Precise rotation	Anterior glide
	

Sahrmann S

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Posterior Glide at 90 Flexion

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Psoas Mobilization


- Passive Strumming – Cranial → Caudad
- Inhibitive Pressure – Shortened position
- Active Lengthening
 - Int/Ext Rotation
 - Heel Slide
 - Ant/Post Pelvic Tilt



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Psoas/Capsular Mobility

- Posterior Pelvic tilt
- Tighten Glute
- Vary Direction of Lunge
- Vary Hip INT/EXT Rot

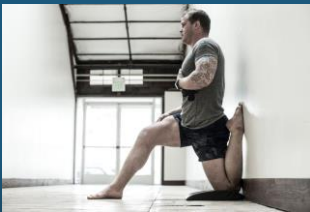


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Rectus Fem > Psoas typically

“Asses not Assume”


Don't over stretch anterior hip capsule and/or Psoas if hypermobile



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The Influence of Varying Hip Angle and Pelvis Position on Muscle Recruitment Patterns of the Hip Abductor Muscles During the Clam Exercise

- Gluteus maximus/medius activation greater pelvis was in neutral
- Gluteus medius activation was greatest when the hip was flexed to 60°.
- Activation of the tensor fasciae latae was not influenced by pelvis position or hip angle.

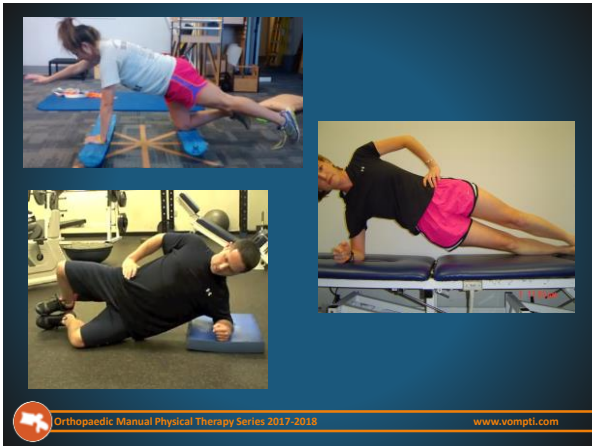


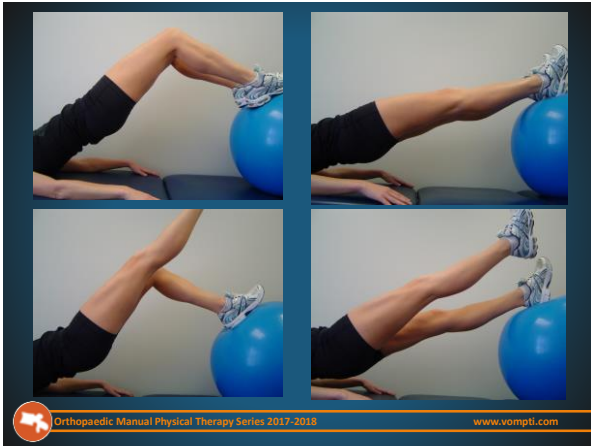
JOURNAL OF ORTHOPAEDIC & SPORTS PHYSICAL THERAPY | VOLUME 43 | NUMBER 5 | MAY 2013

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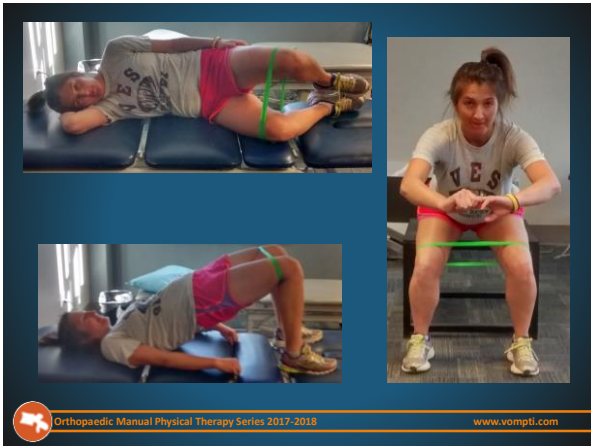


Response/ Re assess	Treatment	Running
	1 st : Manual - Hip mobilizations (Post, Lat, Inf) STM - Psoas, Gluts. Hip ER activation	None
Eliminate posterior hip pain Decreased anterior hip sxs. Increased ROM Flexion, Ext, IR, ER	2nd: Manual Therapy - Hip mobs STM/MFR - Psoas, Gluts PROM Lumbopelvic Stabilization Dynamic hip stabilization	Run 15 minutes pain free
(-)FADDIR Increased anterior hip pain following basketball	3 rd : Manual - Hip mobs; STM - Psoas, Gluts. Progress dynamic hip stabilization	Run 20 minutes pain free





Response/ Re assess	Treatment	Running
	1 st : Manual – Hip mobilizations STM – Psoas, Gluts. Hip ER activation	None
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(-)FADDIR Increased anterior hip pain following basketball	3rd: Manual Therapy – Hip mobs STM – Psoas, Gluts PROM Progress dynamic hip stabilization	Run 20 minutes pain free

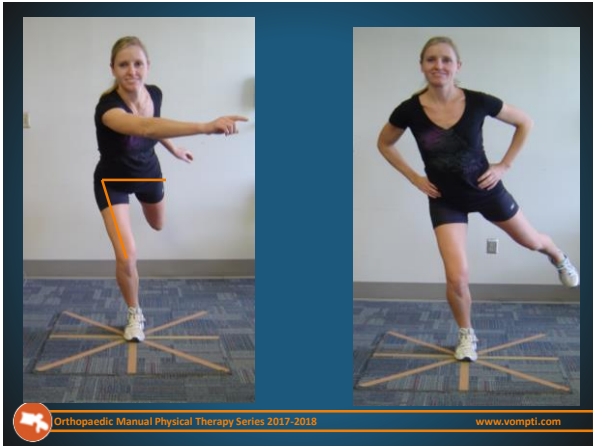




Response/Re assess	Treatment	Running
(-) Resisted SLR No anterior hip pain at rest/AM	4th : Manual Therapy- Hip mobs STM - Psoas PROM Progress Gluteal strengthening - activation/timing	Run 20 minutes 3x/week - pain free
Step Down (-) Trendelenberg Continued improving hip sxs	5-7 th visits: Manual- Hip mobs STM Psoas Progress LQ alignment	Running 25 minutes 3x/week pain free
Step Down: (-) dynamic valgum No ant hip "soreness" following running	8 th visit: Manual Hip mobs STM Psoas Progress eccentric strengthening	Run faster pace Hill work out




Response/Re assess	Treatment	Running
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- Faster pace run
- Hill workout
- **Return of all anterior hip symptoms**
- (+) FADDIR
- (+) Quadrant
- (+) Thomas Test
- (+) Resisted SLR
- ? Advanced Imaging
- ? Intra Articular Hip injection



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Systematic review
The validity and accuracy of clinical diagnostic tests used to detect labral pathology of the hip: A systematic review
Roanna M. Burgess^{a,c}, Alison Rushton^b, Chris Wright^b, Cathryn Daborn^a

Recommendations:


MRA preferred imaging method for patients with suspicion of a labral tear

> 95% accuracy with 3 views Manual Therapy (2011)

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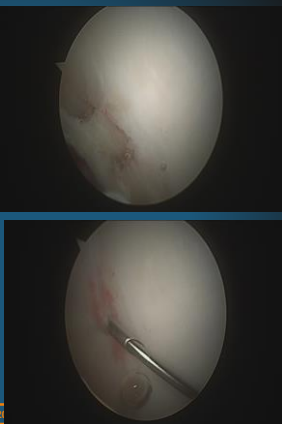
Advanced Imaging

- **MRA** – Slight Irregularity of free edge of superior labrum suggestive of fraying
- Intra articular Hip injection – No benefit



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- **Diagnostic Arthroscopy**
- **Extensive Synovectomy** – anterior/posterior
- **Chondroplasty**
- **Labral repair**
 - Anterior
 - Anterolateral



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Rehabilitation After Arthroscopic

Decision for

IJSPT

INVITED CLINICAL COMMENTARY
REHABILITATION AFTER LABRAL REPAIR AND FEMOROACETABULAR DECOMPRESSION: CRITERIA-BASED PROGRESSION THROUGH THE RETURN TO SPORT PHASE

Michael Wahoff, PT, SCS, OCS*, Steve Dieckhoff, MPT, DPT, ATC, CSCS*, Jenna Hodges, PT, DPT, ATC, CEAT, CSCS*, Joseph D. Phares, PT, DPT, SCS*

Non-surgical Treatment of Acetabular Labrum Tears: A Case Series
 * Vastak, Vanessa Oussoren, Robby L. Barin, Thapa Yoko Fukuda

Clin Sports Med 30 (2011) 463-482
 Michael Wahoff, PT, SCS*, Mark Ryan, MS, ATC, CSCS

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Efficacy of adding a physiotherapy rehabilitation programme to arthroscopic management of femoroacetabular impingement syndrome: a randomised controlled trial (FAIR)

Bennell KL, et al. *BMJ Open* 2017;7

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Post Operative

- WB 20# crutches x 3 weeks
- ROM - Int/Ext Rotation, Flexion to tolerance; EXT
- Joint Mobilizations (Gr I/II) - Distraction, Distraction in Flexion; Lateral distraction in Flexion
- Soft Tissue Mobilization - Rectus Fem, Psoas, Iliacus, ADDs, Gluts
- Hip Proprioception/Kinesthesia
- Glut Activation - Medius/Minimus
- Pelvic/Trunk Stability

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Gluteus minimus m.
Gluteus medius m. (Posterior part)

Fig. 5. Diagram showing the posterior part of gluteus medius and part of gluteus minimus with the corresponding force vector. These muscles pull the femoral head into the acetabulum on the weight-bearing side and are responsible for hip joint stability during gait.

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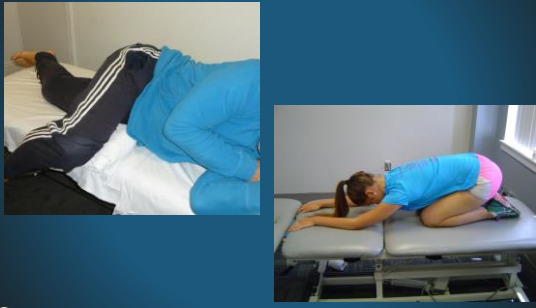
Posterior Glide at 90 Flexion

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Posterior Hip Mobilization

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Self Posterior Capsule Stretch



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3 weeks post op

- D/C crutches
- Slight c/o Ant hip pain
- Continue Manual Therapy
- Improving ROM – Flexion, ER limitation
- Proprioception
- Bilateral Strengthening – Closed Chain



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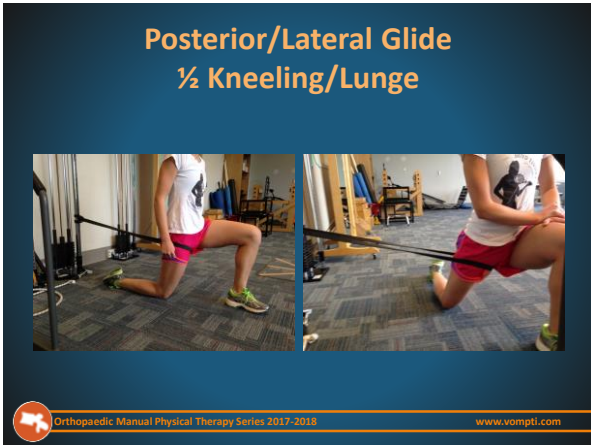
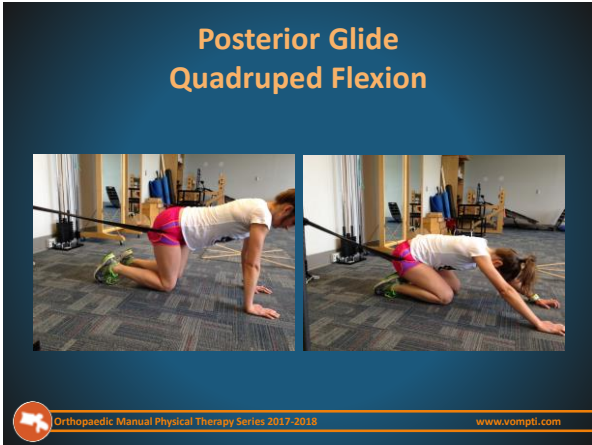
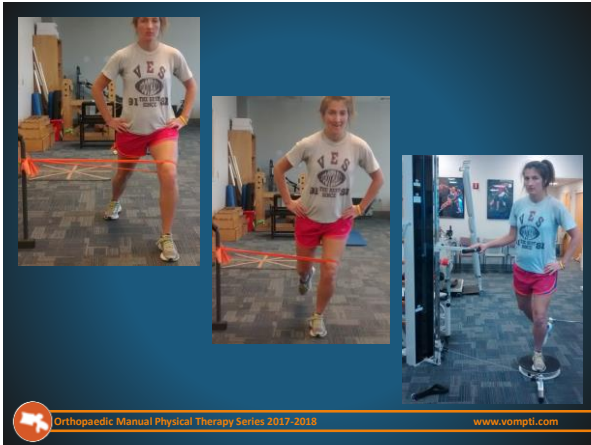


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4 Weeks Post Operative

- Pain free ambulation
- No Ant hip pain
- Progressing toward full ROM all planes – limited Flexion, Ext Rot
- Progress unilateral stance activities

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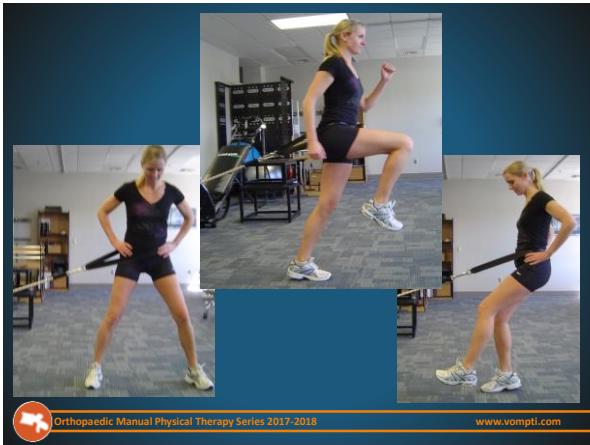




5 Weeks Post Operative

- Decreased functional strength with unilateral stance activities
 - Step Down Test – Fem ADD/IR, Slight Trendelenberg
- Began yoga – Modified poses
- Progressed Dynamic Stabilization - Proprioception

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6 Weeks Post Op

- Follow up with MD
- Cleared to began return to run progression
- Ran 10 minutes
- Slight anterior hip tightness following
- Manual Therapy
- Progress dynamic hip stabilization

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7 Weeks post op

- Running 10 minutes
3x/week
- **Observational Gait Assessment**
- Fem ADD/IR throughout stance, medial heel whip at terminal stance.

Patient or Problem	Intervention	Comparison Intervention	Outcomes
--------------------	--------------	-------------------------	----------

- In a runner s/p Chondroplasty/labral repair what are factors for pain free return to running?

Article Reviewed: _____

What did you learn from article to apply to your specific patient/clinical case?

The effects of cam femoroacetabular impingement corrective surgery on lower-extremity gait biomechanics

Gait & Posture 37 (2013) 258-263

The effects of cam femoroacetabular impingement corrective surgery on lower-extremity gait biomechanics

Gait & Posture 37 (2013) 258-263

- 3D lower-extremity joint kinematics and kinetics.
- Comparing preoperative and postoperative FAI groups, and a healthy control group.
- Gait Biomechanics of FAI patients **did not return to normal after surgery.**
 - Reduced hip frontal and sagittal plane ROM
 - Smaller peak Hip ABD and INT ROT moments
 - Decreased peak Hip power
- Reductions in hip pain, hip impairments detected preoperatively, perhaps due to modified gait patterns, **persisted postoperatively.**
- ??? Further research is required to confirm the reasons for which lower-extremity gait mechanics of FAI patients do not return to normal following surgery ???

Lower Extremity Injuries: Is It Just About Hip Strength?

BRYAN C. HEIDERSCHEIT, PT, PhD
(Online Sports Phys Ther 2005;49(3):214-6; doi:10.2519/jospt.2005.0302)



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Gait Retraining for Runners: In Search of the Ideal

JOURNAL OF ORTHOPAEDIC & SPORTS PHYSICAL THERAPY | VOLUME 41 | NUMBER 12 | DECEMBER 2011
 BRYAN HEIDERSCHEIT, PT, PhD

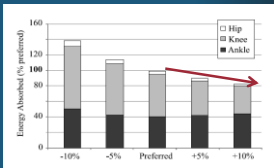


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Effects of Step Rate Manipulation on Joint Mechanics during Running

Med. Sci. Sports Exerc., Vol. 43, No. 2, pp. 296-302, 2011.
 BRYAN C. HEIDERSCHEIT^{1,2}, ELIZABETH S. CHUMANOV³, MAX P. MICHALSKI³, CHRISTA M. WILLE², and MICHAEL B. RYAN¹

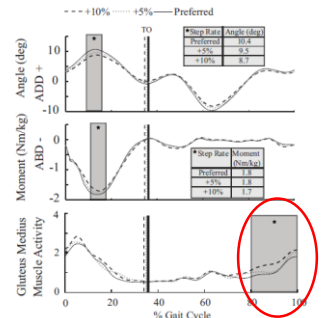
- Increased step rate 10%:**
 - 34% Decrease in energy absorbed at the knee > hip
 - Decreased step length
 - IC: Heel closer to COM
 - Decreased braking impulse
 - Decreased knee flexion
 - Increased leg stiffness
 - Decreased Hip ADD
 - Decreased COM vertical excursion



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Changes in muscle activation patterns when running step rate is increased

Elizabeth S. Chumanov^a, Christa M. Wille^b, Max P. Michalski^b, Bryan C. Heiderscheit^{ab,*}



Step Rate	Angle (deg)
Preferred	10.4
-5%	9.5
+10%	8.7

Step Rate	Moment (Nm/kg)
Preferred	1.1
-5%	1.0
+10%	1.2

Significantly Increased Gluteus activation at late swing with 10% increased in step rate

Gait & Posture 36 (2012) 231-235

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Mirror gait retraining for the treatment of patellofemoral pain in female runners
 Richard W. Willy ^{a,*}, John P. Scholz ^b, Irene S. Davis ^c *Clinical Biomechanics 27 (2012) 1045-1051*

- Gait Re training – **Mirror**
- Significant Improvements in
 - Pain
 - Function
 - Hip IR/ADD
- Improvement in Central Processing
 - NM improvements
 - SL Squat
 - Step Down
- Maintained for 3 months

Session Number	Treatment Time (Minutes)	Feedback Time (Minutes)
1	12	12
2	14	13
3	16	14
4	18	15
5	20	16
6	22	17
7	24	18
8	26	19

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iHOT¹²
 INTERNATIONAL HIP OUTCOME TOOL

NAME: _____ DATE OF BIRTH: _____ TODAY'S DATE: _____

SELECT ONE OF THE BEST ASPECTS OF YOUR HIP PROBLEMS AS YOU FEEL ABOUT IT. (Circle one)

Left Right

QUALITY OF LIFE QUESTIONNAIRE FOR YOUNG, ACTIVE PEOPLE WITH HIP PROBLEMS

INSTRUCTIONS

- These questions ask about the problems you may be experiencing in your hip, how these problems affect your life, and the emotions you may feel because of these problems.
- Please indicate the severity by marking the line below each question with a slash.
- If you put a mark on the far left, it means that you feel you are significantly impaired. For example:

SIGNIFICANTLY IMPAIRED	/	NO PROBLEMS AT ALL
------------------------	---	--------------------
- If you put a mark on the far right, it means that you do not think that you have any problems with your hip. For example:

NO PROBLEMS AT ALL	/	SIGNIFICANTLY IMPAIRED
--------------------	---	------------------------
- If the mark is placed in the middle of the line, this indicates that you are moderately disabled, or in other words, between the extremes of "significantly impaired" and "no problems at all." It is important to put your mark at either end of the line if the extreme descriptions accurately reflect your situation.
- Please let your answers describe the typical situation in the last month.

TIP If you don't do an activity, imagine how your hip would feel if you had to try it.

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Q1 Overall, how much pain do you have in your hip/groin?
 EXTREME PAIN _____ NO PAIN AT ALL

Q2 How difficult is it for you to get up and down off the floor/ground?
 EXTREMELY DIFFICULT _____ NOT DIFFICULT AT ALL

Q3 How difficult is it for you to walk long distances?
 EXTREMELY DIFFICULT _____ NOT DIFFICULT AT ALL

Q4 How much trouble do you have with grinding, catching or clicking in your hip?
 SEVERE TROUBLE _____ NO TROUBLE AT ALL

Q5 How much trouble do you have pushing, pulling, lifting or carrying heavy objects?
 SEVERE TROUBLE _____ NO TROUBLE AT ALL

Q6 How concerned are you about cutting/changing directions during your sport or recreational activities?
 EXTREMELY CONCERNED _____ NOT CONCERNED AT ALL

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Q7 How much pain do you experience in your hip after activity?
EXTREME PAIN _____ NO PAIN AT ALL

Q8 How concerned are you about picking up or carrying children because of your hip?
EXTREMELY CONCERNED _____ NOT CONCERNED AT ALL

Q9 How much trouble do you have with sexual activity because of your hip?
 This is not relevant to me
SEVERE TROUBLE _____ NO TROUBLE AT ALL

Q10 How much of the time are you aware of the disability in your hip?
CONSTANTLY AWARE _____ NOT AWARE AT ALL

Q11 How concerned are you about your ability to maintain your desired fitness level?
EXTREMELY CONCERNED _____ NOT CONCERNED AT ALL

Q12 How much of a distraction is your hip problem?
EXTREME DISTRACTION _____ NO DISTRACTION AT ALL

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