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PROFESSOR OF TRAUMA & ORTHOPAEDIC SURGERY

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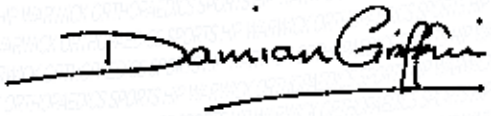
Dear Colleague,

The Sports Hip Conference will run again in 2018 as part of our portfolio of Sports Injury conferences. Some of you may have already attended the Sports Foot & Ankle, Sports Shoulder and and Sports Knee conferences. The dates for the next events will shortly be published on our website
www.sports-surgery.org

The key feature of these Sports Injury conferences is that we explore the latest ideas and most difficult problems in a relatively small group, guided by an expert international faculty.

Please do let us know if you have any thoughts about the meeting or any suggestions as to how we might develop it in the future.

With very best wishes.



PROFESSOR DAMIAN GRIFFIN
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Chad Mather



Chad Mather is an assistant professor in the Department of Orthopaedic Surgery and Duke Clinical Research Institute at Duke Health. His clinical practice focuses on hip arthroscopy.

Chad is a health services researcher with a focus on economic analysis, decision modeling, health preference measurement and personalized decision-making. His current work focuses on building tools for healthcare consumerism by facilitating measurement and communication of individual patient preferences in treatment decisions. Additionally, Chad maintains a great interest in health innovation, particularly in creating innovative healthcare organizations and engaging physicians to embrace innovation.

Chad was a health policy fellow with the American Academy of Orthopaedic Surgeons and the Arthroscopy Association of North America. He is currently the vice president of the North Carolina Orthopaedic Association.

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Session 2

DEEP GLUTEAL AND PERITROCHANTERIC SPACES

Deep gluteal syndrome and ischiofemoral impingement

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Deep Gluteal Space Syndrome & Ischiofemoral Impingement

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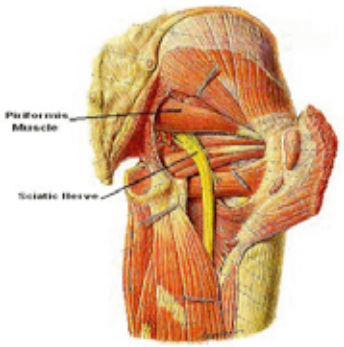
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Disclosures

- Consultant
  - Stryker
  - KNG Health Consulting
- Board Membership
  - North Carolina Orthopaedic Association

Deep Gluteal Space Syndrome

- Sciatic Nerve (L4 o S3) exits through sciatic notch inferior to the piriformis muscle
- Covered by the G. Max and passes between the ischial tuberosity and greater trochanter
  - 28mm of excursion with hip flexion
  - Nerve is able to stretch and glide with joint movement



Martin et al. Arthroscopy 2011.

3

Deep Gluteal Space Syndrome

- History: trauma and symptoms of inability to sit (> 30 min)
  - Radicular pain and paresthesias
- Entrapment can occur either at the level of the spine (central) or below (peripheral)
  - Exclude spine
- Deep gluteal syndrome (DGS) can be caused by fibrous bands, gluteal, piriformis, or HS muscles

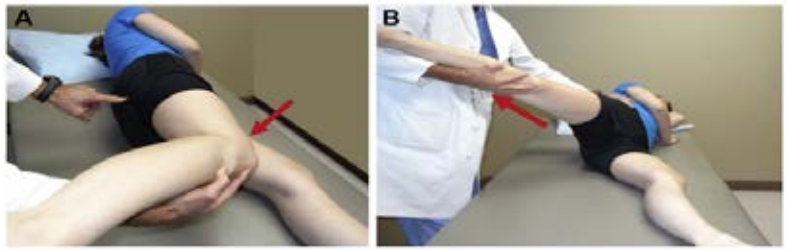


Seated piriformis stretch test

Martin et al. Arthroscopy 2011.

Ischiofemoral Impingement

- Lesser trochanter and ischium
- Buttock pain, pain with sitting
- Pain with hip extension (running, end of stance phase)
- No pain with resisted hamstring testing

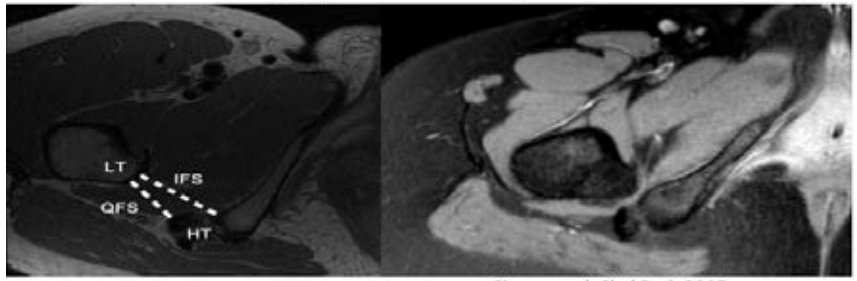


Martin et al. Arthroscopy 2015.

5

Ischiofemoral Impingement

- Guided Injections (U/S or CT), PT
- IFS < 15mm, Accuracy 78.3%, Sens 76.9%, Spec 81%
- QFS < 10mm, Accuracy 77.1%, Sens 78.7%, Spec 74.1%
- Common asymptomatic MRI finding



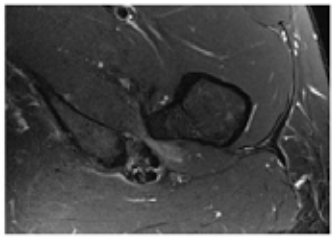
Martin et al. Arthroscopy 2015.

Singer et al, Skel Rad, 2015

6

Treatment

- Non-operative
  - Slower to move to surgery unless severe and obvious (min 4 months)
  - PT, injections, NSAIDS
  - Avoid painful positions
  - lumbar spine eval

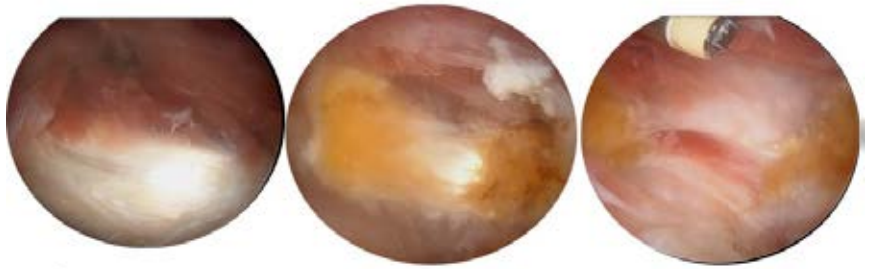


How to get started with surgical treatment of these problems…

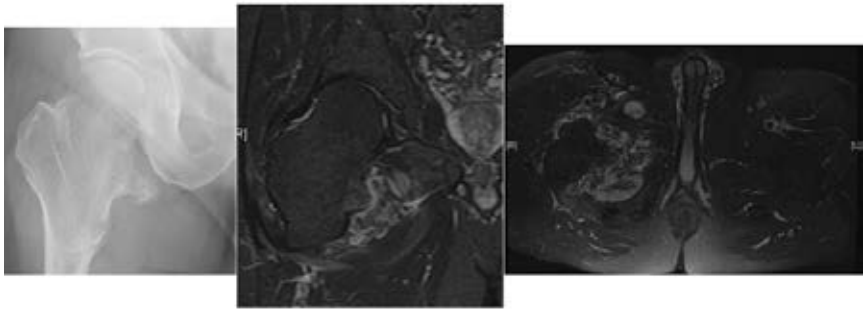




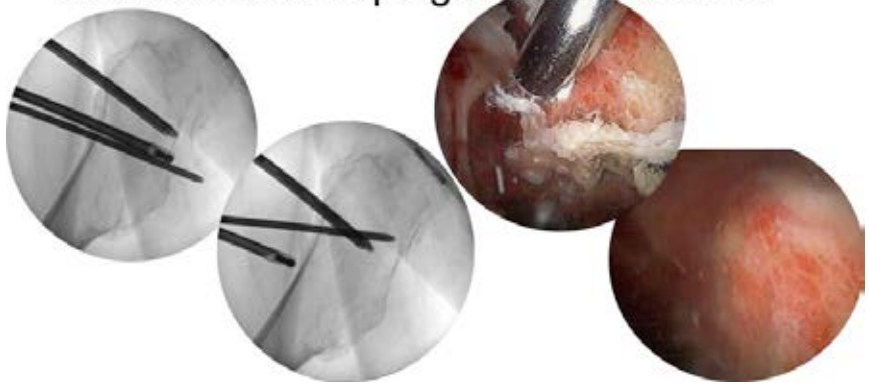
From the front
Extra-articular Psoas Release (THA)



Ischiofemoral Impingement with MHE

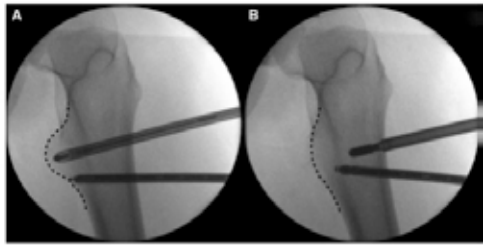


Ischiofemoral Impingement with MHE



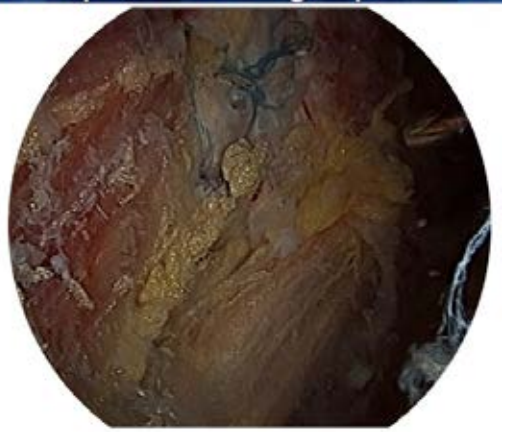
O'Donnell et al, J Hip Pres Surg, 2014

- 2-3 anterior portals
  - 3cm anterior to femur
  - Prox portal at lesser
- Resect from distal to proximal and anterior to posterior
  - Flexion, abd, ER
  - Curved bur/RF
- Check radiographs
- Keep surgical time short

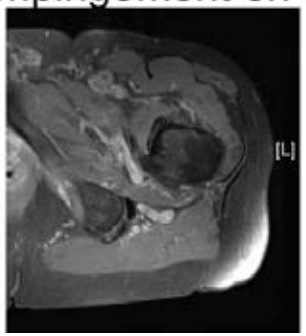


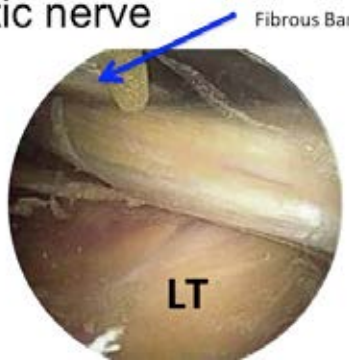
From the back…Endoscopic hamstring repair





Ischial bursitis with fibrous band impingement on sciatic nerve





Adhesions

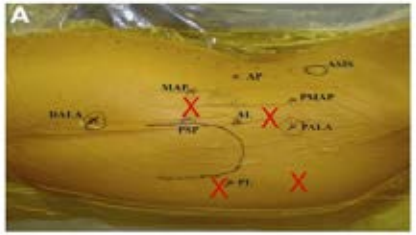


After release



Videos courtesy of Damian Griffin

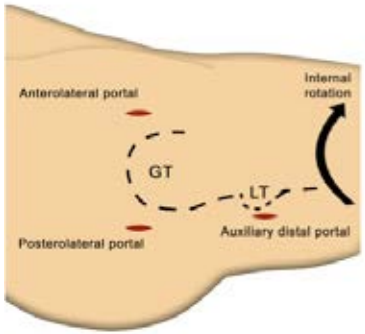
From the side…peritrochanteric space endoscopy

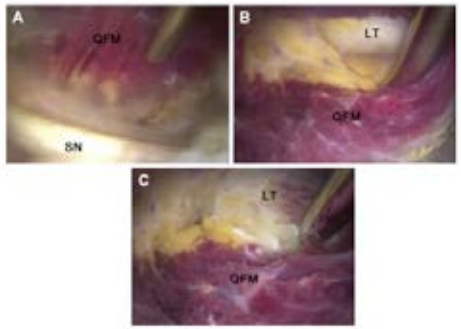


- Deep gluteal space is just posterior to the anterior border of the gluteal sling

Robertson WR & Kelly BT. Arthroscopy 2008.

Hal Martin's Preferred Approach





Martin et al, Arthroscopy, 2015 LT decompression with measurement of distance and exam

Ischiofemoral Impingement
LT excision

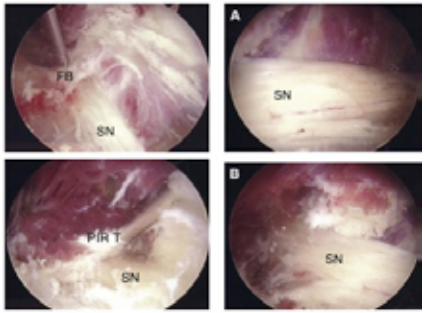
- Two distinct tendons
- Bald anterior wall
- Cannot resect LT and maintain psoas attachment
- High level athletes?



Gomez-Hoyas, Martin et al, J Hip Preservation 2015

Deep Gluteal Syndrome - Outcomes

- 35 Patients
- Mean age of 47 years
- **Duration of symptoms: 3.7 years**
- MHHS pre-op: 54.4
- MHHS post-op: 78.0
- **Narcotic use pre-op: 21 pts**
- **Narcotic use post-op: 2 pts**
- VAS: 2.4
- Absence of Sit Pain: 83%



Martin et al. Arthroscopy 2011.

19

Ischiofemoral Impingement - Outcomes

- 5 patients, 2 yr min f/u
- Dx: buttock pain + pos impingement, long stride walking test, QF edema
- mHHS
  - Preop 51.3 (34.1-73.7)
  - Post op 94.2 (78.1-100)
  - increase of 43 pts (FAI ~25)
- VAS 6.6 down to 1
- Return to sport 4.4 months
- No complications



Martin et al, Arthroscopy, 2015

Summary

- Evolving understanding of diagnosis and treatment
- Diagnosis supported by both history, exam and imaging
- Extensive trial of non-op treatment
- Chronic pain, high incidence of narcotic use
  - Challenging but high potential impact
- Surgical techniques are an evolution of current approaches
  - Safe
  - Excellent outcomes

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Session 7

FEMOROACETABULAR IMPINGEMENT 1: HOT TOPICS

Is surgery cost-effective?

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CONTACT THE AUTHOR

Is Hip Arthroscopy Cost Effective?

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Duke Orthopaedics

What does it mean to be cost effective?

Includes all costs
- direct (-)
- indirect (+)
  - Productivity
  - Caregiver
  - Externalities
  - Spillover

$$\frac{\$}{QALY} > \text{Willingness to pay}$$

Moving target
Dependent on perspective

UK – NICE
- 20-30K pound/QALY

USA – tiered
- $50k/QALY – governmental
- $100k/QALY – societal
- $150k/QALY – health system

Individual variability
Must reflect trade-offs
Relative to gold standard/baseline

Generating the hypothesis

Favorable
- Occurs in young people
  - Prime productive years
- Results are durable
- Pain at rest/sitting
- Current outcomes studies favorable

Unfavorable
- High direct/upfront costs
- Perception of inconsistent outcomes
- Limited evidence
- Payers limiting access
  - US
  - Canada

Hypothesis: hip arthroscopy for symptomatic FAI is cost effective

The Effects of Arthroscopy for Symptomatic Femoroacetabular Impingement on Quality of Life and Economic Outcomes

Richard C. Mather III MD MBA, Shane J. Nho MD, Andrew Federer MD, Jennifer Nguyen PhD, Chris Larson MD, J. W. Thomas Byrd MD, Marc J. Philippon MD Asheesh Bedi MD, Joss Saavoss PhD, Michael Salata MD & Lane Koenig PhD

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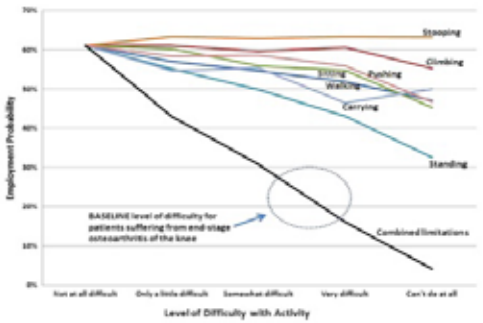
KNG HEALTH CONSULTING LLC

Quantifying impact on productivity

MSK Value Model

Regression analysis to quantify the relationship between the severity of activity limitations and employment, household income, missed work days and disability payments

- National Health Interview Survey (185,829)
- Mean Aggregate Productivity



Dall et al, Cost Effectiveness and Resource Allocation, 2013

AAOS Value Project







AAOS American Academy of Orthopaedic Surgeons / American Association of Orthopaedic Surgeons

Methods and modeling

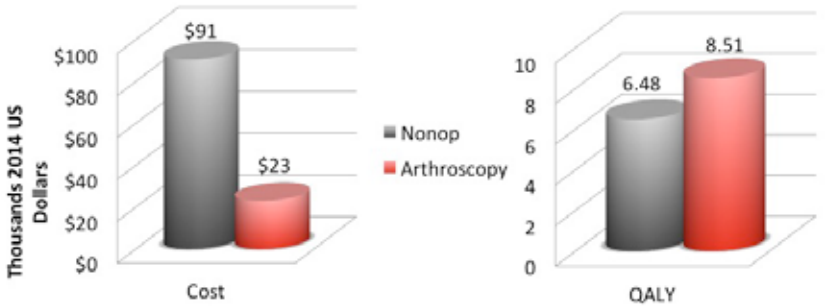
- Markov model
- Hip arthroscopy vs symptomatic treatment
  - Assume all patients had 3 months non-operative management
  - Counterfactual (no crossover), allows measurement of full impact of the intervention
- 10 year time horizon
- Populations and model assumptions
  - Less controversial indications, high volume surgeons
  - Non-arthritic, young patients, no dysplasia, Ehlers Danlos, etc
  - Age <50, mean 33
  - MSK value model populated from two high volume surgeons
  - Assumptions validated with a survey to a group of high volume hip surgeons
  - Direct costs taken from private payer database (reimbursement)

Results – Mean Aggregate Productivity

- 106 patients, 12-18 months postop
  - Mean age 33±8 (17-49), 70% female
  - All had labral repair, 95% femoral osteochondroplasty, 55% acetabular rim trimming

	Mean change (preop to postop)	Upper bound	Lower bound
Probability of working	19.5%	24.9%	13.4%
Mean aggregate productivity (annual)	$8,968	$14,747	$2,988

Results – Markov model, 10 year time horizon



Hip Arthroscopy is cost saving and more effective

Sensitivity Analysis

- Results highly robust with very few sensitive variables
- Break even point on investment in surgery = 1.87 yrs
- Direct costs only
  - Hip arthroscopy = $5,625 incremental costs
    - $2,751 ICER = highly cost effective

Comparison to other MSK Conditions

National Health Interview Survey Function Index Value

Condition	Pre Mean	Post Mean	Gain
Symptomatic FAI*	**58.8**	**88.2**	**29.4**
Anterior Cruciate Ligament *Mather et al JBJS 2013*	81.4	93.0	11.6
Total Knee Replacement *Ruiz et al JBJS 2013*	48.0	74.3	26.3

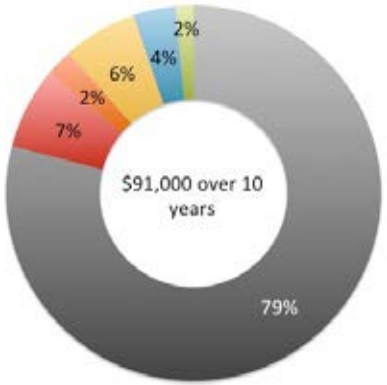
*Statistically significant improvement in 7/8 functional activities/questions

11

Economic Value Added

86% total value is captured as surplus by stakeholders

92% of that surplus captured by patients/ employers



- Surplus to society (patient, employer)
- Contribution margin to hospital
- Surgeon fee
- Cost to hospital
- Rehabilitation costs (DME, PT)
- Lost productivity due to recovery

What about timing of surgery?

- Some payers and other stakeholders have advocated for a mandatory 6 month trial of non-operative treatment

Cost Effectiveness Analysis of Early Arthroscopic Hip Surgery Versus Non-operative Treatment and Delayed Surgery for Symptomatic Femoroacetabular Impingement

Richard C. Mather III MD MBA, Jaskarndip Chahal MD FRCSC, Simon Lee MPH, Charles Bush-Joseph MD, Bryan Kelly MD, J. W. Thomas Byrd MD, Marc J. Philippon MD & Shane J. Nho MD

HOSPITAL FOR SPECIAL SURGERY · Nashville Sports Medicine · Midwest Orthopaedics at RUSH

Duke Clinical Research Institute — From Thought Leadership to Clinical Practice · Duke Orthopaedics

Results

Early Arthroscopy is Cost Effective

	Cost	QALY	Cost Diff	Diff in QALY	ICER
Early Arthroscopy	$18,686	2.016	$1,968	0.061	$32,295
Nonoperative RX & Delayed Arthroscopy	$16,718	1.955	-	-	-

- Early arthroscopy achieved greater QALYs at a cost below willingness to pay
  - $50,000-$100,000/QALY

Results – Sensitivity Analysis

Sensitivity Analysis		Threshold	
Variable	Base Case Value	Cost Effectiveness	Cost
Non-op Success Rate	44%	47%	36%
Months of Non-op Rx	6	3	Robust
Cost of Non-op Rx*	$3,377 $2,718	$2,300 $710	$5,345 $1,820
Cost of Surgery	$18,686	$20,994	14,476

*$3,377 reflects the cost of the first 6 weeks of treatment while $2,718 reflects each subsequent 6-week period **total percent of good and excellent results

Is there value in delaying THA?

- No OA – ICER $21,700 = Cost effective
  - Duration of benefit only 3 yrs
- OA – ICER $79,500 = NOT cost effective
- ***Highly cost effective*** if THA delayed by 3 years or more
- ***Cost saving*** if THA delayed 16 yrs or more

Shearer, Bozic et al, CORR, 2012

The Way Forward

What we know

- Hip pain and associated disability is costly
- ***Interventions*** targeted to FAI syndrome are likely high value
- ***Treatments*** should be framed as investments
- Findings support access to care and ***research funding***
- Greater economic impact than ACL & rotator cuff tears
- Earlier ***treatment*** is cost effective

What need to know

- Cost effectiveness in less clear indications (over age 50, borderline dysplasia)
- Role of provider volume on cost and outcomes
- Impact on narcotic use/abuse
- Impact of mean aggregate productivity on decision making
- Patient preferences
  - Know what is important to patients
    - Facilitates communication and engagement
  - Extended periods of rehab, tolerance for failure (THA)