ARTHROSCOPIC ADVANCES OF THE HIP AND PELVIS

Dean K. Matsuda, MD
Director, Hip Arthroscopy
DISC Sports and Spine
Marina del Rey, California, USA
DISCLOSURES

- **Royalties:**
  - Smith and Nephew
  - Zimmer Biomet

- **Consultant**
  - Zimmer Biomet

- **Committees**
  - AAOS Adult Hip program committee
  - Director, Traveling fellowships, Orthopaedics Overseas

- **Editorial Boards:**
  - Orthopedics Today
“Hip arthroscopy has become the fastest growing area of orthopedic surgery.”
- Safran MJ. Sports Medicine & Arthroscopy Review, June 2010

Eighteenfold increase 1999-2009
- Colvin, JBJS Am 2012

Threefold increase 2008-2013
- Bonazza, Arthroscopy 2018
Indications 1989

Thomas Sampson, MD
Video Journal of Orthopedics

1) synovectomy and/or synovial biopsy
2) removal of loose bodies
3) removal of debris following a closed reduction of a fracture dislocation of the hip
4) evaluation and treatment of osteochondritis dissecans
5) evaluation for arthroplasty
6) unresolved hip pain.
Indications 2018

- Labral Tears
  - Labrochondral injury
- Femoroacetabular Impingement (FAI)
- Loose Bodies
- Benign Tumors
- Ligamentum Teres Injuries
- Snapping Hip – Internal
- Iliopsoas Impingement
- Septic Hip
- AVN
- OCD
- Dysplasia
- Hip Instability
- SCFE
- Post-THA
- Hip Dislocations/Subluxations
- Arthroscopic Osteosynthesis

- Peritrochanteric Space
  - Snapping Hip – External
  - Recalcitrant Trochanteric Bursitis
  - Gluteus Medius/Minimus Tears

- Osteitis Pubis/Athletic Pubalgia

- Endoscopy-assisted PAO
  - Triple
  - Bernese ?

- Deep Gluteal Space
  - Sciatic Entrapment
  - Ischiofemoral impingement
  - Proximal hamstring repair
ROADMAP

- Broad Exposure
  - Non-technical
- Relevant Topics
  - Vetted
It's no longer just Arthritis, Bursitis, or Flexor Tendinitis

- Labral tears
- Femoroacetabular impingement
- Dysplasia
- Peritrochanteric space
- Deep gluteal space
- Athletic pubalgia
- Fractures
LABRAL TEARS
Labral Tear Treatment Options

- Benign neglect
- Debridement
  - Resection
  - Selective
- Repair/refixation
- Reconstruction
  - Labralization
Labral Tear Treatment Options

- Benign neglect
- Debridement
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Labral Tear Treatment Options

- Benign neglect
- Debridement
  - Resection
  - Selective
- Repair/refixation
- Reconstruction
  - Labralization
Better Outcomes from Labral Repair than Debridement?

**PRO**

1. Haddad, Bone Joint J. 2014
2. Krych, Arthroscopy. 2013
3. Tibor, HSS J. 2012

**CON**

1. Cetinkaya, Hip Int. 2015
2. Zaltz, CORR 2012
3. Menge, JBJS. 2017
Labral Reconstruction: Concept

- Graft replaces deficient/irreparable labral segment
Labral Reconstruction: Options

- **Autograft**
  - ITB
  - Gracilis/SemiT
  - Rectus
  - Capsule
  - (Lig Teres)

- **Allograft**
  - ITB
  - SemiT
  - Tib Ant
  - Labrum

- **Labralization**
  - Cartilage pseudolabrum
Labral Reconstruction: Techniques

Gracilis Autograft

Matsuda, TIO 2012
Matsuda AJSM 2012
Outcomes

- Clinical improvement
  - Arthroscopic
    - Wolff, ISHA 2016
    - White, Arthroscopy 2016
    - Geyer, AJSM 2013
    - Boykin, AJSM 2013
    - Domb, AJSM 2013
    - Matsuda, AJSM 2013
    - Philippon, Arthroscopy 2010
  - Open
    - Costa Rocha, Hip Int 2013
    - Walker, CORR 2012
    - Sierra, CORR 2009
My Preference

- Segmental Reconstruction
  - Allograft SemiT

- No patient leaves OR without restored labral fluid seal and eradication of any impingement
FEMOROACETABULAR IMPINGEMENT: PUSHING THE LIMITS
Femoroacetabular Impingement (FAI)

- Arthroscopy
  - Focal Pincer
  - Anterolateral Cam

- Open Surgical Dislocation
  - Global Pincer
  - Posterior Cam
Anteromedial Femoroplasty
to increase flexed hip internal rotation

Matsuda, Arthroscopy 2014
RESIDENT’S RIDGE
Posterior Cam Deformity

Challenges

- Vessels
- Posterior access

Posterior Cam Deformity Solutions

Posterior Cam Deformity
Global Overcoverage

Challenges

- **Access**
  - Central compartment
  - Posterior rim

- **Intra-op monitoring**
  - Acetabuloplasty

Posterior Rim Access

- Modified MAP

OUTCOMES: Global vs Focal Pincer FAI

Matsuda DK, JHPS 2015
Multicenter outcomes of arthroscopic surgery for femoroacetabular impingement in the community hospital setting.

Matsuda DK\(^1\), Kholed M\(^2\), Antwan M\(^2\), Burchette R\(^3\), Bini J\(^3\), Anthony F\(^2\), Harro J\(^2\), Calipusan C\(^2\)

Abstract

The purpose of this study is to determine multi-center outcomes from arthroscopic surgery for femoroacetabular impingement in the community hospital setting. A prospective design with 2-year minimum follow-up using the nonarthritic hip score (NAHS), a 100-point scale of perceived post-operative change for pain, activities of daily living, sports activities, and patient satisfaction was implemented at three community hospitals. Of 150 enrolled patients (159 hips) with mean age of 40 years (range, 12-73), there was 81% participation. Mean NAHS at preoperative was 54.9, 3 months: 66.6, 12 months: 74.9 and 24 months: 75.4. This represents a 20.5-point improvement in NAHS (P < 0.001). On the 100-point scale, pain was rated +73.5, ADL's: +76.2 and sports: +68.6. 64% of patients were satisfied with their surgical outcome. Conversion arthroplasty rate was 8.8% and complication rate was 2.5%. In conclusion, arthroscopic surgery for symptomatic femoroacetabular impingement in the community setting provides safe and successful outcomes.

Poorer Arthroscopic Outcomes of Mild Dysplasia With Cam Femoroacetabular Impingement Versus Mixed Femoroacetabular Impingement In Absence of Capsular Repair.

Matsuda DK\(^1\), Guido N, Kholed M, Matsuda NA, Anthony F, Sampson J, Burchette R

Abstract

PURPOSE: To compare outcomes of mild dysplasia with cam femoroacetabular impingement (FAI) vs mixed FAI with hip arthroscopy without capsular repair.

METHODS: A retrospective review of a 2009 to 2016 multicenter prospective outcome study was performed comparing a cohort with mild dysplasia and cam femoroacetabular impingement (cohort D) to a cohort with mixed FAI (cohort M). Outcome measures included Nonarthritic Hip Score (NAHS) and satisfaction with minimum 2-year follow-up.

RESULTS: Of 150 patients/159 hips enrolled in the initial prospective outcome study, 10 patients/10 hips had acetabular dysplasia and 8 patients met the inclusion criteria. Cohort D had 5 patients (5 females) of mean age 40.5 years with mean lateral center-edge angle (LCEA) of 19\(^\circ\) (range, 16\(^\circ\)-24\(^\circ\)) demonstrating a mean change in NAHS of +20.06 at 3 months (P = 0.05), +18.33 at 12 months (P < 0.001), and +0.75 at 24 months (P = 0.74). Mean satisfaction was 2.88 out of 5. Cohort M had 59 patients (52 females) of mean age 36.6 years with a mean LCEA of 33\(^\circ\) (range, 25\(^\circ\)-28\(^\circ\)) demonstrating a mean change in NAHS of +12.06 at 3 months (P < 0.001), +30.36 at 12 months (P < 0.001), and +1.96 at 24 months (P < 0.001). Mean satisfaction was 3.58 out of 5. Cohort D demonstrated significantly less improvement in NAHS (P = 0.002) and a difference of 3.19 points compared to cohort M at minimum 2-year follow-up. Dysplasia was the only statistically significant predictor of poorer outcomes.

CONCLUSION: The common combination of mild dysplasia and cam FAI has poorer outcomes than mixed FAI following arthroscopic surgery without capsular repair.
Femoroacetabular Impingement Outcomes

80-85% successful outcomes

PROs increased @ min 2+ years postop

8.8% conversion THA

3.1% revision arthroscopies

2.5% complications

Dysplasia subset did poorer in era before capsular closure
Femoroacetabular Impingement Outcomes

- **10% Revision Arthroscopies**
  - Bonazza, Arthroscopy 2018

- **519 case Learning Curve to decrease revision rate**
  - Mehta, AJSM 2018

![Learning Curve Graph]

**Steep Curve**
You reached high skill rapidly earlier on. I.e., it’s easier to learn.

**Shallow Curve**
You gain skill painfully slowly. I.e., it’s hard to learn.

![Graph Image]
ARTHROSCOPY-ASSISTED CLOSED PROXIMAL FEMORAL OSTEOFOMY
Femoral Version affects FAI Outcomes?

- Fabricant et al, JBJS 2015
  - Relative Retroversion → Less improvement
Severe Femoral Retroversion
“Textbook” Femoroplasty
“Closed” Derotational Osteotomy
“Closed” Derotational Osteotomy
“Closed” Derotational Osteotomy
DYSPLASIA??
Arthroscopic labral debridement in dysplasia → poor outcomes

Parvizi J, Arthroplasty 2009
Arthroscopic Capsular Plication and Labral Preservation in Borderline Hip Dysplasia

Domb, AJSM 2013

- 77% Good/Excellent Outcomes
89% of studies: Clinical improvement
14% Revision rate
9.6% THA conversion

Outcomes of hip arthroscopy are inferior in dysplastic patients, although outcomes may be better in borderline dysplastic patients

Yueng, BJR 2016
Dysplasia: When Bony Procedure Needed

- Age ≥ 42 years
- LCEA <19°
- ACEA >13°
- Tonnis angle >17°
- Coxa Valga NSA >140°
- Broken Shenton’s Line
- Any OA

Hatakeyama, AJSM 2018
Matsuda, Arthroscopy 2012
Outcomes as Function of Acetabular Coverage

- Borderline dysplasia and global pincer FAI had similar successful outcomes as control group.
Endoscopic Shelf Procedure

Uchida S et al, Arthrosc Tech, Feb 2014
Endoscopic Shelf Procedure

Uchida S et al, Arthrosc Tech, Feb 2014
ENDOSCOPY-ASSISTED PERI-ACETABULAR OSTEOTOMY
Arthroscopy or PAO
Arthroscopy & PAO
Rationale for **Endoscopic PAO**

- **CC dx & rx**
- **PAO vs THA?**
- **Femoroplasty**

**Prevent:**
- Sciatic injury
- IA osteotomy
- Post column fx
- Acetabular AVN
Rationale for Endoscopic PAO

Arthroscopic Dynamic Testing

Detect/Fix Retroversion
Confirm eradication of FAI
Check stability
The Peritrochanteric Space

- Space between the Greater Trochanter and Iliotibial Band
- Analogous to the subacromial space in the shoulder
Peritrochanteric Space

The Peritrochanteric Space

- Space between the Greater Trochanter and Iliotibial Band
- Analogous to the subacromial space in the shoulder

Greater Trochanter

Iliotibial Band
Peritrochanteric Space

Not all lateral hip pain is trochanteric bursitis

- External snapping hip (visible)
Peritrochanteric Space

Not all lateral hip pain is trochanteric bursitis

- External snapping hip (visible)

![Image of Peritrochanteric Space with labels for PITB Proximal and Distal, and Iliotibial Band with GT标注]
Peritrochanteric Space

Not all lateral hip pain is trochanteric bursitis

- Rotator cuff tear of the hip
Peritrochanteric Space

Not all lateral hip pain is trochanteric bursitis

- Rotator cuff tear of the hip

Byrd, Arthrosc Tech 2013
Endoscopic Gluteus Medius/Minimus Repair

Older women

Similar significant improvement as open surgery

>35 point improvement in mHHS

Nawabi, OJSM 2015
Internal Snapping Hip

Iliopsoas tendon

- Audible
- Endoscopic Release has been done if painful
Internal Snapping Hip

Iliopsoas tendon

- Trend toward NOT releasing iliopsoas tendon
  - Important hip flexor
  - Anterior hip stabilizer

Brandenberg, AJSM 2016
Internal Snapping Hip

Iliopsoas tendon

- Trend toward NOT releasing iliopsoas tendon
  - Important hip flexor
  - Anterior hip stabilizer

Brandenberg, AJSM 2016
Matsuda, JAAOS, 2018 in press
Deep Gluteal Space
ISCHIOFEMORAL IMPINGEMENT

- Uncommon cause of posterior hip pain
- Mechanical impingement between LT and Ischium → Inflamed Quadratus Femoris (QF)
- No single clinical test
- MRI
  - Narrow LT-Ischium interspace
  - Inflamed QF
- Conservative Rx including QF injection

Ohnishi, AJR 2018
IFI Surgical Options

- Ischial resection
- LT resection
  - Posterior
  - Anterior
IFI Outcomes

- **Posterior Endoscopic LT osteoplasty**
  - mHHS 54 → 91
  - Hatem, Arthroscopy, 2015

- **Anterior Endoscopic LT osteoplasty**
  - mHHS 43 → 91
  - Wilson, JHPS, 2016
Endoscopic Sciatic Neurolysis

Deep Gluteal Space

A. Normal
B. Pathologic

Martin, JHPS 2015
Endoscopic Sciatic Neurolysis

60 patients

- mHHS 82 $\rightarrow$ 92 ($p=0.003$)
- VAS 7.4 $\rightarrow$ 2.6 ($p=0.003$)
- No complications

Park, BMC Musculoskelet Disord. 2016
Endoscopic Proximal Hamstring Repair

Proximal HS Anatomy

Endoscopic Repair
Guanche, JHPS 2015
Matsuda, Arthroscopy, 2017
ENDOSCOPIC PUBIC SYMPHYSECTOMY FOR OSTIEITIS PUBIS
Athletes with FAI

- Transfer stress
- Conservative Rx
  - Prolonged
  - 7-9% fail
Athletic Pubalgia + FAI
Larson, Arthroscopy 2011

- Management of both disorders concurrently led to improved outcomes and a return to sporting activity in 89%.
Pubic Symphysis Curettage

- **Open curettage**
  - Radic, AJSM 2008

- **Mini-open curettage**
  - Hechtman, Sports Health 2010

- **Endoscopic pubic symphysectomy**
  - Matsuda, Orthopedics 2010
Endoscopic Pubic Symphysectomy

Matsuda, Arthroscopy 2015
Outcomes: NAHS

- Pre-op 50.2 → Post-op 85.5 (P=0.03)
Endoscopic Repair of Prepubic Aponeurosis Avulsion
Fracture Fixation
Arthroscopic Osteosynthesis
Femoral Head Fracture

Right Hip Scope Repair ORIF
Arthroscopic Osteosynthesis
Acetabulum
Life-saving Hip Arthroscopy?

- 27 yo woman
- Rhabdomyolysis
  - DIC
  - Renal failure
- Emergent hip arthroscopic I & D
- Later hip arthroscopy for FAI
- Memorable follow-up

Matsuda, Orthopedics 2012
TAKE HOME POINTS

- **Indications** for hip arthroscopy are expanding
- Even **complex FAI deformities** can be treated arthroscopically
- **Endoscopic procedures** may expand less invasive options for borderline dysplasia, peritrochanteric and subgluteal space pathology, trauma, and athletic pubalgia
THANK YOU