Hip Preservation in the Adolescent and Young Adult

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Disclosures

• Financial - None
• I do not perform total joint arthroplasty

Objectives

• Discuss etiology of hip pain in young patients
• Review key exam findings
• Discuss treatment approaches
• Discuss pitfalls in treatment
Hip Pain

- Complex multilayered anatomy
- Broad differential
  - Musculoskeletal
  - Neurologic
  - Gynecologic
  - Gastrointestinal
  - Vascular

Hip Disease

Hip Pain - Musculoskeletal

- Intra-articular
  - Labral
  - Chondral
  - Ligamentum teres
  - Capsular laxity
  - Adhesive capsulitis
  - FAI – femoroacetabular impingement
  - Loose bodies
  - Intra-articular tumors (PVNS, chondromatosis)
Hip Pain - Musculoskeletal

• Extra-articular
  – Hip tendinitis/avulsion injuries
  – Snapping hip
    • Iliopsoas
    • ITB
  – Abductor tears
  – Osteitis pubis
  – Athletic pubalgia
  – Nerve compression pathologies

Hip Pain - History

• Location and Quality
  – C-sign
  – Anterior, Posterior, Lateral
• Discrete injury
  – Limitations
  – Recreating pain
  – Avoidance maneuvers
• Associated symptoms
  – Catching/locking/popping
  – Audible snap
  – Instability

Hip Pain 101: The labrum is painful

• Both to the patient AND the surgeon/therapist
• Underlying causes
Hip Pain – The Labrum

- Labral Tears
  - Repetitive hip flexion or pivoting
  - Skeletal deformities

Femoroacetabular Impingement (FAI)

- Abnormal morphology + abnormal contact during terminal motion
- Hip pain and labral degeneration
- Types
  - Cam
  - Pincer

Femoroacetabular Impingement (FAI)

- Pincer

FAI

- Sharp anterior groin pain
  - Deep flexion, IR, abduction
- Lateral or posterior if extensive
- Difficulty squatting/cutting
- Limited flexion and IR

FAI – Radiographs

Shaded area = Pincer deformity
FAI – Radiographs

FAI – 3D CT

Development Dysplasia of the Hip (DDH)

• Inadequate osseous coverage leads to mechanical overload
  – anterosuperior acetabular rim
  – labrum

• Radiographs/Advanced imaging – critical
  – lateral center-edge angle of Wiberg (LCEA)
  – anterior center-edge angle of Lequesne (ACEA)
  – Acetabular index (AI)
  – Femoral head extrusion index
  – Tönnis angle
AP Pelvis – Lateral Center Edge Angle

Normal ≥ 25

False Profile Pelvis – Anterior Center Edge Angle

Normal ≥ 20

Treatment

• FA morphology ≠ FAI
• FA morphology + impingement symptoms = FAI
• Abnormal contact
  – Extremes of motion
  – “Increasing flexibility”
• Pilates-based PT program
• Alteration of positions to relieve contact
  – Activity modification
• Corticosteroids
Treatment – Nonoperative FAI

• Limited evidence in the literature
  – 0-90% successful
• More successful for mild deformities
• Postural rehabilitation
• Avoid PROM and stretching


Treatment – Nonoperative DDH

• Murphy et al, JBJS 1995\textsuperscript{13}
  – 285 pts followed to 65 years old
  – All patients with any of the following factors developed premature OA
    • LCE<16
    • AI>15
    • Uncovering of femoral head >31%
• Subluxation – (break in Shenton’s line) - poor

Treatment - Surgical Intervention

• Goals
  • Diagnostic evaluation of cartilage and labrum
  • Treat cartilage and labrum
  • Address underlying sources of impingement
  • Address underlying sources of mechanical overload
Surgical Intervention

- Arthroscopy
  - Stab incisions
  - Ambulatory surgery
  - 4 Rs
    - Repair
    - Reconstruct
    - Resect
    - Release

- Open Surgery
  - 5 Rs
    - Repair
    - Reconstruct
    - Resect
    - Release
    - Reorient
  - Surgical Hip Dislocation
  - Proximal Femoral or Pelvic Osteotomy

Periacetabular Osteotomy (PAO)

- Developed by Ganz16 ~30 years ago
- Allows significant correction with stable fragment position
- Decrease pain and delay THA (hopefully)
- Incomplete osteotomy of posterior column
- 4 cuts with reorientation
PAO

- Pubic ramus

PAO

- Ischium

PAO

- Ilium
  - Ilium → Ischium along posterior column
PAO

- Fragment Reorientation

Outcomes - FAI

- Arthroscopic FAI surgery (2yr f/u)^8,10
  - 70-90% return to sports
- Open FAI surgery (12-70 month f/u)^9,11
  - 80-96% return to sport
Outcomes - DDH

• Steppacher et al, CORR 2008\textsuperscript{14}
  – 68 hips, mean 20yr f/u
  – 60% survival (no THA)
  – Worse outcomes:
    • patients >29 years at time of surgery
    • preoperative OA grade of 2
      – Survival (Tonnis 0 = 81%; Tonnis 1 = 65%; Tonnis 2 = 13%)
    • postoperative extrusion index 20% or more

Combined Arthroscopy and PAO for Dysplasia

• Ross et. al AJSM 2011\textsuperscript{12}
  – Level IV
  – 73 hips in 71 patients
  – Combined approach
  – Labral tears 65.8%
  – Acetabular cartilage lesions 68.5%
  – Higher incidence in LCE <15 or AI >20

Combined Arthroscopy and PAO for Dysplasia

• Domb et al Arthroscopy 2015\textsuperscript{15}
  – Level IV, 2.4yr f/u
  – 17 patients
  – 100% chondrolabral pathology
  – 12/17 labral repairs
  – 13/16 (82%) excellent results
17 y.o female

- Active competitive dancer
- Mild hip pain “for years”
- Significant symptoms precluding dance since 3/13.
- Tried PT, act mod, CSI with mild relief.
- Continued ant groin pain with activities. Pinch sensation anteriorly. Also buttock region pain.
- +Impingement sign (IR 30)

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- LC1 18, A1 8
- Anterior CE 17; alpha angle 72
Options?

- Hip arthroscopy with labral debridement/repair
- PAO

Painful labrum – early failure
4.5 months postop

Outcome

Returned to collegiate level competitive dance at 8 months.

Complex Deformity

• 29 y.o male with right hip pain and catching for 4 months. Mild continued pain after PT and CSI.
• IR (-5) R; IR (5) L.
• ER 40 B
Options and concerns?

Comprehensive Treatment

- Hip arthroscopy
- Labral repair
- Cyst decompression
- Subspine decompression (AIIS)
- Open osteochondroplasty
- PAO – periacetabular osteotomy

Intra-articular work

Labral tear with chondral flap

After debridement and repair
Reorientation

1 year postop

1-year postop
No pain. Full activities.

Fatigue, limp, no prev tx

Case courtesy of Dr. Perry Schoenecker

Initial x-ray - - limps w/ basketball games, no pain

Manipulating acetabular fragment: lateral tilt, antever, medialize & anterior tilt.

Bernese PAO
Asymptomatic

Pt. called…
“my hip is hurting…
“no my right one”

Now basketball coach at University
When to heal with steel (or metal on plastic)?

- Advanced age
- Advanced OA (Tonnis 2 or 3)
- Poor preoperative joint congruity

Conclusions

- Define the underlying cause of the hip pain
- Determine most suitable way to treat the underlying pathology
- 4 vs 5 “R”s of hip preservation surgery
  - Repair
  - Reconstruct
  - Resect
  - Release
  - Reorient
- Sometimes a 6th “R” may ultimately be the answer
- REPLACEMENT

References

Questions
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Hip Capsule in hip preservation
Questions and case examples
What about the capsule?

• Increasing evidence of the importance of the hip capsule as stabilizer
  – Initially ignored in hip arthroscopy
• Multiple reports of postoperative dislocation
  – Capsulotomy or capsulectomy

Data

• Complete capsular closure (of T) better than partial closure at 2yr f/u\(^\text{16}\)
• Biomechanical data suggests iliofemoral ligament critical stabilizer against increased ER and hip anterior translation\(^\text{17}\)

17 yo female
Persistent hip pain
2 hip scopes with labral repair
Restore anatomy

- Close the capsule
- Reconstruct if necessary

18 y.o s/p right hip scope

1 year postop – no recurrence