Identifying Hip Dysplasia in the Young Adult and What to do Next

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1

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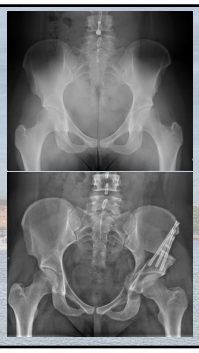
2

What we will cover

- What is hip dysplasia?
  - Complaints
  - Physical Exam Findings
  - Radiographic Findings
- Nonoperative Options
- Predictors, Benefits, Challenges
- Technique
- Final Product
- Postoperative



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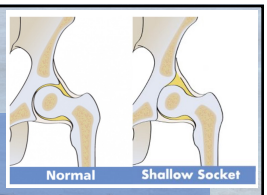
What is Hip Dysplasia? Epidemiology

- 1/1,000 births
- Risk Factors
  - Ligamentous laxity ** Check Beighton score
  - Breech delivery
  - Female
  - Family History (12-33%)
  - Packaging disorders
    - First born
    - Multiple gestation
    - Oligohydramnios
    - Torticollis, congenital knee dislocation, metatarsus adductus

4

What is Hip Dysplasia?



- Spectrum of disease
  - Shallow acetabulum
    - Acetabular version problems
  - Femoral anteversion
  - Coxa valga
- PAO can address acetabular deficiencies and version
  - Retroverting or reverse PAOs may require wedge resection

5

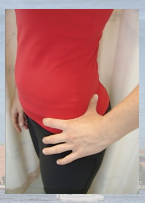
Introduction: Acetabular Dysplasia

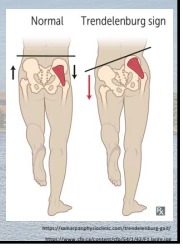
- One of the most common causes of secondary arthritis of the hip
- Decreased acetabular coverage:
  - Increased loading of acetabular rim
  - Shearing forces on acetabular dome
- Periacetabular osteotomy:
  - Reorients and better distributes joint reactive forces
  - Concomitant Surgeries
    - Hip arthroscopy
    - Femoral osteochondroplasty
    - Proximal femoral osteotomies

6

What is Hip Dysplasia? Complaints

- Pain
  - Anterior, C-sign
  - Lateral, Posterior
- Catching/Clicking
- Instability/Mistrust
- Limp
  - Trendelenberg





7

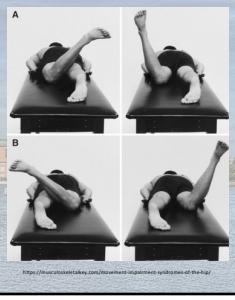
What is Hip Dysplasia? Physical Exam

- Motion
- Impingement/Labral disease
- Instability

8

What is Hip Dysplasia? Physical Exam

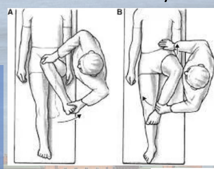
- Motion
  - Internal rotation often increased d/t femoral neck anteversion.
  - Retroversion of the acetabulum can cause loss of IR



9

What is Hip Dysplasia? Physical Exam

- Impingement/Labral disease
  - FADIR: femoral neck hits anterior acetabular rim
    - Flexion 90, adduction and IR: Pain in groin
  - FABER: flexion, abduction, ER (cam lesion, labral tear)



https://dynamicnaples.com/blog/2019/6/25/does-your-hip-click-maybe-its-fai-femoroacetabular-impingement
https://www.orthobullets.com/spine/422812/sacroiliac-joint-dysfunction

10

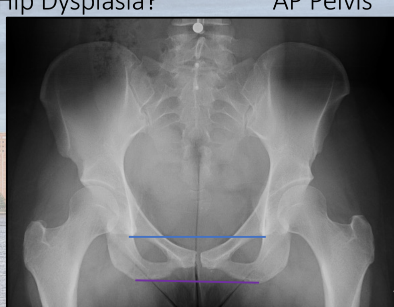
What is Hip Dysplasia? Physical Exam

- Instability
  - Apprehension test:
    - Hip extension + ER (off edge of table)
    - Discomfort and instability
  - Prone Instability test:
    - Knee flexed to 90°, ER, downward force on greater trochanter
    - Anterior hip pain

https://www.researchgate.net/figure/Hip-apprehension-test-for-labral-pathology-The-patient-has-pain-secondary-to-posterior_fig3_304464975
https://www.physiotutors.com/wiki/hip-prone-instability-test/

11

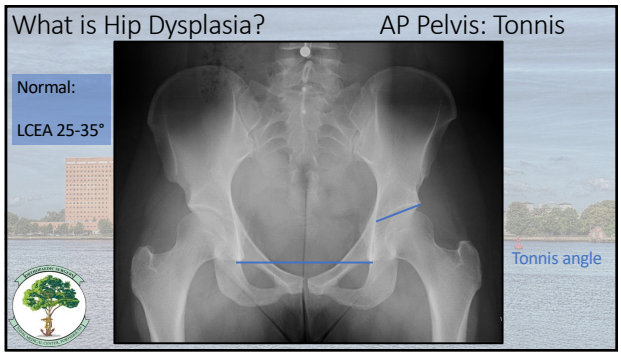
What is Hip Dysplasia? AP Pelvis



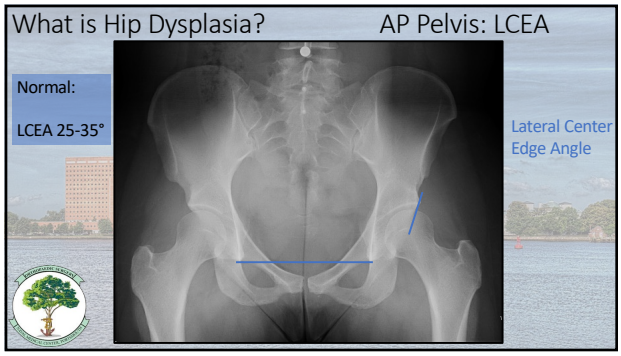
Teardrop

Inferior ischium

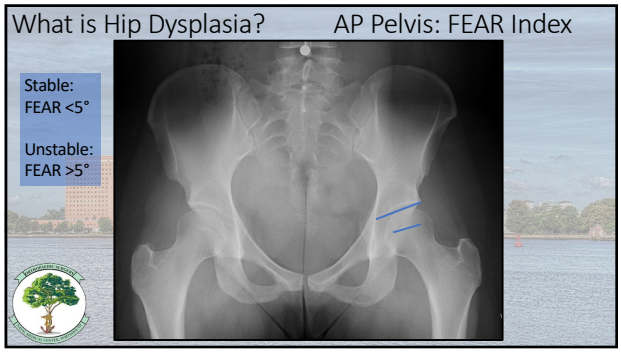
12


What is Hip Dysplasia?
AP Pelvis: Tonnis
Normal:
LCEA 25-35°
Tonnis angle

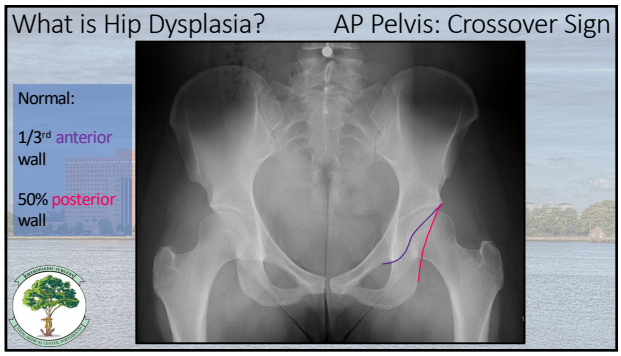
13


What is Hip Dysplasia?
AP Pelvis: LCEA
Normal:
LCEA 25-35°
Lateral Center Edge Angle

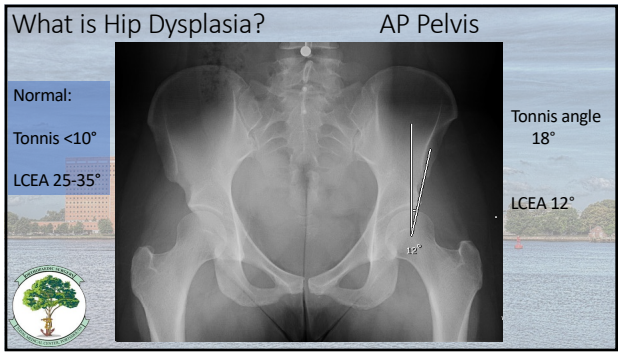
14


What is Hip Dysplasia?
AP Pelvis: FEAR Index
Stable:
FEAR <5°
Unstable:
FEAR >5°

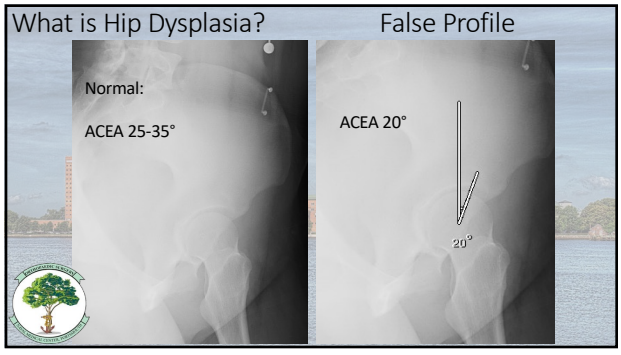
15


What is Hip Dysplasia?
AP Pelvis: Crossover Sign
Normal:
1/3rd anterior wall
50% posterior wall

16


What is Hip Dysplasia?
AP Pelvis
Normal:
Tonnis <10°
LCEA 25-35°
Tonnis angle 18°
LCEA 12°

17


What is Hip Dysplasia?
False Profile
Normal:
ACEA 25-35°
ACEA 20°

18

Hip Dysplasia: Nonoperative Options

- Physical therapy
  - Activity modification
  - Strengthening
    - Core
    - Hip Girdle: abductors, extensors, deep rotators
      - Hip flexors, if needed depending on sport
  - Neuromuscular control
    - Lumbopelvic
    - Lower extremity

19

Hip Dysplasia: Nonoperative Options

- Injections
  - Intra-articular
  - Psoas
  - Greater trochanter
  - US or XR guided
  - Diagnostic
  - Therapeutic

20

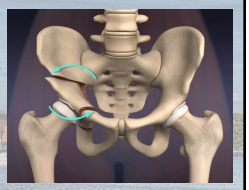
Predictors of Success:

- Female
- Age < 40 years
- Tonnis grade 0-1 (minimal to no radiographic arthritis)
- Motion > 90 degrees hip flexion, > 15 degrees internal rotation

21

Benefits of PAO

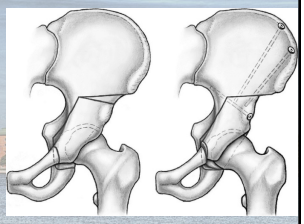
- Fragment mobility
- Correction of version, subtle abnormalities
- Extra-articular
- Maintains abductors



22

PAO Challenges

- Lack of fragment mobility
  - Inadequate correction
  - Acetabular retroversion/anteversion
- Nerve Injury
- Fracture propagation
  - Posterior column fractures
  - Intra-articular fractures



23

PAO: Technique – Arthroscopy?

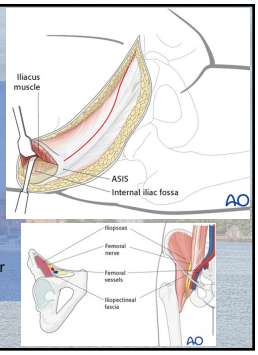
- Arthroscopy Indications
  - Address Intra-articular pathology:
    - Complex labral tear – repair, recon
    - Assess cartilage
  - Cam lesion takedown
  - Subspine debridement

- Combined
  - One surgery, one recovery
  - Longer case
  - Neuromonitoring leads
  - Boots/traction injury
- Staged
  - Two anesthetics
  - Shorter cases

24

PAO: Technique – Approach

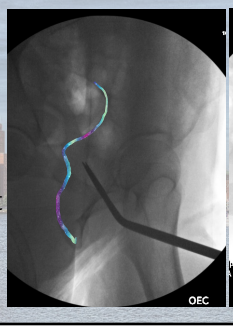
- Visualization critical early in practice
- Follow intermuscular planes, minimize bleeding
- Iliofemoral approach:
  - Lateral window
  - Modified Heuter interval
- Rectus-sparing possible
- Exposure of superior pubic ramus, iliac fossa and part of quadrilateral plate
- Proximal dissection to undermine skin for ease of guidewire placement

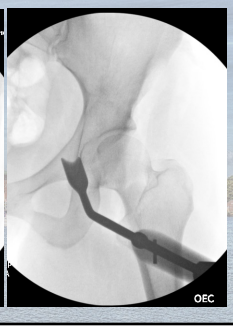


25

PAO: Technique

Ischial cut

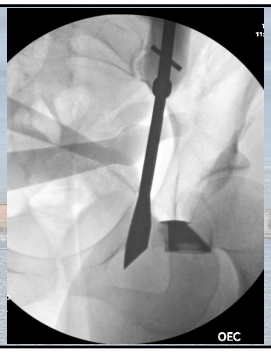




26

PAO: Technique

Pubic cut



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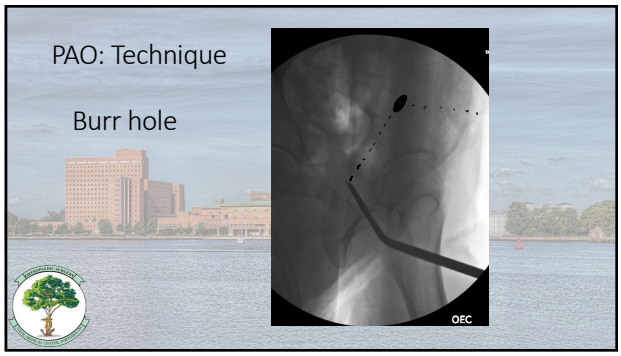
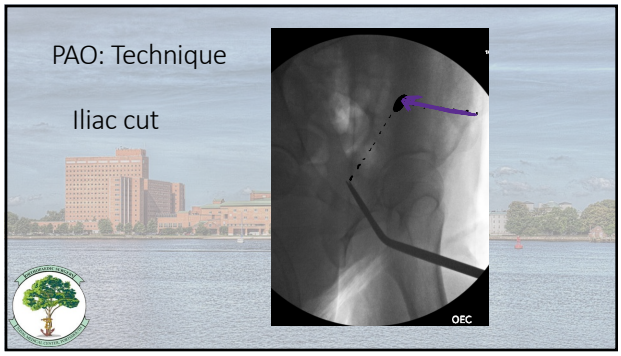
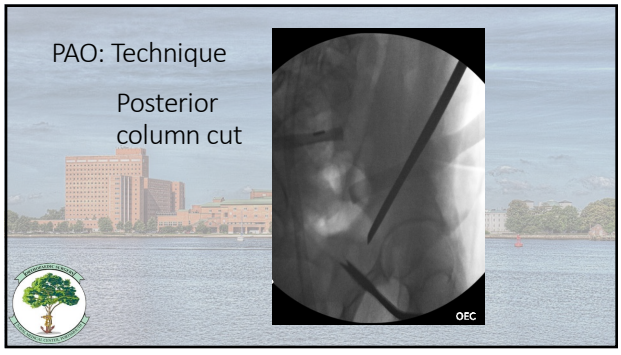

PAO: Technique
Burr hole
OEC

28


PAO: Technique
Iliac cut
OEC

29

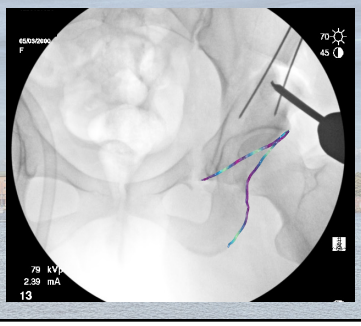

PAO: Technique
Posterior
column cut
OEC

30

PAO: Technique

Mobilize and temporary fixation

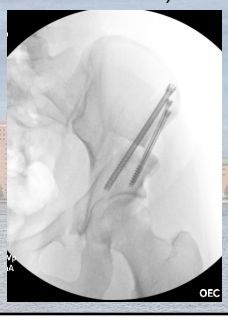
Check motion:
- >90 deg flexion
- >15 deg IR

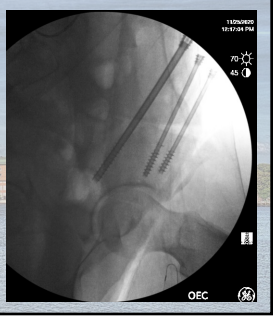


31

PAO: Technique

PAO: Measure, drill and screw

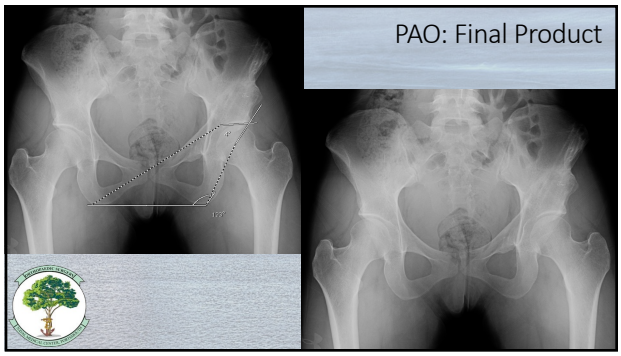




32

PAO: Final Product

33



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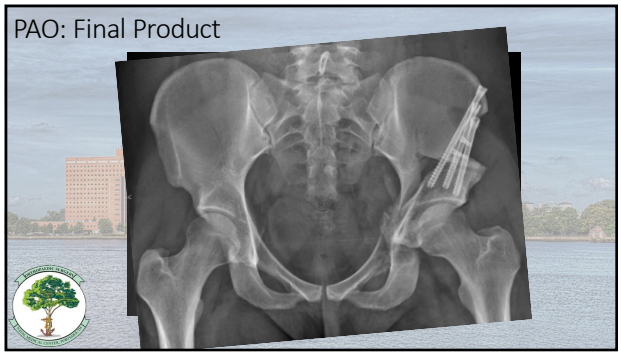

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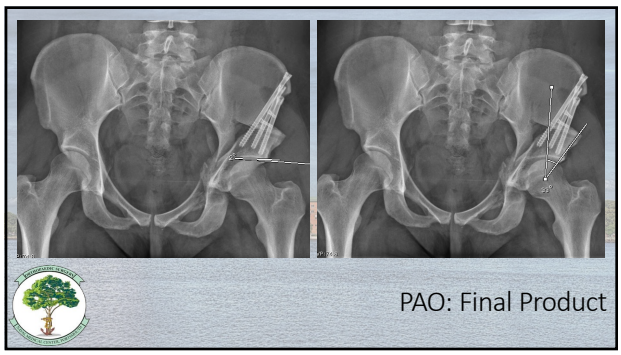
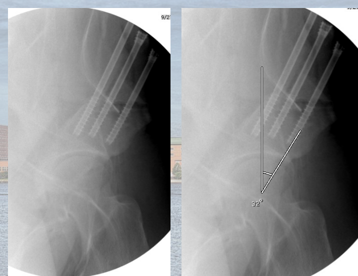


36

PAO: Final Product



37

38

PAO: Postoperative

- CBC until stable
- BMP x1, replace lytes
- Multimodal pain control
- H.O. prophylaxis
- DVT ppx ASA 81mg BID
- PT for out of bed POD1, TTWB
- Outpatient PT, start early
- Home health, only select — not for lazy pts

Table 1. Rehabilitation after hip preservation procedures

	Goals	Recommended Exercises
Phase 1	Protect healing tissues Pain control Maintain proximal and distal strength/mobility	Stationary bike CPM Manual therapy Ankle pumps Isometrics: gluteal, quadriceps, hamstrings, abductor,[a] adductor[a] Hip/ankle/knee passive ROM Ankle/knee active ROM Prone lying
Phase 2	Restore ROM Muscular reeducation	Quadruped rocking Stretches: quadriceps, hamstring, hip flexor, hip rotators Supine gluteal bridge Active hip abduction (no resistance, low repetitions) Calf raises Mini squats Active hip flexion to 45° Initiate aquatic program (Appendix 1)[b]
Weightbearing progression	Gradual increase of weightbearing (with MD approval)	Clock steps Bird dog Hamstring bend over Side plank
Phase 3	Gait normalization Improve strength to allow performance of ADLs	Elliptical Side stepping Step up/step down PREs: Leg extension, hamstring curl
Phase 4	Muscular endurance Cardiovascular endurance Advanced strengthening	Dynamic stability/single-leg exercises Proprioceptive/neuromuscular training Nonimpact cardiovascular Lateral band walk Leg press
Phase 5	Return to sport	Walking lunges Stair climber Jogging progression Golf progression (If appropriate) agilities, plyometric jumps, cutting/pivoting, reaction drills, contact drills

ADLs, activities of daily living; CPM, continuous passive motion; PREs, progressive resistance exercises; ROM, range of motion.
[a]May not be appropriate for all procedures. Caution specifically after surgical dislocation and proximal femoral osteotomy.
[b]Appendix 1 is available at http://sph.sagepub.com/content/by/supplemental-data.

39

PAO: Postoperative

- Outcomes (Published)
  - 10-year survivorship:
    - 93% at age 20
    - 90% at age 30
    - 82% at age 40
  - Survivorship overall:
    - 86% 10-year
    - 60% 20-year
    - 29% 30-year
- Outcomes (Mine)
  - Return to duty:
    - 75% within 1 year
  - Complications
    - Range minor to major
    - Constipation —> revision
  - Failure (THA done)
    - 1/60 = 2%

40

What we covered:

- What is hip dysplasia?
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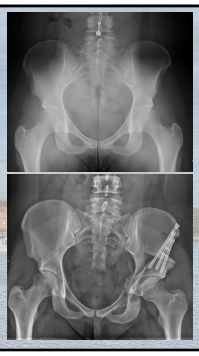
- Nonoperative Options
- Predictors, Benefits, Challenges
- Technique
- Final Product
- Postoperative



41

Questions?

- Thank you!

42

Resources

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43