A 14-year-old athletic male with a medium build presents with 3 weeks of atraumatic left hip and thigh pain. For that last 12 hours, he has been unable to bear weight, even with crutches. He denies right hip pain. He has obligatory external rotation of the left hip upon flexion. Radiographs are seen in figures A, B. What is the best next step?

Slipped Capital Femoral Epiphysis

Overview

- Condition of the proximal femoral physis that leads to slippage of the metaphysis relative to the epiphysis
- Most commonly seen in adolescent obese males
- Treatment is usually percutaneous pin fixation

Epidemiology

- Most common disorder affecting adolescent hips
- 10 per 100,000(USA)
- More common in
  - obese children
  - males
  - African Americans,Pacific islanders, Latinos

Epidemiology

- During period of rapid growth (10-16 years)
- 13 for boys
- 12 for girls
- Associated with puberty
- Left hip is more common
- Bilateral in (~25%)

Risk factors

- Obesity-single greatest risk factor
- Acetabular retroversion and femoral retroversion

Associated conditions

- Hypothyroidism -most common etiology of nonidiopathic SCFE
- Renal osteodystrophy
- Growth hormone deficiency
- Panhypopituitarism
- Indications for endocrine workup
  - child is < 10 years old
  - weight is < 50th percentile
- Down syndrome

Pathophysiology

- Adolescence-perichondrial ring thins and weakens
- Physis is still vertical in this age group
- Mechanical forces acting on a susceptible physis
- Slippage occurs though the hypertrophic zone of the physis

Pathoanatomy

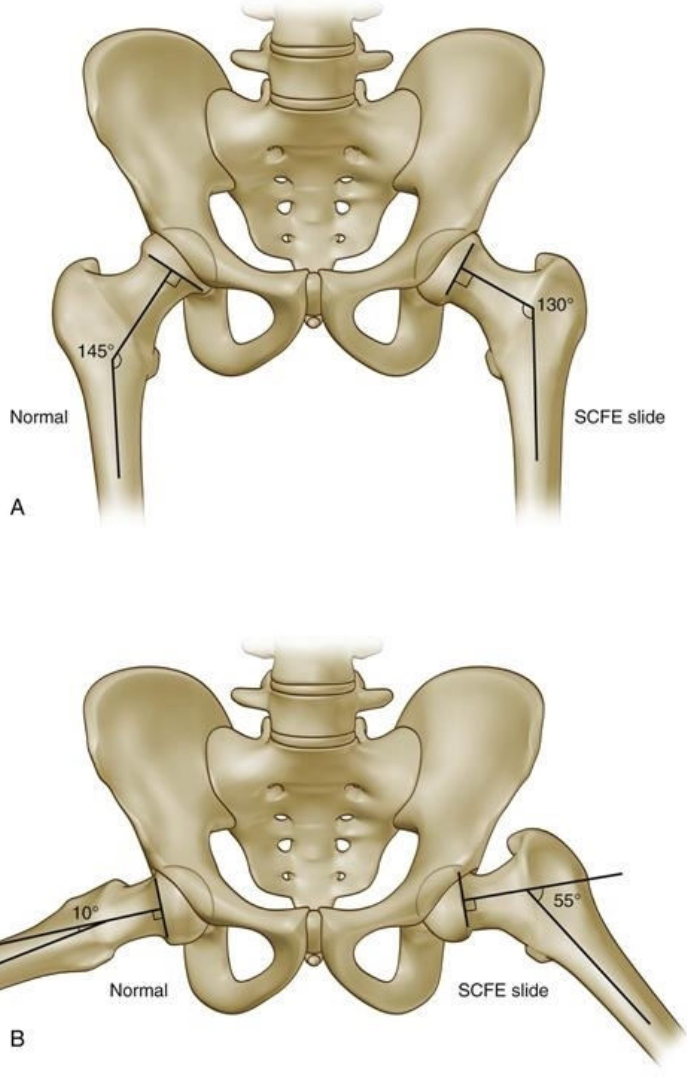
- Angulation-metaphysis translates anterior and externally rotates
- Epiphysis remains in the acetabulum
- Periosteum remains intact (chronic SCFE)
- In acute SCFE, periosteum can be partially torn

Loder Classification

- Based on ability to bear weight
- Stable-Able to bear weight with or without crutches
  - Minimal risk of osteonecrosis (<10%)
- Unstable-Unable to ambulate (not even with crutches)
  - High risk of osteonecrosis (25-35%)
- Provides prognostic information

Southwick Slip Angle Classification

- Based on femoral epipyseal-diaphyseal angle difference
- Mild < 30°
- Moderate 30-50°
- Severe > 50°
- Based on the degree of difference between the affected and unaffected hip



Grading System -- based on percentage of slippage

- Grade I 0-33% of slippage
- Grade II 34-50% of slippage
- Grade III >50% of slippage

Symptoms

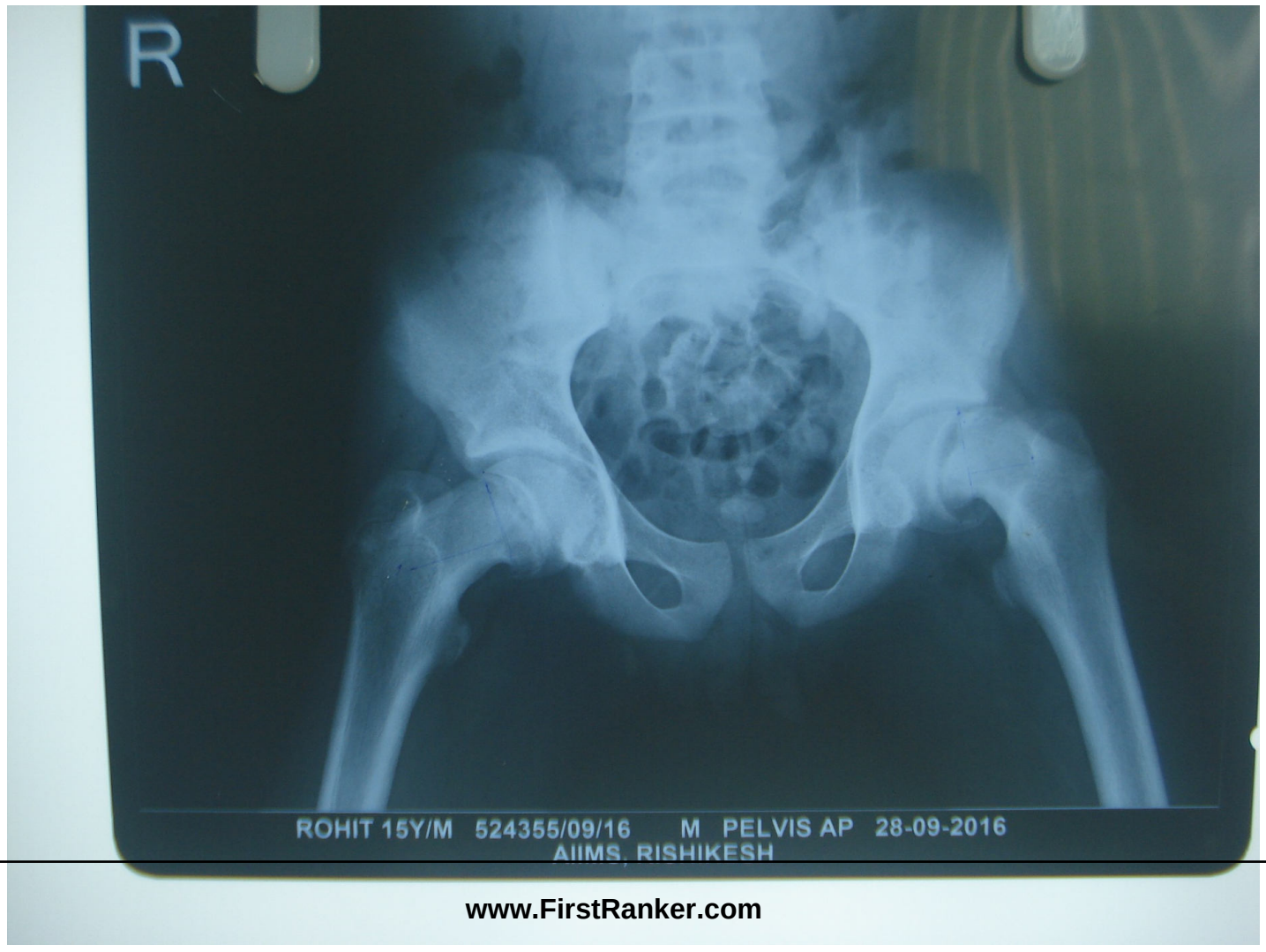
- Groin and thigh pain -most common presentation
- knee pain
  - can lead to missed diagnosis
- Limp
  - antalgic gait
  - externally rotated foot progression angle
- Patients prefer to sit in a chair with affected leg crossed over the other
- Duration
  - symptoms for weeks to months before diagnosis is made
- Acute on chronic-severe pain,unable to bear weight

Physical exam

- Abnormal gait
  - antalgic, waddling, externally rotated gait or Trendelenburg gait
- Decreased hip motion
  - Loss of hip IR, abduction, and flexion
  - Obligatory external rotation during passive flexion of hip (Drehmann sign)
- Weakness
  - thigh atrophy

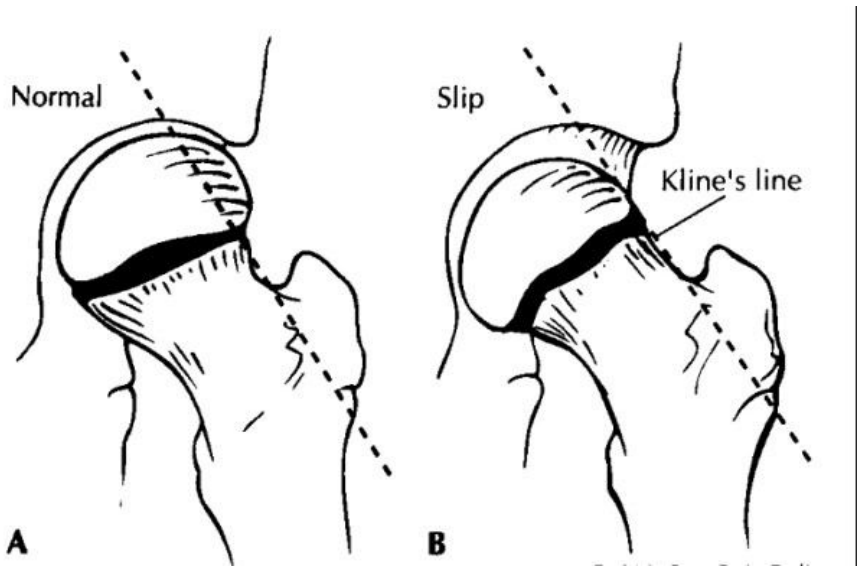
Radiographs

- AP & frog-leg lateral of right and left hip
- lateral radiograph is best way to identify a subtle slip



Radiographs

- Klein's line
- Line drawn along superior border femoral neck
- Will intersect less of the femoral head or not at all in SCFE



Radiographs

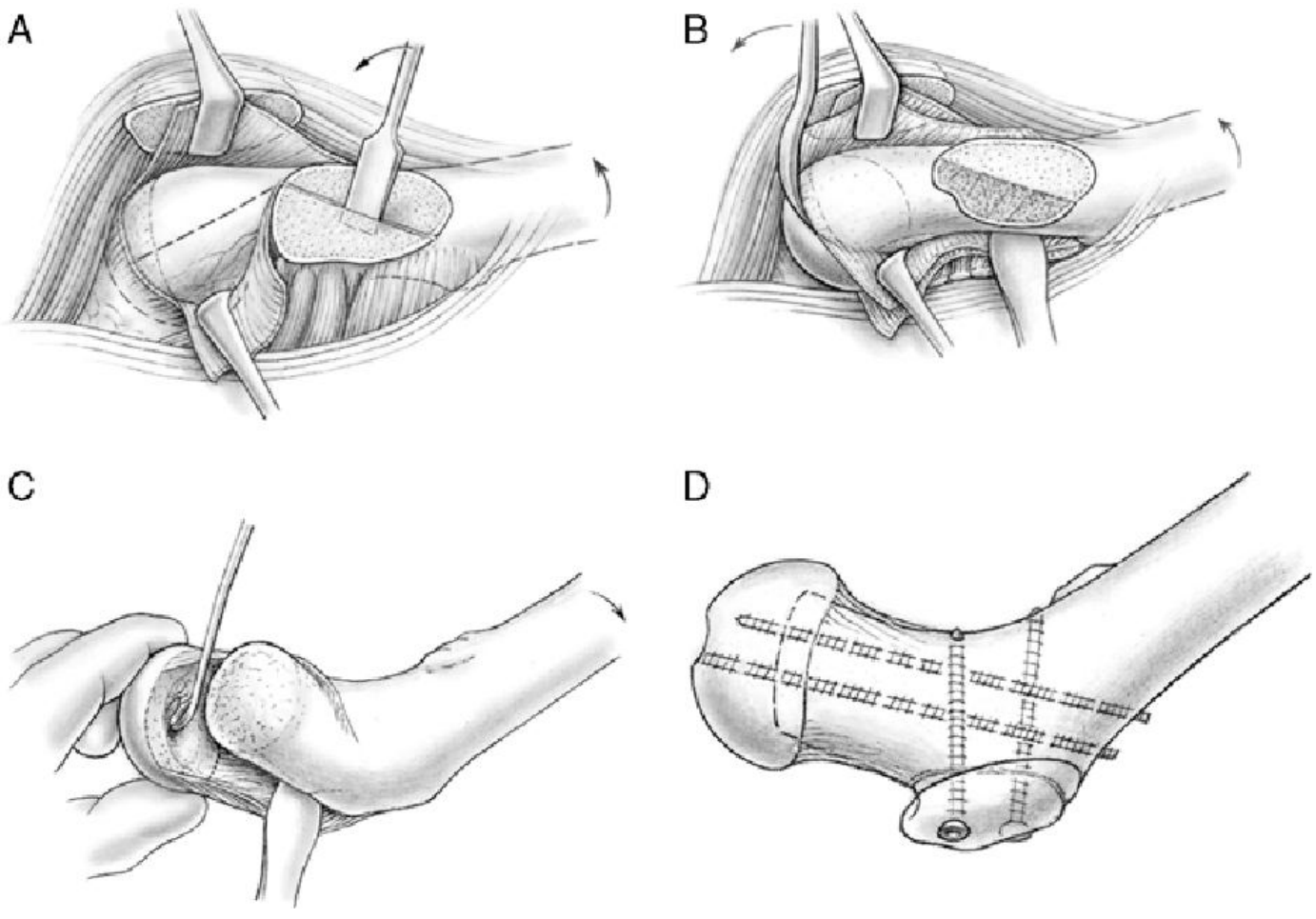
- Epiphysiolysis (growth plate widening or lucency)
- Blurring of proximal femoral metaphysis (metaphyseal blanch sign of Steel)
  - seen on AP due to overlapping of the metaphysis and posteriorly displaced epiphysis
- MRI
  - may help diagnose a preslip condition

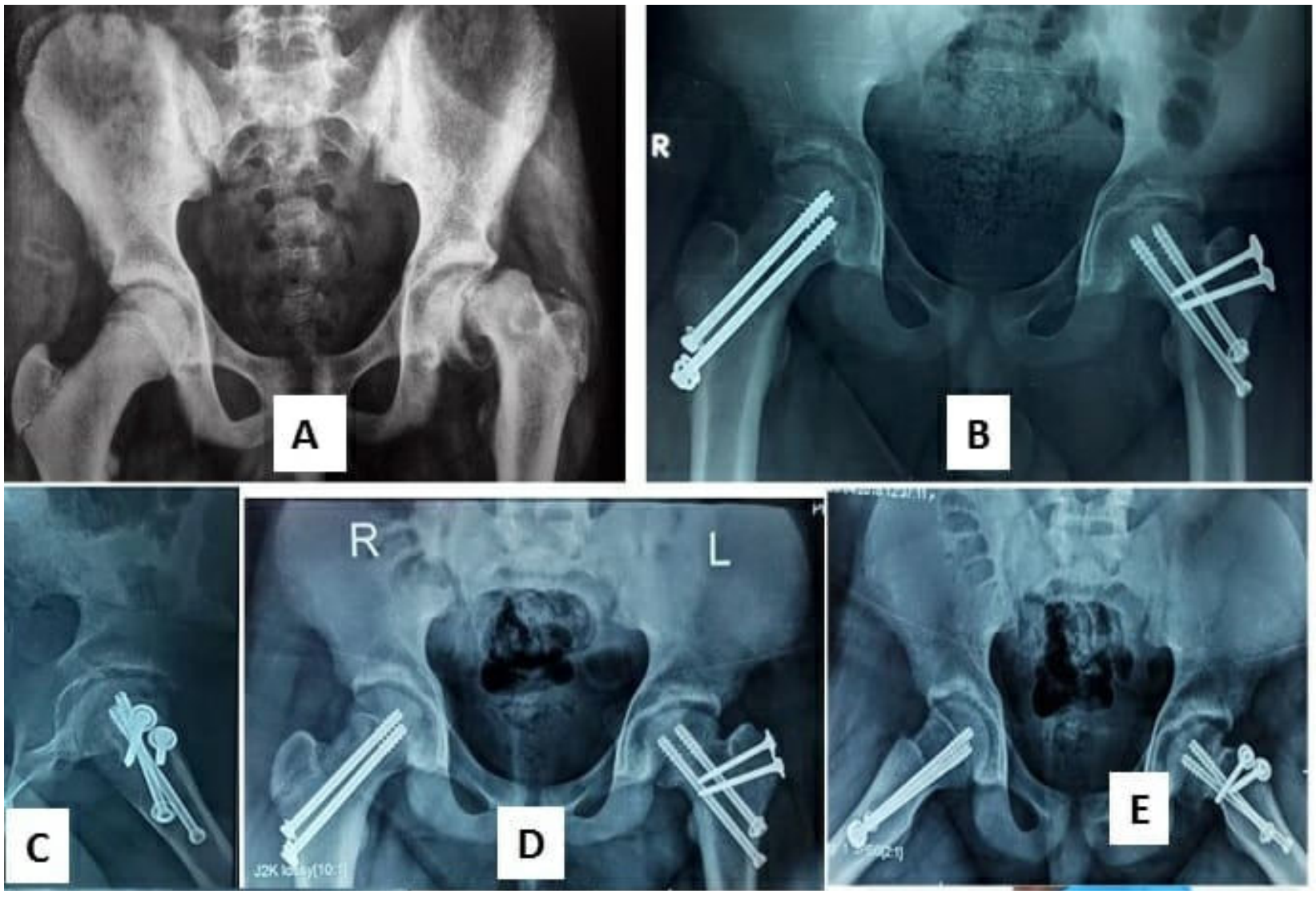
Treatment-Stable slip

- Operative-percutaneous in situ fixation
- indications
  - both stable and unstable slips
  - one vs. two cannulated screws is controversial
- benefit of 2 screws needs to be considered in the face of greater screw related complications
- contralateral hip prophylactic fixation-controversial

Treatment

- Open epiphyseal reduction and fixation
  - controversial
  - unstable and severe slips
- technique
  - capital realignment via the modified Dunn procedure





Complications

- Osteonecrosis of femoral head
  - increased risk with unstable slips (~24-47%), most common predictor
- operative complication (4-6%)
  - hardware placement in posteriosuperior femoral neck has the greatest risk of disrupting the vascular supply
- Chondrolysis (0-2%)
- Residual proximal femoral deformity & limb length discrepancy
- Degenerative arthritis