

Myths and Misconceptions in Pediatric Orthopedics

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Disclosures

- None

Myths and Misconceptions in Pediatric Orthopedics



For the sixth consecutive year, *U.S. News & World Report* ranks our Orthopedics program among the nation's best in its "Best Children's Hospitals" edition. We're #3 in the country!

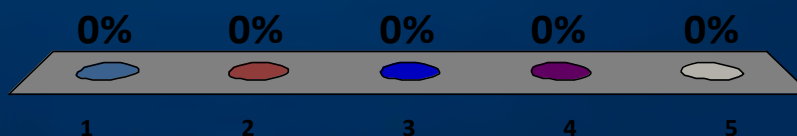
Take Home Points

1. Developmental dysplasia of the hip is not an emergency.
2. Slipped capital femoral epiphysis should be diagnosed and referred in an emergent fashion.
3. Back pain and anterior knee pain are common in adolescents and should be treated with stretching and sports modification.
4. Lower extremity alignment differences are a normal part of growing up.



An 8-month old male presents as a referral for asymmetric thigh folds. Based on the radiographic findings, which of the following physical exam findings is most likely to be present?

1. Positive Barlow
2. Positive Ortolani
3. Positive Gower sign
4. Limited hip abduction
5. Ipsilateral clubfoot



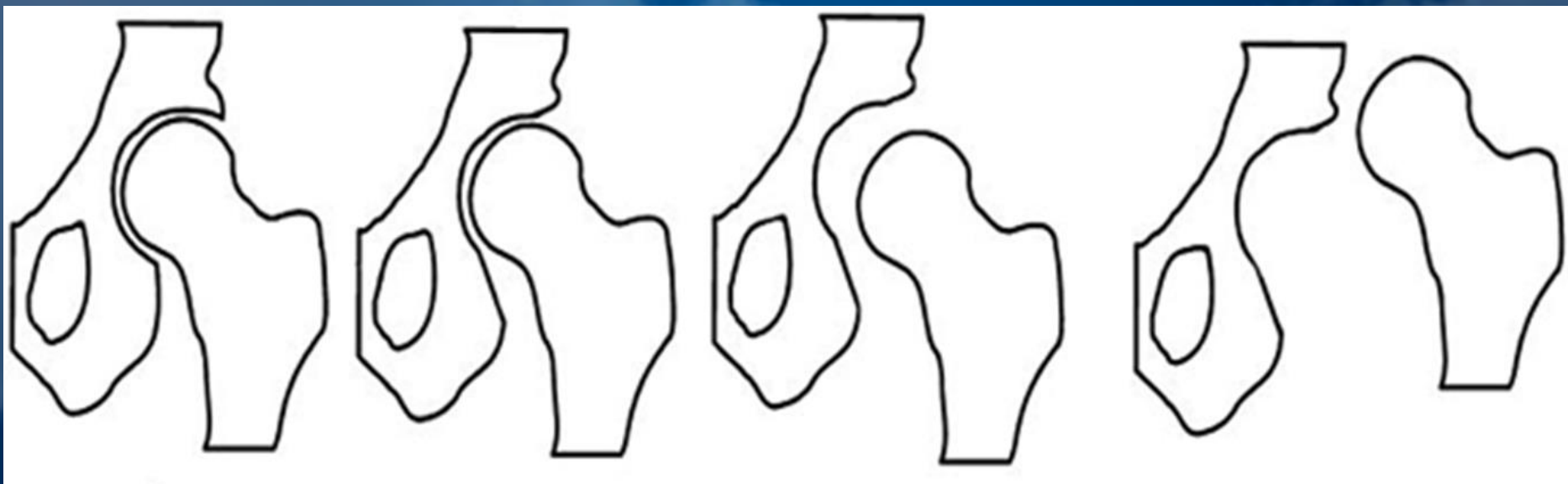
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Developmental Dysplasia of the Hip

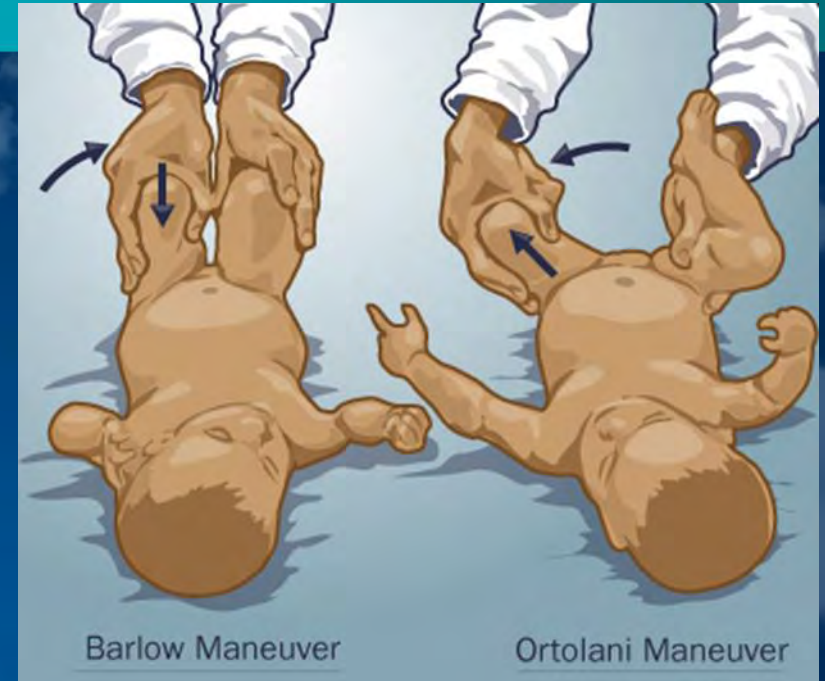
- Spectrum of disease



Dysplasia → Subluxation → Dislocation

Instability

- 2 types:
 - “Macro”: with passive manipulation (Ortolani and Barlow)
 - “Micro”: sub-clinical shearing often present older patients with dysplasia



Diagnosing DDH in Infancy

- Clinical / physical exam: the old gold standard
 - Evocative tests
 - Ortolani-test to reduce “OKAY!”
 - Barlow-test to dislocate “BAD!”
 - Instability/telescoping
 - Asymmetry: thigh folds, abduction, etc
- Ultrasound: the new gold standard
 - More sensitive than PE or XR till ~6 mo of age
- Radiography
 - More sensitive than US after ~6 mo of age

Simplified Treatment for DDH

- Birth to 18 months of age:
 - Pavlik harness
- 18 months to 5 years of age:
 - Observation / Surgery
- 5 years to maturity (arthritis):
 - Surgical correction / hip preservation

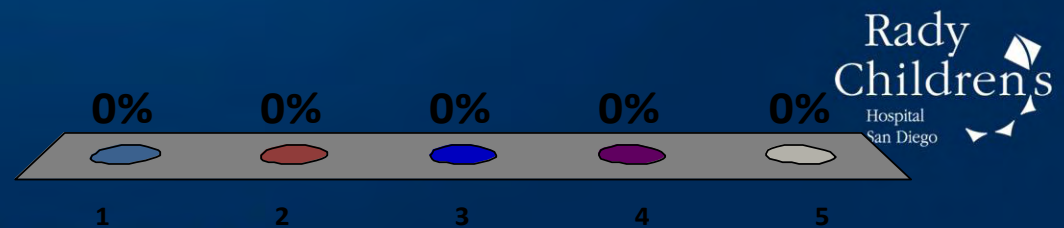


When to refer?

- Risk factors / Family history
- Instability on physical exam
 - Most “clicks” are NOT evidence of instability
- OK to be seen around 4-6 weeks of age
 - In clinic ultrasound and dynamic evaluation
- Reassure parents of treatment success and natural history

A 12-year old male reports a 6-week history of left knee pain and limp. He denies any history of trauma or fever. Examination reveals full knee range of motion with no effusion. He stands with his foot externally rotated and he has diminished hip internal rotation. What is the most appropriate management?

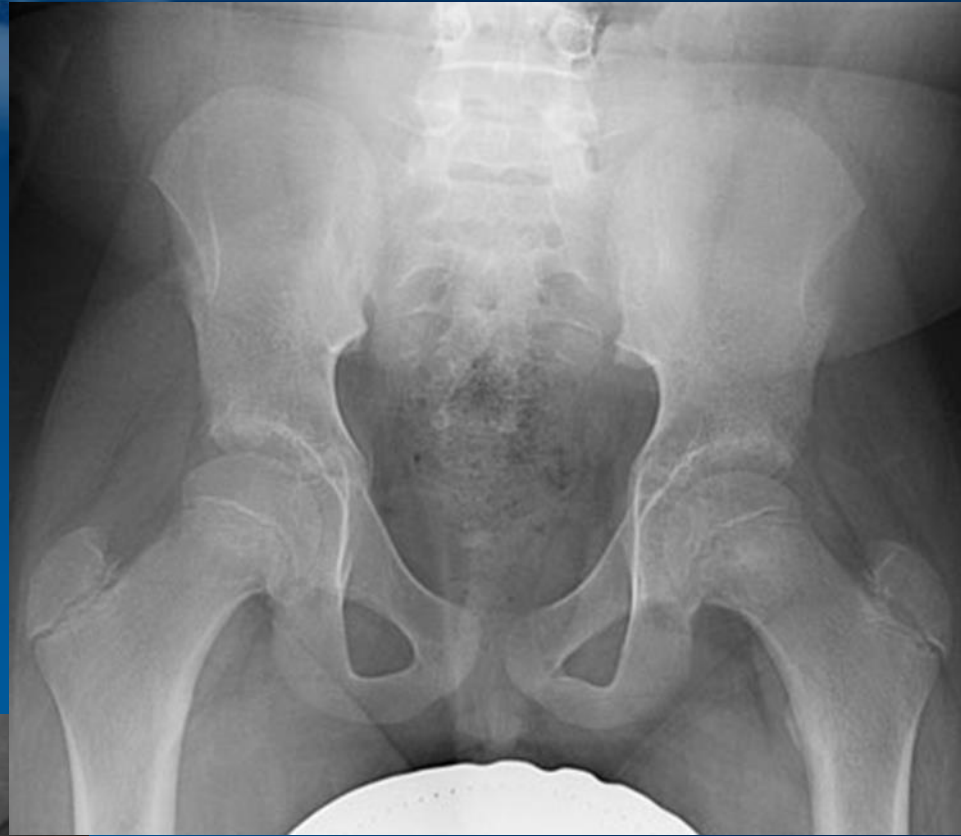
1. Knee radiographs
2. Hip radiographs
3. RICE (rest, ice, compression, elevation)
4. Bed rest
5. Referral to physical therapy



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Slipped Capital Femoral Epiphysis- Clinical Presentation

- Painful limp
 - Hip pain absent in up to 50%
 - Pain localized to knee and/or distal thigh in 23-46% (obturator nerve)
 - Usually can bear weight
 - Many with history of mild trauma that they believe to be cause (groin sprain etc.)
- Gait abnormalities - antalgic / trendelenberg / external FPA
- Range of motion
 - Loss of internal rotation / Obligate external rotation



Initial recognition is a problem!

SCFE: Initial Treatment by Local Physician (Cowell, Clin. Orth. 48:89-94, 1966)

Referred to orthopaedist for definitive therapy	50%
No x-ray or therapy	17%
Treatment for "knee problem"	13%
Knee x-ray ordered	10%
Repeat knee x-ray ordered	4%
Treated with crutches	10%
Hip x-ray done, but diagnosis NOT made	6%
Pain medication only	4%

Initial recognition continues to be a problem!

Delay in Diagnosis of Slipped Capital Femoral Epiphysis

Mininder S. Kocher, MD, MPH*; Julius A. Bishop, AB†; Bryce Weed, AB§; M. Timothy Hresko, MD*; Michael B. Millis, MD*; Young Jo Kim, MD, PhD*; and James R. Kasser, MD*

- Reviewed 196 SCFE patients at CHB
- Median delay in diagnosis: 18 wks
- 9.5 wk median delay for acute on chronic unstable SCFE
 - Median duration of unstable status: 2 wks
- Relationship between delayed diagnosis and slip severity:
 - $<30^\circ$: 10wks, $30-50^\circ$: 14.4wks, $>50^\circ$: 20.6wks

Adolescent Back Pain

Traditional view:

- Children don't get back pain
- Back pain is an indicator of a pathologic process and needs to be worked up

Current view:

- Back pain is very prevalent
- Often due to a benign process / muscular etiology

Prevalence Studies

Jones GT, Macfarlane GJ: Epidemiology of low back pain in children and adolescents. [Review] [47 refs]. *Archives of Disease in Childhood* 2005, 90(3):312-6.

- 1 year prevalence rates: 7-58%

Smith DR, Leggat PA: Back pain in the young: a review of studies conducted among school children and university students. *Current Pediatric Reviews* 2007, 3:69-77.

- Lifetime prevalence: 70-80% by age 20

BMC Musculoskelet Disord. 2011 May 16;12:98.

Prevalence and tracking of back pain from childhood to adolescence.

Kjaer P, Wedderkopp N, Korsholm L, Leboeuf-Yde C.

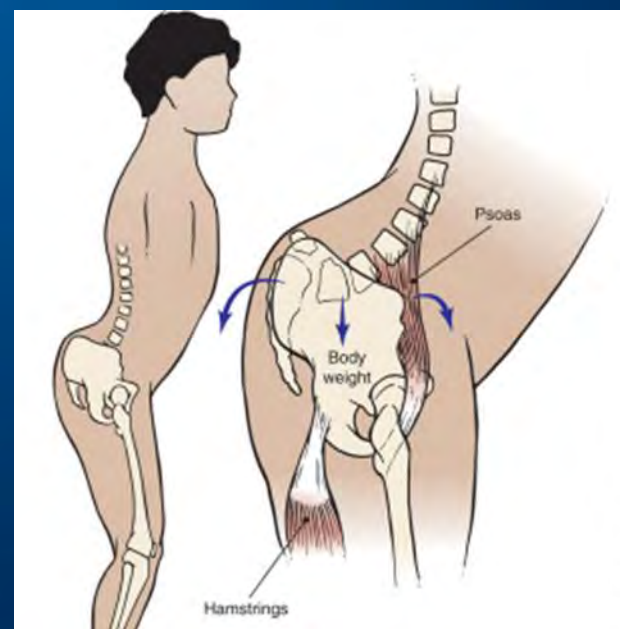
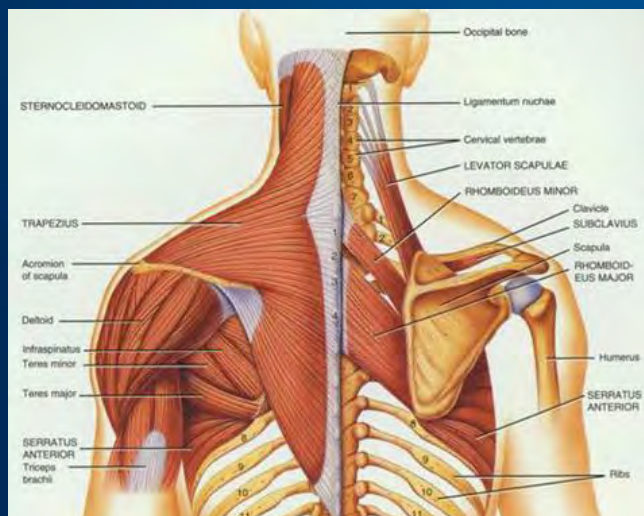
- Longitudinal cohort study of 771 children
- Prevalence back pain: Age 9: 33%, Age 13: 28%, Age 15: 48%

Symptoms of significance

- Constant pain or night pain, systemic symptoms
 - infection or tumor
- Activity-related pain with athletics
 - stress fracture, spondylolysis
- Morning pain improved with activity
 - spondyloarthropathy
- Radicular pain
 - pain in leg or root distribution

Common Physical Exam Findings

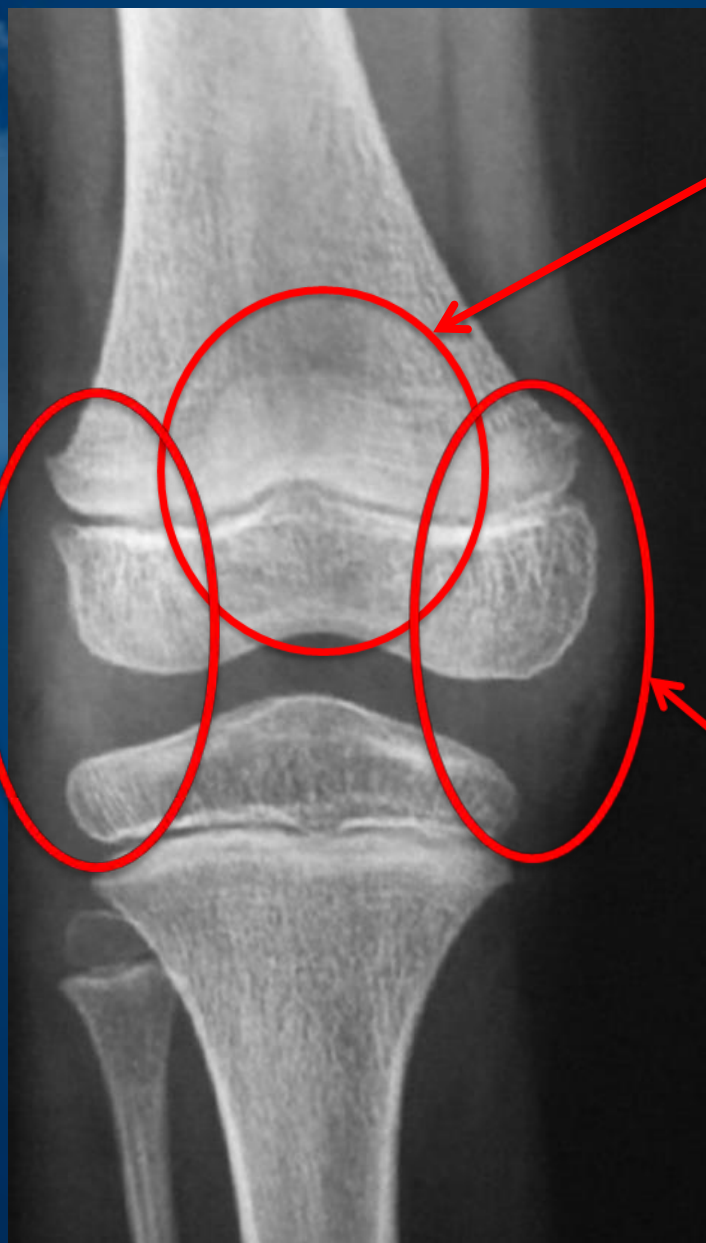
- Paraspinal muscle spasms
- Tight hamstrings with decreased popliteal angle
- Tenderness along trapezius or periscapular stabilizers



Concerning Physical Exam Findings

- Neurologic deficits
- Asymmetric reflexes
- Radiculopathy
- Mid-line tenderness to palpation
- Rotational abnormalities on forward bend
- Clonus / Babinski
- Pain with hyperextension
- Cavus foot deformity
- Ataxia, gait disturbance
- Skin abnormalities / spinal dysraphism

Adolescent Anterior Knee Pain



Anterior Knee Pain

1. Patellofemoral
2. Jumper's knee
3. OS/SLJ

Lateral Knee Pain

1. IT Band Syndrome

Medial Knee Pain

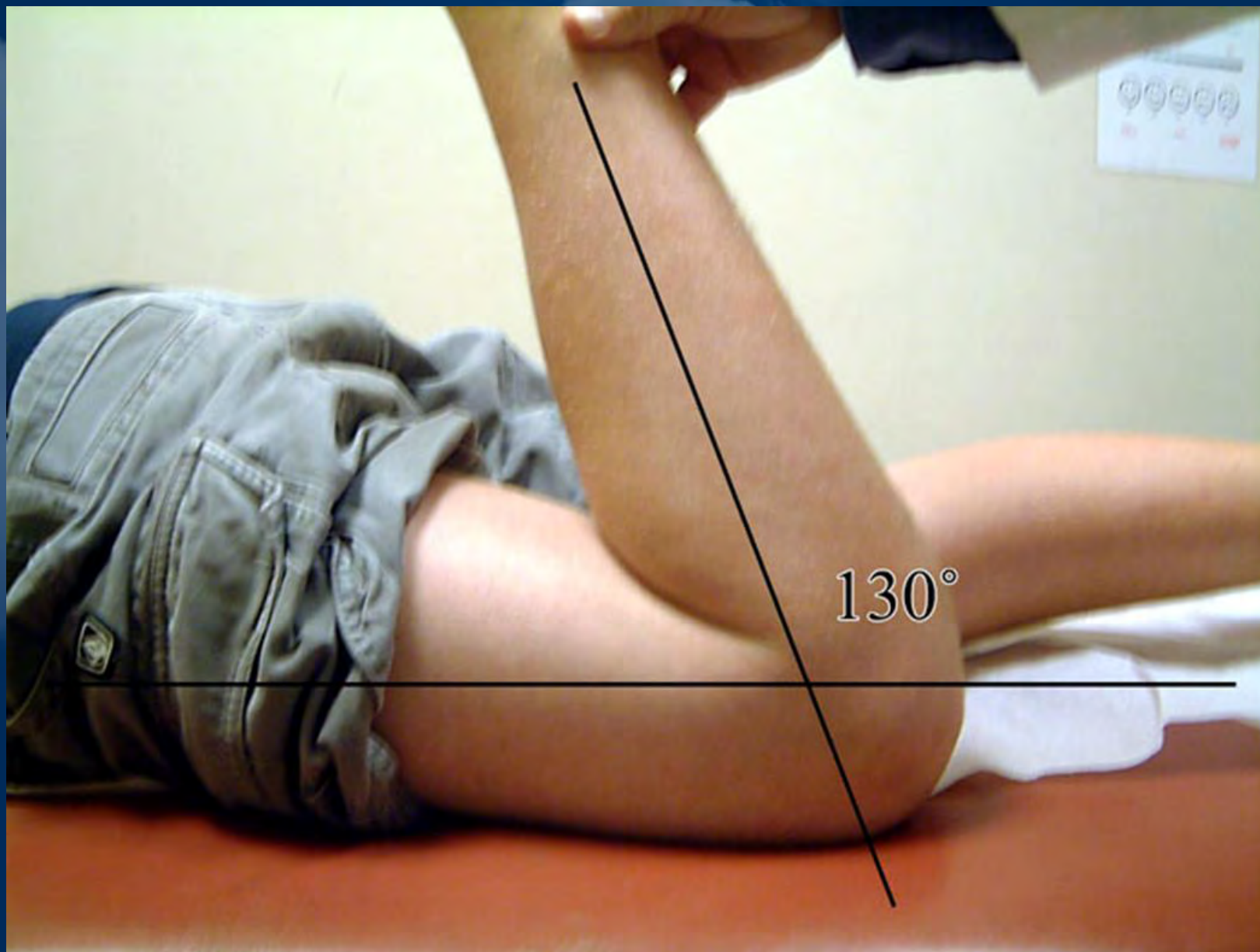
1. Plica pain

Overuse Injuries

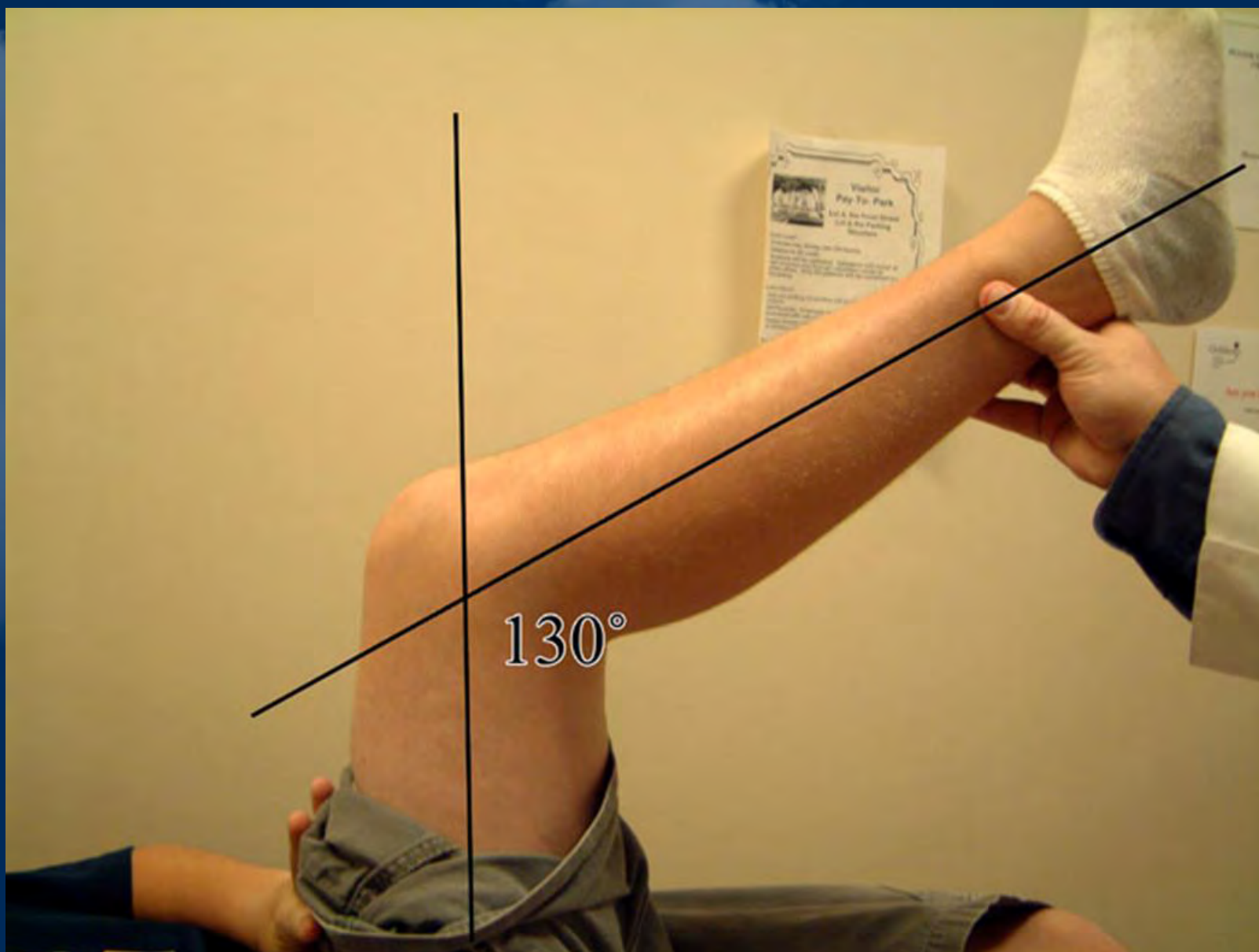
Why is it happening more often?

- Younger age kids specializing in specific sports
- Intense year round competition and practice
- Growing bodies more susceptible to injury
- Parental and coaching pressure and unrealistic expectations
- Super competitive youth sports culture

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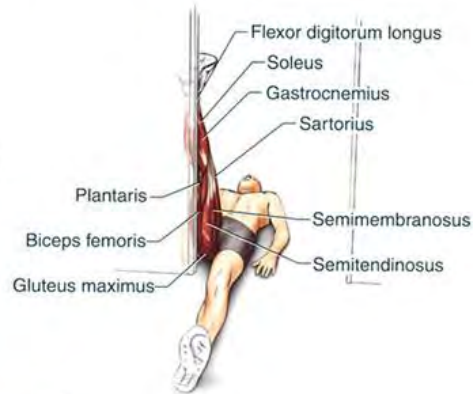


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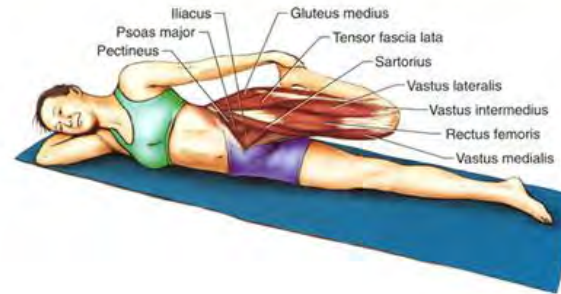


Myths and Misconceptions in Pediatric Orthopedics

Recumbent Knee Flexor Stretch



Lying Hip Flexor and Knee Extensor Stretch



Over 2 Million Sold!

STRETCHING

FOR EVERYDAY FITNESS AND FOR RUNNING, TENNIS, RAGUETBALL, CYCLING, SWIMMING, GOLF, AND OTHER SPORTS

by **BOB ANDERSON**
Illustrated by **JEAN ANDERSON**

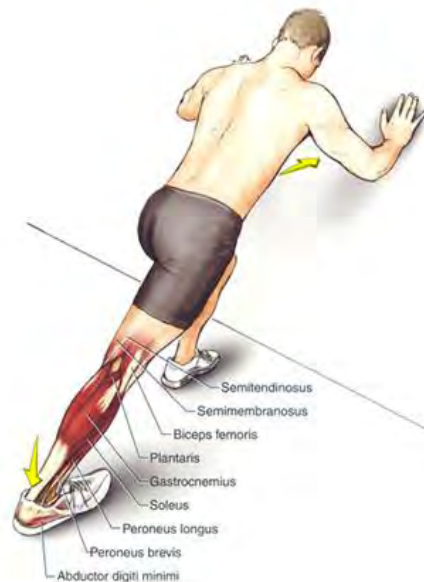
STRETCHING Anatomy

ARNOLD G. NELSON
JOUKO KOKKONEN



Your illustrated guide to improving flexibility and muscular strength

Single Plantar Flexor Stretch



Double Plantar Flexor Stretch



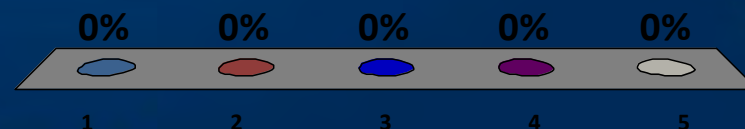
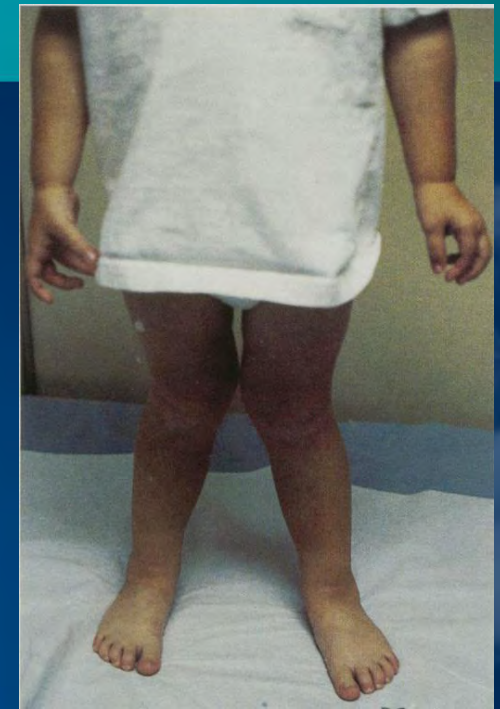
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Overuse: Prevention Strategies

- Pre-season conditioning and training 6 – 8 weeks prior to season
 - Work on improving strength, flexibility and endurance
- Resistance training in adolescence improves neuromuscular function
 - Cross training
 - Light weights, high reps
- Warm up and cool down properly before and after activity
- Avoid playing for multiple teams at same time
- 3-4 months of rest from same sport/year
- 10% Rule: Never increase training program variables by more than 10% per week

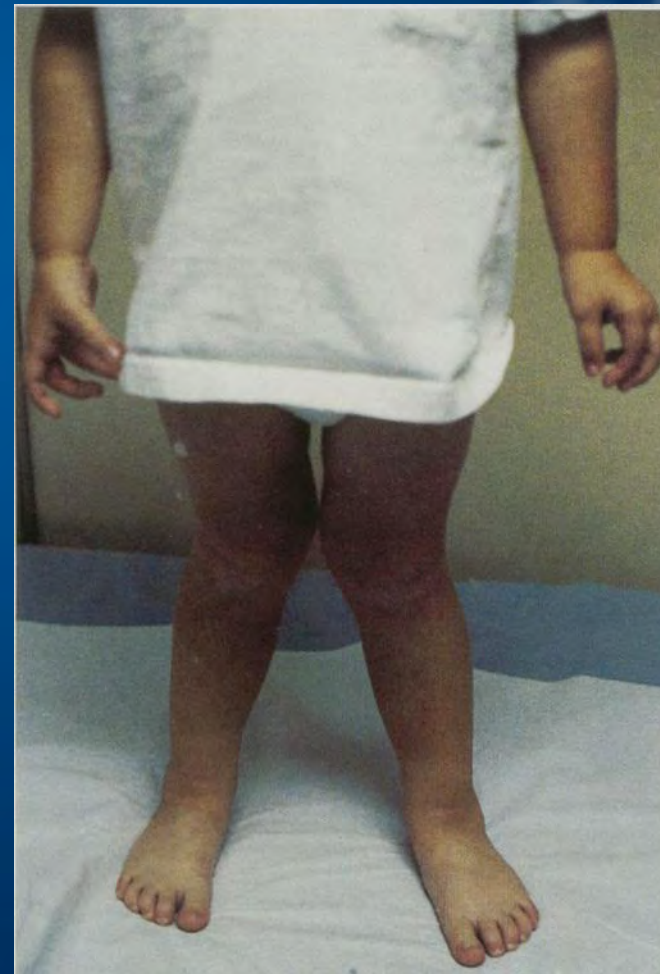
3-year-old boy presents for limb alignment abnormality. He started to walk at age 10 months and has a gait that is appropriate for his age. His height is in the 40th percentile for his age. Management should consist of:

1. Orthopedic Surgery consult
2. AP and lateral knee radiographs
3. Observation and clinical follow-up
4. Blood serum levels for calcium, phosphate, BUN and creatine
5. 24-hr urine collection for vitamin D metabolites



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Limb Length Discrepancy

- Epidemiology:
 - In army recruits, it was found up to 50% had a limb length discrepancy (LLD) of up to 1 cm
 - Gait studies: pattern is not altered in $LLD < 2$ cm
 - No long term implications
 - Confused for scoliosis

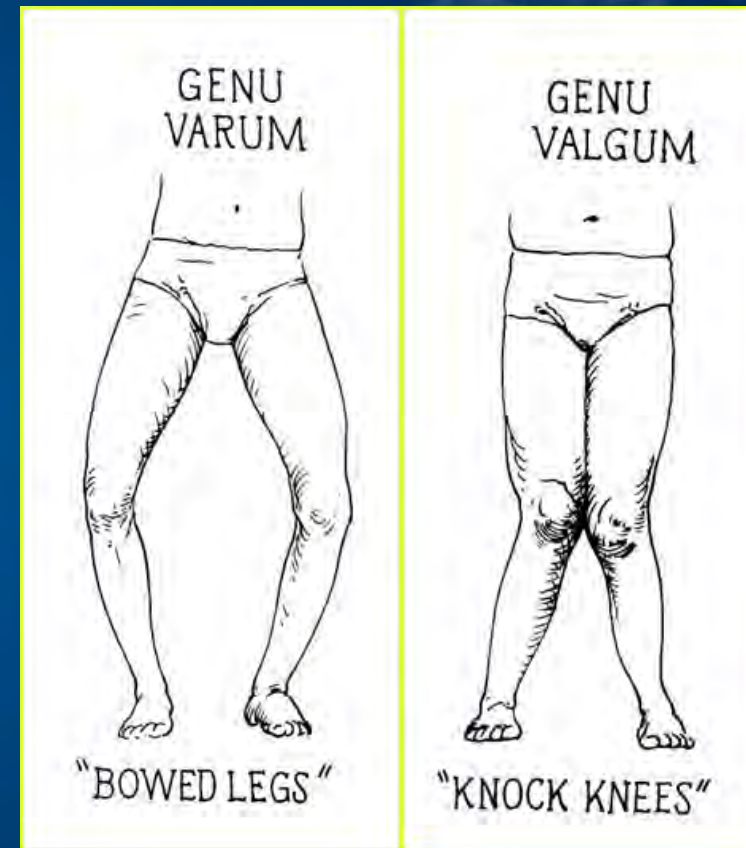


Scoliosis due to LLD



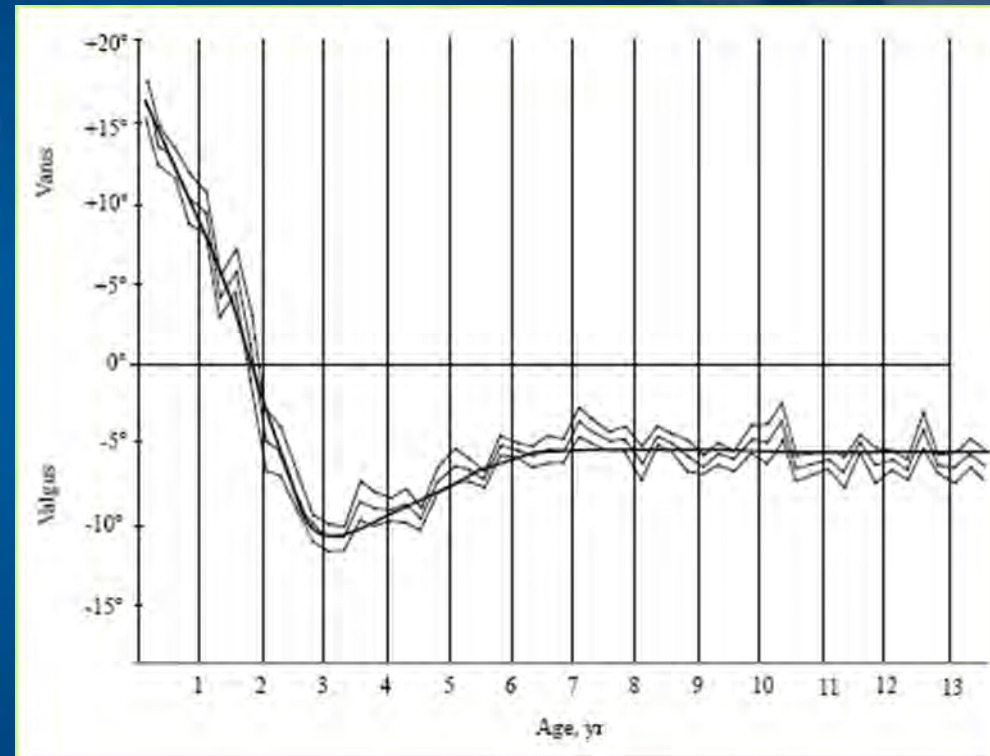
Coronal Plane Alignment

- Examine supine with limbs out straight
 - Neutral alignment when medial malleolar just touch AND medial femoral condyles just touch
 - Genu varum = medial malleolar touch, space between knees
 - Genu valgum = medial femoral condyles touch and space between ankles
 - Up to 8 cm of intermalleolar distance is normal at age 3-4 years



Genu Varum and Valgum

- Normal tibial femoral angle
 - Newborn= 10-15° varus
 - 2 years = neutral alignment
 - 3-4 years = 10-15° valgus
 - Gradual resolution over years to adult valgus of usually 7-8°



Rotational Alignment

- Intrauterine molding causes
 - External rotation of the hip
 - Despite high degree of femoral anteversion
 - Internal rotation of the tibia
 - Variable positioning of the foot (usually flexible)
- Adult rotational profile reached between ages 8-10 years old
 - Tibia externally rotates 15 degrees
 - Femoral anteversion decreases on average 25 degrees



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Thank You!

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