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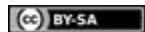
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# COMMON MUSCULOSKELETAL PROBLEMS

C. CRAIG

M2 - MUSCULOSKELETAL

Fall 2008



ANGULAR and TORSIONAL  
DEFORMITIES of the  
LOWER EXTREMITIES

# TERMS

Valgus - deviation away from midline

Varus - deviation toward midline

Torsion (rotation)

Internal

External

Version (rotation)

Anteversion/retroversion

# EXAMINATION

Relaxed

Supine/sitting/walking

Each individual joint

Beware any asymmetry

# IN - TOEING

Metatarsus adductus

Newborn – 18 months

Limited to forefoot

80 % improve spontaneously

Casting

Surgery - rare



© PD-INEL Allison Gilmore, MD, ET AL



# IN - TOEING

Internal tibial torsion

6 – 18 months

85 % improve spontaneously

Defined by transmalleolar axis

Infant +5 /adult + 22 degrees

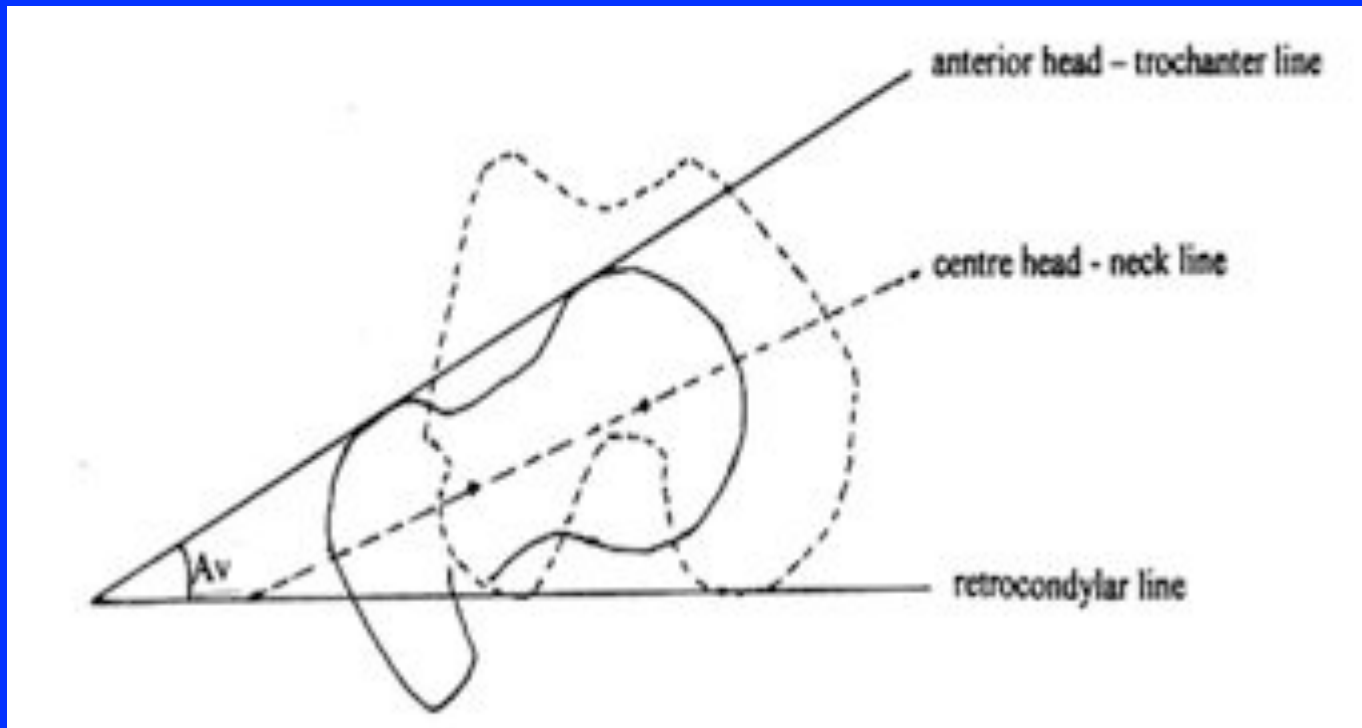
Image of tibial  
torsion removed

# FEMORAL ANTEVERSION

3 – 9 years

Not “hip problem”

Improves spontaneously until age 12







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# DIFFERENTIAL DIAGNOSIS

Equinovarus (clubfoot)

Neurologic problems

Cerebral palsy

Myelodysplasia



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# OUT-TOEING

Calcaneovalgus foot

Usually improves spontaneously

External tibial torsion

Uncommon – neurologic problems

Myelodysplasia

Cerebral palsy



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# OUT - TOEING

External rotation contractures hips

Seen in newborn

Improve spontaneously first year

Drawing of newborn  
out- toeing removed

Please see: <http://www.cssd.us/body.cfm?id=1218>



**BOWLEGS / KNOCK KNEES**

# EVALUATION

## Clinical

Knee joint laxity

Range of motion

Location of angulation – femur/joint/tibia

Assess alignment – AP/lateral/rotation

# EVALUATION

Radiographic

Long films – standing

Neutral alignment



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# EVALUATION

## Laboratory

Renal function studies – BUN/creatinine

Calcium/Phosphorus/Alk.phos.

BOWLEGS (GENU VARUM)

# Differential diagnosis

Physiologic (most common)

Blount's Disease

Rickets

Skeletal dysplasia

# PHYSIOLOGIC BOWLEGS

Normal in infants (15 degrees)

Neutral by 18-24 months

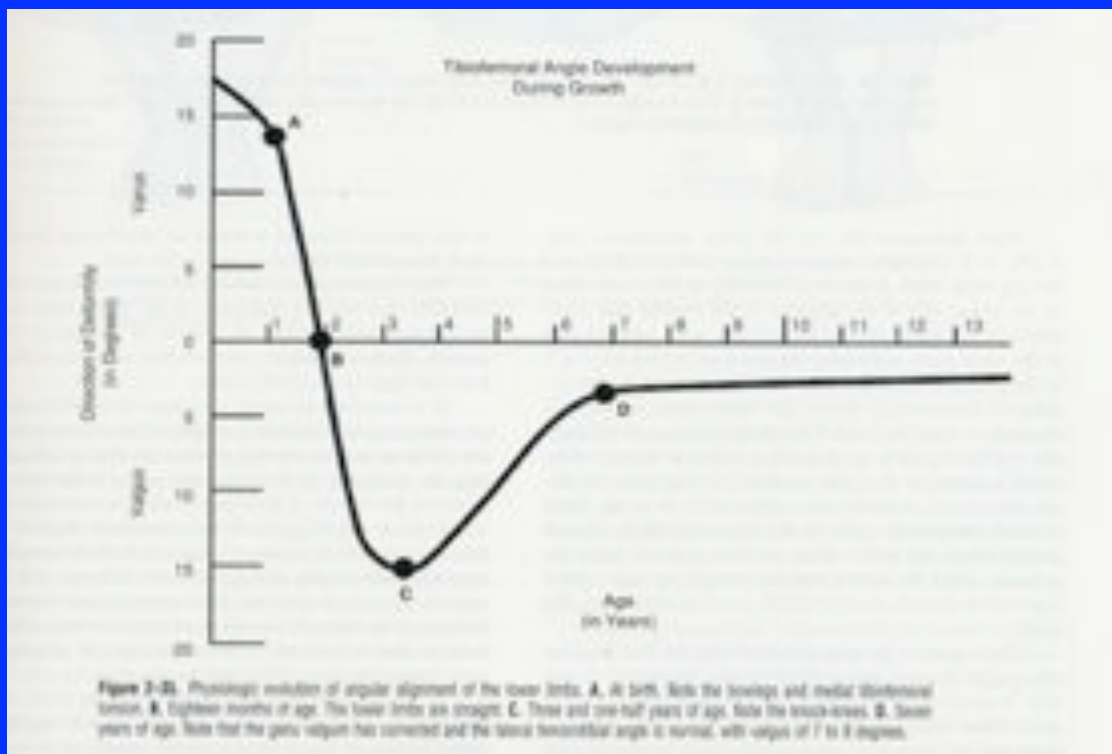
X-rays normal except for bowing



## Developmental Stages



© PD-INEL Dr. C. Robert Dushack



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# INFANTILE BLOUNT'S DISEASE

Growth retardation proximal tibial epiphysis

Medial / posterior

Abnormal weightbearing stresses

Early walkers

Obesity

Racial

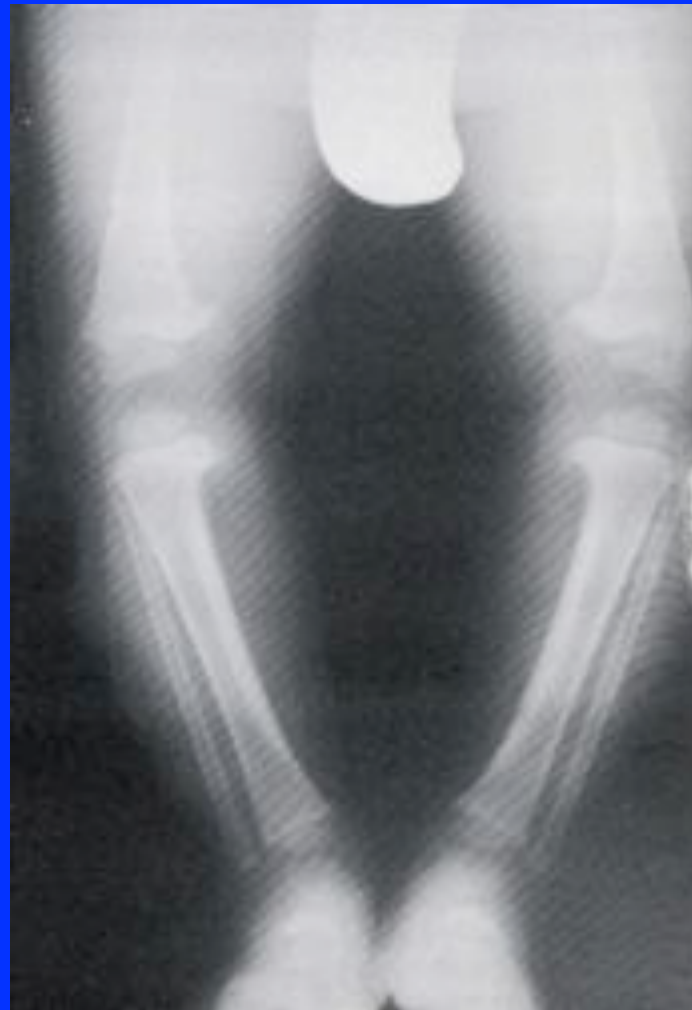
Bilateral 75 %

# IMAGING

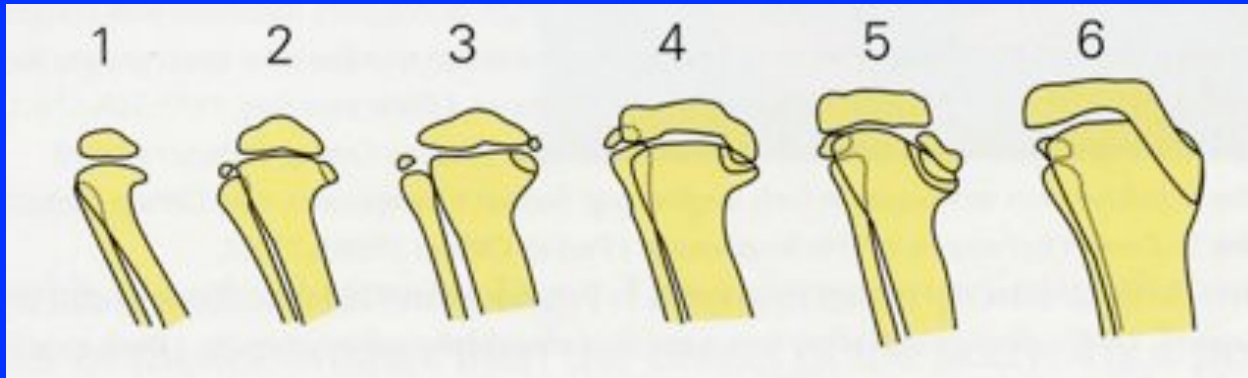
Medial “beaking” initial sign

Progressive depression medial tibial plateau

Langenskiold stages I-V



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# GENU VALGUM

Developmental most common

Differential diagnosis

Metabolic bone disease

Renal osteodystrophy

Trauma – proximal tibial fx.

Tumor – fibrous dysplasia



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# DEVELOPMENTAL HIP DYSPLASIA

## Etiology

Multifactorial

Not always congenital or dislocated

“continuum of dysplasia”

# DDH - ETIOLOGY

## Mechanical factors

First born (small space)

Breech presentation (60%)

Left hip (60%)

Torticollis (20%)

Metatarsus adductus/calcanoevalgus

# DDH – ETIOLOGY

Physiologic factors

Female (6:1)

Hormones – estrogen

Environment

Cradle boards

# HIP AT RISK

## Major

Abnormal clinical exam

Breech presentation

First born female

Family history DDH

# HIP AT RISK

## Minor

Limitation of abduction

Sacral dimple

Foot deformity

Torticollis

Scoliosis

# NEWBORN TO TWO MONTHS

Ortolani and Barlow tests most reliable

X-rays unreliable (false neg. 50%)

Ultrasound – non-invasive

Age limited

Operator dependent

May be too sensitive (immaturity)

Helpful for brace follow up



# DDH - EXAM

Infant relaxed/supine

Stabilize pelvis

Flex hip 90 degrees

Adduct past midline / gentle outward pressure

Gentle abduction – lift toward socket

Feel dislocation/relocation

Not just abduction test





Refer to: <http://static.howstuffworks.com/gif/hip-dysplasia-screening.jpg>

Sketch of DDH exam  
removed

# NEWBORN TO SIX MONTHS

Ortolani positive – reducible

Reduce femoral head

Maintain abducted and flexed

100 degrees flexion/60 degrees abduction

Document reduction (x-ray/ultrasound)

# PAVLIK HARNESS

Maintains flexed/abducted posture

Free motion within limited range

Safe zone of Ramsey

Flexion above 90 degrees

Avoid excessive abduction

Avascular necrosis



# TWO MONTHS TO TWO YEARS

Radiographic findings

Shenton's line broken

Proximal/lateral migration femoral head

False acetabulum (acetabular dysplasia)



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# DDH EXAM

EVERY WELL BABY EXAMINATION



# IDIOPATHIC SCOLIOSIS

Incidence - 22/1000

4/22 require treatment

Sorting

Discovery – school screening

Initial exam – family MD/pediatrician

Disposition - orthopaedist

# SCOLIOSIS

## ETIOLOGY - GENETIC

80% Positive family history

Variable expression

High degree penetrance

Equal sex distribution

# SCOLIOSIS

## CLINICAL EVALUATION

A-P alignment

Curve types

Right thoracic/left lumbar most common

Double major/thoracolumbar

Trunk alignment

Rib hump (forward bending test)

Sketch of scoliosis  
exam removed

Sketch of scoliosis  
vertebrae removed



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# SCOLIOSIS

## CLINICAL EVALUATION

Sagittal alignment

Thoracic lordosis

Kyphosis

Lumbar lordosis



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# SCOLIOSIS

## RADIOLOGIC EVALUATION

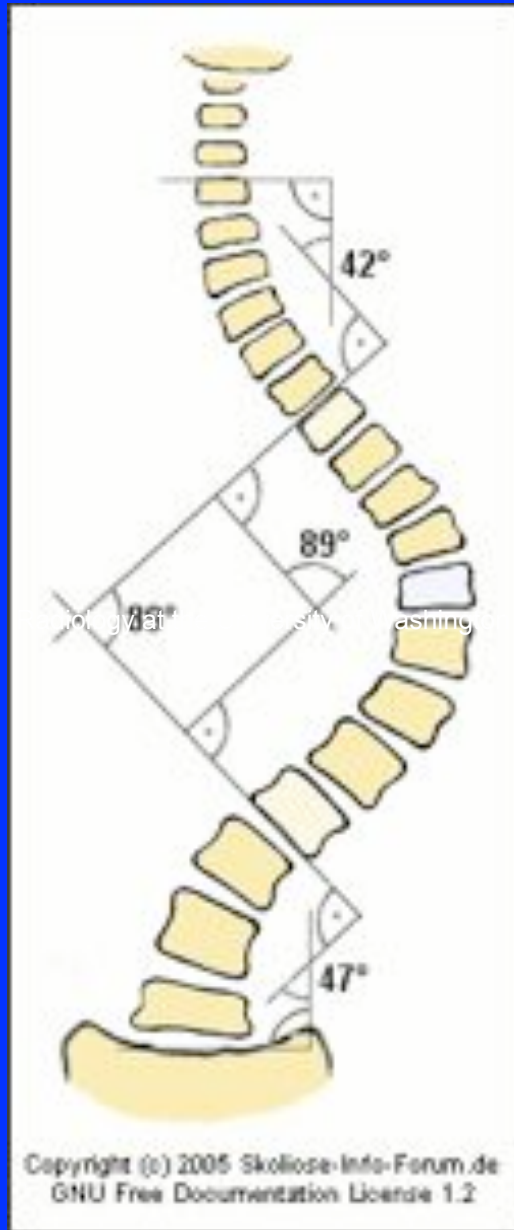
Standing PA and lateral films (initial)

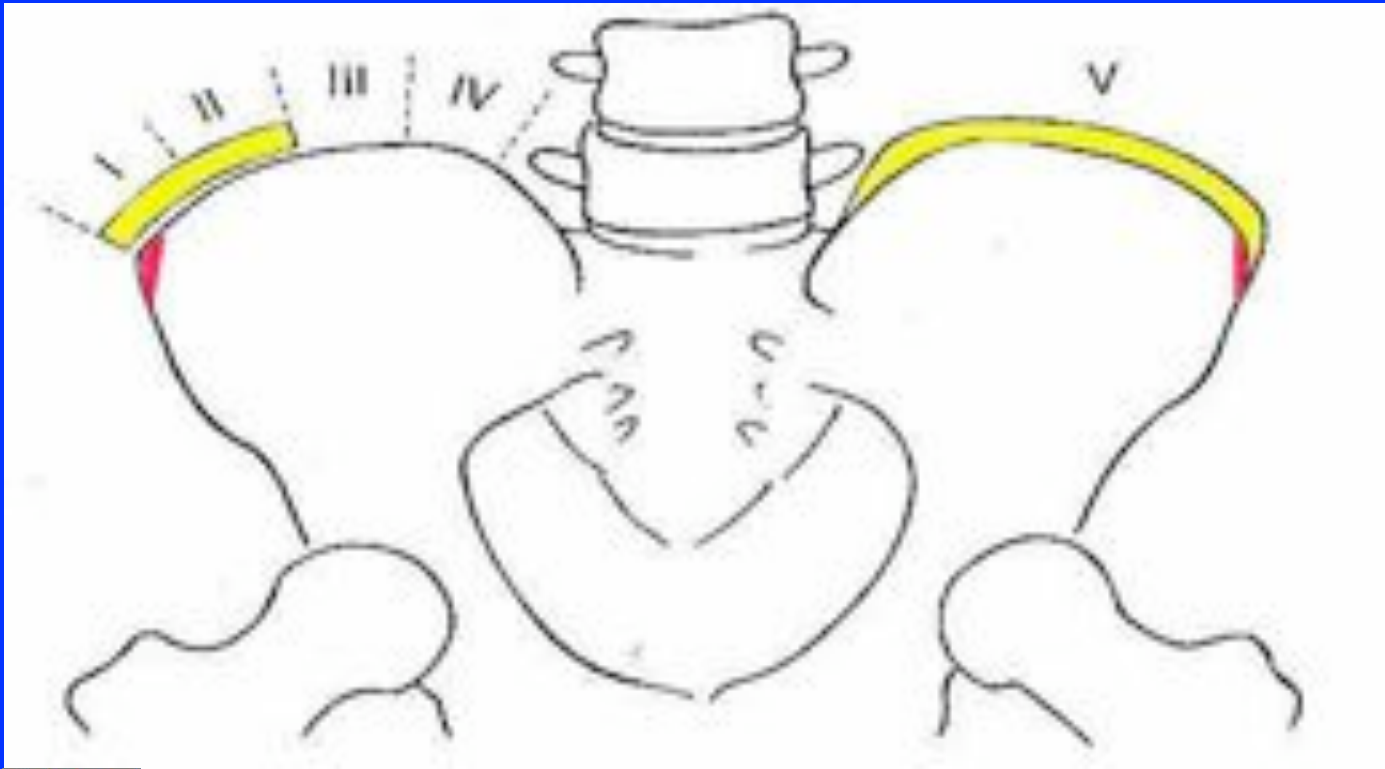
Entire spine

Cobb measurement method

Minimize follow up films

Risser grading – skeletal maturity







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# SCOLIOSIS

## BEWARE

Painful scoliosis/neurologic findings

Progressive curve in males

Unusual pattern (left thoracic)

Rapid progression ( $> 1$  degree/month)

## INTRADURAL ABNORMALITY

Tumor/syrinx/ruptured disc

# SUMMARY

Most angular deformities resolve with growth

Exam best screen for DDH in newborn

Caution “hip at risk”

Majority of scoliosis non-progressive

Beware “unusual scoliosis”

# Additional Source Information

for more information see: <http://open.umich.edu/wiki/CitationPolicy>

Slide 8: Allison Gilmore, MD, ET AL, <http://www.consultantlive.com/display/article/10162/33387>

Slide 12: The Internet Journal of Biological Anthropology 2009 : Volume 3 Number 1,  
[http://www.ispub.com/journal/the\\_internet\\_journal\\_of\\_biological\\_anthropology/volume\\_3\\_number\\_1\\_63/article\\_printable/femoral-anteversion-comparison-by-two-methods.html](http://www.ispub.com/journal/the_internet_journal_of_biological_anthropology/volume_3_number_1_63/article_printable/femoral-anteversion-comparison-by-two-methods.html)

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Slide 33: Dr. C. Robert Dushack, <http://www.pffcpc.com/flatfoot.shtml>; Source Undetermined

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Slide 65: Source Undetermined

Slide 67: Zorkun at Wikidoc.org, [http://www.wikidoc.org/index.php/Image:Scoliosis\\_cobb.gif](http://www.wikidoc.org/index.php/Image:Scoliosis_cobb.gif)

Slide 68: Xray2000, <http://www.e-radiography.net/radpath/r/risser-sign.htm#TOP>

Slide 69: Source Undetermined