Tibia Vara or Blount’s disease

- A developmental disorder of growth which affects the medial aspect of the proximal tibial physis and leads to a sharp angular varus deformity at this site associated with internal tibial torsion.
Incidence

- 0.05 per 1000 live births
Risk factors

- Afro-Caribbean child
- Female
- Obese
- Walking at an early age
Pathology

• Physeal cell columns become irregular
• Endochondral ossification is impeded
• Eventually a bony bridge arrests medial growth
Natural history

- The affected infant walks on internally rotated tibiae and flexed knees, applying a lateral thrust to the knees
- Increasing varus ensues
- Intra-articular deformity leads to symptomatic arthritis
Presentation

- 14 – 36 months
- Increasing bow-legs in a child since it started walking
Evaluation

- Developmental milestones
- Growth chart (ht and wt)
- Examination
  - Degree of genu varum and internal tibial torsion
Evaluation

- X-rays
  - Genu varum relatively severe for the child’s age
  - Genu varum which has not improved or which has deteriorated over 3-4 months
  - Excessive internal tibial torsion
  - Ht less than 25th centile
  - Family history
  - Marked asymmetry
Radiological assessment

- Plain X-rays
  - Fragmentation medial to the epiphysis - pathognomic
  - Femoro-tibial angle (Salenius and Vankka)
  - Metaphyseal-diaphyseal angle (Levine and Drennan) – angle of 12° or more diagnostic
  - Classification (Langenskiold)- stages I to VI
  - Medial physeal slope > 60° associated with recurrent deformity
The Development of the tibio-femoral angle in children

- Salenius and Vankka, JBJS; 57-A: 259-261, 1975

  - 979 patients
  
  - Close correlation between tibio-femoral angle measured clinically and radiologically
  
  - Normal knee alignment progresses from 10-15° varus at birth to
    10-15° valgus at the age of 3 and reverts back to 5-7° valgus by the age of 6.
Tibio-femoral angle vs age
Physiological bowing and tibia vara: The metaphyseal-diaphyseal angle in the measurement of bow-leg deformity

- **Levine and Drennan, JBJS; 64-A: 1158, 1982**
  - 48 children, 26 with physiological bowing and 22 with tibia vara
  - followed to age of 3 or until bowing resolved
  - radiographic assessment with tibio-femoral angle and metaphyseal-diaphyseal angle
• Levine and Drennan, JBJS; 64-A: 1158, 1982
  – 58 limbs with m-d angle < 11°; only three patients subsequently developed signs of tibia vara
  – 30 limbs with m-d angle > 11°; radiographic changes of tibia vara were present or developed in 29
  – at the time of initial diagnosis, if the characteristic radiographic signs of tibia vara were not present, the m-d angle allowed differentiation between physiological bowing and tibia vara
Metaphyseal-diaphyseal angle

• M-D angle

> 11° indicative of Blount’s disease
Medial physeal slope
Radiological assessment

- CT scans
  - Indications
    - Age > 5 yrs
    - Medial physeal slope > 60°
    - Langenskiold stage IV
    - Body wt > 95th centile
    - Black girl close to meeting the above criteria
Differential diagnosis

- Physiological bowing
  - Genu varum persisting after 18 months
  - Radiologically
    - Symmetrical involvement
    - Normal appearing growth plate
    - Medial bowing affects both the proximal tibia and the distal femur
    - Metaphyseal-diaphyseal angle less than 11°
Differential diagnosis

• Hypophosphataemic rickets
  – Familial
  – Short stature – ht < 10\textsuperscript{th} centile and always < 25\textsuperscript{th} centile
  – Radiology
    • Epiphysis widened and irregular
    • Cupping of the metaphysis
  – Low serum phosphorus
Differential diagnosis

• Metaphyseal chondrodysplasia
  – Retarded growth
  – Radiology similar to rickets but less marked
  – Normal serum phosphorus
Differential diagnosis

• Focal fibrocartilaginous dysplasia
  – Unilateral
  – Progressive genu varum
  – Indentation at the metaphyseal-diaphyseal junction of the proximal tibia
Treatment

• Difficult and unpredictable

• Warn parents about the possibility of recurrence and multiple operations
Treatment

• Pre-Blount’s (< 3 yrs)
  – Observe
  – Most deformities resolve spontaneously
  – Role of bracing unproven
Osteotomy
Treatment

• Definite Blount’s (3-6 yrs)
  – Progresses if left untreated
  – Delay in treatment is a mistake
  – Corrective proximal tibial osteotomy
  – Overcorrection by 5-10° for the child at risk
Treatment

- **Blount’s (>6 yrs)**
  - Risk of bony bridge high
  - Tomograms or CT scans
  - Resection of bony bridge with corrective osteotomy
  - Interposition of silastic, bone cement, cranioplast
Treatment

- **Blount’s in the older child (8-9 yrs)**
  - Corrective osteotomy with lateral tibial and fibular epiphysiodesis

- **Late, neglected case**
  - Associated with marked depression of the medial tibial plateau and ligamentous laxity
  - Elevation of the medial tibial plateau, corrective osteotomy and lateral epiphysiodesis
Siffert’s procedure
Adolescent Blount’s

- 6-13 yrs
- medial growth plate arrest of uncertain aetiology
- unilateral
- less severe than infantile form
- treated by corrective osteotomy and lateral epiphysiodesis