Developmental Orthopedic Disease - (DOD)

- *What is it?*
- *How do they get it?*
- *How do I evaluate/diagnose it?*
- *How should it be treated?*
- *What should I expect with treatment?*
- *Why treat it?*

DOD

Flexural Deformities

- Contractural
- Laxity

Angular Deformities

- Varus
- Valgus

Osteochondrosis *(OCD)*

flaps (dissecans)

subchondral cysts

Physitis

Wobblers

Brachygnathism

Why treat it?

Normal bone growth

- “Endochondral Ossification”
- Cartilage leads the way
- Maturation and differentiation from cartilage to bone

Foals are Plastic

- Growth influenced by:
  - nutrition
  - amount of weight bearing
  - our intervention - surgical

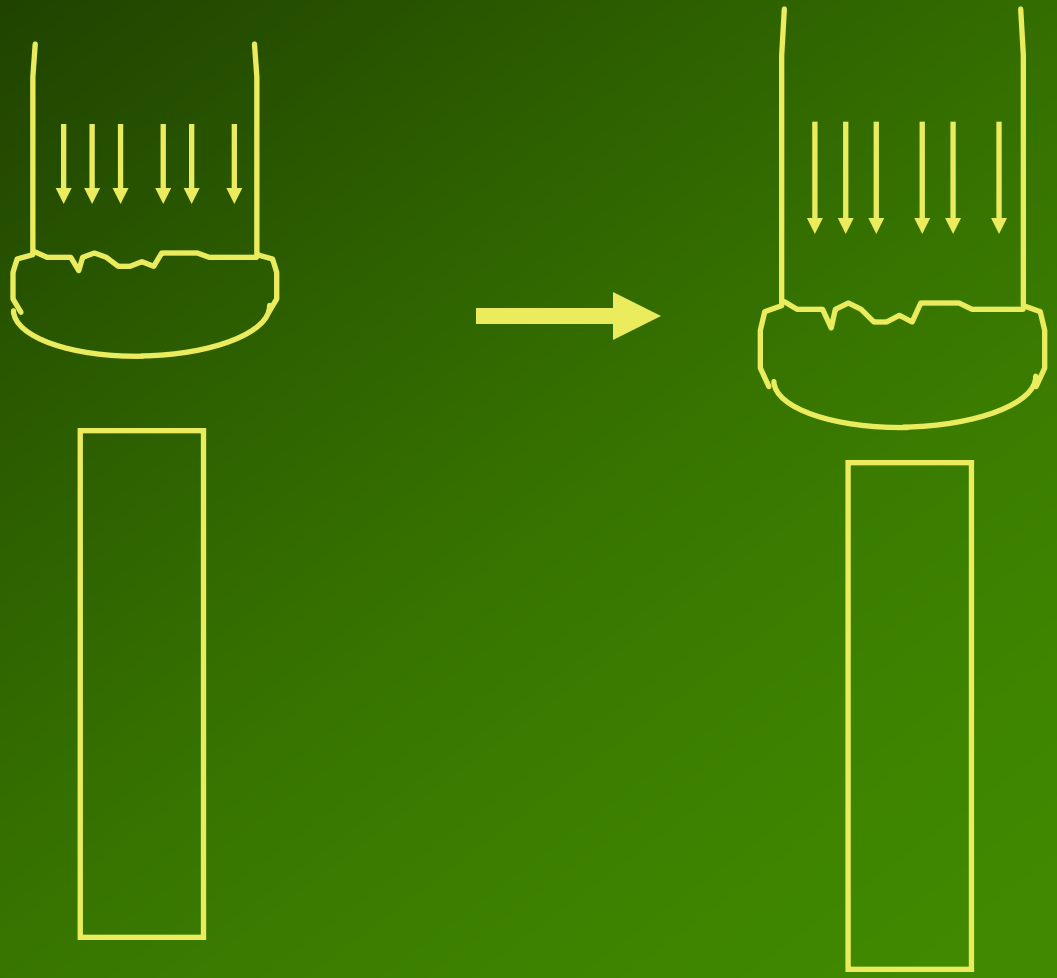
Treat the foal - Not just the problem

- Stabilization / support
- Exercise
- Medications
- Nutrition
- “Soft” vs. “Hard” tissue

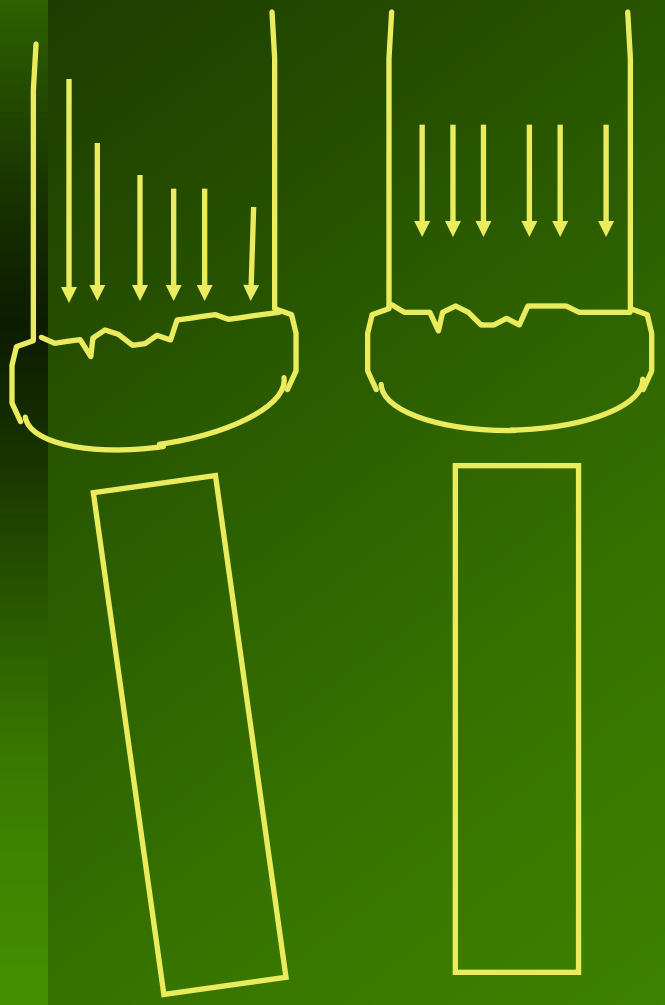
Angular Deformities

- “Crooked” Foal
- Limb distal to the joint
  - valgus or varus
- Carpus/Tarsus and fetlock

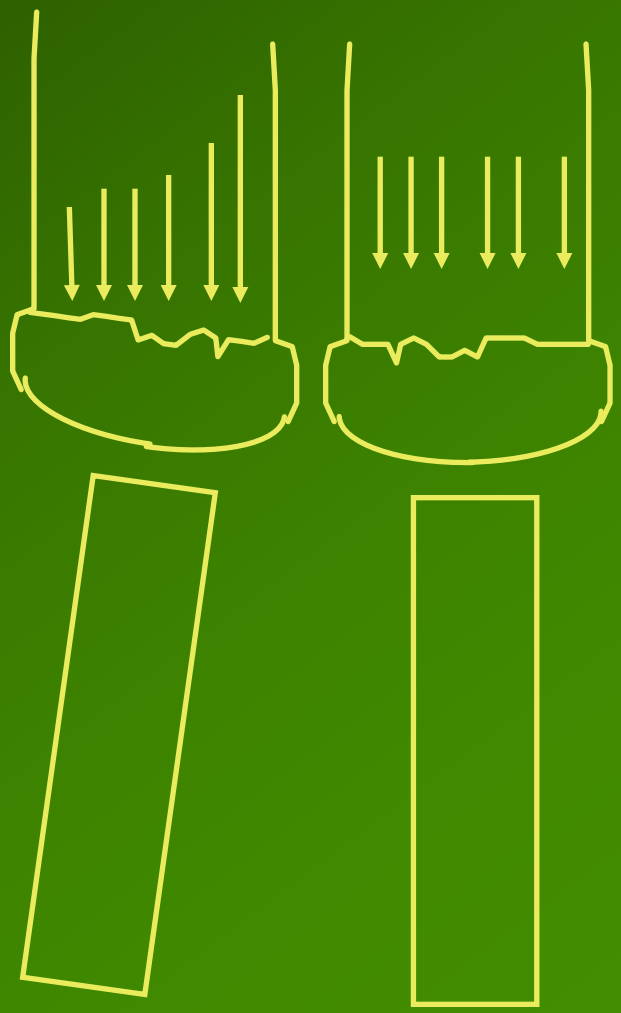
Growth vs. Deformity



Varus



Valgus



Angular Deformities

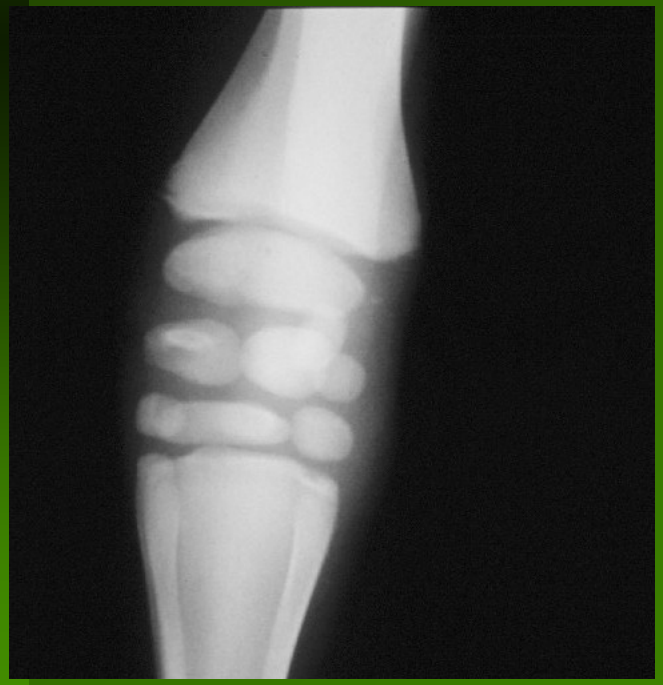
- Asymmetric physeal growth

Angular Deformities

- Periarticular laxity

Angular Deformities

- Delayed/irregular ossification of cuboidal bones



Angular Deformities

- Delayed/irregular ossification of cuboidal bones

Angular Deformities

- Delayed/irregular ossification of cuboidal bones

Angular Deformities

- Excessive weight bearing

What is normal?

- Toe out
- Carpal valgus

Early recognition is critical

- Site of deformity
- Degree of deformity
- Potential for correction
  - shaping remaining growth

Determinants for our intervention

- Physical examination
  - Which joint, severity, precipitating cause
- Duration and Progression
- Previous “management”
  - Exercise, nutrition, any treatment
- +/- Radiographs

Expectations for the carpus

- Some valgus
- 5-7 degrees by 4 mths
- <2 degrees by 8-10 mths
- Most rapid growth < 6mths of age

Fetlock deformities

- Often undiagnosed
- Varus; left rear most common
- Rapid growth < 3 mths

Treatment options

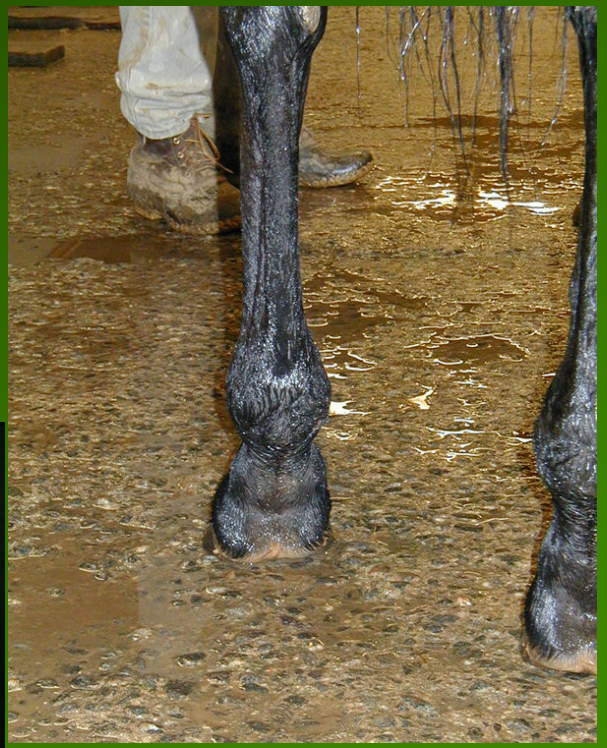
- Conservative management

Treatment options

- External coaptation
  - Too much is BAD

Treatment options

- Limited External Coaptation



Treatment options

- Limited External Coaptation

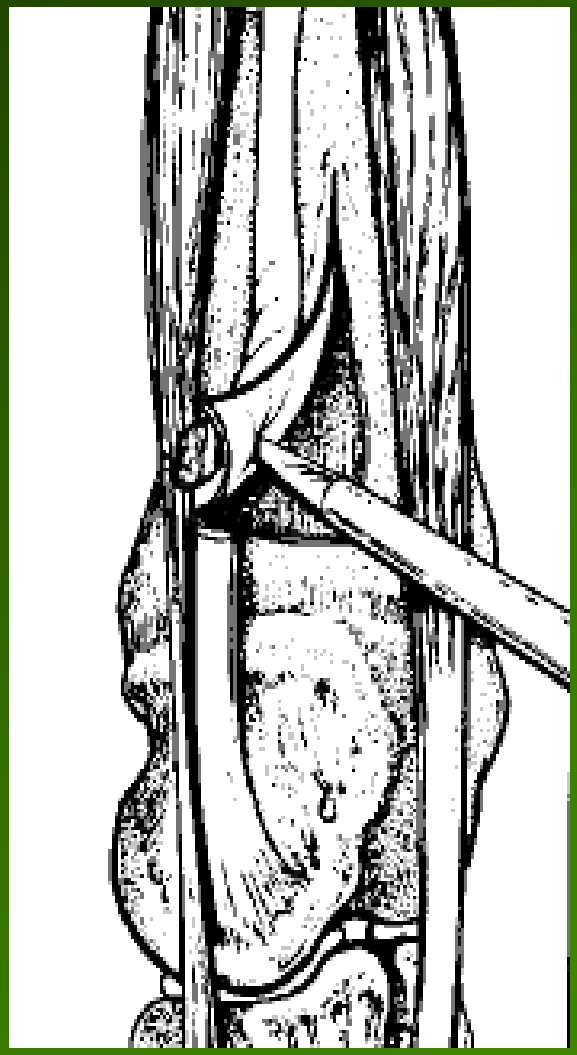
Treatment options

- Conservative management
- External coaptation
- *Surgical intervention*

Surgical options

- Periosteal transection
- Transphyseal bridging
- Step osteotomy

Periosteal Transection



Auer J. Equine Surgery1992;947

Advantages of early periosteal transection

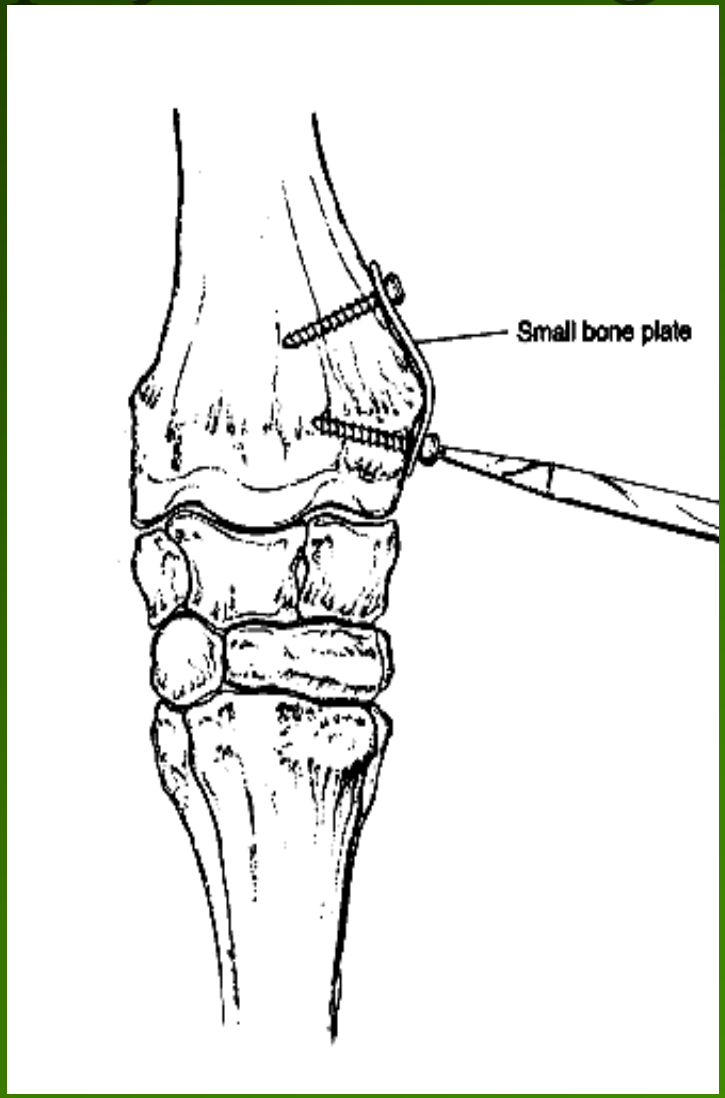
- Minimal risk
- No overcorrection
- Decreased cost
- 6-8 weeks of effect

Periosteal Transection

Transphyseal bridging

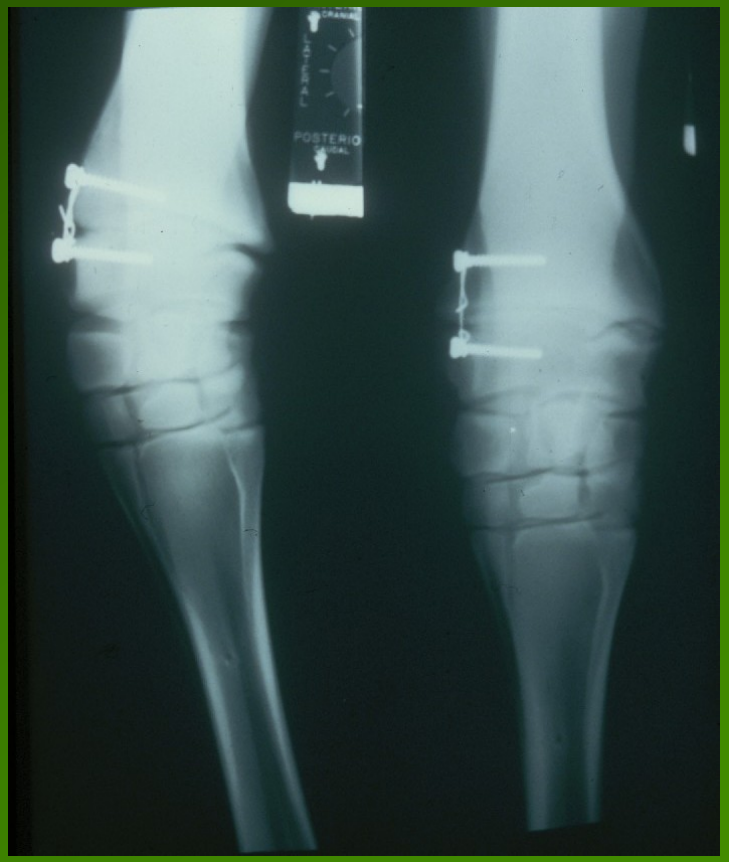
- Can overcorrect
- Requires 2nd removal procedure
- Increased Cost
  - 1st procedure + removal procedure
- ***But*** quicker resolution

Transphyseal Bridging



Auer J. Equine Surgery1992;951

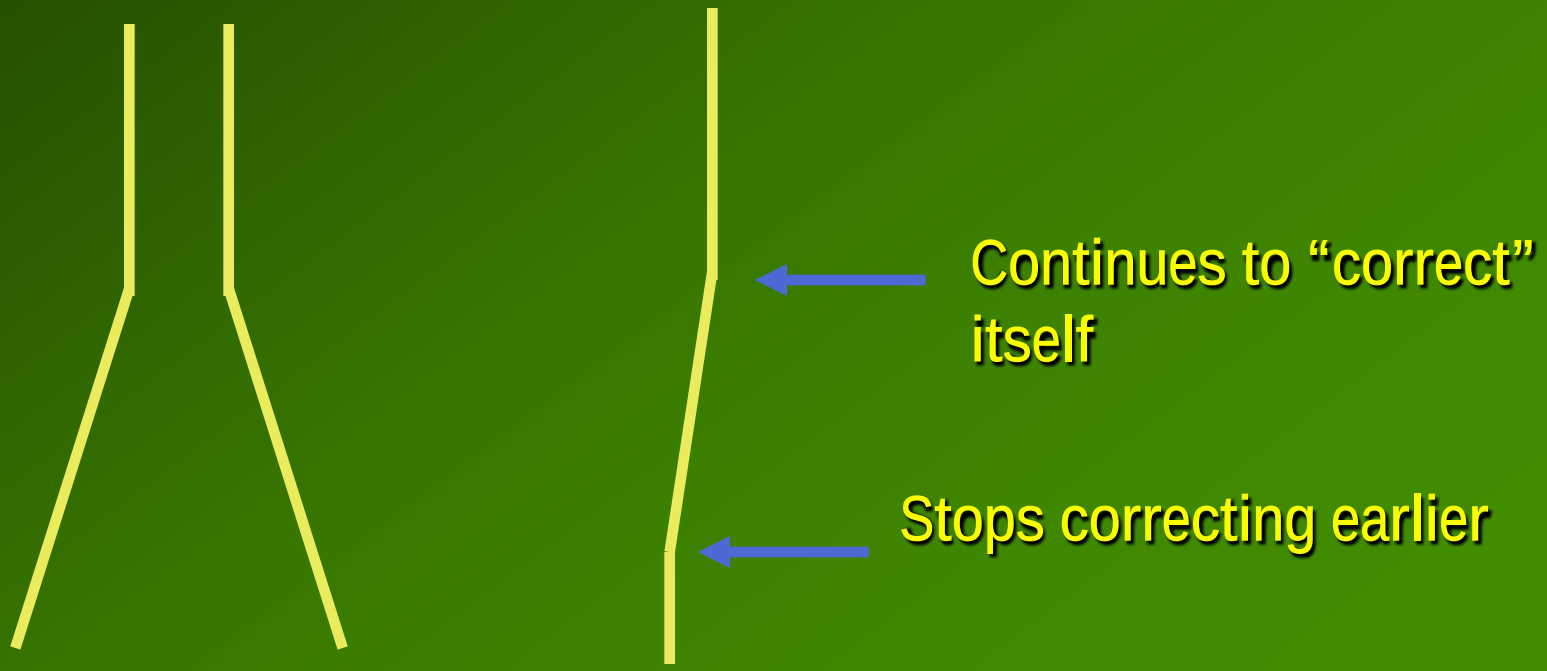
Transphyseal Bridging



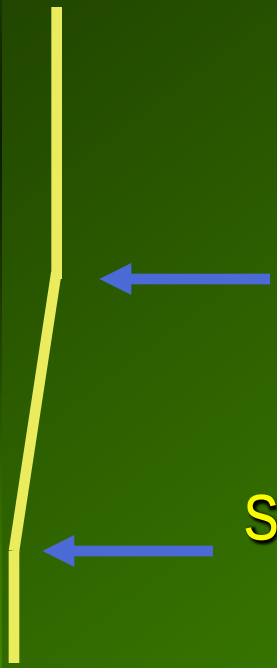
Transphyseal Bridging

Surgical limitations

- 15-20 degrees for the carpus
- 6-8 degrees for the fetlock



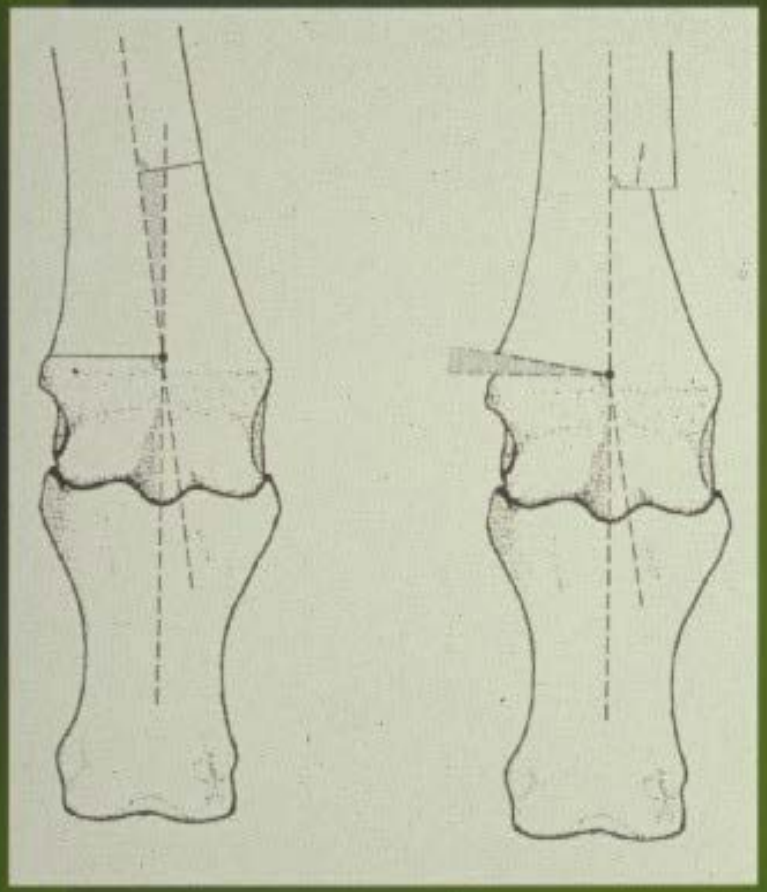
Surgical limitations



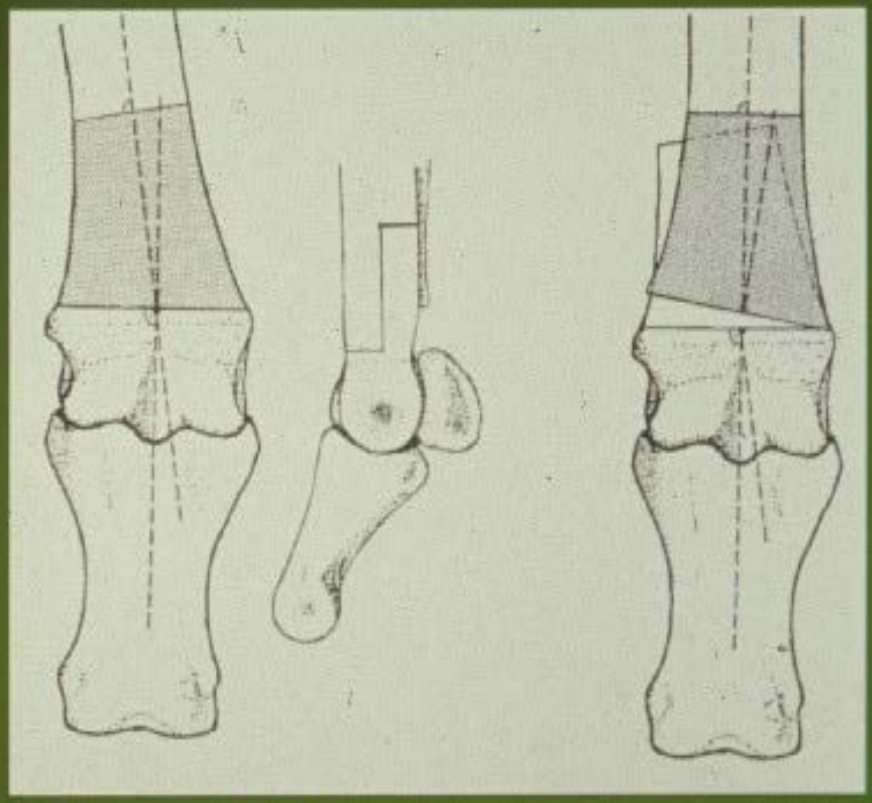
Continues to “correct” itself

Stops correcting earlier

Step Osteotomy



Sagittal plane



Frontal plane

Auer J. Current Practice Equine Surgery 1990:496

Flexural Deformities

- Contracture
  - congenital
  - acquired
- Laxity
  - primarily congenital

Contracture

- Bone outgrows tendons
- Flexors overpower extensors
- Pain-myotactic reflex
- “Contracted Tendons”

Sites of Contracture

- Coffin joint -

"Club Footed"

Sites of Contracture

- “Fetlock joint - “Posty” “Upright”

Sites of Contracture

- “Carpus - “Over”

Determinants for our intervention

- Physical examination
  - which joint
  - severity
  - precipitating cause

Determinants for our intervention

- Duration and Progression
- Previous “management”
  - amount of exercise
  - nutritional
  - any treatment

Nonsurgical management

- Limited exercise

Nonsurgical management

- Oxytetracycline
- Bandaging/support/ splinting
- Analgesics

Nonsurgical management

- Bandaging/support/splinting

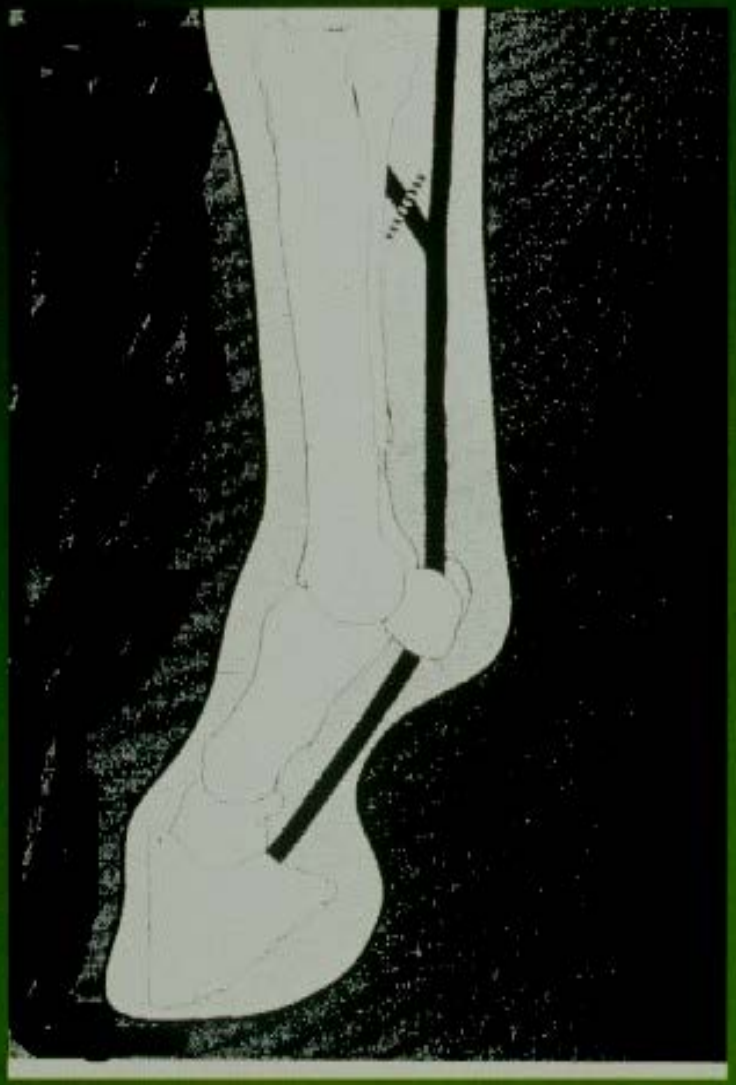
Nonsurgical management

- Shoeing:
- *Toe extensions????*
- *Heel elevations????*

Surgical management

- "Check" ligament desmotomies
  - cut the tether to allow greater flexibility
- Tenotomies
  - cut the attachment
  - severe cases - breeding animal

Inferior check ligament



Wagner PC, Current Practice Equine Surgery, 1990;474

“Club-Footed”

- < 4 mths of age
- Inferior check ligament desmotomy
- Shoeing with sx
  - toe extension

“Posty”

- 8-18 mths of age
- Superior and inferior desmotomy
- Shoeing?

Flexor laxity

- Coffin joint
- Fetlock

Flexor laxity

- Less is better

Flexor laxity

- Controlled exercise

Flexor laxity

- Shoeing

Flexor laxity

Flexor laxity

- Shoeing

Musculoskeletal Exam

- Palpation - often in recumbency
  - Heat
  - Pain
  - Swelling
  - Range of motion

Symmetry

Musculoskeletal Exam

- Observe at a walk / trot
  - More evident than adults
  - Sequential evaluations
- Radiographs
- Ultrasound

Critical to alleviate lameness as quickly as possible

- Angular / Flexural deformities can have a more significant effect than the primary problem

Sepsis

- Multiple joints or physes
  - Cultures
  - “Squeeze the bone”
- Source
- Often insidious onset
- Difficulty in interpreting radiographs