


Neonatal Orthopedic Conditions

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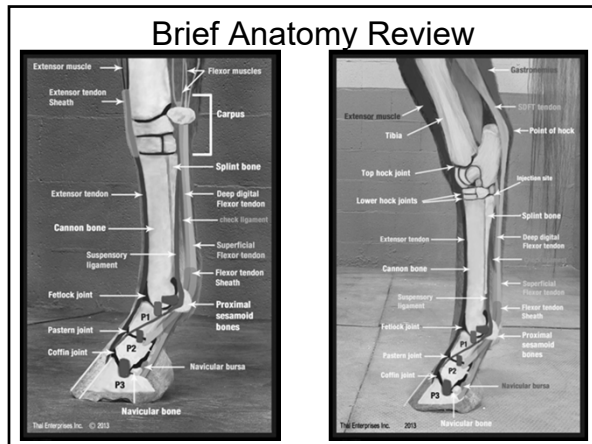


Learning Objectives

- Differentiate between the main equine pediatric orthopedic conditions
- Understand principles behind the treatment strategies for each condition


Main Pediatric Conditions

- 1) **Tendon laxity** = weak flexor tendons
- 2) **Flexural deformities** = contracted tendons
- 3) **Angular limb deformities** = limb deviations




Tendon Laxity

- Typically newborn foals
 - Congenital more common than acquired
- Clinical signs
 - Not weight bearing on toes, walking on heel bulbs
 - Severe cases rest fetlocks on ground
- Hindlimbs most commonly affected



Congenital Tendon Laxity

- Etiology: musculotendinous weakness
 - Prematurity
 - Primary systemic illness
 - Lack of exercise



Acquired Tendon Laxity

- Etiology: induced weakness
 - Bandaging, splinting, or casting for extended periods
 - Hoof overgrowth



Tendon Laxity Treatment

- Trim heels flat → eliminate “rocker” effect
- Heel extension shoes (more severe cases):
 - Provide plantar/palmar support
 - Protect fetlocks and heel bulbs from trauma
- Exercise
- Prognosis: Favorable



Tendon Laxity Treatment






Before



After

Tendon Laxity Treatment


Presentation:
Non-weightbearing

With shoes

2 months
Post-discharge


Flexural Deformities

- “Contracted tendons”
- Persistent hyperflexion of joint
- Tendons functionally too short compared to bone
- Pain-mytactic reflex
- Forelimbs most commonly affected
 - Typically only one joint: DIP, fetlock, or carpus
- Congenital or acquired



Congenital Flexural Deformities

- Etiology: multifactorial
 - Uterine malpositioning
 - Genetics
 - Idiopathic
- Fetlock and carpal deformities most common
 - Fetlock: SDFT, DDFT
 - Carpus: SDFT, DDFT and carpal fascia



Congenital Flexural Deformities Treatment

- Increase exercise
- Oxytetracycline (3g/foal)
- NSAIDs
- Splints during the day
- Toe extension shoes
- Surgery (severe cases)



*** MUST ASSIST TO STAND AND NURSE ***

- Prognosis: Better if shorter duration and if limb can be straightened manually

Congenital Flexural Deformities Treatment



24 hours old



1 week later:
Tx = exercise

Congenital Flexural Deformities Treatment



72 hours old

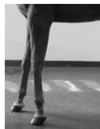


3 days later:
Tx = oxytetracycline,
NSAIDs, splints, exercise

Acquired Flexural Deformities

Acquired flexural deformity

- Unilateral or bilateral: DIP or fetlock joint most common
- Etiology:
 - Chronic pain in affected limb
 - Rapid growth
 - Nutritional imbalance
 - Genetics



Acquired Flexural Deformities: DIP Joint

- Contracture of DDFT, "club foot"
- Most develop between 4 weeks to 4 months
- Stage 1: dorsal hoof wall less than vertical
- Stage 2: dorsal hoof wall over vertical


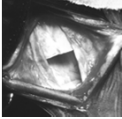



Acquired Flexural Deformities: DIP Joint

- Treatment:
 - Dietary changes
 - Exercise
 - Toe extension shoes
 - NSAIDs and sometimes oxytetracycline
 - Surgery: distal check ligament desmotomy; may need DDF tenotomy for stage 2
- Prognosis: Guarded for stage 2 cases




Acquired Flexural Deformities:
Coffin Joint: Ex




Pre-op

Distal check
ligament desmotomy
Toe extension shoes

Post-op



Acquired Flexural Deformities:
Coffin Joint: Ex


Pre-op

Distal check ligament
desmotomy
Heel wedge then toe
extension shoes

Post-op

Acquired Flexural Deformities:
Fetlock Joint

- Contracture of SDFT
- Knuckle forward at the fetlock with the hoof in normal alignment
- Most develop between 9 months to 2 years
- Most often SDFT and DDFT both involved



Acquired Flexural Deformities: Fetlock Joint

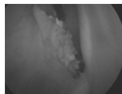
- Treatment:
 - Dietary changes
 - Exercise
 - Toe extension shoes
 - NSAIDs and sometimes oxytetracycline
 - Surgery: proximal +/- distal check ligament desmotomy; rarely SDF tenotomy
 - Splinting of limb
- Prognosis: Variable - joint capsule fibrosis



Acquired Flexural Deformities: Fetlock Joint: Ex



1 year old



3 days post-op

Proximal check ligament desmotomy, toe extensions, splinting, oxytetracycline, NSAIDS

Angular Limb Deformities

- A lateral or medial deviation of a limb:
 - Varus: medial deviation of limb below a joint
 - Valgus: Lateral deviation of limb below a joint
- Congenital or acquired (opposite limb pain)



Angular Limb Deformities



Varus
Medial deviation



Valgus
Lateral deviation

Angular Limb Deformities

- Age: foals, usually quite young
- Breed: all, particularly those with rapid growth
- Limb: forelimb more common than hind
- Sites: carpus, fetlock, tarsus

★ **Most common deformities:**
carpal valgus, fetlock varus

Angular Limb Deformities Need To Know...

- Is a deformity present?
- Has the deformity changed over time?
- What is the deformity?
- What joint(s) are involved?
- What should you do, act or wait and see?

How to Examine Foals

- 1) Look at the foal from the front
- 2) Palpate the limb - can you correct it?
- 3) Examine the foot
- 4) Watch the foal walk
- 5) Know what is normal!



1) Look at Foal From the Front

- Align yourself with the toe of foot
- Ask where is knee and rest of limb?



2) Palpate the Limb

- Joint laxity
- Can the deformity be manually corrected?
- Any heat, pain, swelling?
 - Check opposite limb



3) Examine the Foot

- Is the hoof worn more on one side?



4) Watch the Foal Walk

- Watch the foal travel
- Look for:
 - Multiple limb involvement
 - Lameness in opposite limb
 - Similar deformities in mare

4) Watch the Foal Walk



5) Know what is normal

- Toe out
- Carpal valgus
 - 5-7° by 4 months
 - <2° by 8-10 months

Congenital Angular Limb Deformities

- Present at birth, many correct without treatment
- If severe ($\geq 15^\circ$) or not improving within 5-7 days, treatment indicated
- Etiologies:
 - Intrauterine malpositioning
 - Joint laxity (prematurity)
 - Incomplete ossification of cuboidal bones (normally 300 days of gestation)

Congenital Angular Limb Deformities

- Premature “Windswept” foals in which:
 - Both hindlimbs curve in the SAME direction
 - Ligament/tendon laxity
 - Self-correct in couple weeks
 - Tx: Controlled exercise

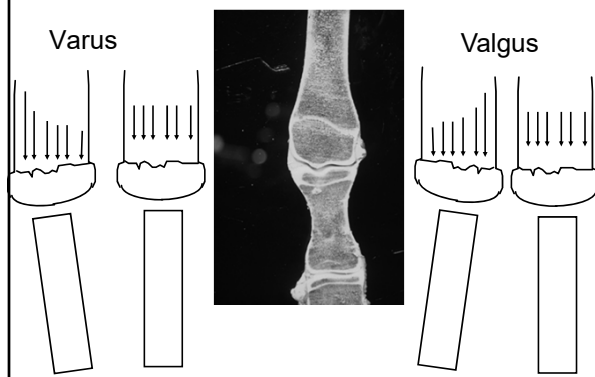


Acquired Angular Limb Deformities

- Born straight, go crooked within weeks or months of birth
- Etiologies:
 - Asymmetric physeal growth
 - Growth plate injury or physitis
 - Lameness in contralateral limb
 - Overnutrition leading to rapid growth
 - Genetic predisposition to rapid growth

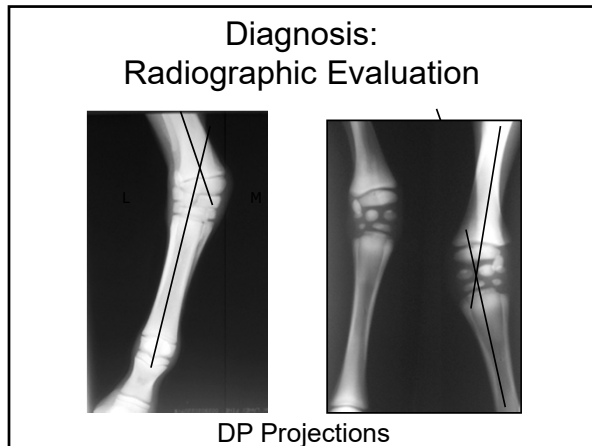


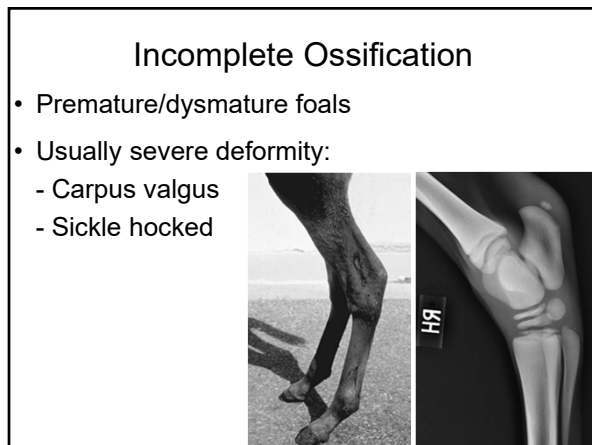
Physeal Asymmetry

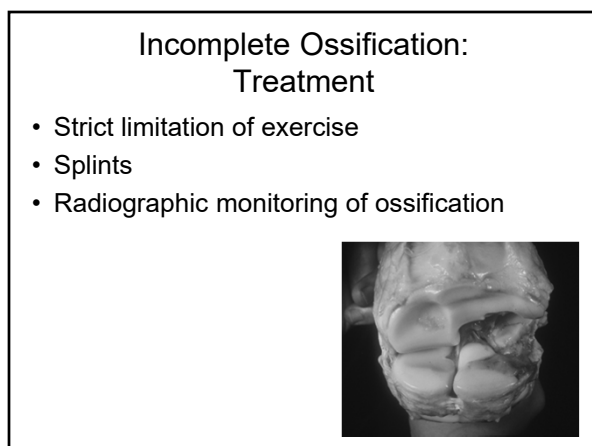


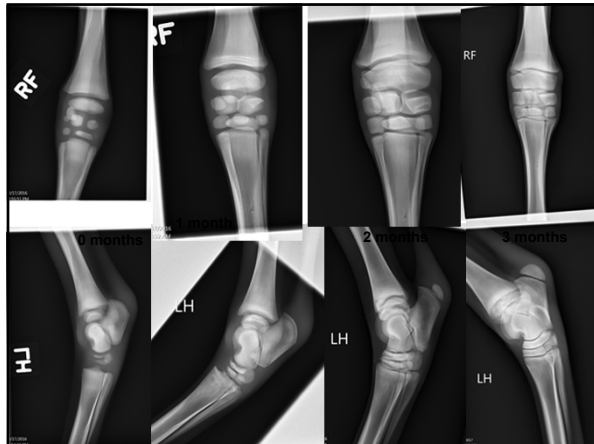
Angular Limb Deformities Diagnosis

- Visual and physical exam:
 - Lameness in opposite limb
 - Mare's legs
- Radiographic exam:
 - Long plates: 7x17
 - DP and lateral
 - Determine degree and pivot point









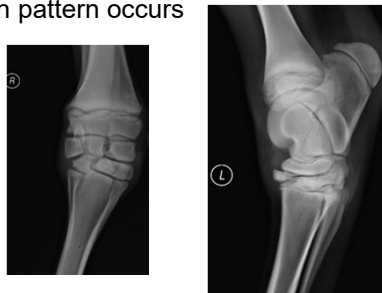
Incomplete Ossification: Treatment

- Sleeve (tube) cast:
 - Ends at fetlock (i.e. doesn't include foot)
 - Side effect is tendon laxity (max 14 days)



Incomplete Ossification: Treatment

- EARLY treatment essential before abnormal ossification pattern occurs



Other Angular Limb Deformities: Treatment

- Conservative:
 - Mild cases (5-10°) or early in physeal growth
 - Rest, trimming, shoes
- Surgery:
 - Moderate to severe cases or at end of physeal growth
 - Periosteal transection, transphyseal bridging, single transphyseal screw, wedge osteotomy

Review: Physeal growth

Joint	Physis	Radiographic closure	Physiologic closure	Majority growth completed by	Recommended treatment time
Fetlock	Distal MC/MT III	8-10 months	4 months	3 months	<1 month
Carpus	Distal radial	22-28 months	18 months	12 months	<4 months
Tarsus	Distal tibial	17-24 months	9 months	8 months	<4 months

Other Angular Limb Deformities: Conservative Treatment

- Corrective trimming: lower the wall toward which hoof is deviating
 - Ex: Turned out → Trim outside wall
- Shoeing: place extension on side of hoof that is wearing the most
 - Ex: Turned out → Inside (medial) extension



Other Angular Limb Deformities: Conservative Treatment: Ex

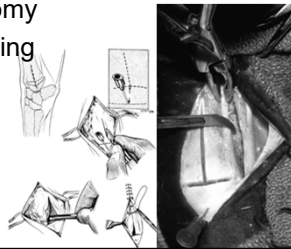
- Fetlock varus (turned in)
 - Trim inside
 - Outside extension



Treatment 10 days later

Other Angular Limb Deformities: Surgery - Periosteal Transection

- Performed to stimulate growth:
 - On CONCAVE side, proximal to physis
- Radius - ulnar ostectomy
- +/- transphyseal bridging on opposite side



Other Angular Limb Deformities: Surgery - Transphyseal Bridging

- Slow growth on CONVEX side of deformity
 - Screws proximal and distal to physis
 - Figure of 8 wires around screws
- REMOVE IMPLANTS WHEN STRAIGHT

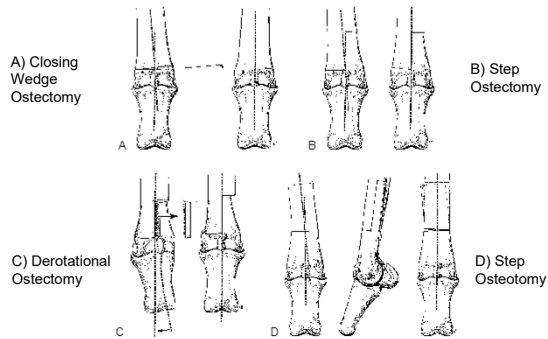


Other Angular Limb Deformities: Surgery - Transphyseal Screw

- Performed to slow growth:
 - On CONVEX side of deformity
 - Single lag screw across physis
 - Improved cosmetic appearance
- REMOVE IMPLANTS WHEN STOP

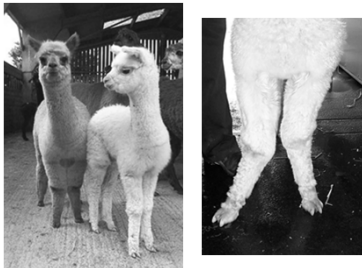


Severe Angular Limb Deformities: Surgery – Osteotomy



Angular Limb Deformities: Alpacas!

- Normal carpal valgus - surgery ONLY if true deformity!



Angular Limb Deformities: Prognosis

- Incomplete ossification:
 - Good if treated early
 - Guarded if treated late/crush injuries
- Other angular limb deformities:
 - Severe ($>15^\circ$) = fair if early
 - Lower joint = fair if early, generally less success due to short time for correction
 - End of physeal growth = less success

Questions?

