A15-3749
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History and Signalment

- 5 week old
- Female
- African crowned crane
- History of being a “poor doer”
- Difficulty walking
- Incubated and hand fed then returned to the aviary
- One week prior to submission:
  - Poor appetite
  - Suspected broken leg
  - Radiographs suggested incomplete development of leg bones

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Morphologic diagnoses

**Tibiotarsus**: Failure of endochondral ossification, with failure of chondroclasis, persistent metaphyseal and diaphyseal tongues of hypertrophied chondrocytes, myelofibrosis, microfractures, and periossteal fibrosis

**Proximal tibiosarsus**: Fracture, closed, simple, oblique, acute, focal, severe
Rickets

- Affects young rapidly growing animals
  - Prior to epiphyseal closure

- Avian Rickets
  - Etiology linked with nutritional imbalance
  - Insufficient dietary calcium, vitamin D$_3$ or phosphorus
    - Hypocalcemic rickets = elongated proliferative zone
    - Hypophosphatemic rickets = elongated hypertrophic zone
  - Excess dietary calcium or phosphorous

Dinev, I (2012)  
http://dx.doi.org/10.1016/j.rvsc.2011.02.011

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Rickets

Gross abnormalities

- Abnormal endochondral ossification and deformities
- Thickened flared metaphysis
- Flattening of epiphysis
- Curving of long bones
- Fractures common
- Kyphosis, lordosis, and scoliosis
- Deformation of the thoracic wall

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Rickets Pathogenesis

**Growth plate:** Failure of mineralization of cartilage → failure of hypertrophic chondrocytes to degenerate → failure of capillary invasion from metaphysis → lack of osteoprogenitors and osteoblasts with persistence of chondrocytes at sites of endochondral ossification → Thick cartilage trabeculae persist

**Trabecular bone:** failure to mineralize → osteoclasts cannot bind → reduced bone and cartilage removal at cutback zones, impaired remodeling, and thickened irregular metaphyseal trabeculae covered in thin seams of un-mineralized osteoid

**Cortical bone:** Failure of osteoid mineralization → endocortical and trabecular surfaces are expanded by unmineralized osteoid → pliable bone subjected to weight → microfractures

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Thank You!

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