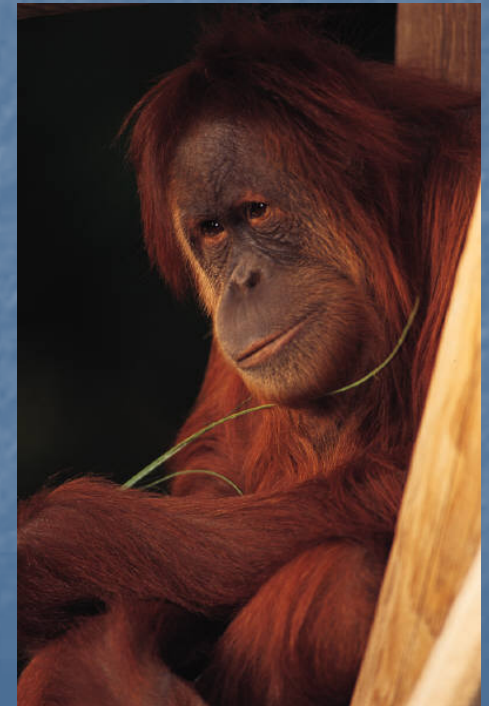
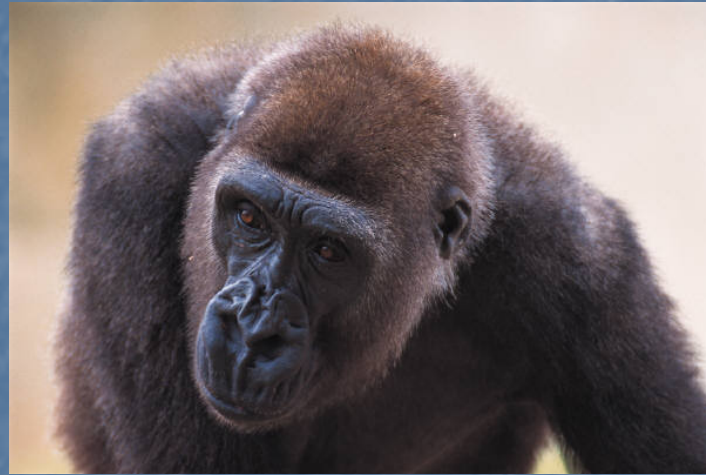


# Challenges of Primate Medicine: Case Discussions



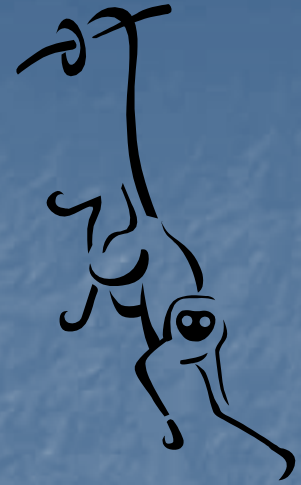
James W. Carpenter, MS, DVM, Dipl. ACZM  
Professor  
Zoological Medicine  
College of Veterinary Medicine  
Kansas State University  
Manhattan, Kansas

# Primates

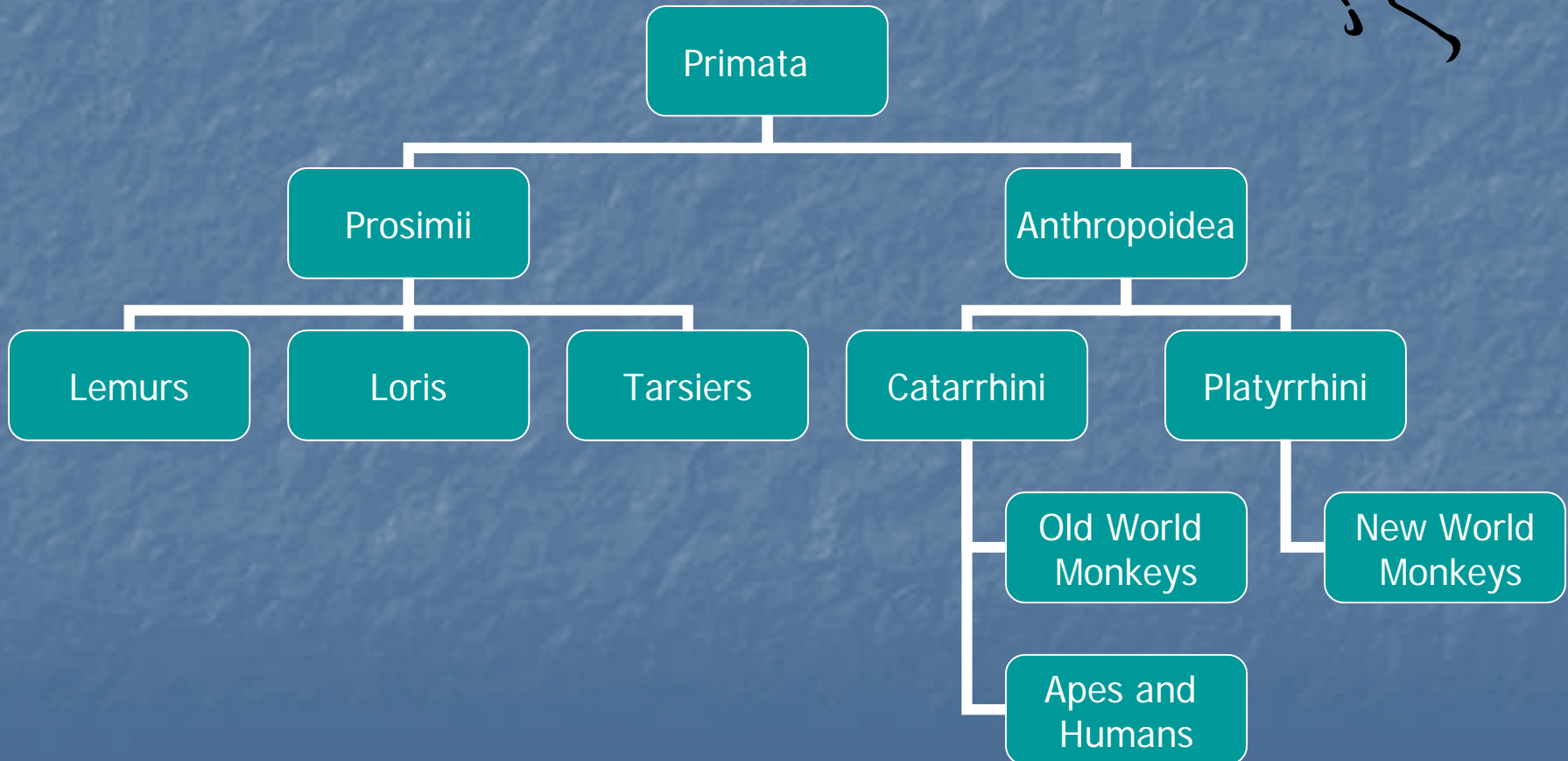




# Primate Taxonomy



Historically, the Order Primata has 2 suborders:



# Primate Taxonomy (cont.)

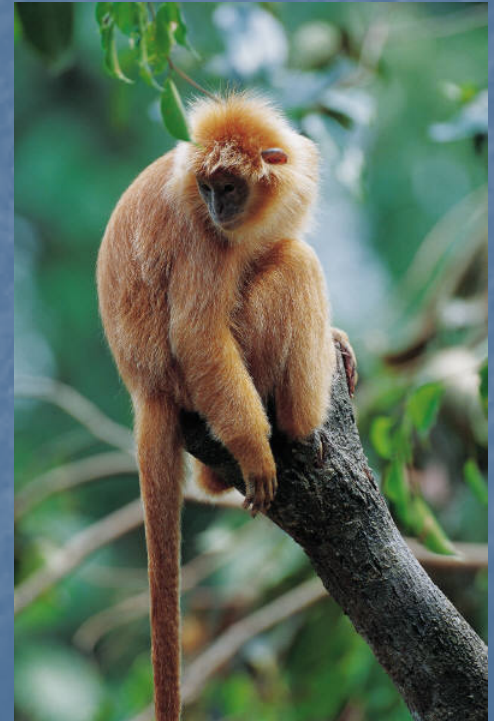
- Incredibly diverse!
- Over 230 ( $\pm$ ) living species represented by 13 different families
  - Smallest: pygmy mouse lemur, ~50 g and 10-15 cm long
  - Largest: gorilla, ~175 kg and 1.8 m tall





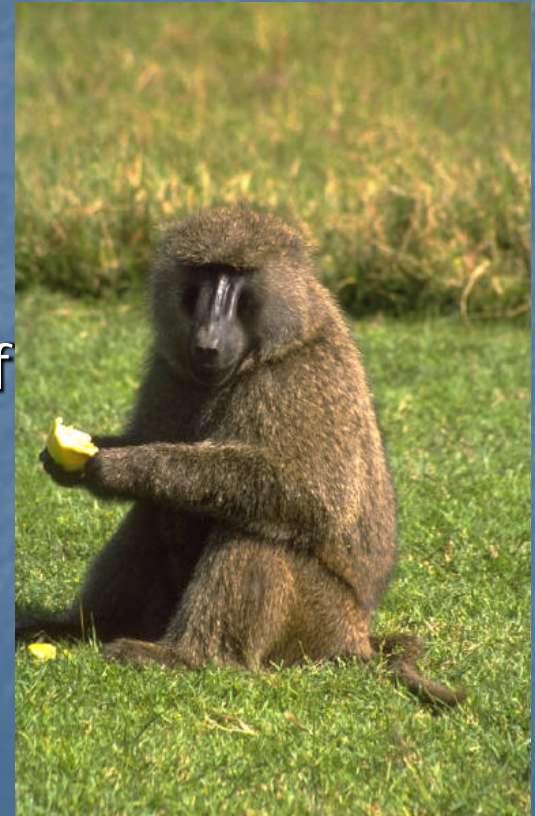
# Primate Characteristics

- "New World monkeys"
  - 53 species in 3 families
  - Southern Mexico, South and Central America
  - Some have prehensile tails
  - Mostly arboreal
  - No menstruation
  - Require vitamin D<sub>3</sub>



# Primate Characteristics (cont.)

- "Old World monkeys"
  - 78 species
  - No prehensile tail
  - Sacculated stomach ( $\pm$ )
  - Menstruation
  - Do not require external source of vitamin D<sub>3</sub>





# Primate Characteristics (cont.)

- "Great apes"
  - Endemic to Africa, except orangutans
  - Very intelligent
  - Very dependent on learned behavior
  - Lack external tails
  - Laryngeal sacs
  - Arms longer than legs
  - Require exogenous vitamin C
  - Predominately herbivorous
  - Menstruation







# Primate Characteristics (cont.)

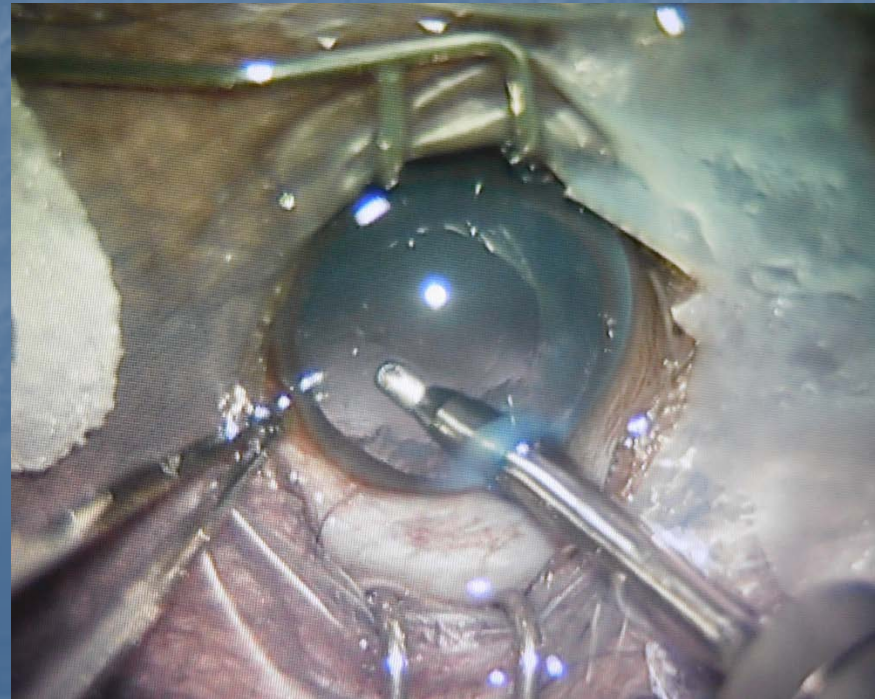
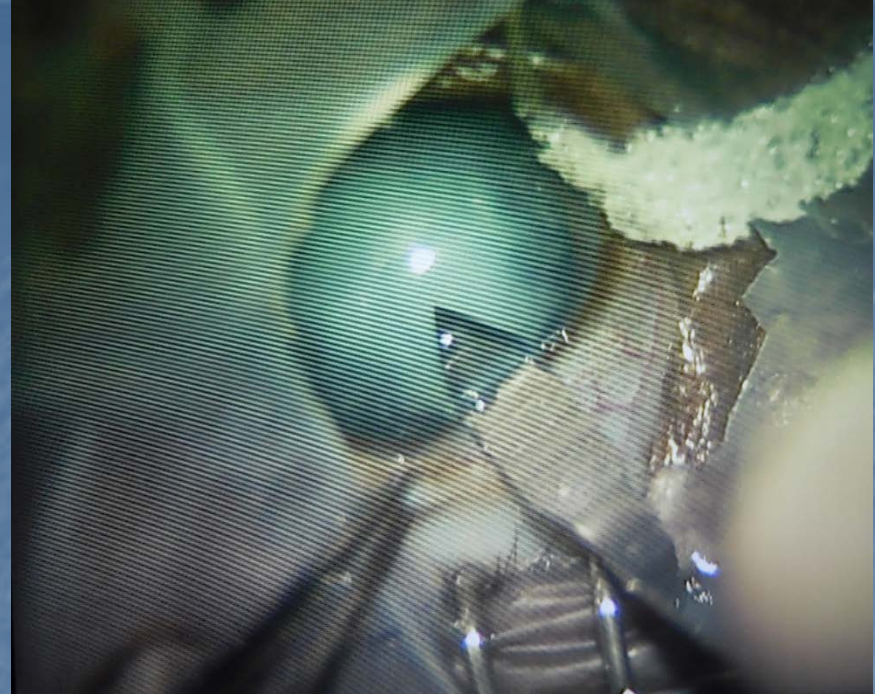
- "Lesser apes" (gibbons, siamangs)
  - Asia
  - Menstruation
  - Excellent brachiators
    - Long arms, curved fingers















Veterinary Health Center  
23 KANSAS STATE UNIVERSITY

SCOTT ADAMS

VHC

Dr. J. W. Carpenter

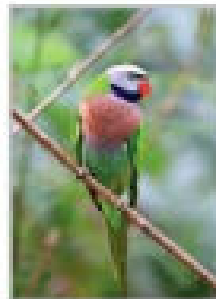
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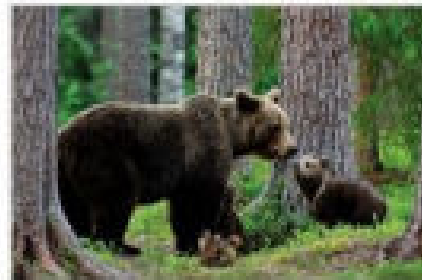
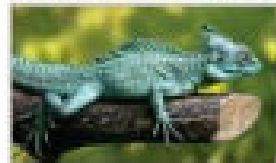
VOLUME 8

FOWLER'S

# ZOO AND WILD ANIMAL MEDICINE



R. Eric Miller  
Murray E. Fowler



ELSEVIER

# Ecological Status

- Great apes
  - All species are listed as endangered
- Callitrichidae, Cebidae, Cercopithecidae
  - 284 species and subspecies are listed as threatened
  - 22 new species or subspecies described since 1990



# Ecological Status (cont.)

- Threats to wild populations
  - Habitat loss (deforestation)
  - Hunting for commercial bush meat trade
  - Commercial pet trade



# Veterinary Challenges

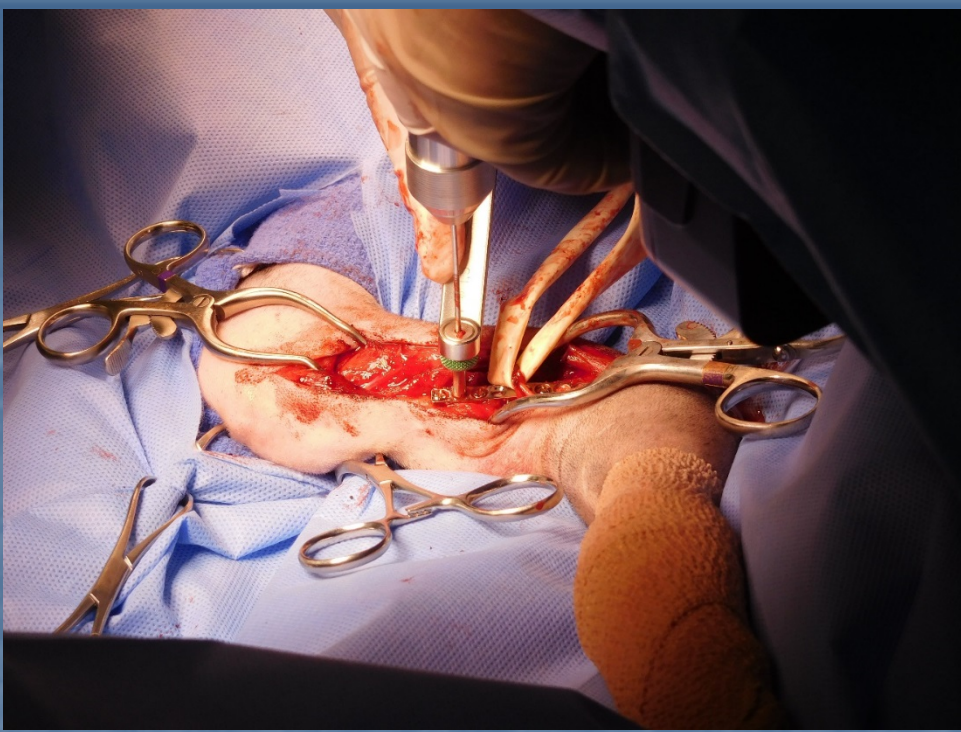
- Diverse!
- Physical restraint (physical strength, sharp teeth)
- Chemical restraint
  - Intelligent, fast
  - Proper dosage?
- Providing medical therapy or postsurgical care
- Disease transmission











# Preventive Medicine Recommendations for Primates





# Preventive Medicine Recommendations (cont.)

- Physical examination
  - Annually if possible
  - Includes CBC, serum biochemical analysis, dental prophylaxis, vaccinations, etc.









# Preventive Medicine Recommendations (cont.)

- Tuberculin testing
  - Mammalian Old Tuberculin
  - 0.1 ml ID
  - Tests are read at 24, 48, and 72h





# Preventive Medicine Recommendations (cont.)

- Fecal parasite examination
  - q3-12mo
- Fecal culture
- Serology
  - Initial screen and serum banking, then prn
  - Herpes B: all macaques
  - Retroviruses, parainfluenza, measles, hepatitis B, etc., based on species and history

# Preventive Medicine Recommendations (cont.)

- Tetanus vaccination
  - All species
  - IM (SC deposition of aluminum adjuvants may cause sterile abscesses)
  - Various schedules proposed
- Measles vaccination
  - MLV (do not vaccinate pregnant animals)
  - Various schedules proposed, depending on species



# Preventive Medicine Recommendations (cont.)

- Poliovirus vaccination
  - Great apes only
    - MLV oral vaccine
    - Various schedules proposed
- Rabies vaccination
  - Use only killed virus preparations
  - Commonly used in rabies-endemic areas

# What's Your Diagnosis?

## Some Neat and Cool Primate Cases





Case 1  
A Brown Tufted Capuchin (*Cebus  
*apella**) With Acute Posterior  
Paresis



# History

- 18-year-old intact male
- Acute hind limb paraparesis
  - Dragging self around
  - Urinating on self
  - Appeared painful
  - Lethargic
- Housed with another capuchin

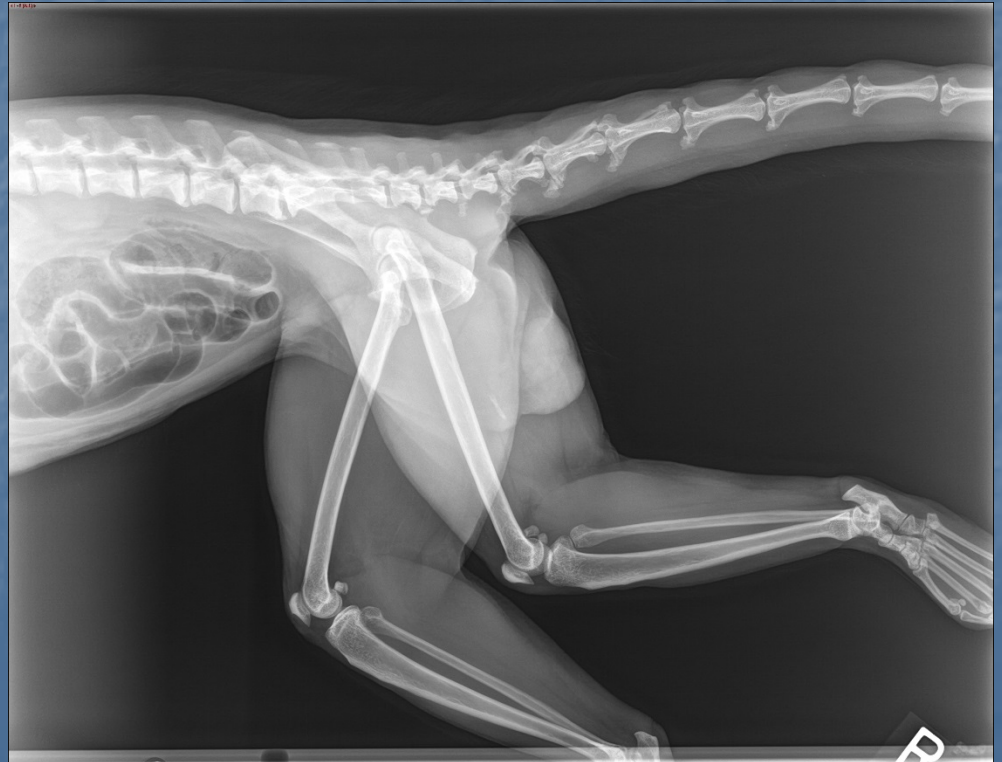
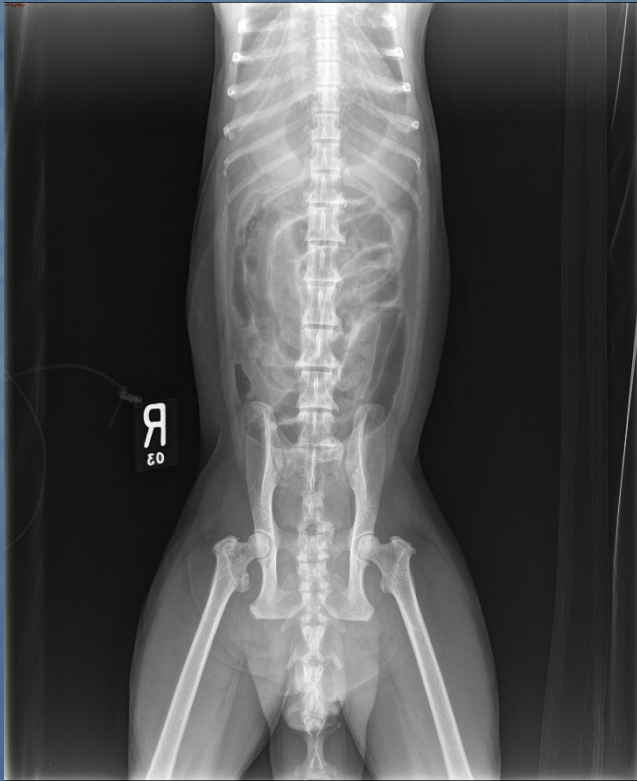


# Diagnostics

- Physical examination, following isoflurane anesthesia via chamber induction
  - Good body condition (3.5/5); 5.7 kg
  - Hind legs cold, absent femoral pulses
  - Dark brown-red colored urine
- Radiographs
- Chemistries and CBC
  - CK was markedly elevated (321,000 U/L)

# Radiographic Findings

- Narrowed lumbosacral vertebral space?
- No lytic lesions, fractures, etc.





# Abdominal Ultrasound

- Thrombus (1.5 cm in length in distal aorta)



# Diagnosis

- Aortic thromboembolism at level of aortic bifurcation
  - Often associated with cardiac, renal, or endocrine disease
- Due to poor prognosis, humane euthanasia was elected
- Pigmenturia was presumed to be myoglobinuria cause by muscle necrosis



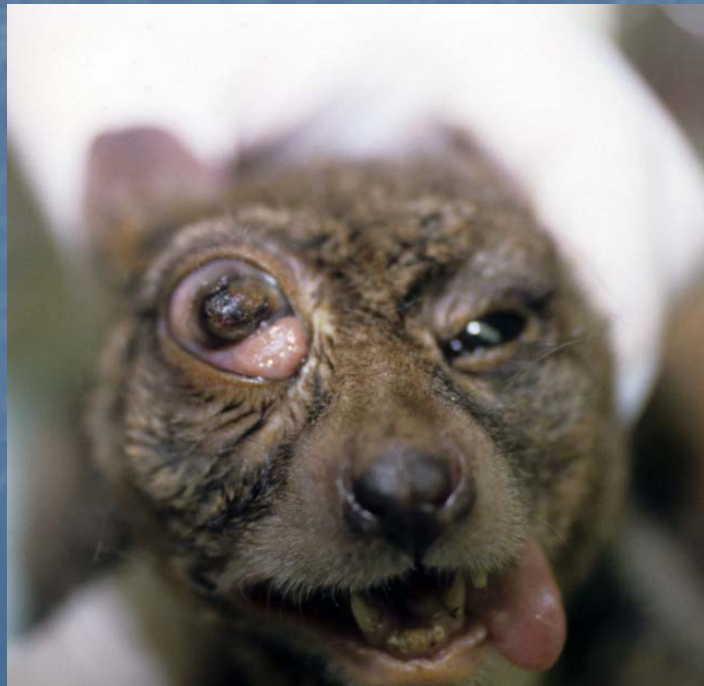
Case 2  
Unilateral Proptosis in a Greater  
Bushbaby (*Otolemur garnettii*)



# History

- 5-yr-old male submitted for unilateral proptosis of 5 days duration
- Owner noticed conjunctivitis 4 wk before (trauma from 2 cage mates?)

Now what?





# Physical Examination

- Depressed, dehydrated
- Right eye protruded 1 cm from the orbit
  - Conjunctivitis, corneal perforation, iris prolapse
- Purulent discharge from right nostril
- Pink mass displacing right maxillary premolars and molars







Diagnostics?

# Diagnostics

- Fundic examination (WNL)
- Radiography
  - Thorax and abdomen (WNL)
  - Skull radiographs revealed osteolysis of right maxilla and zygomatic process, and teeth displaced by mass
- Hematology and serum chemistries
  - ↑ WBC, ↓ PCV, ↑ neutrophils, ↓ lymphocytes
- Biopsy





Differentials?

Diagnosis?



# Right Maxillary Fibrosarcoma

- Histologically, the mass was composed of spindle cells
  - 3-5 mitotic figures/400x
- Owner elected euthanasia and necropsy
- Mass extended through nasal turbinates
- Corneal ulceration and perforation and iris prolapse resulted from the growing maxillary fibrosarcoma

# Discussion

- Oral neoplasias are rare in primates, and not reported previously in prosimians
- Treatment of fibrosarcoma involves radical surgical excision
  - Recurrence and/or metastasis may occur
- Chemotherapy may retard recurrence



Case 3  
Two Moribund Black-and-White  
Colobus (*Colobus guereza*)



# History

- Two subadult (1♂, 1♀) colobus were found prostrate and dyspneic in their exhibit in early AM
- Two adults were unaffected

Now what?





# Physical Examination

- Severe depression
- Hypothermic ( $<95^{\circ}\text{F}$ )
- Moderately dehydrated
- Shock
- Tense and painful abdomen



Diagnostics?



# Hematologic and Serum Chemistry Findings

- Monocytosis, lymphopenia, toxic neutrophils
- Moderate dehydration and hypovolemia  
(↑ PCV)
- ↑ total protein
- ↑ BUN
- Electrolyte (Ca, Na, Cl) imbalances

# Radiography





Diagnosis?

# Acute Gastric Dilatation

- Stomachs were grossly distended with ingesta, fluid, and gas



# Treatment

- Decompression by passage of an orogastric tube
  - 750-1,000 ml of ingesta removed
- IV fluids and steroids
- Supportive care
  - O<sub>2</sub> and supplemental heat
  - Broad-spectrum antibiotics
  - ♀ survived, ♂ aspirated and died 12 hr later from respiratory compromise and/or shock

# Discussion

- Acute gastric dilatation reported previously in rhesus monkeys, other macaque spp, baboons, marmosets, a guenon, a spider monkey, a squirrel monkey, and a colobus.
- Generally associated with chronic Ab therapy, anesthesia, food restriction, or accidental overfeeding.
- Generally results in intragastric fermentation (*Clostridium perfringens*)



# Addendum

- These colobus were inadvertently fed twice their daily rations of fruit, vegetables, and primate biscuits the evening before.
- Necropsy revealed
  - Dilatated gastrointestinal tract
  - Bronchopneumonia (secondary to aspiration)



Questions?

