Timing of Birth

Prematurity
Dysmaturity
Postmaturity

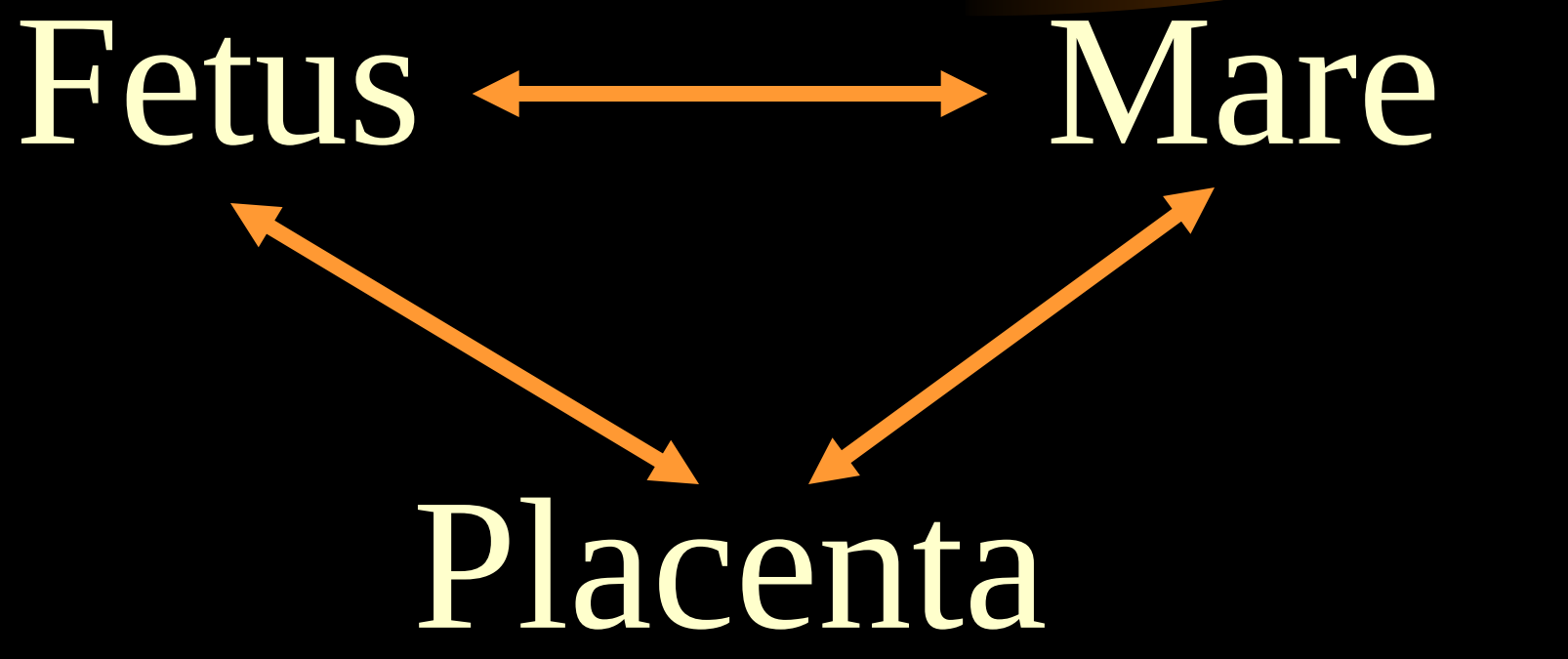
Prematurity

- Average gestational length
  334 to 340 days
- Traditionally premature
  < 320 days
- Each mare - own normal
  Range 310 – 390 days

- Can have an apparently mature foal at 315 days
- Can have an apparently premature foal at 360 days

Coordination of maturation

Timing of foaling



Coordination of maturation Maternal Preparation for foaling

- Myometrium preparation
  - Antepartum contractions
  - Hormonal preparations
- Relaxin production
- Mammary gland preparation
  - Glandular development
  - Colostrum production
- Behavioral adaptation

Coordination of maturation Fetal Preparation for foaling

- Lung maturation
  - Final parenchymal development
  - Cellular differentiation
  - Surfactant appearance
- Cardiovascular transition
- Adrenal maturation
- Metabolic transition
- Renal transition
- Gastrointestinal maturation

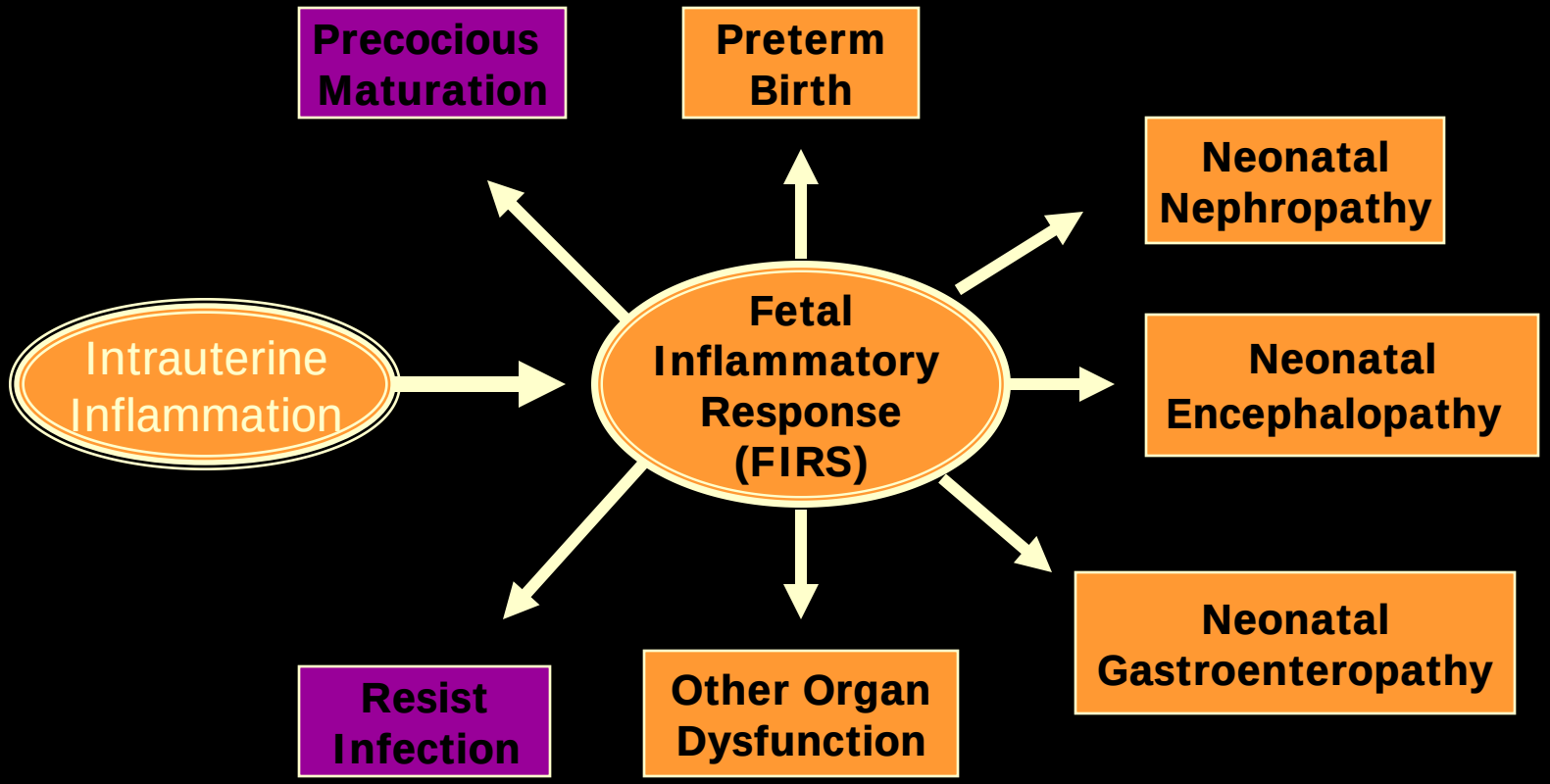
Readiness for Birth
Role of Cortisol

Cortisol orchestrates final development

In the fetal foal there is a late cortisol surge

Fetal foal

- Final maturation occurs in a 48 hr window
- Foal born before this
  - Premature
  - Stress responsiveness poor
  - Poor prognosis


Precocious Maturation
Preterm Birth
Neonatal Nephropathy
Intrauterine Inflammation
Fetal Inflammatory Response (FIRS)
Neonatal Encephalopathy
Neonatal Gastroenteropathy
Resist Infection
Other Organ Dysfunction

Readiness for Birth
Precocious maturation

Mare with placentitis/dying twin

- Precocious udder development
- Hastened preparation for foaling

Fetal response

If birth occurs soon

- Premature
- Poor prognosis

If birth is delayed

- Foal born vigorous
- Good prognosis
- Small size
- Incomplete ossification

Readiness for Birth
Precocious maturation

Foals born after prolonged placentitis

Hyperfibrinogenemia

Leukocyctosis - often > 20,000

Presuckle IgG > 800 mg/dl

Readiness for Birth Coordination of maturation

- If mare gives birth before foal can mature
  - Premature foal
- If foal is mature before mare is ready
  - Continues to grow
  - May outgrow placenta
  - Postmature foal
- If mare and foal mature together
  - Normal foal
  - Even when gestation length > 400 days or < 320
- Gestation length usually follows history


400 Day Club

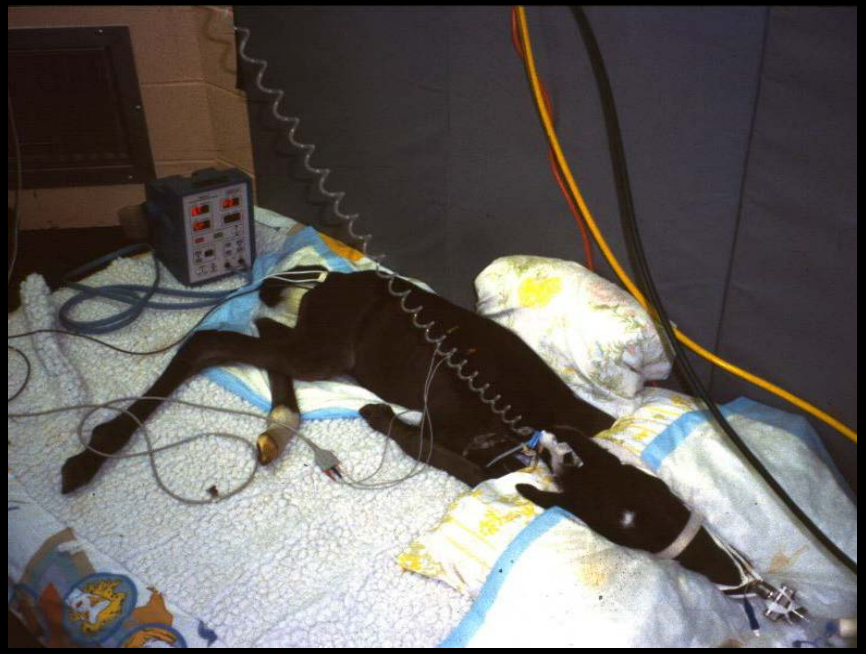
Prematurity
Clinical Characteristics

- Low birth weight
- Small frame
  - May appear thin
  - Poor muscle development
- Periarticular laxity
  - Hoof-to-withers Test
  - General flexibility

Hoof-to-Withers Test

Prematurity Clinical Characteristics

- Usually flexor laxity
  - Occasional contracture
- Usually hypotonia
  - Occasional hypertonia
- High compliance to chest wall
  - Soft ribcage
- Low compliance to lungs
  - Stiff lungs
  - Respiratory distress secondary to fatigue



Prematurity
Clinical Characteristics

- General muscle weakness
  - Delayed time to standing
- Short, silky hair coat
- Domed forehead
- Poor ear cartilage development
- Weak suckle

Prematurity Clinical Characteristics

- Poor thermoregulation
- GI tract dysfunction
- Delayed maturation of renal response
  - Low urine output
- Entropion with secondary corneal ulcers
- Poor glucose regulation

Prematurity Laboratory findings

Decreased PCV

Leukopenia, neutropenia

- Associated with low cortisol, sepsis

Abnormal glucose homeostasis

Low IgG

- Poor absorption?
- Dysmotility
- Sepsis
- Not nursing

Electrolyte disturbances

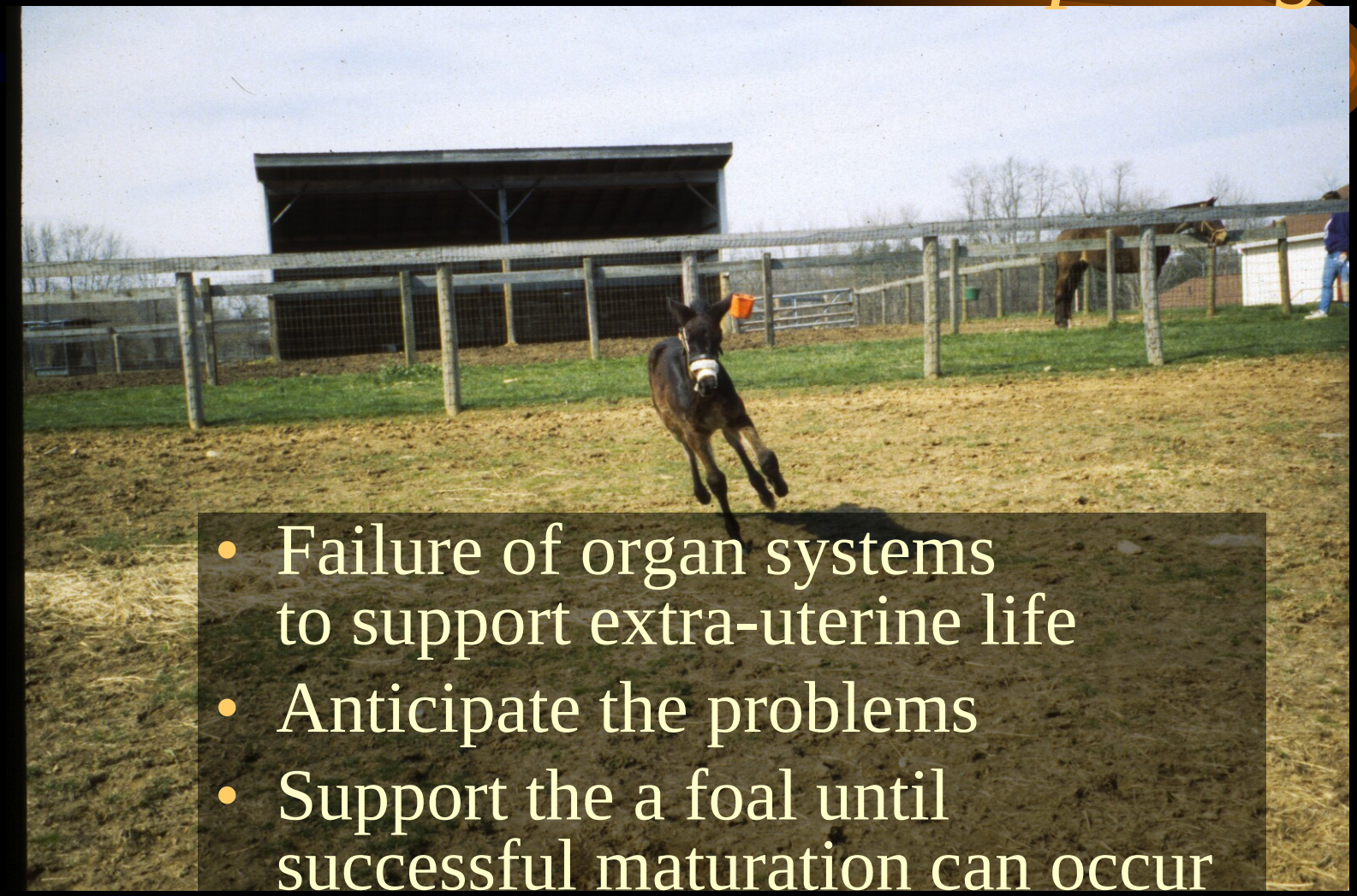
Postmaturity Clinical Characteristics

- Normal to high birth weight
- Large frame but thin with muscle wasting
- Often flexor contracture
  - Occasionally flexor laxity
- Usually hypertonia
  - Occasional hypotonia
- Delayed time to stand
  - Hyperreactive state
  - Poor postural reflexes

Postmaturity Clinical Characteristics

- Long hair coat
- Fully erupted incisors
- Weak suckle
- Poor thermoregulation
- GI tract dysfunction
- Delayed maturation of renal response
  - Low urine output
- Poor glucose regulation

Prematurity/Postmaturity Theraputic goal



- Failure of organ systems to support extra-uterine life
- Anticipate the problems
- Support the a foal until successful maturation can occur

Prematurity/Postmaturity Treatment CNS

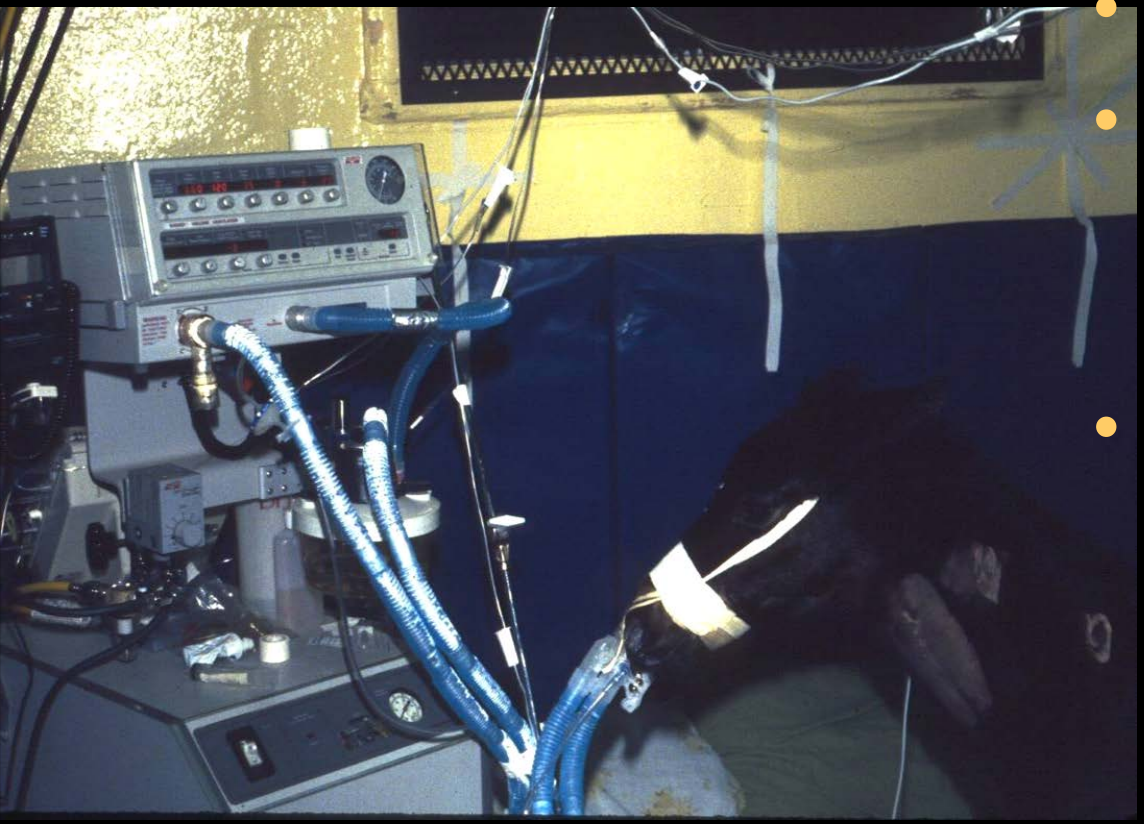
Adequate perfusion - oxygen, nutrient delivery

- Maintaining intravascular fluid volume
- Maintain tissue perfusion - pressors and inotropes

Hypoxic ischemic asphyxial or inflammatory insult

- Prenatal, intranatal, or neonatal period
- Treat as a foal with neonatal syndrome

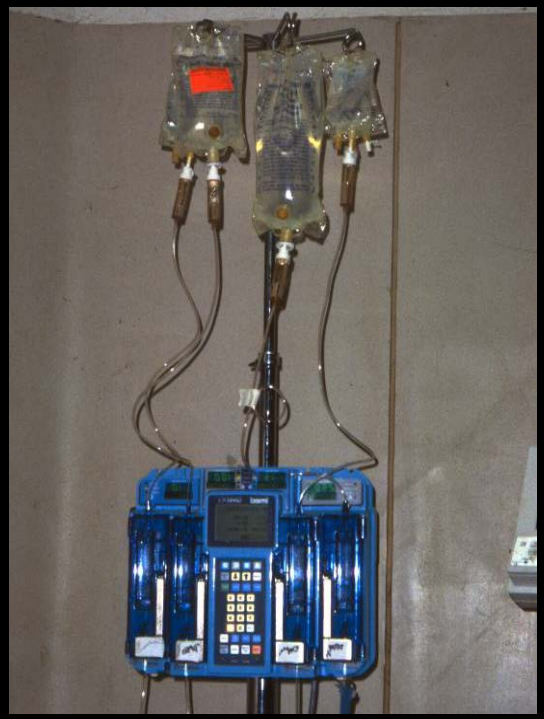
Prematurity/Postmaturity Treatment respiratory system



- Surfactant
- Complaint chest wall, weak muscles, and stiff lungs
- Respiratory failure
  - Intranasal oxygen
  - Positional support
  - Mechanical ventilation

Prematurity/Postmaturity
Treatment cardiovascular system

- Poor or marginal cardiovascular function
  - Lack of responsiveness of vessels to pressors
- Cardiovascular failure
  - Fluid support
  - Inotropes and pressors
    - Vasopressin, dobutamine, dopamine, norepinephrine, epinephrine



Prematurity/Postmaturity Treatment renal system

- Poor renal function initially
  - Foals are born with unique renal function
  - Maintain fetal renal response pattern
  - True prematurity of the kidneys
  - Neonatal Vasogenic Nephropathy
  - Hypoxic ischemic damage
  - Inflammatory damage
- Do not fluid/sodium overload

Prematurity/Postmaturity Treatment gastrointestinal system

May not be ready to function fully

- Lack of GIt maturity
  - Dysmotility
- Hypoxic insult
- Inflammatory insult

Dysmotility

Necrotizing Enterocolitis

Before feeding is attempted

- Metabolic, cardiovascular, respiratory stability

Volumes fed should be slowly increased

Parenteral nutritional support is often needed

Prematurity/Postmaturity
Treatment glucose instability

- Blood glucose monitoring
- Intravenous glucose
- Insulin therapy

Constant IV infusion of regular insulin

Prematurity/Postmaturity Treatment hypothermia

- Premature neonates have difficulty with thermoregulation
- Control environmental temperature
- Warm the neonate
  - Heat lamps
  - Hot water bottles
  - Warm air blanket
- Iatrogenic hyperthermia

Prematurity/Postmaturity
Transfer of Immunoglobulins

- Colostrum
  - Enteral feeding may not be possible
  - Trophic feeding
  - Absorption may not be efficient
  - Colostrum substitutes – don’t work well
- Plasma transfusions are indicated

Prematurity
Incomplete ossification

Should always check

- Even in precocious premature foals

Various approaches have been used

Current approach

- No splints or casts
- Confine to padded stall
- Allow limited, supervised exercise
  - Initially 5 minutes or less
  - Gradually increase periods standing
- Carefully monitor for angular deformity

Prematurity/Postmaturity Complications

- Secondary bacterial infections
- Fungal infections
- Self trauma
- Limb deformities
- Gastrointestinal problems
- Aspiration pneumonia