


Colorado State University
Knowledge to Go Places



Yak Calving


2018 YakSpo
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Obstetrical Topics


- What do we know about Yaks (*Bos grunniens*)?
- Stages of Labor
- Normal Presentation and Delivery
- Malpresentation
- Support




Resources

- USYAKS: Emergency Calf Management after Dystocia (Difficult Birth)
 - <http://www.usyaks.org/?p=7003>
- Zi XD (2003). "Reproduction in female yaks (*Bos grunniens*) and opportunities for improvement." *Theriogenology* 59(5-6): 1303-1312
- Internet Images




What About Yaks?

- Warm Season Breeders
- Puberty at 13 to 36 months
 - Nutrition is main determinant
 - Milking of a dam delays puberty of the calf
 - Winter supplementation




Zi XD (2003). "Reproduction in female yaks (*Bos grunniens*) and opportunities for improvement." *Theriogenology* 59(5-6): 1303-1312



What About Yaks?


- Gestation 250-260 days
 - *Bos indicus* and *Bos Taurus* ~ 279-287 days
- Cows calving early in the season are more likely to have a fertile estrus the following season
- Calving once every 2 years or twice in 3 years

Zi XD (2003). "Reproduction in female yaks (*Bos grunniens*) and opportunities for improvement." *Theriogenology* 59(5-6): 1303-1312



What About Yaks?

- Abortion?
 - 5-10% reported
 - Winter supplementation ↓ pregnancy loss
- 90% Calf Survival Rate
 - Better survival if cows are not milked

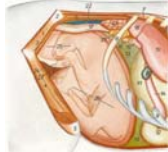


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Stage 1 Labor

- Preparation
 - Fetal Stress
 - ↑ Fetal ACTH & Cortisol
 - ↓ Placental Progesterone, ↑ Placental PGF_{2α}
 - Myometrial Contractions
- Relaxation of the Pelvic Ligaments
- Restless Behavior Abdominal Discomfort
- Distension of the Teats
- Relaxation & Dilation of the Cervix
- Initiation of Ferguson Reflex
- Ends with rupture of allantois



Stage 1 Labor Duration

- Average Duration 6 hours
 - Up to 24 hours
- Evaluation
 - >6 Hours since first observing Stage 1 Labor
 - Vaginal Exam
 - Who can do this?



Call For Veterinary Assistance

- Stage 1 Labor
 - Cervix is dilated and there is no further progression within 30 minutes.
 - Cervix is dilated and you can feel the fetus but the feet are not coming through the cervix.
 - It feels like there is a twist in the vagina.
 - Any other concerns.



Stage 2 Labor

- Rupture of Allantois
- Appearance of Amniotic Sac
- Presentation of Fetus
- Ferguson Reflex
 - Oxytocin
 - Uterine & Abdominal Contractions
- Delivery of Fetus



Stage 2 Labor Duration

- Beef Cows
 - <30 minutes
 - Up to 4 hours
- Beef Heifers
 - <60 minutes
 - Up to 8 hours
- Assistance?
 - >60 minutes in Stage 2 Labor



Call For Veterinary Assistance

- Stage 2 Labor
 - Calf fetlocks or hocks cannot be exteriorized within 30 minutes
 - Abnormal position cannot be corrected within 30 minutes
 - Retained head position
 - True Breech position
 - Cervix not dilating within 30 minutes



Stage 3 Labor

- Detachment and Expulsion of the Placenta
- Average 8 hours (bovine)
 - Minutes
 - 12 hours
- Retained Placenta
 - Detachment
 - Expulsion



Evaluating Parturition



The phrase comes from the [Ren & Stimpy show](#) that aired on Nickelodeon in the early 90's.

<https://medium.com/@firehoseproject/a-guide-to-yak-shaving-your-code-d30f98dc759>



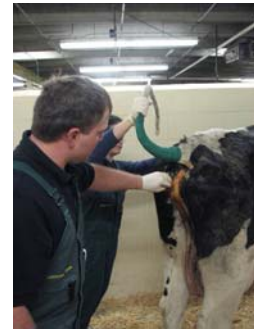
Vaginal Exam

- Cleanliness!!



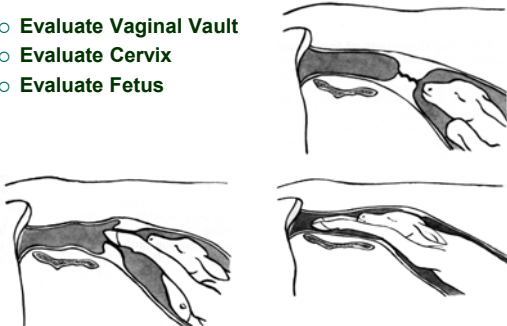
Vaginal Exam

- Cleanliness!!



Vaginal Exam

- Evaluate Vaginal Vault
- Evaluate Cervix
- Evaluate Fetus



Lubricants



- Polyethylene Polymer (PEP)
 - Toxic in the peritoneum
 - 1.25g Fatal in cow
- Caution if performing a cesarean section

Carboxy Methylcellulose



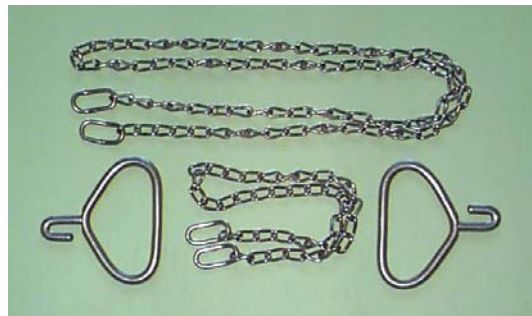
Lubricants



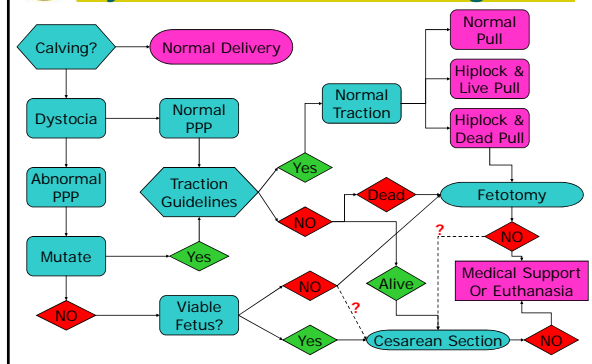
- Thin Lubricant with warm water and pump into uterus with stomach tube.



Obstetrical Equipment

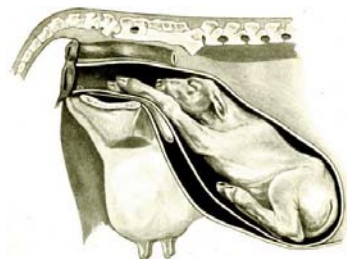


Dystocia Decision Making



Presentation: Anterior Longitudinal

- Position: Dorsosacral
- Posture: Head, Neck & Forelimbs Extended



Anterior Traction Guidelines

- Assure Proper Anterior Presentation, Position, and Posture
- Place Obstetrical Chains.
- Cast the cow in Right Lateral Recumbency.
- Traction on down (calf's left) leg by 1 person until the fetlock is 1 hand's breadth past the vulva.
- Traction on up (calf's right) leg by 1 person until both fetlocks are 1 hand's breadth past the vulva.
- Calf's shoulders are now through the pelvis and the calf can be delivered vaginally.



Why Lay the Cow Down?

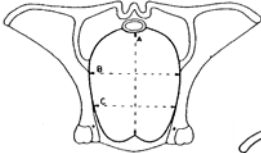
- 30% Less Force to Extract the Calf!
 - Gravity
 - Pelvic Brim
 - Rumen Contents
- Better For The Cow
 - Natural Position
- Better For The Calf
 - Less Traction Force



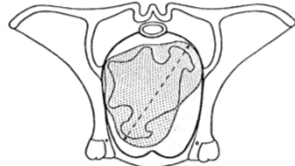


Pelvic Dimensions

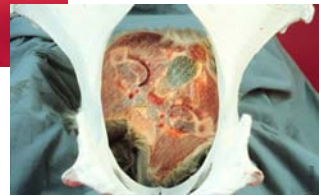
MATERNAL PELVIC INLET



A. SACRO-PUBIC DIAMETER
B. DORSAL TRANS-ILIAC DIAMETER
C. VENTRAL TRANS-ILIAC DIAMETER



Rotating the Hips



Anterior Presentation Delivery



Anterior Presentation Delivery



Chain Placement



Stretching Vulva Over Head





Rotating the Hips



- Prevention of Hip Lock



Anterior Presentation Delivery



Stretching Vulva Over Hips



Fetal Mutation

- Correcting an abnormal Presentation, Position, or Posture.
- Easier the earlier you are in Stage 2 Labor.
 - Less uterine contraction
 - More uterine fluid
- Tocolytics?
 - Produce Uterine Relaxation
 - Epinephrine, 1ml/100lb BW, IV or IM
 - β -2 Agonist \rightarrow Smooth Muscle Relaxation



Front Leg Retained



Retained Carpus



Pull the carpus upward and lateral while turning the hoof medially and extending the leg.

A chain or rope may be placed on the distal portion of the limb and traction applied while the carpus is repelled upwards and laterally





Retained Shoulder



Repel the calf to create more room to grasp the carpus and then the foot.



Retained Shoulder



The humerus is grasped and the carpus is twisted medially.

Further repulsion of the calf to bring the carpus dorsal and within reach



Retained Shoulder



The metacarpus is grasped and the carpus is twisted upwards and laterally to direct the pastern medially.

The carpus is lifted up and directed medially while the forelimb is extended.



Retained Shoulder



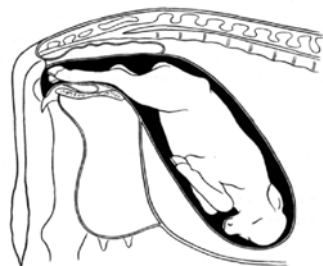
Protect the tight ventral wall of the uterus against the pointed claw by cupping the hand around the hooves.

The metacarpus is grasped firmly and the carpus is twisted upwards and laterally to lift the claw above the level of the pubic brim.



Presentation: Posterior Longitudinal

- Position: Dorsosacral
- Posture: Hindlimbs Extended



Posterior Traction Guidelines

- Assure Proper Posterior Presentation, Position, and Posture
- Place Obstetrical Chains.
- Cast the cow in Right Lateral Recumbency.
- Traction on down (calf's right) leg by 1 person until the hock is beyond the vulva.
- Traction on up (calf's left) leg by 1 person until both hocks are past the vulva.
- Calf's hips are now through the dam's pelvis and the calf can be delivered vaginally.



Rear Leg Retained



Repel Calf



Hock pulled upward and lateral



Rear Leg Retained



Hock pushed upward and lateral



Chain attached to foot, hock pushed antero-lateral while leg extended



Rear Leg Retained



Cupping the foot to protect the uterus



Both legs extended



Lateral Deviation of Head



True Breach



- Posterior longitudinal presentation
- Dorsosacral position
- Both hind legs retained at the hips.
- Failure of the Ferguson reflex.



Breach

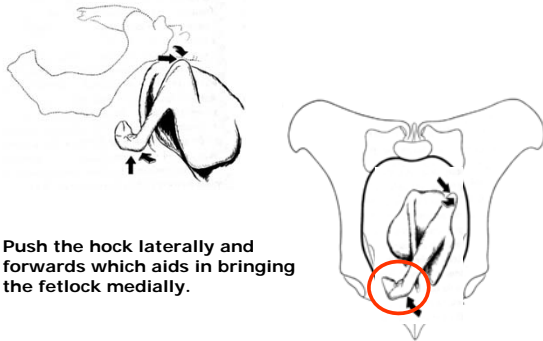


Repel the fetus anteriorly and upwards to retrieve a hock.





Breach

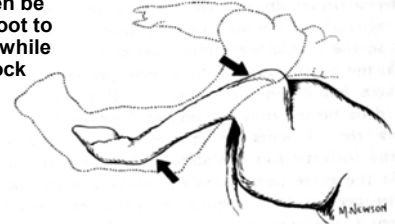


Push the hock laterally and forwards which aids in bringing the fetlock medially.



Breach

- A chain can then be placed on the foot to pull it medially while repelling the hock laterally.



- Final extension procedure is repeated for the second leg which should be relatively easier because there is more room to maneuver



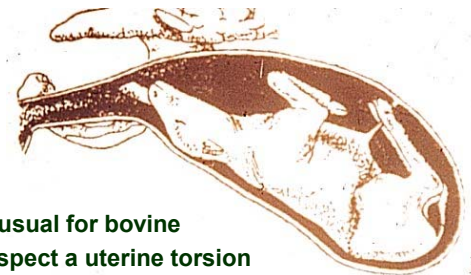
Dogsitting Position

- Anterior presentation with hind legs extended and in the pelvic inlet.
- Correction is very difficult.
- Front half of the fetus can be repelled and the fetus extracted by the hind legs.
- Traction on the front limbs with partially repelled hindlimbs can result in perforation of the uterine wall below the pubic brim.



Dorso-Pubic Position

- Unusual for bovine
- Suspect a uterine torsion



Swollen Head & Tongue



- Occasionally when the head of a live calf becomes wedged in the birth canal for a prolonged period of time, the jugular veins are compressed while the carotid arteries continue to pump blood to the head. The result is venous congestion and a swollen head.



Fractured Ribs



- Excessive force of extraction
- >3 Ribs fractured will often result in death due to the reluctance to breath from the pain



Fetotomy



Uterine Torsion

- Rectal Palpation
- 81% Full Term
- 34% Precervical
- 63% Counterclockwise
- Mostly Large Calves
- Retained Placenta
- Dead Calf
 - Cervix is less likely to dilate for vaginal delivery.



Uterine Torsion - Rolling

- Roll in the direction of the torsion
 - Trying to catch the cow up with the fetus.



Clockwise Uterine Torsion Correction

UF/dioet



Uterine Torsion - Rolling



Uterine Torsion - Rolling



Uterine Torsion - Rolling





Uterine Torsion - Rolling



Uterine Torsion - Rolling



Uterine Torsion - Rolling



Uterine Torsion - Rolling



Uterine Torsion – Other Methods

- Manual Detorsion
 - Grasp legs and detorse with a rocking motion
 - Detorsion Rod
- Surgical Detorsion
- How do you know when to deliver?
 - Cervix Dilation
 - May not dilate further and cesarean section may still be required.



Physiologic Parameters

- Calf Vigor
- Breathing
 - 30 seconds
- Hold Head Up
 - 15 minutes
- Sternal
 - 30 minutes





Sternal



Physiologic Parameters

- Suckle Reflex
 - 60 minutes
- Standing
 - 60 minutes
- Nursing
 - 120 minutes



Nursing



Physiologic Parameters

- Temperature: 101-103° F
 - 1-2 ° F higher than dam at birth
- Heart Rate: 100-140/minute
- Respiratory Rate: 30-60/minute



Beef Calf Mortality

- Birth to Weaning - 6-8% average
 - 57% in first 24 hours
 - 75% in first 7 days
- Causes
 - Dystocia - 17.5%
 - Stillbirth - 12.5%
 - Hypothermia - 12.2%
 - Diarrhea - 11.5%
 - Respiratory - 7.6%



Stimulating Respiration

- Clear Fetal Membranes
- Clear Airway Fluids
 - Suction
 - Paper Towel
 - Gravity Not Effective
- Sternal Recumbency
- Stimulate Breathing
 - Thoracic Massage
 - Nasal Stimulation





Pulmonary Treatment

- Inadequate O₂ Exchange
 - Supplemental Oxygen
 - Nasal Insufflation
 - 50-100 ml/kg/min Flow Rate
 - PaO₂ > 55 mmHg increased survival
- Hypoventilation
 - Mechanical Ventilation
 - Tracheal Intubation
 - Manual (Ambu Bag)
 - Mechanical Ventilator



Passive Immunity

- Colostrum
 - Produced last 4-6 weeks of gestation
 - Maternal Antibodies (IgG₁)
 - **Energy Rich!**
- Requirements
 - Adequate Production from Dam
 - Adequate Intake
 - Adequate Absorption



Adequate Colostrum Absorption

- Within First 6 hours
- "Open Gut"
- Decreased Absorption
 - Hypoxia
 - Compromised Circulation
 - Hypothermia
 - Competing Proteins
 - Too Late



Esophageal Tube Feeding
<http://www.usyaks.org/?p=6921>



If you don't see the calf nurse

- Give Colostrum
 - 10 ml/lb BW at 2 hours
 - Watch to see if the calf is up and nursing
 - If not, give another 10 ml/lb colostrum at 6 hours
- Colostrum Sources
 - Yak Colostrum
 - Milked from Dam
 - Stored (frozen) Yak colostrum
 - Beef Cow Colostrum
 - Fresh
 - Frozen
 - Commercial Colostrum Replacer
 - Avoid Dairy Cow Colostrum



Total Protein and Disease Risk

- Calf Blood Total Protein (TP) is an indicator of passive transfer
- Adequate → TP > 5.5 mg/dl
- Partial or Complete Failure → TP < 5.0 mg/dl
- Mortality Risk
 - TP 6.0-6.5 → Mortality Risk = 1
 - TP 5.5-6.0 → Mortality Risk = 1.4
 - TP 5.0-5.5 → Mortality Risk = 2.1
 - TP 4.5-5.0 → Mortality Risk = 3.3
 - TP < 4.5 → Mortality Risk = 6.0



Colostrum Storage

- Frozen Colostrum
 - 1 Quart Ziploc Bags
 - Collect From Mature Cow
 - After vigorous calf has nursed for 2 hours
 - Clean Udder
 - Filter through gauze or cheesecloth
 - Good For 12 months
- Thawing
 - Warm Water - 110° F





Colostrals Replacers

- Calf needs ≥ 2 grams IgG per Kg BW
 - 4 grams even better
- Yak and Beef Cow colostrum contain about ~100-200 mg/ml
- Colostrum Supplements <25 mg/ml
 - Inadequate
- Colostrum Replacers 50-80 mg/ml
 - \$30 to \$40
- Compete with maternal IgG absorption
- Plasma or Whole Blood Transfusion



Colostrum Replacers

Product Name	Immunoglobulin (grams)	Manufacturer
Colostrix Plus	55	AgriLabs
Colostrix 130	130	AgriLabs
Lifeline	50	APC, Inc.
Acquire	100	APC, Inc.
Lifeline Rescue	150	APC, Inc.
Calf's Choice Total Gold	60 per bag (two bags for replacement, 1 bag for supplement)	ALTA Genetics USA Inc.
Calf's Choice Total Silver	100 g	ALTA Genetics USA Inc.
Calf's Choice Total HiCal (Bronze)	100	ALTA Genetics USA Inc.
Secure Calf Colostrum Replacer	125	Vita Plus
Secure 175	175	Vita Plus
Sav-A Calf Ultra Start 150	150	Milk Products LLC
Bovine IgG Colostrum Replacement	100	Land O Lakes Animal Milk Products Co.



Energy Metabolism

- Energy sources
 - Hepatic and other glycogen stores
 - Utilized within 4-6 hours
 - Brown adipose tissue
 - Utilized within 1-5 days
 - Nutrition of dam
 - Colostrum and Milk
 - Required for survival
 - 10% BW Maintenance



Hypoglycemia

- Inadequate Nursing
 - Weakness
 - Dummy
 - Maternal Factors (mothering, teats, mastitis)
- Environmental Exposure
 - Temperature
 - Wind & Moisture
 - Shelter
- Septicemia



Thermoregulation

- Environment
 - Moisture
 - Wind
 - Temperature
- Maternal Behavior
- Energy
 - Colostrum!
- Activity

**Temperature
<101 ° F
Indicates Fetal
Stress!**



Hypothermia

- Body Temp < 101 ° F
 - Suckle reflex?
 - Shivering?
 - <98° F is CRITICAL
- Energy
 - Colostrum!
- Warm Calf





Warming the Neonate

- Dry
- NUTRITION!
 - Warm Colostrum
- Bedding (6" minimum)
- Body Coats
- Warm Air



Calf Warming Methods



Recognize the High Risk Situation

- Any Abnormal Birth
 - Premature
 - Dystocia
 - Meconium Staining
 - Twins
 - Etc.
- Inclement Weather
- Weak Dam
- Malnourished Dam



Recognize the High Risk Calf

- Normal
 - Head Up – 15 minutes
 - Sternal – 30 minutes
 - Standing – 1 hour
 - Suckle – 1 hour
 - Nursing – 2 hour
 - Temp > 100° F
- Problems
 - Failure of Above
 - Sepsis



Proactive Intervention

- Administer Colostrum
 - Give about 10 ml per lb BW within 2 hours
 - Bottle Feed
 - Tube Feed
- Provide Warmth & Shelter for 24 Hours
- Keep Nursing
 - Needs the energy!
- Oxygen?
 - Will improve survival



Newborn Checklist

- Immediately: Clear Airway → Breathing
- 15 Minutes: Head Up
- 15 Minutes: Dip Navel
- 30 Minutes: Sternal Position
- 60 Minutes: Standing + Suckle Response
- 120 Minutes: Nursing
- 120 Minutes: Temp > 100° F

***If ANY of these not met,
Institute Intervention***



Newborn Intervention

- Move dam and calf to warm shelter
 - 6 inches bedding
 - Dry calf
- Administer Colostrum
 - About 10 ml/lb BW
 - Nurse
 - Tube
 - If T < 100° F
 - Calf Warming Hutch
 - Calf Coat



Newborn Intervention

- If Respiration > 60 Breaths/Minute
 - Thoracic Massage
 - Prop in Sternal Position
 - Call for Veterinary Support
 - Supplemental Oxygen
- Check TP at 24-48 hr
 - Assesses Passive Transfer
- When In Doubt



CALL!



Newborn Calf Checklist

Date: _____ Dam ID: _____ Calf ID: _____
 Weather: _____ Outdoor Temp: _____
 Stage 2 Labor Time: _____ Birth Time: _____ Calving Score: _____
 Calf Born (found) Alive Dead Birth Weight: _____ lb

Following Live Birth	INITIAL	TIME/TEMP	GOAL
Immediately Clear Airway	<input type="checkbox"/>	_____ min	<2 min
Calf is Breathing	<input type="checkbox"/>	_____ min	<2 min
Calf is Holding Head Up	<input type="checkbox"/>	_____ min	<15 min
Maintains Sternal Position	<input type="checkbox"/>	_____ min	<30 min
Suckle Response	<input type="checkbox"/>	_____ min	<60 min
Standing on Own	<input type="checkbox"/>	_____ min	<60 min
Nursing Dam	<input type="checkbox"/>	_____ min	<120 min
Body Temperature at 1 hr	<input type="checkbox"/>	_____ ° F	>100° F
Body Temperature at 2 hr	<input type="checkbox"/>	_____ ° F	>100° F
Body Temperature at 3 hr	<input type="checkbox"/>	_____ ° F	>100° F

Calf Intervention
If the calf fails any of the items to the left, then provide the following care.

- Bring Cow/Calf pair inside.
- Dry Calf.
- Put calf under a heat lamp on 6" deep bed of straw.
- Colostrum: Give the calf 10 ml/lb BW within 2 hours of birth by bottle or tube feeding.
- Give Vitamin E injection
- Continue to monitor.



Vital E – Newborn

- ALL Newborn Calves
 - Administer 4 ml SQ within 6 hours of birth
- Vitamin E, A, and D
- Why?
 - Vit E – Colostrum
 - Vit A – Colostrum and Milk
 - Vit D – Placenta
 - Required for proper immunity, organ function, and bone development.



Questions?

