



- ### The Buck
- History
    - Age
      - Old or immature
        - Onset of puberty breed specific
    - Past breeding history
      - Ability or inability to breed
      - Generally change buck every 2 years
  - Physical Examination
  - Breeding Soundness Examination

# Buck/Ram Reproduction

- ### Physical Examination
- Eyes
    - Infection, scarring
  - Legs
    - Conformational, infectious (footrot), lameness
  - External genitalia
    - Scrotum, testicles, penis, epididymis
  - Polled
    - intersex
  - Body condition
    - Must be in good body condition before begin breeding season

- ### Selecting a buck
- Ultimate goal of herd
  - Milk production
  - Twinning rate
  - Muscling
  - AI becoming more popular
  - 3 important points:
    - History
    - Physical exam
    - Breeding soundness exam

- ### Breeding Soundness Exam
- |   |  |
|---|--|
| <ul style="list-style-type: none"> <li>• Complete Physical Examination</li> <li>• External genitalia           <ul style="list-style-type: none"> <li>• Scrotum</li> <li>• Testicles</li> <li>• Epididymis</li> <li>• Pampiniform plexus</li> </ul> </li> <li>• Scrotal circumference           <ul style="list-style-type: none"> <li>• Positive correlation with sperm output</li> </ul> </li> <li>• Penis           <ul style="list-style-type: none"> <li>• Exteriorize or electroejaculate</li> </ul> </li> <li>• Semen evaluation           <ul style="list-style-type: none"> <li>• Morphology</li> <li>• Gross Motility</li> <li>• Linear Motility</li> </ul> </li> </ul> | <ul style="list-style-type: none"> <li>• Complete Physical Examination           <ul style="list-style-type: none"> <li>• - Ram – Blood for B ovis ELISA (&gt;9 mo old)</li> </ul> </li> <li>• Behavioral Examination (?)</li> <li>• External genitalia           <ul style="list-style-type: none"> <li>• Scrotum</li> <li>• Testicles</li> <li>• Epididymis</li> <li>• Pampiniform plexus</li> </ul> </li> </ul> |
|---|--|

### Scrotal Circumference Recommendations Buck

<b>&lt;20 cm</b>	<b>questionable</b>
<b>20-30 cm</b>	<b>Satisfactory</b>
<b>&gt;30 cm</b>	<b>Exceptional</b>

### Breeding Soundness Exam

- Scrotal circumference
  - Positive correlation with sperm output
- Penis
  - Exteriorize or electroejaculate
- Semen evaluation
  - Morphology
  - Gross Motility
  - Linear Motility

### Scrotal Circumference Recommendations

Ram – 8-14mo		Ram - > 14 mo	
<b>&lt;28 cm</b>	<b>questionable</b>	<b>&lt;32 cm</b>	<b>questionable</b>
<b>28-36 cm</b>	<b>Satisfactory</b>	<b>32-40 cm</b>	<b>Satisfactory</b>
<b>&gt;36 cm</b>	<b>Exceptional</b>	<b>&gt;40 cm</b>	<b>Exceptional</b>

### Semen collection and analysis

- AV
  - Trained bucks
- Electroejaculator
  - Bailey (Western Instrument Co)
  - Lane (Lane Mfg.)
  - Standard electroejaculator with appropriate probe (19-25 x 3.5 cm, L x D)

### Scrotal Palpation

- Palpate for abnormalities
  - swelling, atrophy, symmetry
  - firm and similar to muscle
- Little seasonal change in SC

### Epididymal Palpation

- Palpate for abnormalities
  - swelling => consider B ovis (A sp rams < 9 mo of age)
  - Sperm granulomas in intersex goats (?)

### Semen collection and analysis

- Restraint (standing or lateral recumbency)
- Evacuate rectum of feces + lube
- Ejaculatory pattern
- Gross Motility
  - Undiluted semen on low power
- Progressive Motility
  - Diluted semen with cover slip
  - “linear” motility
- Morphology
  - Count 100 cells, record normal vs abnormal

### Semen Evaluation

- Place semen on pre warmed (37 C), dilute with pre-warmed lactated ringers or 2.9% buffered Na Citrate
- > 5 WBC's / hpf => consider B ovis
- Stain w/ Eosin - Nigrosin

### Male to Female Ratio

	Conditions	Ratio (M/F)
<b>Yearling</b>	<b>confined</b>	<b>1:25</b>
<b>Adult</b>	<b>confined</b>	<b>&lt;1:50</b>
<b>Adult</b>	<b>range</b>	<b>~ 1:30</b>
<b>Adult</b>	<b>Synchronized Females in Season</b>	<b>~ 1:25</b>
<b>Adult</b>	<b>Synchronized Females out of season</b>	<b>~ 1:10</b>

### Minimal Acceptable Levels for a Satisfactory Potential Breeder Buck

<b>Volume</b>	<b>0.5ml</b>
<b>Motile Sperm</b>	<b>70%</b>
<b>Concentration</b>	<b>2 billion/ml</b>
<b>Morphology</b>	<b>80% normal</b>

Adapted from Pugh DG, Sheep and Goat Medicine

### Scrotal – Testicular Ultrasound

- Normal testicular parenchyma is homogenous
- Hyperechoic – hypoechoic => fibrotic change, cystic structures, pathology
- Mediastinum is hyperechoic and in center of testicle

### Male Surgery

- Epididymectomy
- Castration

### Ram Semen Examination

	Exceptional	Satisfactory	Unsatisfactory
<b>Morphology</b>	<b>&gt; 90 %</b>	<b>&gt; 50 %</b>	<b>&lt; 50 %</b>
<b>Motility</b>	<b>&gt; 70 %</b>	<b>&gt; 30 %</b>	<b>&lt; 30 %</b>

# Doe/Ewe Reproduction

### The Doe

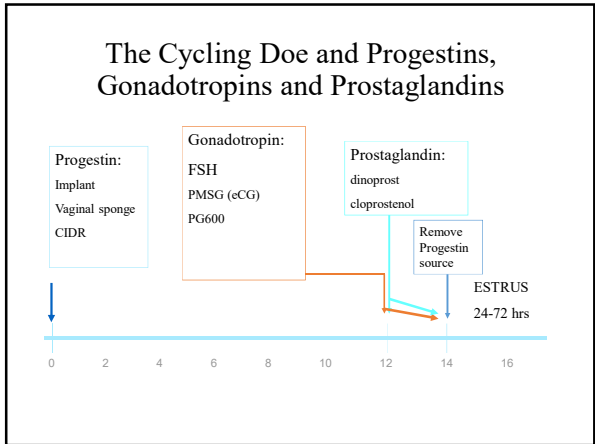
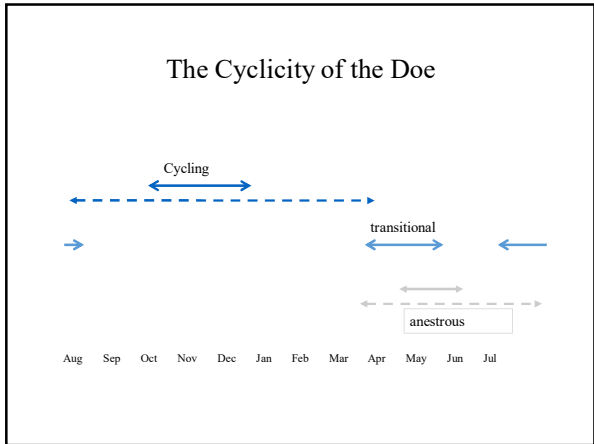
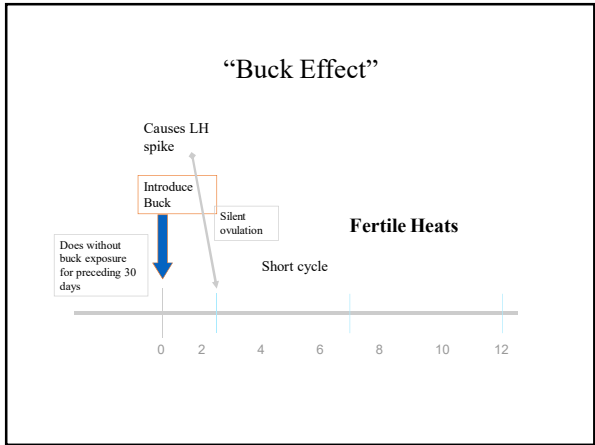
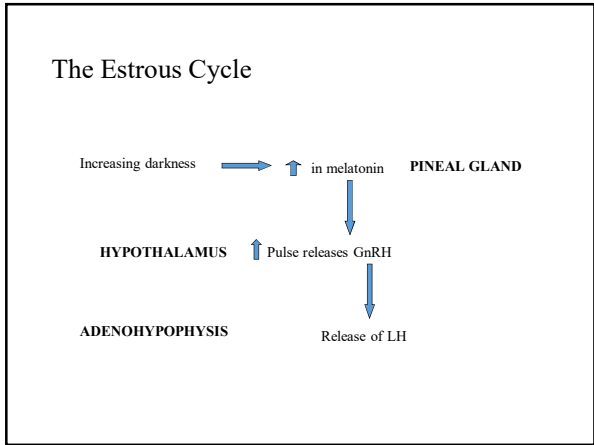
- Puberty
  - Breed variation
- Body Weight
  - 60-70% adult before enter breeding herd
- History
  - Previous mating
  - Previous kidding
- Physical Examination
  - Lameness
  - External genitalia
  - Vaginoscopy
- Transrectal ultrasound

- Seasonally polyestrus in North America
  - Become more polyestrus closer to equator
- Typically cycle August to March
  - Most fertile period October to December
  - Increasing darkness in relation to day length triggers cyclicity

Kenya: goats that live in caves

### The Estrous Cycle

- Proestrus:
  - May include bucks first interest in doe
- Estrus:
  - Characterized as time from moment doe stand to be mounted until refusal
  - 12 – 72 hours long
  - Tail wagging, bleating, restlessness, pacing, vulvar swelling
- Metestrus:
  - Time period of formation of CL
- Diestrus:
  - CL mature producing progesterone



Sheep → 142d – 152d (mean – 147d)

Goats → 145d – 155d (mean - 150d)

(Note: Small breeds 2-3 d shorter)

### Pregnancy Diagnosis

BioPryn Test & IDEXX Ruminant Pregnancy Test ~ a week earlier than ultrasound...

But..... 10-15% of those early embryos will be lost during the first trimester (blood or serum)

Cost \$6.50/ for sheep and goats, but varies.

Sheep and goat pregnancy can be detected via an ELISA on serum as early as 30 days.

### Pregnancy Diagnosis – Goats

- Real Time Ultrasound

- 20 d if well restrained and rectally (?)

- 30 – 40 d placentomes -doughnuts

- 40 – 50 d placentomes –‘C’ shaped

- 40 – 70 d fetal #'s determined

uterine contents, fetuses counted, fluids and cotyledons observed for abnormalities at ~ 45-60 days

# Fetal Wastage

### Pregnancy Toxemia

Big ‘C’ shaped Placentomes point toward ‘baby angel’... if not.....**Think twins**

**Best accuracy for Twin Dx in early gestation**

### Observations

- Late onset of estrus and cyclicity
- Low kidding rates
- Interruption or ‘Gaps’ in kidding
- Pregnancy toxemia
- Abortion
- Stillbirths
- Neonatal mortality
- RFM

Early Embryonic Loss	Infectious Causes
<ul style="list-style-type: none"> <li>• Heat stress</li> <li>• Luteolysis</li> <li>• Chromosomal abnormality</li> <li>• Toxins (Plant, poisons, etc)</li> <li>• Infectious diseases</li> <li>• Idiopathic</li> </ul>	<ul style="list-style-type: none"> <li>• Viral infections</li> <li>• Bacterial Infections</li> <li>• Protozoal Infection</li> </ul>

Goat Abortion
<ul style="list-style-type: none"> <li>• <i>Chlamydophila abortus</i></li> <li>• <i>Coxiella burnetti</i> (Q fever)</li> <li>• <i>Campylobacter jejuni</i></li> <li>• <i>Campylobacter fetus</i> subsp. <i>fetus</i></li> <li>• <i>Toxoplasma gondii</i></li> <li>• <i>Brucella melitensis</i></li> <li>• Border disease virus/BVD</li> <li>• Akabane or Cache Valley Virus</li> <li>• <i>Brucella ovis</i> (predominantly infertility) sheep</li> </ul>

Non-infectious Causes
<ul style="list-style-type: none"> <li>• Plant or bacterial Toxin <ul style="list-style-type: none"> <li>• Iatrogenic – (dinoprost 5-10mg im; cloprostinol 100-125ug im)</li> </ul> </li> <li>• Stress, Trauma (Doe - CL dependent)</li> <li>• Angora abortion syndrome</li> <li>• Diet related</li> </ul>
Environmental Abortion
<ul style="list-style-type: none"> <li>• Stress – heat, nutritional ( CP, E, Vit A, I, ZN, Se, etc) management, etc (goats, lamas)</li> <li>• P4 deficiency - ????</li> </ul>

Late Gestation Infectious Causes
<ul style="list-style-type: none"> <li>• <i>Chlamydophyla abortus</i></li> <li>• <i>Toxoplasma gondii</i></li> <li>• Q-fever – <i>Coxiella burnetii</i></li> <li>• <i>Campylobacter jejuni</i> and <i>C. fetus fetus</i></li> <li>• <i>Brucella melitensis</i></li> <li>• <i>Leptospira</i> species</li> <li>• <i>Listeria monocytogenes</i></li> </ul>

Infection
<ul style="list-style-type: none"> <li>• Early Embryonic Death</li> <li>• Abortion</li> <li>• Fetal Mummification</li> <li>• Birth of Weak or Stillborn Fetus/Offspring</li> <li>• Birth of Clinically Normal, Congenitally Infected Offspring <ul style="list-style-type: none"> <li>• (Rowe, personal communication, 2013)</li> </ul> </li> </ul>

Venereal Disease & Abortion
<ul style="list-style-type: none"> <li>• Caprine Herpes Virus <ul style="list-style-type: none"> <li>• Venereal disease (purulent vulvitis)</li> <li>• Abortion</li> </ul> </li> <li>• <i>Ureaplasma</i> spp. <ul style="list-style-type: none"> <li>• Granular vulvovaginitis</li> <li>• Rarely, placentitis</li> </ul> </li> </ul>

### Fetal Wastage - Prevention

- Biosecurity – Isolate additions for 30d
  - Avoid cow, hog, cat, rat, deer, dog(?) exposure
  - Maintain separate production units
  - Maintain healthy animals –CP/Minerals, BCS, clean water, feed above ground, etc
- Vaccinate – Chlamydia, Campylobacter, etc in endemic areas 4 & 2 mo pre partum (?)

### Management of Goat Abortions

- Zoonotic potential => minimize human exposure  
**(Note: Identify people at highest risk: pregnant, infant, or immunosuppressed, etc)**  
**(Note: Take zoonosis precautions as routine obstetrical practice)**
- Biosecurity
- Segregate pregnant and aborted Does / Avoid exposure
- Implement Therapeutic strategies (?)

### Abortion Storm

- Obtain a Definitive Diagnosis
  - Animal origin
  - Vaccination history
  - Breeding dates/ Fetal Wastage dates
  - Physical examination of aborting Doe
  - Examination and findings of aborted fetus

### Reduce Transmission Risk

- Immediately remove aborted feti & placentas (**Note: remove placentas, double bag**)
- Isolate aborting Does (3-4 weeks)
- Prevent fomite transmission ( clean dispose of - boots, shovels, clothing, vehicles.....dogs) (**Note: Wear disposable gloves**)
- Clean/ disinfect area
- Avoid moving new animals into exposed group

### Abortion Diagnosis

- Necropsy of Fetus & Placentas
  - Send feti and placentas to diagnostic laboratory
    - (Cold container, ice packs, etc)
  - Field necropsy
    - Gross findings
    - Placenta - intercodyledonary and codyledonary samples and smears
    - Fetal serum or pleural fluid
    - Abomasal contents
    - Fresh and formalin fixed lung, liver, kidney & brain
- Acute & Convalescent Sera
  - May not be able to detect rising titer
  - High maternal titer not always indicative of cause of fetal death

### Short Term Control of Abortion Storm

- **Antibiotic treatment**
  - Chlamydia, Q fever => **Must begin < 75-80 d of gestation**
  - Campylobacter => **antibiotics may be of value during an outbreak**
- **Vaccines**
  - Chlamydia, Campylobacter, Brucellosis
- **Natural Immunity**
  - ~ 3 years conferred during herd outbreaks (Chlamydia, Coxiella)

### Abortion Control

- Purchase Bucks and Does from Clean Herdss
- Biosecurity - 30 d
- Routinely necropsy stillborn and aborted fetuses

### Fetal Wastage - Prevention

- Decrease stress – nutritional, parasite, crowding, heat, etc
- Add Chlorteracycline, monensin, deqcoquinat to diet of pregnant animal (?)
- Respond aggressively to abortions – isolate, necropsy, submit sample, etc

### Abortion Diseases – No Deformities

- Toxoplasmosis –
  - Tx: decoquinat, monensin
  - Prevention: vaccinate (?), cat control
  - ZOONOTIC
- Chlamydia –G(-), C psittaci, several biotypes
  - Signs: pneuminia, keratoconjunctivitis, epididymitis, polyarthrits,
  - Abortion: 25-60% in new infections, then chronic, final month
  - Pre abortion signs: febrile, anorexia, bloody discharge
- Chlamydia
  - Dx: Stain CTD (Gimenez Ziehl-Neelsen)=> elementary bodies
  - - Prevention: Vaccinate prebreeding, boost, then annual pre breeding
  - ZOONOTIC

### Pseudopregnancy

- Mucometria / hydrometria, ‘cloud burst’, prolonged luteal phase
  - Incidence – 3-5% in dairy, out of season breeding,
  - Dx – P4 increased, ultrasound – no CLD

### CHLAMYDOPHILA Abortion

- *Chlamydophila abortus*
- Long incubation period
- Fibrinous placentitis
- Contagious
- Outbreak or endemic
- Placenta critical for diagnosis (IFA, IHC, Giemsa stain)

### Plants Affecting Fertility

- Moldy corn / wheat – Fusarium => estrogenic, depressed kid crops, ovarian cysts, abortions
- Clovers – estrogenic => same as above, cystic hypoplasia of uterus & cervix, hydrops
- Ponderosa Pine – Still births, late abortion, renal tubular necrosis, cervical dilation
- Cotton seed – gossypol => sperm abnormalities
- Veratrum californicum – exposure => 0 – 36d fetal loss, cyclopa, cleft palate
- Lupine, locoweed, sudan grass - arthrogriposis

### Abortion Diseases – No Deformities

- Coxiellosis – Q fever –*Coxiella burnetti*
  - goats, , world wide, cows possible source, sexual transmittion possible
  - Intracellular gram-negative bacterium
  - Shed several weeks in genital secretions; longer in milk
  - Survival in dried organic material facilitates aerosol dispersion
  - Signs: pregnant animals=> abort, placentitis
- Q Fever
  - Dx: Stain CTD & fetal abomasum (Ziehl-Neelsen), serology
  - Prevention: cattle-rodent control (?)
  - ZOONOTIC



### Coxiellosis – Q Fever

- Zoonotic - Human health risk – especially naïve or high risk
- No vaccine available in the USA
- Treatment does not appear to eliminate shedding
- Call State for Regs

### Abortion Diseases – No Deformities

- Salmonella- sheep & goats, stress (heat, feed, parasites, crowding, etc), birds & wildlife
  - Signs: abortion storms (70%), febrile, diarrhea, systemic illness, abort throughout gestation, metritis
- Salmonella-
  - Dx: Isolate organism
  - Tx: support, Antibiotics
  - Prevention: Autogenous bacterin, decrease stress
  - ZOONOTIC

### Abortion Diseases – No Deformities

- Campylobacter (*Campylobacter jejuni*, *Campylobacter fetus fetus*)
  - Culture (microaerophilic)
  - Gram negative, motile, “comma shaped”, direct exam of
  - Abomasal contents under darkfield microscope
  - C jejuni & fetus, Sheep in western NA, and range areas, not as common in goats
  - Signs: late term abort, stillbirth, weak kids, mucopurulent vulvo-vaginal discharge, necrotic –grey target -livers in feti
- Campylobacter
  - Dx: Dark field – ctd, fetal abo, ctd impression
  - Prevention: Vaccinate prebreeding, boost, then annual pre breeding
  - ZOONOTIC

### Abortion Diseases – No Deformities

- Toxoplasmosis – T gondii, abort mummification, stillbirths, weak lambs or kids or crias
  - CATS... Kittens or immunosuppressed cats
  - Life cycle: Cat = definitive host
  - Transmissible to man
  - Signs: Early embryonic death, abortion, fetal mummification.....storms of 30-90%, normal female, fresh fetus
  - Focal mineralization of cotyledon
  - Diagnosis: Serology, pathology

### Abortion Diseases – No Deformities

- Brucella – G (-), cocco-bacillus
    - Sheep - B ovis – epididymitis rare abort
    - Goats – B abortus & melitensis
- Signs: abort final trimester, goats – febrile, wt loss mastitis, lameness, hygroma, orchitis
- Brucella –
    - Dx: Isolate organism, serology
    - Tx: cull
    - Prevention: ID Slaughter
    - ZOONOTIC

### Abortion Diseases – No Deformities

- Leptospirosis -
  - cows > sheep / goats / lamas, goats – icterohaemorrhagica, grippotyphosa, pomona, hemorrhaging
  - sheep – hardjo, bratislava, pomona, icterohaemorrhagica
  - lamas – icterohaemorrhagica, copanheni, grippotyphosa
- Leptospirosis -
  - Signs: anorexia, febrile, jaundice, anemia, abortion, death (?)
  - Dx: Dark field – placenta, feti, paired serum w/4x
  - Tx: ?...antibiotics
  - Prevention: vaccinate (?), rat, cow, hog control
  - ZOONOTIC

### Abortion Diseases – No Deformities

- Listeriosis – G(+) – *L monocytogenes* (sheep, lamas & goats) & *ivanovii* (lamas & sheep), ubiquitous, browse – high pH soils
  - Signs: early gestation=> abort late gestation => still births/weak septicemia pre abortion, metritis
- Listeriosis –
  - Dx: culture, white pin point abscesses in fetal liver (brain)
  - Tx: Tetracycline, vaccinate (?)
  - Prevention: vaccinate (?), rat, cow, hog control
  - ZOONOTIC

# Birthing Babies

### Abortion Diseases – No Deformities

- Others
  - *Mycoplasma*... goats, mastitis, arthritis, keratoconjunctivitis, vulvovaginitis, bad deal
  - Neospora: alpacas and lamas
- Bluetongue – orbivirus & carried by *Culicoides* gnats
  - Signs: abortion seasonal, febrile, swollen tongue.....
  - Dx: viral isolation
  - Prevention: vaccinate (?)
- Bovine Viral Diarrhea: pestivirus
  - Goats: not common
  - Signs: diarrhea, abortions, stillbirths, PI's may occur

### PARTURITON

#### The First Stage

- Myometrial contraction 2 to 12 hrs. Doe leaves herd acts uncomfortable, restless, urinates frequently
- Cervix relaxes and releases the cervical seal.

#### The Second Stage

- Delivery of the fetus, 1 to 2 hrs., usually in lateral (older does may remain standing)
- The amnion protrudes from the vulva, followed by the forefeet & head ( NOTE: A Doe that fails to continue progressing should be examined)
- Posterior presentation is normal if both legs are extended and delivery occurs rapidly
- With multiple kids the Doe may or may not rest between deliveries or the deliveries may occur in quick succession
- If the Doe strains without producing any kid more than 30 min, intervention is indicated.

### Abortion Diseases – Deformities

- Akabane: arbovirus & carried by mosquitoes & gnats (rare NA)
  - Signs: nonpreg – subclinical, pregnant -abortion or stillborn, mummy, dystocia, arthropryposis, hydranencephaly
  - Dx: viral isolation, AB
  - Prevention: vaccinate (?)
- Cache Valley: carried by mosquitoes
  - Signs: pregnant -abortion or stillborn, mummy, dystocia, arthropryposis, microencephaly, spinal cord hypoplasia hydranencephaly
  - Dx: viral isolation, AB, absence of titers does not r/o
  - Prevention: vaccinate (?), insect control

### PARTURITON

#### The Third Stage

- Delivery of the placenta (6 hrs) and involution of the uterus.
- If no signs of septicemia or toxemia, placenta delivery should cause no concern until 12 to 18 hrs.
- Uterine involution should be complete by day 28
- Lochia (a nonodorous, reddish-brown discharge) is normal for up to 3 weeks

## Parturition

### The 3-30 Rule

- Doe should be examined 30 minutes after contractions begin or after the breaking of the chorioallantoic membrane
- If the female is normal and parturition is progressing normally, the clinician should wait at least 30 minutes before beginning any treatments or manipulations
- Females should be examined 30 minutes after delivery to determine whether another fetus is still in the uterus or birth canal
- Dystocia may be complicated with
  - Fatigue
  - signs of pain and panting
  - Uterine Inertia & Hypocalcemia (both primary or secondary to respiratory alkalosis) => poor uterine contractility

## Dystocia

### Left Paralumbar Fossa Approach:

- Fewer respiratory complications
- Abdominal viscera within the abdominal cavity
  - (Note: If bloat occurs rumen has room to dilate before respiratory compromise & can be easily decompressed)
- Care to not damage abdominal viscera due to thin abdominal wall.
- Exterorize the gravid uterus, & pack off with sterile towels before opening
- Uterine incision over greater curvature
- DO NOT lacerate the fetus.
- Make incision over each fetus
  - (Note: If 2 feti in same uterine horn => 1 incision)

## Fetotomy

- Percutaneous: Sheep & Goats...(camelids)
- Fetotomy: friable uterus, use lots of lube (Crisco)
- NSAID's, antibiotics, cloprostinol, PGF, oxytocin

## Goat Dystocia

- Patience
- Clean (Ivory soap)
- Lube (already hydrated => KY Jelly)
- Light traction (very friable uterus)
- Gentleness
- Small hands

## C Section

- Closure of body wall w/ absorbable suture
- Close each muscle layer separately (???time???)

### NOTES:

The most common reason for cesarean section is inadequate cervical dilation (Note: cervix might have been adequately dilated during labor but contracted during prolonged dystocia)

- Uterine torsion: severe tissue damage, avascular uterus, non viable, and SICK Does
  - The uterus experiencing torsion may not be viable and the dam could be very ill.

## C - Section

- Decision – malposition, inadequate cervical dilation, narrow birth canal, inability to extract fetus
  - (Note: Stress may cause malposition, failure of cervical / birth canal dilation)
- Complications of C-section – incisional infection / dehiscence, evisceration, infertility, death
  - sterile / clean, antibiotics, flunixinamine
- Sheep – Goats => left flank, friable uterus, incise greater curvature of uterus, 1 layer closure

## C Section

### Complications of C-section:

RFM, incisional infection / dehiscence, evisceration, infertility, death

### SO.....

- sterile / clean
- antibiotics (perioperative)
- banamine

**Any Questions?**

