

Calf and Heifer Management

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Reading Materials:

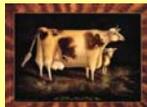
Topics 45 & 46 of Dairy Cattle Science (by Tyler and Ensminger)

Raising Heifer

- Provide replacements for cows leaving the herd
- Improve genetics and production raised heifers economically
- Future investment
 - Coststo raise heifers to the time of first calving
 - Minimize calf mortality and maximize health
 - Try for rapid growth and development
 - Minimize costs and increase the efficiency

Key Mgt Areas Affecting Calf Well Being & Performance

-mgt.
- mgt
- Nutrition
-
- Sanitation
- Disease detection, mgt., and prevention
- Pain Mgt.



Dystocia

- Any abnormal or difficult delivery process
 - Poor communication between the fetal calf and it's dam
 - Mal-presentation of the calf
 - Difficulties due to inappropriate assistance
- Scoring system for calving ease
 - 5 point system
 - Score of 1 indicateswas provided
 - Unobserved calving are scored 1 by definition

Birth Weight Issue

- Use easy calving score bulls for breeding
 - Specially in heifers
- Maternal constraints on fetal growth are important, but they can be partially overridden by sire effects



Fig 45-1. Malpresentations, such as this backwards presentation, are more common in multiparous than in primiparous cows (Courtesy of Howard Tyler, Iowa State Univ.)

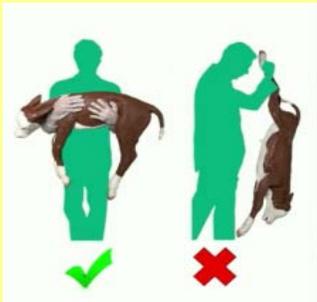
No more than 150 pounds of force applied to Holstein calves, 75 pounds for Jersey calves



Fig 45-2. Mechanical calf jacks can generate over 1700 pounds of force on the calf and should only be utilized in extreme situations and with extreme care (Courtesy of Iowa State University, Iowa State Univ.)

Care of the Born Calf

- *Stimulation of Respiration*
 - Remove the excess mucus from the nasal passage and mouth
 - Removal of accumulated fluid from lungs
 - Do not lift the calf by the hind legs
 - Applying bilateral pressure on the ribcage and forward motion from the abdomen to the neck
 - Tickling nasal passage with a piece of straw or Cold water to face



Adapted from Godden, 2016

Care of the Born Calf

Physical examination and identification of the calf

- Examination of the mouth and the nose
- Undesirable limb abnormalities
- Extra attention to calves born with assistance
- Freemartin
- Identification (place an ID in the left ear)
- Separation

Care of the Born Calf

Navel disinfection (within 2 hr of birth)

- Reduce the risk of navel infection and septicemia
- Saturate the navel with 7% iodine solution
 - Use laboratory squeeze bottle
 - Navel cord and area around it should be saturated

•REMEMBER!!

Poor sanitation and mismanagement of the calving area cannot be overcome by navel dipping

Colostrum Management

- **Colostrum contains:**
 - IgG, other immune factors, growth factors, 24% solids nutrients
- **Advantages of effective IgG transfer**
 - Reduction of mortality
 - Improves growth rate and feed efficiency (
 - Decrease age at first calving
 - Increase milk yield in 1st and 2nd lactation

Faber et al., 2005; Denise 1989; Nocek et al., 1984)

Colostrum Management

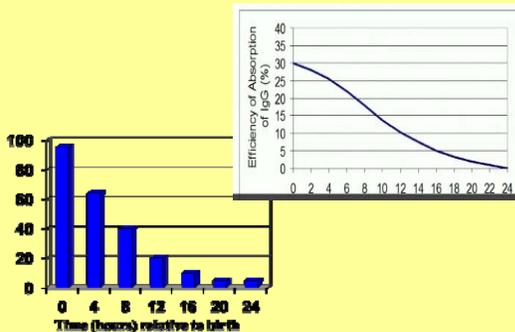
Colostrum Collection

- Bloody colostrum and colostrum collected from a cow with mastitis must be discharged
- Using colostrometer & after cooling down, check the quality (> mg/ml IgG)
- Extra high quality colostrum should be stored in 2 qt. jugs and kept below 0°C
 - Indicate the IgG Concentration on the jug
 - @ 4°C for max. 2 days

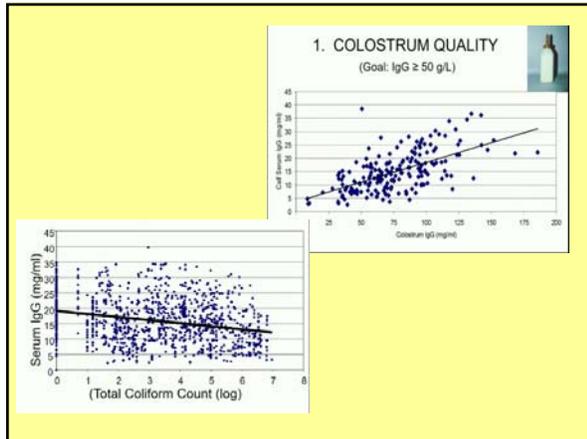
Colostrum Management

- Colostrum feeding
 -qt of top quality colostrum
 - (.....mg/ml IgG) within < 4 hr after birth
 - A second 2 qt of colostrum before 12 hr after birth
- Colostrum Mgt.
 - Keep a good record of colostrum quality for each cow/heifer
 - Quality of colostrum fed to the calf should be recorded

Efficiency of Ig absorption



Courtesy of Dr. Kincaid and Goddon



How is our industry doing at colostrum management?

	Goal	Current Reality
Quality	> 50 g/L IgG	US: = 15.5% farms test w colostrometer or brix ¹ QC: No farms tested quality ³
Quantity	3-4 L (10% BWt)	US: 87% of farms gave ≥ 4 qts within 24 hrs ¹ QC: Avg. 4.5 L within 24 hours ³
Quickness	1-2 hr (6 max)	US: Avg. 3.6 hrs old at first feeding ¹
Cleanliness	< 100,000 TPC	US: 43% of samples failed ⁴
FPT Rates	< 10%	US: 19% ² PEI: 28% (5 herds) ⁵

Adapted from Godden, 2016

- ### The 5 Points of Colostrum Mgt
- *Quality, Quantity, Quickness, Cleanliness, quantity monitoring*
 - **Factors affecting quality:**
 - Dry cow management (vaccination, nutrition, stress, length of dry period, milking time post-calving), parity
 - **Quantity:**
 - Feed 150-200 g of IgG (3-4 liter within first 4-6 hr)
 - Gut closure takes place by 24 hours of age
 - **Cleanliness:**
 - Free from bacteria (Salmonella, E. coli (must be < 10,000 cfu/mL), Mycoplasma)
 - Bacteria prevent IgG absorption Total count < 100,000 cfu/mL
 - *Do not high heat-treat colostrum, i.e. pasteurization (loss of IgG)*
 - Gentle heat-treat 140°F for 60 min (reduces bacteria counts)

Factors affecting Ig absorption



- Time of colostrum feeding
- Quality of colostrum (cow age, vaccinations, # of milkings after calving)
- Amount of colostrum fed
- Stress
 - glucocorticoids cause gut closure
- Season
 - higher absorptive ability in fall

Dr. Kincaid, WSU

Passive Immunity

- Failure to obtain passive immunity results in.....
 - Direct economic losses as well as a loss of genetic progress
- Calves with lower levels of passive immunity have decreased growth rates and increased health problems

Monitoring Passive Transfer

- Taking blood samples
 - 12-15 healthy calves
 - Age: 1-7 days old
 - Measure IgG in serum using refractometer
 - Goal:.....of calves should be g/dL IgG
 - > 6 g/dL total serum protein
- Sign of unsuccessful IgG transfer:
 - calf serum IgG < 5.5 g/L (@ d 2 -3 of age)
 - may increase mortality up to 31%-50% by 3 wks of age (Wells 1996)

USDA 2014, Morrill et al., 2014, Elsohaby et al., 2015)

A Few Extra Points

- Any calf born as result of dystocia is more prone to:
 - Stillbirth, Neonatal mortality, and colostrum deprivation
- Prolonged calving can result in hypoxia
 - Metabolic acidosis
 - Decrease in efficiency of colostrum absorption

(Besser et al., 1990)

Calf Housing

- Clean, dry, good ventilation, prevent calf-to-calf contact (e.g. calf hutches)
- Wet and filthy bedding must be avoided
 - Smooth stone river [6-8 inches]
- Keep space between calf hutches or use every other pen (when you can)
- Place the hutches for south east exposure



Courtesy Purdue University

Three phases of ruminant development

- **Pre-ruminant** - birth to 3 wk
- **Transition** - 3 wk to 8 wk
- **Ruminant** - > 8 wk

Feeding the Young Calf (Liquid Feed)

- **After colostrum feeding:**
 - Liquid: transition milk @ ~10% (4-5 qt) of birth wt. for 3 days thereafter both liquid and dry feed until weaning
- **Liquid feed**
 - **Transition milk** [high nutrients and inexpensive]
 - **Mastitis milk ??**, [problem w/ *E. coli* or *Pasterurella*]
 - **Milk from treated cow??** [(-) effects on good bacteria]
 - Potential problems with growth rate
 - **Milk replacer**
 - Good choice overall (Balance of protein and energy)

Pasteurization of Milk for Feeding Calves

- The primary goal of pasteurization is to reduce the load of possibly pathogenic bacteria, thus minimizing the risk of disease transfer.
- Low-dose antibiotics in waste milk can result in a heterogeneous increase in antimicrobial resistance. (Cornell Research)
- Pasteurization may reduce antibiotic residues, which could significantly reduce the influence of antibiotic presence in calves' gut flora. (Cornell Research)



Fig 45-15. On farm pasteurizers drastically decrease bacterial loads in milk and therefore enhance performance of calves (Courtesy of Mark Kirkpatrick)

**Feeding the Young Calf
(Liquid:Milk Replacer)**

- **Milk re-placer (factors to consider)**
 - Price
 - Quality
 - Nutrient analysis
 - Ingredients:Source of protein and energy, source of emulsifiers and stabilizer

**Feeding the Young Calf
(Liquid:Milk Replacer)**

- **Major Nutrients:**
 - Metabolizable energy: 1.71 Mcal/lb
 - ~ 1 lb/day

CP:%	Ether extract (fat):%	
Ca: .7 %	P: .6%	Mg: .07%
Fe: 100 ppm	Mn: 40 ppm	Zn: 40 ppm
Vit A: 1700 IU/lb	Vit D: 270 IU/lb	Vit E: 90 IU/lb

Feeding the Young Calf (Dry Feed)

Starting 3 days after birth (calf starter)

- **Palatable**
 - Addition of molasses (~7%)
- **Fermented rapidly**
 - Important for VFA's and rumen development
- **Supply required nutrients (.....TDN)**
 - **Sufficient fiber and bulk to maintain normal ruminal papillae shape**
 - Coarse texture or pelleted, e.g. oats
 - **High in energy and protein**
 - Corn, barley
 - Fat as long as does not reduce intake
 - **Coccidiostate**
 - Ionophors

Extra Points about the Calf Starter

- **Starter should contain enough coarse ingredients**
 - Mixture of 20% chopped hay and 80% starter
- **Starter should always be available**
- **Feed proper amount daily to keep the feed fresh**
- **Keep the starter away from the water bucket**

8 week old calves



Milk Only

Milk
&
Grain

Milk & Hay

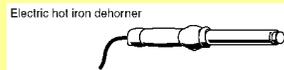
THE IMPORTANCE OF FEEDING GRAIN is shown by these photos of rumen interiors. The calf fed both milk and grain has much more developed fingerlike projections. Because of these papilli, the calf has more rumen surface with which to absorb protein, energy, and other nutrients.

Courtesy of Dr. Kincaid, WSU

Stimulating Rumen Development

- Fresh water should be available to calf from birth
 - Calves easily dehydrate
 - Free water intake is crucial for maintaining a normal rumen environment
 - Increases dry matter intake

Dehorning



- Can be accomplished as early as 2 wk of age
- Use an electric dehorner
 - ✓ the quickest, the most effective





Fig 45-20. Barnes type dehorners are most commonly used on older calves, and this technique requires removal of all horn bud tissue for success (Courtesy of Dr. Mark Kirkpatrick; Pfizer Animal Health)

Dehorning Paste

- ✓ The combination of caustic substances in dehorning paste cauterizes tissue and prevents horn growth.
- ✓ It is applied to the horn buds of calves **before four weeks of age**.
- ✓ **Advantages:** Bloodless; non-invasive; less risk of injury to the calf handler.
- ✓ **Disadvantages:** Calf cannot be exposed to rain or allowed near other animals for six hours; cannot be used in calves over eight weeks of age. Mixed results???



Removing Supernumary Teats

- Extra teats have no value and may interfere with milking
- Should be removed when calf is 1-2 months of age
- Usually little bleeding when teats are properly removed

Weaning

- When to wean a calf
 -weeks of age
 - *When calf steadily eats about 1.3 lb of calf starter*
 - *Gaining .8 lb/day by 6 wks (~ 130-140 lbs)*
- Small wt. loss after weaning can occur when calves do not consume enough starter

Weaning

- Weaning is stressful, do not do other mgt. practices that are stressful
- Keep the calf in the hutch for about 10-15 days after weaning
- Begin the grower feed

Calf-hood Health and Disease Management

- Minimize pathogen exposure
 - Sanitation
 - Maternity stall
 - Calves housed in clean, well-ventilated area
 - Minimizing contacts
 - Individual housing systems
 - Adequate space between calves
 - People exposed to calves practice good hygiene
 - Care for calves prior to older animals
 - Develop chore routine to minimize pathogen transmission