

Parturition in the Mare

Predicting the time of foaling

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Length of Gestation

- Normal range : 335 to 342 days
<300 days = abortion
300-320 days = premature and non-viable w/o care
>360 prolonged gestation "overdue" ; occasionally more than one year ; notoriously small foals
- Seasonal influence : winter/spring > 5-10 days longer than spring/summer (place under artificial photoperiod)
- Colts longer gestation than fillies.
- **Pathologically longer gestation** : ingestion of toxins - ergot alkaloids in endophyte fungus (*Acremonium coenophialum*) contaminated fescue grass.

Signs of readiness for foaling (1)

- In the last month, mares should be monitored for changes in:
 - Vulvar laxity and edema
 - Vulvar discharge ("cervical plug is melting")
 - Relaxation of pelvic ligaments (sacrosciatic ligaments - area around the tailhead)
 - Udder development
 - Teat start to fill in

Signs of readiness for foaling (2)

- Teat start to point outwards
- "Waxing" of the teats – accumulation of wax-like, dried milk at the teat
- Changes in the consistency and color of the milk
- Changes in the mineral composition of the milk (Ca, Na and K)
- Changes in milk pH, antibody conc, taste (sugar)

Predicting the day of foaling

- Udder is becoming larger
- Udder produces yellow thick secretion
- Teat start to increase in size
- Wax starts to appear at the teat
- Vulva becomes larger and softer
- Ligaments around the tail become soft

The udder

Udder is becoming larger

- Starts about 1 month before and becomes more important in last 2 weeks.
 - First the lower part increases but basis is still narrow
 - Then the base of the udder (upper part) starts to increase in volume
- About 1-3 days before foaling very obvious increase in size.

The teat

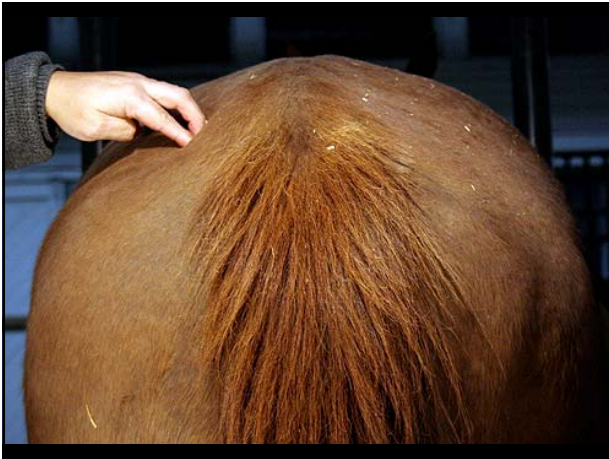
The teat gradually become longer and more filled

- Teat start to increase in size in the last week
- Wax starts to appear at the teat usually 1 to 4 days before foaling.
- Sometimes the mare starts to loose milk before foaling. Attention she may loose colostrum.
- As the udder fills the teat will gradually start to point outwards (last days)





First stage labour has started when...
 Milk starts to drip and sometimes run continuously – oxytocin is being released due to uterine contractions and foal is engaging in the birth canal.



Sacrosciatic ligaments

- <24 hrs before foaling

Vulvar relaxation

- Vulva starts to loosen hours to days before foaling

Day 318 → Day 329



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Predicting the day of foaling

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The milk

- The milk will change color and thickness (consistency).
- First very thick, sticky, yellow-transparent secretion.
- Then becomes more milk-white color.
- 0-1-2 days before foaling becomes creamy, white yellow to orange thick = colostrum

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The milk

Changes in consistency ...

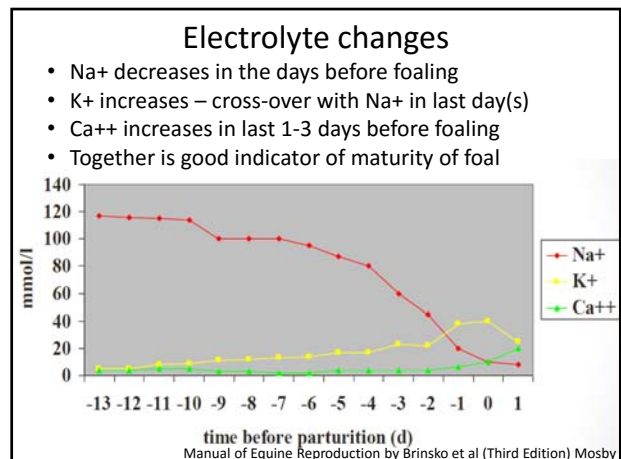
- Color and thickness (consistency)
 - At first very thick, sticky, yellow-transparent
 - Gradually more milky-white color
 - 0-2 days before foaling becomes creamy, white-yellow to orange and thick = colostrum

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The milk

Changes in the composition ...

- mineral composition of the milk (Ca, Na and K)
- pH
- antibody concentration (colostrum)
- taste (increase in sugar content)



Ca concentrations in the milk

- Ca conc = maturity of the foal
- Ca conc increase in last 2-4 days before foaling
- Test neg: less 1% foaling
- Test pos: more 80% foaling in next 12h
- Test should be done in evening



Foal Watch® - Ca-test

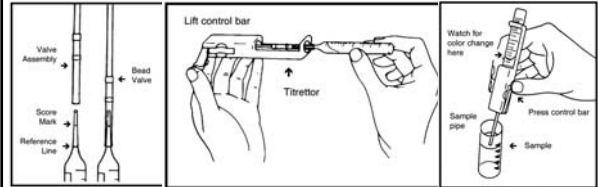


Figure 1

Figure 4

Foal Watch®

<https://youtu.be/1D9Dqew-03E>
<https://youtu.be/7W990pSTdl0>

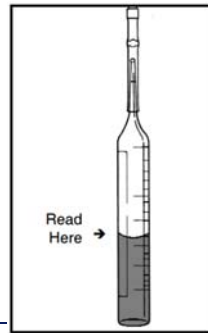


Figure 5

Table 2.3 Scoring system for electrolyte concentrations in pre-foaling mammary secretions. From Ousey *et al.*²⁹

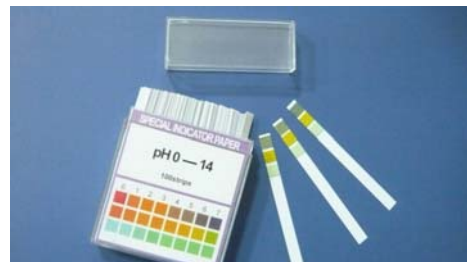
mg/dL	Calcium		Sodium Na ⁺		Potassium K ⁺		Points for each electrolyte in specified range		
	mEq/L	SI	mg/dL	mEq/L	mg/dL	mEq/L			
≥40	≥20	≥10	≤69	≤30	≤50	≥136.5	≥35	≥35	15
≥28	≥14	≥7	≤115	≤50	≤50	≥117	≥30	≥30	10
≥20	≥10	≥5	≤184	≤80	≤80	≥78	≥20	≥20	5

A total score ≥25 for all three electrolytes suggests fetal maturity and probability of a safe induction.

Interpretation of mineral conc

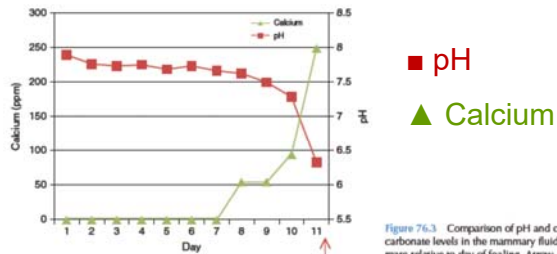
- Different for each test.
- For example for the Predict-a-Foal test:
 - If only one of five squares shows colour change then <1% chance will foal in next 12 hrs
 - If four out of five squares have switched colour than there is an 80% that the mare will foal in the next 24 hrs
- Should be used in combination with other changes to decide if foal is mature and parturition can be induced.

pH in milk decreases last 24 hours



Changes in Ca⁺⁺ and pH

- At the time of the increase in Ca⁺⁺ there is usually a decrease in pH in last 24 hrs

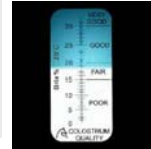


■ pH
▲ Calcium

Figure 76-3 Comparison of pH and calcium carbonate levels in the mammary fluid of a mare relative to day of foaling. Arrow indicates foaling at day 11 of testing.

IgG concentrations in milk

- Before foaling milk becomes thick, viscous yellow to orange = colostrum
- Good colostrum (>60 g Ig/L) is yellow and thick (not white and thin)

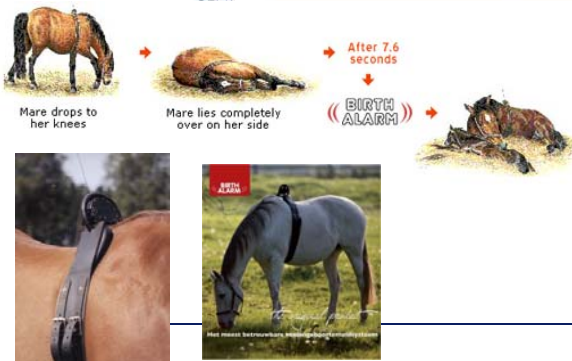


The milk / colostrum

- Before foaling Ca conc increases
- pH of the milk decreases fast within 24 hours before foaling
- Glucose (sugar) conc increase in last 2 days (tasting)
- IgG conc increase in last 2 days (refractometer)

Alarm Tools

- Systems on vulva (opening of vulva)
- System on girth (position of mare)



Halter mounted alarm





C6 Birth Control I
 Birth Control
 SOLUTIONS OPTIMIS
 WWW.SIGLOO.COM



Base kit
 One Receiver +
 Two Transmitters








Sigloo Foaling Alert
<https://youtu.be/-VpFVRY25No>


Foalart device




Parturition in the Mare
The foaling process
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Stages of normal parturition

1. Preparation (30 min to 4 hrs)
 - Uterine contractility increases in intensity and frequency (contractions are NOT visible)
 - Cervical dilatation
 - Repositioning “turning” of the foal
2. Expulsion of foal (5 to 20 min)
 - Expulsion of the foal
3. Expulsion of placenta (2-6 hrs)

First stage labour

- Restless, looking at flank, pacing, sweating, increased heartrate and respiratory rate
- Frequent urination
- Frequent laying down and getting up
- Pawing
- Tail is clearly elevated


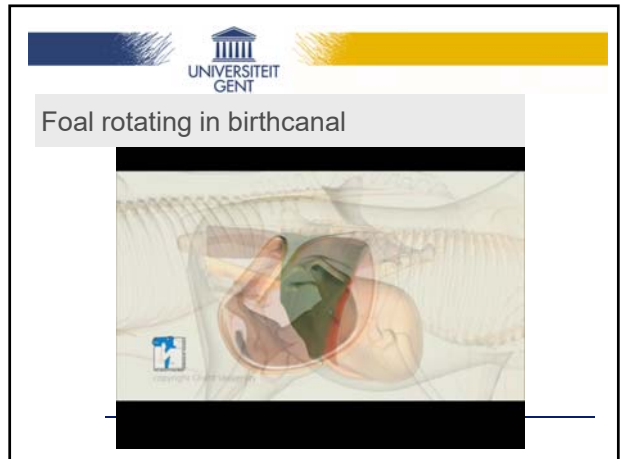
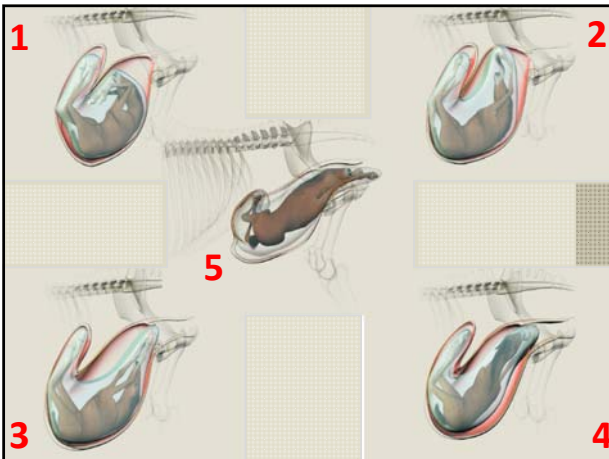



Figure 9-9 Mare in the first stage of labor. The tail has been wrapped and the perineal area and udder have been cleansed. The mare was sweating, stretching, sitting her tail, and urinating small quantities at periodic intervals.

Figure 9-10 Pony mare in the first stage of labor. Regardless

Manual of Equine Reproduction by Brinsko et al (Third Edition) Mosby



Second stage labor

- Starts when “water breaks”, rupture of the chorioallantois membrane






Figure 9-11 The chorioallantois has ruptured, and allantoic fluid escapes from the birth canal. The fluid may initially be released in a slow, almost undetectable stream or in a prominent stream that is obvious. This point marks entry into the second stage of labor.

Manual of Equine Reproduction by Brinsko et al (Third Edition) Mosby

2nd Stage: Expulsion of the foal

- Rupture of the chorioallantois (‘water breaks’)
- Abdominal contractions + release of oxytocin
- Amnion is forced between the vulvar lips
- Delivery progresses and foal is born

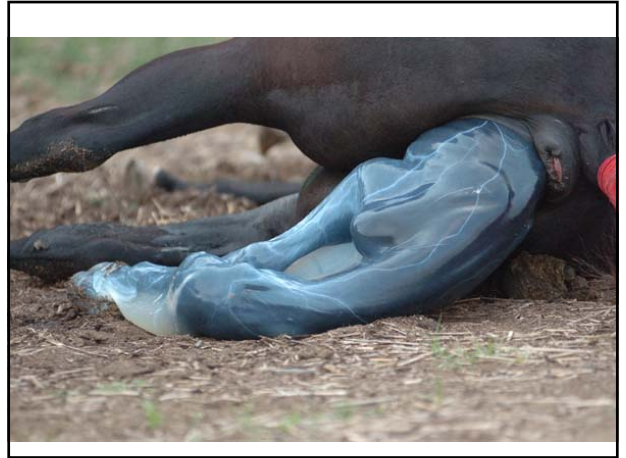
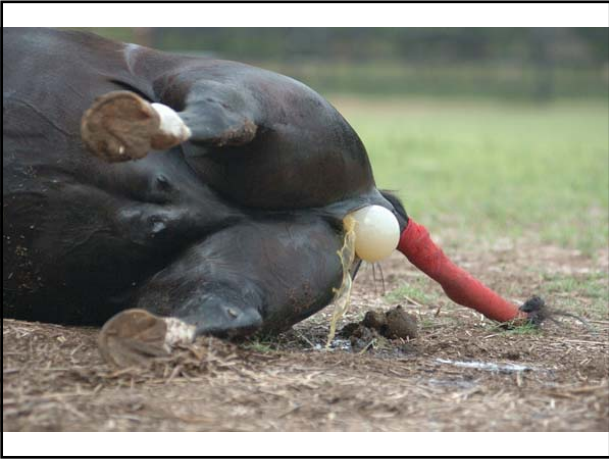
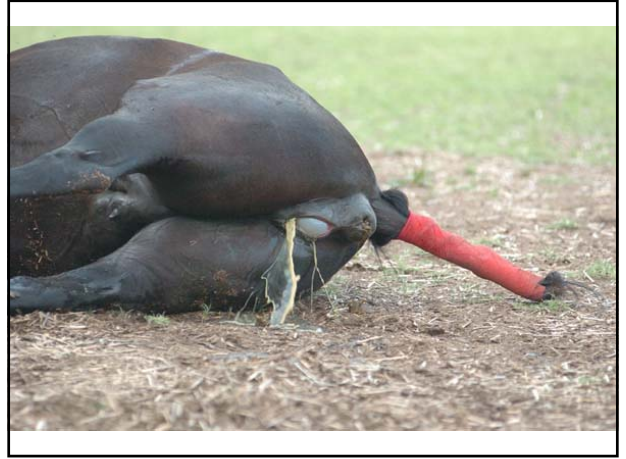




Figure 9-17 When possible, the umbilical cord should be left intact for a few minutes to ensure maximal blood flow from the placenta to the circulation of the newborn foal.

Manual of Equine Reproduction by Brinsko et al (Third Edition) Mosby

Rest of the pictures @

<http://www.equine-reproduction.com/articles/Foaling.shtml>

get to be able to pass the foal herself, and may appear to be necessary assistance at this stage (a girl can try to get both of her hands on either side of the foal's chest to push before the cervix is adequately relaxed) through a mare developing uterine inertia - a lack of desire to push. In other foalings, in the event of a mare who is to do the work, and this may be a mare who is that mare who is just there to assist!



Notice the normal passage of the foal toward the back. If assistance is required, as most mares pulling toward the mare's back in conjunction with the contractions is recommended. There are some emergency situations where this is not recommended, and rapid extraction is desirable, but in most cases the "toward the back" or "toward the mare's back" side will apply. Once the foal is out of the mare, manual support of the umbilical membrane should be performed if it has not naturally occurred. Note that the foal cannot breathe until its chest has passed out of the mare and is able to expand (and there is air). Remember too that there will still be oxygen transfer between the placenta and umbilical cord for the duration of placental blood flow and expansion of the umbilical.



As long as the mare is quiet and prepared to remain lying down, we like to gently manipulate the foal toward the mare where she can see it easily, and possibly touch it. We try to avoid disruption at this stage by keeping the mare down as long as possible, so we need the medicine to suppress naturally unless there are problems for the mare getting up on her own. The natural expansion reduces the diameter of the foal's head and neck, and allows it to pass through the cervix. The amount of blood loss is minimal (about 1/2 cup to 1 cup) and is usually not a problem. The natural expansion reduces the diameter of the foal's head and neck, and allows it to pass through the cervix. The amount of blood loss is minimal (about 1/2 cup to 1 cup) and is usually not a problem. The natural expansion reduces the diameter of the foal's head and neck, and allows it to pass through the cervix.

During foaling ...

Redbag >>> Immediately open de membranes and consider that the foal is in trouble. Gentle traction!



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Delivery of the foal

- Allantochorion breaks inside at level of cervix
- Amnion remains intact (white blue membrane)
- First one leg – then second leg and nose – still wrapped in amnion
- Legs are presented slightly one behind the other – important to keep diameter at shoulder level minimal
- Nose of foal is at about the carpus.
- Passing the shoulders is most critical/intens part

Video animation on foaling

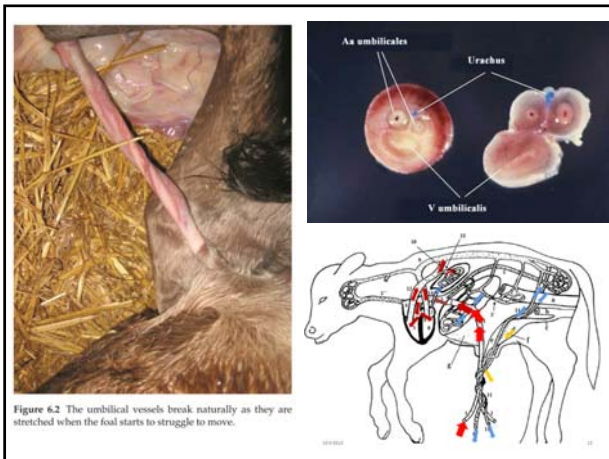
<http://plasticreality.nl/?p=52>

41 to 1:20

<https://youtu.be/YtnRIHwTf58?list=PLMLlvzrvbJcRWSIkRFxwrkdZ-6cVJfMki>

Rupture of the umbilical cord

- Often remains intact when foal is already completely out of pelvic canal
- Leave cord intact – continued transfer of blood from the placenta to foal
- Ruptures when foal and/or mare try to get up.
- Will rupture spontaneous at specific place – pale and slightly narrow part about 1 to 2 inches from abdominal wall.
- Should not be ligated unless excessive bleeding – increased risk for infection
- Disinfect with chlorhexidine (1 or 2%) several times per day during first 3 days



- Stage 3 of labor
Expulsion of the fetal membranes
- Normally completed within 30 min to 3 hrs
- Expulsion of fetal membranes – **should** be completed after 3-6 hrs (12 hrs)
- Some breeds are very sensitive to ret sec : Friesian breed, heavy draft horses increased at risk of laminitis as a complication of ret sec.