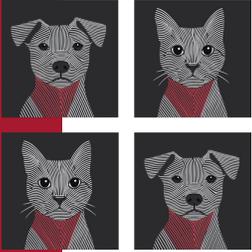


Whelping....or YELPing? When Things Go Wrong at the End of Gestation

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Dystocia in Small Animals

Dystocia is defined as a difficult birth or the inability to expel the fetus through the birth canal without assistance



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OK....Lets Talk about the Birds and Bees



ANESTRUS (non-fertile stage)
- usually 7-9 months*
No bleeding.
"Waiting" stage until female comes into heat again

PROESTRUS - 9-10 days*
(non-fertile stage)
Bloody discharge can occur or not, varies in color and intensity among individuals

ESTRUS - 5-9 days*
(fertile stage)
Discharge often becomes pinkish red but can also stop at this point, while female remains most fertile. If male becomes receptive to males

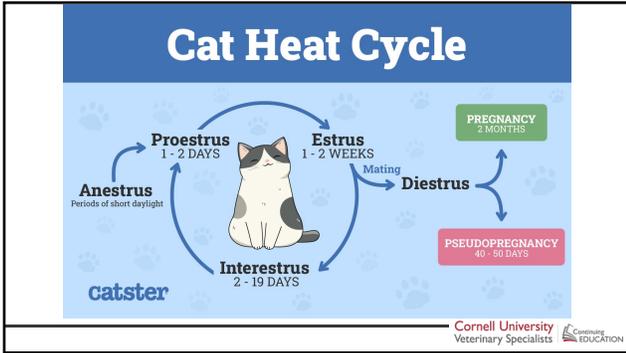
DIESTRUS - 2 months*
(non-fertile stage)
Bloody discharge can occur or not and stops eventually, varies in color and intensity among individuals

*The time spans given in this infographics are only average values, which can vary largely among individuals!

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- After the first heat cycle, the female experiences puberty and achieves reproductive maturity
- The typical age of onset of puberty is 10 to 12 months with a range of 6 to 24 months
- Normal gestation length in the dog may range from 57-72 days from the first time of breeding
- Average length is 65 days
- Cats are induced ovulators, there generally less variability in gestation length, which ranges from 63-65 days

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As the Whelping date Approaches.....

- Mammary development, vulvar enlargement, mucous vaginal discharge
- Relaxation of the pelvic ligaments
- Onset of lactation may be noted
- A sudden drop in body temperature (<2°F) is noted within 24 hours

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3 Stages of Normal Parturition

Stage 1	Stage 2	Stage 3
<ul style="list-style-type: none">• Subclinical uterine contractions and progressive dilation of the cervix• Lasts 6-12 hours• Restlessness, apprehension, panting, nesting behaviors, hiding, and anorexia• Tachypneic, restless, and vocal, or may lay in their nesting boxes, purring	<ul style="list-style-type: none">• Active expulsion of the fetuses• First fetus is usually delivered within 1 hour of onset of stage 2 in cats, and within 4 hours in dogs• Subsequent deliveries every 15 min to 3 hours• Active straining• The entire process generally occurs over 2-12 hours• May take as long as 24 hours with large litter sizes	<ul style="list-style-type: none">• Expulsion of the placenta• One placenta for each fetus delivered• Placentas are usually still attached• If detached should emerge within 15 min to several hours• Lochia may be seen during all stages of labor

Following parturition, the discharge gradually becomes red-brown, decreasing in volume over 4-6 weeks as urine involution takes place

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When They Don't Follow The Rules-Uterine Inertia

Primary Uterine Inertia

- The uterus may fail to respond to the fetal signals
- Insufficient stimulation to initiate labor
- Over-stretching of the myometrium by large litters
- Excessive fetal fluids or oversized fetuses
- Inherited predisposition
- Nutritional imbalance
- Fatty infiltration of the myometrium
- Age-related changes
- Deficiency in neuroendocrine regulation
- Systemic disease

Secondary Uterine Inertia

- Exhaustion of the uterine myometrium caused by obstruction of the birth canal



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Abnormally Prolonged Whelping

- Whelping not observed within 24-36 hours after the drop in rectal temperature
- Whelping not observed within 12-26 hours after decrease in progesterone
- Interval between puppies or kittens is ≥ 30 minutes clear signs of contractions
- Interval between puppies or kittens ≥ 2 hours without signs of contractions
- Entire duration of whelping lasting >24 hours
- Active labor for > 4 hours and no puppies or kittens produced
- Weak labor for > 4 hours and no puppies or kittens produced
- Abnormal vulvar discharge

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Diagnosis of Dystocia-Physical Examination

- Accurate history and physical examination
- Palpation of the abdomen
- Digital examination of the vagina using aseptic technique



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Diagnosis of Dystocia-Bloodwork

- Serum biochemical analysis
- PCV/TS, blood glucose, ionized calcium concentration



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Diagnosis of Dystocia-Imaging

- Lateral and Ventrodorsal abdominal radiographs



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Diagnosis of Dystocia

- Abdominal ultrasonography



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Treatment-Medical Management

- The goal of medical management is to stimulate the myometrium with drugs (only if imaging findings do not indicate obstructive dystocia) or provide manual assistance
- Fetal manipulation is attempted, the gloved hand should be lubricated, with lubrication applied around the fetus if possible
 - Apply gentle traction
 - Cleanliness is important, wear sterile gloves, and use sterile lube



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Surgical Management

Surgical management should be considered when:

- Complete primary uterine inertia
- Partial primary uterine inertia
- Secondary uterine inertia where large numbers of fetuses remain and response to drugs is unsatisfactory
- Suspicion of uterine torsion, rupture, prolapse, or herniation
- Evidence of fetal distress with poor response to medical intervention

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Caesarian Section

- An anesthetic protocol should be selected with the goal of maximizing survival of neonates and mother
- Attempts should be made to minimize exposure of the fetus to anesthetics
- Keeping the time from induction to delivery as short as possible
- The female should be clipped and prepped prior to induction
- Induction agents should be given to effect
- Regional techniques such as line blocks and epidurals may help to minimize the need for other drugs



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Neonatal Resuscitation



What do you need...

- A warm (90°F) incubator
- Hemostats
- Suture material
- Suction bulb syringes
- Emergency drugs
- Dry towels

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Resuscitation

- Each neonate is handed off
- The umbilical cord should be clamped and ligated 1-2 cm from the umbilicus
- Fetal fluids and amnion should be removed by rubbing briskly with a towel
- The oral cavity and nares may be suctioned with a bulb syringe
- Positive pressure ventilation may be initiated with a snug fitting mask
- Keep the neonates head and neck extended to ensure adequate inflation of the lungs
- Cardiac massage may be instituted if a heartbeat can not be detected once warming and ventilation measures have been instituted
- Reversal should be given if the dam received opioid analgesics as part of the anesthetic regimen



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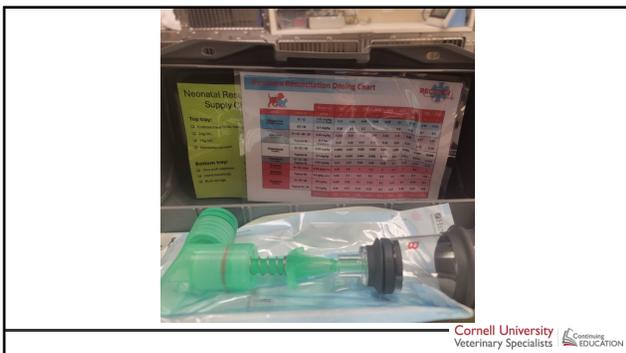
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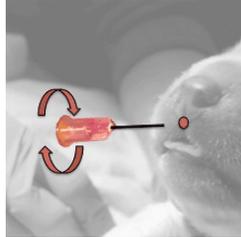


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Nasal Philtrum

If the neonate fails to draw a breath within 30 seconds or has a slow; irregular respiratory pattern. Respiration can be stimulated by placing a 25-gauge needle in the Renzhong or Jen Chung acupuncture point in the nasal philtrum and rotating the needle clockwise against the underlying bone



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Keep in Mind

- The old practice of "swinging" puppies to clear their airways is best avoided because of the potential for cerebral hemorrhage due to concussive injury
- Intubation may be accomplished using a catheter or small, uncuffed endotracheal tube
- Isoflurane is minimally metabolized, ventilation is the primary route of elimination
- Depressant effects can not be reversed until the neonate breathes
- Doxapram (Dopram) is routinely administered in many practices as a respiratory stimulant, it is not used for this purpose in the resuscitation of human neonates. There is no evidence to support its use in veterinary patients



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Prognosis

- Medical management of dystocia is guarded, with success rates of 20-40%
- Stillbirth rates have been shown to rise when dystocia is allowed to continue for greater than 4.5-6 hours from the onset of second stage labor
- Caesarian section should not be delayed if response to medical management is poor or unlikely to result in successful delivery
- Neonatal survival rates following surgical treatment of dystocia have been reported at 92% at birth, with 80% still alive at 7 days post c-section



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Prevention

The only way to prevent dystocia is to spay the animal

It can be reduced by

- Breeding only healthy, young animals without medial issues
- Keeping dogs at a healthy body weight
- Knowing the expected due date and the normal stages of labor
- Providing a quiet, safe whelping area
- Considering an elective C-section for high risk dogs
- Obtaining radiographs at 42 to 52 days post breeding to evaluate the number of fetuses

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Dystocia in Guinea Pigs



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Keep in Mind

- Females are spontaneous ovulators
- Seasonally polyestrous and breed year round in captivity
- 15-17 day estrus cycle
- Females exhibit distinct signs of proestrus and estrus
- Females experience their first estrus as early as 3-6 weeks old
- The pubic symphysis is a fibrocartilaginous bridge in breeding females
- After about 6 months of age in males and unbred females, the symphysis calcifies and becomes permanently fused
- Dystocia is most common in sows bred and having their first litter after approximately 6 months of age because the pelvic symphysis is fused



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Understanding the Guinea Pig Estrous Cycle

Four Stages of the Estrous Cycle

Proestrus (1-1.5 days)	Estrus (8-11 hours)	Metestrus (3 days)	Diestrus (11-12 days)
Characterized by the development of ovarian follicles, swelling of the vulva, and the beginning of the rupture of the vaginal closure membrane	The period of sexual receptivity or "heat" where the female is receptive to a male	Follows ovulation, characterized by the formation of the corpus luteum	The longest phase, featuring a functional corpus luteum and high progesterone levels, where the vaginal membrane is closed

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Uterine Inertia

Sow-related

- Breed too old
- Obesity
- Uterine torsion

Pup-related

- Large fetal size
- Fetal malposition



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Parturition

- Gestation can range between 59-72 days
- The sow does not build a nest
- Pups are delivered rapidly with the entire birthing process lasting a total of 30-45 minutes
- Once strong abdominal contractions have begun, a pup appears within 5 minutes or less
- The interval between delivered pups, or the rest period, is 3-10 minutes

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Dystocia

- Dystocia can be challenging to detect early because of this variable gestation length paired with the sow's lack of nest building and the abrupt onset of labor
- If a sow has been continuously and unsuccessfully straining for more than 10-20 minutes or intermittently for greater than 2 hours is typically experiencing dystocia



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Diagnoses of Dystocia

- Physical examination
 - The female is often restless and irritable
 - Hunched posture or even biting at the lateral body wall
 - Appear weak and depressed due to exhaustion when labor has been prolonged
 - In severe cases, there may be bloody vulvar discharge or the green-brown, ink-like discharge caused by placental separation
 - Muscle spasms and possibly convulsions



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Diagnosis of Dystocia-Abdominal Palpation



- Gently palpate the abdomen to determine if uterine contractions are present
- As dystocia advances, contractions are often mild or even absent
- Fetal masses may be palpated in the caudal abdomen and a fetus may also be visible or palpable within the birth canal
- Visually examine the birth canal and digital palpation to determine the presence and position of the pups

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Diagnosis of Dystocia-Imaging

- Radiographs
- Determine the number, size, and position of the fetuses
- Evaluate the birth canal
- Pubis in relation to pup size
- Exclude other possible mechanical obstruction including inflexion of the pelvic symphysis



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Diagnosis of Dystocia

- Abdominal ultrasound
- Confirming the number of fetuses
- Determining the visibility of pups



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Diagnosis of Dystocia-Bloodwork

- Chemistry and CBC
- Hypoglycemia
- Dehydration
- Hypocalcemia

If fetal death has occurred, toxic heterophils, thrombocytosis, and other changes suggestive of acute inflammation can be observed



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Treatment

- IV and IO catheter
- IVF with glucose supplementation if warranted
- Supplemental heat
- Nutritional support
- Analgesia
- If pubic symphysis has separated, lubricate the birth canal with water-soluble lubricant to assist parturition



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Oxytocin

- If uterine inertia is suspected and the pubic symphysis has separated oxytocin can be used to stimulate contractions
- 0.2-0.3 IU/kg IM

★ Remember that Oxytocin will be ineffective if the muscles are too fatigued to respond. In cases of hypocalcemia, 5-10ml of calcium gluconate can first be delivered as a 10% solution orally



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Manual Removal

- Manual removal of the pup is sometimes possible for malposition or large pups using careful redirection and gentle traction
- There is risk to both the pup and the sow
 - Vaginal or uterine tears
 - Prolapse



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Surgical Intervention



- Surgical intervention should be considered if no pups are produced with 15-30 minutes after 1-3units/kg IM Oxytocin
- Public symphysis closed or fused
- Fetus too large for pelvic delivery
- Malposition
- Longstanding fetal death

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Caesarian Section

Preoperatively, tilt the surgical table so the patients chest is higher than the abdomen to minimize compression of the chest by the large, gravid uterus

Avoid excessive handling of the gastrointestinal tract

Surgically sterilize the sow to prevent future pregnancies

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Postoperatively

- As viable young are removed, they should be cleaned and immediately stimulate to breathe
- Encourage the sow to eat as soon as possible
- Provide pain control
- Monitor the patients appetite and eliminations
- Monitor hydration
- Antibiotics may be indicated if vaginitis is present



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Prognosis

- Uncomplicated dystocia is associated with a good prognosis for recovery
- Guarded to poor for guinea pigs that require surgical intervention
- Guinea pig young are relatively well developed, they have a high demand for oxygen and a low tolerance for carbon dioxide
- The young will quickly deteriorate if they are still within the uterus as placental separation occurs



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Neonatal Care

- Young are precocial
- They are born with teeth and hair
- The eyes and ears are open
- Pups may not nurse immediately, but when they do so they sit in a prone position
- Orphaned pups will often refuse food for the first 12 hours postpartum
- Neonates obtain all maternal antibodies from the placenta, not the milk
- Weaning is generally complete by 21-28 days of age
- Weigh pups daily
 - Young that lose weight or that weigh less than 60grams carry a poor prognosis



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Prevention

- Separate male and female guinea pigs by the time they are 21 days old as the females will begin cycling
- Prevention of dystocia is much more successful than treatment in the guinea pig
- Ensure the sow is first bred before 6-7 months of age to make sure the public symphysis remains open
- Prevent obesity in sows by providing adequate space for exercise and monitoring food intake to avoid overfeeding
- Exercise is particularly important during pregnancy
- Offer a balanced diet, that includes sufficient vitamin C

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