

APPENDIX XXII: Fetal examination and sample management

Killer whale fetuses can be encountered as gestational fetuses within dead stranded pregnant females or as abortions or still births. Killer whale pregnancy can last 15-18 months. Determining if a small-sized animal is a neonate or a fetus can be difficult. Fetal decomposition can occur in utero or after expulsion. A fully developed, full sized animal can be delivered as a stillborn due to fetal death just prior to or at parturition. Because of these complexities, a thorough examination and sample collection is critical for fetal review.

A killer whale can be identified as fetus if:

- The developing fetus is present within a gravid uterus or birth canal or the abdomen of an adult female with an internal uterine rupture
- The fetal development is incomplete

Findings that **suggest** but do not confirm the animal as a fetus include:

- The body is less than 2.5m (8.2 feet) in length or 182 kg (400 pounds) in mass.
- Gastric content includes amniotic fluid and no milk
- Fetal folds are present

Taking a history on a fetus:

1. Maternal information including age, overall health, past pregnancies and their outcomes as known
2. Environmental situation including weather and conspecific events – is aggression/trauma a concern?
3. Paternal identity or possibilities
4. Any observed situation related to abortion – time/character of anorexia, contractions, straining, delivery complications, additional cases

Fetal/Tissue Examination:

1. Collect placenta, fetus, and amniotic fluid
2. Measure fetal length, weight, the distance between the eyes, note developmental features, estimate degree of decomposition (fresh, mild, moderate, severely deteriorated, mummified)
3. Examine the skin for meconium (green or orange) staining. Likewise, look for tan discoloration of the trachea and bronchi suggesting meconium inhalation.
4. Examine the placenta for completeness of expulsion. If the placenta is presented in sections, try to piece together to form a complete membrane. Weigh, measure the length and # twists in the umbilical cord. Extra support can be found at :
<http://placentation.ucsd.edu/killerwhalefs.htm>

Specific points of examination:

Note: any abnormalities, photograph and sample for formalin

1. Observe for any malformations or organ abnormalities (when something does not form)

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2. Observe for any swelling/edema or hemorrhage – especially in the head/neck region that might suggest dystocia
3. Specifically observe the umbilicus for swelling/hemorrhage
4. Observe ribs and skull for swelling/fractures/irregularities
5. Observe organs for irregularity, firmness, necrosis, meconium staining, or abscesses
6. Examine brain for completeness; rule out hydrocephalus
7. Observe placenta for thickening, thinning, or discoloration
8. Specifically note the character of gastric contents – amniotic fluid versus curdled milk

Collection of Fetal samples for freezing/ancillary testing:

Abdominal/thoracic fluid (5 ml)	Spleen
Blood (3-5ml)	Thymus
Brain	Tissue pool (liver, spleen, lung, brain) in viral transport media
Gastric fluid (5-10 ml)	Tissue pool (liver, spleen, lung, brain) in RNA later
Kidney	Umbilical cord/placenta
Liver	
Lung	
Pericardial fluid (3ml)	

Fetal samples for culture:

- Stomach content – aerobic, anaerobic, fungal, and *Campylobacter* sp. cultures
- Liver – aerobic culture
- Lung - aerobic culture
- Umbilicus – aerobic
- Other cultures as indicated by gross findings

Fetal samples for 10% neutral buffered formalin:

brain	parathyroid
bladder	placenta (see exam details below)
colon/rectum	skeletal muscle
gonads	skin
esophagus	spleen
heart	stomach
intestines	trachea
kidney	thymus
larynx	thyroid
liver	tonsil
lung pituitary gland	umbilicus
lymph nodes	

Placental exam:

1. Save sections of placenta, amniotic sac, and umbilicus in 10% neutral buffered formalin
2. Save two 10 x 10cm sections of placenta frozen in whirl paks
3. Save small section (1cm x 1cm – cut into fragments) of placenta in RNA later and freeze
4. Save small section in EM fixative (Gluteraldehyde or Karnovski's solution)