Northern River Otter Medicine
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Introduction
Northern (aka North American) River otters (*Lontra canadensis* or LOCA) are found throughout North America in riparian zones. A typical “home” territory for otters in the wild is 3-15 square miles and they tend to live alone or in pairs but are highly social. An adult otter typically weighs between 10-30 pounds, so size of normal pups may also vary greatly throughout North America. Primarily piscivorous, otters have high metabolic rates, rapid digestion, and have been found to spend 41-60% of their time in the wild involved in feeding or foraging activities.

Juvenile otter care
Age Determination
- North American River Otters are born between January and March in this part of the country. They are usually found when they are ~6-12 weeks once they begin venturing out of the den on their own. The mom will return for a pup if she is known to be in the area.
  - Pups may be truly orphaned or temporarily separated
  - Dehydrated, hypothermic or debilitated pups need rehabilitation
- Newborn – 2 weeks: dark brown-grey fur, eyes closed, able to chirp
  - ~110-650 grams
- 3 Weeks: growling, tooth eruption
  - ~550-900 grams
- 4 Weeks: increased activity, muzzle hairs lighten, no whiskers
  - ~700-1200 grams
- 5 Weeks: crawling on belly, eyes open, bluish-gray in color
  - ~1000-1500 grams
- 6 weeks: eyes can focus, holds head up when walking
  - ~1200-1400 grams
- 7 - 8 weeks: active and playful, eliminating on own, learning to swim
  - ~1150–1900 grams, will start eating canned foods and fish
- 9 -10 weeks: confident swimming
  - ~1900–2400 grams, can be moved outside

Handling:
- Even very young otters may attempt to bite (5 – 6 weeks old)
  - Use leather gloves and a towel for handling and restraint
- Young otters can be “scruffed” by restraining head around back of neck
- Use carriers to transport otters for weights or physical exams

Housing:
- If eyes closed, keep in a small cage with a heating pad and heated rice sock.
- If eyes open, place in large or walk-in cage with crate for a den, towels for nesting material and foliage for enrichment.
  - A heat lamp and space heater should be used to keep ambient temp above 75°F, and no wires/cords should be within reach of an otter with eyes open.
● Supervised tub times 2-3 times/day can start at 7-8 weeks
  ● At ~8 weeks a water bowl can be introduced; a second water bowl is placed in the corner of the cage as a latrine.
  ● Neutral colored rubber toys, foliage and fish pieces can be offered in the tub
  ● Clean towels must be provided in cage after swims to allow otter to dry coat

Feeding Guidelines:
● Stimulate neonates (< 7 weeks old) to urinate/defecate prior to each feed
● Otters should not go more than 6 – 8 hours between feeds if not weaned
  ● Feed neonates commercial milk replacer (approximately 30% protein and 50% fat) at 30-40% BW per day
    ● Stomach capacity is 50 ml/kg
    ● Formula should be made a minimum of 4-8 hours prior to feeding, or the previous night
    ● Divide amount of formula to be given in a day by 50 to determine number of feeds
  ● Warm formula in water bath to ~100˚F prior to feeding
    ● Check temperature of formula prior to feeding by touch to skin
  ● Formula needs to be discarded 24 hours after reconstitution
● Feeding Schedule (formula):
  ● 0-2 weeks: feed every 2 -3 hours (including overnight)
  ● 3-4 weeks: feed 5-6 times per day, every 3 hours (no overnight feeds)
  ● 5-6 weeks: feed 5 times per day, every 3-4 hours
  ● 7-8 weeks: feed 4-5 times per day, every 4 hours (introduce fish)
  ● 9-10 weeks: feed 4 times per day (decreasing formula with weaning)
● A gradual change from mother’s milk to formula is necessary:
  ● Feeds 1 & 2 at 25% milk/75% water
  ● Feeds 3 & 4 at 50% milk/50% water
  ● Feeds 5 & 6 at 75% milk/25% water
  ● At feed 7 can be placed on 100% formula
● Nipple feed with a syringe (< 4 weeks) or bottle feed
  ● Human baby bottles with preemie nipples can be used for otters > 4 weeks
  ● Can help adjust otter to bottle by covering the pup’s eyes and hold the mouth closed over nipple to prevent chewing
  ● Squeeze a small amount of formula into mouth to acclimate to taste
● Disinfect Syringes After Each Feeding
  ● Wash feeding syringes, bottles and nipples in warm soapy water and rinse thoroughly (push water through nipples with syringe)
    ● Take apart syringes and bottles and leave to dry on towel
    ● Disinfect in chlorohexidine for 10 minutes and then rinse well (flush with water)
  ● Pups > 6 weeks can be offered milk in a stainless steel or ceramic bowl
  ● Monitor for diarrhea and bloating at each feed, and inform the vets if seen

Weaning:
● Once eyes are fully open at 7 weeks, the weaning diet should be offered. Formula feedings should NOT be skipped.
until consistently eating weaning diet.

- Chopped smelt, kitten chow soaked in formula first introduced
  - One new item should only be introduced every few days
- Crickets, mealworms, super worms can be offered in a bowl or during tub time
- Chopped mice and chicks and a variety of fish, crabs can also be added
- Complete weaning occurs after 16 weeks
  - 90% of post-weaning diet should be whole fish and kitten chow
  - Mice, chicks, worms, crickets, crabs, and shrimp should comprise ~10%
  - Wild otters eat 15 – 20% of their body weight per day
  - Captive otters need to be fed 3-4 times per day due to their high metabolism.

**Common Problems**

I. Pneumonia – bacterial, viral, verminous. TPR should be taken daily and any oculonasal discharge, dyspnea, or tachypnea should be immediately worked up completely.

II. Diarrhea

Differentials include

- **Metabolic**
  - Run a full biochemical profile to rule out organopathies, electrolyte imbalances, etc.
- **Nutritional**
  - Dietary change at admission or during rehab
  - Overfeeding or feeding the wrong things
- **Iatrogenic**
  - Stress from vet, medications
  - Poor husbandry or unsanitary conditions or feeding position
- **Infectious**
  - bacterial, viral, parasitic (see endoparasite section)
    - Clostridial diarrhea (do fecal gram’s stain)
  - Antibiotic use as in SA (often metronidazole)
- **Idiopathic**
  - If possible, find underlying problem & treat
  - Antidiarrheal drugs like loperamide HCl last resort (0.1-0.2 mg/kg PO q8h)

Normal stool for a river otter pup on milk replacement diet and no solid foods

Loose, abnormal stool for a river otter pup on milk replacement diet and no solid foods
Endoparasites
LOCAs may have a variety of parasites that can have an impact on health, especially in a rehabilitation setting. *Dirofilaria lutrae* and *Dirofilaria immitis* have been reported in NA river otters with the former species considered otter-specific. In-house ELISA tests for heartworm disease may be positive with both infections because female antigens are conserved. Confirmation of a positive result, either by an echocardiogram or examination of blood for microfilaria, is needed. Adult *Di. lutrae* worms are found subcutaneously and the microfilaria in the blood are much larger than those of *D. immitis*. The subcutaneous abscesses that can develop due to *Di. lutrae*, may be lanced and the worm gently removed. The wound should be flushed, and the animal treated with doxycycline and ivermectin. Otters in an outdoor rehabilitative setting should ideally be placed on monthly heartworm preventative. Another differential for worms found subcutaneously in NA otters is *Dracunculus lutrae* (or Guinea worm). When these worms or nodules are lanced, larvae with long taping tails will be detected vs. the microfilaria that would be present with *D. lutrae* infections. Also, no *Dr. lutrae* larvae enter circulation. Local hair loss and skin damage due to self-inflicted trauma (scratching) may occur with *Dr. lutrae*. There is no treatment other than physical removal and because *Dracunculus* have no evidence of *Wolbachia* endosymbionts, treatment with doxycycline would probably not be indicated. Animals with evidence of pneumonia should be checked for an eosinophilia on CBC. If present, this may indicate a high probability for *Crenosoma goblei* (lungworm). Although *C. goblei* larvae may be found on a fecal exam, bronchoscopy or bronchoalveolar lavage may be more sensitive. In our hands, treatment with fenbendazole (50 mg/kg PO q24h x3d) appeared to be more effective than ivermectin (0.3 mg/kg PO) in treating several individuals.

Preventative Medicine
- Heartworm Dz selamectin 6 mg/kg monthly topically and drydock overnight or Heartgard plus® chewables (hide in fish); start prevention right before going outside or at 8 weeks of age
- Routine fecal exams
- Pyrantel pamoate 5 mg/kg q 7-10 d PRN
- Vaccination
- Merial® CD3 & Imrab® 3
- Prevent tail sucking with enrichment; orange oil; conspecifics

Anesthetic protocol
- For adult otters, use a combination of:
  - dexamethomidine (0.03 mg/kg), midazolam (0.15 mg/kg), and butorphanol (0.2 mg/kg)
- Mix in a single syringe; give IM after net restraint
- Recumbency ~5m
- Reverse with atipamezole (0.2 mg/kg), flumazenil (0.05 mg/kg) and naloxone (0.1 mg/kg) or naltrexone (0.6 mg/kg) IM
- At risk for exertional rhabdomyolysis, hyperthermia, and apnea

Enrichment
Enrichment is loosely defined as a dynamic process for enhancing an animal environment within the context of the animals’ behavioral biology and natural history. Ideally, otter patients should be given the most natural habitats that the facility can offer; including pools or water bowls large enough to permit bathing, and items for hiding, climbing, and digging as appropriate. Enrichment is designed specifically for otters to encourage physical and mental
activity based on their natural behaviors. It should also be age/development stage and medically appropriate. Generally, our otters receive new enrichment items every day.

**Benefits of Enrichment**

There are a number of reasons why enrichment is both a moral and medical imperative. For young, wild orphans raised in captivity it can encourage the development of naturally occurring behaviors, which may increase the animal’s survival probability upon release. Additionally, enrichment may provide increased opportunities for exercise, which may help make the animal more physically fit for life in the wild. It also enhances mental development and contributes to the reduction or prevention of stereotypical behaviors; defined as repetitive patterns with no goal or objective. Examples of this seen frequently in caged wildlife include negative activities such as pacing, circling, over grooming, chewing or licking cage wire, and aggression towards oneself or others. A common example of behavioral abnormalities in orphaned wildlife is inappropriate suckling or nursing. But this problem can often be ameliorated by effective enrichment, especially if employed early in the development of the behavior.

Further, enrichment may help to decrease the stress of captivity. Stress can have significant impact on health, including causing blood pressure changes, tachycardia, dysrhythmias, altered endocrine function and an increase in endogenous corticosteroids, which may lead to hyperglycemia, weakened immunity, and delayed wound healing. Hide boxes appear to be a crucial item for ameliorating stress. When possible, social species like otters should always be housed together even if this means transferring to another facility.

**References**

