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Ferret care and husbandry

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The ferret (*Mustela putorius furo*) is a member of the order Carnivora and the family Mustelidae. It is thought that ferrets have been living in association with humans for over 2000 years [1,2]. Ferrets are lively and engaging, and continue to gain in popularity as pets; it is estimated that there are 8 million ferrets kept as pets, making them the third most popular pet in the United States [3,4]. Despite this popularity, most states do not recognize the ferret as a domestic animal; in several locations ferrets cannot legally be kept as a pet. In some states, permits must be issued by the appropriate state or federal wildlife/fisheries department prior to acquisition of a pet ferret (Table 1) [1,3].

Husbandry

In the United States, ferrets are kept primarily as indoor pets, while in Europe they are often maintained outdoors. Indoor ferrets may be housed in cages or “ferret-proofed” rooms. Minimum cage size should be $9.5 \times 9.5 \times 7$ -cm high, and should be large enough to provide an area to sleep, eat, exercise, and have a litter box. Aquariums are not suitable for ferrets because they do not allow for adequate ventilation [1]. Ferrets should be allowed to be loose in the home only under supervision. Ferrets are capable of squeezing into very small spaces, into furniture, appliances, and ventilation systems. They also like to chew, and sometimes swallow, rubbery items, pencil erasers, furniture and mattress stuffing, stereo speakers and headphone materials, and pipe insulation [5,6]. Owners must “ferret-proof” the house before allowing their ferrets to run loose.

Ferrets have a tendency to urinate and defecate in corners, and can be litter trained. Owners may need to place litter boxes in multiple corners to

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Table 1
Ferret facts

Male	Hobb
Female	Jill
Young	Kits
Body weight:	
Neutered male	800–1400 g
Neutered female	500–900 g
Temperature	37.8–40°C (100–103 F)
Pulse	170–280 beats/min
Respirations	25–40/min
Life span	5–7 years average (up to 8–11 years)
Puberty	4–8 months
Estrous cycle	Seasonal
	Induced ovulator
Gestation	41–42 days
Litter size	1–18 (ave 8)
Weaning age	6–8 weeks

[1,4].

ensure compliance. Recycled paper litters or processed natural fiber litters are recommended for use in the litter box. Clay cat litters are not recommended because as the ferret digs and burrows into the material, it may dry the coat and cake in the nostrils. Some ferrets may ingest this material and become obstructed. The litter box should be cleaned daily.

Ferrets like to burrow and hide, and should be provided with sleep sacks, sleep tents, towels, or old shirts. If the ferret wants to chew or ingest these items, PVC tubing, dryer vent hoses, or cardboard boxes may be used instead. Ferret toys should be composed of hard plastic material that cannot be chewed up and swallowed. Some ferrets may safely play with cloth toys, but the owner must be very observant for any evidence that the ferret may be trying to chew off pieces and ingest them.

Outdoor ferrets must be protected from extremes of heat and cold. Ferrets do not tolerate temperatures over 32°C (80°F), and can suffer from heatstroke [1]. In winter, shelter with bedding should be available. Supplemental heat should be provided when the temperature drops below 6°C (40°F).

Grooming

Ferrets have a natural musky odor, which is stronger in the intact ferret than the neutered ferret. Regular bathing is not recommended; at most, bathe a ferret once a month with a mild shampoo labeled for kittens or ferrets. Nails may be trimmed using human nail trimmers. Styptic powder should be applied if a nail is trimmed too short. Distracting the ferret with a treat can be helpful when trimming nails. Feline hairball laxatives (1 to

2 mL or 0.25 inches) can be given two to three times weekly as a gastric hairball preventative.

Nutrition

The ferret is an obligate carnivore with a short intestinal tract, no cecum or ileocolic valve, and a short colon. The gastrointestinal (GI) transit time is rapid (3 to 4 hours), so food must be easily digestible. Although the exact nutritional requirements of the ferret have not been established, most premium cat foods and ferret diets appear to be adequate for ferrets. Dry foods may be offered ad libitum. It is generally accepted that adult neutered ferrets require 30% to 40% protein, 18% to 20% fat, and 2% fiber in the diet [1,6,7]. Breeding animals and kits require diets higher in protein and fat [1]. Carbohydrates are not required in significant amounts and should be limited [6]. High fiber diets should not be fed to ferrets because they increase stool volume, and can induce a relative protein:calorie deficiency [6,8].

Ferret owners should be encouraged to read diet labels to ensure that the diet they are feeding contains appropriate levels and sources of protein and fat. The first three ingredients in a ferret diet should be meat, poultry, meat and poultry meals, and other animal-based proteins and fat [7,8]. Canine diets should never be fed to ferrets because the protein, fat, and carbohydrate content is not appropriate, and the diets often contain a high percentage of grain and vegetable matter [1].

An emerging question and controversy among many exotic animal practitioners is the long-term effect of formulated dry and canned diets on the overall health of ferrets, and the potential association of these diets with the development of disease. Some practitioners feel strongly that feeding commercial diets containing poor quality meat proteins or large quantities of plant-based ingredients contributes to the development of eosinophilic gastroenteritis, inflammatory bowel disease, insulinoma, urolithiasis, and general unthriftiness [6,7]. For example, in the United States where most ferrets are fed dry kibble diets, the incidence of insulinoma is high. In Europe and Australia, many ferrets are fed whole prey items (ie, a “natural” diet), and the incidence of insulinoma is low. A correlation between diet and the development of certain diseases in ferrets is hypothetical at this point in time, and while the authors do not necessarily advocate abandoning the feeding of premium quality cat foods or ferret foods to ferrets, this controversy demonstrates the need for long-term dietary studies in ferrets. In the future, we may find that the current commercially prepared diets containing cereal and plant-based materials are ultimately not appropriate for the ferret.

Water should be available at all times, and may be offered in heavy ceramic crocks or hanging sipper bottles. Treats and supplements should not exceed more than 1 teaspoonful per day, and should be composed of items

appropriate for an obligate carnivore [6,9]. An occasional raisin or vegetable will not harm ferrets; however, owners should be encouraged to offer a more acceptable snack such as a teaspoon of meat baby food. Vitamin supplementation is not necessary if the ferret is on an appropriate diet.

Supplemental feeding is important in the management of critically ill or anorectic ferrets and in prevention of hypoglycemic episodes associated with insulinoma. As a general rule, most ferrets should be fed as much food as they will take comfortably (usually 12 to 25 mL) two to four times daily. Ferrets may be force fed meat-based baby foods, or meat-based critical care diets marketed for cats (Prescription Diet A/D, Hills Pet Products, Topeka, Kansas). When using a prescription diet, the required daily volume of food may be calculated using the guidelines available for cats. Kitten milk replacers can be used to supplement-feed kits when necessary [10].

Home-made critical care diets can be fed to sick ferrets—these consist of the ferret's normal dry diet ground to powder and mixed with enough water to make gruel. Premium quality canned cat food, meat baby food, and a high-calorie supplement (Deliver 2.0, Mead Johnson Nutritionals, Evansville, Indiana, or Nutri-Cal, Evsco Pharmaceuticals, Buena, New Jersey) are added until the mixture has a batter like consistency [7].

Instructions when making an appointment

Ferrets require annual exams, and often require annual vaccinations. Aging ferrets that are 3 years or older require biannual exams and diagnostics. When scheduling an appointment make note of ferret's age, and if the animal has been spayed or neutered. Remind the owner of the healthy older ferret that routine blood work and radiographs may be recommended by the veterinarian at the time of the exam.

Ferrets should be fasted for 4 hours prior to all appointments, including routine vaccine appointments. Instruct owners to bring in a fecal sample. The feces should be less than 24 hours old and kept in a sealed container. Ask the owner about any current concerns that they have, and request that the owner bring any previous veterinary medical records, radiographs, any current medications, and a sample of the current diet.

Medical conditions that require immediate attention without fasting include: recent trauma, fractures, severe diarrhea, vomiting, seizures, syncope, unconsciousness, inability to urinate, dyspnea, sudden hind limb weakness, and ingestion of a toxic substance. If a ferret is seizing, instruct the owners to place a small amount of a high-sugar syrup or honey onto the gums of the ferret prior to transport.

Ferrets should be transported to and confined in the clinic waiting area in a hard plastic carrier. The carrier should be partly covered with a towel to minimize stress. Instruct clients to provide the ferret with a towel, sleep sack, or fleece hammock/tent, so that the ferret can burrow and hide.

Recognizing illness commonly seen in ferrets

Ferret disease processes differ from dogs and cats, and it is important to identify diseases most noted in ferrets, to enable both veterinarians and staff to treat accordingly.

Pain

Ferrets express pain associated with disease, and their manifestations vary from cats and dogs. Ferrets with pain show bruxism, with or without salivation (especially with gastrointestinal ulcers or foreign body/trichbezoar). Other signs of gastrointestinal pain or nausea may include: abdominal tensing during exam palpation, retching, or salivation.

Ferrets with generalized or severe pain may have a bushed tail (the pilo-erection makes the tail look like a bottlebrush), have dull mentation, may crouch in a sternal position with an arched back, and do not play (Fig. 1). They may also lie in lateral recumbancy with the head tucked. Ferrets may exhibit a change in personality, such as severe aggression, and show atypical attempts to bite a handler—this needs to be differentiated from the mild aggression of adrenal disease. Dental pain may include dysphagia or drooling. Facial or ear pain may be expressed by head shaking or ear/face scratching.

Treatment of pain includes: identification and treatment of the underlying cause of pain, administration of an appropriate oral or injectable non-steroidal antiinflammatory, or administration of an opioid-analog analgesic such as buprenorphine HCl (Buprenex) or butorphanol tartrate (Torbutrol, or Torbugesic) [10]. Caution: ferrets treated with butorphanol often exhibit



Fig. 1. Bushed tail.

a heavy stupor for 4 to 6 hours postmedication in the authors' experience. Painful animals should be housed in quiet surroundings, and should be provided with a hiding place such as a sleep sack, towels, and an appropriate litter pan.

Vaccination reactions

Ferrets are more likely to have anaphylactic vaccine reactions to either rabies or distemper vaccines than canids or felids. Owners should be asked to remain at the clinic for 30 minutes postvaccination to observe for signs of possible reaction. Clinical signs of a vaccine reaction include: diarrhea that is sometimes bloody, hematuria, dyspnea, vomiting, and fever. The veterinarian should treat the ferret with diphenhydramine HCl (Benadryl) 2 mg/ml intravenously (i.v.) or intramuscularly (i.m.), and dexamethasone 1 mg/kg, i.m. When severe reactions occur, epinephrine can be administered 20 µg/kg i.v., i.m., subcutaneously (s.c.), and supportive care initiated immediately as for dogs and cats [11]. The veterinarian can discuss reactions, risks, and modification or cessation of vaccine protocols with the client, if indicated.

Hair loss

Ferrets may exhibit seasonal hair loss during normal shedding cycles, usually in the Fall and Spring. This coat change is more noticeable in intact ferrets [6,12]. Ferrets will have a shorter darker coat in summer and a longer lighter colored coat in winter [6]. As ferrets age, alopecia is likely to become more prominent. Waxing and waning alopecia with or without pruritis may be an indicator of future adrenal disease, which appears to be more prevalent in North American ferrets [13,14]. Alopecia may occur symmetrically over the tail, may involve only the tail tip, and may also include hind quarters, shoulders, ventrum, or head [14]. Focal hair loss may also be caused by neoplasia (especially mast cell tumors), external parasites, contact dermatitis, or trauma [15]. When clipping an animal for procedures, clients should be told that depending on hair coat cycle, there may not be hair regrowth for weeks to months [6].

Hind limb weakness

Hind limb weakness is a common nonspecific presentation in ferrets. This may indicate generalized weakness due to underlying disease such as insulinoma, trichobezars, Gastrointestinal (GI) foreign body, neoplasia, cardiac disease, or sepsis. Primary spinal lesions or myelopathies are not common in ferrets [16].

Respiratory distress

Ferrets are nasal breathers; therefore, open-mouthed breathing is abnormal [6,10]. Ferrets in respiratory distress will stand with lowered head and neck, and will breathe with increased rate, often with abdominal effort. If the ferret cannot stand, it may lie in sternal or lateral recumbency with the forelimbs extended or at the sides. Mucous membranes may be cyanotic. Causes of respiratory distress include: upper or lower respiratory infections, influenza, or, toxicity, congestive heart failure, pulmonary edema, pulmonary effusion, neoplasia (ie, lymphoma), trauma, metabolic disease, or airway obstruction.

Zoonotic diseases

The only documented zoonotic diseases of the ferret are influenza A and B, (orthomyxoviruses); however, human-to-ferret transmission is more common than ferret-to-human transmission [11,17]. Ferrets may exhibit high fever that may undulate, heavy bouts of productive sneezing, lethargy, and inappetance. Young or immunocompromized ferrets are at risk for secondary sequellae such as pneumonia. Antipyretics are not indicated [17].

Potential bacterial zoonotic diseases such as leptospirosis, listeriosis, salmonellosis, campylobacteriosis, and tuberculosis may occur in the ferret, but transmission to humans has not been documented. Ferrets are susceptible to rabies; however, there has never been a report of rabies transmission to humans from ferrets. Little is known about natural rabies infection in this species. Ferrets are susceptible to dermatophytosis (*Micropsorium canis* and *Trichophyton gypseum*), which can be transmitted to humans [18]. Respiratory or systemic fungal infections are rare in ferrets and diagnosed postmortem [18]. Potential zoonotic parasitic diseases of ferrets may include scabies (*Sarcoptes scabiei*), giardiasis (*Giardia* sp), toxoplasmosis (*Toxoplasma gondii*), and coccidiosis (*Eimeria* sp) [13].

Anorexia

Anorexia is a general clinical sign for many diseases, and may be associated with GI foreign body, GI obstruction, food changes, infection, hepatic disease, renal disease, heart disease, neoplasia, and endocrine disease (insulinoma especially). Ferrets that are nauseous will exhibit bruxism, salivation, squinting, and head shaking when food is presented.

Stranguria/straining to defecate

Owners may notice a ferret elevating it's tail, crouching, straining, and not passing urine and/or stool. The owner may be concerned about constipation, which does need to be ruled out, but constipation or colitis

occurs less frequently than urinary tract disease. Stranguria or pollakiuria is often caused by urinary tract infections, urolithiasis, neoplasia, urethral strictures, or obstruction secondary to adrenal disease due to an enlarged prostate [19–21].

Vomiting

Gastric foreign body, trichobezoars, and gastrointestinal ulceration are all common gastrointestinal causes of vomiting. Less common causes include gastric neoplasia, parasitism, and megaesophagus. Nongastrointestinal causes of vomiting include: hypoglycemia, allergic reaction, renal disease, toxicity, neoplasia, trauma, or Aleutian Disease Virus [10].

Gastrointestinal foreign bodies are prevalent in ferrets under 2 years of age, whereas older ferrets are more prone to trichobezoars [22]. Either condition may or may not present with vomiting. Weight loss and occasional diarrhea may be the only presenting signs and signs may only be intermittent [5,22].

Diarrhea

Gastrointestinal causes of diarrhea in ferrets commonly include: *Helicobacter mustelae* gastritis, eosinophilic gastroenteritis, lymphoma, epizootic catarrhal enteritis, and proliferative bowel disease [23]. Nongastrointestinal causes of diarrhea include: insulinoma, allergic reaction, toxicity, hepatic disease, neoplasia, trauma, or Aleutian Disease virus [10].

Ferrets may present with melena. Causes of melena include: nonsteroidal antiinflammatory toxicity (especially ibuprofen), gastric or duodenal ulcers secondary to foreign body, or *H mustelidae*, inflammatory bowel disease, and corticosteroids [10,24,25]. *H mustelae* infection has also been associated with gastric adenocarcinoma and certain forms of lymphoma [25].

Epizootic Catarrhal Enteritis (ECE or “green slime disease”) is commonly seen in ferrets, and is thought to be caused by a rotavirus or coronavirus [12,26]. The clinical signs can include: green watery diarrhea, vomiting, dehydration, weight loss, and death. Green stools are not pathognomic for ECE—they can be caused by bile pigments being more visible in the feces when a ferret is showing decreased food intake [22,27]. Following infection with ECE, damage to the GI tract can lead to chronic malabsorption/maldigestion, and possible predisposition to other diseases. Ferrets can act as asymptomatic carriers for life.

Aleutian disease is an uncommon parvoviral disease originally seen in mink. Symptoms include: progressive weight loss, melena, inappetance, and immune complex-associated signs such as uveitis and elevated gammaglobulin levels [27–29]. There is no effective serodiagnostic test available; the

tests currently in use show many false positives due to crossreactivity of antigens to other parvoviral diseases [29].

Hospitalization and supportive care is indicated for any ferret that is vomiting. Diagnostics such as radiographs, complete blood cell count (CBC), and serum chemistries should be considered.

Radiographs should be taken using inhalant anesthesia to facilitate positioning. A plain film is taken first. If necessary, a large diameter red rubber catheter can be introduced into the mouth and esophagus, and the stomach can be insufflated with 15 mL of room air. A radiograph is taken immediately after insufflation. This procedure aids in identification of foreign material in the stomach, but is not a substitute for a barium study. When indicated, a barium study should also be performed. Gastrotomy is the treatment of choice for trichobezoar or gastric foreign body removal. Biopsy of the gastric mucosa is recommended to rule out underlying gastric disease [22].

Heatstroke

Heatstroke is more prevalent in outdoor ferrets or indoor ferrets with restricted access to water during warm weather. Ferrets have ineffective sweat glands in haired areas; thus, they are more at risk for heatstroke at ambient temperatures over 35°C (85°F) [6,10]. Ferrets will present often recumbent, stuporous, dehydrated, and may be in shock with body temperatures $\geq 40^{\circ}\text{C}$ (104°F). Immediate treatment is imperative.

Splenomegaly

An enlarged spleen (hypersplenism) may be noted on palpation in clinically normal ferrets, and rarely represents primary splenic disease [30,31]. Pathologic enlargement of the spleen may indicate primary neoplasia, metastatic neoplasias (lymphoma, insulinoma, or other neoplasias), or a hematoma [30]. Seventy-five percent of ferrets with lymphoma may exhibit splenomegaly, but many ferrets with enlarged spleens may not have lymphoma [31,32]. Splenomegalic ferrets may have abnormal blood hemodynamics, and can show evidence of thrombi [10]. Splenectomy is performed if there is diagnosed neoplasia, if the enlargement causes discomfort, or if trauma to the spleen is evident [30,31].

Neoplasia

Ferrets in the United States are plagued by many neoplastic conditions, most commonly insulinoma, lymphoma, and adrenal neoplasia. These diseases often present concurrently and often with other disease processes, such as cardiomyopathy [14,33].

Insulinoma

Insulinomas are neoplasms involving the beta cells of the pancreas. Insulinomas secrete excess insulin, resulting in hypoglycemia. Insulinoma is commonly diagnosed in ferrets 4 to 5 years of age, but can occur between 2 to 8 years of age. Affected ferrets exhibit intermittent or variable signs related to effects of hypoglycemia on the central nervous system [14]. Ferrets may present with chronic signs, such as weight loss, hind limb weakness, increased daytime sleeping, and decreased appetite. Ferrets may also present with sudden collapse, lethargy, a “glazed” expression, or salivation. Episodes may last minutes to hours [12,33]. Severe signs include tachycardia, tremoring, hypothermia, and subsequent cerebral hypoxia that can lead to death. A presumptive diagnosis of insulinoma is made when repeated fasting blood glucose levels are below 70 mg/dL [14]. Other less common causes of hypoglycemia in ferrets include starvation, sepsis, and hepatic disease [14,33].

Ferrets that present in an acute hypoglycemic crisis should have a blood sample drawn for blood glucose analysis. Once the sample is taken, give a sugar-rich source orally, such as 50% dextrose or Nutrical (Evesco Pharmaceuticals, Buena, New Jersey) followed by a high protein meal. An unconscious hypoglycemic ferret requires 50% dextrose given by slow i.v. bolus to correct clinical signs—not the hypoglycemia—and appropriate supportive care [14,33]. Medical or surgical therapies are addressed by the veterinarian.

Lymphoma

Lymphoma is not uncommon in ferrets. Multicentric lymphoma affecting lymphnodes and organs is the most common form; however, gastrointestinal, cutaneous, and orbital forms are reported as well. Splenomegaly may or may not be present [31,32].

Ferrets less than 1 year old may exhibit weakness, weight loss, inappetance, and lymphadenopathy. Ferrets 1 to 3 years of age commonly develop mediastinal or multicentric lymphoma, and present with the above signs, or may have muscle wasting, occasional vomiting, and respiratory difficulty [31]. Ferrets greater than 3 years of age are often asymptomatic, or may show signs of chronic illness [31,32]. The course of this disease may wax and wane, with or without treatment for up to 6 months before the animal becomes ill again [21,31,34]. Diagnostics may include: CBC, whole body radiographs, a serum chemistry panel, lymph node biopsy, and bone marrow cytology [31,32].

Adrenal disease (adrenal hyperplasia|adenoma|adenocarcinoma)

Adrenal disease is a common disease in the United States [14,33]. Ferrets have a complex neuroendocrine system. Pet ferrets are usually neutered

early, and are also removed from a seasonal day:night cycle because they are kept indoors. Current hypotheses suggest that the adrenal cortex begins secretion of sex hormones in place of the “missing” gonadal tissue. The artificial light cycles cause continued overstimulation of the hypothalamic–pituitary–adrenal neuroendocrine axis, resulting in production of androgens by the adrenal gland. These factors combined may give rise to what is labeled as adrenal disease in ferrets (hyperplasia of the adrenal glands, adrenal adenomas, and/or adrenal adenocarcinomas) [14,35].

Affected ferrets will present with varying levels of hairloss, often beginning at the tail. The hair loss may wax and wane over a few years until regrowth stops [14,33]. Spayed female ferrets may develop an enlarged vulva, and vulvovaginitis. Males may develop prostatic cysts secondary to adrenal disease, and may demonstrate stranguria or urinary tract obstruction [13,14]. Pruritis, or anemia secondary to bone-marrow suppression by excess secretion of estrogen, may occur. Diagnostics include adrenal hormone assays, CBC, serum chemistry panel, and radiographs to evaluate for concurrent disease [14,34]. Treatment options for adrenal disease include medical management or surgery.

Cardiac disease

Dilated cardiomyopathy is the most commonly seen cardiac disease in middle-aged or older ferrets [28,36]. Hypertrophic cardiomyopathy, heartworm disease, valvular heart disease, myocarditis, metastatic neoplasia, and congenital heart disease have all been documented as well [28]. Hypertrophic cardiomyopathy does not appear to be associated with hyperthyroidism in the ferret [36].

Ferrets may present with weight loss, lethargy, and hind limb weakness [28,36]. An elevated heart rate, muffled heart sounds, cyanosis, harsh or dull lung sounds, tachypnea, dyspnea, prolonged capillary refill time, jugular venous distention, a weak femoral pulse, or femoral pulse deficits may be noted [10,28,36]. Splenomegaly, hepatomegaly, and/or abdominal enlargement due to ascites may be apparent on examination if congestive heart failure is present [28,36]. Coughing and/or vomiting is not common in the ferret [36]. Ferrets with dilated cardiomyopathy may present with a holosystolic murmur, tachycardia, and/or a gallop rhythm. Appropriate diagnostics include a CBC, serum chemistry panel, radiographs, electrocardiogram, and cardiac echocardiogram [28,36].

Internal parasites

Gastrointestinal parasitism is uncommon in the ferret, but may occur. Occasionally, ferrets may become secondarily infected with nematodes

(*Toxascaris leonine*), *Giardia* sp, or coccidia from other pets in the household, or tapeworms (*Diplydium caninum*) transmitted by fleas from other pets [1,22,37]. A fecal sample may be submitted for a direct smear and fecal floatation when kits are first presented to the veterinarian. Annual fecal examinations may not be necessary for adult ferrets kept indoors unless the ferrets are exposed to cats and dogs that venture outside.

Ferrets are susceptible to heartworms (*Dirofilaria immitis*), and often present with symptoms of congestive heart failure or respiratory distress. In endemic areas, ferrets should be placed on heartworm preventative at 12 to 16 weeks of age, and ferrets 6 months of age or older and not currently on preventative should be heartworm tested prior to starting preventative therapy. Monthly ivermectin is most commonly used, and year-round therapy may be indicated for endemic areas [10,28]. It has been recommended that ferrets be heartworm tested prior to starting heartworm preventative; however, there is currently no accurate heartworm test available for the ferret. The occult tests are often not accurate because ferrets usually only have a burden of one to three adult worms [13,17,28]. The direct test (Knotts test) may be performed; however, microfilaremia occurs in less than 2% of infected ferrets [28,36]. Thoracic radiology, and echocardiography have both been useful in the diagnosis of heartworm disease. Treatment of heartworm disease is difficult because most ferrets present to the veterinarian in advanced stages of cardiorespiratory disease at the time of diagnosis [28,36].

External parasites

Ferrets are susceptible to canine and feline ear mites (*Otodectes cynotis*). Affected animals are often asymptomatic, and may only present with thick, brown debris in both ears. Diagnosis is based on identification of the mites with light microscopy and treatment is with intraaural ivermectin (Ivomec) [13].

Fleas (*Ctenocephalides* sp.) parasitize ferrets, and kits, and geriatric ferrets with severe infestations may develop anemia. Most flea products approved for use in cats may be safely used on ferrets; however, it is prudent to check with the manufacturer of the product first before recommending these products to clients. Anecdotally selamectin (Revolution) has been used to treat and prevent fleas and ticks in the ferret. Fipronil (Frontline Top Spot) and imidaclopramid (Advantage) have been used anecdotally with success topically once every 60 days; sebum production is higher in ferrets than in cats and dogs, allowing for a longer interval between dosing [10,13]. Lufenuron (Program), has also been anecdotally used in the ferret [10,15]. Topical flea foams with carbamates and organophosphate derivatives should be used with caution. Rarely, infestations with *Demodex* sp or *S. scabei* are noted in ferrets [13,15].

Restraint

In general, pet ferrets are docile and easy to restrain and examine without assistance. Adult ferrets rarely bite, while kits are playful and may try to nip. Tractable ferrets can be lightly restrained on the examination table by placing one hand under the chest and lifting slightly. More energetic ferrets may need to be restrained by scruffing. When scruffing a ferret, use one hand to grasp as much skin as possible over the back of the neck and lift the ferret up, suspending all four legs off the table. Most will promptly relax and offer little resistance. The spine can be supported with the other hand, or the ferret may be reclined against the forearm of the arm the handler is using to scruff the ferret (Fig. 2). The rear legs should not be placed on the table top or held; this gives the ferret leverage, and it may struggle. This method of restraint is useful for many procedures including: oral medication administration, vaccination, injections, and subcutaneous fluid administration. Many ferrets yawn when scruffed, which aids in examination of the oral cavity.

Most ferrets strongly object to having their temperature taken with a rectal thermometer. Two people are often required when this procedure is performed. One person can scruff the ferret and support the body, while the other person takes the temperature and restrains the hind quarters. The



Fig. 2. Restraint of the ferret by scruffing.

ferret can also be scruffed and placed in dorsal recumbancy by one handler, while the second handler takes the temperature and restrains the hind legs (Fig. 3).

Ferrets that are too difficult to handle may need to be anesthetized when procedures are to be performed. Inhalant anesthesia may be administered via an anesthetic face mask.

Blood collection

The blood volume of the ferret is approximately 5% to 6% of the total body weight. Ten percent of the calculated blood volume may be safely collected at any one time [1]. Several venipuncture sites are available; the site chosen depends on the skill of the phlebotomist, and on the volume of blood required for diagnostic testing, because the volume of blood that may be collected can vary from site to site.

When large volumes of blood need to be collected the preferred venipuncture sites are the jugular vein and the anterior vena cava. The cephalic vein, lateral saphenous vein, and tail artery may be used when smaller volumes of blood are needed. Clipping a toenail to collect a blood sample should not be performed because it is painful and will not yield a viable laboratory sample [1].

Most ferrets can be manually restrained for blood collection. Ferrets that cannot be effectively immobilized with simple restraint should be anesthetized for sample collection. It is important to note that anesthesia may alter the blood values (especially the CBC) [13]. When anesthesia is used,



Fig. 3. Restraint for taking the temperature.

a notation should be made on the laboratory requisition form and in the patient chart so future blood sample results can be properly compared.

Several methods are described to restrain the unanesthetized ferret for jugular venipuncture. The ferret may be restrained like a cat by holding the forelegs extended over the edge of a table with the neck extending up, or the ferret can be placed in dorsal recumbancy and restrained using the same techniques described for the anterior vena cava (see below). Last, the ferret can be wrapped in a towel with the front legs drawn back along the thorax, leaving only the head and neck extending from the towel. The ferret is scruffed and placed in dorsal recumbancy [38] (Fig. 4). Shaving the neck and applying pressure at the thoracic inlet will enhance visibility of the vein, which lies more laterally in the neck than in dogs and cats. Blood samples may be collected with a 25-gauge needle on a 1 or 3 mL syringe. Ferrets that struggle or are resistant to restraint should be anesthetized for this procedure.

The anterior vena cava may be used for blood collection. Technicians unfamiliar with ferrets or with minimal experience in phlebotomy should perform this procedure on anesthetized ferrets because it does take practice to do this procedure without risking harm to the ferret. Experienced technicians often perform this technique without anesthesia. At the authors' practice, ferrets are routinely anesthetized with isoflurane for this procedure regardless of the experience of the technician or veterinarian.

Three people are required to collect blood from the anterior vena cava of the unanesthetized ferret. One person restrains the forelegs and head while another restrains the hind legs and body. A third person draws the blood sample by palpating the "notch" where the first rib meets the manubrium and visualizing a line of sight running from the "notch" to the opposite hind leg. A 25-gauge needle attached to a 1 or 3-cc syringe is then inserted into



Fig. 4. Restraint for jugular venipuncture using the towel wrap method.

the thoracic cavity at the notch at a 45° angle and aimed along the sight line toward the opposite rear leg. The needle should be inserted to the hub. Negative pressure is applied to the syringe and the needle is slowly withdrawn until blood begins to fill the syringe (Fig. 5). If the ferret struggles, the syringe should be withdrawn quickly; do not make a second attempt until the ferret is quiet. Any ferret that struggles during restraint should be sedated before attempting blood collection from this site.

The cephalic vein may be used for blood collection. At the authors' practice, this is the preferred site for blood collection for complete blood cell counts and serum chemistry panels unless the animal is scheduled for i.v. catheterization. Up to 1 mL of blood can be collected using a 1-cc syringe with a 25-gauge needle (Fig. 6).

The ferret is restrained for cephalic venipuncture by wrapping it firmly in a towel with the head and one foreleg free. The handler then places one hand around the neck of the ferret and extends the head up. The other hand is placed behind the elbow of the leg to extend the limb. The thumb of that hand is placed over the dorsal surface of the forearm just in front of the elbow to occlude the vein. Do not roll the vein as you would in dogs and cats. The handler's forearms may then be placed on each side of the ferret to support the body and aid in restraint. Most ferrets will struggle briefly, then will become quiet. The cephalic vein is located over the antebrachium, and courses laterally.

The lateral saphenous vein courses diagonally across the lateral surface of the hind leg just proximal to the hock, and may be used for collecting small volumes of blood. Restrain the ferret by scruffing it with one hand and laying it on its side. Place the palm of the other hand over the sacrum and pelvis for support, and use your fingers to hold off the vein above the stifle. Occasionally, a second person is needed to help restrain the ferret's body. A 25-gauge needle mounted on a 1-cc syringe is used for sample collection.

The tail artery may be used for venipuncture when necessary; this site may be more painful for the ferret than other blood collection sites. Placing



Fig. 5. Blood collection from the anterior vena cava.



Fig. 6. Blood collection from the cephalic vein.

the ferret in a heated environment or applying a warm compress to the underside of the tail for several minutes prior to the procedure will help facilitate blood flow at this site. The ferret is either scruffed and restrained on its back or anesthetized and placed in dorsal recumbancy. A 25-gauge needle attached to a 1-mL syringe is inserted into the groove on the ventral midline of the proximal third of the tail at a 45° angle toward the body and advanced until blood begins to fill the syringe. Because this is an artery, direct digital pressure must be applied to the venipuncture site for 2 to 3 minutes after sample collection is complete [12,38].

Radiology

Radiographs are an important diagnostic tool in exotic animal medicine. Whenever possible, ferrets should be anesthetized to ensure that quality radiographs are taken; ferrets are wiggly creatures, and are often difficult to restrain for the length of time needed to acquire good quality films. Small animal technique charts may be modified for use with ferrets; however, a technique chart specific for ferrets should be established whenever possible. Rare-earth film cassettes and high detail radiographic film are also beneficial in producing high-quality, high-detail radiographs. The standard positioning techniques used for dogs and cats may be used for the ferret.

Urine collection/urinalysis

Urine samples may be collected for urinalysis via cystocentesis, free catch after natural voiding or manual expression of the bladder, or urinary

catheterization. The bladder wall in the ferret is very thin, and sedation is often necessary when obtaining a urine sample by cystocentesis to prevent laceration of the bladder [20]. Ferrets are obligate carnivores; therefore, the normal urine pH should be acidic. Reference values for urinalysis are listed in the literature (see Recommended Texts).

Medication administration

Several good exotic animal formularies are available, and should be an essential requirement for any veterinary practice that treats ferrets. These texts provide drug information and doses for ferrets, even though there are currently no approved drugs available for use in ferrets in the United States, and use of all medications are considered off-label [1]. When published drug doses are not available for ferrets, feline drug dose recommendations and protocols may be followed [12]. The routes of medication administration used in dogs and cats (*per os*, s.c., i.m., intraosseously [i.o.], i.v.) are used in ferrets.

Oral medication

Oral medications are generally given in liquid form because pills are very difficult to administer. Oral medications that are only available in pill form may need to be crushed and hidden in a treat or compounded into a liquid suspension to make administration easier for the owner.

Injectable medication

Critically ill ferrets require routes of administration that provide rapid drug delivery. s.c. injections may be given in the loose skin over the shoulders. i.m. injections are typically given in the semimembranosus/semitendinosus muscles of the hind limb or in the epaxial muscles of the back. The volume of the i.m. injection must be limited due to the small muscle mass of the ferret; after several days of therapy it may be necessary to switch to administration of s.c. injections or *per os* medications. i.v. medications are the preferred method of treatment in critically ill ferrets, and must be given via indwelling catheter [1].

Fluids

The daily fluid requirements for ferrets have not been definitively determined; maintenance fluid requirements are typically assumed to be 75 to 100 mL/kg/day. Additional fluids may be added to compensate for dehydration and for ongoing fluid losses. Physiologically balanced solutions

are administered; however, it is important to note that ferret often need dextrose added to fluids because hypoglycemia may be present.

Parenteral fluids may be given s.c., i.v., or i.o.. Mildly dehydrated ferrets (<5%) may be given fluids in two to three boluses administered in the subcutaneous space over the shoulders and back during the course of a 24-hour period. Ferrets may object to s.c. fluid administration. Scruffing the ferret and holding it so that its feet do not touch the table top is sufficient restraint; however, occasionally two people will be needed (Fig. 7).

An i.v. catheter should be placed when ferrets are more than 5% dehydrated. Intravenous fluids may be given by continuous infusion or may be divided into two to three doses given over the course of a day. To prevent overhydration, fluids must be administered with an infusion pump or a flow control regulating device.

Intravenous catheterization

Indwelling i.v. catheters are used routinely in ferrets. Intravenous catheters are typically placed in the cephalic vein; the lateral saphenous vein may be used for catheterization as well, but this site is difficult to maintain (Fig. 8).



Fig. 7. Subcutaneous fluid administration.



Fig. 8. Ferret with a cephalic i.v. catheter.

To place an i.v. catheter, anesthetize the ferret with inhalant anesthesia, unless the ferret is moribund. Place the anesthetized ferret in sternal recumbancy and position as described for cephalic venipuncture. The skin of the ferret is very tough; therefore, perform a modified cutdown with a 20- or 22-gauge needle, taking care to avoid the vein, and introduce a heparinized 24- to 25-gauge catheter into the vein. The catheter may then be threaded off the stylet directly into the vein. When catheterizing small or severely debilitated ferrets, it is sometimes helpful to attach a tuberculin syringe containing heparinized saline to the catheter hub after removing the stylet. Heparinized saline is then flushed through the catheter to dilate the vein as the catheter is advanced. The person holding off the vein must release pressure on the vein as the catheter is advanced if this technique is used. The catheter is taped and wrapped securely to the forearm. Most ferrets do not chew catheters, and will not require Elizabethan collars as long as the catheter is covered and the rubber injection port is not exposed.

Jugular catheters are not frequently used in ferrets unless central venous access is needed for treatment purposes; ferrets often object to the tape around their neck and become depressed [4]. When necessary, i.o. catheters may be placed in the proximal tibia or greater trochanter of the femur.

Hospitalization

Ferrets can be easily accommodated at an existing small animal practice. Most instruments and supplies used to treat dogs and cats can be used to treat ferrets as well. Acquisition of a gram scale, small uncuffed endotracheal tubes (2.0–2.5), ferret urinary catheters, microtainer blood collection tubes, and small-gauge needles (25–27 gauge) are often the only equipment additions necessary.

Ferrets can be hospitalized in standard stainless steel small animal cages; however, ferrets are agile escape artists, and small ferrets may be able to squeeze through the bar spaces. Standard cage doors can be modified with a Plexiglas plate that covers the bottom one-half of the door. Hospital intensive care cages with Plexiglas fronts and circular access ports may be used as well. Cages need to be large enough to accommodate a sleeping area, litter box, and food and water bowls. Ferrets should be provided with towels or sleep sacks to burrow into (Fig. 9).

Ferrets can be finicky eaters, and should be fed their regular diet while hospitalized. If the regular diet is not available, premium quality high-protein cat or kitten food, or a palatable ferret food may be offered.

Preventive care

In addition to appropriate husbandry, ferret owners can maintain quality of life in ferrets with regular physical examinations, vaccinations when appropriate, dental prophylaxis, and treatment of emerging medical or surgical conditions. It is advisable for ferrets new to the household be quarantined a minimum of 2 weeks before exposing them to resident ferrets to avoid transmission of contagious disease [10]. Physical examinations and fecal parasite exams should be performed on ferrets new to the household. Annual exams should be performed on ferrets until 3 years of age, and biannual exams should be performed on ferrets older than 3 years of age. The “geriatric” ferret over 3 years old should have a fasting blood glucose and diagnostics performed as recommended by the veterinarian [10,11].



Fig. 9. Hospital cage setup with sleep sack and litterpan.

Current vaccination recommendations for small animals as cited by the American Veterinary Medical Association are inconclusive, and no official recommendation exists regarding a consensus for small animal vaccination protocols. Annual vaccination frequency is based on an historic basis, and does not appear to be based on scientific information [39]. The decision to vaccinate must be managed for the individual animal based on a valid veterinarian–client–patient relationship.

Distemper is often a fatal infection in ferrets [10,11,27]. Currently, there are two approved preventative vaccines for canine distemper virus (CDV) (PureVax Ferret Distemper, Merial Inc., Athens, Georgia, and Fervac-D, United Vaccines, Madison, Wisconsin). Ferrets should receive a series of CDV vaccinations 2 to 4 weeks apart, starting at 6 to 8 weeks of age, through 16 weeks of age. An older ferret with an unknown vaccination history should receive two CDV vaccinations administered 2 to 4 weeks apart [11].

Vaccination against rabies virus (RV) should be considered due to the zoonotic potential; certain localities specifically mandate annual vaccination of ferrets. The only rabies vaccine approved in the United States for use in ferrets (Imrab 3/Imrab 3 TF, Merial, Inc, Athens, Georgia), is labeled to be given annually, not triannually [40]. The initial rabies vaccine is given at or after 14 to 16 weeks of age [11].

Adverse reactions are more common in ferrets than in cats and dogs. Anaphylactic reactions are more prevalent than delayed-type hypersensitivity reactions. Once a ferret has experienced a vaccination reaction, future reactions are likely. Continued vaccination with pretreatment of diphenhydramine HCl (Benadryl, Parke-Davis, Morris Plains, New Jersey) or cessation of vaccinations is up to the discretion of the veterinarian and client. The ferrets overall health, immune status, the relative risk of exposure, risk of reaction, and local and state laws governing vaccination should all be considered.

Dental care should include daily to tri-weekly toothbrushing with gauze/cloth and an enzyme-based dentifrice for cats. Ferrets will accept brushing with difficulty and resist fingerbrushes.

Anatomy

The ferret has a flexible “otter”-shaped body. In general, male ferrets are larger than females. The natural coat color is called sable. Other common colors include albino, cinnamon, silver, black-eyed white, chocolate, siamese, panda, and shetland sable. Ferrets experience a season weight fluctuation [2]. In the fall, ferrets may gain up to 40% of their body weight, and will then lose that weight the following spring. Ferrets have thick skin that can make venipuncture and giving injections challenging. Dried sebum may be present on the skin, and appears as small red-brown patches [4].

Ferrets do not have well-developed sweat glands, and dissipate body heat by panting. The ferret dental formula is 2 (I3 3 C1 1 P3 3 M2 1) = 34 teeth. The canine teeth are prominent, and the upper canines may extend to ventral border the chin [10,6].

Ferrets have horizontally slit pupils. Ferret vision is less acute than the cat or dog, and albino ferrets will often have poorer vision than other ferrets. Ferrets may see some colors such as red. Cataracts and corneal abrasions are often noted. Retinal degeneration may occur as well [29].

Ferrets have five nonretractable claws on each limb. Occasionally, owners request to have a ferret declawed; however, this procedure should never be performed [2,4]. Ferrets that have been declawed are often not able to walk normally.

The ferret's heart is located more caudally in the thorax than dogs and cats. The approximate landmarks are the sixth and eighth rib. Sinus rhythms are common in ferrets, and may be quite pronounced. The spleen of the ferret varies greatly in size dependent on the animal's health and age. An enlarged spleen is not uncommon in older ferrets, and can be a "normal" finding. Ferrets are induced ovulators. A female that is not bred or spayed may develop life-threatening estrogen-induced anemia [2]. Ferrets have paired anal sacs. Most ferrets purchased from commercial breeding farms and pet stores are already descented and neutered; private breeders often leave these procedures to the new owner. Ferret odor primarily comes from the sebaceous glands in the skin. Intact animals during will have a stronger odor and yellow-tinged oily fur during breeding season [6,10].

History—first/annual visit

A complete history is important to exotic animal practice because many health problems are caused by inappropriate husbandry and nutrition. History questions should include the following list of topics:

1. Source of ferret, age, gender, spay/neuter status, and reproductive status in intact females.
2. Vaccine history and any previous reactions. Animals coming from a large supplier (such as Marshall Farms, North Rose, New York) are routinely given their first distemper vaccination at about 6 to 7 weeks of age [6,10].
3. Type of enclosure, type of cage environment, any cohabitants. Types of toys, bedding, and type of litter substrate. Time spent out of enclosure, and if that time is supervised.
4. Diet history: ask about regularly fed foods, treats, or supplements, and feeding schedule. Ask if there have been food changes, especially recently.
5. Changes in activity levels or hind leg weakness, or a change/absence of play behavior. Other changes in behavior.

6. Changes in eating/drinking habits, changes in urination or defecation habits. Presence of diarrhea, melena, vomiting, salivation? Straining to void?
7. Respiratory difficulties, exercise intolerance, or syncope?
8. Changes in hair coat, skin, or weight noted by client?
9. Any other abnormalities noted or that the client is concerned about?
10. New ferret additions to household. Any signs of disease in the new ferret(s)? Discuss quarantine.
11. Any signs of influenza in the human members of the household?

While taking the history, observe the ferret's mentation and activity level. Ferrets should quickly arouse even if sleeping, and explore their surroundings. Allow ferrets to wander the ferret-proofed exam room. Hind leg weakness, stupor, lethargy, or disinterest in surroundings may indicate an ill animal.

Annually, ask about changes in the household—additions or losses of pets, changes in this animal's health status, any concerns or problems noted by the owner, current diet, medication, and housing.

History—geriatric visit

Ferrets over 3 years of age are considered geriatric, and should be fasted 4 to 6 hours prior to biannual examinations. As ferrets age, they may start to exhibit signs of neoplasia, especially insulinoma, cardiac, or endocrine disease [31]. Quality of life for the aging animal is paramount. Topics that should be discussed in addition to the ones noted above include:

1. Is the ferret sleeping more than normal (for an aging ferret)
2. Recommend avoidance of condo-type cages, and provision of litter pans with short sides for older ferrets with arthritis or other degenerative diseases. Sleeping areas should have comfortable bedding.
3. If the ferret is getting roughhoused by younger ferrets, consider separating into adjacent cages.
4. Review diet—discourage high-sugar foods such as raisins, fruit, or yogurt treats. Recommend offering high-protein snacks such as human meat-type baby food, up to three or four times daily, especially in ferrets with diagnosed insulinomas.
5. Review ferret behavior for new clients—geriatric ferrets should still play. They may exhibit shorter bouts of play, and may exhibit heat-seeking behavior.
6. Any changes in the ferret recently?

Exam—first/annual visit

Physical examination of the ferret is similar to pet canid and felid exams. Obtain an accurate weight in grams to monitor weight trends or for precise dosing of medications.

Assess the skin for masses, parasites, and the fur for thinning or alopecia. Assess hydration by checking skin turgor, skin tenting, by sliding the skin over shoulders, or by assessing oral mucous membrane tackiness [10,11].

Evaluate the direct and consensual papillary light reflex, and normal lack of menace. Ferrets will squint or “dazzle” in bright light [11,29]. A fundic examination can be performed after applying a mydriatic, and applanation tonometry can be performed with a Tono-pen (Tono-Pen Model II, Oculab, Glendale, California). Mean intraocular pressure is 22.8 ± 5.5 mmHg [29]. Evaluate the ears, and assess for tattoos, excess cerumen, pruritis, or abnormalities [10].

An oral examination may be performed while the ferret is scruffed. Evaluate capillary refill time (normal is 1–2 seconds) and gum color. Monitor for presence of tartar gingivitis, and gingival recession. Evaluate the canine teeth for wear or fracture from chewing at cage bars. If plaque, heavy tartar buildup, gingivitis, or other indications of progressive periodontal disease are present, recommend a dental prophylaxis.

Auscult the chest while ferret is standing on all fours or while the ferret is scruffed [10,11]. Monitor for arrhythmias, dropped beats, or premature beats. Evaluate the femoral pulses with respect to the heart. Auscult the thorax carefully—lung sounds and changes in them can be very faint. Note respiratory rate and effort, and the lack of paradoxical breathing in a normal ferret. Differentiate normal “ferret sneezes” from productive sneezing with discharge. Productive sneezing may indicate an upper respiratory infection, especially influenza.

The abdominal examination is best done while the ferret is scruffed. Palpate the stomach for pain, masses, foreign bodies, or trichobezars. Palpate the caudal portion of the liver and its margins. Palpate the length and surface of the spleen—note if the margins are rounded or sharp, and if splenomegaly is present. Assess the gastrointestinal tract. The kidneys are prominent, and should have smooth surfaces. Perirenal fat may be noted. The adrenal glands are usually not palpable even when disease is present, but masses could be noted. The bladder is usually soft and small.

Evaluate the submandibular, prescapular, popliteal, and axillary lymph nodes. True peripheral lymphadenopathy will palpate as firm enlarged lymph nodes within the fat pads around lymph nodes [10]. Mesenteric lymph nodes should not be prominent—enlargement may indicate gastrointestinal disease, infection, or neoplasia.

To identify gender in ferrets, identify the preputial opening on the ventral abdomen caudal to the umbilicus in the male. Evaluate the prepuce for abnormalities or discharge; if abnormalities are noted, sedate the ferret for examination of the external urogenital structures. In the female the vulva is just ventral to the anus [6]. Females may have a clear normal discharge. Externally evaluate anal sacs if they are present. Evaluate the anus for prolapse or fecal material.

Evaluate the musculoskeletal and neural systems. Note any abnormalities in skeletal structure, muscling, and body symmetry. Note cranial nerve function including facial symmetry, ocular responses, sensation, and swallowing reflex. Note if mental status is appropriate, and if pupillary light response, strabismus, nystagmus, or head tilt is present. Assess gait for asymmetry, ataxia, or hind limb weakness. Further neurologic examination can assess motor, withdrawal or nociception, and conscious proprioception. Reflex assessment may be inconsistent in normal ferrets.

If abnormalities are noted on physical examination or in the history, then perform the appropriate diagnostics, such as CBC, serum chemistries, urinalysis, radiographs, or other diagnostics the veterinarian deems necessary. If possible, evaluate feces and urine at time of exam.

Exam—geriatric visit

The physical examination in a geriatric ferret is essentially the same as described above. Watch for an increased frequency of cardiac disease, ocular disease, signs of insulinoma, adrenal disease, and abdominal masses. Often the geriatric ferret will have an enlarged spleen. Skin masses are more prevalent in older ferrets, and are reported to be benign the majority of the time. Excisional biopsies are still indicated [15]. Recommend a blood glucose, serum chemistry panel, CBC, full-body radiographs as part of the biannual examination. Additional diagnostics such as an electrocardiogram, echocardiogram, or abdominal ultrasound may be indicated.

Important questions for owners

Age of ferret.

Where did the owner obtain the ferret? How long has the ferret been in the household?

Previous veterinary care? Did that care include vaccinations? Blood work? Radiographs?

Can we request copies of those records?

Past illnesses? Surgeries? When did they occur?

Is the appetite, attitude, and activity normal?

Are the stools normal?

What is the diet? Any recent changes?

Do you give your ferret treats or supplements? What kind? How often?

Do you give hairball preventative? How much? How often?

Any recent change in the diet or environment?

Does the ferret go outside?

Other ferrets in the home? Other pets in the home? What are they?

Recent acquisition of a new ferret? Exposure to other ferrets, ferret shows, or ferrets at a pet store?

Current medications?

Any one in the family sick with the flu?

Any signs of hind limb weakness, sudden episodes of weakness, drooling, or “staring off into space.” Do you ever hear ferret grinding its teeth? Do you allow the ferret to run free in the house? Supervised or unsupervised?

Is the ferret a chewer? Any toys missing parts? Does the ferret chew rubber, foam or leather items?

Recommended reading for owners

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Ferrets Magazine. P.O. Box 55903, Boulder CO 80322-5983.

Recommended reading for veterinarians

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Recommended Web sites

www.ferret.org

website for the American Ferret Association

www.ferretcentral.org

links to articles, web sites, contacts, clubs shelters and organizations

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