

# Guide to husbandry and common diseases in degus and skunks

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in part one of a two-part article, look at care and handling techniques, as well as how to approach diagnosis of common diseases in the species

## **UNUSUAL exotic mammals are increasingly seen in practice in the UK.**

Although basic principles will apply to the care of these more unusual species, it is useful to know some basic biology and specific husbandry requirements for these animals, as well as medical conditions common to these species.

This two-part article will contain mainly husbandry advice since a lot of the problems encountered in practice will be due to shortfalls in basic care provision. Handling, diagnostic testing and common presentations will also be covered.

In this part, we look at degus (*Octodon degus*) and skunks (*Mephitis mephitis*). The second part will consider meerkats (*Suricata suricatta*) and coatimundis (*Nasua* species).

## **Degus**

The degu is a small rodent endemic to central Chile, mainly inhabiting the western foothills of the Andes.

Degus are rodents belonging to the suborder Hystricognathi (porcupine-like rodents) based upon jaw musculature and skull structure. This group also includes guinea pigs and chinchillas.

They have elodont cheek teeth; this means the teeth are open rooted and continuously growing, similar to rabbit cheek teeth.

They belong to the family Octodontidae. Octodon refers to the figure of eight shape of their cheek teeth.

Degus are well adapted to laboratory life and are commonly used as an animal model of behaviour and brain function because they share some behavioural features with human beings. They are also valuable research animals for resolving other questions regarding reproduction, diabetes mellitus, cataract development and Alzheimer's-like pathology.

They have now become popular pets in the US and many European countries and are exhibited in many zoos.

## **Behaviour**

Degus are highly social. In the wild they live in burrows and, by digging communally, are able to construct larger and more elaborate burrows than they could on their own. They spend a long time on the surface foraging for food and exhibit a large array of communication techniques. They have an elaborate vocal repertoire comprising up to 15 unique sounds.

In captivity, if degus are not given social interaction and physical stimuli, they might become aggressive or self-mutilate, but fighting is rare, even when introducing new animals. They enjoy human interaction.

They use urine to scent mark. Degus are diurnal and do not hibernate.

Degu pups are fairly precocial; they are born fully furred with open eyes. Their auditory and visual systems are functional at birth.

## **Housing**

Degus should be provided with a large cage containing shelves, branches, a running wheel and plenty of room to exercise ([Figure 1](#)). Suitable substrates include dustextracted wood shavings, recycled paper products and hay.

Dust baths should also be provided and chinchilla dust is a suitable material. They should be allowed to dust for 10 to 15 minutes several times per week.

## **Anatomy and physiology**

Degus resemble large gerbils and are a dark greyish-brown colour with a dark brush on the tip of the tail. They are hindgut fermenters and have a functioning caecum.

They have five toes on each foot, but the pollex is small, with a nail rather than a claw in the front feet.

## **Diet**

Degus are strictly herbivorous and feed on a wide variety of plants, roots, seeds and fruits in the wild. They are adapted to a very high-fibre diet in the wild and perform coprophagy to extract more nutrition from their diet.

It is important to know degus are very intolerant to sugars. They have been found to have a divergent insulin structure and are highly susceptible to developing diabetes mellitus when fed regularly on a diet containing free sugars.

A good captive diet consists of a mixture of rodent blocks and guinea pig pellets or degu-specific diets along with grass hay (meadow or timothy hay). Butternut squash, sweet potatoes, other vegetables, seeds and peanuts are given as treats. Foods containing sugar (such as fruits, raisins, breakfast cereal or honey treat sticks) should be avoided. Also, most pelleted feeds contain molasses so it is worth checking the ingredient list.

Although degus are closely related to guinea pigs, research has shown they are able to synthesise their own vitamin C, so there is no supplementation requirement.

## **Sex determination**

The anogenital distance of the male is approximately double that of the female. The prepuce resembles a clitoris, but is several times larger. The penis can be exteriorised by moving the prepuce proximally. The testicles are intraabdominal; there is no scrotum. Females have four pairs of mammary glands. ( and ).

## **Anaesthesia and sample collection**

Anaesthesia can be easily achieved with isoflurane in an induction chamber or large facemask and maintained with a small tightly fitting facemask. Injectable combinations that could be used include

ketamine plus diazepam, ketamine plus medetomidine, or ketamine plus acepromazine (doses as in other hystricomorphs).

Blood collection sites include the cranial vena cava (preferred by the authors), saphenous and jugular veins.

## Common presentations

In the authors' experience the most common disease processes seen in practice are:

### Dental disease

Degus have elodont teeth. Therefore, they present with similar dental problems to those seen in chinchillas and guinea pigs. These include:

- Incisor malocclusion, usually secondary to coronal elongation of cheek teeth.
- Overgrowth of clinical crowns and reserve crowns of cheek teeth; causing spurring and soft tissue trauma, as well as bone penetration and periapical infections respectively ([Figure 4](#)).
- Traumatic fractures of incisors.
- Elodontomas: the definition of elodontoma is a hamartoma of continuously developing odontogenic tissue and alveolar bone at the periapical bud of elodont teeth. It is a pseudoneoplastic lesion. The exact pathogenesis is unclear, but one of the causes includes acquired dental disease and subsequent impaired eruption due to apical teeth elongation and germinal tooth tissue damage. Severe damage to odontogenic germ tissue could result in continuous formation of dental tissue leading to neoplasia ( Jekl et al, 2008). It generally manifests itself with areas of increased opacity in the nasal cavity around the roots of the incisors.

Treatment for these conditions should follow the general guidelines of rabbit/rodent dentistry. Elodontomas generally carry a poor prognosis.

Similarly to rabbits, there is a correlation between mineral content of the diet and dental disease. Apical and coronal crown elongation of all cheek teeth and significantly smaller relative cheek teeth and mandibular densities were recorded in degus fed a high-phosphorus diet with an improper calcium: phosphorus ratio. A calcium:phosphorus ratio of 1:1 was responsible for the rapid development of dental disease ( Jekl et al, 2011a).

In one study ( Jekl et al, 2011b) dental disease represented 60 per cent of pathology reported in degus.

## **Skin problems**

Skin problems include behavioural problems, trauma, infections and parasitism:

- Self-barbering of forepaws and barbering by cage mate.
- Self-barbering due to dental pathology.
- Fight wounds with or without abscesses.
- Tail slip: degloving injury to the tail due to inadequate restraint.

Degus must never be picked up by the tail as this results in the skin degloving. The treatment for this condition is invariably amputation. The correct way to restrain a degu is by scooping it up with two hands ([Figure 5](#)). From here they can be scruffed or held in an encircling grip for examination.

- Ectoparasites are rare.
- Dermatophytosis has occasionally been described. Treatment with antifungals such as terbinafine or topical antifungal creams can be performed as in other small mammals.

## **Diabetes mellitus and cataracts**

Degus fed on high dietary sugar readily develop hyperinsulinaemia with subsequent cataracts and diabetes mellitus (DM). According to some authors, DM is the most common disease in laboratory colony degus.

The mechanism behind the development of cataracts is that degus have a physiologically increased aldosterone reductase activity in the lens. This enzyme converts glucose to sorbitol, which increases the osmotic pressure and water influx in the lens and, in the case of high glucose concentrations, results in cataracts. Lens luxation has also been described.

Cataracts can develop independently from DM due to the lens being very sensitive to high sugar diets.

## **GI disturbances**

Several GI disturbances are seen commonly in degus:

- Non-infectious diarrhoea, generally caused by improper levels of fibre in the diet.
- Pancreatitis associated with high-fat diets.

- Gastric bloat secondary to respiratory problems (gaspings and aerophagia) due to nasal cavity obstruction (rhinitis and elodontomas).
- Parasites are very rare.

## Neoplasia

The incidence of neoplasia seems to be low in degus. Some neoplasias that have been documented are: lipoma, fibrosarcomas, melanomas and malignant histiocytoma. ([Figure 6](#)).

## Bacterial infections

*Pseudomonas* species from dirty water bottles. Rhinitis is commonly seen in pet degus.

## Heat stress

Degus easily succumb at temperatures above 30°C (86°F).

## Obesity

Due to incorrect diet and insufficient exercise.

## Skunks

Skunks are mammals belonging to the Mephitidae family, which was a subfamily within the Mustelidae (which includes ferrets, weasels, otters, badgers, stoats and wolverines), but recent genetic evidence suggests skunks are not as closely related to badgers as thought, so they are now a separate family.

There are 11 different species of skunks. The striped skunk (*Mephitis mephitis*) is the species most commonly kept as a companion animal. Their natural range is from southern Canada into the US and northern Mexico. The typical colouration pattern in striped skunks consists of black fur with a white V running down the back and a white stripe running between the eyes from the top of the head to the tip of the snout. Another colour found in the pet trade is brown and red ([Figure 7](#)).

They have elongated bodies with short, well-muscled legs and long front claws for digging.

They are best known for secreting a liquid with an intense foul odour from their scent glands as a defence mechanism. It is composed of a mixture of sulphur-containing chemicals such as thiols (mercaptans), which have a highly offensive smell that can be described as a combination of rotten eggs, garlic and burned rubber. In some European countries and in the US, captive-bred skunks are descented at a very young age. This practice is illegal in the UK under the Animal Welfare Act

and is considered an unnecessary mutilation.

## Behaviour

Skunks can be very playful and will often fake a threat display by stomping their front feet and raising their tail without spraying.

They have very sharp teeth and can bite. In the wild, striped skunks are important wildlife reservoirs for rabies. They can also be infected by an ascarid nematode called *Baylisascaris columnaris*, thus they can potentially cause larva migrans in people. Socialisation, gentle handling and neutering will reduce the incidence of biting.

Pet skunks require abundant socialising and safe chewable toys (dog bones and tartar-controlling treats).

Skunks are crepuscular and solitary animals when not breeding. In the wild, in colder areas, they might gather in communal dens for warmth. They are not true hibernators, but they can den for prolonged periods of time.

## Housing

Most skunks need to be caged individually once they are adults. Only young skunks and non-pregnant females seem to tolerate the company of other skunks. Many skunks that are raised individually and are well integrated into a home, may not accept another skunk.

Skunks can be destructive so owners should skunk-proof their house if they are going to be kept indoors. They can climb and open cabinets, dig at carpets and steal objects. They should be prevented from accessing household poisons and chemicals, open toilet bowls, wet/dirty bedding and electrical cords.

Young skunks need to be confined when unsupervised. Their enclosure should be spacious, sturdy and durable enough to prevent digging or chewing to escape. They can be trained to use a litter tray. Unscented litter should be used and cleaned regularly.

An adult indoor skunk should be provided with sleeping quarters inside a large den. This will make it feel secure. The den can be made out of a cardboard box or a large plastic shelter (dog carrier). It should contain cloth blankets, sheets or other bedding that can be removed and washed frequently. Skunks can also be housed outside in a large cage with sleeping quarters. Make sure it is escape proof.

Environmental enrichment is paramount for skunks. Disposable and easily cleaned toys should be provided. These might include pingpong balls, tennis balls, paper bags and cardboard boxes.

## **Diet**

Free-ranging skunks are omnivorous, with a diet consisting of insects, rodents, birds, fruits and vegetables. In the wild they are one of the primary predators of the honeybee; their thick coats protecting them against the stings.

In captivity, their diet can consist of low-fat dry dog food supplemented with vegetables, fruits and insects. Cottage cheese, yogurt and dry milk can be offered daily. One egg with the shell or a mouse can be offered weekly to help meet calcium requirements.

They should always have access to water either in a bottle or spill-proof bowls.

Although nocturnal, skunks can adapt to partially diurnal lifestyle and can be fed either in the morning or at night.

Overfeeding or feeding foods with high-fat content (cat food or moist canned dog food) must be avoided as skunks have a tendency to become obese ([Figure 8](#)).

## **Sex determination**

The testicles are positioned close to the anus and the penis is located on the ventral abdomen in males. Contrary to popular belief, skunks cannot be sexed by their striping pattern.

Skunks should be neutered before six months of age to prevent severe aggression by males and potential complications due to extended oestrus in females.

## **Anaesthesia and sample collection**

The authors prefer the use of injectable anaesthesia in this species using a combination of xylazine plus ketamine (at ferret doses) and maintenance with isoflurane. Care must be taken in skunks with cardiomyopathy or obese animals. Skunks are easily tubed using non-cuffed endotracheal tubes ([Figure 9](#)).

Blood collection can be achieved from the jugular, saphenous, cephalic or femoral veins.

Manual restraint of a skunk is achieved by grasping them by the scruff with the right hand while the left hand extends the rear legs and tail. This is a very similar procedure to restraining a ferret.

## **Vaccinations**

Skunks are susceptible to rabies and canine distemper. There have been anecdotal reports they might be susceptible to feline distemper as well.



The authors have used a full dose of Nobivac DHPPi without any reaction in this species. However, no claims can be made for the effectiveness of any vaccination protocol in skunks.

## **Common presentations**

### **Malnutrition/obesity**

Malnutrition or obesity is commonly seen in pet skunks. Malnutrition can lead to deficiencies and diseases, such as metabolic bone disease (MBD). Presenting signs for MBD might be a gradual decrease of activity and difficulty walking. Pain and discomfort might be present with movement.

Diagnosis will be based on radiography (demineralisation of bones) and low calcium levels (ionised calcium) on bloods. Treatment will be aimed at controlling the pain and improvement of diet.

Overfeeding or feeding fatty foods/excessive treats together with lack of exercise can lead to obesity. Obesity can increase the risk of other health problems such as fatty liver disease.

### **Dental disease**

It is common to encounter evidence of gingivitis, tartar and periodontal disease. Dog chews and regular home dental cleaning can be used as a preventive. In severe cases, dental treatment under general anaesthesia, including cleaning, polishing and occasional extractions, might be required.

### **Cardiomyopathy**

Skunks can develop cardiac disease. Amino acid deficiencies, such as taurine and carnitine, could play a role in some skunk cardiomyopathies. Symptoms that can be seen in advanced cases include lethargy, ascites, dyspnoea and weight loss. Treatment can be based on feline protocols.

### **Aleutian disease**

Aleutian disease (AD) is caused by a parvovirus. It is known to infect various members of the Mustelidae family, with mink and ferrets being the most common hosts. AD in adult animals is characterised by hypergammaglobulinaemia and immune-complex disease, resulting in multiple organ failure. It has been described in pet skunks. The cases described presented with a debilitating/wasting disease or sudden death.

Biochemical changes included hyperglobulinaemia and increased alanine transaminase and alkaline phosphatase, which may have resulted from lymphoplasmacytic inflammation, viral infection of hepatocytes, and/or the accumulation of immune complexes associated with persistent adenovirus infection. No specific treatment is available, but supportive treatment with antibiotics and steroids might give some relief.

## Toxoplasmosis

Clinical signs of toxoplasmosis include pyrexia, lymphadenitis, splenomegaly, myocarditis, pneumonitis, hepatitis and encephalitis. Diagnosis is based on serology. Prevention is extremely important and contact should be avoided with feline species and feline faeces.

## Lungworm

Lungworm is more commonly seen in wild skunks. Clinical signs include cachexia, anaemia, coughing, dyspnoea, depression, nasal discharge and neurological signs. The diagnosis is based on finding the first stage infective larvae in faecal samples. Treatment is based on the use of anthelmintic drugs such as ivermectin or fenbendazole.

## External parasites

Fleas and sarcoptic mange can be seen in skunks. Fipronil and ivermectin can be used off-licence in this species.

## Rectal prolapse in juveniles

Juvenile rectal prolapse is generally seen secondary to internal parasitism. Parasites that can be seen in skunks are roundworm and *Baylisascaris columnaris*. Regular faecal samples and worming treatments are advisable in this species. Fenbendazole can be used at 50mg/kg daily for five days. Environmental control including regular cleaning of litter trays and disinfection of surfaces is paramount.

A specific risk is the zoonotic potential of *Baylisascaris columnaris*, which can cause encephalitis in humans. The larvae can migrate to human nervous tissues and there is no treatment for infected humans.

## References

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**Figure 1.** Degu accommodation should provide opportunities and space for exercise.







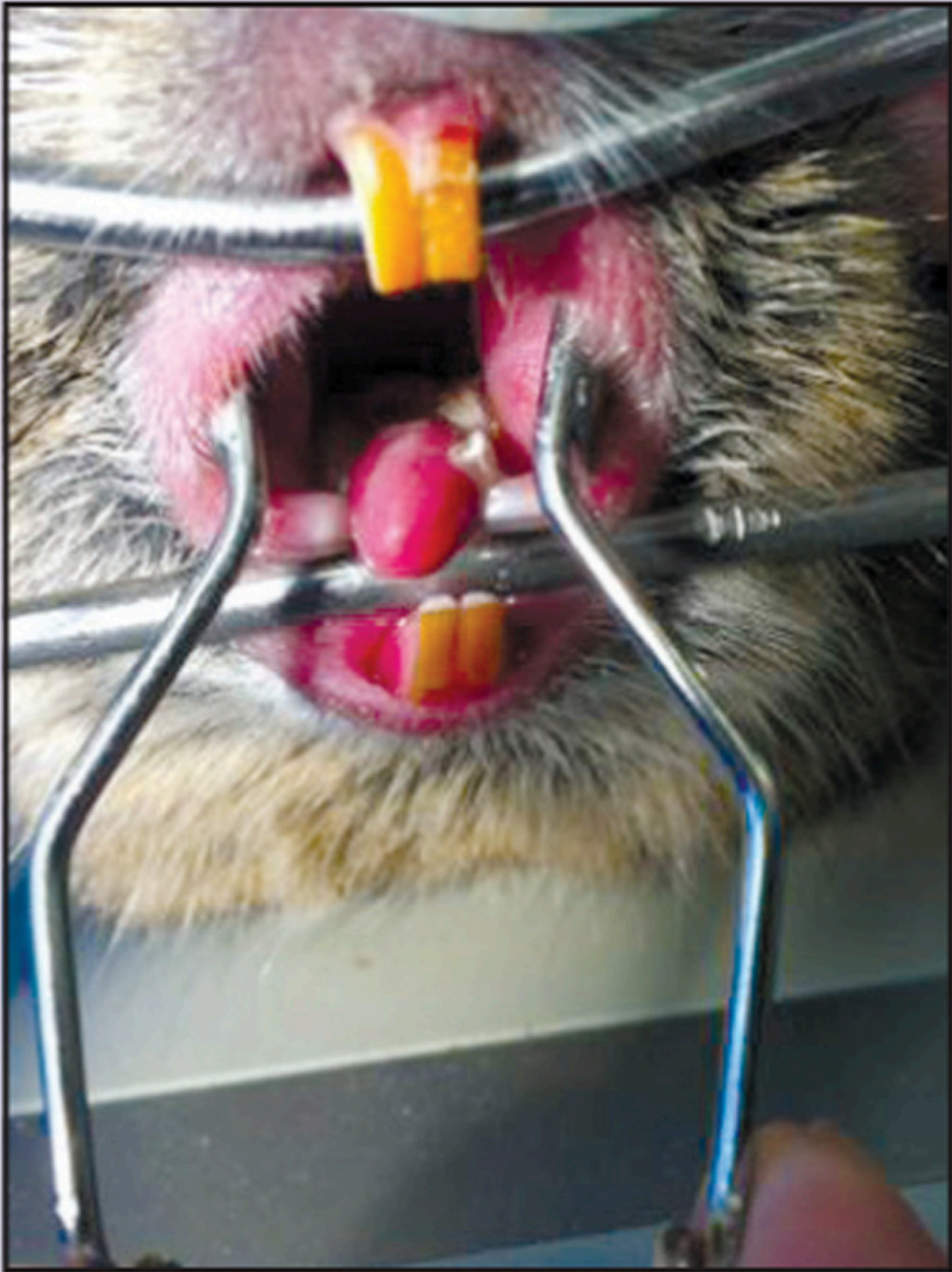
**Figure 2.** Degu male genitals.





**Figure 3.** Degu female genitalia.





**Figure 4.** Dental disease in a degu.



**Figures 5a (inset) and 5b.** The correct way to hold a degu.



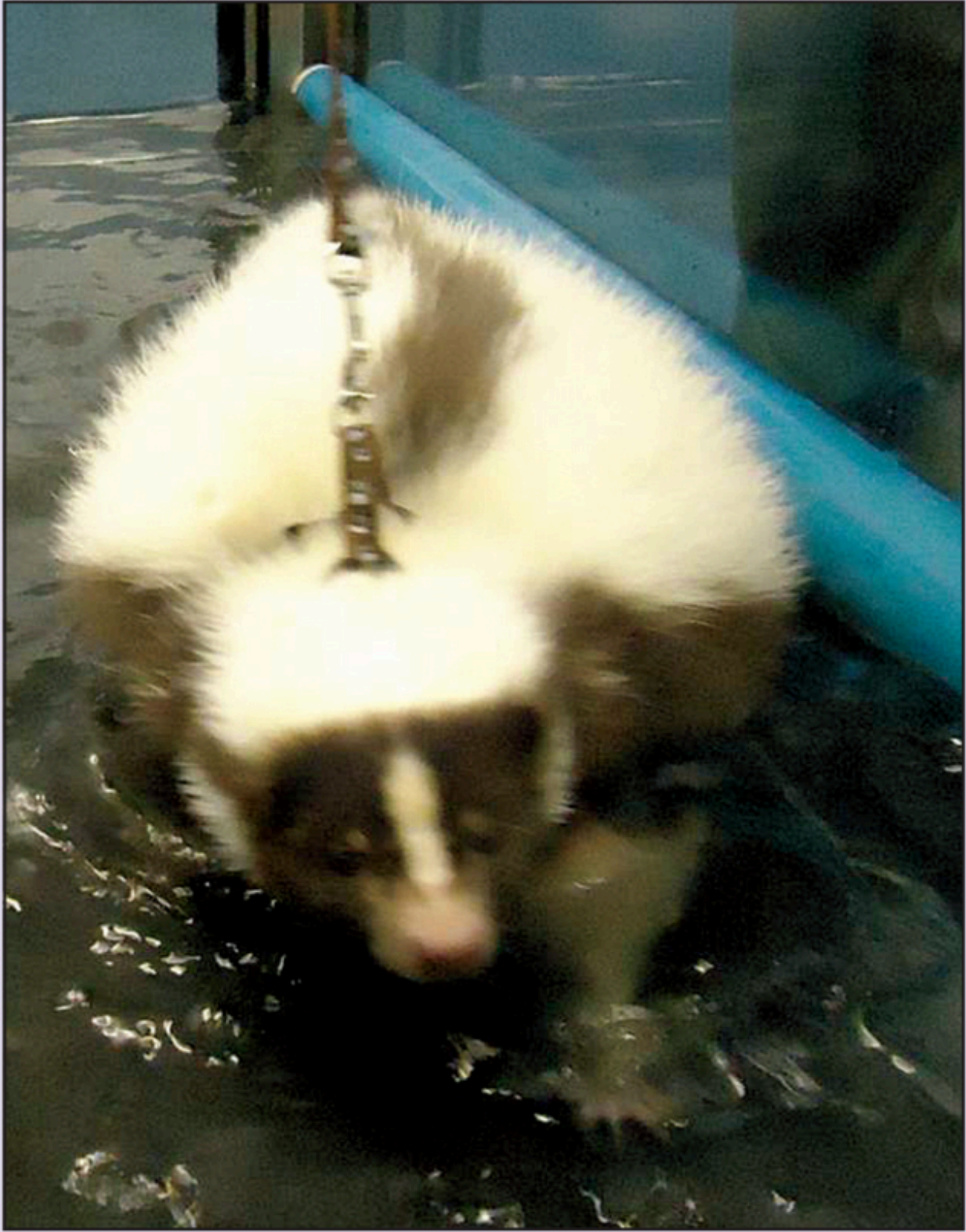


**Figure 6.** Tail chondrosarcoma in a degu.

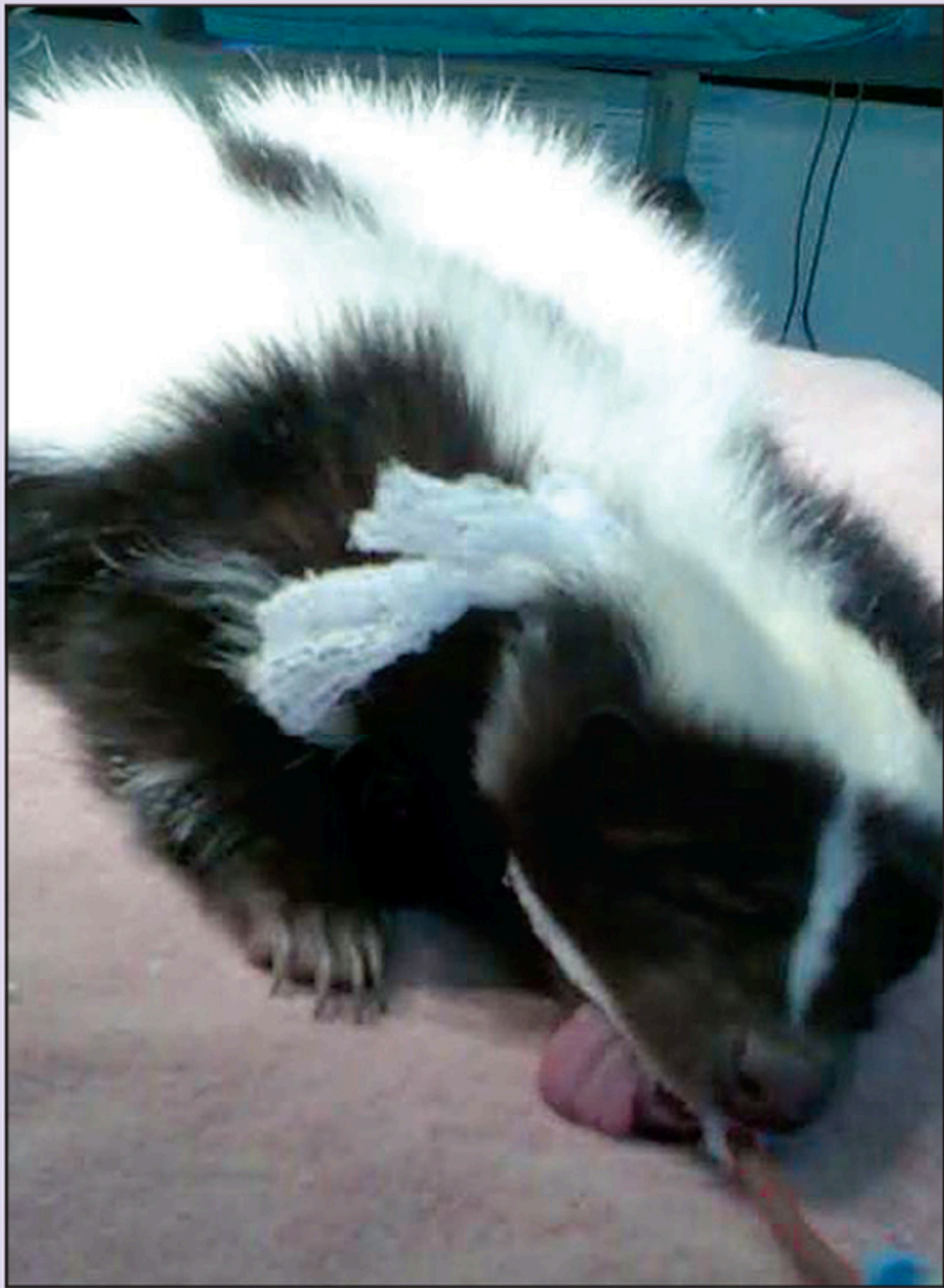


**Figure 7.** A brown skunk.





**Figure 8.** An obese skunk in hydrotherapy.



**Figure 9.** An intubated skunk during anaesthesia.

<b>Vital statistics</b>	
Body length	12.5cm to 19.5cm
Tail length	10.5cm to 16.5cm
Bodyweight	170g to 300g
Normal body temperature	37.9°C (101.8°F)
Average lifespan	Five to eight years
Maximum lifespan	10 years
Sexual maturity	Three to four months
Breeding season (captive)	Year-round. In the wild in autumn, with pups early spring
Gestation	87 to 93 days
Litter size	One to 10 pups (average six to seven)
Weaning	Four to six weeks
Litters per year	Two or three
Dental formula	I 1/1 C 0/0 P 1/1 M 3/3

**Table 1. Degus**



<b>Vital statistics</b>	
Average lifespan	Eight to 10 years
Average bodyweight	2kg to 4kg (7lb to 10lb)
Total length	21in to 32in
Tail length	7in to 16in
Body temperature	102°F (38.9°C)
Heart rate	140bpm to 190bpm
Sexual maturity	One year
Gestation	66 days
Dental formula	I 3/3 C 1/1 PM 3/3 M 1/1

**Table 2. Skunks**