and other small mammals such as cats and dogs is their increased susceptibility to hypothermia, which potentiates the effects of anaesthesia

- Anaesthetic depth may be evaluated by loss of righting reflex, loss of palpebral blink reflex, rate and depth of respiration. Many rodents do not close their eyes during anaesthesia and a petroleum-based artificial tear ointment must be applied to the eyes to prevent corneal desiccation
- Continue monitoring during recovery. Do not mistake sternal recumbency for full recovery
- Maintaining good anaesthesia records is critical

**MCQs**

1. Pulse oximeters are now available for use in small mammals. Which statement is NOT true about pulse oximeters?
   a. Pulse oximeters are valuable for monitoring arterial oxygenation and pulse rate
   b. Several models can be used in animals weighing >200 g (e.g. rats), but are not accurate for mice

2. Which of the following is NOT recommended when preparing injectable anaesthetic agents for use in rodents?
   a. Obtain an accurate measurement of bodyweight
   b. Dilute drugs before administration
   c. Mix drugs in one syringe
   d. Use insulin syringes

3. What is the approximate blood volume of an adult mouse weighing 40 g?
   a. 2 ml
   b. 4 ml
   c. 6 ml
   d. 8 ml

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**Common medical conditions in chinchillas**

**Thomas Donnelly**

Gastrointestinal and dental problems are common in chinchillas. Abnormalities related to subclinical dental disease have been reported in one-third of apparently healthy chinchillas presented for routine physical examination. Nutritional (e.g. less abrasive diet in captivity) and genetic causes have been proposed as the predisposing factors for the development of dental disease. Cheek tooth crown and root abnormalities are routinely seen. Tooth elongation and its secondary complications, affecting the reserve or the clinical crown or both, is the underlying cause for most clinical signs. Chinchillas are often able to eat and maintain good body condition until severe complications, such as soft tissue trauma from sharp dental spikes or periodontal abscessation, have occurred. A history of reduced food intake, changed food preferences towards more easily chewed feed items, weight loss, reduced faecal output, saliva-stained skin and fur with crust and alopecia of the perioral area, wetting and crusting of the chin (‘slobbers’) and forefeet, epiphora, poor fur condition and fur chewing are indicative of dental disease. On clinical examination palpatory irregularities of the ventral borders of the mandible and overgrown or irregular occlusal surfaces of the incisor teeth may be found. The prognosis for chinchillas diagnosed with dental disease depends on the severity of dental disease, the animal’s general condition and owner compliance. Repeated intraoral examinations and treatments under general anaesthesia are necessary to control complications and to maintain an acceptable quality of life for the animal.

Systemic disease or painful conditions may typically result in secondary gastrointestinal problems with non-specific clinical signs such as anorexia, decreased faecal production and lethargy. Identifying the underlying cause is critical to improve the outcome and reduce the chance of recurrence. Diarrhoea and soft faeces are common presentations. Chin- chilla anatomy precludes the ability to vomit; choking may be observed when the entrance to the trachea is occluded by a large piece of food or bedding or in postpartum females that eat their placentas. Megaoesophagus, which leads to regurgitation and aspiration pneumonia, has been described. Gastric ulcers are common in young chinchillas and are frequently caused by feeding coarse, fibrous roughage or mouldy feeds. Bloat or tympany can result from sudden dietary changes, especially overeating. It has been reported in lactating females 2–3 weeks postpartum and may be related to hypocalcaemia. Inappropriate feeding of fresh green feed high in simple carbohydrates or sudden changes in diet will result in dysbacteriosis and cause soft faeces. Constipation is more common than diarrhoea. A sudden change in diet, an inappropriate diet of insufficient dietary fibre and roughage, or infectious causes can result in dysbacteriosis, gastroenteritis, ileus and consequent constipation.

**KEY LEARNING POINTS**

- Chinchillas have a high requirement for dietary fibre. Their diet should mainly consist of high-quality grass hay.
- Lack of hay and feeding a pelleted diet often results in dental disease; feeding a diet high in simple carbohydrates often results in gastrointestinal disorders.
- Dental disease is common in chinchillas. Chinchillas are often able to eat and maintain good body condition until severe complications occur. A dental examination should be routinely performed during a clinical physical examination. Palpate lower jaw borders and check incisors. To examine the premolar and molar teeth an endoscopic examination under anaesthesia is required.
Gastrointestinal disorders are common in chinchillas. The most frequent are diarrhoea (soft faeces) and constipation. Aim to identify the primary cause and treat the secondary complications, including pain.

Hospitalisation of chinchillas often requires nutritional support and fluid therapy. Monitoring of hospitalised chinchillas should always involve daily feed intake, faecal output and urine output.

**MCQS**

1. Which statement is NOT true about acquired dental disease in chinchillas?
   a. Chinchillas are often able to eat with dental disease
   b. Chinchillas often maintain good body condition until severe complications of dental disease have occurred
   c. Genetic causes are the primary predisposing factors for the development of dental disease
   d. Molar teeth problems are more common than incisor problems

2. What may constipation in chinchillas lead to?
   a. Bloat and gastric ulcers
   b. Rectal prolapse and intestinal torsion
   c. Caecal impaction and rectal prolapse
   d. Fatty liver and gastric ulcers

3. How is the presence of large numbers of the yeast *Cyniclomyces guttulatus* (previously *Saccharomycopsis guttulata*) in a faecal smear or faecal flotation from a chinchilla considered?
   a. Normal
   b. Secondary to an underlying gastroenteric disease
   c. Abnormal
   d. a and b

**Nutritional disorders in small mammals**

**Thomas Donnelly**

An understanding of the nutritional requirements of small mammals allows veterinarians to understand how problems may have developed. Veterinary nurses play an invaluable role in educating owners about appropriate diets, the unique nutritional needs of their pet during different life phases and how to aid recovery with special diets. Nutritional disorders of small mammals can be divided into the following categories:

- **Deficiencies.** These are true deficiencies, where absence or too little of a nutrient leads to overt disease. The most important example is vitamin C deficiency (scurvy) in guinea pigs. Clinical scurvy can result in death in as little as 2 weeks and subclinical scurvy is a major predisposing factor for other diseases. The stability of vitamin C in diets varies with composition of the diet, storage temperature and humidity. The feed content of vitamin C is reduced by dampness, heat and light. Water in an open container may lose up to 50% of its vitamin C in 24 hours. Aqueous solutions of vitamin C will more rapidly deteriorate in metal, hard water or heat, and are more stable in neutral to alkaline solutions.

- **Excesses.** These are not true toxicities, where too much of a nutrient leads to poisoning. Rather they are situations where inappropriately high amounts of a nutrient predispose the animal to disease. An important example is excess calcium in the diet, usually in calcium-rich hay (the ideal Ca:P ratio in hay is between 2:1 and 1:1) leading to the development of urolithiasis, which we often see in rabbits and guinea pigs. Another example is giving too many simple carbohydrate feeds such as fruits or sugar-laden treats, leading to diarrhoea or dysbacteriosis.

- **Inappropriate diet.** The most important example is ‘soft’ diets where lack of abrasiveness leads to dental disease. Generally dental disease in herbivorous rodents, such as guinea pigs and chinchillas, are manifest as molar problems and are associated with inadequate hay in the diet. In omnivorous rodents, such as rats, mice, hamsters and gerbils, dental disease manifests as incisor problems. The abrasion of upper incisors primarily depends on attrition from the opposing incisors in the lower jaw. The ‘hardness’ of feedstuffs is not as important in incisor wear and tear as faulty incisor conformation is. Another example of an inappropriate diet is inadequate crude fibre, which predisposes small mammals to gastrointestinal disorders.

- **Obesity.** Concentrate diets (e.g. rodent pellets) are energy rich and were created to feed laboratory rodents during their growing phase. Most of these animals do not live long after reaching puberty. However, providing concentrate diets to pet rodents, which have the potential to reach maximal lifespan, leads to obesity. Well documented consequences of obesity in rodents are metabolic derangements, increased inflammation, increased tumour incidence and decreased lifespan.

Well balanced diets not only avoid nutritional disorders and secondary health problems but when offered in foraging devices and access-challenging hoppers, they can also provide added environmental enrichment.

**KEY LEARNING POINTS**

- Many nutritional diseases in small mammals are due to inappropriate feeding by well intentioned owners.
- Chinchillas and guinea pigs have a high requirement for dietary fibre which is typically provided as hay. Lack of hay often results in dental disease.
- Guinea pigs of all ages are dependent on a dietary source of vitamin C.
- Diets high in calcium appear to predispose guinea pigs and rabbits to urolithiasis.
- Obesity is a common problem in pet small mammals and leads to decreased lifespan.