



Care sheet

for

Rabbits

Care of Rabbits

Introduction

The domestic rabbit, *Oryctolagus cuniculus*, is a descendant of wild rabbits living in Western Europe and northern Africa. In their natural environment, rabbits are gregarious and reproductively successful. They are completely herbivorous (eat only plants) and most actively forage in the twilight or nighttime hours. Rabbits use their claws to dig and burrow into the ground for shelter and protection. They rarely stand their ground when threatened but instead use their considerable speed and maneuverability to escape harm. Domestic rabbits or wild rabbits kept in captivity, however, can display an amazing degree of aggression when upset or threatened.

Domestic rabbits are bred and kept for commercial meat and fur, teaching and research, as indoor and outdoor pets, and for exhibition by rabbit fanciers. Rabbits make excellent pets. Their fastidious nature, docile behavior and quiet manner make them increasingly popular house pets.

Nutrition

In the wild, rabbits are essentially grazers, although they will forage on leaves and shoots at low level. Commercial rabbit diets are often too low in fibre and too high in protein, fat and energy. Indigestible fibre (lignocellulose) stimulates gastrointestinal motility and has a protective effect against enteritis. Many pet rabbits are overfed, and underexercised. This predisposes the rabbit to obesity, chronic soft stools, dental disease and behaviour problems. The energy requirements of a rabbit can be met very rapidly on a concentrate diet and this can lead to dental disease owing to lack of wear, obesity and boredom-associated problems such as stereotypic behaviour and aggression.

- Rabbits were evolved to exist on a minimalist diet of grass, providing a high fibre diet, with an abrasive action on the teeth. The act of grazing for 4-5 hours a day (as wild rabbits do) encourages even wear of the molars. Rabbits also synthesize vitamins B, C and K in the caecum, and reingest these nutrients during the practice of caecotropy.
- The correct diet for a rabbit is based on unlimited fresh hay, plant fibre in the form of vegetables and wild plants, and a limited quantity of dry mix (pellets). Small quantities of fruit may be offered but fruits high in simple sugars should be avoided.
- Clean fresh water should be available at all times, and in a container the rabbit is accustomed to. Rabbits will not drink from an unfamiliar water source and can dehydrate in this way. Dehydration leads to anorexia, gastric and intestinal stasis and the dehydration of the gastrointestinal contents causing secondary intestinal obstruction.

Fresh water should be offered daily, either in a bottle or in a heavy ceramic dish that cannot be easily overturned. Drinking bottles are easier to keep clean than water bowls and they avoid wetting of the dewlap, which can lead to a moist dermatitis. The water container, regardless of the type used, should be thoroughly cleaned and disinfected at least every 1-2 days. Water intake is fairly high, at about 10% of body weight.

Ceramic or metal feeding bowls are most hygienic and will not be gnawed, and hay can be fed loose or dispensed from a rack or net. Wire mesh hay racks can be used to divide adjacent hutches. Food hoppers and automatic water valves are often used for large groups and in commercial or laboratory situations. Hay should always be available and can be fed from racks or nets to increase time spent feeding. Carrots or other vegetables can be suspended from the cage roof to act as an edible toy and to increase the time spent eating.

Dietary requirements

Rabbits require 18-20% fibre, of which 10% should be crude indigestible fibre. Protein levels should be 17-18% for breeding stock, 15% for growth, and 12-13% for maintenance. The recommended level for fat is 3% for pregnancy and 1% for maintenance.

The Hay and Vegetable Diet

Current thought suggests that the most balanced diet for rabbits consists of a diet based on hay and greenfoods, supplemented with a dry mix. This provides a diet that is high in fibre and low in protein and carbohydrate, and will correct many nutritionally related disorders. Sudden changes in diet should be avoided, as should frosted or mouldy food and lawnmower clippings. Rabbits enjoy sweet foods, but sugar-rich treats should not be fed (although they may be of use in tempting an anorexic animal to feed or when training an animal to reinforce desirable behaviour).

Hay

Hay is the single most important component of the diet. Good-quality hay should be offered daily. Some researchers believe this practice reduces intestinal problems and the tendency to pull out and chew on hair. Rabbits on high fibre, low protein and low carbohydrate diets rarely suffer from enterotoxaemia, and practice complete caecotropy, so do not develop chronic soft stools. The provision of hay relieves boredom, and prevents the development of behavioural problems. The type of hay is important; it should be fresh, not mouldy. Alfalfa hay is rich in calcium and should be given sparingly, and not to rabbits on a dry food already containing alfalfa e.g.

Russell Rabbit as the high calcium in the diet could predispose to urolithiasis. Grass hay (0.4% calcium) and Timothy hay (0.5% calcium) are most suitable.

Greenfoods

Rabbits should also receive a varied diet of vegetables and wild plants. The majority of wild plants are astringent in nature and can be fed in unlimited quantities. Grass, where available, is obviously the most natural food for a rabbit. Any new plants or vegetables should be introduced slowly, and withdrawn if they cause diarrhoea after 24 hours. Eventually each rabbit should be given 1/2 cup vegetables/per kg body weight daily. Other food items (lettuce, spinach, alfalfa sprouts, carrot tops, beet greens, carrots, apples, etc) can be offered in small amounts daily. These food items should not be offered in larger amounts because they are water-rich and lack the nutrient density of the pelleted diets. Furthermore, many rabbits develop a preference for these items over pellets if they are offered in large quantity. Rabbits can tolerate table food items offered daily if given in small amounts (no more than 20% by volume of the total diet). This is especially true of rabbits fed in this fashion from an early age.

Dryfoods

Many dry foods are available to supplement the hay and vegetables. Whatever

the diet that is fed it is important the rabbit eats every component. Many rabbits are selective eaters and leave the grass pellet component of a commercial mix, favouring the grains and pulses. These favoured items are low in calcium, and this can lead to bone and dental disease.

Many rabbits are selective feeders, eating only the carbohydrate and starchy portions of the dry food (grains and pulses), and leaving the fibre and pellets. This can result in obesity, and a diet that is low in vitamins and minerals, particularly calcium which can lead to bone and dental disease. Selective feeders are best changed onto a uniformly presented food such as pellets or extruded nuggets. Whatever the dry food it is important to limit the quantity that is fed, to prevent obesity (pellets should not be fed if overeating and obesity have become problems).

It is best to give your rabbit a small quantity in a bowl in the morning; this may be eaten within the first hour, but should not be replaced until the following day. The pellets should be as fresh as possible when purchased and should be purchased in relatively small quantities. The pellets should be stored in the refrigerator to prevent premature spoilage. Pellets that will probably not be used within 2 months of purchase should be frozen immediately after purchase. Refusal to eat rancid pellets is a relatively common cause of inappetence among rabbits.

Calcium

The rabbit has an unusual calcium metabolism compared to other mammals. Calcium uptake is not finely controlled by homeostatic mechanisms; rather plasma calcium is more directly linked to dietary calcium, and any excess calcium is excreted in the urine. Low calcium diets (seen in rabbits such as selective feeders) can predispose to osteoporosis, osteomalacia, poorly mineralised teeth and acquired malocclusion. High calcium diets (if rabbits are oversupplemented with minerals) can lead to excess calcium crystals in the urine, and urolith formation. A balanced diet based on hay, greenfood and complementary dry food should provide adequate vitamins and minerals for the rabbit, and vitamin and mineral supplementation should only be considered in a rabbit with established dental disease associated with under calcification of the teeth and jawbones, or osteoporosis. Access to sunlight is also important to enable the rabbit to manufacture vitamin D.

Vitamin-mineral supplementation is not necessary if a pet rabbit is fed as outlined above. Many rabbits love to gnaw and chew on their cage and on items within the cage. A well-boiled round steak bone (marrow removed) and/or small dog chew toys are often accepted as challenging gnawing substitutes.

Many veterinarians recommend adding pineapple or pina colada yogurt to the daily diet. Most rabbits willingly accept the yogurt, especially if they are introduced to it at a young age. Yogurt not only promotes and maintains the normal bacterial flora within the digestive tract, but the pineapple contains an enzyme (papain) that is thought to help dissolve any hair that has been eaten (see section on Hairballs).

Handling and Restraint

Improper handling may cause serious, life-threatening injuries. Fractures and dislocations of the back, most often resulting in paralysis of both rear legs, are the most common injuries. These injuries also occur when rabbits are suddenly frightened and attempt to escape from a small enclosure.

A rabbit's spine is relatively lightweight and fragile. When a rabbit becomes frightened, it violently struggles by powerfully kicking its back legs. The lightning-fast movements of the rear legs cause over-extension of the lumbosacral (lower back) region of the spine, which frequently results in fractures or dislocations. One should never try to overpower a struggling rabbit. If a rabbit violently resists physical restraint, it should be immediately released and approached later when it has calmed down.

A soft-spoken, relaxed approach with rabbits works well. Covering the eyes

and lightly stroking a rabbit will usually result in a hypnotic-like trance that often renders them less prone to panic and injury.

Rabbits should *never* be picked up by their ears. If you are concerned about being scratched by the claws, place a towel over the rabbit's back and wrap it around the body to restrain all 4 feet before picking up the rabbit. An alternative method of picking up a rabbit involves sliding one hand under its breastbone and grasping both front legs between the fingers of this hand. The other hand is then gently worked under the rear quarters to fully support them as the rabbit is lifted upwards, in the same manner as cats are held.

Housing Considerations

Rabbits can be kept outside in hutches, or indoors as 'houserabbits'. The latter is an increasingly popular trend, and the BHRA (British Houserabbit Association) now has over 3000 members. Most 'houserabbits' have a collapsible dog crate as their base accommodation, with variable opportunity for free exercise in the house. Rabbits naturally urinate and defecate in one place and thus are easily housetrained (particularly if neutered) to use a litter tray by repeatedly placing them in the tray on acquisition. All indoor and some outdoor rabbits will become accustomed to using a litter tray. If the rabbit has already selected an area for elimination, the litter box should be placed in this location. It helps to place some of the rabbit's fecal pellets in the litter box to encourage its use. Loss of litter-trained habits may be the first warning symptom of bladder disorders.

Indoor rabbits should be confined to a suitable enclosure when their activity cannot be adequately supervised. A roomy wire cage with at least one-half of the floor's surface area covered with Plexiglas or washable towels is recommended. The Plexiglas or towels provide relief from constant and continual contact with the wire floor, helping to prevent hutch sores on the feet (see section on Hutch Sores). A water bottle or ceramic crock, food dish and a litter box should be provided for the rabbit inside the enclosure. Chewable toys are enjoyed by house rabbits e.g. cardboard boxes, old telephone directories, commercial cat or bird toys. Under no circumstances should rabbits be allowed total freedom within the home. Rabbits love to chew and can be very destructive to household furnishings. Furthermore, biting into telephone and electrical cords can seriously injure them. House rabbits will readily learn to use 'cat-flaps' for access.

Rabbits housed outdoors should be confined in roomy wire cages with Plexiglas covering about one-half of the floor's surface area. The wire mesh should be just large enough to allow fecal pellets to drop through. A water bottle or ceramic crock and a heavy food dish should be provided. Contact with wild rabbits should be prevented to minimize the risk of disease transmission by direct contact (e.g. viral haemorrhagic disease) or vectors such as the rabbit flea (e.g. myxomatosis), and suitable fly and mosquito

control should be considered in summer months.

Outdoor rabbits must be checked every day, with special attention paid to the perineal area in summer months as caking of caecotrophs or sitting in wet soiled bedding can predispose to myiasis ('flystrike'). Lack of caecotrophy and caking of caecotrophs in this area is often erroneously interpreted as diarrhoea. The cause can be obesity, spinal pain or dental disease.

Wherever the rabbit is kept, the following points are important:

- Each rabbit should be allowed 4 hours exercise daily, to encourage cardiovascular fitness and skeletal strength, and reduce the risk of obesity.
- During the period of exercise the rabbit may have access to potentially toxic substances. Outside toxic plants are the first consideration, indoors rabbits may gain access to household substances, indoor plants (e.g. *Dieffenbachia*), and lead. Ingesting carpet can also lead to gastrointestinal obstruction.
- Rabbits require exposure to sunlight on a regular basis, to maximize their production of vitamin D, important in the homeostatic regulation of blood calcium. Indoor rabbits must be given periods outside.
- If litter trays are used they should be filled with straw, wood shavings (not sawdust) or paper based litter. Clay cat litter is not appropriate as it can cause gastrointestinal obstruction if ingested.
- Indoor rabbits may live in association with cats and dogs. Although these are traditionally their predators, many rabbits learn to accept their company without fear. Transmissible diseases include fleas, Cheyletiella and bordetellosis and the implications of these must be considered if rabbits are mixing with other household pets.
- A 'hiding spot' should be provided. Rabbits are typically anxious, wary animals and are easily frightened. This is especially true of newly acquired pet rabbits and rabbits kept for reasons other than as pets. A concealed area into which these rabbits can retreat when they feel threatened is necessary to prevent injury that would result from excessive and futile efforts to escape from the cage. Hiding provides a safe alternative to useless and often injurious escape efforts.
- Shade must be provided to prevent heat stress or heat stroke. All rabbits, even those housed indoors, are especially sensitive to high environmental temperatures. Adequate shelter, for outdoor rabbits, must also be provided against wind, rain, snow and ice.
- Cleanliness is essential to prevent disease, and hutches should be cleaned at least once a week. Wet soiled bedding can cause ulcerative plantar pododermatitis ('sore hocks'), and high ammonia levels predispose to respiratory disease.

Exercise area

An exercise area must always be provided in addition to a hutch. This can be in the form of a mobile run, ark or permanently fenced area of grass. Alternatively, a shed or garage can be used to provide a floor pen. Raised

shelves or platforms are readily used. If rabbits are housed outside it should be remembered that they do dig deep burrows, and measures to prevent escape should be taken, such as paving the edges of the pen or sinking wire mesh below ground level. Rabbits can jump well; covering the run or pen with a mesh top will prevent escape, as well as providing protection from potential predators such as cats and dogs. Due to their natural prey status, rabbits should always be provided with appropriate 'bolt holes,' such as empty cardboard boxes or pieces of drain pipe, to use if alarmed.

Stocking

Veterinary surgeons are often asked to advise on the suitability of companions for the rabbit. Rabbits are social creatures, and where possible should be allowed companions. It is very important to sex rabbits when they are first examined, and not rely on what the pet shop said!

Littermates can be kept together but should be neutered if of opposite sexes. Unrelated females will usually tolerate each other if sufficient space is provided, but they can fight. Introduced intact bucks will fight and inflict severe injuries. All introductions should be supervised, and neutering will minimize the risk of conflicts.

Other house pets can be well tolerated, but dogs and cats should not be left unsupervised with rabbits.

- The ideal combination is a neutered male and neutered female, and with the advent of safe anaesthesia isoflurane and increased veterinary expertise there is no reason why we should not be offering rabbit neutering routinely to our clients. Unneutered does can live with neutered bucks, but they may have an increased chance of developing pyometra later in life.
- Same sex rabbits will often fight once they reach sexual maturity. This applies to does as well as bucks. Early neutering may reduce this risk, but it cannot guarantee it.
- In some circumstances rabbits will live harmoniously with guinea pigs. Bullying by the rabbit can occur. If they are kept together, guinea pigs should be provided with an area that is inaccessible to the rabbits. Factors to consider are the risk of limb or rib fracture to the guinea pig if the rabbit kicks, *Bordetella* carried asymptotically by the rabbit which is pathogenic to the guinea pig and their differing dietary requirements.

Breeding

Sexual maturation

Onset of puberty depends on breed but is at around 4-5 months of age in the female and 5-8 months in the male. Within a breed, does tend to be slightly larger than bucks but bucks have broader heads. Smaller breeds mature

earlier than larger ones. Does tend to be more territorial than bucks; to avoid aggression the doe should be taken to the buck or to neutral territory for breeding.

Rabbits are reflex ovulators. There is no definitive oestrous cycle, but periods of receptivity usually occur for 12-14 days, followed by 2-4 days of non-receptivity while new follicles are developing. This can, however, be highly variable, and some does will become receptive every 4-6 days during the breeding season (January to September).

Mating behaviour

When receptive, a doe becomes very active, rubs her chin on objects and exhibits lordosis, and the vulva becomes congested and reddish-purple. Sexually mature bucks will mate at any time.

Courtship behaviour is brief (about 30 seconds) and involves sniffing, licking and following the doe. Enurination - the spraying of a jet of urine at the doe is common sexual behaviour.

Copulation is very brief and involves a vigorous thrusting intromission, which often leads to the buck falling backwards or sideways and vocalizing. Ovulation occurs 10 hours after copulation. Does may also mount each other, and this or an infertile mating can induce ovulation and lead to a pseudopregnancy, which lasts about 18 days.

Pregnancy

Pregnancy can be detected by palpation 2 weeks after a successful mating. Normal gestation is 30-32 days. Passive immunity is acquired by placental transfer before birth. Nest-building behaviour involves burrowing if possible, and pulling of fur from the dewlap, flanks and belly to line the nest and expose the nipples.

Parturition

Parturition usually occurs in the early morning. Litter size varies between 4 and 12 kittens, with the larger breeds producing larger litters. The kittens are altricial.

Neonatal care

Rabbit milk is exceptionally nutritious, and nursing is for only a few minutes once, or occasionally twice, a day. This brief nursing period is often misinterpreted by owners as mismothering, but is entirely normal. The parental bond is maintained by scent, with the doe marking her kittens with her chin and inguinal gland secretions. Handling of the kittens can lead to mismothering, and so this should be avoided, particularly during the first week of the kittens' lives. Kittens emerge from the nest at about 2-3 weeks of age and can be weaned at 4-5 weeks of age. Early handling and socialization is important in pet rabbits. Kittens show interest in solid food at about 2 weeks of age, and coprophagy starts at about 3 weeks of age. Stomach pH in non-weaned kittens is 5.5-6.0, but this decreases to 1.0-2.0 after weaning. Coprophagy usually commences 3-8 hours after feeding.

Behavior

Rabbit behaviour is significantly different from that of cats and dogs owing to their prey status. They have poor display of greeting behaviour, pain and fear. Scent is much more important than sight, and each animal has an individual scent profile. They can distinguish between familiar and unfamiliar humans, and between men and women. Rabbits are highly social. In the wild they live in warrens usually containing 70 or more individuals, but groups are broken down into 2-8 individuals. Foraging takes up most of the time in the wild, in the early morning and at night. Rabbits should not be kept singly unless the owner can devote a lot of time to them, but should rather be housed in neutered groups or pairs. They spend a lot of time engaged in mutual grooming and lying together. Does are more territorial than bucks, and as they reach sexual maturity may become aggressive towards the owner and other animals. Does may also bite, dig and chew flooring and household items, spray urine and mount other rabbits. If outdoors on soil the doe may excavate deep tunnels.

A well-socialized pet rabbit will beg for treats, 'hum' at and circle the owner, stand on its back legs and lick the owner's hands and arms. They are inquisitive and enjoy exploring. Picking up objects with the teeth and throwing them is also common, as is exploratory chewing (beware of electrical cables).

A rabbit in pain will be immobile with a hunched posture, and may grind its teeth and show increased aggression. Thumping with the hind leg is an alarm call. Fear elicits either complete immobility or a flight response, with often frantic attempts to escape, which can be accompanied by screaming.

Rabbits have not been bred for positive behaviour traits, and behavioural problems are not uncommon. Individual rabbits have distinct 'personalities,' which can range from extremely timid to very aggressive. In general, the smaller breeds tend to have a more nervous disposition. Aggression is generally learnt, i.e. the owner leaves the rabbit alone if it behaves aggressively. Other causes of aggression are territorial behaviour, boredom, pain, improper socialization and negative association, i.e. a previous aversive or traumatic situation. Behavioural aggression can be successfully treated in many cases using similar techniques to those used in dogs.

Surgical Considerations

Sterilization

Pet rabbits not intended for breeding should be *sterilized* at any time after 4 1/2 months of age. Male rabbits (especially of the dwarf varieties) have a tendency to become aggressive upon reaching sexual maturity. Neutering (castration) is the best way to reduce the severity of the problems (biting,

urine-spraying) seen in sexually mature male rabbits.

Female rabbits should be spayed (ovariohysterectomized) to prevent unwanted pregnancy and uterine cancer. Uterine tumors are the most common type in female rabbits and often are associated with serious blood loss. Spaying female rabbits may also help to prevent or reduce territorial aggression among females.

Infections Requiring Veterinary Attention

Bacterial Diseases

The most important being *Pasteurellosis*: The bacterium, *Pasteurella multocida*, is the major infectious agent of rabbits. It is most often transmitted among chronically infected does and their litters or between breeding males and females. The bacteria most often reside in the nose, lungs and eye membranes, but can spread to other areas of the body. Respiratory disease, including pneumonia and infection of the nasal passages and sinuses, is very common. Infections of the eye membranes, middle ear, jawbone and uterus are most often the result of the *Pasteurella* organism. Abscesses are also common and occur when the *Pasteurella* organism settles in a specific location. The rabbit's body responds to this invasion with an influx of tremendous numbers of white blood cells to fight the infection. Pus results from the accumulation of dead and dying white blood cells and tissue cells in the area of the infection. Prognosis is poor although some recover with aggressive antibiotic therapy.

Fungal Disease: Ringworm

Viral Diseases

Viral diseases affecting pet rabbits are rarely identified. Fortunately, such devastating viral diseases as *myxomatosis* are very uncommon in pet rabbits in the United States. *Rabies* is virtually unknown in pet rabbits.

Parasitic Diseases

Ear Mite Infestation

Cheyletiella Mange ('Walking Dandruff')

Flea Infestation: Flea collars should *not* be used on rabbits and care with use of topical

spray as many are toxic to rabbits

Coccidiosis: (inappetence, diarrhea, dehydration, increased thirst, possibly death).

Pinworm Infection

Non-Infectious Conditions Requiring Veterinary Attention

Hairballs

Like cats, rabbits (especially Angora rabbits) frequently develop hairballs within their stomachs. But unlike cats, rabbits cannot vomit. As a result, hair that is swallowed from frequent grooming passes into the stomach and remains there. Over time, the hair develops into a solid mass. As the hairball increases in size it begins to occupy more and more of the stomach, leaving less room for food. Initial signs of a hairball problem include reluctance to eat pellets and more interest in eating greens and treat items. Later signs include inappetance, smaller fecal pellets or none passed at all, weakness, weight loss and eventually, death from starvation.

Surgery is often necessary to remove the hairball from the stomach. Some cases can be successfully managed more conservatively with judicious use of fresh pineapple or papaya products and intestinal lubricants. For this reason, conservative treatment is usually attempted before resorting to surgical intervention. Recurrences are common.

Prevention involves vigorous daily brushing of the rabbit and daily use of intestinal lubricants (Laxatone, Evsco Pharmaceuticals, Buena, NJ 08310) formulated for cats. Many rabbit fanciers and veterinarians believe that feeding fresh (not canned) pineapple juice, pineapple chunks and papaya, which contains the digestive enzyme papain, may help prevent stomach hairballs in rabbits. The suggested daily dosage of pineapple juice is 1/2 tsp per 2 lb body weight. A suitable alternative to this is pina colada yogurt at a dosage of 1 cc per pound body weight given orally given twice daily.

Hutch Sores ('Sore Hocks')

Hutch sores are chronically ulcerated and infected wounds on the weight-bearing surfaces of the rear (and sometimes the front) paws. They are caused by a number of predisposing factors: reduced thickness of fur on the bottoms of the feet, continued thumping of the rear feet when frightened; excessive body weight, repeated or continual urine-soiling of feet; lack of movement from living in a small enclosure and abrasions from irregular cage flooring. Hutch sores can occur in rabbits housed on solid floors, but are more common in rabbits kept in enclosures with wire floors. Pet rabbits that are housed indoors or outdoors should be confined in roomy wire cages with Plexiglas covering about one-half of the floor's surface area.

Hutch sores are treated with antibiotics (both topically and by injection) and periodic bandaging of the affected feet. Treatment is usually long-term and also requires identification and correction of the underlying causes. Hutch sores must be treated aggressively to prevent infection of deeper soft tissues and bone.

Overgrown Incisor Teeth

Malocclusion (Improperly aligned teeth resulting in abnormal tooth growth and wear) in rabbits usually results in overgrown incisor (front) teeth. Occasionally, misdirected premolar and molar teeth are noted. Many rabbits with a malocclusion probably have a genetic deficiency that causes an abnormally short upper jaw. This structural defect prevents the continuously growing upper and lower incisors from meeting each other as the rabbit chews. Consequently, the overgrown incisors cause considerable trauma to the tongue and lining of the mouth. A rabbit's 'bite' must be absolutely perfect so that its continuously growing teeth wear down, properly.

Infections of the jawbone in the area of the incisors can also result in misalignment of these teeth. Many cases of overgrown incisors result from previous injury to the area of the jaw responsible for growth of the incisors, with subsequent uneven tooth growth.

Initial signs of this disorder include failure to properly chew and swallow food, salivation and a wet dewlap. Inappetance and weight loss soon become noticeable. Death from starvation can occur if the problem goes untreated.

Treatment involves periodic clipping of the incisors and attention to any wounds within the mouth caused by the overgrown teeth. The clipping procedure should be carried out by an experienced veterinarian or veterinary technician and must be done periodically for the remainder of the rabbit's life. Rabbits with this condition should never, under any circumstances, be bred.

Overgrown Claws

Overgrown claws are easily torn when caught in fabric or wire mesh. A panicked rabbit can also inflict painful scratches with them. Clipping claws requires experience and judicious restraint of the rabbit, and should be done as needed.

Heat Stress (Heat Stroke)

Rabbits are especially susceptible to heat stroke, particularly those that are overweight and/or heavily furred. Environmental temperatures above 85°F, high humidity (above 70%), inadequate shade and ventilation, crowding and other forms of stress are additional predisposing factors. Rabbits cannot sweat and do not increase water intake when hot. Rabbits tolerate cold better than heat, and as they do not have brown fat deposits they shiver when very cold.

Signs of heat stroke include panting, salivation, ear reddening, weakness, refusal to move, delirium, convulsions and, eventually, death. Heat stroke can be successfully treated if recognized early. Heat-stressed rabbits should either be sprayed or bathed with cool water. Another very effective way to rapidly lower the body temperature involves applying cold running water to the ear flaps. Once these first-aid measures are undertaken, a veterinarian should be contacted immediately.

Prevention of heat stroke involves providing adequate shade from the sun (if the rabbit is housed outdoors) and ventilation (if the rabbit is housed indoors or with many other rabbits). A continuous light mist or spray of water and/or a fan operating over a container of ice and directed at a rabbit within its enclosure can help lower the air temperature, whether the rabbit is housed indoors or outdoors.

Trauma to the Spine

An interesting fact is that a rabbit's entire skeleton comprises only 8% of its total body weight. In comparison, a domestic cat's skeleton comprises 13% of its body weight. The rabbit's fragile lumbar spine (lower back) is surrounded by powerful muscles and is particularly susceptible to fracture. Back injuries most often occur when rabbits are dropped, or improperly picked up or restrained. Closely confined rabbits that become excited and thrash about excessively are very prone to back injuries.

Signs of back injury may include incoordination, urine-soiling and uncontrolled defecation. Paralysis of the rear quarters is the most serious consequence of this type of injury. Any rabbit exhibiting any of these signs should be examined by a veterinarian at once. A thorough physical examination and radio-graphs (x-rays) are usually necessary to make the diagnosis and predict the eventual medical outcome. Spinal injuries are considered very serious and, generally speaking, the outcome is often unfavorable.

To avoid injury, rabbits should be picked up and restrained very carefully. A panicked, struggling rabbit should never be forcefully restrained. Instead, such a rabbit should be immediately released and reapproached when it has calmed down.

Uterine Cancer

The most common tumor of domestic rabbits involves the uterine lining. In breeding rabbits, the early signs of this tumor involve decreased fertility, smaller litter sizes, abortions and stillbirths. In pet rabbits, the most common clinical sign of a uterine tumor is intermittent bleeding from the vulva. This vulvar bleeding is often mistaken for blood in the urine. The volume of hemorrhage can be substantial and alarming. If bleeding is intermittent, the results of a urinalysis may be normal between bleeding episodes.

Though this type of tumor can spread to the lungs, spaying of affected does is strongly advised. Because this type of tumor is so common, all pet female rabbits should be spayed after 4 1/2 months of age to avoid difficulties with the reproductive tract later in life.

Wryneck

Wryneck, a serious problem in pet rabbits, is a mild to severe twisting of the head that causes incoordination and sometimes total incapacitation. Wryneck

is most often the result of a bacterial infection of the inner ear and is not a true neck problem. It can be treated with antibiotics and anti-inflammatory drugs, but the outlook with these cases is always guarded.

Unfortunately, wryneck often results from abscessation of the inner ear (and sometimes the brain). Penetration of antibiotics into the diseased area is often restricted or impossible, resulting in mild improvement, temporary relief, or no improvement at all.

Temporary Selective Anorexia

Some pet rabbits occasionally refuse to eat alfalfa pellets. Affected rabbits usually continue to eat other items in their diets. This condition occurs most often in response to stress, such as that associated with inadequate husbandry or sudden environmental changes. Affected rabbits may continue to refuse to eat pellets for weeks. Old or spoiled (rancid) pellets will also be steadfastly refused.

This condition is diagnosed indirectly. Physical examination of the rabbit reveals nothing abnormal and laboratory tests on blood samples are normal. Other causes of inappetence must also be ruled out, such as hairball formation.

Poisonings and Other Hazards

Pet rabbits are often allowed the 'run of the house'. However, rabbits love to chew and often get into trouble by chewing on electrical cords, poisonous houseplants, floor mats and rugs. Electrocution, serious burns, poisoning and intestinal impaction are the most frequent consequences of such chewing. Rabbits should be confined when their owners are away from the house and must be closely supervised when their owners are at home so that these accidents are avoided.

Sensitivity of the Rabbit's Intestinal Tract

The bacterial populations in a rabbit's intestinal tract are considered the most delicately balanced of any in all herbivorous mammals. The growth and activity of normal (favorable) bacteria tend to keep potentially harmful bacteria in check. Overgrowth of harmful bacteria usually results in production of toxins that are rapidly absorbed into the rabbit's circulation, quickly causing illness and death.

In addition to orally administered antibiotics, other insults can disturb the balance of bacteria. Rapid changes in the diet are most often implicated. For example, a rabbit's diet was suddenly changed from alfalfa pellets to oats because the pet owner had run out of rabbit pellets. The rabbit died within 24 hours of this diet change. Another case of sudden death involved a pet rabbit that ate a large quantity of oatmeal cereal and died the following day. A third rabbit was allowed to consume huge quantities of lawn grass. Its intestinal

tract was not adequately prepared and the rabbit died the same day.

No other commonly kept house pet is as sensitive to dietary changes as the rabbit. Consequently, such changes should be made very gradually. Supplements to the regular diet should be added cautiously and should not constitute more than 20% of the total diet by volume.

The Appearance of Rabbit Urine

Urine from normal rabbits usually contains large amounts of light-colored sediment and may appear abnormal to the uninitiated. The color of normal rabbit urine varies from white, to 'yellowish-white', to 'light brown'. Rabbits that drink large quantities of water tend to produce clearer urine containing less sediment.

Rabbits that have been recently treated with antibiotics and those undergoing significant stress may temporarily produce urine that is orange or red-tinged. Such urine can be differentiated from that which accompanies urinary tract infections or uterine bleeding by use of a urinalysis, performed by a veterinarian.

Important Physiologic Values

Normal Body Temperature: 101.5-103°F

Life Span: 5-10 years (rarely up to 15 years)

Breeding Age: Males = 6-10 months; Females = 5-9 months

Pregnancy: 29-35 days (avg. 31-32 days)

Litter Size: 4-10

Weaning Age: 4-6 weeks