

# 2018 RWAF Conference

## **OWNERS STREAM**

Welcome to what is now our 15<sup>th</sup> conference, which we are thrilled to be hosting in Bristol. This year we are once again pleased to be able to bring you a variety of lectures, all chosen carefully to keep you up to date with the latest research and techniques.

We welcome any feedback and any suggestions for next time. We are hugely grateful to our team of Educators today, and as ever, thanks to our sponsor, Burgess Pet Care.

Thanks therefore go to the following people:

Dr Twigs Way

Dr Livia Benato

Dr Emma Keeble

Dr Molly Varga

Dr Elisabetta Mancinelli

Dr Richard Saunders

Keith Hinde

Jo Hinde RVN

Moreover, of course, huge thanks to all of you for coming along and supporting this event. It would not have been possible otherwise. We hope you have a useful and educational day.

Alan, Emma, Rae, Richard & Ros

*Team RWAF*



## CONTENTS

<u>Topic</u>	<u>Speaker</u>	<u>Page</u>
BIOGRAPHIES		3&4
WHAT TO GROW AT HOME	TWIGS WAY	5
HEAD TILT – CAUSES AND CURES	LIVIA BENATO	5
NURSING AT HOME	EMMA KEEBLE	6-11
DIAGNOSTICS – WHY DO WE NEED THEM	MOLLY VARGA	12-13
FEET	ELISABETTA MANCINELLI	14-18
PROJECT CAPONE	KEITH HINDE	19-22

### Twigs Way

Twigs is a Garden and Landscape Historian and most definitely not a vet! However her interest in plant history has combined over the last fifteen years with running a rabbit rescue/sanctuary resulting in a specialist interest in collecting wild forage and growing food for rabbits, as well as designing gardens suitable for rabbit owners. She has written two books for the RWA on these subjects ('Foraging for Rabbits' and 'Gardening for Rabbits') with a third planned on Vegetable Growing and Allotmenting for Rabbits. Twigs regularly holds day schools on plant identification for rabbit owners, and also talks on housing for rabbits, drawing on her own experiences. Her talks are entertaining and guaranteed to have no gory slides.

### Livia Benato

Livia Benato has worked with rabbits and exotic animals since she graduated in 2002. She works at CityVets in Exeter as Small Mammal and Exotics Veterinary Associate and she is studying towards her PhD in Rabbit Pain and Stress at the University of Bristol. Livia is a RCVS and European Recognised Specialist in Small Mammal Medicine.

### Emma Keeble

Emma Keeble graduated from the University of Bristol in 1994, working in mixed veterinary practice, wildlife rehabilitation and small animal exotic pet first opinion and referral practice before joining the University of Edinburgh, Dick Vet Rabbit and Exotic Animal Practice in 1999. She was veterinary surgeon to Edinburgh Zoo for 10 years as part of this role. She gained her RCVS Diploma in Zoological Medicine (Mammalian) in 2006 and became a RCVS Specialist in 2007. She is currently a lecturer and clinician in rabbit, exotic animal and wildlife medicine and surgery at Edinburgh University with a high clinical teaching caseload of pet exotic species, both first opinion and referral cases. She lectures to veterinary professionals nationally and internationally on exotic pet, zoo and wildlife medicine. She has published widely in veterinary books on exotic pets, wildlife casualties, reptile neurology and rabbit neurology, and has edited books on rabbit, ferret and rodent medicine and surgery and wildlife casualties. She has a particular interest in Encephalitozoon cuniculi infection in pet rabbits and the diagnosis of osteoarthritis in small pet mammals.

### Molly Varga

Molly gained her RCVS Certificate in Zoological Medicine in 2001 and her Diploma (Mammalian) in 2007. Her special interests are rabbit medicine and surgery. Molly has contributed to several books including the BSAVA Manual of Reptiles, Nursing Exotic Pets and Wildlife, Rabbit Medicine and Rabbit Surgery and volumes on rodent/rabbit medicine and surgery. Molly's update on the Textbook of Rabbit Medicine has recently been published. Molly also reviews articles for other authors and Journals, and has been involved in reviewing the WildPro volume on Lagomorphs. She is an examiner for the RCVS Diploma in Zoological Medicine. Molly heads the Exotics Referral Service at Rutland House Veterinary Referrals, St Helens, Merseyside.

**Elisabeth Mancinelli DVM CertZooMed Dipl. ECZM (Small Mammal Medicine and Surgery) MRCVS European Veterinary Specialist in Zoological Medicine (Small Mammal Medicine and Surgery) RCVS Recognised Specialist in Zoo and Wildlife Medicine**

Elisabetta graduated from the University of Naples "Federico II", Italy, in 2002. Her interest in exotics became clear shortly after her graduation, anticipating a career mainly based on non-conventional

animal medicine and surgery. After a small animal focused internship, she's been working solely with exotics since 2003. She undertook an externship in France, mainly based on reptile medicine and then completed an externship program at the "Angell Animal Memorial Hospital" in Boston (USA), focusing on exotic animal medicine and surgery. In 2007, she moved to UK where she initially worked in private practice and wildlife charities. In 2009, Elisabetta started the first European College of Zoological Medicine (ECZM) Residency in Small Mammal Medicine, which she completed at The Royal (Dick) School of Veterinary Studies, Edinburgh. From September 2010, she holds the RCVS Certificate in Zoological Medicine. In 2014, she obtained the ECZM Diploma, Specialty "Small Mammal Medicine and Surgery". She currently leads the exotic department at Highcroft Veterinary Referrals, Bristol (UK).

**Richard Saunders BSc (Hons) BVSc MSB CBiol DZooMed (Mammalian) MRCVS**

Richard Saunders qualified in 1994 from Liverpool University and worked in increasingly exotic practice until 2008, when he took up a Bristol Zoo Residency in Rabbit and Zoo Animal Medicine and Surgery. After that, he continued in Bristol Zoo as a Staff Vet, and as the Rabbit Welfare Association and Fund's Veterinary Advisor. He is the co-author of "Notes on Rabbit Internal Medicine" and "Rabbit Behaviour, Health and Care", and several chapters for the current BSAVA rabbit manuals on Medicine and Surgery. He has 2 rabbits, Leela and Pongo.

**Keith Hinde**

I'm a freelance IT consultant with over 20 years experience in the application of Internet technologies. Aside from private corporate clients, I like to look at ways to solve real life problems through creative use of technology, particularly in the sphere of animal health and welfare. For the past two years or so I've been working alongside the RWF to try and leverage technology to tackle one of the root causes of Rabbit welfare issues in the UK: problem breeding and irresponsible selling.

# Growing for Rabbits

Dr Twigs Way

With supermarket shelves full of every conceivable vegetable and fruit, and summer weeds growing waist high to forage, we sometimes forget how much we can grow ourselves to feed our rabbits and why we should do so. This talk will start by looking at why we should not just reach for the nearest bag of pre-packaged parsnips or kale as the easy way out as winter wild forage dies back, and go on to look at how to decide what is best for you and your rabbit to grow. We will consider time and space, commitment to gardening on your part, and desire on the rabbit's part. The talk includes a Top Ten list of vegetables and herbs to grow, and a back up plan of a further ten, in case of picky rabbits or difficult soils. Also plants to avoid and weeds to encourage. An overview of protective measures to help ensure your crops live beyond the seedling stage will be useful for all prospective rabbit gardeners.

The talk will be 'slide-led' and so is **not** available as speakers notes in advance but the whole presentation will be available (as PDF) on request after the conference by contacting Twigs via the RWAFF.

## Head tilt causes and cures

Livia Benato DVM MScR CertZooMed Dip ECZM (Small Mammals) MRCVS

Head tilt, also called torticollis (from Latin 'twisted neck'), is the rotation of the animal's head in a sideways direction and, in severe presentations, also downwards. This condition is often due to changes in the animal's balance and is defined as vestibular syndrome. A rabbit that presents head tilt should be seen as soon as possible as this is always a concern.

The two main causes of head tilt recognized in rabbits are Encephalitozoon cuniculi (EC), a parasite, and ear disease. In the UK, EC has been reported in both wild and domestic rabbits. A presumptive diagnosis can be made by taking an accurate history and by physical examination. A tentative diagnosis can be made carrying out a blood test that indicates if the rabbit has been exposed or not to the parasite.

Ear disease is caused by the inflammation and infection of the inner part of the ear. This is generally secondary to an untreated and severe infection of the external ear canal or to the spreading of a respiratory disease. In these cases, although radiographic examination is essential as it is easily available, a CT scan should be considered when possible as it is the gold standard in order to achieve a better diagnosis and plan a surgical treatment.

This lecture will discuss the different causes of head tilt in pet rabbits and will give an update of the available diagnostic tests and treatments. Will also give some tips of how better support the rabbit patient during the course of the disease.

## **Nursing your pet rabbit at home**

Nebulisation tips, how to syringe feed successfully, when to change routine and separate bonded pairs, and when to ask for help

Dr. Emma Keeble BVSc MRCVS

RCVS Diploma in Zoological Medicine (Mammalian),

RCVS Recognised Specialist in Zoo and Wildlife Medicine

Lecturer and Clinician in Exotic Animal Medicine

Dick Vet Rabbit and Exotic Animal Practice, University of Edinburgh

Nursing pet rabbits can be challenging, especially in a home environment where a rabbit is less likely to comply and is more easily distracted! This lecture will provide helpful tips for nursing your rabbit at home (nebulisation and syringe feeding tips), as well as guidance on how to monitor nursing progress, managing bonded pairs when one animal is ill and when to seek veterinary advice.

Nebulisation therapy is extremely useful in the management of chronic upper and lower respiratory disease in pet rabbits and is extremely well tolerated. Nebulisers can be readily purchased on-line, and newer models are quieter and more efficient. A particle size of  $<3\mu\text{m}$  is recommended. Medications can be nebulised, creating a fine mist that the rabbit inhales, so acting directly on the airway system. Many different types of drug can be given via this route including antibiotics, antifungals, bronchodilators and mucolytic drugs. A commonly given antibacterial / antifungal treatment is a product called 'F10 SC'. This MUST be diluted before use (1ml F10SC to 250mls tap water). Nebulisation is usually carried out 1-2x daily for approximately 20 minutes each time. The easiest way to nebulise your rabbit is to create a 'nebulisation chamber' using your pet carrier. This can be made more pet friendly by soft bedding, hay and familiar toys being added. Food and water bowls should be removed, as the nebulised drugs can settle onto these. The rabbit is placed inside the box and the nebuliser cup attached to the inside of the door of the box using tape or ties. The medication is poured into the base of the cup (usually approx. 5mls in total) and the cap screwed on. The cup must be kept upright at all times otherwise it won't work and take care not to over fill the cup (as if too full a mist will not form). Test that it is working before closing the door. If working properly a fine mist should be seen coming from the top of the cup. A heavy blanket or towel is then wrapped / draped over the box and the nebuliser is turned on. After 20 minutes, turn the nebuliser off and wait a further 10 minutes for the mist to dispel, before removing your rabbit from the box and reuniting it with friends! Rabbits can be nebulised together if both animals are affected. The box and nebuliser can be left as is for the next treatment. Any unused medication can

be reused at the next treatment, but it is advisable to clean out the cup with warm water periodically.

### Restraint for medication and syringe feeding

In scared or wriggly rabbits, when giving treatments by mouth, in the eyes or ears, or for syringe feeding recovery diets, it may be necessary to 'bunny burrito' (wrap in a towel) your pet. The end result of this is often more manageable, with the legs all contained and only the head left to control, especially if medicating single handed. The rabbit can be placed on the floor before wrapping in a towel. You can then sit with legs either side of the rabbit, rabbit's head facing away from you and lean down to syringe feed. N.B. Holding your animal on it's back ('trancing') to give medications or feed by mouth should NEVER be done. This is highly stressful to your rabbit and there is a high risk of aspiration (inhalation of food into the airways) in this position.

#### 'Bunny Burrito' – step by step guide

- 1) An appropriate sized towel should be placed unfolded on the floor with the rabbit on top. (N.B. Do not make the towel too small or the folds will loosen.)
- 2) One side of the towel is wrapped over the top of the rabbit and 'tucked in' underneath on the opposite side.
- 3) The rump area of towel is folded forwards over the back end of the rabbit.
- 4) The remaining towel end is folded over the back, tucking in the front feet, before being secured underneath the rabbit on the opposite side.
- 5) The rabbit only has its head visible, allowing you to give medications easily or start syringe feeding.

### Syringe feeding

Prepared, palatable formulas for rabbits are widely available, such as 'Supreme's Recovery Plus ®', 'Oxbow's Critical Care Formula ®', 'Oxbow's Critical care formula fine grind ®', and 'Lafeber's Emeraid Nutritional care system herbivore®'. Rabbits can object to initial administration although they do seem to enjoy the taste and may even voluntarily suck from the syringe (Author's personal experience). Otherwise rabbits can be wrapped in a towel ('bunny-burrito') and the syringe gently inserted into the diastema (space between incisors and first pre-molar) and no more than 0.5-1ml syringed periodically, whilst observing for the rabbit to chew and swallow. Your vet should give you guidelines on how much and often to feed your pet and the product should have instructions on the packaging on how to make up and store the feed. As a general rule the author recommends

giving between 10-30ml per feed (depending on the size of the rabbit), 2-5x daily (depending on how much the rabbit is eating and the product used).

1. A wide-nozzle, dosing syringe should be filled with critical care formula
2. The rabbit should be restrained appropriately
3. The nozzle is gently inserted behind the incisors and advanced 2-4cm into the mouth (rabbit size dependent)
4. The patients head should remain parallel to the floor while small volumes of food are administered
5. The syringe should be removed from the oral cavity between mouthfuls to encourage chewing and wait for your pet to swallow before giving further feed.

Warning: Do not continue to feed if your pet does not swallow or chew. Doing so could lead to excessive food material in the mouth and a high risk of aspiration. Very sick rabbits will not swallow and should be taken immediately to your vet.

Top tips: allow time between each mouthful. Agitating the towel in front of your bunny can encourage them to dig at the towel and this is often followed by chewing and swallowing activity. If your pet refuses to chew and swallow give them a break between mouthfuls by placing them on the floor and allowing them to hop around. Syringe feeding should never be hurried, so take your time! Different products can be tried if one product is not liked.

When to change routine and separate bonded pairs:

It is preferable to house bonded pairs together wherever possible, even when one animal is not well, however separation for a few hours or even overnight may be necessary when one animal is unwell to assess what food and water your ill pet has eaten / drunk and whether any droppings or urine have been passed. This can be easily achieved using your pet carrier, fully cleaned out and made up with clean bedding / hay / tempting food and water. It is fine to leave your rabbit for an hour or so inside the box to observe whether they are eating and passing droppings. This is very important to know in a sick rabbit housed with others since, as rabbits are prey species, they hide signs of ill health. Assessment of droppings is key to gauging your rabbit's health and food intake. Irregular, small dry droppings are a sign of reduced food intake and / or gut stasis. Less than 10 droppings passed over night is cause for concern and you should contact your vet immediately for advice.

Sometimes bonded pairs will fight when one of the pair is ill. This can occur if the dominant rabbit is ill and the subordinate one sees a chance to become top dog! It can also occur with the dominant rabbit starting to sense its companion's weakness

and taking advantage of this. In this situation it is usually necessary to separate the rabbits. This should be done so that they still have visual and olfactory contact and if possible supervised time together can be allowed.

When to ask for help from your vet

Pain, distress and discomfort are all difficult to assess in pet rabbits. Rabbits are nervous, sensitive animals and are less likely to show visible signs of pain than dogs and cats, since in the wild they would be predated on. There are several key factors that rabbit owners can monitor at home to assess ill health in their pet and determine whether a trip to the vet is required.

Factors that can be monitored at home:

- \* Daily weighing
- \* Close monitoring of urine and faecal output
- \* Rectal temperature (a vet must show you how to do this first)
- \* Breathing rate
- \* Monitoring of food intake (daily diary)

Things that can be done to help sick rabbits at home:

- \* Warmth if required (place by radiator, hot water bottle wrapped in towel)
- \* Keep away from other pets and excess noise
- \* Provide a quiet hide dark warm area
- \* Minimisation of handling
- \* Ad lib water by a familiar route – bowl vs bottle
- \* Provision of tempting food – herbs, garden weeds
- \* House with a friend if possible

Appetite may be stimulated in the convalescing rabbit by provision of fresh greens such as grass, dandelion leaves, fresh herbs and kale. A hide area in the cage is essential. Good quality hay should be available at all times. Where possible present the rabbit with its normal diet (food and water) in a form that it is used to. Recent research has shown that rabbits greatly prefer drinking water from a bowl and are more likely to drink if offered water via this route than using a bottle. Litter trays

should be provided if usually used by the rabbit. Stressors such as contact with prey species, over handling, noise and painful procedures should be avoided where possible.

Physiological Data for the Rabbit (average values for reference):

Heart rate 180-250/minute

Respiratory rate 30 – 60 /minute

Body temperature 38.5 – 39.5C Concern if <37C or >40.5C

Daily food consumption (pellets) 20g/kg

Daily water consumption 50-100-ml/kg

Daily urine production 20-250 ml/kg

When should I contact my vet?

Clinical signs of reduced or loss of appetite and production of scant, small irregular droppings are most commonly encountered in the sick rabbit. These findings may be associated with pain; in particular related to dental disease or gastrointestinal disease.

Vital Clinical signs

The more a rabbit is manipulated and handled, the more stressed it becomes. Vital parameters – respiratory rate, heart rate and temperature – easily become elevated with stress and handling. Interpretation of values obtained should therefore take these factors into account. Rectal temperature is a good assessment of whether the animal is in shock or dehydrated as temperature drops rapidly in sick rabbits. Elevations in temperature are common with stress, over handling and infection / inflammation.

Droppings

Visual assessment of size, shape, consistency and amount passed is essential. No droppings being passed over night is an emergency situation. Reduced droppings or changes in size and shape should also be seen by a vet.

Food intake

A rabbit that normally eats well, but then refuses breakfast should be seen by a vet. Waiting 1-2 hours and tempting to eat with leafy greens / herbs / favourite food

items is acceptable as long as the rabbit is bright, hopping around and showing no signs of abdominal pain or teeth grinding.

Reduced urination / straining to urinate / lack of urination

These could all be associated with a major problem in your pet rabbit (for example associated with dehydration, cystitis or a urinary blockage). It is advisable to contact your vet for advice in these situations.

If your rabbit is ill and has to be taken to your vet please remember to bring any current medications with you, as well as a small amount of its usual food. It may also be helpful to bring a free catch urine sample and some droppings for your vet to examine and test. If your pet is part of a bonded pair ask your vet about bringing its companion along too. Remember, if in doubt, call your vet

## **Diagnostics- Why Do We Need Them?**

Molly Varga BVetMed DZooMed MRCVS

Rabbit Welfare Association and Fund Conference 2018.

### **Introduction**

As rabbits increase in popularity, so the quest for improved knowledge, more refined diagnoses and more complex treatments increases. All of these things are welfare driven- the better the diagnosis we make as vets, the more specific and often successful the treatment that we can prescribe. Consequently, the days where a physical examination was sufficient to make a diagnosis are long gone. And to be honest, there are many cases where we shouldn't base our diagnosis on examination alone, because the risks of the treatment also need to be considered- and it is worse than cruel to give a treatment that causes side-effects to an animal that does not need it. So what are the diagnostic options?

### **Blood Samples**

Blood samples are some of the commonest tests that we offer, and these can 'look' for many different conditions. The most basic blood samples check the relative numbers and types of blood cells. This allows your vet to tell whether or not your animal is anaemic (low red cell count) or suffering from infection or inflammation (high white cell count). These are not things that can be obtained from a physical examination. Other things that we can find from blood tests are whether the internal organs are functioning or not, and whether or not they are inflamed or damaged. So all in all these tests are a complement to physical examination and allow us to make a more complete evaluation of your animal, they get to the information that cannot be seen or felt.

Other types of blood samples may be suggested such as 'titres' for *E.cuniculi*. Again, these samples give us information that we cannot obtain by any other method, and may allow your vets to determine whether the illness your rabbit has, is related to this parasite.

### **X-Rays (Radiographs)**

Your vet may find changes on the physical examination that suggests that radiographs are needed in order to make a diagnosis. X-rays will primarily show changes to the skeleton but on some occasions will also be able to show changes to soft tissues such as the lungs, heart and the contents of the abdomen. X-rays are essential if your rabbit is having regular dental work. In most cases your rabbit will require sedation in order to get radiographs that are diagnostically useful.

### **Ultrasound**

Ultrasound gives moving images of internal organs and is very useful for diagnosing pregnancy, and changes to the internal organs for example the liver and also the heart. It can allow measurement of organs or abnormal areas, assessment of gut motility, and it can be used to guide taking samples from internal organs if needed. Although in some cases your rabbit may need sedation for this, in many cases basic ultrasound can be performed on a conscious animal. There is a specialised form of ultrasonography known as echocardiography that is specifically used to evaluate the heart shape, the blood flow through it, and how well the heart is functioning- this is usually done by a cardiologist.

### **Computed Tomography (CT scans)**

Computed tomography is an advanced form of imaging. It uses a series of x-ray images to build a 3-D image of your rabbit. Although some hospitals are able to do this conscious, in most cases your rabbit will require sedation at least in order to get good enough images. CT is very good for skeletal imaging, but less sensitive for soft tissues. It is possible to get 3-D printing done from CT images so that bespoke implants can be made for things like serious fractures.

### **Magnetic Resonance Imaging (MRI) Scans**

Magnetic Resonance Imaging (MRI) uses a magnetic field and electric gradients to form an image of the body and its internal organs. It does not involve the use of x-rays. MRI scanning can take a long time, and the animal has to remain still, so general anaesthesia is required. MRI scanning is particularly useful for looking at soft tissues, and is very often used in the diagnosis of cancer. The cost of MRI scanning can be prohibitive.

### **Conclusions**

From an outside viewpoint, its easy to think that additional 'diagnostics' are a waste of money; however, they may significantly benefit your rabbit in the long term. The better, and more specific the diagnosis you allow your vet to make for your pet, the better the treatment they can provide. No-one has made us miracle workers and in many cases, we can't tell exactly what is wrong, until we are able to investigate.

## Rabbit's feet

Elisabeth Mancinelli

Knowledge of the anatomy, physiology and common conditions affecting these important anatomical parts is essential in order to provide the most adequate care.

### Anatomy and physiology

Pet rabbits have a delicate and light weight skeleton compared with other mammals. This makes up for only 7-8% of the total body weight of the animal, as compared to 12 to 13% in cats. The front legs are short and fine while the back ones are long and powerful, allowing for the typical hopping movements. Many studies have focused on the architecture of the skeleton in this species to determine the force, velocity and properties of muscles involved in running, escaping predators or hopping. The rabbit's anatomy is designed to evade predators by accelerating quickly, performing numerous, rapid changes in direction with maximum acceleration and by maintaining a high speed locomotion. The powerful hind limb musculature and light skeleton also enable powerful jumping over long distances. The powerful hind legs and lumbar muscles mean that rabbits can kick violently. That's why correct handling is critical. If a rabbit struggles when picked up, or even when they stamp their feet violently on the ground, they are prone to fracture of their backbones (usually at the 7th lumbar vertebra) and damage to their spinal cord.

Rabbits have 6 or 7 tarsal bones (the ankle) and 9 carpal bones (the wrist). They have a total of 18 digits. Each front (thoracic) foot has 5 digits, of which the inward facing is the vestigial dewclaw that grows higher on the leg and does not reach the ground. Each hind (pelvic) foot has 4 digits. Each digit has an associated non-retractable toenail that has a blunt end. Rabbit claws cover and protect the distal phalanges against shock and pressure from body weight. The nails' rounded shape also provides grip when the rabbit moves and allows digging in soil. Differently from cats, dogs and rodents, rabbits lack footpads and have instead compressed coarse guard hair that cover the areas under the toes and along the hock (tarsal and metatarsal areas), protecting the feet from injury during movement and leaping. Rabbits housed improperly, and those that are overweight, may develop ulcerated hock and metatarsal areas. Rabbits bear their weight on the digits and claws of the hind feet during running and on the area between the hock and the claws when at the rest.

### Examination

Allowing the rabbit to hop around free within a consulting room floor, making sure to provide a non-slip surface (e.g. a large towel), may be helpful to assess the patient's gait. This may allow to assess whether the rabbit is

hopping or walking and identify the presence of abnormalities. The majority of healthy rabbits will tend to hop even when moving slowly while rabbits with skeletal (e.g. spinal problems) or neurological deficits will often walk. The forelegs are used to groom the face and inability to do so may be an indication of spinal issues. Furthermore, examining the inner surface of the front paws may reveal the presence of discharge (e.g. dried mucopurulent material) which may be indicative of ocular and/or nasal disease. An orthopaedic examination may be performed if required. Neurological deficits may also be identified, suggesting the need for a more in depth examination. The ventral surface of all feet (front and back) should be examined, making sure to part the thick protective guard-hairs covering the skin and assess the presence or lack of hair, any redness, callus formation or evidence of infection (e.g. pododermatitis). A small, circular hairless area at the tip of the hock is not unusual in most rabbits. However, if the feet or hocks appear ulcerated or infected, or if a rabbit struggles to walk or even assumes an abnormal position when urinating, veterinary care should be sought immediately and further investigations should be performed. Large felts of densely matted hair can also accumulate on the plantar aspect of the hind feet. These animals should be groomed daily making sure the loose felts of hair, which may otherwise be ingested by the rabbit, are removed. However, the hairs covering the ventral surface of the feet should never be clipped as they are protective and serve an important purpose. Their complete removal may predispose to or cause pododermatitis (“sore hocks”). Any swelling or lumps should be noted and further investigations should be considered to identify the origin (e.g. abscess, foreign body reaction, tumour) and evaluate the extent of the problem. Rabbits have very sharp toenails that should be examined and periodically trimmed during routine grooming. Nails can be trimmed as a two-person procedure (one person holding the rabbit outward against their body while the other trims the feet). Elongated, distorted nails may cause excessive pressure on the hocks.

A complete physical examination is important as many of the problems seen affecting rabbits’ feet may be painful and can greatly impact on the animal’s quality of life. The need for pain relief should be carefully assessed by the veterinarian examining the rabbit.

#### Common diseases of the rabbit’s feet

Chewing and self-mutilation of nails and/or digit or feet are occasionally seen in pet rabbits. The exact cause is not clear and it is possible that several conditions may result in this type of behaviour including obsessive/compulsive behaviour, boredom or lack of attention, hypersensitivity (e.g. to skin parasites), contact dermatitis or they may be the result of discomfort due to

overgrown nails, or the presence of bacterial or fungal infection of the terminal digit portion or the nail bed. Self-trauma can be so severe in some cases leading to the loss of the affected digit/s. Gathering a complete history of the rabbit is

important including details of husbandry, environmental hygiene, exercise possibilities, diet, and medical history. A complete clinical evaluation of the patient is necessary. Even if only one paw is affected, it is important to check all others and rule out the presence of skin parasites, as well as bacterial or fungal dermatitis. If an infection is present, it may require adequate investigations and antibiotic therapy to prevent its spreading to the bone and onset of osteomyelitis. Administration of analgesics helps relieve pain caused by a broken nail, particularly when the break is near the nail bed or includes the sensitive quick. A parasiticide may be used in cases of parasitic infestation. In most cases the new nail will regrow back normal. If, however, the nail root has been damaged, the new nail will be abnormal (e.g. irregular, twisted). Environmental enrichment should be implemented (including adequate exercise and playing time, a bonded companion, and foraging opportunities) to reduce the risk of behavioural related issues (e.g. boredom). Neutering may help prevent frustration. A high fibre diet is essential as chewing hay and grazing grass prevents boredom as well as providing an adequate intake of nutrients. Self-mutilation following intramuscular injections of certain drugs into the caudal thigh has also been reported.

Contact dermatitis may occur as a result of repeated exposure to chemicals (e.g. disinfectants, wood shavings, topical creams or ointments). The lesions usually have a characteristic distribution which may help identify the cause. For example, lesions on the hocks and scrotum can be associated with reactions to a substrate used. Identification and removal of the inciting cause is essential as well as treatment of irritation or infection this may have caused. The use of corticosteroids should be avoided as well as the use of drugs/cream designed for human use.

Pododermatitis, often called “sore hocks”, is a chronic skin disease which most commonly affects the back feet of rabbits. Less frequently, the front feet may be also involved. Pododermatitis usually starts with a hairless spot localised on the sole. The skin, initially inflamed and red, may then become thickened and flaked, with necrotic tissue in the middle of the wound as the disease progresses. Ulcers and abscesses can be present in advanced stages. The bacterial infection can be accompanied by the presence of caseous white pus. If the wounds remain untreated, the infection will spread to the inner tissues, potentially leading to the involvement of the underlying bones and tendons with loss of their function. The rabbit is usually painful and restless. Decreased appetite and weight loss may be seen. Factors predisposing to pododermatitis are multiple and may include a rabbit’s weight, body condition,

age, sex, and concurrent diseases. Furthermore, pressure and friction may act locally on the hock area predisposing to the development of pressure ulcers (similar to bedsores in humans). From a survey performed to gather data specific to pet rabbits, it appeared that many of the same risk factors identified in commercial animals, are valid for pet rabbits. The findings suggested, for example, that neutered female domestic rabbits are more predisposed to pododermatitis than

neutered males. This is likely due to the fact that neutered females may be less inclined to movement and more predisposed to obesity compared to neutered males, hence the higher incidence of sore hocks. Animals that are overweight also are at higher risk of pododermatitis compared to those considered to be at an ideal weight. It is generally accepted that the type of substrate on which a rabbit is housed has a great impact on the development of sore hocks as it can affect the weight distribution. Many types of flooring are also abrasive and can cause friction, increasing the likelihood of sore hocks developing. Hay, compared to other types of bedding (including carpet, hard flooring, newspaper, straw, shavings, towels, blankets, recycled paper bedding, carpet or foam mats) is associated with a reduced incidence of pododermatitis. In the study mentioned, 100% of the rabbits housed on beddings different from hay presented various degree of pododermatitis. These findings confirm the fact that house rabbits which, in the majority of cases, are kept on rough carpeting or hard flooring are more susceptible to developing pododermatitis compared to those that spend most of their time sitting on hay. Pododermatitis is a serious and painful condition, often difficult and frustrating to treat, which can rapidly progress and potentially compromise the health and welfare of pet rabbits by causing chronic pain and suffering. There is clear evidence that husbandry and captive management have a great impact on the development of this condition. Therefore, increased awareness of this extremely common problem is necessary as many pet rabbit owners are unaware of it and many veterinarians underestimate its impact.

Fractures of digits or limbs may occur as a result of trauma (e.g. a limb trapped between cage bars) or inappropriate handling. The rabbit may be unable to bear weight on the affected limb. The shape of a rabbit's leg does not allow easy application of splints, bandages, casts or slings. Orthopedic surgery may be performed in some cases to re-align the fragments, immobilise the fracture and speed up healing. However, rabbits' bones are brittle and fractures are often complex. In those cases where surgery is not an option or fails, or where severe infection is present, amputation may be considered. Amputations are usually well tolerated by rabbits.

### Arthritis

This is a very common condition often seen in middle aged to older rabbits. Arthritis may affect the spine, legs or feet and it is usually very painful,

potentially having a great impact on the rabbit's quality of life. Long term pain management may be required. Husbandry changes may help the rabbit being more comfortable (e.g. deep bedding, barrier cream to protect the skin against sores, clean perineum daily, avoid platforms, and reduce climbing opportunities).

### Foreign bodies

Foreign bodies, including grass seeds, splinters, wood or sutures left after surgery may embed between a rabbit's toes causing bleeding or the formation of granulomas or abscesses. The foreign body needs to be removed and the wound treated appropriately. Failure to remove all of the foreign body may lead to severe and progressive infection affecting the surrounding tissue or even the bone. In severe cases, loss of limb may result.

### Neoplasia

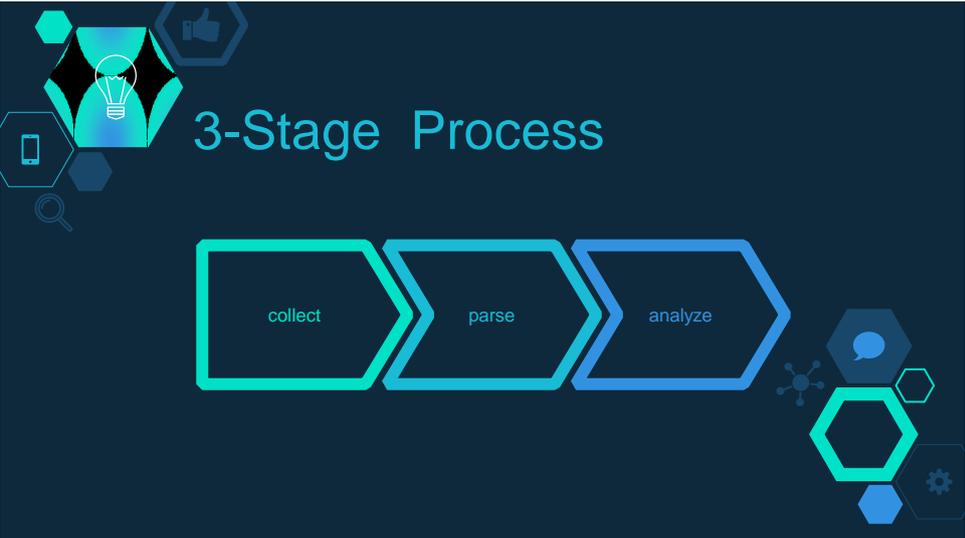
Although uncommon, tumours affecting rabbit's feet may be seen. Therefore any swelling or lump should be immediately investigated to identify its origin and extent. The feasibility of surgical removal should be assessed on a case by case basis.





## Stakeholder Benefits

<p><b>NGO's</b></p> <p>Solid base dataset for decision-making, research and lobbying.</p> <p>Target outreach and marketing efforts.</p> <p>Monitor trends, welfare issues and assist law enforcement.</p>	<p><b>Political &amp; Legal</b></p> <p>Track volume sellers, to tackle legal, welfare and revenue issues.</p> <p>Independent data to base legislative decisions around.</p> <p>Transparency.</p> <p>All open source intel.</p>	<p><b>Publishers</b></p> <p>Better product.</p> <p>Visible CSR boost.</p> <p>Advanced analysis that is not cost effective to run in-house.</p> <p>Feedback into development lifecycle.</p> <p>Fraud prevention.</p>
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## How does it work?

<p><b>Collect</b></p> <p>Scheduled collection of newly posted adverts. Content is secured along with photos.</p>	<p><b>Process</b></p> <p>Content is parsed to extract maximum volume of relevant data. Data enhanced via 3rd party libraries, techniques and datasets. Stored in native graph database.</p>	<p><b>Analyze</b></p> <p>Scheduled large scale analysis for stakeholders. Ad-hoc analysis for specific case issues or reporting requirements. TBI: Dashboard and seller spot check UI.</p>
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# 155,352

UK Rabbit Adverts Collected




# 327,446

Photos

# 2,502

Advertisers\*

# 11,849

Phone Numbers





# Case Studies



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- ## Next Steps?
- ◇ “tech4pets”
  - ◇ Legislative support
  - ◇ Wider range of species
  - ◇ Other geographies
  - ◇ More innovation
  - ◇ More sites
- 



# Thanks!

## Any questions?

You can find me at:

- ◇ [keith@hinde.co.uk](mailto:keith@hinde.co.uk)

