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UP FRONT...

Faced with all the gloom and doom regarding selection and recruitment of veterinary surgeons, liberally laced with concerns about long hours, work/life balance and mental well-being – to say nothing of the physical dangers of being a ‘horse vet’ – and one might begin to wonder why anyone would want to enter the veterinary profession at all. Yet they do. And reading through this edition of *Veterinary Practice Today*, I am reminded of some of the reasons why.

First, midst the humdrum expressions of anal glands and routine vaccinations, there are the adrenergic moments that mean life or death to a patient; elation or heartbreak to a client. Respiratory emergencies are a case in point, in which your quick thinking and a calm, rational approach call upon all those years of professional training to produce a happy ending. This is both a pressure and a privilege that can bring great personal satisfaction in its fulfilment.

Second, there are the more subtle life-changing clinical outcomes that can be achieved by embracing the findings of all the latest research-based approaches to our advisory work in practice – illustrated in this *VPT* by advances in dry cow management, strategic scientifically based sheep nutrition, and a radical rethink on handling resource-guarding behaviour in dogs.

As a profession we are blest with a wide range of continuing education opportunities and we should not underestimate the importance and responsibility of keeping up to date – indeed we should take a pride in it, especially when we may be in critical discussion with large animal clients who are making far-reaching decisions that will affect their livelihoods for many years to come.

Third, we should never forget the serendipitous nature of our profession – those oddball cases and surprises that keep us on our toes and provide us with those coffee-break, ‘you’ll-never-guess-what’ anecdotes. Nowhere is this better illustrated than in those beguiling cases involving grass seeds. I well remember my three most startling cases involving migrating seeds that exited, respectively, via the elbow, the bladder and the chest wall!

But of all the underlying reasons for us to take heart, perhaps the most reassuring are the stories emanating from practice in which the vocational nature of our professions – as vets and nurses – can be expressed in the wider community. None of us can fail to be inspired by Michelle Southern and the ‘Street Paws’ initiative.

We may find the trials and tribulations of veterinary practice overburdening and oppressive; but there will always be opportunities for outreach, which in turn put our troubles into some kind of perspective.

David Watson
Editor

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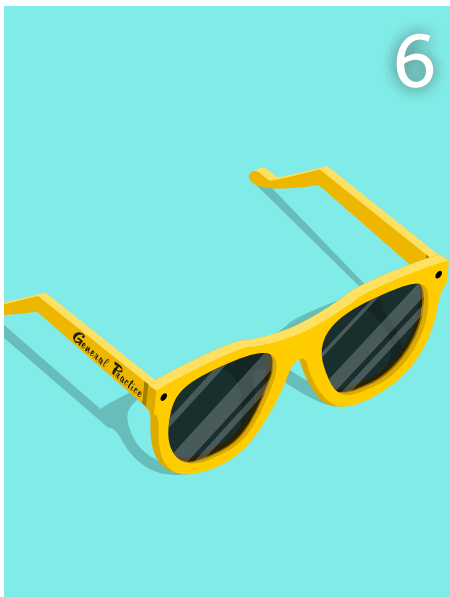
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Peter Brown BVetMed MRCVS
President of the Society of Practising
Veterinary Surgeons.



Correction

In the previous issue of *Veterinary Practice Today* 6(3):17-19 – PPD Question number 5 in Emma Purnell's article 'Nurse clinics for renal patients' should have read:

5. Which of the following should not be carried out in renal nursing clinics?
- A. introducing new foods to the pet
 - B. blood pressure monitoring
 - C. urine sample analysis
 - D. weight checks.

Answer: S.A

So what's wrong with being a GP?



Caroline Bower
BVM&S MRCVS DipCABC

Caroline qualified in 1981 and her first job was in mixed practice in Rugby, Warwickshire. In 1983, she moved to Devon and continued working in mixed practice until 1987, when she and her husband started a family. She worked as a locum for the next three years and then joined the Veterinary Hospital Group, Plymouth, working shorter days to allow for family life, but was still involved in night and weekend shifts.

Perceiving a need for a pet behaviour service within the group, she studied for a postgraduate diploma in companion animal behaviour counselling, initiated behaviour consultations alongside her GP role, and helped train the nursing team to take on puppy classes and clinics.

In due course she became a managing partner and continued her management role until 2014. She continues to work in the practice on a part-time basis.

During the past few months, there has been much heated discussion, letter writing and debate on the subject of problems associated with recruiting and retaining veterinary surgeons in general practice. Despite all the opinions offered – the wailing and gnashing of teeth – we do not know exactly why there is a problem. It is certainly multi-factorial, and those taking part in the debate have all offered different and valid reasons as to its underlying causes.



GENERAL PRACTICE

Only two or three years ago, there were concerns that the combination of a strong intake of EU vets, coupled with increasing numbers of veterinary graduates from additional UK veterinary schools, would lead to veterinary unemployment issues. Now, it seems, we have the exact opposite of this situation.

Several correspondents have pointed out that we are an evidence-based profession, so obviously we should start by gathering evidence. Information is, in fact, already being collated by both the BVA and the RCVS – the latter taking their statistics from voluntary removal forms. Giving feedback, however, is not mandatory.

The BVA has just published information suggesting that there are a mixture of 'push and pull' factors behind veterinary surgeons' decisions to leave general practice and move to non-clinical roles – with many making this move around seven years after qualifying. In the sample polled, reasons given included finding a new challenge (43%), getting away from out-of-hours work (25%), a desire for more flexible working (14%), and 10 per cent reporting that clinical work was incompatible with family or outside commitments.

My remit for this article is not to speculate about veterinary surgeon shortages per se, but to give my views on why being a veterinary GP can still be a rewarding and fulfilling career.

What happened to me?

I shall start by summarising my own experience of being a general practitioner – which I have enjoyed for the best part of 37 years – because this may help explain my attitude to general practice to this day.

At the time of qualifying, in 1981, women were still very much in the minority in the profession and it was difficult to get a job, in mixed practice in particular. Farm work was male-dominated, most employers were male and were suspicious or sceptical of female vets and their ability to do a solid day's work. It is hard to believe these days, but there was fierce competition for veterinary practice roles, and female new graduates were not in demand!

After three months of searching and many applications, I was accepted for a job in Rugby in a large mixed practice, which turned out to be everything a new graduate first job should be – the managing partners were forward thinking, communicative, supportive and appreciative. I worked hard, did my share of night and weekend work; yet always felt that there was someone there if I needed help or advice.

This was invaluable and I was very fortunate, because this gave me confidence and experience that stood me in good stead for the future. I left this job after 18 months simply because I was getting married and moving to Devon, where I joined another mixed practice. By way of contrast, this one seemed poorly managed, assistants were not appreciated or valued, and we had every ounce of work squeezed out of us – with little thanks. However, the spectrum and variety of equine, small animal and farm work in a beautiful part of the world made up for this.

Those were the days when you drove around with no mobile phone, and could stop and have lunch and a good natter with farm clients. I was on duty two in three nights and weekends, and did this for four years, before having our first child.

After failing to negotiate any flexibility in the working rota, I reluctantly handed in my notice and carried on with locum jobs for the next three years – in order to keep up my skills and knowledge, whilst having a second birth (twins!) and becoming organised for flexible child care that allowed me to be a mum whilst maintaining contact with my chosen profession.

I then drifted into full-time small animal work, mainly because the hours were more flexible, shorter, more controllable, and in a large, well-managed hospital practice, there were plenty of us to share the anti-social hours.

What's good about working in general practice?

General practitioners are the bedrock of the profession, providing the interface between first-opinion veterinary care and the animal-owning public. In comparison with medical GPs, we have a fantastic spectrum of opportunities to use our skills and knowledge – and in the right environment, the job can be enormously satisfying.

We use our communication skills to interact with clients and fellow staff; our understanding of animals and ability to handle them well to achieve a good physical examination; and our tact and perceptive approach to give treatments in the consulting room or on the farm. In addition, we can use technical and other specialist skills in order to 'work up' cases, carry out and interpret whatever diagnostic tests we feel are needed (and the client can afford), and conduct surgical procedures to our own ability.

In a well-managed practice, we should expect support and interchange of ideas from our fellow team members, well-trained and motivated nurses and receptionists, and sensible management of the business, with opportunities to contribute our input of ideas.

We are also in the virtuous position – with a strong knowledge base – of being able to educate our clients in the good care and welfare of their animals, be they domestic pets, horses or livestock. We can influence their attitudes to all aspects of physical health care but also mental well-being and development (in companion animals). If we have a social conscience we can become involved in local charity work, school education programmes, media work ... you name it. Why would anyone not find this satisfying?

From a work/life balance point of view, we still work relatively long hours compared to many other professions. However, since the advent of out-of-hours providers and practice group cooperation in sharing the emergency work load, for many (but by no means all), the job is light years away from the relentless nights and weekends we expected to work 30 years ago. This is a change for the better in every way, especially for patient care and clinical staff well-being.

What about career progression?

In the recently reported BVA poll, 43 per cent of veterinary surgeons left general practice – often after about seven years – in order to find a new challenge, such as work in government roles, research, academia or industry. I would argue that plenty of challenges can be found without leaving practice – such as becoming involved in management or partnership; developing enhanced skill sets in clinical areas, such as imaging, surgery and medicine; involvement in local community projects, or veterinary politics at a regional or national level. Not all of these opportunities afford enhanced remuneration!

“General practitioners are the bedrock of the profession, providing the interface between first-opinion veterinary care and the animal-owning public”

As a significant number of general practices have become owned by larger organisations, the opportunities to 'buy a share' in partnership have diminished; although this is a double-edged sword – the financial investment is relatively little or nothing, but the potential income in return for management responsibility is also significantly less. Some people working for 'corporates' find their ability to influence decision-making is curtailed; however this depends on the individual group, and the same can apply in some independent practices.

Opportunities to develop enhanced clinical skills within practice have undergone a sea change from the old, comprehensive RCVS Certificate scheme, to the new Advanced Veterinary Practice (CertAVP) scheme. The BSAVA has introduced a new range of certificates to appeal to those in small animal practice who do not want to study financial and management modules – and there is no shortage of CPD available these days for those who wish to enhance their clinical skills.

Certificate holders are not specialists in the true sense of the word, but they can provide an enhanced level of service within a practice, and enjoy greater work satisfaction; whilst gaining the respect of their veterinary colleagues by virtue of their greater knowledge and expertise.

What are the challenges of general practice?

Well, of course, there are plenty, as in any job, but their influence depends on the practice itself and the attitude of the individual. There is no getting away from the fact that the practice working day is rarely 9 to 5, and that we are expected to achieve a great deal in terms of client and patient care during those hours, as well as charging correctly for our work so that the practice achieves a profit, whoever the owners are.

Many veterinary surgeons are also still involved with anti-social hours work, as well as their weekday role; yet we do know that all the above is expected of us when we sign up for working in general practice. Clients can be demanding and sometimes unreasonable in their expectations – both clinical and financial.

We work under pressure when unexpected emergencies occur, when other members of the team are off work, when we have to cope with day-to-day problems, such as computers crashing, or when we have our own difficulties to deal with outside work. A sense of humour and a supportive team are prerequisites when you hit a bad patch.

Having a family to care for, especially pre-school children, brings new challenges for veterinary parents – I know from personal experience. This calls for yet more energy and organisation, resilience, a great deal of juggling to try to keep everyone happy at home and at work, and it is inevitable that individuals can find this difficult to deal with. Apart from having a stable home and support network of friends or family, an understanding and flexible employer is essential at this point.

These days there is far more sharing of parental leave, and employment laws dictate good conditions for maternity leave

and return to work. In addition, there are CPD courses aimed at vets returning to work following parental leave, so that is definitely a step forward.

Things are changing slowly, but when I qualified I was certainly poorly prepared for the challenges of communicating with clients (we have two patients in every consultation after all!) and had absolutely no understanding of financial or staff management issues. Dealing with clients and their idiosyncrasies still seems to be the biggest challenge for new graduates, and this is something with which we crusty old vets can certainly help.

As for the management issues, veterinary surgeons still learn by trial and error (or vice versa); yet there are certainly more courses available if we have the will and can make the time to educate ourselves. In an ideal world, there should be more than a smattering of management, communication and behaviour studied within the veterinary curriculum, but I won't climb onto that hobby horse!

What has changed in the last 30 years?

Major changes include financial pressures on new graduates resulting from university fees and other costs; greater expectations and demands from our clients, be they agricultural or pet owners; the increase in women in the profession; factors resulting from online activities (advertising, use of social media, client 'knowledge' and purchase of medicines); and the advent of the 'corporates'.

This latter group has received a bashing in the veterinary media; although I do not believe we can lay all the blame for the shortage of veterinary surgeons at their feet. Yes, they have changed the potential, in corporate-owned practices, for veterinary surgeons to achieve a higher, profit-related income; but they also enable younger vets to become involved in management of the practice in return for a profit share, without the burden of capital borrowing.

Some have introduced much-needed new graduate support schemes – giving new graduates a leg up through a framework of clinical support and pastoral care within selected practices. For some considering a veterinary career in practice, the reduced possibility of becoming a profit-owning partner or director in an independent practice will be a serious consideration, yet there are still opportunities out there.

Some potential veterinary students may opt for medicine, dentistry or another science-related degree leading to higher potential income. 'Feminisation' of the profession was bound to have a knock-on effect for full-time veterinary numbers. That was inevitable. It means that we need more graduates to share the work load. The point is that if the right candidates are selected for university veterinary school places it doesn't matter, because highly motivated individuals should stay with their chosen profession unless their working conditions are insufferable.

I cannot understand why anyone who has sweated to gain entry to veterinary school and then toiled through five intensive years of study to enter a profession they have probably wanted to join since they were a child, would give it all up; although it is perfectly understandable why some choose to take a career break whilst their children are very young.

Everyone entering veterinary school should know what the job is like and what the demands are – these days there are also plenty

of role models around who can tell them what it is like balancing their family with a career.

It is rumoured that tutors in some of our veterinary schools are disrespectful of the role of general practice and that they instil the idea in undergraduates that this is a stepping stone to specialisation. If that is true, it is a great shame; because if the numbers of the right students are selected – with a significant number who are passionate about wanting to be practising vets and who know what they are letting themselves in for, in every sense – then the universities should be inspiring these budding professionals to be great at their job and letting them know what opportunities are out there.

I wonder if universities do keep track of all their selected graduates to ascertain whether they have used their degree to good effect – whether that be in practice or in one of the many other areas to which vets can contribute?

New graduates entering practice nowadays are perhaps less inclined to be 'have-a-go' heroes than their predecessors – which may be a consequence of their university education, fear of litigation, or general attitudes of the animal-owning public and availability to refer to specialist centres. In my opinion, this is actually a good thing, from the point of animal care, and in some cases it saves our clients money by avoiding inappropriate investigations and treatments.

However, as with all things, there is a balance, and it is a question of providing a good level of competence within the first-opinion veterinary team to handle what is still a wide spectrum of illnesses, accidents and emergencies, and then knowing when to refer.

I do agree with a recent correspondent in the *Veterinary Record* who suggested that employers and senior veterinary surgeons need to look forward for solutions to attract and keep young vets in general practice. It is no use just blaming our regulatory bodies, government, Brexit or corporate ownership. We need to nurture and encourage young members of the profession, and help them to see that a career in general practice is still an attractive proposition, which can provide both career progression and job satisfaction.

In addition we need to face the reality that veterinary surgeons with young families can reasonably request more flexible working conditions to achieve a reasonable work/life balance – although this isn't all one-way. If practices look after these vets (and nurses) they will stay with us and be valuable members of our team. We have to take a long-term view.

The young veterinary surgeons themselves also need to have the right attitude to grasp opportunities, give of their best and accept that they won't have everything their own way. It is a question of give and take, which means we need excellent channels of communication.

Universities should be selecting the right students, then preparing graduates for the reality of life at the coalface, with an understanding that they will take some knocks along the way.

I do believe that if universities, employers, senior vets and young graduates can all work together with the energy, enthusiasm, humour and determination which they need, the future can be bright in general practice. I hope I am right. ■



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Kate graduated from the University of Bristol in 2006.

Since graduating she has travelled to over 30 countries and worked as a veterinary surgeon in Australia, New Zealand and the United Kingdom. She currently lives in East Anglia and works as a freelance small animal locum for her company 'Lend a Paw Locums'.

Grass seed foreign bodies – a review

Grass awns are a common problem in veterinary practices worldwide. Most grass seed cases are straightforward and the seed is quickly located and removed. However, some grass seed foreign bodies can have severe – and often surprising – consequences. This article focuses on the wide variety of grass awn foreign body presentations.

Most UK grass species seed between May and September (**Figure 1**). The majority of patients presenting with grass seed foreign bodies are dogs, although grass awn foreign bodies have been documented in many species.

Dog breeds with medium to long coats, with plenty of interdigital hair – such as poodle crossbreeds, spaniels and other working breeds – are over-represented (**Figure 2**). Well-groomed, smooth-coated dogs with relatively short-haired feet are less likely to be bothered by grass seeds.

Seed species

The species of grass most likely to cause grass seed foreign bodies in the UK seems to be *Hordeum*, or barley grass (Cherbinsky, 2010). There are many varieties of barley grass, including wild (**Figure 3**) and cultivated barley (**Figure 4**). Barley grass is extremely common and has long, barbed awns that adhere tightly to the fur.

Migration and infection

Grass awn migration follows the path of least resistance. Retrograde movement is unlikely owing to the hundreds of barbs present along the awn. Seeds migrate between muscle bellies or along lumens – the urethra, for example – until the seed leaves the body or lodges in a body cavity. Migration is often unpredictable and seeds can be elusive. Once lodged, the seed often causes an abscess, which will initially respond to antibiotics but often reoccurs once the medication finishes.

Migrating grass awns often cause infection. Soil-



Figure 1. A typical English hedgerow in late summer, displaying a variety of seed species.



Figure 2. A long-coated dog with profuse interdigital hair.



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GRASS SEEDS



Figure 3. Wild barley grass.



Figure 4. Commercial barley.



Figure 5. Seeds in the interdigital area are commonly located between the toes.

borne organisms, such as *Actinomyces* and *Nocardia* species, are associated with awns, though infections are often mixed (Doyle, 2009, Klocke, 2014). Seeds migrating through the upper respiratory tract may carry commensal organisms, such as *Staphylococcus*, *Streptococcus*, *Pasteurella* and *E. coli*. A broad-spectrum antibiotic, such as amoxicillin/clavulanate, is a good first-line choice pending culture and sensitivity. Long courses of antibiotics are often required.

Routine removals

The eye, ear and paw are common sites for grass seed foreign bodies in small animals (Figure 5). Grass awns lodged in the interdigital area are easily distinguished by a small swelling between the toes. Many patients will have multiple seeds caught between their toes, so a thorough check of the entire body is extremely important.

Grass seeds often lodge behind the nictitating membrane of the eye. This is the most common site for grass seed localisation in cats (Brennan, 1983).

Approximately half of all canine grass seed foreign bodies in dogs involve the ear

canal (Brennan, 1983; Hicks, 2016) and seeds often pierce the tympanic membrane, causing intense irritation and pain. Thankfully the majority are easily removed with an otoscope and a pair of crocodile forceps (Figure 6); and the ear drum often heals quickly without intervention so long as infection is absent. Healing, however, should be monitored by serial examination.

Laboratory findings and diagnosis

Leukocytosis is often present in cases of grass awn foreign bodies. Neutrophilia is noted in approximately 20 per cent of cases (Klocke, 2014); although red blood cell counts and biochemical analysis are invariably normal.

Grass seeds present as a variety of different conditions. There have been recorded cases of grass seeds causing nasal obstruction, pneumothorax, tracheal and bronchial foreign bodies, tonsillar irritation, parotid duct obstruction, pericardial effusion, meningoencephalitis, urolithiasis, urethral obstruction, urethrovaginal fistula, discospondylitis, osteomyelitis of the lumbar vertebrae and spinal empyema.

Clinical signs may be non-specific, including lethargy, pyrexia, lymphadenopathy, weight loss, and decreased exercise tolerance, making diagnosis difficult.

Locating the seed

Although many grass seed foreign bodies are relatively easy to remove, the awns have a well-deserved reputation for being elusive and seeds may be extremely difficult to locate. As treatment of grass seed foreign body-related disease focuses on removal of the seed, followed by debridement of infected tissue and appropriate antibiotic therapy, this can be problematic.

One seed may require several surgical operations to remove it – each intervention further disrupting the site and increasing scar tissue, to say nothing of adding to the stress on the animal and the cost to the owner. It is, therefore, vital that the owner is warned of the risk of reoccurrence and the possibility of repeat surgical explorations.

A thorough clinical examination may aid location of the seed. Close attention should be paid to any areas

of pain or swelling, because surgical exploration of any suspect swelling may yield the offending grass awn (Figure 7).

In the hands of an experienced technician, ultrasonography may be helpful in locating hidden seeds and readily detects awns located in fluid pockets or organs, such as the urinary bladder. However, a grass seed lodged in the respiratory tract may pass undetected owing to reflection of the ultrasound beam by the surrounding air (Vansteenkiste, 2016). Where visible, seeds often present as a linear hyperechoic structure with clear contrast with surrounding fluid, or they show acoustic shadowing.

Grass seeds may be recognised on CT images; although secondary changes, such as exudate, abscesses, lymphadenopathy, or pulmonary consolidation, are often easier to detect than the seed itself (Vansteenkiste, 2016). Likewise, fluid and fibrosis seen on magnetic resonance imaging (MRI) scans may indicate a grass seed, even if the awn itself is invisible.

Complicated cases

The most common presentation of grass seed



Figure 6. Otoscopic removal of a grass seed from a dog's ear canal.

CASE STUDY

The author recently treated a male, neutered domestic long-haired cat with apparent urethral obstruction and urinary overflow. Following anaesthesia and examination, a 3cm long grass seed was removed from the cat's urethra (**Figure 8**). Cystocentesis revealed a concurrent urinary tract infection with *E. coli* and *Enterococcus* spp. The urinary tract infection was treated with systemic non-steroidal anti-inflammatories and antibiotics following culture and sensitivity testing. The cat made a full recovery.



Figure 8. Grass seed foreign body in cat's urethra prior to removal.



Figure 7. Grass seed following removal.

foreign bodies in referral practice is pyothorax caused by the migration of inhaled grass awns (Hicks, 2016). Radiography in these cases often shows a pleural effusion, with pyothorax confirmed on thoracocentesis. Consolidation of the lung may be detected on radiography if the effusion is not overwhelming. Lung abscesses, pulmonary masses or large inhaled foreign bodies may require surgery, whilst less severe cases can be treated with thoracocentesis and broad-spectrum antibiotics for at least six weeks (Johnson, 2007).

Inhaled seeds may lodge in the right or left lung, although the right lung may be more common owing to the straighter angle between the right principal bronchus/carina (Cerquetella, 2013). Bronchoscopy is recommended if there is suspicion that the seed may be retained in the bronchus. This technique allows visualisation and removal of the grass seed. Inhaled grass awns may migrate into the thoracic wall, lumbar vertebrae and epaxial muscles.

If you can't find the seed?

If you suspect the presence of a grass awn foreign body but the seed cannot be located, long-term antibiotic therapy, ideally based on culture and

sensitivity testing, should be instituted. Infected fluid should be drained, if possible, and inflamed tissue debrided. With luck, the body will wall off the foreign body. However, if not sequestered, the grass seed may cause a chronic infection or migrate elsewhere in the body.

Prevention

Dogs with active lifestyles, longer coats and less grooming are most at risk of foreign bodies. It is often impractical to restrict exercise owing to the long 'seeding season'; but owners can limit walks to lawns or woods where seeds are less likely. Frequent grooming is crucial. Longer coats should be kept trimmed short so that the seeds are easier to spot.

Double coats should be stripped, removing as much as possible of the woolly undercoat. In addition, there are a variety of products available that are designed to restrict grass seed attachment, such as boots, snoods, or ear coverings.

Conclusion

In conclusion, cases of grass seed foreign bodies can vary from the straightforward to the severe. It is often the secondary consequences of the foreign body – such as fibrosis or fluid build-up – that may be detected, rather than the seed itself. In cases

where the seed is concealed within a body cavity, the vague clinical signs and wide variety of disease presentations may make diagnosis difficult.

Ultrasonography, radiography, endoscopy, computer tomography and magnetic resonance imaging may all be used to detect grass seeds.

Treatment of grass seed foreign body-related disease hinges on the successful, complete removal of the awn. In cases where the grass seed cannot be located, prolonged antibiotic therapy is often required and is not always successful. ■

Acknowledgment

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PPD Questions

1. What is the most common location for grass seed foreign bodies in (a) dogs and (b) cats?
2. What is the most common presenting complaint in grass seed foreign bodies presented to referral practices?
3. Are inhaled grass seeds more likely to settle in the right or left lung?
4. What secondary changes, caused by a grass seed foreign body, may be visualised on imaging?
5. What species of grass is most likely to cause grass seed foreign bodies in the UK?

- Answers**
1. (a) external ear canal and (b) eye
 2. pyothorax
 3. right lung
 4. fluid (exudate or abscess), fibrosis, pulmonary consolidation, enlarged lymph nodes
 5. Hordeum or barley grass species.

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Kerry graduated from the University of Sydney in 2005 and, after 12 months working in a small animal general practice in the city, spent several years as an emergency clinician in private practice.

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Kerry's interests include transfusion medicine, mechanical ventilation and toxicology.



*Suggested Personal & Professional Development (PPD)



EMERGENCIES

Respiratory emergencies in the dog and cat

Managing the patient with respiratory distress is complex – not only because the patient is at risk of death, but also because the owners are often equally distressed. In many cases, the key at first is to allow the patient to settle (with or without sedation) in an oxygen-rich environment. This benefits the patient, but also allows the clinician to monitor the respiratory patterns, auscultate the thorax and formulate the diagnostic plan.

The most important part of any assessment in a patient is a physical examination. However, in a patient with respiratory distress, this often proves difficult, if not impossible; so rapid interpretation of respiratory patterns and postures are useful in this environment.

Respiratory patterns allow the animal to meet their oxygen requirements by using the least amount of energy. Consider the following examples:

- abdominal breathing – the use of accessory muscles of respiration seen in resistance to exhale in small airway collapse
- cyanosis – the result of hypoxaemia caused by parenchymal disease, that may or may not be cardiovascular in origin
- loud respiratory breaths tend to be the result of upper airway obstruction
- an abducted posture where the head is extended, forelimbs abducted and refusal to lie in lateral recumbency – a sign of marked effort in severe parenchymal disease.

Patients with severe distress can be markedly fatigued and falsely appear settled in their kennel, showing very subtle signs of distress, such as nostril flaring, retracted lips on inspiration and short shallow breaths. It is often useful to have tools prepared for intubation close to the patient.

Thoracic auscultation should allow the clinician to



Figure 1. Pleural effusion.

pinpoint possible underlying aetiologies and further direct diagnostic procedures. For example, dull or absent lung sounds – especially ventrally – would be seen with pleural space disease, parenchymal obliteration with neoplasia or significant consolidation of lung lobes.

Turbulence resulting from narrowed airways can be heard as increased dry sounds, which may be upper or lower in origin. Crackles indicate fluid in the airways – more often parenchymal. Caution must be applied to ensure referred upper sounds of panting are not confused with true parenchymal disease.

Diagnostics Point-of-care ultrasound

This is a non-invasive way to obtain preliminary imaging of the thorax. Abnormalities in the thorax that are useful to pursue

in cases of respiratory disease include:

- b-lines indicative of consolidation or fluid accumulation in airways
- pleural effusion (Figure 1)
- pneumothorax seen as loss of glide sign.

Thoracic radiographs

Radiography is often not possible, owing to restraint requirements, and should be delayed until the patient can either be restrained or sedated. Oxygen tanks can be utilised to both supply oxygen and position the patient – albeit not ideal positioning – for radiographs. When appropriate, this is the most useful initial diagnostic tool.

Computed tomography (CT)

CT scanning is a useful specialised imaging technique to further pursue aetiology after thoracic radiographs have either failed to yield a diagnosis, disease is recurrent or it has



Figure 2. Thoracocentesis can be a useful diagnostic tool.

Results: Gases+			
pH	8.837		Low
pCO ₂	92.4	mmHg	High
pO ₂	148.7	mmHg	High
cHCO ₃ ⁻	15.6	mmol/L	
BE(ecf)	-18.3	mmol/L	Low
cSO ₂	96.0	%	
Results: Chem+			
Na ⁺	136	mmol/L	Low
K ⁺	> 12.0	mmol/L	High
Ca ⁺⁺	Failed	QC	
Cl ⁻	123	mmol/L	
cTCO ₂	18.5	mmol/L	
AGapK	cnc		
Hct	20	%	Low
cHgb	6.7	g/dL	Low
Results: Meta+			
Glu	6.6	mmol/L	High
Lac	0.54	mmol/L	Low
Crea	0	umol/L	Low
Reference Ranges			
pH	7.350 - 7.450		
pCO ₂	35.0 - 38.0	mmHg	
pO ₂	85.0 - 100.0	mmHg	
cHCO ₃ ⁻	15.0 - 23.0	mmol/L	
BE(ecf)	-5.0 - 0.0	mmol/L	
cSO ₂	90.0 - 100.0	%	
Na ⁺	139 - 150	mmol/L	
K ⁺	3.4 - 4.9	mmol/L	
Ca ⁺⁺	1.12 - 1.40	mmol/L	
Cl ⁻	106 - 127	mmol/L	
cTCO ₂	17.0 - 25.0	mmol/L	
AGapK	8 - 25	mmol/L	
Hct	35 - 50	%	
cHgb	12.0 - 17.0	g/dL	
Glu	3.3 - 6.4	mmol/L	
Lac	0.60 - 2.90	mmol/L	
Crea	44 - 115	umol/L	
Sample type: Dog Venous			
Hemodilution: No			

Figure 3. An example of a blood gas analysis printout.

PaCO ₂	> 45mmHg
PvCO ₂	> 50mmHg
End tidal CO ₂	> 40mmHg

Table 1. Hypoventilation criteria



Figure 4. Thoracocentesis in a case of haemothorax.

progressed. Rarely is this indicated as a first-line tool.

Bronchoscopy

Bronchoscopy, together with bronchoalveolar lavage (BAL) and endotracheal wash (ETW), are ancillary tests for parenchymal disease based on imaging findings. They are useful to diagnose infectious/inflammatory lower airway disease and some neoplasms that would be more ‘effusive’, such as lymphoma.

Thoracocentesis

This can be used as a diagnostic tool – indicated after the detection of absent lung sounds that could be consistent with pleural space disease; or therapeutically after supportive changes in radiographs or point-of-care ultrasound (Figure 2).

Blood gas analysis

Blood gas analysis can be used to further quantify both cause and effect of respiratory distress. In general, arterial blood gas is used for

oxygenation; and either arterial or venous can be used for ventilation evaluation (Figure 3). Ventilation capabilities are evaluated by measuring patient CO₂. Hypoventilation (Table 1) and hyperventilation are seen as hypercapnoea and hypocapnoea, respectively; although the preferred method to evaluate CO₂ is arterial, other markers can be used as surrogates.

Common conditions

The list below is not exhaustive, but a sample of common respiratory emergencies in the dog and cat.

Pleural space disease

This can be seen as an accumulation of air or fluid in the pleural space and, less commonly, changes in the pleura itself. Pneumothorax can be open or closed – open tends to be the consequence of a traumatic episode; and closed caused by trauma (high-rise falls or road traffic accidents). If it is

spontaneous, then this is most often caused by pulmonary bullous emphysema.

Management of pleural space disease that persists after one to two attempts at thoracocentesis (Figure 4) or any pyothorax (Figure 5) is best managed via the placement of thoracic chest drains. In patients with haemothorax, drainage should be performed if respiratory signs justify it clinically, as the blood will be resorbed.

Less invasive drains, such as MILA 12-16 gauge catheters, can be found in multiple catheter lengths and fenestration locations (Figures 6 & 7). These can be placed via the Seldinger technique – which has the benefit of placement with sedation and local anaesthetic infiltration, if required.

Trochar thoracic drains (Figure 8), placed surgically, are used for effusions with higher cell and fibrin levels increasing turbidity or post-thoracotomy (Table 2).

Medical management with thoracic drainage has long been the recommended therapy for feline pyothorax; and in the last few years this has been supported in canine patients. However, in

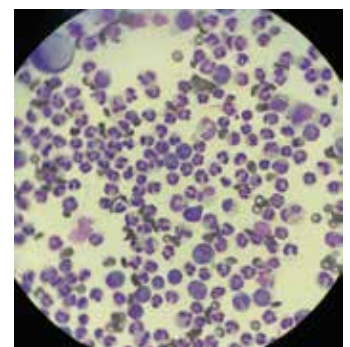


Figure 5. Microscopic view of effusion from a patient with pyothorax.

dogs, computed tomography should be used to eliminate consolidated or abscessed lung lobes, foreign material or pulmonary masses that would be an indication for surgical exploration via thoracotomy.

Aspiration pneumonia

Aspiration pneumonia is common in dogs, but less so in cats, and requires a predisposing patient factor, such as:

- breed – brachycephalic breeds
- clinical signs – vomiting, regurgitation, neurological impairment (recumbency, seizures, loss of gag).

Diagnosis can be made with ‘survey’ thoracic radiographs – seen as consolidation of single or multiple lung lobes or a bronchial pulmonary



Figures 6 & 7. Less invasive catheters can be found with various lengths and fenestration locations.

parenchymal pattern. The right middle lung lobe is the lobe more commonly affected, owing to its proximal location to the tracheal bifurcation. This can be further confirmed with sampling of airway fluids by blind or bronchoscopically-guided airway lavage, or trans-tracheal aspiration.

Cytologic findings in aspiration pneumonia include intracellular bacteria within a neutrophilic population of cells.

Early clinical signs of aspiration pneumonia include tachypnoea, exercise intolerance and pyrexia; and later, as the disease progresses, hypoxaemia, hyper- or hypocapnoea, respiratory distress, cyanosis and respiratory fatigue.

Brachycephalic obstructive airway syndrome (BOAS)

Brachycephaly – or shortening of the facial skeleton in any animal species, particularly certain dog breeds such as pugs, Boston terriers and French bulldogs – is the factor that causes BOAS. The most common anatomical



Figure 8. A trochar thoracic drain.



Figure 9. Tracheotomy tubes can be used to avoid prolonged anaesthetics.

changes seen are elongated soft palate, stenotic nares, everted laryngeal sacculles and everted tonsils. These factors contribute to airway obstruction by impeding airflow.

It is essential to ascertain early the temperature of the patient, because hyperthermia is a common finding and can lead to heat stroke. Intravenous access is required early too, bearing in mind that these dogs often require sedation as a vicious cycle of respiratory distress and anxiety occurs, whereby both contribute to the other. These patients often require intubation during a respiratory crisis, until oedema resolves and where, at that point, surgical management can be performed.

Tracheotomy tubes can be used to avoid prolonged anaesthetics (**Figure 9**).

What to do when diseases progress Hypoxaemia and oxygen therapy

Oxygen supplementation is indicated for most patients with respiratory distress. Specifically, however, oxygen therapy is indicated for patients with an SPO₂ less than 93 to 95 per cent or a PaO₂ less than 70 to 80mmHg, which defines hypoxaemia (reduced oxygenation of arterial blood).

Causes of hypoxaemia include:

- decreased oxygen content of inspired air
- intrapulmonary shunt
- hypoventilation
- ventilation-perfusion mismatch
- diffusion impairment.

Oxygen can be delivered by non-invasive means, such as flow-by, face-mask, oxygen hood or oxygen cage; or by invasive methods such



Figure 10. Nasal catheters should be avoided in coagulopathy and nasal discharge.



Figure 11. Mechanical ventilation requires intensive nursing.

as nasal prongs, nasal or nasopharyngeal oxygen or trans-tracheal oxygen. Each means has their own indication and contraindication – for example, nasal catheters should be avoided in coagulopathy and nasal discharge (**Figure 10**).

Respiratory failure and mechanical ventilation

Mechanical ventilation is not a therapy for lung disease; but rather a supportive mechanism whilst the underlying condition causing the respiratory failure resolves. Criteria for mechanical ventilation include any of the following:

- severe hypoxaemia (PaO₂ <60mmHg)
- severe hypercapnoea (PvCO₂ >60mmHg)
- respiratory fatigue or impending respiratory failure.

One of the more common reasons for mechanical ventilation is impaired gas exchange resulting from

Fluid classification	Total protein	Total nucleated cell count	Causes
Pure transudate	< 25g/l	< 1,500/uL	<ul style="list-style-type: none"> reduced oncotic pressure owing to hypoalbuminaemia increased hydrostatic pressure owing to portal hypertension or lymphatic obstruction neoplasia
Modified transudate	2.5 - 7.5g/l	1,000 - 7,000/uL	<ul style="list-style-type: none"> increased post-hepatic hydrostatic pressure caused by heart failure or vascular permeability owing to vasculitis neoplasia
Exudate/pyothorax	> 30g/l	> 7,000/uL	Infection via: <ul style="list-style-type: none"> penetrating insults, haematogenous spread, inhaled foreign material, pneumonia aseptic exudates are often caused by feline infectious peritonitis (check serum albumin:globulin ratio as most often < 0.6) or neoplasia iatrogenic after thoracocentesis or pulmonary biopsy
Effusion characteristics			
Chylothorax	<ul style="list-style-type: none"> primarily lymphocytes, however, can be neutrophilic with chronicity triglyceride level effusion > serum cholesterol effusion < or = serum 		<ul style="list-style-type: none"> cardiac disease thoracic duct obstruction or rupture cranial mediastinal mass lung lobe torsion diaphragmatic or peritoneopericardial hernia heartworm disease idiopathic cranial vena cava thromboembolism
Haemothorax (Figure 4)	<ul style="list-style-type: none"> haematocrit > 10% 		<ul style="list-style-type: none"> coagulopathy (Angiostrongylosis, clotting factor disturbances; less likely, primary haemostatic disorders) trauma neoplasia diaphragmatic or hiatal hernia iatrogenic

Table 2. Chest fluid classifications and effusion characteristics

pulmonary parenchymal disease. This impairment is the result of fluid accumulation in the alveoli and collapsed airways. By providing higher FiO₂ and positive-pressure ventilation, multiple components of respiration can be improved, including:

- increasing surface area for gas exchange
- reducing anatomical dead space ventilation

- reducing the work of breathing
- improving acid:base status by improving hypercapnoea.

Mechanical ventilation requires intensive nursing (Figure 11) and must be provided in a centre with 24-hour care, such as a referral hospital. It can be cost-prohibitive and may

lead to complications, such as hospital-acquired pneumonia, hypotension and multiple organ failure.

Summary

Managing the patient with respiratory distress is complex, not only as the patient is at risk of death but also because the owners are often equally distressed.

The key at first is to allow the patient to settle (with or without sedation) in an oxygen-rich environment.

This benefits the patient; but also allows the clinician to monitor the respiratory patterns, auscultate the thorax and formulate the diagnostic plan. ■

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Dip App Psych CCAB

Karen is an ASAB-Certificated Clinical Animal Behaviourist with 20 years of experience in the field and runs a full-time behaviour practice, 'Pawprint', near Peterborough, working with family pets on a veterinary referral basis. She is a full member of the Association of Pet Behaviour Counsellors (APBC) and an Animal Behaviour and Training Council (ABTC) Registered Clinical Animal Behaviourist and Animal Training Instructor.

Karen has written three books: What your Dog Wants, 21 Days to the Perfect Dog and Being a Dog – all aimed at communicating welfare and training issues to the wider dog-owning public. She is resident behaviour and training feature writer for Dogs Today magazine as well as other UK and international pet titles.



**Suggested Personal & Professional Development (PPD)*



BEHAVIOUR

Resource guarding – (2) management and advice for families and multi-dog households

Resource-guarding behaviours are typified as a form of competitive aggression relating to the control and ownership of specific items, places and other things of value to the subject dog. In part one of a two-part assessment [*Veterinary Practice Today* 6(3): 14-16], we considered the specifics of protectiveness around resources themselves, with a brief summary of practical protocols with which to assist clients.

In this second article, we look in more depth at how families and multi-dog households can handle the challenges posed by resource-guarding.

Resource guarding behaviours are a normal behaviour for any species and could be considered essential to survival; but they rely on competitive behaviours rather than affiliative ones.

As such, dogs living in a human family displaying defensive behaviours over resources need careful practical management. Punishment – including shouting and physical methods, as well as snatching away the resource (as discussed in part one of this series) – serves to further entrench and escalate possessive behaviours, creating an amplified and, of course, riskier response for all concerned.

Even though resources for the domestic dog are relatively plentiful, this may not influence its defensive impulse. Put simply, if a dog values something in its possession, it is likely to work to retain it regardless of the variety or quantity of other resources surrounding it. This is particularly so if the dog is confronted regularly.

Learning from its environment and the responses given to its behaviour are inherent in any dog. Thus the human family must work to intervene early with any defensive behaviours seen, even in very young puppies. Methods and protocols for such intervention will be discussed. Lastly, the competitive nature

between other pets in the home must be considered and managed.

Since each household is run differently, and individuals within can also express a wide variation in preference (see part one), the following protocols are not intended to be used without careful history taking and discussion with the host family. It is essential to discuss the specific behaviours and resources that create a defensive response; but it is also mandatory that all family members agree and comply willingly with advice.

Some basic principles

With a dog that has already manifested a bite or snapping, the presence of children within the household means that serious consideration must be given to the risk of the behaviour repeating or amplifying. Since valuing resources is, effectively, an inherent behaviour, this cannot be 'removed'. What can be altered, however, is the dog's response to behaviours that it is currently perceiving as a threat of removal; or people and other dogs moving past locations that the dog values, and so on.

Desensitisation and counter-conditioning work can have

a beneficial impact within such anticipation, but it is dependent on the owner maintaining the dog's interpretation that such movements are no longer a threat. It is this which can be difficult and must be taken into consideration when providing advice.

Whilst it is sometimes tempting for in-house advice to be given, it is this author's opinion that – based on case experience – a clinical animal behaviourist should be involved through veterinary referral as early as possible in cases of this nature, no matter how young the dog.

Exercise and welfare

All dogs should undergo proper health screening to ensure there are no medical issues. Increased thirst or hunger, pain, and a host of other illnesses can bring a dog closer to the threshold of demonstrating aggressive behaviours.

Examine the dog's exercise routine. Often, an under-stimulated dog will seek out and scavenge items to amuse themselves as the only activity available to them. In addition, attention from an owner where none is otherwise

"Put simply, if a dog values something in its possession, it is likely to work to retain it regardless of the variety or quantity of other resources surrounding it"



given means that the dog inadvertently learns to 'steal for fun' (even when punished as a result).

Devices

Practical interventions include:

- muzzles (provide clear advice on training, especially taking into account the risk of a dog guarding food around a muzzle-training exercise)
- house-line (a 2m lead used to move a dog around the home without needing to take a collar)
- stair gates
- crates
- locks on doors
- clear signage indicating not to open certain doors.

Environmental management

Initially, items and locations where guarding has previously occurred must be identified and removed, or access blocked. If the dog has a safe area, such as a crate, and it has previously 'defended' in this location, the owner may want simply to maintain this place as one where the dog is at least contained.

The owner must be asked whether or not it is ever essential to remove the dog from that place. Usually the answer is "no", and the dog can often be invited out of it for a food treat. The priority is to prevent conflict; however, a safe haven is important for dogs, and it enables families to enforce safety by instructing children and visitors to leave the dog alone when it is in there.

Socialisation in young puppies

Appropriate socialisation is crucial to development, especially for teaching impulse control. An understanding of the general ways of people and children in particular mean that their confidence and adaptability is built as a strong foundation. Of course, the quality of the social experience is paramount.

Body language

Dogs can learn that human body language need not predict resource removal. They must be taught that hands reaching out to them do not

snatch – and instead give tasty food or enjoyable touch.

Humans need to learn to read their dog's body language to understand what signs may be those of discomfort or warning. Overt signals – such as growling, snapping and biting – are often the only communications that human families recognise. Stillness, lip-licking, yawning, averting eyes or head, and bodily withdrawal are communicative conflict avoidance signals – but less easily recognised and must be specifically pointed out. Even less noticeable are those of body orientation towards a desired resource, or 'blocking' where the dog attempts to prevent removal of a resource.

'Give and take' games

Dogs that learn the rules of 'give and take' using positive reinforcement use this understanding and generalise it to situations where a resource can be swapped for another without reacting with frustration or fear at the impending loss.

Such training appears to be confrontational, meaning that owners tend to order the dog to "Drop!" or "Leave!" with the dog simply letting go of an item without any recompense. It does not take long for an animal to learn that humans remove the nice things in life.

Instead, these should be considered 'swap' cues (the word "Give" is often a new cue that can be said in a less threatening tone). On occasion, simply asking owners to say "What's this?" or "Biscuits!" changes the emotional tension to that of a positive response in all parties. The dog relinquishes an item or location in return for wages of some sort. Food can be a highly effective 'wage' and is easy to manage. Toys are also a useful 'wage' but must be kept 'valuable' by the owner retaining access to them at other times.

In a situation where a dog has an item in its possession and already shows defensive behaviours, whilst food swap may be an option, it

is often the case that the dog has already learned not to relinquish an item under any circumstances. In such cases, careful observation of the owner's body signals prior to the 'swap' often show that the owner stares at the dog, reaches out, bends forward and looks perturbed or anxious. These are all predictive signals to the dog that they are about to lose their resource, and can obstruct progress when food is offered.

Should this be the case, owners must be counselled to teach 'swap' games away from situations of previous confrontation and away from items of high value. Perhaps instead, swapping one food item for another is a good start point. Alternatively, a pair of equally valuable toys – with the dog playing with one and then being offered another for a game – are great introductions to the new rules that hands always give and that humans are generous.

Hand feeding

To establish that hands always deliver, meals can be hand-fed rather than simply giving food in a bowl. Such a huge opportunity for learning hand safety must be emphasised to all owners, especially those with new puppies.

Hand feeding is not recommended with a dog that is already likely to guard food in hands or generally in the vicinity. Instead, the owner may wish to place (or throw) food into a 'reward bowl' so that the dog can begin to learn that humans are to be welcomed.

Rather than giving a large meal in one go, with a dog



that is highly aroused through anticipation, smaller and more frequent meals may be advisable. Again, using food for training sessions is an excellent and productive way to achieve this goal.

Alternate bowls and scatter feeding

Placing food into one bowl, allowing the dog to eat this, then placing some more food into another bowl, and alternating them, is often recommended. However, with dogs that are already highly sensitised to defending food in bowls or even simply on the floor, the risk is that the dog will begin to guard food in both locations.

It may be better to dispense with the bowl altogether and use hand feeding and training specific behaviours on cue as a means of delivering food. Alternatively, the bowl may be

kept in a secure location such as a crate, from which the dog can eat without disturbance. The dog is then allowed to leave that location when finished, with the bowl being removed once they have left and the crate door closed until next time.

Likewise, scatter-feeding for resource guarding might be suggested as a means to allow the dog to forage. This does not take into account the frustration aspect for a dog that is desperate to gain the resources, thus amplifying their anxiety. Scattering also increases the range of territory the dog may decide to defend in future.

Retrieve training

Since scavenging is often a part of item possession, it makes sense to work with the dog's existing behaviours. Accepting that the dog will always pick up items of interest, the dog can successfully learn to bring them to the owner for some kind of reward, or perhaps an interaction with the item itself. Owners must list all items in order of preference first (see

part one for guidelines). The least exciting item – usually one of the dog's own toys – is worked with first.

The item is played with into a corner space so that the dog naturally turns back to the owner once the item is thrown into the corner. The owner can then offer to play with the item with the dog, or swaps it for a higher value reward (usually food), throwing the item again. The cue "Fetch" is then used to help the dog recognise the game. The dog begins to bring the item in anticipation for further reward. Only then should the owner begin to introduce items of greater value. Items for training should always be those that – should the dog show signs of guarding behaviours – can simply be left with the dog without fear of injury.

Multiple-dog households

The above measures must all be applied, with the added complication of assessing each dog within the household to ensure its own relative resource values and competitive behaviours are clearly noted.

"Often owners may think that one dog is the antagonist, finding later that they are only reacting to another dog's subtle body signals"

Often owners may think that one dog is the antagonist, finding later that they are only reacting to another dog's subtle body signals. Eye contact, particularly staring, must be carefully monitored.

Hormonal changes can increase sensitivity to such behaviours: meaning that bitches in or around the time of their season – who previously appeared to behave companionably – may change their behaviours. Such changes create a learned experience that may then persist strongly, perhaps as a result of the hypersensitivity at this time.

Stationing

Each dog should be trained to go to its own crate, mat or other station on cue, and trained to stay there using positive reinforcement training. This is taught separately, one dog at a time, before bringing the dogs together for training. It ensures that potential conflict can be interrupted with a positive outcome for each dog, by giving the cue for each dog to move to their station.

New dogs

Inter-dog aggression can arise from resource protection as a result of a new dog being introduced to the home, especially those that place a high value on the same types of resources as any other dog.

Puppies, in particular, have not learned self control or boundaries and can easily exacerbate a situation. Each dog must have its own area, feeding space, toys and training time with the owner. ■

PPD Questions

1. What subtle body signals might owners be taught to recognise, both in single and multi-dog households?
2. Why might retrieve training be useful in resource-guarding cases?
3. Is it possible to 'remove' resource-guarding behaviours from a dog? What could clients be informed regarding this?

Answers

1. stillness, lip-licking, yawning, averting eyes or head, bodily withdrawal, orientation towards resource, blocking to prevent resource removal, eye contact and staring between dogs

2. retrieve allows the dog to learn that a resource can be shared with an owner because the dog will always regain that resource or earn something of higher value; resource guarding is an instinctive survival response so it cannot be 'removed'; clients can be informed that the dog is always likely to perform such behaviours, but that there are means of management, risk reduction and desensitisation/counter-conditioning, which will all help as long as the client can ensure permanent compliance from all concerned.

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Laura graduated from Cambridge University in 2011 and, after working in a small animal hospital and completing a rotating internship at the Royal Veterinary College, is now training to be a specialist in Emergency Medicine and Critical Care. She is interested in all aspects of emergency medicine and critical care, especially the management of acute kidney injury and the use of renal biomarkers.

Critical care of the hospitalised patient in general practice

Management of the critical small animal patient is intensive, yet can be very rewarding. Regular assessment is the key to success – allowing monitoring of the disease process, response to therapy and detection of any complications. Therefore, alongside daily assessment of the parameters pertinent to the primary disease process, surveillance for new problems is vital.

A checklist, such as 'Kirby's Rule of 20' (Kirby 2000) is a useful guide in assessment and recognition of changes in your patient (**Figure 1**). This article will highlight certain aspects of this checklist and how to implement it in practice.

A thorough, daily physical examination is important to assess for any progression of clinical signs relating to the primary disease, as well as the development of new clinical findings that may have occurred as a complication of treatment or hospitalisation. Examination should include an assessment of the patient's neurological, cardiovascular and respiratory status – the patient's major body systems.

Physical examination

The patient's level of consciousness and response to the surroundings should be assessed. Standardised terminology to describe the patient's alertness are obtundation (mild, moderate and severe), stupor and coma (**Table 1**). In any patient that is stuporous or comatose, a gag reflex should be checked. If an animal has a compromised gag, immediate endotracheal intubation should be performed to minimise the risk of aspiration of oral secretions, which could lead to aspiration pneumonia.

Cardiovascular assessment includes evaluation of heart rate, pulse quality and synchronicity with the heart beat, mucous membrane colour and capillary refill time. Heart rate and rhythm should be compared to the baseline for the individual patient and interpreted in light of the patient's current pain and stress levels. New murmurs, gallop rhythms in cats, and tachy- and brady-dysrhythmias should be noted and investigated.

Monitoring the respiratory rate and effort of a patient is an effective method of evaluation of the respiratory system. In addition, serial thoracic auscultation of the lung fields is important as subtle changes in respiratory noise may indicate early pulmonary dysfunction or pleural space disease, prompting further diagnostics. Body temperature (ideally rectal) should be monitored at least once daily in the critical patient, with more frequent measurement required

in patients with marked pyrexia, hyperthermia or risk factors for its development. Environmental hyperthermia should be differentiated from pyrexia by considering the underlying disease process.

Many animals do not tolerate rectal temperature measurement. In these cases, alternative locations can be considered. In cats, axillary temperature measurement is considered a better substitute for rectal temperature than tympanic temperature measurement (Smith et al, 2015; Goic et al, 2015; Cichocki et al, 2017). Animals receiving active warming should have their temperature assessed more frequently to prevent iatrogenic hyperthermia.

The development of pyrexia in a previously normothermic patient is not uncommon in the hospitalised patient. A full physical examination should be performed in these individuals, paying particular attention to the respiratory system. Aspiration pneumonia is a relatively common complication in recumbent critical patients and early detection is key.

If the physical examination is unremarkable, removal and replacement of the intravenous catheter can be considered as a first-line step because, in the author's experience, phlebitis



*Suggested Personal & Professional Development (PPD)



Table 1. Level of consciousness

Obtundation	Decreased awareness of surroundings
Stupor	Decreased consciousness, only able to respond to noxious stimuli
Comatose	Unconscious, unable to respond to all – including noxious – stimuli

- mentation
- oxygenation and ventilation
- heart rate, rhythm and contractility
- perfusion and blood pressure
- fluid balance
- oncotic pull
- glucose
- electrolyte and acid base
- albumin levels
- red blood cells and haemoglobin concentrations
- coagulation
- immune status, antibiotic dosage and selection, WBC count
- GI motility and mucosal integrity
- renal function
- drug dosage and metabolism
- nutrition
- pain control
- nursing and patient mobilisation
- wound care and bandage change
- tender loving care (TLC).



Figure 1. 'Kirby's Rule of 20'.

Figure 2. One sign of over-hydration is chemosis.

secondary to the presence of an intravenous catheter is the most common cause for the development of pyrexia in a hospitalised patient. The requirement for other indwelling devices – such as urethral catheters, drains and so on – should also be considered as these can become contaminated and lead to inflammation, hospital-acquired infections and pyrexia, which can clear once the device is removed.

Fluid balance

Assessment of perfusion parameters (heart rate, pulse

quality, mucous membrane colour and capillary refill time) indicates the intravascular fluid volume only. Hydration assessment is considered a subjective measure of interstitial fluid and intracellular fluid. Daily body weight changes reflect fluid balance and, therefore, may be more of an objective way to monitor hydration.

When dehydrated, a patient's skin turgor is decreased and so skin 'tenting' is prolonged. Mucous membranes are dry and weight loss occurs. With over-hydration, skin

turgor increases and the subcutaneous tissue gains a jelly-like consistency. Additional signs of over-hydration include weight gain, serous nasal discharge, peripheral oedema and chemosis (**Figure 2**).

Critically ill patients are at increased risk of developing fluid overload and this has been shown to be associated with an increased risk of death (Cavanagh et al, 2016). Therefore, close monitoring of fluid balance to prevent under- or over-hydration is required. Pre-designed fluid assessment sheets for monitoring ins and outs are useful guides for assessment of fluid therapy (**Figure 3**). Urine output measurement methods include 'free catch' of urine, weighing of bedding and incontinence pads – as well as the use of ultrasound for estimation of

bladder volume (Lisciandro and Fosgate, 2017).

Urine output in a well-perfused, normally hydrated animal on intravenous fluids should be 1-2ml/kg/hr. Urethral catheterisation should be performed in patients where olig- or anuria (urine output <1ml/kg/hr) is suspected – especially in those patients that have gained weight. Urethral catheterisation may also be performed in non-ambulatory patients to maintain comfort and prevent urine scald. Urethral catheters should always be placed in a sterile manner with a closed collection bag to minimise the risk of hospital-acquired urinary tract infection.

Laboratory data

Bedside laboratory data can aid interpretation of physical examination, allowing perfusion and hydration assessment alongside checking for blood glucose, acid-base and electrolyte abnormalities that may occur secondary to the disease state or interventions. Lactate is a marker of tissue perfusion – elevated lactate alongside compatible clinical signs (tachycardia, changes in pulse quality, prolonged capillary refill time, cold extremities and hypotension) is indicative of poor perfusion. Lactate itself can also be elevated secondary to certain drug therapies, including glucocorticoids and underlying disease states such as neoplasia and liver disease. It should, therefore, be interpreted in light of full clinical assessment of the patient.

Packed cell volume and total solids measurement, alongside assessment of the serum for icterus, lipaemia or haemolysis should be performed at least once a day in critical patients. Hypoproteinaemia is common in critical patients and has been associated with increased risk of wound dehiscence following

"Regular assessment is the key to success – allowing monitoring of the disease process, response to therapy and detection of any complications"

INS: Record total ml of each fluid that the patient has received since last recording

Time							
Crystalloid							
Colloid							
Boluses							
Diluted medication							
CRIS							
PRBC							
PRBC							
Drinking water							
Enteral feed							
Paraenteral feed							
Other							
Total (add column)							

OUTS: Record/estimate total ml of each type of fluid lost since last recording period

Time							
UOP							
Chest tubes							
JP Drain							
NG tube							
Vomiting							
Diarrhoea							
Other							
Total (add column)							

FLUID BALANCE:

Time							
Total ins-total outs							
Cumulative ins-outs (= sum of first row)							

DAILY TOTAL

To be completed at the end of 24 hour recording period

Total ins:	Total outs:	Total balance:
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Figure 3. An example of a pre-designed fluid assessment sheet for monitoring the ‘ins and outs’ of fluid therapy.

PCV and pre-emptive blood typing could be performed.

Patients that are anorexic in hospital are likely to develop hypokalaemia, particularly if they are on non-supplemented intravenous fluid therapy. Potassium levels should be monitored at least once daily – with supplementation as required, based on published guidelines (Figure 4).

Glucose measurement should be performed frequently in all patients, particularly in juvenile patients and small dog breeds. The development of hypoglycaemia in adult dogs and cats should prompt the consideration of sepsis. Supplementation with 2.5%-5% dextrose in an isotonic crystalloid, such as Hartmann’s fluid, should be considered in these patients.

Blood smear assessment

Daily examination of a blood smear allows subjective assessment of neutrophil and platelet numbers, as well as the presence of red cell regeneration and erythrocyte morphology. This is very useful in monitoring anaemic, neutropenic and thrombocytopenic critical patients, or those with infectious or inflammatory conditions.

Patients that are severely neutropenic (<1x10⁹/L) will require strict barrier nursing and broad-spectrum antibiotics. Thrombocytopenia alongside prolonged coagulation times (prothrombin and partial thromboplastin times) may suggest a disseminated coagulopathy.

Patient-side ultrasound

Patient-side ultrasound is a useful tool for the detection and monitoring of free fluid in body cavities. This is particularly important in those patients at risk of fluid overload – patients with oligo- or anuria – and in monitoring for septic peritonitis following gastrointestinal surgery (Figure 5).

As the clinician’s skills increase, patient-side ultrasound also allows assessment of pulmonary pathology, gastrointestinal motility and has been shown recently to be useful, alongside heart rate and blood pressure measurement, in guiding assessment of volume status (Sanderson et al, 2017; Cambournac et al, 2017).

Analgesia and drug therapy

Adequate analgesia is an essential part of critical care. Pain can cause a variety of systemic issues, including effects on the cardiovascular system and wound healing. Pain assessment can be easy when the animal is showing obvious signs of distress – including yelping or guarding the injured site. Some patients, however, are more stoic.

Objective pain scoring systems, such as the short-form Glasgow composite measure pain scale, may be useful to detect and monitor the severity of pain and response to analgesic therapy (University of Glasgow, 2005). These scoring systems should be incorporated into overall patient assessment by the staff, especially the nurses who provide the minute-by-minute

“Daily examination of a blood smear ... is very useful in monitoring anaemic, neutropenic and thrombocytopenic critical patients, or those with infectious or inflammatory conditions”

Potassium supplementation	DO NOT administer at a rate >0.5mEq/kg/hr
Serum potassium (mEq/L)	mEq KCL per 1,000ml fluid bag
3.5 - 5.5	20
3.0 - 3.5	30
2.5 - 3.0	40
2.0 - 2.5	60

Figure 4. Potassium supplementation guidelines.

intestinal surgery (Ralphs et al, 2003; Swinbourne et al, 2017). Management of hypoalbuminaemia involves treating the underlying disease and providing nutritional support. Plasma and synthetic albumin transfusion have not been shown to increase survival in these patients (Mazzafero et al, 2002).

Anaemia is a common finding in critically ill patients, particularly in cats. In one

study, three quarters of cats developed anaemia during ICU hospitalisation and this was thought to be at least partly related to repeated blood sampling (Balakrishnan et al, 2016). Care should be taken in these critical patients to only draw the minimum volume of blood required for the tests, in order to minimise the risk of development of anaemia. The optimum PCV for oxygen transport is 27 to 33 per cent, so close monitoring of a declining

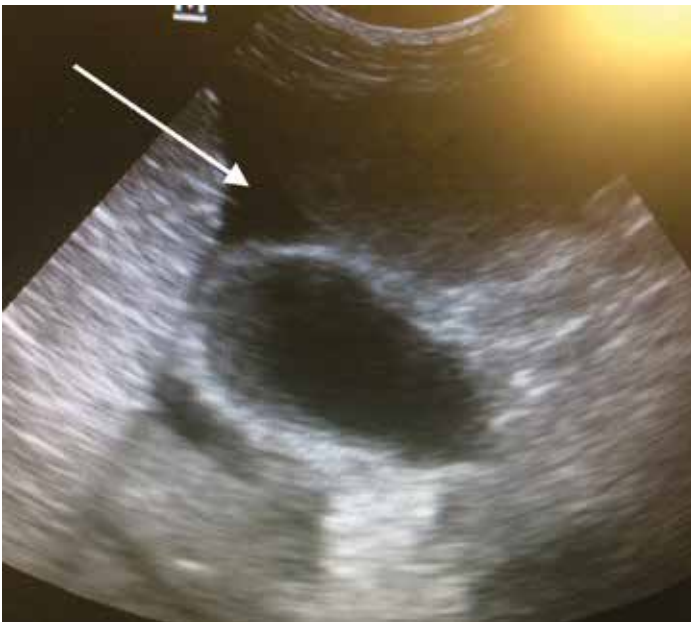


Figure 5. 'Free fluid' visualised using ultrasound.

care. If there is any suggestion that the patient is in pain, then analgesic medication should be trialled. Opioids are 'cardiovascular sparing' and generally safe to use, even in the most critical patient.

Nutrition

Nutritional support is a crucial part of critical care. Patients that develop a negative energy balance may have decreased immune function and, therefore, be at risk of pneumonia, sepsis, multiple organ dysfunction and death. Enteral nutrition to support the gastrointestinal tract is the preferred route of nutrition delivery.

Daily recommended resting energy requirement (RER) should be calculated for all patients by using the previously published formula (**Figure 6**).

If a patient has been anorexic for more than two days, feeding tube placement should be considered, with nasogastric tubes often being good options as they are cheap and simple to place; although they do require the use of a liquid food (**Figure 7**).

Initially 10-30% RER should be fed, with close monitoring

for signs of intolerance, such as regurgitation or diarrhoea. Syringe feeding is unlikely to fulfil calorie requirements and is associated with food aversion and increased risk of aspiration; so it is not recommended. If the patient does not tolerate enteral feeding, parenteral nutrition could be provided through a peripheral vein; but this requires close monitoring for lipaemia and electrolyte abnormalities.

Physiotherapy and TLC

Recumbent patients are at high risk of developing complications, such as aspiration pneumonia, urinary tract infections, muscle atrophy, decubital ulcers, urine and faecal scalding and peripheral oedema. Alternating body position can improve chest wall expansion, prevent atelectasis and improve oxygenation. Regular turning, soft comfortable bedding that wicks away urine, and early mobilisation are recommended. Basic physiotherapy, such as assisted standing and range-of-motion exercises, should be considered in all critical patients to prevent these complications.

$$\text{Resting energy requirement (RER)} = 70 \times \text{BW (Kg)}^{0.75}$$

Figure 6. Calculation of daily energy requirement.



Figure 7. If a patient has been anorexic for more than two days, feeding tube placement should be considered.

Some patients, such as those with tetanus, may require more intensive physiotherapy. A patient's mental health is as important as physical health too. Sitting a patient upright or assisted standing can improve a patient's emotional well-being, in conjunction with owner visits, provided they do not lead to distress when the owner leaves. In all instances, patients should receive plenty of attention from staff and time spent grooming and playing.

Communication

Communication between all staff involved in management of

critical patients is paramount – nurses are often better placed at detecting subtle changes in patients if they are providing more regular care and assessment. Discussion between clinicians and nurses is required at least once a day, which often fits in well with hand-over rounds between day and night teams.

Another important aspect of hospitalised critical patients is communication with owners. The owners of critical patients are often understandably upset about their pet needing to be hospitalised for prolonged periods of time,

“Communication between all staff involved in management of critical patients is paramount – nurses are often better placed at detecting subtle changes in patients if they are providing more regular care and assessment”

so updates should be given at least once daily, as well as the opportunity to visit their pet. This can be reassuring for the owners by allowing them to see where their pet is kennelled and all the members of staff involved in their care.

Good communication involves regular updates, but also checking that owners understand their pet's disease and prognosis – as well as their bill (both current and projected); because often in highly emotionally charged situations, such information can be hard for the owners to grasp and remember.

Conclusion

Evaluation of the critical patient is multi-faceted. Assessment of the patient should be performed in a careful step-by-step manner. Checklists, such as ‘Kirby’s Rule of 20’, are excellent starting tools to ensure every organ system is considered in the management of the critical patient. This should be used alongside feedback from all members of the staffing team to ensure optimum patient care. ■

PPD Questions

- Which of the following is a sign of fluid overload?
 - peripheral oedema
 - decreased skin turgor
 - chemosis
 - all of the above.
- Which of the following has been associated with poor wound healing post surgery?
 - neutropenia
 - hypoglycaemia
 - hypoalbuminaemia
 - hyperlactaemia.
- Which of the following is considered the best form of short-term nutritional support?
 - syringe feeding
 - nasogastric feeding tube
 - gastrotomy tube
 - parenteral nutrition.

1.D 2.C 3.B
Answers

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It's not just chocolate, grapes and onions...

Our pets are generally immune to the various trends towards Clean Eating, Paleo Diets and 5:2 strategies – dogs remain firmly committed to the famous See-Food diet, whereas cats have a somewhat deserved reputation for being the fussy eaters of the pet world. Owners, therefore, must be ever-vigilant to ensure that foods that are unsuitable for animals are kept well away from their pets – and certainly never given as treats.

Chocolate, grapes (and raisins) and onions (*Allium* spp.) are always high on the list of enquiries received by the Veterinary Poisons Information Service (VPIS); but because these foods are well-known issues – and frequently discussed – we'll look at some foods less commonly reported, but equally problematic and challenging to treat.

Hops

Animals can ingest hop plants from gardens (*Humulus lupulus*), dried plant material from flower arrangements or spent hops from the brewing process – the last of which represents the greatest risk.

All forms of hops can cause malignant hyperthermia, although the exact mechanism is unknown. In five cases reported by Duncan et al (1997), four out of five dogs died. Clinical effects of panting, abdominal distension and discomfort, restlessness, anxiety, tachycardia and tachypnoea were seen within 2.5 to eight hours following ingestion and the onset of rigor mortis was very rapid in the three cases in which it was measured.

It should be noted that these five cases involved four greyhounds. This breed may be more at-risk but the

numbers are too small to make any definite conclusions.

It is essential to monitor the animal's temperature and vital signs – and in severe cases, if required, aggressive cooling measures are recommended. Ensure there is adequate hydration with intravenous (IV) fluids to lower body temperature, promote urine output and prevent myoglobinuria-induced renal impairment.

Ethanol

Dogs seem to have a particular penchant for whisky-based cream liqueurs and, as in humans, it's the metabolites of alcohol that do the damage and cause the clinical effects.

The onset of effects normally occurs within one to two hours and is characterised by vomiting, diarrhoea, excitability and agitation – and then depression, ataxia, disorientation, vocalisation, drowsiness, weakness, hypothermia, metabolic acidosis, hypoglycaemia, urinary incontinence and respiratory depression. Convulsions can occur in severe cases.

Any ingestion of above 0.4ml/kg of ethanol could cause clinical effects. This is equivalent to 1ml/kg bodyweight for

a 40 per cent spirit, 4ml/kg bodyweight for a 10 per cent wine, and 8ml/kg bodyweight for a 5 per cent beer. Emesis should only be considered if ingestion was recent and the animal is not showing signs of CNS depression (which can be rapid in onset) and the use of activated charcoal is not helpful, as it does not bind to alcohol.

Most cases require supportive care only, but IV fluids may be needed for rehydration. The body temperature should be monitored and warming measures instituted if required and, in addition, monitoring and correction of blood sugar levels. Check blood gases, if possible.

Bread dough

There are two problems associated with the ingestion of uncooked bread dough, which result from yeast fermentation:

- expansion of the dough mass causing gastric distension and obstruction (through production of carbon dioxide).
- production of ethanol.

Most cases occur after the dog eats dough that has been left to rise and they typically do not present to a veterinary surgery until clinical features have appeared (Means, 2003). Clinical effects can present within one to 10 hours – with the initial sign often being vomiting, followed by signs of increasing ethanol intoxication.

Emesis is often unsuccessful because of expansion of the



*Suggested Personal & Professional Development (PPD)



POISONS

"All forms of hops can cause malignant hyperthermia, although the exact mechanism is unknown"



bread dough in the warm gastric environment. There is also a risk of stomach rupture if the dough mass blocks the oesophageal sphincter and a risk of aspiration in animals with CNS depression.

Passing a stomach tube may help to expel accumulated gas. In severe cases, a gastric lavage should be attempted using cold water (to slow the yeast fermentation) – but take care in hypothermic animals. If this fails, gastrotomy should be undertaken to remove the fermenting dough mass.

Adsorbents are not recommended because they do not bind ethanol and are contraindicated in animals with obstruction. Full supportive care should also be given.

Nuts Macadamia nuts

The mechanism of toxicity of these nuts is unknown. It may involve a constituent of the nuts, processing

contaminants or mycotoxins (Hansen et al, 2002). A toxic dose has been estimated to be approximately two or three nuts, which equates to about one nut per kilogram (Gwaltney-Brant, 2007).

The onset of clinical effects – such as weakness and ataxia (more pronounced in hind limbs), abdominal tenderness, lethargy, vomiting, diarrhoea, pyrexia, bloat, lameness, stiffness, joint pain and recumbency – generally occurs within 12 hours, although these effects can last between 24 to 48 hours.

Treatment is supportive. However, if the quantity ingested is large (e.g. >20g nuts or 50g/kg bodyweight) then administration of a laxative will hasten passage of the nuts through the gastrointestinal tract. Most cases can be managed at home (Hansen et al, 2000; Hansen, 2002) because the syndrome appears to be self-limiting. Full recovery is expected.

“There are two problems associated with the ingestion of uncooked bread dough, which result from yeast fermentation...”

Stored nuts

These can become contaminated with moulds, which may produce toxins. Aflatoxin is produced by *Aspergillus* spp. Dogs appear to be particularly sensitive and even low levels of fungal toxins can be toxic to them. Aflatoxins primarily affect the liver, causing hepatic damage (hepatocellular necrosis), severe gastrointestinal signs (anorexia, vomiting and diarrhoea), polydipsia and polyuria, depression, lethargy, weakness and jaundice.

The onset of clinical effects is variable depending on the concentrations and, presumably, the aflatoxin involved. Death can occur within three to seven days of onset of signs in acute poisoning. The liver is the target organ and the death rate is high.

In more chronic, low-dose poisoning, the effects are the same but milder, and are characterised by non-specific signs, including reduced growth rate and liver damage. Toxicity can occur over weeks or months.

There is no specific treatment for aflatoxicosis and management is supportive – recommendations being based on treatments for liver failure (Furrow, 2007).

Activated charcoal may be given if ingestion is recent, but this is rarely the case. Monitoring of liver function, clotting parameters, electrolytes, blood glucose and a full blood count is also recommended. Fluid support is essential because hypovolaemia and hypoperfusion are common in liver failure. Antiemetics should be used, if required.

Nutrition is also important in dogs with liver damage. The diet should be balanced and protein-restricted foods should be avoided unless the animal has hepatic encephalopathy (Furrow, 2007). Recovery may be prolonged.

Liver protectants may be beneficial in these cases. Several have been suggested (Furrow, 2007) but the most practical are acetylcysteine and vitamin E. There is experimental evidence showing reduced liver damage in animals given either of these drugs. Other suggested liver protectants are S-adenosylmethionine, milk thistle (silymarin), L-carnitine (Furrow, 2007).

A word on peanut butter

Many US peanut butters have xylitol added to them, so always try to ascertain the exact brand name – VPIS can help identify those peanut butters that contain xylitol.

Palm oil is another product contained in some brands of peanut butter – usually those at the lower end of the price spectrum. Fed in large quantities, palm oil can lead to stomach upsets and diarrhoea, owing to the high level of saturated vegetable fats contained within it, making it very rich and fatty – and thus both high in calories and, possibly, too rich for the digestive system of some dogs.

More on xylitol

Often found in chewing gums and ‘sugar-free’ foods, xylitol is a potent stimulator of insulin release in dogs.

They appear to absorb xylitol quicker and more extensively than humans (Kuzuya, 1969). The onset of clinical effects is often seen

within an hour, although in some cases – particularly those with subsequent liver damage – hypoglycaemia can be delayed for 24 to 48 hours. Liver failure can occur in the absence of hypoglycaemia and signs occur nine to 72 hours after ingestion.

Clinical features of hypoglycaemia include vomiting, tachycardia, ataxia, coma, convulsions, hemiparesis, hypokalaemia, hypomagnesaemia and hypophosphataemia.

Aggressive treatment is recommended for >50mg/kg and includes induction of vomiting (if ingestion was less than one hour ago) and activated charcoal, despite the potential for low levels of binding to xylitol.

Baseline values for glucose, potassium, phosphorus, total bilirubin, liver enzymes and clotting parameters should be obtained. Monitor glucose concentrations every one to two hours for at least 12 hours and recheck the other tests every 24 hours for at least 72 hours (Dunayer, 2006). Frequent small meals or oral sugar may be given for eight to 12 hours in an animal without clinical features of hypoglycaemia (Dunayer, 2004), but if this is ineffective – or the animal is symptomatic – then correct hypoglycaemia with glucose/dextrose.

For doses >0.5g/kg, monitor as above and consider dextrose therapy immediately – even in the absence of hypoglycaemia (Dunayer, 2006). S-adenosyl-L-methionine (Denosyl, Nutramax) can be used as a hepatic protectant (Dunayer, 2008).

Avocado

The leaves, bark, fruit and seeds of avocado are toxic to animals. The active principle is believed to be persin; however, the mechanism of action is unknown. In the UK, cases are

“Dogs seem to have a particular penchant for whisky-based cream liqueurs...”

only likely to be reported in domestic animals (e.g. dogs, cats or birds) that have been fed or accidentally ingested avocado fruit.

Onset of signs is very variable depending on the quantity ingested – effects can occur within 24 hours or up to several days after ingestion. Typically, avocado causes myocardial degeneration and heart failure, manifesting as generalised oedema and dyspnoea, raised creatine kinase (CK), aspartate aminotransferase (AST) and lactate dehydrogenase (LDH).

In most cases of ingestion reported to the VPIS, the dogs and cats remained well. There may have been anorexia, diarrhoea and vomiting. Severe cases can involve gastrointestinal obstruction resulting from ingestion of an avocado stone (two of 18 cases reported to VPIS).

'Jerky' treats – a warning

Ingestion of 'jerky' treats has been associated with Fanconi syndrome in dogs and cats in the US, Canada, Australia and the UK. In most cases, the treats originate from China.

In the US, the Food and Drug Administration's (FDA) Center for Veterinary Medicine has run more than 1,200 tests, visited pet treat manufacturing plants in China and worked with researchers, state laboratories and foreign governments – yet has still not determined the exact cause of the illness.

Fanconi syndrome

Fanconi syndrome is a generalised proximal tubular reabsorptive defect, resulting in excessive loss of many solutes in the urine. It has been reported as an acquired condition (with 'jerky treats' and some drugs) or inherited in a variety of breeds (most commonly, Basenjis).

There is excessive urinary loss of glucose, sodium, potassium, phosphorus, uric acid, bicarbonate, albumin and amino acids. Blood glucose concentrations are normal. Serum electrolytes are normal early in the disease, but hypophosphatemia, hypokalaemia and metabolic acidosis are seen in the later stages.

Signs reported include polyuria/polydipsia, inappetence, lethargy, vomiting and diarrhoea – and there may be weight loss. With regards to treatment, withdrawal of treats may be all that is required in some cases; although there is some merit in monitoring the electrolytes, renal function, urinalysis, blood gases and liver enzymes.

Treatment is supportive with correction of electrolyte imbalances and acidosis. Veterinary professionals who would like advice on management of Fanconi syndrome can contact Anderson Moores Veterinary Specialists, Winchester, on 01962 767920 (working hours 8.30am–6.30pm) or e-mail medicine@andersonmoores.com. The main contact is David Walker.

Any suspected cases should also be reported in the case registry on the VPIS website. ■

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Public poisons triage service benefits pets and vets

The Animal PoisonLine* (APL) has just completed its first year of operation. The Veterinary Poisons Information Service (VPIS) launched this helpline in April 2017 for pet owners to use if they were concerned that their animals had been exposed to something potentially poisonous.

The VPIS has provided specialist advice to veterinary practices for their poisoning cases for over 25 years and is well known and respected amongst the veterinary community; but this is the first time that members of the public have had direct access to its expertise.

“The main reason for launching APL was to enable owners to quickly access accurate information that they cannot find elsewhere,” says Nicola Robinson, the veterinary surgeon who heads up VPIS. “Often owners are very worried about their pet and turn to the internet, which can be inaccurate and potentially harmful. Others may, understandably, go straight to their practice for treatment when, in reality, it may not be needed.”

Animal PoisonLine is a triage service, informing owners whether any signs are to be expected and if a visit to a veterinary practice is necessary. During the first year, nearly 1,300 calls were received – of which 90 per cent were referred directly from veterinary practices. Nine out of 10 calls related to poisoning in dogs – the largest number of calls being about human medication that had been ingested accidentally.

Other common items included grapes, chocolate, rodent poisons and household products. There were occasional calls too about veterinary drugs that had been administered incorrectly; or to confirm that the advice pet owners had received from a veterinary practice was appropriate.

Interestingly, a significant number of calls directly from veterinary practices were about human anti-inflammatory medicines – notably ibuprofen.

Owners who are concerned that their pet has been poisoned – or who have been referred by their vet – can call 01202 509000 to access the 24-hour service. Users are charged £30, including VAT, and are required to pay upfront using their credit card. ■

***Animal PoisonLine is a 24-hour service on 01202 509000, or at www.animalpoisonline.co.uk**

CASE STUDY 1



Fenton, four-year-old male Labrador that drank Aqua Kem Blue toilet fluid.

Claire Salter was away on holiday caravanning in the Lake District in November 2017. She used a toilet fluid called Aqua Kem Blue in the portable toilet, adding a ‘small amount’ then filling up with 3-4 litres of water. Fenton then drank from the portable toilet. Claire called her vet back in Wiltshire who advised calling APL – which she did.

Aqua Kem Blue contains formaldehyde and ethanol which would have been a problem if the product had been ingested in its concentrated form. However, because water had been added to dilute it before Fenton drank, APL could reassure Claire that there would be no need to seek treatment and she could continue her holiday without worry.

CASE STUDY 2



Logan, one-year-old German shepherd dog that ate his owner’s medication.

Sandra Thirkettle was taking the antibiotic flucloxacillin and she left the tablets on her bedside table. She realised 3.5-4 capsules were missing and that Logan had eaten them, totalling between 1,750mg and 2,000mg. Sandra called APL 15 minutes after the tablets had been ingested and was very concerned. She was reassured that Logan could be observed at home and that this medication would not cause any severe signs. She did not, therefore, have to go to the vet.

“Your helpline was so useful, explaining what symptoms to watch out for. I can’t thank you enough for your valued help, allaying my fear...”

“The man who dealt with the phone call was very polite and made us feel very reassured once the measurement of nicotine was deemed safe”

CASE STUDY 3



Si Si, five-month-old Maltese terrier weighing 3.6kg that had ingested electronic cigarette liquid.

Owner Natalie O'Connor called her vet after her young Maltese terrier puppy ingested approximately 2.5ml of e-cigarette liquid. Her vet advised that she called APL to find out if the amount ingested exceeded the treatment dose for nicotine.

The liquid was 3mg/ml, which is low and the total ingested was therefore 7.5mg of nicotine. APL reassured Natalie that this was a low dose and that she did not need to take Si Si for any treatment.

CASE STUDY 4



Waffles, two-year-old, 2.5kg lop-eared rabbit that had eaten rat poison.

Glen and Victoria Bowler had recently acquired Waffles as a rescue and kept him as a free-roaming house rabbit. He went into the utility room where there was some mouse and rat poison ('The Big Cheese Mouse and Rat Killer') and ate a pellet.

The product contains the anticoagulant difenacoum but APL could reassure the Bowlers that the amount ingested did not exceed the level that would cause bleeding in a rabbit this size. They were advised, however, that they needed to ensure he did not have further exposure.

CASE STUDY 5



Mittens, domestic short-hair cat who ate several different food items.

Philippa Talbot was clearing out her freezer when some food fell on the floor - 'Linda McCartney's vegetarian duck in hoisin sauce', 'Quorn mince', 'Aunt Bessie's carrot and suede mash', peas and possibly, 'Quorn pepperoni slices'. While she had her back turned, Mittens ate it all. He had recently eaten vegetarian bolognese with onions and garlic and had been rushed to the vet for gut decontamination.

Philippa was extremely worried because she was snowed in, but the vet told her to call APL before deciding what to do next. She was reassured that, although there is a small amount of garlic in the hoisin pieces, there was no need for any treatment. Mittens developed borborygmi, but had recovered completely the next day.



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Marie is also a lecturer on the veterinary nursing diploma course at Bottle Green Training, Melbourne, Derbyshire.

*XLVets is a community of independently-owned, progressive veterinary practices that work together to achieve the highest standards of veterinary care.
www.xlvets.co.uk

Essentials of grooming horses

Veterinary professionals should be aware that horses need to be groomed for physical and psychological health reasons. For this, a specific set of grooming tools is required. This article will discuss the correct equipment and techniques required for grooming equine patients.

Horses groom each other in the wild and, as it is a good bonding process, most horses are groomed by their owners every day while they are at home. Daily grooming whilst in the veterinary hospital will both reassure the horse and enable the registered veterinary nurse (RVN) in charge of the case to become acquainted with the animal and assess its condition and rate of progress (Whatley, 2006).

Reasons for grooming

There are three main reasons why it is beneficial to groom horses:

Appearance

It is to be expected that an owner will come to the veterinary hospital to visit their hospitalised animal; so a clean, well-groomed animal will reinforce the impression of professional care. This is a very important role for RVNs in practice and is often overlooked.

Grooming removes grease, dust and dead skin, helps keep pores open and aids blood circulation (Whatley, 2006).

Contact

Horses are gregarious by nature and often end up isolated in one stable whilst in the hospital on box rest. Daily grooming helps develop rapport between the RVN and the horse (Whatley, 2006). The social contact provided can reduce anxiety and contribute to a faster recovery.

Health

Daily attention while grooming enables the RVN to undertake a guided

assessment of the patient and get to know the horse as an individual. Any changes in the horse's stance and general demeanour should be reported to the veterinary surgeon responsible for the case (Whatley, 2006).

In addition, the RVN should check for heat, digital pulses, sores and swelling.

The grooming process

Each horse should have its own individual grooming kit (Table 1). This should be disinfected after the patient has been discharged (Whatley, 2006).

Always restrain the horse to groom it by tying it up using a quick-release knot. A methodical approach should be adopted and it is wise to start at the neck and work backwards towards the quarters and the hind legs.

The head should be done last – because horses are prey animals, they are more likely to let you groom their head once they trust you. When grooming the horse, the handler should always stand by the side of the horse to

reduce the risk of being kicked (Whatley, 2006).

A full grooming is advisable before a patient is discharged, and hoof oil should be applied to the hooves to provide the finishing touch.

Conclusion

Horses can only be handled safely if the handler has knowledge of their natural behaviour. Being 'prey' animals, horses are easily frightened and will react by either running away, biting or kicking. Firm, kind handling is what is required of RVNs in practice, paying particular heed to the fact that the horse is likely to be stressed owing to its being in unfamiliar surroundings.

Grooming is very important, especially for hospitalised horses, in order to provide social contact and guide a detailed assessment of the patient. RVNs should not underestimate the importance of their role in providing company and comfort to hospitalised horses and this helps to reduce stress and encourage a faster recovery. ■



*Suggested Personal & Professional Development (PPD)












GROOMING

PPD Questions

1. Give three benefits of grooming a horse.
2. What should a body brush be used for?
3. When grooming a horse, where should you start?

Answers
1. appearance, contact, health
2. laying the hair flat and making the horse's coat shiny. It can be used all over the horse's body
3. on the neck.

Table 1. The equine grooming kit

Item	Use	Example
Dandy brush	Has hard bristles and is used for removing mud and sweat from the coat. It should not be used on horses that are sensitive or clipped and should not be used on the legs or head of the horse.	
Body brush	Much softer than the dandy brush and may be used on the whole horse. It is used to lay the hair flat and create a shine.	
Curry comb	May be plastic, metal or rubber and should never be used on the head or legs. The plastic curry comb is used with extreme care to remove thick, dry mud from the horse. The metal curry comb is used in combination with the body brush, but should never be used on the horse. The metal curry comb is drawn across the body brush to remove hair and dirt collected on it. The curry comb is then tapped on the floor periodically to remove any dirt that has accumulated. The rubber curry comb is used in a circular motion to remove any loose hair and to give a massage. This is incredibly useful for foals and they thoroughly enjoy the attention!	
Shedding blade	Used to remove large amounts of hair when the horse moults. Should only be used on the body and never on the legs or face.	
Sponges	Three separate ones should be available: one for the eyes, one for the nose and one for the anus. These areas should be cleaned using a sponge and clean water once daily.	
Mane comb	May be made of metal or plastic. Use the comb to separate the mane and tail hairs. Spray the area first with mane and tail conditioner to ease the separation and add shine.	
Wash brush	May be used whilst bathing the horse to aid removal of mud and debris from the coat. This brush can also be used for washing hooves.	
Sweat scraper	Used to squeeze excess water out of the coat after bathing or hosing down. Should be used rubber side to the horse and only used on the body, not the head or legs.	
Hoof pick	Must be used from the bulb of the hoof towards the point of the hoof, avoiding damage to the sensitive frog. Attention is required around the central and lateral clefts to ensure that all debris is removed.	

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Airway disease in racehorses and human athletes

A study by researchers at the Ontario Veterinary College, University of Guelph, has found that inflammatory airway disease in racehorses is more common than previously thought.

In the study, researchers examined lung tissue from 95 deceased racehorses that had actively raced or trained before their deaths. They found that most of the horses had some degree of inflammatory airway disease (IAD), with mild to severe airway changes.

Apparently, the discovery came as a surprise to the team, because previous studies had suggested the disease only occurred in up to half of equine athletes.

“The disease was known to be common in racehorses, but not as widespread as this study reveals,” said co-author, Professor Jeff Caswell. “The findings suggest that IAD does not result from unique exposure of an affected horse to the stimulus that causes the disease. But rather the research suggests that all racehorses may be exposed, with inflammation of the airways experienced by many.”

Published in the *American Journal of Veterinary Research*, the study was the first of its kind to assess information on a tissue level. It was also the first to discover airway inflammation in horses not specifically chosen for poor performance.

“None of the deceased horses showed obvious signs of airway inflammation in their final three races,” said co-author, Professor Luis Arroyo. “The research shows that inflammation is always prevalent in racehorses, even those that may or may not have respiratory signs.”

It is interesting to compare the findings of this study with observations on human athletes, published by Stéphane Berman from the Monaco Institute of Sports Medicine and Surgery. In a paper entitled ‘Airway inflammation and upper respiratory tract infection in athletes: is there a link?’ she states that upper respiratory tract infection (URTI) is regarded as the most common medical condition affecting both highly trained and elite athletes – in particular those



participating in endurance events – and the causes of these disturbances, also occurring during training, remain unclear.

Viruses such as rhinovirus, adenovirus and parainfluenza virus are frequently reported as the source of URTI. However, in a few comprehensive laboratory and epidemiological studies that reported at least a 30 per cent incidence of URTI, no identifiable pathogens were either reported or studied.

A recent, longitudinal study investigated symptomatology and aetiopathology in sedentary controls, recreational and elite athletes. The highest incidence of URTI occurred in the elite athletes. However, only 11 out of 37 illness episodes overall had pathogenic origins, and most of the unidentified upper respiratory illnesses were shorter in duration and less severe than infectious ones.

The author claims that this concept of inflammation without infection in athletes is quite new and leads us to consider other explanatory pathophysiological conditions.

Cellular components of airway inflammation exist in high-level athletes’ airways, particularly those involved

in endurance events. Increases in airway neutrophils, eosinophils and lymphocytes have been described under resting conditions in endurance sports, swimmers and cross-country skiers; and it is postulated that these inflammatory patterns may be the consequence of pollutants or chlorine-related compounds in swimmers.

After intense exercise, similar airway cellular profiles have been reported, with a high number of bronchial epithelial cells. This increase in airway inflammatory cells in athletes can result from a hyperventilation-induced increase in airway osmolarity, stimulating bronchial epithelial cells to release chemotactic factors.

Fortunately, in most cases, these inflammatory cells express a rather low level of adhesion molecules, explaining why airway inflammation may appear blunted in athletes, despite numerous inflammatory cellular elements. However, it can be hypothesised that a transient loss of control of this local inflammation, owing to various external physico-chemical constraints, might occur. This may account for some of the unidentified upper respiratory illnesses. ■

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CQ

CENTRAL QUALIFICATIONS™

Celebrating success

It was a full house for the 2018 Central Qualifications Graduation and Awards Ceremony, held at Central Hall, Westminster, on Saturday 9 June.

This is the fifth year the awards have been held to celebrate the hard work and achievements of the veterinary nurses who have qualified during the course of the past academic year. And thanks to the support of staff from colleges throughout the UK and over 600 veterinary practices, even more students realised their dream of becoming qualified members of the veterinary nursing profession, as they were presented with ceremonial CQ badges and scrolls, while families and friends looked on.

CQ graduates from far and wide:

- Abbeydale Vetlink, Monmouth
- Bicton College, East Budleigh
- Bridgwater and Taunton College, Bridgwater
- CCOAS, Suffolk and Kent
- Chichester College, Pulborough
- Goddard Vet Group, Wanstead
- Oaklands College, St Albans
- Plumpton College, Lewes
- Reaseheath College, Nantwich



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Veterinary Nursing Educator Awards 2018

This was the second year of CQ's 'Veterinary Nursing Educator of the Year Awards' – established in order to recognise the hard work and commitment of all staff who support students studying for veterinary nursing qualifications, as well as to acknowledge their talent, skills and dedication to veterinary nurse training.

The Awards were open to anyone involved in training and educating veterinary nurses in the UK and a large number of nominations were received. The winners were selected using a broad base of criteria. They were picked out as people making a difference, as excellent teachers and people who provided help, support and motivation to those whom they teach.

With so many excellent nominees, it was no easy task to choose just two award winners. However, the two candidates who 'stood out above the crowd', were Elaine Lamb and Kerry Jackson.

Qualities considered when choosing the Veterinary Nursing Educator award winners:

- inspiring role model
- helping student veterinary nurses to achieve their potential
- having a significant impact on students and the wider learning community
- excellent rapport with students
- effective engagement with students
- 'bringing to life' the importance of the veterinary nursing role
- engendering pride in the veterinary nursing profession.

Elaine Lamb RVN Cert Ed QLTS MBVNA

Elaine has been a qualified veterinary nurse for 24 years. She originally trained as a human nurse; but after leaving work to have a family, she retrained as a veterinary nurse in 1991.

Once qualified, she worked in small animal practice – soon becoming a head nurse; and in 1994 undertook some part-time lecturing on the pre-veterinary nursing course. Elaine says she then became "hooked upon teaching" and in 1997 became a full-time lecturer in veterinary nursing and animal care at her local college of further education – North Trafford, in Greater Manchester.

Elaine stayed in this role for nine years before moving to Myerscough College Manchester Centre in 2003 and then to Reaseheath College in 2012. Reaseheath celebrated its first cohort of qualified veterinary nurses in 2017 with an 83 per cent pass rate.

Elaine has recently become acting head of Reaseheath College and programme leader for Veterinary Nursing, covering for maternity leave. The main topics Elaine teaches are medical nursing and anatomy and physiology. However, she thinks that over the years she will almost certainly have delivered every unit on the course!

So what is it that Elaine enjoys about veterinary nurse training? She says that she simply enjoys the excitement from the students when they "get it" or when they pass their exams and achieve their qualification.

She feels that additional support for students to help them achieve their qualifications is vital and this includes involving other departments within the college structure – learning skills and 'well-being' teams, for example. Students also receive regular one-to-one tutorials and visits to practice. Reaseheath offers an 'open door' policy for its student nurses, who are aware that they can contact their tutors at any time.

There are, of course, the inevitable difficulties encountered by veterinary nurse educators – and Elaine says that she sometimes finds it hard to see students struggling with certain aspects of their training. It is at these times she feels frustrated that she cannot just wave a magic wand to solve all their problems.

We asked when she gets the most satisfaction from her role as a veterinary nurse educator. Elaine said it is when, years after training a student, she sees them as qualified nurses and they remember her. "It's magic," she says.

We asked Elaine what the Veterinary Nursing Educator Award meant to her and her reply was that, "It gives us, the trainers, the recognition for all of the hard work we put into our subjects to ensure that our nurses achieve their goals and ambitions – and I am proud to receive it."



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Kerry Jackson RVN DTLLS IQA

Kerry qualified as a veterinary nurse in 2002 while training at the Goddard Veterinary Group (Wanstead Veterinary Hospital). She then went on to work in both general and referral practice, including the Royal Veterinary College's Queen Mother Hospital for Animals. She re-joined the Goddard Veterinary Group Training Department in 2011, where she initially took over responsibility for co-ordination of the Level 2 Veterinary Care Assistant course – followed by the Level 3 Diploma in Veterinary Nursing in 2016.

When asked what it was that made her want to be involved in student training and support, Kerry explained that she was inspired by the tutors on her nurse training course (Perdi Welsh and Hilary Orpet), who, she said, always made lessons memorable. As an educator, she wants to encourage and inspire nurses in the same way.

Kerry loves being involved with nurse training – the actual teaching and, especially, when a student 'gets' what she has been trying to teach them. She also enjoys student support, finding it especially gratifying when a student who has been struggling is able to grow in confidence. "It is the best feeling," she said, "when they don't need you any more."

We asked Kerry what she most liked about her training role and she simply replied that every group of students is different, every day is different and this is what makes her love her role so much.

Support for students is very much in the forefront of Kerry's mind – she considers it to be really important and, to this end, she organises small cohorts of students so that they can be given individual support. Kerry thinks this definitely helps them to succeed.

There are always going to be difficulties for anyone working as a veterinary nurse educator, but Kerry's main problem is that there are simply not enough hours in the day to get everything done. She also explained that some students don't realise how demanding the course can be and that they will have to work really hard to achieve the qualification. But, of course, the training staff are aware of this and part of their role is to be understanding and provide students with all the different kinds of help they need.

The greatest satisfaction Kerry gains from her role is seeing the students finally gaining their CQ certificate, because she knows how hard they have worked to achieve this and how well deserved it is.

Kerry considers winning the Veterinary Nursing Educator Award to be an honour, saying it is nice to know that all her hard work is acknowledged and that it makes a difference to her students.



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The perils of wildlife filming

The special guest speaker at the CQ Graduation and Awards Ceremony was James Brickell – EMMY and three-time BAFTA award-winning film director. James has worked at the highest level of wildlife film-making for over 20 years – most of them with the world famous BBC Natural History Unit and Sir David Attenborough.

James, who originally wanted to become a veterinary surgeon, has shown how important it is to follow your dreams and passions and his career – although not in the veterinary world – has clearly satisfied his desire to be close to animals and discover more about them through the medium of film.

James' passion for capturing the wonders of the underwater world was wonderfully illustrated in his talk to the CQ audience. He began by saying that what really excites him is filming the more unpopular animals, those that engender a certain amount of fear in most people. Snakes are a typical example; and he went on to describe how he was involved in the very first film showing a rattlesnake hunting its prey in Malaysia, which was part of the BBC series *Life in Cold Blood*, shown in 2008. He explained that rattlesnakes are one of the most highly advanced snakes, feeding at night and "ambushing" their prey. His challenge was to achieve what had never been achieved before – to film this highly venomous snake hunting at night.

James talked of the problems on shoots, especially with dangerous animals. He said, jokingly, that one of the rules is that running away is not allowed! He did stress, however, that cameramen are briefed thoroughly before shooting – especially if this is filming underwater. He gave the example of when he was filming leopard and tiger sharks. The cameramen do not interact with the animals, because there are other members of the team whose responsibility it is to "control" the situation. The cameramen see everything that is going on through a viewfinder, even if it means – as in this case – being surrounded by 30 sharks.

Sometimes, however, it is not the wildlife that can cause problems. Humans can cause just as much danger to their colleagues by erratic, thoughtless or spur-of-the-moment actions – perhaps just to get that last shot or few more seconds of film. James emphasised the teamwork involved in wildlife filming and explained that it can take over 200 hours of filming to produce just two or three

minutes of actual film. It is these few minutes of film that Sir David Attenborough would then go on to narrate.

In some ways, this cameraman teamwork has parallels with the teamwork of veterinary nurses, who are responsible for much of the 'behind the scenes' work in the veterinary practice.

Filming underwater at night also has its problems as James described when filming giant squid being fished from the ocean. Squid can be dangerous to work with and will pull apart any prey animal with ease – this can include any unfortunate fishermen who happen to be in their way or, indeed, cameramen. The squid can not only attack using their sharp strong 'beaks', but will also emit red flashes and squirt black ink. Not surprising then that the cameramen wore chain mail diving suits when filming.

James has always wanted to film sea lions underwater and when he did get this opportunity he discovered just how awesome these creatures can be. Although cumbersome on land, sea lions are amazingly agile when in the water. The females are normally the size of a large dog but the males can weigh up to half a ton. The whole camera crew were nervous about filming these creatures, especially as once in the water they realised just how poor the visibility was.

Suddenly, they found themselves surrounded by about 50 sea lions that had appeared out of the murky waters and surrounded them. Any one of these creatures could have crushed the cameramen and tensions were high. However, just as quickly as they had appeared they disappeared – much to everyone's relief. James described this experience as being more scary than swimming with great white sharks.

He ended his talk by showing his most favourite sequence from filming on the Great Barrier Reef. It features a small brown fish, called the pearlfish. Pearlfish are slender, elongated fish with no scales and translucent bodies, they are very vulnerable to predators and have unique way of protecting themselves – by seeking refuge for much of their lives in the lower alimentary canal of the sea cucumber, which they reach by entering via its anus.

This has to be one of the more unusual and bizarre methods of protecting oneself in the animal kingdom and James pointed out that the film he made of the pearlfish and sea cucumber became the first viral hashtag for the BBC! ■





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James Crilly
MA VetMB CertAVP DipECSRHM
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James graduated from the University of Cambridge in 2010. He worked in mixed practice in the Scottish Highlands before undertaking a farm animal residency at the University of Edinburgh. He currently works at Larkmead Veterinary Group, which is a member of XLVets in Oxfordshire. He is on the committee of the Sheep Veterinary Society, and is a member of the Goat Veterinary Society and European College of Small Ruminant Health Management.*

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**Suggested Personal & Professional Development (PPD)*



SHEEP

Sheep nutrition and its impact on production

Sheep nutrition is a colossal topic. This article will focus on how nutrition impacts the ewe's capacity to give birth to live, healthy and vigorous lambs. Even with this narrowed focus, it will be a cursory introduction; but there is plenty of useful reference material available.



Figure 1. This flock increased its scanning percentage from 184 per cent to 206 per cent by increasing the average ewe BCS at tupping from 2.5 to 3.5. This was achieved by weaning earlier and ensuring that thin ewes had access to better quality grazing.

Foetal programming

All the oocytes a ewe will ever produce develop *in utero* – so maternal nutrition during mid-pregnancy can influence the lifetime reproductive potential of lambs (Kenyon and Blair, 2014). The energy demands of early and mid-pregnancy are small, but adequacy is often assumed. Nutrition may not be adequate if the grazing period is short – or the pasture of very poor quality – or if there are concurrent disease conditions.

Lamb growth rates and reproductive potential

Lamb growth rate has an impact on the timing of puberty, which is especially important if the aim is to breed ewe lambs (Kenyon et al, 2014). Ewe lambs should be 60 per cent of adult bodyweight at mating; which

requires an average lamb growth rate of approximately 220g per day for a standard commercial breed (adult bodyweight 70-80kg).

Lambs experiencing better pre-weaning nutrition have a higher fecundity, which may be as much as five lambs per 100 ewes per year (Rhind et al, 1998). These differences persist, even if adult nutrition and liveweight is identical. There is no similar evidence for the impact on barren rate.

Weighing lambs regularly throughout the growth

period will help to ensure that growth targets are being met, by detecting suboptimal growth early and allowing the causes to be addressed (Gascoigne and Lovatt, 2015)

Nutritional impacts on ovulation rate Long-term

Ewes in poorer body condition five months prior to ovulation have a lower ovulation rate compared to ewes in better condition at that time, even if by the time of ovulation there is no difference in body condition (Fletcher, 1974). Consequently, it is advisable

“Nutrition may not be adequate if the grazing period is short – or the pasture of very poor quality – or if there are concurrent disease conditions”



Figure 2. This triplet-bearing ewe died of OPT. The gravid uterus filled approximately half the abdominal cavity and demonstrates how potential dry matter intakes are reduced during late pregnancy.

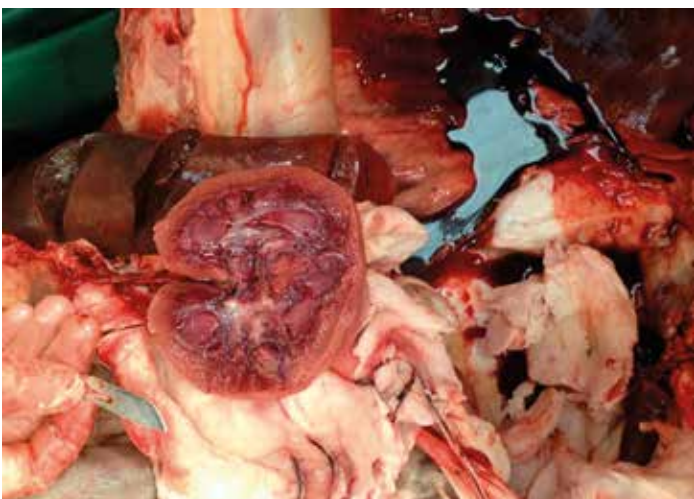
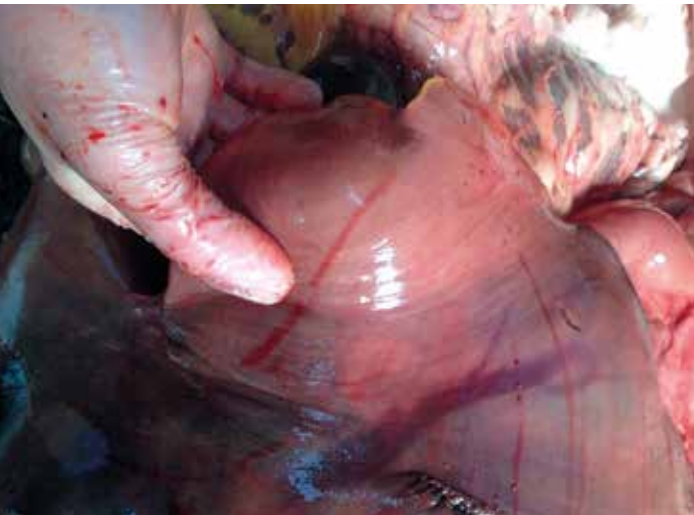


Figure 3. The liver and kidney of the ewe in Figure 2, show fat accumulation, typical of OPT.

“In most cases the energy density of the diet must increase if the energy demands of pregnancy are to be met”

to ensure that ewes never drop below condition score 2/5 – body condition scoring at eight weeks post-partum will identify early ewes that are struggling.

Ewes in poor condition should be put on better grazing, or consideration should be given to weaning them early. If grass cover is limited – owing to drought, for example – then supplementary forage provision should be considered.

Medium-term

Ovulation rate is maximal when ewes are in body condition 3 to 3.5/5. It takes six to eight weeks on unrestricted grazing to gain one unit of body condition. Weaning too late to allow ewes to fully recover body condition should be avoided (**Figure 1**).

‘Flushing’ is placing ewes on a better plane of nutrition – above maintenance – in the run-up to tugging (Scaramuzzi et al, 2006). A two-week period is considered sufficient to gain the benefits of flushing in terms of increased ovulation rate. There is some debate about whether ewes that are already in optimal body condition show any improvement in fecundity by flushing. So on farms where feed supplies are often limited, consideration should be given as to whether flushing will result in too many twin or triplet-bearing ewes – the nutritional needs of which cannot be met by the farm.

Short-term

Very short-term impacts of increased plane of nutrition have been described (Scaramuzzi et al, 2006). The mechanism is thought to be mediated by glucose and insulin. Feeding ewes 250g to 500g of concentrate feed (lupin seed or 80% barley/20%

soya mixtures have been described) per head per day, from Day minus eight to Day minus three (when the ovulation in question is Day zero), is reported to increase ovulation rate by up to 30 per cent; but it is only of use when the timing of oestrus is known – for example, in oestrus synchronisation programmes.

Effects of plane of nutrition in early and mid-pregnancy

As implantation does not occur until Day 16 after conception, the embryo is particularly vulnerable to any changes at this time. Both under- and over-nutrition of ewes has been associated with increased embryonic loss. The aim should be to keep ewes on a ration, providing between maintenance (M) and M+10% until one month after the rams come out.

Undernutrition in mid-pregnancy will limit placental development; so reductions in ewe bodyweight between tugging and scanning should be avoided.

Pregnant ewe lambs – a special case

In the case of pregnant ewe lambs, the ration must not only meet the demands of maintenance and pregnancy, but must also allow for growth. Paradoxically, however, overfeeding pregnant ewe lambs results in reduced lamb birth weights. This is thought to result from a shift in prioritisation of energy and protein away from placentation and foetal nutrition. The aim should be for 130g/d growth rate over pregnancy, until the last six weeks (Kenyon et al, 2014). In the last six weeks, ewe lambs should be fed for M+pregnancy only – in other words, fed as for adult ewes.

Stage	Target body condition score	
	Lowland	Hill/upland
Tupping	3 - 3.5	2.5 - 3
Scanning	3 - 3.5	2.5 - 3
Lambing	2.5 - 3	2.5
Eight weeks	2.5	2
Weaning	2.5	2

Table 1. Typical targets for body condition for lowland ewes



Figure 4. The haylage offered to the ewes on the farm of the ewe featured in Figures 2 and 3 was stemmy, weed-filled, unpalatable and spoiled in places. It has low nutritional value and it can be clearly seen where the ewes have sorted through it for more nutritious and palatable portions.

Feed	Feeding space (per ewe)
Continuous/ad lib	20cm
Discontinuous	45cm (60cm for triplets)
Water	5cm

Table 2. Recommended food access space for sheep

The vital last third – nutrition in late pregnancy

Late pregnancy is when the vast majority of foetal growth occurs, as well as mammary development and the production of colostrum. Energy and protein demands increase dramatically. This is further complicated by the fact that the ewe’s potential feed intake will be constrained by the space-occupying effect of the uterus (**Figure 2**). In most cases the energy density of the diet must increase if the energy demands of pregnancy are to be met.

Impacts on lamb survival

Lamb birth weight has a major impact on lamb survival – with

lambs under 3kg (for most commercial breeds) having reduced survival (lambs with birth weights over 6kg also show reduced survival). There are also effects of ewe body condition score on lamb survival outwith lamb birth weight; because ewes that are too thin have a greater risk of death and uterine inertia. Ewes that are too fat have an increased risk of dystocia and vaginal prolapse.

Impacts on metabolic disease

Insufficient energy intake in late pregnancy results in the ewe trying to mobilise her own body reserves as an energy source. At a modest rate, this

is sustainable. However, too great a negative energy balance leads to the mobilisation of more fat and ketone bodies than can be metabolised, leading to fat accumulation in the liver and ketoacidosis (**Figure 3**). The result is twin lamb disease/ovine pregnancy toxemia (OPT).

As the cure rate for clinical cases of OPT is disappointing, prevention should be the aim. Try to ensure that the diet meets the energy requirement of the ewe, based on foetal number. A modest shortfall – 2MJ ME per day, for example – can be met by sustainable mobilisation of body reserves, but a greater degree of negative energy balance should be avoided.

Sudden changes in diet, severe bad weather, ‘dog worry’ or other stressors can result in hypocalcaemia or hypomagnesaemia. A low sodium intake has also been implicated in occurrences of the latter; whereas excessive calcium provision has been associated with the former.

Overfeeding of rapidly fermentable carbohydrate – grains or compounded concentrate feed, for instance – results in ruminal acidosis. Ruminal turnover is decreased, water is drawn osmotically into the rumen, the effectiveness of digestion is decreased and there is a shift from thiamine production to destruction, increasing the likelihood of cerebrocortical necrosis (CCN). These changes may result in clinical ruminal acidosis (dullness, dehydration, scour); or may be subclinical, but with knock-on impacts on health, such as a greater risk of vaginal prolapse.

As a rule of thumb, concentrates should

constitute no more than 60 per cent of the DMI – if more than 250g is fed (for a 75kg ewe), this should be split into two or more feeds per day. Any changes in diet should be made gradually.

Impacts on colostrum quality and milk production

Negative energy balance and/or insufficient dietary protein intakes reduce the degree of mammary development, and subsequent milk production potential, and the amount and quality of colostrum. As an example, a 70kg twin-bearing ewe’s metabolisable protein (MP) requirement is 93g/day at seven weeks pre-lambing rising to 126g/day by one week pre-lambing.

How protein supplementation can help control gastrointestinal nematodes

Feeding a higher level of MP in late pregnancy – 30 per cent more than the AFRC recommendation, for instance – can reduce the size of the peri-parturient rise in nematode egg shedding considerably, obviating the need for anthelmintic treatments at lambing time (Houdijk et al, 2000).

Trace element deficiencies and their impact on reproductive potential

Selenium and iodine deficiency can both result in increased embryonic loss. Cobalt deficiency around mating and in early pregnancy has been associated with lower neonatal lamb vigour. Copper, selenium and iodine deficiency in late pregnancy can all impact on the viability of lambs – being the causes of swayback, white muscle disease and cretinism, respectively.

Care must be taken to avoid over-supplementation. Copper poisoning is common in sheep

“Care must be taken to avoid over-supplementation”

Animal	BOHB (mmol/l)	UreaN (mmol/l)	Alb (g/l)	Mag (mmol/l)	Cu (umol/l)
01027	2.40	1.30	33.00	0.78	22.10
869	1.90	1.60	28.00	0.70	20.30
844	1.80	2.20	32.00	0.72	17.50
6017	2.90	2.00	34.00	0.82	18.60
671	3.70	1.70	30.00	0.63	17.50
Means	2.54	1.76	31.40	0.73	19.20

Animal	BOHB (mmol/l)	UreaN (mmol/l)	Alb (g/l)	Mag (mmol/l)	Cu (umol/l)
3064	0.70	2.40	32.00	0.71	18.30
842	1.40	2.60	32.00	0.74	17.20
3826	0.90	2.30	30.00	0.62	21.60
744	1.70	2.20	31.00	0.76	20.50
909	1.90	3.20	34.00	0.81	19.20
4290	1.00	2.40	36.00	0.83	17.20
Means	1.27	2.52	32.50	0.75	19.00

Figure 5. A metabolic profile of the ewes from the farm featured in Figures 2 to 4. Metabolic profile results from the twin- (left) and triplet-bearing ewes (right). β -hydroxybutyrate levels are elevated in all but two animals, indicating widespread negative energy balance in these sheep. Several animals show marginal low albumin levels, which would be consistent with chronic disease, such as fasciolosis. The urea-N levels are variable, indicating that the diet provides sufficient Effective Rumen Degradable Protein, but that access to it is uneven within the group. Low magnesium levels in some sheep also indicate uneven feed intakes.

as they are particularly efficient at extracting it from the diet; so concentrates formulated for other species should never be fed to sheep.

Tools and techniques for investigating sheep nutrition

A good introduction to assessing the nutrition of late pregnant ewes can be found in Phillips et al (2014).

Body condition scoring

Body condition scoring sheep is performed by feeling for the degree of fat and muscle cover over the lumbar region. It is most common to use a 0-5 scale. The usual targets for body condition for lowland ewes are shown in **Table 1**.

Visually assessing feed and feed access

Feed should be pleasant-smelling, free from mould, soiling or excessive amounts of dust. Holes in the forage feed indicate the sheep find the majority unpalatable and have been searching for the more palatable portions (**Figure 4**). Uneaten feed should be removed promptly.

Feed access is of vital importance (**Table 2**); but do not forget to assess water provision – is it clean, fresh and accessible?

At grass, the DM availability can be assessed using a

plate meter, or by dropping a clipboard on the grass and using a special sward stick to measure off the DM. As a rule of thumb for set-stocked pasture, if the grass is less than three centimetres high, then supplementary forage and concentrate is required. If it is over 4.5cm, then no supplementary feeding is likely to be necessary; and if it is in between, then some concentrate feeding is required.

Metabolic profiling and trace element testing

Dietary energy supply can be assessed by measuring blood beta-hydroxybutyrate from six to 10 ewes in each management group at three to four weeks before lambing. Target values are below 1.0mmol/l where foetal numbers are known, or 0.8mmol/l where foetal numbers are unknown. The energy required to replace the shortfall can be calculated using Russel (1985).

Several laboratories offer fuller metabolic profiles, which will also assess protein status, and certain macro-and micro-elements (**Figure 5**).

If sampling to calculate whether or not a trace element deficiency exists, it is best to sample at least six randomly selected sheep from each 'dietary group'. The gold

standard for assessing the status of many trace elements is tissue sampling.

Feed analysis and ration calculations

Forages can vary significantly from clamp to clamp, field to field and year to year, so it is worth requesting forage analyses before performing ration calculations simply because the forage fed may differ significantly from standard figures.

Performing a basic ration calculation to work out the ME content of the diet is easy, and even calculating protein provision is relatively simple.

The AHDB guide 'Feeding the Ewe' provides a guide to performing these calculations, as well as offering standard feed value figures (Povey et al, 2017). ■

PPD Questions

1. Production of oocytes in the ovary is:
 - A. completed by mid-gestation
 - B. completed by puberty
 - C. continuous throughout the lifetime of the sheep
 - D. recommenced about two to three months prior to the breeding season.

2. A high plane of nutrition – compared to a low plane of nutrition – of lambs pre-weaning increased their lifetime reproductive potential by:
 - A. zero – there was no statistically significant effect
 - B. one lamb per 100 ewes per year
 - C. five lambs per 100 ewes per year
 - D. 10 lambs per 100 ewes per year
 - E. one lamb per ewe per year.

3. The optimal body condition score at tupping for lowland ewes is:
 - A. 1-2
 - B. 2.5-3.5
 - C. 3.5-4.5
 - D. 3.0-3.5.

4. The recommended feedspace for discontinuous feeding of ewes is:
 - A. 5cm
 - B. 10cm
 - C. 20cm
 - D. 30cm
 - E. 45cm.

5. The recommended maximum beta-hydroxybutyrate level for late pregnant ewes, when the foetal number is known, is:
 - A. 0.8mmol/l
 - B. 1.0mmol/l
 - C. 1.1mmol/l
 - D. 1.6mmol/l
 - E. 3.0mmol/l.

Answers
1.A,2.C,3.D,4.E,5.B.

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*Suggested Personal & Professional Development (PPD)



DAIRY CATTLE

Care of the dry cow

Dairy cows normally have a dry period of around eight weeks and this is an important time to prepare for calving and the next lactation.

Though it can be tempting to leave a dry cow somewhat to her own devices during this rest period, there are many considerations to which a farmer and veterinary surgeon should pay attention in order to ensure good health – not only in this period, but in the months to follow. In fact, if a cow is not ‘set up’ correctly in her dry period, there are high risks of metabolic disorders, excessive weight loss, lameness, mastitis and poor fertility in early lactation.

As there is no chance of turning back the clock for individually affected cows, it is important to focus on the dry period whenever periods of poor health and production occur in early lactation – spates of displaced abomasas, mastitis or metritis, for instance – to protect those cows about to calve in the months to come.

This short review looks at three of the main considerations:

- energy requirements
- group movements and social disruption
- space allowances.

Energy requirements

A non-lactating dairy cow has very low nutritional requirements – certainly in comparison to when she is producing 30 or more litres of milk per day. In terms of energy, a 700kg Holstein cow will have a maintenance energy requirement of around 75 mega-joules (MJ) per day. Poor quality grass or silage has an energy density of around 9MJ/kg dry matter, so eating just eight kilogrammes of dry matter (DM) per day would meet this requirement.

The danger during these early weeks of the dry period is,



Figure 1. A pregnant heifer with a low rumen-fill score indicating low dry matter intakes for whatever reason. This heifer will be at greater risk of post-calving metabolic problems.

perhaps, less of under-feeding and more of overfeeding – a dry cow is very capable of eating around 12 to 15 kg/day dry matter of even the most unappetising of diets, at this stage. Therefore, cows may gain body fat in the ‘far-off’ dry period and increase the risk of greater calving difficulties, metabolic disease and appetite depression following calving (Drakley et al, 2006). In particular, visceral fat may be gained, and this is more dangerous from a metabolic health perspective than subcutaneous fat, characterised by an increased body condition score (Janovick et al, 2011).

Compare this situation to the energy requirements of the same cow making 40 litres of milk per day just a few weeks later:

Energy requirement = 75MJ/day maintenance plus 5.5MJ/litre milk ≈ 300MJ/day

This is around four times her maintenance requirement and is a phenomenal metabolic achievement. For comparison,

the highest work rate a human would ever achieve is around 3 x M (for energy) – this would include an endurance cyclist or a polar explorer, for example. It is in order to consume this large amount of energy that lactating dairy cows are fed diets containing higher energy densities, typically containing high levels of starch. This might be in the form of different forages; such as maize silage, or concentrate fed in the parlour (cow cake), or alongside forages as partial mixed ration (PMR) consisting of forage plus concentrate mixed together – or a combination of all three.

Only towards the last few weeks of gestation does the growing calf begin to have a more significant demand for nutrients. Again, just concentrating on energy, a foetus at full term requires around 40MJ/day. Therefore, the overall intake requirements of the same poor quality silage or grass would increase to around 12 to 13 kg DM/day (115MJ per day). By now, once the cow is close



Figure 2. A high straw, low energy-density diet, typical of a controlled energy feeding system.

to gestation, her appetite is lower; so whilst this intake is realistic, it is far from assured if the quality (tastiness) of the diet is not good.

At this stage of the dry period, it is common for cows to lose weight, particularly if dry matter intakes are low (Figure 1). Fat mobilisation at the end of the dry period is characterised by high blood levels of non-esterified fatty acids (NEFAs) and this is a known risk for metabolic disorders, such as ketosis or displaced abomasum once the cow has calved (LeBlanc et al, 2005).

Monitoring NEFAs in the last week of pregnancy – but not within 24 hours of gestation – is a useful exercise. The target is [NEFA] < 0.5mmol/litre.

There is an additional consideration, however. If the cow is only fed forages – in order not to over-feed her for energy – the rumen microbiome would not be acclimatised to the high starch diet to which it must be adapted immediately after calving. More importantly, the rumen mucosa will not have the absorptive capacity to exchange bicarbonate ions for volatile fatty acids (VFAs). VFAs include propionic,

butyric and acetic acids and are primary products of rumen fermentation. Their production is a ‘good thing’, because they are the main energy source for the cow; but accumulation in the rumen can lead to acidosis and a slowing of fermentation. This leads to energy deficit and weight loss.

VFAs themselves, particularly propionate, govern the length – and, therefore, the surface area – of rumen papillae (Dirksen et al, 1985). Cows that are not fed starch pre-calving have relatively stunted papillae and are thus at greater risk of poor rumen health following calving because the rate of VFA production can significantly outstrip the rate of absorption.

Herein lies the delicate balancing act that is the core of successful dairy cow nutrition. In the weeks immediately before calving, a cow must neither gain nor lose weight, yet her energy requirements and dry matter intakes alter. Furthermore, the cow should be fed some starch to acclimatise the rumen, and her dry matter intakes should be as high as possible so that she maintains good intakes post-calving.

“In the weeks immediately before calving, a cow must neither gain nor lose weight, yet her energy requirements and dry matter intakes alter”

A diet with starch is highly likely to result in overfeeding unless it is ‘watered down’ with a low-energy forage, such as straw (Figure 2). But then the diet is unpalatable, so intakes may drop. And concentrate is easily sorted out from dry straw so that some cows in the group are over-fed and others may be under-fed. No wonder then that farmers often chuck their dry cows outside on a plain pasture or provide ad-lib big-bale silage and hope for the best!

Group changes

Owing to the different nutritional demands of cows during the dry period, it is common for farmers in the UK to run a ‘far-off’ and a ‘near-to-dry’ group. Typically, cows spend five weeks in the ‘far-offs’ on an ‘easy-keep’ system, followed by three weeks in a ‘close-to’ group where the diet might, in theory at least, better meet their needs during this crucial transition period.

In practice, a two-group system can work reasonably well, but there are some significant potential downfalls. Firstly, cows introduced to a low-palatability, dry, straw-based diet in the ‘close-to’ group can suffer a marked suppression in dry matter intakes at a very risky time. Weight loss and high NEFAs may result – both of which increase the risk for post-calving health disorders.

The second downfall is a consequence of risks associated with group changes. Cows are social animals. Herd social dynamics are complex and it is an area we don’t understand enough about. What is known is that whenever a cow moves from

one group to another, there is disruption to not only her own feeding pattern but the feeding behaviour of the whole group (von Keyserlingk et al, 2008).

The general advice is to avoid moving cows between groups where possible, in order to allow a stable hierarchy to develop. When cows are moved – which almost inevitably must happen at drying off, but happens again if moved from a ‘far-off’ to a ‘close-to’ dry group – it is better to move in at least pairs (Nordlund et al, 2006).

Farmers should avoid drying-off cows or moving them in ones or twos on a very frequent basis. Depending on herd size, a better approach may be to have a fixed day per week when drying-off and group movements occur. This can have two benefits:

- reduced number of times the dry cow groups are disrupted by new additions
- batching cows so new cows enter the dry groups in at least pairs, and often larger groups.

Despite these measures, it is common for farmers to report bullying and fighting when new cows are added to established dry cow groups. This is a risk for abortion, as well as slips and injuries. Besides, the stress for the cows is presumably not pleasant and if we can reduce this we will better protect their welfare.

Given that there is a natural variation in gestation lengths, it becomes difficult to ensure that cows are in the ‘close-to’ group for the correct period of time. A big advantage of diagnosing twinning during pregnancy scanning is so that these cows can be moved

Parameter	Space per cow (minimum)	Notes
Feed space	85cm	Or five head-lock spaces per four cows. Ensure all available space is being used and that feed is fresh at least daily.
Water space	10cm	Or one rapid drinker per 10 cows. Always more than one water point per group, and stress-free access is important too (Figures 4 & 5).
Lying space (loose housed)	1m ² per 1,000 litres milk production	Plus a third as much again for loafing/feeding area. The devil is in the detail: good layout is needed to ensure the whole lying area is usable and that there is good hygiene.
Cubicles (width)	140cm	At least one cubicle per cow, preferably deep sand bedded.

Table 1. Space allowances for Holstein dry cows

two to three weeks earlier into the ‘close-to’ group, on the assumption they will calve around 10 to 14 days earlier than cows carrying single pregnancies.

Space allowances

A key element of looking after dry cows successfully is to ensure they are never over-crowded. Over-crowding can be with respect to feeding space, water space or lying space – sometimes all three. **Table 1** shows the minimum space allowances for Holstein cows during the dry period. Always look at all three aspects.

One of the most valuable things a veterinary surgeon can do is to help their dairy clients by calculating the maximum number of cows for any given shed or space, based on the most limiting factor – feed, water or lying space. Better still, if the farmer is made to stick to it (**Figures 3, 4 & 5**)!

Many dairy farmers expand their herd sizes on an almost

constant basis. Usually, more milking-cow accommodation is built and this is often followed by a parlour extension. Next – usually because calves are coming out of the farmer’s ears – new calf pens are constructed.

Lastly, in the author’s experience, is consideration given to additional dry cow accommodation. And when it is addressed, the next wave of expansion has already occurred and so it is already over-stocked when a slight rise in seasonal calving numbers occurs.

For all-year calving herds, it is the convention to factor in a 30 to 40 per cent seasonal variation in calving numbers. Therefore, the dry cow accommodation should be built for 130 to 140 per cent of average requirement. **Figure 6** depicts a typical calculation.

The premise is that if the accommodation is built for the average requirement, it will be overstocked for 50 per cent of the time. Overstocking will always lead to problems, so this means the farm will



Figure 3. It is necessary to calculate the feed space and the number of cubicles. One of them is likely to be the limiting factor.



Figure 4. Extremely limiting access to water – see the cow at the far end of the shed. This is the only drinking space and has been created so dry cows must stand in the footbath in order to access water.



Figure 5. Even if the linear water space is adequate, observe cow behaviour to indicate whether the overall provision is adequate. This cow tells us something important about her discomfort accessing this trough.

experience post-calving difficulties for 50 per cent of the year. This rings true for many farms in the UK.

Summary

Looking after the dry cow is a significant part of dairy

farming. Increasingly, dairy veterinary surgeons will become more involved in dry cow management and farmers will reap the benefits. Sometimes it is a challenge to work ‘upstream’ of problems seen on a day-to-day basis,

and it can be difficult to persuade farmers to broaden their view beyond the difficulties they face today.

The author increasingly finds his role involves bringing a focus to the neglected area of dry cow management – not because the first-opinion veterinary surgeon has not been aware, but because an external pair of eyes has been the catalyst required for farmers to see their own bottlenecks more clearly. ■

Herd size = 300 cows
 Dry period: eight weeks (five + three weeks)
 Calving interval: 400 days
 In-calf (replacement) heifers housed with dry cows for last eight weeks of gestation
 Herd re-calve rate: 75 per cent
 Replacement rate: 25 per cent (i.e. constant herd size)

Expected number of calvings per year =
 75 heifers (0.25 x 300) + 205 cows (0.75 x 300 x 400/365) = 280

Average calvings per week = 5.4 (280/52)
 Average number of dry cows = 43 (5.4 x 8)

Total dry cow accommodation required = 60 spaces (43 x 1.4)
 e.g. 37 'far-off' spaces plus 23 'close-to' spaces for a two-group 5:3 week system.

Figure 6. Typical calculation for dry cow accommodation.

PPD Questions

- Which of the following is true (tick all that apply)?
 - 'far-off' dry cows require starch in the diet to pre-condition the rumen to the 'close-to' dry cow diet
 - higher propionate concentrations in the rumen leads to larger rumen papillae
 - feeding 12-13kg (dry matter) per day of a medium/poor quality forage would likely provide all the energy required for a late gestation cow
 - feeding 12-13kg (dry matter) per day of a medium/poor quality forage without additional starch supplement would risk poor rumen health in a high-producing cow post-calving.
- What is the recommended minimum feed space allowance for a Holstein dry cow? (There may be more than one answer)
 - 65cm/cow
 - 75cm/cow
 - 85cm/cow
 - five head-lock spaces per four cows
 - space for all cows in the group to eat together without conflict.
- Which is true when a cow is moved into a new group? (There may be more than one answer)
 - there is an increased risk of abortion (if she is pregnant)
 - her feed intake is likely to reduce for approximately seven days
 - the feed intake of the whole group may reduce
 - she will 'buddy up' with any other cow with which she is moved.
- Calculate the number of dry cow spaces which are required for the following farm:
 - all-year calving herd
 - 200 cows
 - calving interval of 365 days
 - six-week, single group dry period
 - replacement rate of 25 per cent, all bought-in fresh calved
 - constant herd size.

Answers
 1. B, C & D 2. C, D & E 3. A, B & C 4. 24
 (Calculation: $200 \times 0.75 = 150$ calvings per year; $2.88/\text{week} \times 6 = 17.3$ dry cow spaces on average for six weeks; $\times 140\% = 24.2$.)

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Long-overdue action on large animal welfare

Legislation that requires CCTV in all English abattoirs came into force in May in a move that is set to establish the country as a global leader in animal welfare standards. All slaughterhouses in England will be required to comply with the new law by 5 November 2018 – an adjustment period of six months has been allowed by the Government to enable businesses to install a suitable CCTV system.

The initiative follows a government consultation on plans to install CCTV cameras in slaughterhouses in all areas where animals are present. Under the new arrangement, Official Veterinarians (OVs) will be given unlimited access to the CCTV footage. In turn, this will enable them to reassure consumers that high animal welfare standards are being met.

Commenting on the move, animal welfare minister, Lord Gardiner, said: “The Government shares the public’s high regard for animal welfare and we are proud to have some of the highest standards in the world ... we welcome the new law which requires mandatory CCTV in all abattoirs in England.

“We are a nation that cares about animals and these strong measures will ensure all animals are treated with the utmost respect at all stages of life and it allows us to continue to lead the way and to raise the bar in high welfare standards.”

The move has been welcomed by the British Veterinary Association and the Veterinary Public Health Association, who have campaigned on this issue for several years.

BVA president, John Fishwick, said: “We are delighted that CCTV will now become mandatory in all abattoirs across England, providing OVs with an essential tool to help them monitor animal welfare and enable them to identify any breaches in the regulations ... Having campaigned for many years for the introduction of CCTV into slaughterhouses, we are very happy to see our work come to fruition and we now hope to see similar legal requirements introduced in Scotland, Wales and Northern Ireland.”

However, there is more to be done. There are still yawning anomalies in the enforcement of welfare issues in food animals being transported to abattoirs in the UK; and even more concerns about the export of live animals for slaughter in other countries in Europe and wider afield.

According to the latest figures, more than 4,000 sheep are transported from the UK to continental Europe for slaughter every



year. Defra says all options for improving welfare are being considered, including a potential ban on export for slaughter.

The RSPCA suggests that the UK has two options. Firstly, it could ban the export of live farm animals for slaughter or for slaughter and further fattening. Secondly it could impose journey time limits on transport once the animals have left UK territory. Neither are possible unless the UK leaves the EU.

It emphasises the point that, in its opinion, ‘it is economic reasons that drive the trade’ and that ‘huge progress can be gained by improving the market conditions in the UK to ensure the meat either stays in the UK, or is exported in a carcass form’.

The RSPCA’s proposed maximum eight-hour journey time for all animals travelling for slaughter or ‘further fattening’ has received a mixed reaction from livestock farmers, especially those in northern England and Scotland, who have no choice other than to transport their sheep and cattle over large distances. Indeed, it could mean that they would no longer be

able to trade with other parts of the UK, which are further away than eight hours.

In April, the Government indicated that the export of live animals for slaughter could be banned after Brexit, and it launched a call for evidence from industry, the devolved authorities, charities and members of the public, on what could be done to improve animal welfare during transport*.

Commenting on this initiative, BVA president, John Fishwick, welcomed the proposals for a ban. “We believe that production animals should not be transported long distances to the abattoir but should be slaughtered as near to the point of production as possible,” he explained. “Animals should be transported on the hook, as meat; not on the hoof, as live animals. ■

* A full review of the subject of Live Animal Exports can be found in the House of Commons Briefing Paper 8031 <http://researchbriefings.parliament.uk/ResearchBriefing/Summary/CBP-8031#fullreport>

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Thinking about starting up your own practice?

There are several options for veterinary surgeons looking to advance their careers in the independent sector, and often the best route is to join an existing partnership or company with an established client base and management structure. Where these routes are not available – or suitable – veterinary professionals may decide to venture out on their own and build a new, start-up practice. Starting any business can be a difficult task, but with careful planning and the right help and support, the process can be successful.

There is a great deal of groundwork to complete and creating a business plan should be at the top of the list. Securing funding, deciding on a location and finding the right premises at the right price can be daunting – even when everything is going well – but those individuals who are determined will usually succeed.

Then, of course, there is the equipping and staffing of premises.

Creating an identity

A key component of the modern veterinary practice is communication and information technology and this permeates through just about every aspect of the delivery of excellent service. Choosing the right IT partner for your business is a key decision and can help differentiate your practice from its competitors. Having a reliable and resilient system that is unaffected by internet connections is of paramount importance, as is access to a 24/7 support service. If your systems are unreliable, the practice's image and identity may suffer.

Marketing and all that goes with it is an essential part of running a veterinary practice. You need a plan, but you also need to know what materials you will require, what they will look like and what will work; so it is important to choose companies that have the necessary expertise and veterinary experience to help you with this.

Making a difference

Winning clients to your practice and delivering a service that is superior to that of your competitors is often no easy task and it is here where partnering with an experienced management provider can make a huge difference. Likewise, using established, tried and tested modern technology solutions can help keep costs under control, as well as providing additional revenue streams. Integrated solutions are the method of choice for modern businesses – with a single platform and one point of call for all IT requirements.

So the time and effort saved by not having to join up a legacy 'PMS' with separate e-mail systems, laboratory equipment systems, PACS and health plan systems can be devoted to clients. It may seem a remarkably simple proposition but the adage, 'Remember, the most important person in the practice is the client', summarises this sentiment.

Committed to the veterinary profession

AT Veterinary Systems' flagship management software, Spectrum, with over 25 years of research and development under its belt, provides unrivalled reliability and functionality and is available as an integrated solution for practices. Spectrum is suited to practices of all sizes – with its DDS cluster technology allowing for easy expansion from single- to multi-site and mobile systems.

The ability to mix and match the modules that can be added to Spectrum enables practices to design an integrated technology solution, matched precisely to their needs – with the ability to expand and improve on a constant basis.

Start-up practices often make the mistake of trying (understandably) to buy the cheapest rather than the best they can afford. Too often, a few years down the line, they need to change their IT system because they have outgrown it or are unable to add on the extra options they need to operate effectively.

As mentioned earlier, compensating for an IT system's lack of functionality by sourcing add-on products from a range of providers has significant disadvantages and is often more costly in the long run. A good example is bolt-on health plan software, where payments and quotas are not linked to the client card, stock and invoicing systems.



Versatile Spectrum

AT's Spectrum allows the addition of a large variety of modules to the core system at times suited to the practice. Additional modules include:

- **ROTA Manager** – an effective easy-to-use solution for planning, designing and managing customised staff rotas
- **IRIS** – a multi-user, multi-screen picture archiving and communication system (PACS)
- **VIPER** – which brings effective case recording and management, with an in-built clinical coding system that provides the gateway to evidence-based veterinary medicine (EBVM)
- **ULTRALINK** – a live reporting and business analysis tool, which monitors all aspects of your practice's performance, complete with dashboards and automatic scheduling
- **PHP** – integrated health plan software allowing you to build and manage custom plans for your clients.

Central Veterinary Services

Practice marketing is essential for success and Central Veterinary Services, a sister company to AT Veterinary Systems, can help you with all aspects of practice marketing – from planning audits and health checks for the practice, to a huge variety of practice literature, including loyalty cards, vouchers, newsletters and general promotional materials, to name just a few.

Setting up a new practice is challenging; yet those who have done so are rewarded with something that they have created and of which they can be proud. It is so important to make the right decisions at the beginning of the process, to choose the right equipment and source the best partnerships with veterinary companies.

AT Veterinary Systems is privileged to have worked with a range of successful start-up practices and will be pleased to support practices through the whole journey. ■

Spectrum features

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|-------------------------------------|--------------------------------|---------------------------------------|
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| ■ clinical notes | ■ reporting | ■ practice health plans |
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Siuna graduated from Glasgow University Veterinary School in 1990 and worked in Thornton-Cleveleys, Lancashire, before buying The Veterinary Health Centre, Lytham St Annes in 1995. In 2000, the practice moved to Greenways, Lytham St Annes.

Siuna enjoys all aspects of small animal medicine and surgery with a particular interest in exotic medicine and surgery and in 2012, she was awarded the Certificate in Advanced Veterinary Practice (Zoological Medicine). She has written a series of six books under the Reptiles Are Cool banner – designed to provide simple and clear care instructions for owners of these fascinating creatures.



*Suggested Personal & Professional Development (PPD)



SNAKES

Housing and environmental care of snakes

Snakes are elongated, legless, carnivorous reptiles of the suborder Serpentes. As with all squamates, snakes are ectothermic, amniote vertebrates, covered in overlapping scales. There are nearly 3,000 species of snake in the world and they inhabit every geographical area, with the exception of Antarctica.

Of these 3,000 snakes, around 375 species are venomous. Venomous snakes represent a very specialised husbandry sector and their keepers and premises have to pass regular local authority inspections.



Figure 1. A garter snake (*Thamnophis* spp.).



Figure 2. A king snake (*Lampropeltis* spp.).



Figure 3. A milk snake (*Lampropeltis triangulum*).



Figure 4. A pastel boa.



Figure 5. A ball python.



Figure 6. A Western hognose (*Heterodon nasicus*).



Figure 7. A corn snake (*Elaphe guttata*).

Reptiles are being kept more regularly as pets in the UK; thereby increasing the pressure on veterinary surgeons to be able to educate and direct new owners towards good husbandry. Fortunately, out of the 3,000 species and subspecies that exist, there are only a relatively small number of species that are kept as pets.

The most commonly kept species are the garter snake (*Thamnophis* spp.) (**Figure 1**), the king snake (*Lampropeltis* spp.) (**Figure 2**), the milk snake (*Lampropeltis triangulum*) (**Figure 3**), boas (Boieae family) (**Figure 4**), pythons (Pythonidae family) (**Figure 5**), Western hog nose (*Heterodon nasicus*) (**Figure 6**) and the corn snake (*Elaphe guttata*) (**Figure 7**).

Targeting advice

The age and ability of the keeper looking after the pet makes a huge difference as to how the issues of husbandry need to be tackled. The pet reptile industry is divided into the pet trade and the hobbyist trade.

Hobbyists are often very knowledgeable and manage to successfully keep and breed some of the rarer and more difficult species of snake. Hobbyists are unlikely to request information on how to keep snakes, unless a problem has arisen with the husbandry, such as a respiratory infection caused by stagnant water.

There is also a faction of snake keepers who advocate keeping snakes in rack systems,



Figure 8. There is a faction of snake keepers who advocate keeping snakes in rack systems consisting of stackable plastic boxes. Often the boxes are very small – accommodating the snake and a water bath.



Figure 9. Wooden vivariums are popular owing to their low cost and increased warmth; but they are difficult to clean because the wood harbours bacteria and viruses.

consisting of stackable plastic boxes (Figure 8). Often the boxes are very small – accommodating the snake and a water bath. Heat is generated in the overall room and there is no access to expressing other behaviours, such as digging or climbing. This is reminiscent of intense farming methods where production and breeding are more important than the welfare of the snake.

Children’s pets

Snakes are often chosen as a ‘first pet’ because they are considered easier to keep than other reptiles – the low cost of food and once-weekly feeding are attractive attributes for parents. However, it is these snakes – often kept in a child’s bedroom – that are most frequently neglected. Their ability to withstand long periods without water and food, and the appearance to seemingly function without added heat, makes these snakes the ‘silent sufferers’.

Salmonella

Salmonella bacteria are considered part of the natural commensal flora of many reptiles’ intestines.

Although harmless to the snake, this micro-organism can be highly pathogenic for children or immunosuppressed adults. Awareness of the dangers and good hand hygiene is imperative. Kissing the snake should be avoided!

Size matters

It is important that all prospective snake owners research the snake they would like to keep before committing to a purchase. Gaining knowledge about where their potential pet lives in the wild is the first step. It is also vital to investigate how large the snake will grow. A three-foot vivarium is not going to accommodate an adult Burmese python; and even some of the boas can reach a large size.

This research should be made fun for children. It should be an educational exercise finding out where the snake is from and the kind of habitat that it would live in. Once this has been determined, it is necessary to create the appropriate environment in which the individual is to be housed.



Figure 10. The substrate must not be sharp; and large enough to prevent its being swallowed.

“The age and ability of the keeper looking after the pet makes a huge difference as to how the issues of husbandry need to be tackled”



Figure 11. Humidity can be measured using a hygrometer.



Figures 12 & 13. Snake internal physiology relies on external heat for energy; so living in a substandard temperature leads to chronic illnesses, such as constipation.

Vivarium

Vivariums come in different shapes and sizes. If the vivarium is to house an arboreal snake, then it needs to have height as well as length. Most importantly, the vivarium needs to be escape-proof, because snakes are ‘escape artists’ and will squeeze through the smallest hole. Traditionally, snakes have been kept in plastic or glass vivariums. Plastic tends to scratch easily and glass can be cold or conduct heat away from the snake. However, both of these compounds are easy to clean and if there are

any infectious organisms, the vivarium can be disinfected.

Wooden vivariums are popular owing to their low cost and increased warmth – they are often lighter in weight too. However, it is very difficult to clean a wooden vivarium because the wood harbours bacteria and viruses and is much harder to disinfect (Figure 9).

As far as considering how big the vivarium should be, this will depend on the species of snake and how much growth is expected. Very large

vivariums with small snakes are harder to heat and have a sharp temperature gradient compared to a smaller vivarium.

For some of the large snakes, such as boas, it may be necessary to rehouse the snake as it grows into a larger vivarium. The snake will spend its whole life in this small space; so it needs to be at least the length of the snake in circumference and as large as the owner can afford. A firm, solid lid that is tight fitting, with no holes, is imperative.

The substrate must not be sharp; and large enough to prevent its being swallowed (Figure 10). Humidity will be reflected in the type of substrate – sand having a much lower humidity than soil, for instance. Humidity can be measured using a hygrometer (Figure 11). Desert snakes will have a low humidity requirement of around 30 to 40 per cent and tropical snakes may need a much higher humidity – at 80 per cent.

Heat

This is the most critical factor to understand when keeping reptiles. Snakes are ectothermic and gain heat from various methods of heat transference. Some snakes bathe on rocks that have been warmed by the sun (thigmothermy), others by basking directly in the sun (heliothermy). Reptiles are effectively solar powered and require an external source of energy to make their muscles move.

Substrate

This depends on the part of the world that the snake naturally inhabits. Desert species will need a substrate such as sand; whereas tropical species will need a mixture of bark and soil. Most soil and bark bought for snake vivariums will have been pre-treated to kill any infections in the soil or bark. Avoid aromatic wood, such as cedar, because of its harmful resins.

“It is important that all prospective snake owners research the snake that they would like to keep before committing to a purchase”



Figure 14. Thermometers should be placed around the vivarium to allow the owner to know the exact temperature in various parts of it and also the temperature gradient.



Figure 15. Snakes are unable to detect pathological levels of heat, so burns can arise from contact with unprotected heat and light sources.



Figure 16. Damage sustained from a sharp key hook.

All their internal physiology relies on external heat for energy too; so living in a substandard temperature leads to chronic illnesses – for example, constipation (Figures 12 & 13), kidney failure, hepatic lipidosis and respiratory infections. Each specific reptile group has an ideal temperature at which the body functions optimally. In reverse, reptiles cannot lose heat and may suffer from hyperthermia in extreme conditions.

There are many hidden problems associated with heating. Thermometers should be placed around the vivarium to allow the owner to know the exact temperature in various parts of it and also the temperature gradient (Figure 14). It is not acceptable to use a heat bulb or mat – with or without a thermostat and no thermometers. A thermostat that never switches off suggests that the vivarium does not reach the cut-off temperature. Likewise, a

thermostat that is never on suggests a vivarium that is too hot.

Snakes are unable to detect pathological levels of heat (Figure 15), so bulbs need to be protected by wire mesh and heat mats should be insulated with a thermostat. The greatest consideration needs to be taken to ensure that the snake is living at the correct temperature for its species.

Furniture

The snake will need a ‘hide’, such as upturned tree bark or a pot. This provides privacy. Sharp objects should be avoided (Figure 16). If ornaments are to be used as decoration for the vivarium, it is prudent to make sure that any cavities or holes are small enough to prevent the snake being trapped (Figures 17 & 18).

Water

A clean source of water should be made available at all times. Snakes commonly



Figures 17 & 18. A corn snake trapped in an ornament and the instruments used to free it.

“Although husbandry of snakes appears at first glance straightforward, there are many pitfalls and veterinary professionals need to be aware of the common errors”

like to bathe by submerging themselves in the water. Rock pools can be bought as part of the furniture or deep trays may be used as a cheap alternative. Dehydration is very common in reptiles; so regular bathing increases hydration and also the humidity in the vivarium.

UV or not UV

With the exception of cave-dwelling or burrowing reptiles, all living creatures need exposure to ultraviolet (UV) light – the spectrum of 290 to 320nm is needed to provide it. Many reptiles need full exposure because, without it, they are unable to convert cholesterol in the skin to the precursors of vitamin D₃. Calcium cannot be absorbed without vitamin D₃ and reptiles are unable to convert vitamin D₂ to D₃ and are unable to store vitamin D₃ in the liver.

Snakes are carnivorous and ingest a good supply of vitamin D₃ in the prey that they eat – this is particularly true of adult prey. They are also tetrachromatic and can use UV light as part of their visible spectrum. The provision of UV light is, therefore, an essential part of their living world and should be provided to all captive reptiles.

Food

Although snakes can be ophiophagic (snake-eating) or egg-eating, fortunately, most are carnivorous – eating rats, mice, gerbils or rabbits depending on the size and species of snake. Most good reptile pet shops keep a selection of dead, frozen food. It is illegal to feed live prey to snakes in the UK.

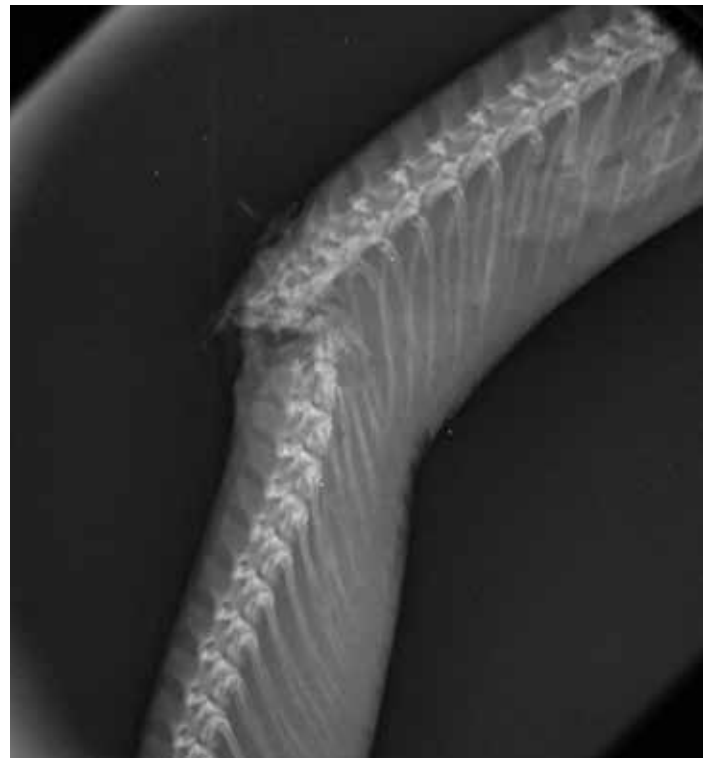
Single or in groups

Most snakes live a solitary life, only meeting members of the opposite sex for breeding purposes. Some snakes of the same species can be kept together, if there is enough space, but a solitary existence is preferable.



Discussion

Although husbandry of snakes appears at first glance straightforward, there are many pitfalls and veterinary professionals need to be aware of the common errors. A light bulb and a plastic fish tank do not necessarily make a good environment for a snake. Sadly, of all the reptiles, snakes seem to be the species that experience the most misadventure in vivariums that are not adequately set up (Figures 19 & 20). ■



Figures 19 & 20. A corn snake with a fractured spine following a cat bite.



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Common medical and surgical conditions of tortoises

Tortoises are one of the most frequently kept species of reptiles in the UK; yet they are also some of the most difficult for which to provide correct husbandry. The most commonly kept species include Hermann's tortoise, Mediterranean spur-thigh tortoises, Marginated tortoises and Horsefield's tortoise. When kept properly, tortoises make hardy reptile pets. As is the case with many pets, however, some medical problems are more common than others and this article aims to cover some of the most frequent complaints encountered.

Husbandry is very important in the care of tortoises – both at the owner's home and also whilst being hospitalised. In general, the species commonly kept as pets are hardy and robust so long as the proper environment and diet are provided. Unfortunately, despite the large amount of published husbandry information available, some owners still fail to meet the basic husbandry requirements – and if these deficiencies continue into the long term, they will lead to chronic immunosuppression and disease.

Tortoises can survive – and to the less experienced owner appear to thrive – for many years in suboptimal conditions, thus making it difficult for owners to correlate their poor husbandry with the onset of illness.

Species identification

It is important to accurately identify the species being examined. Owners will often give common names when registering animals – and there can be some overlap between species. For example if a client says they have a spur-thighed tortoise, you need to be able to identify it is a Mediterranean spur thigh (*Testudo graeca*) or African spur thigh (*Centrochelys sulcata*).

You cannot always rely on owners to have a correct identification of their own pets. In this situation, the husbandry recommendations

would be vastly different and poor identification could lead to giving owners the wrong information.

History

A detailed husbandry and medical history in reptile patients will often take longer on its own than the average UK first-opinion consult. To save time, utilising a proforma husbandry/history form – which can be filled out by the client in the waiting room – will save precious consultation time and ensure a thorough record is taken.

Diagnostic sampling

Many of the same diagnostic tests that are used in companion animals can be performed in tortoises – albeit with a modified technique.

Faecal sampling should be performed routinely in reptilian patients. Direct wet mount microscopy, stained cytology and flotation can all be performed.

Venipuncture sites for collecting blood samples will be species-specific.

In tortoises, the author's preferred sampling site is the jugular. However, this requires good restraint and can be difficult to visualise in some individuals.

In large powerful tortoises, it may not be possible to extract the head from the shell to perform jugular sampling without prior sedation. Some sampling sites – the subcarapacial sinus, for example – are associated with a greater degree of lymph contamination, which subsequently needs to be taken into account when interpreting the results.

The dorsal coccygeal vessel is a useful sampling site in large chelonians where you cannot extract the head. It may allow blood sampling without the need for sedation. The cephalic vein and cervical dorsal sinus are less commonly used, but can be useful in large chelonians. In sick and collapsed reptiles, the blood pressure and sampling rate can be low – the use of pre-heparinised blood gas syringes helps prevent blood clotting before an adequate sample has been drawn. In reptiles, approximately 0.5ml of blood can be taken for each 100g of bodyweight.

Diagnostic imaging can be a useful part of a diagnostic workup. Radiography, computer tomography and ultrasound may all be used. When radiographs are

“Tortoises are one of the most frequently kept species of reptiles in the UK; yet they are also some of the most difficult for which to provide correct husbandry”



*Suggested Personal & Professional Development (PPD)



TORTOISES



Figure 1. Shell injuries can be caused by bites from dogs and wildlife, garden machinery, or from being dropped while being handled.

performed, horizontal beam projections are particularly useful. Ultrasound is especially handy when investigating reproductive and other intra-coelomic disease.

Shell injuries

These injuries are most commonly seen associated with warmer weather when owners are able to provide their tortoises with increased periods of being housed outside.

In most situations (species-dependent) tortoises require an artificially heated environment for the majority of spring and autumn, but can spend time outside on warm days in the summer. As well as facilitating additional exercise time, being outdoors allows exposure to natural ultraviolet (UV) light which has major benefits and is, without doubt, superior to the artificial lights currently available to herpetologists.

Unfortunately, during this time when they are outside, we see a great increase in the number of tortoises presenting with shell injuries – the majority of these occurring following a bite from domestic dogs. Wildlife, such as foxes and badgers, have also been responsible for shell injuries, as has damage from garden machinery or from being

dropped while being handled (**Figure 1**).

Sadly the majority of tortoise shell injuries are preventable – tortoises should never be mixed with dogs and, if outside, should either be supervised directly or in an enclosed animal-proof run. The run should have both sunny and shaded areas to allow thermoregulation. Younger tortoises are most susceptible to damage; although even adult Mediterranean tortoises can suffer life-changing injuries.

Dogs have also been known to remove tortoises from tortoise tables and other indoor accommodation.

While anatomically quite different from traditional companion animals, tortoises with traumatic injuries can be treated using the principles used in treating injuries in mammals. An assessment of the extent of the damage is required in order to plan further diagnostics, treatment options and to give the clients a prognosis for treatment. As soon as possible, analgesia should be provided.

Reptiles with skin and shell wounds are prone to dehydration and fluid therapy will be needed – particularly in



Figure 2. Reconstruction following an animal bite and secondary myiasis.

the early stages of treatment. Any haemorrhage or life-threatening trauma should be treated first. Penetration of the coelom or thoracic cavity needs to be identified; and because the spine, pectoral and pelvic girdles, and thoracic and abdominal ribs are incorporated into the carapace, shell fractures may affect these skeletal components.

An orthopaedic and neurological examination should be performed and, if required, further diagnostic imaging. In some severe cases, where injury that is likely to cause long-term or permanent compromise to an animal's quality of life is identified, euthanasia may be required. In general, tortoises have a high healing capacity and it is surprising to see the severity of injuries from which they can recover (**Figure 2**). This recovery, however, can be slow – taking from weeks in minor cases to several months.

This relatively slow wound healing needs to be emphasised to clients and taken into account when estimating for treatment – the long-term treatment required can become costly. Serial radiographs every six to eight weeks (or CT scans if available and not cost-prohibitive) can

be performed to monitor bone healing and to monitor for complications, such as osteomyelitis, sequester formation and non-union.

Wounds should be flushed and lavaged and any gross contamination removed. Where full-thickness shell injuries with coelomic cavity penetration is present, care must be taken not to flush contamination into the coelomic cavity. Further debridement with wet-to-dry dressings may be needed for a period of several days. Topical or systemic antibiotics may be needed – based on results of sensitivity, where possible.

Once contamination has been removed, then any instability of the shell should be addressed. The technique required will depend on the severity of injuries present. Cool set dental acrylics, arrangements of hooks and wires, cable ties and plates can all be used depending on the lesion or lesions being treated. Care should be taken not to use acrylics over contaminated tissue, so as not to trap infection below.

Nutritional secondary hyperparathyroidism (metabolic bone disease)
Metabolic bone disease (MBD) is a term to describe

a whole host of disease processes that affect the integrity and function of bones and the shell. To avoid confusion, metabolic bone disease should always be further classified – renal or nutritional, for example. Nutritional secondary hyperparathyroidism accounts for the majority of MBD cases seen in our practice. In young animals, the bony abnormalities can be called rickets – in adults, osteomalacia is the appropriate terminology.

Clinical signs include swelling and thickening of the long bones, beak deformities, softened shell and shell deformities. In severe cases, pathological fractures can occur. Patients may present with anorexia, dystocia, cloacal prolapses or have difficulty ambulating.

Nutritional secondary hyperparathyroidism is caused by either dietary or husbandry deficiencies (or a combination). Chronic calcium or vitamin D₃ deficiency, excessive phosphorus, or inadequate exposure to ultraviolet light can all induce nutritional MBD. Even if appropriate UV light is present, if the patient does not have sufficient heat and basking provision, then the D₃ synthesis will be inhibited.

In tortoises, vitamin D is synthesised when the animal is exposed to the correct ultraviolet light spectrum (290-320nm). Cholesterol is converted in the skin to inactive vitamin D. The liver and kidneys are involved in the pathways to synthesise 1,25 dihydroxycholecalciferol (1,25-DHCC), which is involved in intestinal absorption of dietary calcium.

In clinical cases, the parathyroid gland produces excessive parathyroid hormone in response to hypocalcaemia. This stimulates the resorption of calcium from the



Figure 3. Lateral radiograph showing pneumonia in a tortoise.

bones to maintain blood calcium levels.

Treatment has progressed in recent years – although, in advanced cases, the prognosis is still guarded. Owners should be prepared in advance of starting treatment to correct husbandry deficiencies and to expect four to six months of intensive treatment. The husbandry should be evaluated and deficiencies corrected from the outset.

The drug of choice for treating bone and shell pathology is calcitonin – used ‘off-licence’ under the cascade. It inhibits bone resorption by lowering circulating calcium and phosphorus via negative feedback on the parathyroid gland. Owing to the reduction in blood calcium, hypocalcaemic tetany can be induced; although this is very rare in tortoises compared to lizards. Either calcium (ionised and total) levels should be monitored during treatment, or pre-treatment supplementation with calcium and vitamin D₃

should be performed before administering calcitonin.

Mycoplasmosis

Mycoplasma is the most common cause of respiratory disease in tortoises and it has been identified in both captive and wild tortoises. Individuals suffering from *Mycoplasma* may present with palpebral oedema, conjunctivitis, ocular, nasal discharge. It can be carried asymptotically in tortoises and cycles of convalescent and recrudescence of clinical signs have been reported frequently.

The majority of respiratory disease caused by *Mycoplasma* is restricted to the upper respiratory tract (URT). Some cases, however, will extend to pneumonia (**Figure 3**). Disease caused by *Mycoplasma* can be minor to severe; and, in some cases, severe atrophic rhinitis with loss of normal respiratory anatomy can occur. Secondary pathogens may increase the morbidity associated with *Mycoplasma* infection.

A commercial PCR test is available to identify

Mycoplasma on swabs from conjunctiva and nasal secretions. It is highly specific and rapid, and avoids the difficulty of culturing the organism in the laboratory, which requires special conditions and can take several weeks.

There are a number of risk factors for *Mycoplasma* infection. Poor husbandry, leading to immunosuppression, makes an animal more susceptible to infection or can lead to recrudescence of clinical disease. Mixing tortoises – particularly tortoises of different species – has been linked with *Mycoplasma* transmission.

Treatment is generally multifactoral – clearing a tortoise from infection is not always possible – and recrudescence can occur. If husbandry deficiencies are identified, they should be corrected at the outset of starting medical treatment. Common antibiotics used include tetracyclines, fluoroquinolones and macrolides, such as



Figure 4. In pre-ovulatory disease, mature follicles develop in the ovary – but ovulation fails to occur.

tylosin. Antibiotics can be administered systemically, topically and via nebulisation.

Dystocia

Dystocia cases are generally broken down into two categories – obstructive and non-obstructive. Obstructive dystocia is simply an anatomical inability to pass eggs. This can be caused by abnormal eggs (oversized, mis-shaped, damaged), a narrowed pelvis (following MBD), oviductal structure or extraoviductal pathology – coelomic masses, abscess, obesity and cystic calculi.

Non-obstructive dystocias are often attributed – whether rightly or wrongly – to husbandry deficiencies. Inappropriate nesting site,

suboptimal temperature and lighting, malnutrition, dehydration, and muscle weakness owing to inactivity. In all cases, where possible, the cause of the dystocia should be identified to enable the correct recommendation of treatment and prognosis for long-term reproductive health. Clinicians must be aware that eggs can be produced in tortoises without requirement for male contact – in fact, these infertile clutches are more commonly associated with dystocia than fertile eggs.

In cases of non-obstructive dystocia, sometimes the provision of a suitable nesting site – or adjustment to the site or substrate of an existing nest site – is all that is required to stimulate oviposition. If

lethargy, reduced ambulation, depression or any other deterioration is noted, then immediate steps are required to resolve the dystocia. In comparison with lizards, dystocia in chelonians tends to progress relatively slowly.

Oxytocin is the main hormonal treatment used in cases of non-obstructive dystocia. Arginine vasotocin has been shown to have increased success rates in reptiles compared to oxytocin; however, it is very unstable and not commonly available. Adjunctive treatment with calcium, progesterone or oestrogen has been reported, but has very little proven benefit. Calcium injection is associated with the risk of renal damage.

In cases where medical management fails, salpingotomy or ovario-salpingohysterectomy are the surgical treatments of choice. In tortoises, a plastronotomy is often required. If the patient is not required for further breeding efforts, then salpingohysterectomy is generally performed –

thereby removing the risk of recurrence, which is common owing to oviduct stricture, following either prolonged dystocia or salpingotomy. In some cases cystotomy is required to remove eggs – which have moved retrograde from the cloaca – from the bladder.

Pre-ovulatory follicular stasis

Clinicians treating large numbers of reptile patients will likely see as many pre-ovulatory reproductive cases as post-ovulatory (dystocia). These cases are commonly mis-diagnosed or diagnosed late because pre-ovulatory follicles are often not visible on survey radiographs. The most common clinical signs noted by owners are reduced appetite and activity levels. Occasionally straining and digging may be noted.

Ultrasound or CT scans are required to identify the pre-ovulatory follicles. In pre-ovulatory disease, mature follicles develop in the ovary – but ovulation fails to occur (**Figure 4**). Husbandry deficiencies and lack of males for mating have both been implicated. Serial ultrasound scans may be needed to differentiate follicular stasis from normal follicular development.

These cases almost always require surgical management – hormonal treatment is associated with, at best, poor success. Ovario-salpingohysterectomy must be performed. Chronic cases will be associated with salpingitis and secondary peritonitis, which needs aggressive treatment. Cases of follicular stasis commonly present as very debilitated individuals, and a short period of medical stabilisation is often required to improve the chances of surgical success.

Cloacal prolapse

In a tortoise with cloacal prolapse, the first step is to

“A detailed husbandry and medical history in reptile patients will often take longer than the average UK first-opinion consult. To save time, utilise a proforma husbandry/history form, which can be filled out by the client in the waiting room...”

identify the organ(s) that have prolapsed – given that the gastrointestinal tract, urinary bladder, penis and oviduct (in females) can all prolapse. Either muscular weakness or, more commonly, an underlying clinical disease causing excessive straining is the precipitating factor.

Early identification of the prolapse by the owner and prompt treatment greatly improve the prognosis. While medical and/or surgical treatment is a priority, diagnosing the underlying cause is also vital to help prevent recurrence. The colon and oviduct both have a lumen, the colon is generally smooth-walled and faeces can often be obtained from the lumen. Oviducts have striations not present on the oviduct. The thin-walled bladder can readily be identified.

Diagnostic procedures usually performed as part of a thorough investigation into the cause of a prolapse include: faecal examination (flotation, wet-prep examination, cytology), radiography or computer tomography, ultrasound, endoscopy, haematology, biochemistry and bacteriology.

As a general rule, all prolapsed tissue should be lavaged, cleaned and, if required, concentrated sugar solution can be used to reduce oedema. Following prolapse, tissue rapidly becomes engorged owing to restriction of venous return. If tissue is not viable, then various surgical techniques have been published to allow amputation (penis), or resection and anastomosis (colon and oviduct).

When prolapses are replaced, temporary transverse cloacal

“These (shell) injuries are most commonly seen associated with warmer weather when owners are able to provide their tortoises with increased periods of being housed outside”

sutures can be utilised to prevent recurrence whilst the oedema and inflammation resolves – ‘purse-strings’ are preferred by some clinicians; but in the author’s experience are more likely to inhibit normal defaecation and urate deposition.

Colon prolapse

This is most commonly associated with enteritis (bacterial, viral, fungal, parasitic) or constipation. Colon prolapses can also be seen following straining related to reproductive disease. If identified early, they can be replaced rapidly using lubrication and cotton buds. Care should be taken to ensure the colon is fully inverted. Temporary cloacal sutures are often utilised to prevent recurrence. If the prolapse recurs, surgical coeliotomy and colopexy is a very useful and simple technique.

If, following the initial prolapse, the tissue cannot be replaced, then surgical coeliotomy to allow gentle traction on the inflamed and friable tissue can be employed – colopexy can be performed in the same surgery, if required. In tortoises, a pre-femoral approach or plastronotomy will be required. Commonly, however, owing to delays in presenting for veterinary treatment, tissue is already devitalised requiring resection and anastomosis – a published technique exists that allows resection and anastomosis without the need for coeliotomy (Mader, 2005).

This is associated with good success rates.

Penile prolapse

These cases are generally straightforward to treat. If the tissue appears healthy, it can be reduced manually with the aid of lubricant and cotton buds. The urinary system is separate from the male reproductive tract, so amputation is straightforward and, generally, complication free. Amputation is required if tissue is non-viable or cases of recurrent prolapse are seen.

Oviduct prolapse

This is most common with reproductive disease (follicular stasis, dystocia); although gastro-intestinal disease leading to tenesmus can also result in oviduct prolapse. In reproductively important patients, reduction, or resection/anastomosis (if devitalised) can be performed; but in the majority of cases, surgical coeliotomy and ovario-salpingohysterectomy is required.

Bladder prolapse

This is generally associated with cystitis or cystic calculi. Cases have been seen following reproductive disease. If viable, the bladder can be reduced and the underlying cause treated. If areas of the bladder are non-viable, resection followed by double-layer inverting closure, may be performed in some cases. As much of the bladder as possible should be preserved because of its vital role in fluid homeostasis. ■

PPD Questions

1. True or false? Faecal sampling is an important part of an examination of a tortoise and should be performed routinely.
A. true
B. false
2. Which blood sampling site is most commonly affected with lymph haemodilution?
A. jugular
B. subcarapacial sinus
C. saphenous
3. True or false? Ultrasound is not a useful imaging modality in tortoises because the shell prevents a clinician from obtaining an acoustic window.
A. true
B. false
4. Which of these species has a urinary bladder?
A. Mediterranean spur-thighed tortoise
B. green iguana
C. bearded dragon
D. leopard gecko

Answers 1.A 2.B 3.B 4.A&B

Reference

Mader D (2005). In *Reptile Medicine and Surgery (2edn)*, eds Divers S and Mader D. Elsevier.

Wildlife gardening

Wildlife gardening is a popular theme in all the popular gardening publications and on TV and radio gardening programmes; and there is no doubt that, with the decline of our native wildlife, every little that we can do to help save or encourage different species is important.

There are an estimated 16 million gardens in the UK and the way they are cared for can make a big difference to the natural world. However, as always, things are never quite as simple as they may seem.

The *State of Nature Report* published in 2016, compiled by more than 50 conservation organisations, spelt out the destructive impact of intensive farming, urbanisation and climate change. A huge variety of insects, amphibians, mammals and birds are now at risk owing to the loss of habitats – not only on agricultural land, but also marginal habitats such as ponds and hedgerows and, last but by no means least, the paving over of a vast acreage of domestic front gardens to make car parking space.

The effect of intensive farming and climate change is not necessarily something that gardeners can remedy directly, although they can try to redress the effect of the loss of garden habitat by making their gardens more friendly to wildlife. With this in mind, we are encouraged to embrace 'wildlife gardening'; but what does this really mean and just how practical is it for the average gardener?

In essence, wildlife gardening is cultivating a garden with a focus on growing plants and creating habitats that benefit local wildlife. This might be by planting nectar-rich plants to attract bees and other insects, or plants that produce plentiful seeds on which birds and small mammals can feed in the autumn and winter.

Other activities might involve digging a pond which could attract frogs and newts, dragonflies and pond skaters; putting up nest boxes; or perhaps leaving a wild area in one part of the garden where a variety of creatures can live. Putting up something as simple as an 'insect hotel' or leaving a small pile of logs or wood pile can be a great benefit to the insect population.

Hedgehogs are now very much an endangered species; while bats, house sparrows, song thrushes and stag beetles are declining in number. These are all animals that wildlife gardening can benefit.



There is a great deal of advice on how to garden for wildlife and whether the garden is large or small there will always be something that can be done to make it more wildlife friendly. However, although it is most certainly a good thing to garden for wildlife, it may be that some of the wildlife attracted is not quite what you expected.

A pond can be a great asset to a garden and will, indeed, attract those endangered creatures already mentioned. In certain areas of the countryside, however, a pond may also attract herons, which will denude a pond of almost anything swimming in it within a few hours. Other not-totally-welcome visitors are the ducks which will eat much of the wildlife, including frog and toad spawn, as well as helping to turn the edges of the pond into mini mud baths. Ponds also require a fair amount of maintenance – dealing with the algal blooms and removing the autumn leaves and the all-too-vigorously growing water plants that can quite quickly clog up everything.

Wildlife meadows are a wonderful natural asset, but not always easy to establish; and sometimes, once growing, will become quite invasive to the rest of the garden as flowers set seed and the wind distributes them into the cultivated flower beds. Replacing solid fences with hedges is certainly more wildlife friendly too;

although, apart from being comparatively expensive and taking a long time to grow, a hedge, whilst letting in hedgehogs can also let in possible 'undesirables' – such as muntjac deer and the neighbour's dogs and cats – as well as letting *out* our own household pets.

Wildlife gardening is an excellent concept. It will help to encourage – and hopefully conserve – our wildlife, but there is a danger of its becoming a crusade, with gardeners feeling obliged to do all they can to comply. Peacock butterflies lay their eggs on stinging nettles and their caterpillars feed on them – so having a small patch of nettles in the garden is a great idea; but nettles spread readily and having a large nettle bed in the garden is quite a different matter.

The message is to proceed with full knowledge of possible outcomes and with due caution.

The tiniest action can have a big result. Just one bird box could encourage an endangered bird to nest, a few logs piled up at the bottom of the garden could harbour the now-rare stag beetle. Do what you can to whatever extent you wish; but don't let gardening – which in itself is one of the best ways to relax and keep fit – turn into a chore or a demanding ecological nightmare. ■



Michelle Southern

Michelle has had many roles in customer service. She has always had a love of animals and became a practice manager in 2014 at Vets4Pets where she worked for nearly three years, before leaving her role to develop and expand Street Paws.

Paws on the ground

'Street Paws' was founded in Newcastle in April 2016. I was volunteering with a local group making sandwiches to serve on Wednesday nights at the soup kitchen in town. One night I went along to see what happened at outreach, and I saw a dog there with its owner. At that time, I was working in a local veterinary practice as a practice manager. That night, I couldn't get the dog out of my mind. I wondered how the owner was able to care for the dog's medical needs, was the dog vaccinated? Did it have fleas?

By the following morning, I had already formulated a plan to work with the soup kitchen and attend with a veterinary surgeon and a nurse to provide care for the dog and any others in need. I quickly gained support and attended the city centre the following week with a team of three (including myself). We didn't really know what to expect, or how we would be received – but I was determined to do something to help. That first night we didn't see any dogs, only a lovely friendly albino ferret, called Clyde. We still care for Clyde today.

It took a while to gain the trust of the homeless community in Newcastle. Their initial response was invariably, "My dog sees a vet." We suspected that they were wary as to why we were taking an interest in

their companions and were probably afraid that we might take them away.

Eventually word started to spread about what we were doing every month – and we didn't give up. I knew once we were established, then the dogs and their owners would come. It took several months to build trust and we began to vaccinate, provide flea and worming treatments and to microchip the dogs. Clyde attended every outreach for a cuddle and a nail clip!

This outreach had been running in Newcastle for a few months when I visited York and saw that there were dogs sitting on the streets there with their owners too. I knew that I couldn't ignore the fact that there was a need, so I asked contacts I had made through work – and York 'Street Paws' was launched in May 2017.

I had formulated a plan to 'partner' with a veterinary practice in the local area, make connections with a soup kitchen and attend monthly with a veterinary team to treat the pets on the streets (**Figure 1**). This simple plan has now been replicated across the UK in all our outreach areas.

Mighty oaks from tiny acorns...

'Street Paws' was growing and treating an ever-increasing number of animals, so I thought about recruiting a board of trustees and applying for registered charity status with the Charity Commission. This process is ongoing and frustratingly slow; but we hope to become a registered charity within the next few months.

As news of our initiative spread, I was beginning to be approached by veterinary professionals in other geographical areas asking us to expand into their city. I decided that we should try to help as many animals as possible where there was a

"For me, 'Street Paws' represents everything that is important about veterinary medicine. Preventing animal suffering whilst simultaneously supporting our clients and enhancing their quality of life through the improved health of their pets. The bond between a pet and a vulnerably housed owner is so strong and often immeasurably important to that person. It's a privilege to be able to help to maintain that bond"

Anna Formstone MRCVS (volunteer)



Figure 1. Honey.



*Suggested Personal & Professional Development (PPD)

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OUTREACH



Figure 2. 'Street Paws' team in Leeds.

need. At that point, I also lost my Dad very suddenly and unexpectedly – which was a massive shock.

The pressures of working full time and trying to grow the charity were becoming too much, and I knew that something would have to give. I decided that I couldn't give up on 'Street Paws', so I gave up on my job instead. That was during the summer of last year and I began to concentrate all of my efforts on our five outreaches – in Newcastle, York, Leeds, Manchester and Cardiff.

All of the new outreaches were launched following approaches by veterinary professionals who all wanted to volunteer with 'Street Paws' in their area. Once we had practice support, I set about linking to a local charity or group already operating in the locations in which we wanted to start operating. Sometimes this was frustrating because, quite often, I received no response. However, after

a little bit of perseverance and some detective work on Facebook, we successfully forged links – such that 'Street Paws' has now grown to a team of over 130 veterinary volunteers treating over 100 dogs every month (**Figure 2**).

Wealth of goodwill

The very best part of running 'Street Paws' is the outreach visits – I attend every single one in Newcastle because it's my home town, and others where I can. The gratitude from the 'guys on the streets' when you tell them what a brilliant job they are doing caring for their dogs is priceless. They quite often shake your hand – or if you're lucky, you receive a warm hug.

Our Facebook page has over 4,500 followers and we receive an enormous amount of support from the public. There is an ever-increasing volume of dog food donations, along with leads, collars and dog coats and, because we have no funding and no donations



Figure 3. Asbo.

from companies for our supplies, we rely on the generosity of our supporters. Last Christmas one of our dogs, Molly, needed surgery for a mammary tumour and we raised the funds needed through a 'bonus ball' competition on Facebook.

We are gathering momentum all the time across the UK – veterinary surgeons and nurses are keen to help; practices are lending support; and homeless organisations are accepting us. Because of this – and a fantastic team of co-ordinators in each area – we now operate across 14 locations in the North East, North West, Yorkshire and Wales, and outreaches are being launched in Belfast, Hull and Carlisle. We have a partnership with Myerscough College and it is bringing out teams of nursing students to our outreaches in the North West.

Fulfilling physical and emotional needs

Sadly, homelessness is on the rise in the UK – with the latest published estimates suggesting that there are approximately 4,751 people 'sleeping rough' every night. The bond between a homeless person and their dog is immeasurable. They are quite simply their only source of companionship and love – and often the only non-judgemental contact they experience (**Figure 3**).

Many of the rough sleepers will tell you quite openly that their dog has saved their life. The benefits to their health and well-being from having a dog with them is well proven. And they will tell you that they don't take alcohol and drugs because they have to look after their dogs – they worry that, if they do go astray, their four-legged companion will be removed.

Often, these people will provide food for their dogs before themselves. I've lost count of the number of times someone has been passed a sandwich by a member of the public and then fed their dog first. During the winter and spring storms, the homeless people we met in Leeds and Manchester were rough sleeping in temperatures of -10°C as they were not allowed into the hostels because of their dogs. This is something that really affected me and we are now working with local and national charities in Leeds and Manchester to provide accommodation for rough sleepers with dogs, in time for next winter.

By providing outreach, 'Street Paws' fills a gap and makes veterinary care accessible to all regardless of their situation. We also treat the dogs of the vulnerably housed, 'sofa surfers' and hidden homeless who may be living in cars. We treat the animals of people facing extreme poverty,



Figure 4. Scarlet and Lucy.

and we don't ask for proof of entitlement or benefit.

The trustees are all determined to be 'non-judgemental' – after all, who are we to judge if someone qualifies for our help. If anyone is accessing a soup kitchen, then there is a need for our help. We often find that people use our service and feel that they can make a donation for the treatment that they have received and this is gratefully accepted – but not expected.

We have outreach on the same day of the week once per month and always on the 'first' specified day of every month. This makes it easy for the rough sleepers to remember and works very well. Increasingly, we are being contacted outside of outreach because animals are sick or have been attacked. The team will make arrangements for

the dog to be seen quickly at the nearest veterinary practice, and will support with transport if necessary. In April alone, we have had to refer four dogs in three areas to veterinary practices at short notice – and we are lucky to have the support of so many wonderful practices who can accommodate these needs.

Hope for the future

Future plans include the setting up of a more permanent base in outreach areas and working with other agencies for mental health, addiction support, housing and health care. 'Street Paws' accommodation for rough sleepers with pets would also be a future plan as so many hostels won't allow people in with animals.

At the moment, I am co-ordinating some training for our volunteers to enable them to take care of their own

"The dogs mean everything to us and we don't want to lose them as it will destroy all we believe in, we believe a dog is for life. What you are doing here means so much and is good for the dogs as well. We have always been in a position to look after ourselves, but life has dealt us a bad hand and we have ended up where we are. Thank you all for helping our fur kids you are all angels"

K&M – Leeds (clients)

CASE STUDY

Scarlet – Lancaster

We were contacted by the group we work with in Lancaster to say that one of our registered dogs, Scarlet, had been attacked by another dog and could we help. Our co-ordinator, Lucy, quickly arranged for Scarlet to be seen at a nearby veterinary practice and she was treated within an hour. Luckily, she just needed a clean-up and some medication and no stitches were required (**Figure 4**).

CASE STUDY

Togar – Leeds

Togar's owner is living in a caravan in a field in Leeds caring for seven German shepherd dogs. All of the dogs are seen regularly at Beechwood Vets, our partner practice, for many different complaints. All dogs are doing well, especially Togar, who had been experiencing some lameness, which is now being managed with medication.

mental health and well-being. Working out on the streets is often tough – you hear and witness many disturbing things and how do you cope with your own feelings when you return home?

I have enlisted the help and support of Trevor Bell who is kindly donating a training day with a tailor-made programme for our volunteers. I work closely with other projects who are also providing the same service in the UK and they will be invited to attend. We hope that the

day will be held at one of the veterinary schools in the summer, although this is still to be confirmed. ■

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Sarah is marketing manager for Vision Media, a media agency that specialises in marketing, communications and design services for the veterinary industry. She is an associate member of The Chartered Institute of Marketing and completed her professional Diploma in Marketing in 2014.

Marketing. Love it, or hate it.

Marketing is an essential part of running a successful business. After all, if no one knew who you are, where you are and what you are, you wouldn't be there.

Julie Barile, vice-president of eCommerce, Fairway Market, defines marketing as '... traditionally the means by which an organisation communicates to, connects with, and engages its target audience to convey the value of and ultimately sell its products and services.'

'However, since the emergence of digital media, in particular social media and technology innovations, it has increasingly become more about companies building deeper, more meaningful and lasting relationships with the people that they want to buy their products and services'.

When running a busy veterinary practice, it is crucial to maximise the impact of your efforts, time and money; so here are a few top tips to make the most of what you do, and some pointers on things to consider avoiding.

In the beginning...

Before you start your marketing campaign, there are a few things that you should have at the forefront of your mind.

Think

Why are you doing the marketing that you are doing, and what do you want it to achieve? Do you want to create awareness, increase client numbers or inform people about seasonal issues that could affect their pets? Everything that you do should have an aim or objective – after all, if you aren't sure why you are doing something, is it worth the effort?

Be where your audience is

Have a think about who your clients are. Where are they likely to hear about you? Put yourself in their shoes, if you

are in an area that mainly has an ageing population, social media will be a lot less effective than an advert in the local press. Equally a young population will interact with you more on Facebook, Instagram and Twitter.

Track, test and test again

No marketing is guaranteed, and the only way that you can improve on it is to test a theory. Does A or B gain a better response? Try and ensure that you can track results – use a code if you have a special offer and keep a record of when it is used; or you can always ask how people saw or heard about whatever it is you are promoting. Build on your research to create the maximum effect.

Never underestimate the power of frequency

Have you ever heard of 'effective frequency'? It's the number of times that someone needs to see a marketing message before they respond to it. The exact number required is an ongoing question, but the answer is simple. The more times a message is seen, the more likely you are going to get a response.

Don't forget, change is good

Yes, you need to make sure that you are seen, you have multiple 'touch points' and that your audience doesn't forget you. Equally, if you repeat the same advert, with the same message in the same place too many times, the audience will become 'blind' to it. Change it – change

the picture, the colours, the layout. Keep it fresh.

Ready, steady, communicate!

You've decided the who, what, where and how. Now the hard part. You have to communicate with your target audience and more importantly, get them to respond.

Have a single call for action

Make sure your pet is vaccinated. Talk to us about the benefits of regular check-ups. Register to receive our newsletter. Confused? Your clients will be too. Think about the message that you are sending your client and how you want them to respond to it. One action is easier for someone to accomplish rather than multiple ones, so you will gain a better response rate.

Sell benefits, not features

A feature is that you have 24-hour emergency care in your practice. A benefit is that you can care for a client's pet at any time of the day or night, so they don't need to go to another practice for out-of-hours treatment. Tell your audience things that they want to hear and how it helps them achieve the best for them and their pet. They don't need to know about your features, but they do want to know about the benefits to them.

Keep it simple

The simpler the design, the more informative it is. A good test is can you see the company name, message and call to action in three seconds?

"First and foremost, why are you using social media?"



*Suggested Personal & Professional Development (PPD)



MARKETING



Once you have caught your clients' attention, think about how you want them to act. The fewer 'steps' required, the better the response. Also, if you are promoting an event, make sure all the details are there – where, when and who to contact. These are essential if someone is going to make a decision to visit you!

Stand out

You need to stand out from the crowd and be different. Don't replicate what your competitors look like or say. Use your own words to describe you. You know your business best, so use your expertise to sell it to your potential customers. You should also always avoid generic messaging.

Your clients know that you provide an excellent service, that you care. But what makes you different? Make a statement and think "so"...? The answer you get is what makes them come to you.

Be a jargon buster

You are the expert, and sure, it makes you sound as if you know what you are talking about; but your clients don't need jargon. Speak in language that they will understand and to which they can respond. Communicate at their level

of understanding, and make them feel that you can identify with their wants and needs. Never over-complicate, but don't over-simplify.

Let's go social

The ever-evolving, ever-changing, technical world in which we live means that social media is now a part of (nearly) everyone's day-to-day lives. This aspect of marketing is one that is certainly 'of the times' – although it should always be approached with caution. There is nothing worse than a social media account that hasn't had a post on it for over a year, or is targeting completely the wrong audience. So, if you make the decision to go social, think about the following:

Why?

First and foremost, why are you using social media? To convert 'likes' to clients, or just to 'have a presence'? Really consider what it is you want out of your social media, and how you are realistically going to achieve it. To do 'social' properly, you have to invest time in creating relevant content that your audience wants to read and interact with.

Consider the platform

Facebook, Snapchat, Twitter, Instagram, LinkedIn. These

are just a few of the hundreds of social media platforms that are out there. Before you embark on a social media strategy, think about the subject matter, and if it is relevant to the audience on that platform. Facebook is where people tend to talk about friends and family, whereas LinkedIn advertises itself as a professional networking site.

You should also think about how many times you want to post per day. Realistically, how much content do you have? In October 2017, <https://coschedule.com> researched the optimum number of posts on social media. They looked at 14 social media studies and discovered that, on average, you should limit posts to one per day on Facebook, but 15 tweets per day on Twitter. You want what you post to be read – so think about where you are putting your content.

Interact

Your followers do not want to be ignored – and neither will they want to have a conversation with a robot. Give yourself an online persona, ensure that you are seen and, more importantly, that you interact. Reply to posts, respond to messages, 'like' and 'retweet' others' content. Make the most of being 'social'.

Stay up-to-date

There are many features on social media platforms that you can use to your advantage – meaning that you can easily interact with your clients, and keep track of what they are doing whilst on your website and using your social sites.

Social media platforms have to make sure that you keep using them – they are a business and they need revenue, so, therefore, they need users. They have to keep things new and fresh, developing ideas to sustain businesses and users. So, make sure you know about the

features, use them, interact with them – a lot are free and easy to use.

The number of blogs and blog posts that highlight what is new and exciting in the social networking world are almost endless. Be sure to make time to read some – or delegate the task to a member of your team.

Most importantly, never ever forget

We've covered the basics, but here are some things that you should never forget:

GDPR and Data Protection

Marketing, advertising and keeping within the law is an absolute must. It is essential that you do not conflict with any of the data protection legislation and, more importantly, GDPR. There is more information available from *Veterinary Practice Today* at: www.vetpracticetoday.com/vpt-en/index_gdpr.html

Don't rush

Take your time, prepare, make it count.

Check

It doesn't take much for someone to just check through what you have written or created; but it does ensure that you are consistent, that your brand and business is well represented.

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Elaine Fisher, FCIIPD

Elaine, as director of Eagle HR, leads a team of consultants in order to provide a range of services. She offers advice, guidance and support to a range of small and medium-sized businesses, and is a highly credible HR professional, with over 20 years of personal 'hands-on' management experience.

She is an expert in devising and implementing effective reward strategies for employers of all sizes and is skilled in job evaluation, pay structure design and equal pay. Elaine is a Fellow of the Chartered Institute of Personnel & Development (FCIPD).

"It's not in my job description"

In a job market in which qualities such as flexibility and adaptability are not only becoming more valued, but are also expected of employees by veterinary practices, job roles often become much wider than their written job description. There is an expectation of intangible elements but also specific tasks. However, how much can an employer reasonably expect from an employee and can an employee ever refuse? This article will help you navigate through these questions and some of the legal implications to be considered.

What is a job description and what is its purpose?

Most practices will provide some form of job description – of varying detail. A well-written and considered job description will clearly identify the key tasks to be performed, main accountabilities and also the purpose of the role. Some might go further and include the qualifications, characteristics, skills and experience that are needed to perform the role to the expected standard required by an organisation.

But why have a job description in the first place? And when to draft it?

The most obvious benefit of having a well-written job description is to provide current employees and prospective candidates with information on the role. Typically, details regarding responsibilities, duties, accountabilities, qualifications and key expectations are given to provide an understanding of what is required.

For candidates applying for a role at your practice, it can help them to decide not only if it is a job they wish to apply for, but also if their skill set and experience is suited to the role. For human resource (HR) decision makers and practice managers, it can be a useful tool to shortlist candidates who are suitable for interview or further selection.

Producing a job description early in the recruitment process – rather than as a part

of the contractual documents you supply once the candidate has been confirmed in post – enables clarity of the role at the earliest stage. For many candidates, their first interaction with the practice is when they read the job description as part of the application process. It is a powerful tool to communicate the 'employer brand' and the values and objectives of the practice.

The language used here is important as it will help the candidate to build up a picture of the practice and gain a sense of its culture. All practices want to sell themselves – although be careful not to exaggerate or distort the truth, because a new employee could feel misled if the reality turns out to be different.

Once employees are in their role, their job descriptions continue to be useful documents. They can assist with setting goals and targets, planning training and development plans and to aid assessment of an employee's performance in their role.

What are the legal aspects?

A legal framework is provided in the Equality Act 2010 to tackle disadvantage and discrimination, and this framework applies to job descriptions too. The Act details nine protected characteristics that protect individuals from unfair treatment. These are age, disability, gender reassignment, marriage or

civil partnership, pregnancy and maternity, race, religion or belief, sex or sexual orientation.

Some job descriptions will have sections that express qualifications and/or attributes that are required for the role. It could be easy to unintentionally fall foul of a protected characteristic here and discriminate on the basis of some poorly chosen wording. The law doesn't offer a definitive guide on what should or shouldn't be included, but uses a test of what might 'reasonably be understood as indicating an intention to discriminate' and if an 'ordinary' person looked at it, whether they would consider it discriminatory.

It could be blatant direct discrimination; but, more often than not, it is indirect discrimination that can land employers in hot water, and often stems from unconscious bias. Set criteria may sometimes exclude a certain group of people – either making it impossible to perform the roles and duties required or, indirectly, excluding them from the process. Sometimes it can be the language used that gives an indication as to the type of person the job is being directed towards. For example, using gender-specific wording, or words that indicate age – such as 'youthful' or 'mature'.

"It's not in my job description"

It can be difficult to capture every detail of a role within



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a job description because it is usually a short document. With crystal balls also in short supply, it can be hard to predict the way a job may develop if it is a completely new role, or evolve naturally over time.

However, where does an employer stand if they need an employee to do something that is not in their job description, or the relationship between the two parties breaks down and an employee starts to 'work to rule'?

It is common for a job description to contain a 'catch all' statement, with which many people are familiar. In case the author has missed out – or not foreseen – certain eventualities, a statement along the lines of, 'You will be expected to carry out any other duties that may reasonably be required in line with your main duties',

is included at the bottom. Likewise, similar clauses are regularly put into employment contracts.

It would be easy to think that this is would be fine, and an employee can now be asked to do any task. However, the reality is not as black and white.

Is it reasonable?

The 'catch all' statement is often referred to as a 'flexibility clause', as it does what it says on the tin – it gives the employer some degree of flexibility. It should be exercised with caution though, as it doesn't offer an employer carte blanche. The duties that an employer asks of the employee must be within reason.

Therefore, if a practice receptionist who usually dealt with clients was asked to mention a new pet care range for sale in the practice, this would most likely be seen as

reasonable. Conversely, if the practice receptionist was told that he or she was now going to work on intricate clinical treatments, this would no longer be seen as reasonable.

This would be a 'material change' as it is a completely different job, with different duties and responsibilities and required skill set. It would also be deemed a material change if a significant proportion of their previous duties were removed. A unilateral change of role or duties could amount to a fundamental breach of contractual terms and risk an employee bringing a claim for constructive dismissal.

However, what is an employer's position if the change *is* reasonable, yet an employee still states, "It's not in my job description"? This could be seen as a failure to follow a reasonable management request and result in disciplinary

action. In spite of this, before proceeding down a formal route it is always wise to explore the reasons why there is resistance. Is it a consequence of fear of failure and training is required? No understanding of why the change is needed? Communication with an individual before, during and after can aid a smooth transition and increase buy-in.

Can a job description ever be changed?

The simple answer is 'Yes'.

It is good practice to review and update job descriptions to ensure they are still relevant, up to date and align with the goals of the business. The person who has the most knowledge of the job is usually the person doing it. Employers can seize this opportunity to work with the employee to not only update tasks and deliverables, but also drive the intangible behaviours and

soft skills that are expected. Good communication is the practice's biggest asset for bringing an employee inside.

As stated previously, a unilateral change could result in a breach of contract, but if the employee agrees to the change, it can go ahead. The employer should enter into a period of consultation or negotiation with the employee or their representative, such as a Trade Union official.

If the changes are agreed, then the employer must provide written notification of the change within one month. If an agreement cannot be reached, the employer could seek to dismiss and reissue a new contract containing the new terms.

However, caution should be exercised here. It is unlikely that an Employment Tribunal would find the dismissal unfair if it is deemed to be minimal and reasonable.

Therefore, if a practice administrator who worked upstairs in an office, but was asked to move to man the downstairs reception whilst completing their work, this would most likely be seen as reasonable because the skills would be within their remit. Although, if an individual suffered a major detriment – a significant loss of earnings, for example – a tribunal could take a different view. ■

PPD Questions

1. What is a unilateral change?
 - A. a minor change
 - B. a change of conditions of employment without employee agreement
 - C. an agreement between an employee and employer
 - D. a new version of a job description.

2. Which piece of employment legislation contains the details on the nine protected characteristics?
 - A. Human Rights Act 1998
 - B. Equality Act 2010
 - C. Trade Union Act 2016
 - D. Health and Safety at Work Act 1974.

3. When should an employer consult an employee about changing their job description?
 - A. when a significant change to an individual's terms and conditions is proposed
 - B. if an employee is continuing their job with no changes
 - C. when a business decides to hire another person because additional resource is needed
 - D. an employer never needs to consult with employees.

4. What is a flexibility clause?
 - A. a clause that allows an employee to vary their job role
 - B. the ability to work from home when required
 - C. when an employee wants to work overtime
 - D. an express term in a contract or job description that gives an employer some flexibility to make reasonable changes to a job.

5. What is indirect discrimination?
 - A. when an individual is given less favourable terms and conditions because of a protected characteristic
 - B. a term for when no discrimination has taken place
 - C. people who share a protected characteristic are disadvantaged as a consequence of a practice, procedure or policy
 - D. a valid justification for not hiring an individual.

Answers
1.B,2.B,3.A,4.D,5.C

Be inspired

We have all sat through lectures – whether at veterinary school, college, university or conferences – and have come to realise that lectures and lecturers vary in quality. Only a few leave us inspired to work harder, change systems or simply feel more motivated. And it's not usually the content of the lecture, but the delivery by the lecturer, that produces this inspiration.

One such series of lectures was delivered by Katherine Eitel at this year's BSAVA Congress. Katherine is an American performance coach and the founder and CEO of 'LionSpeak' – a communication coaching company. She gave a series of lectures on leadership and teamwork and, although the material content was good, it was not radical or revolutionary. In itself it did not inspire. It was Katherine and *her delivery* of the material that was inspirational.

She really empathised with her audience, such that it felt as if she was speaking to us personally; and I would guarantee that the vast majority of her conference audiences left the lecture theatre feeling inspired and motivated to carry out her suggestions for good communication and teamwork.

So what is inspiration?

Inspiration is defined as the process of being mentally stimulated to do or feel something, especially to do something creative – and this was certainly the case when listening to Katherine.

It is fascinating that the same information can be delivered by two people – one of whom inspires while the other may even demotivate; and it leads us to ask, 'Are inspirational people just born, or can they be made?'

When we think of inspirational people, we may think of Mahatma Gandhi, Winston Churchill, Martin Luther King Jr, Mother Teresa, Nelson Mandela, Malala Yousafzai and Stephen Hawking. What they have in common is fighting on through adversity, striving to make dreams come true and, in so doing, enabling us to believe we can do the same.

There is no doubt that some people simply have what it takes when it comes to being inspirational – it's to do with their personality, demeanour and general attitude to life. This does not mean that we 'mere mortals' cannot aspire to being, at least, a little more inspirational when working with other members of our team. Being inspirational is about energising and creating a sense of direction and



purpose for those with whom we work and helping them to achieve a vision.

It is important, however, not to confuse inspiration with motivation. Motivation is all about movement and achievement – we are motivated to succeed in what we do. When we are inspired, we often don't need external motivation to move forward because the feeling of inspiration is enough to propel us.

The ability to inspire, to infuse energy, passion and commitment is perhaps the single most important leadership skill.

Real life stories inspire

Those who inspire often use their life experiences and knowledge to talk with others and motivate them to take action. They may have almost any kind of background – be experts in their field or have survived life-changing experiences or challenges. A good example of this was yet another speaker at the BSAVA Congress, Nigel Owens, who gave the keynote lecture at the 'President's Welcome' on the Thursday afternoon.


Nigel has reached the pinnacle of his professional career and is respected

by his peers; but it was his description of the struggles in his life – and how he overcame mistakes – that truly inspired his audience, who gave him the first standing ovation any keynote speaker has ever had at a BSAVA Congress. His audience was most definitely inspired.

What was common to Katherine and Nigel was that they both told a story in order to illustrate what they were trying to tell their audience. They both spoke from the heart, admitted their shortcomings, showed how these were overcome and what they learnt from their experiences.

When you think about it – from our childhood onwards – we have all loved to listen to stories. They may have been of the fairy tale kind when we were young; yet, even as adults, a good story can keep our attention and fuel our imagination. Combine the story with the right message and we are a long way towards inspiring our audience.

We cannot all be as inspiring as Mother Teresa or Martin Luther King Jr, but perhaps we can be more inspirational to our fellow team members and colleagues, share the vision and tell the story. ■



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Industry Profile



Your name: Peter Brown
 BVetMed BA(Hons)
 MSc(VetGP) MRCVS

Position & Company: Small animal practitioner and president of the Society of Practising Veterinary Surgeons (SPVS)

What was your pathway to becoming a veterinary surgeon?

As was the case with many of my generation, I suspect, James Herriot played a key role! I can remember discovering the books tucked away in the non-fiction section of the library before they really became popular, and devouring them eagerly. My family was instrumental too.

While I was growing up, my mother acquired some chickens and our back garden seemed to fill up rapidly with animals as we joined the self-sufficiency movement that spawned *The Good Life*. I think my mother still has a rather embarrassing picture of me as a mop-haired teenager – posed with the rest of the family holding chickens – that appeared in a self-sufficiency magazine of the day. After that, it was almost inevitable that someone in the family would become a veterinary surgeon!

What have been the key influences on your life as a practising veterinary surgeon?

That's a hard question to answer! As a vet – and particularly as a practice owner – there are many sources of inspiration: conferences, journals, professional advisers, and so on. But if I could single out one thing, it would be my fellow professionals. Some of the most stimulating times have been when we have gathered together at a conference, or an event organised by a pharmaceutical company.

It's great to socialise, yet it is also an opportunity to learn from what has worked for other people and also what they have found difficult – and, perhaps, realise that you're not alone. We're often so busy in our practices, that we don't make enough time to get together; and I wish we did it more often.

What do you say to young people who come to you expressing a wish to become veterinary surgeons?

I guess it comes down to doing your research and being realistic. Resources such as the RCVS *'I want to be a vet'* are great to give an idea of the range of careers available. However, most youngsters will at least start off by thinking about being a practising vet, so I think seeing practice – or some aspect of veterinary work – is key and should really be mandatory.

It is not easy – particularly with an increased demand for extramural studies (EMS) from undergraduate veterinary students – but if they have to persevere to persuade the practice that they're interested, then maybe that is no bad thing!

How do you think the selection procedure could be improved in order to improve retention rates and recruit undergraduates to meet the actual needs of the profession?

This is a matter for debate – whether to focus on selection or the undergraduate course.

I think the schools have already improved the selection process considerably. Forty years ago, I received an offer from the Royal Veterinary College, London, without an interview at all; but now it's an essential part of the selection process and that makes sense. Being a good vet is about much more than just academic ability.

Arguably, it is what students learn at veterinary school and out on EMS that most affects how they settle into practice; but, again, I think the universities are alert to this and are considering how they can better prepare students for practice, particularly first-opinion practice, which is very different from what they're used to seeing in a university setting.

I have been very encouraged by some of the things Professor Stephen May of the RVC has said in this regard, and I think the issue of recruitment and retention is something with which the whole profession is getting to grips. As a Society, in SPVS we're very aware of how it affects our members and are keen to look at it from a practice perspective too.

What is the role of independent veterinary practices in the face of the seemingly relentless growth of corporate practice?

We certainly live in interesting times! I think a lot of people are waiting to see at what point the growth of corporate practice will level out; but clearly there will always be a role for independent practices that are able to differentiate themselves from larger groups in the market place.

Although the growth of corporate practice is fuelled by the amount of money available for purchase, it does, at least in part I think, reflect the fact that owning a practice is a major commitment in terms of both money and time, which may need to be weighed against a desire for a good work/life balance. This is where SPVS needs to be very aware of its role.

We have always appealed to veterinary surgeons who either own, run, or are interested in running practices; and yet we know, from the work we have done with John Sheridan, that many practices are not as profitable as they could be. So it will become even more important to help practices be efficient and profitable, in order that they remain attractive places to work in and own.

At the same time, we cannot avoid the fact that incorporation is creating a new breed of veterinary surgeons, who may have senior positions within practices, but who either don't want to – or are unable to – own a practice themselves. Will practice, and in particular general practice, which is after all where most veterinary surgeons work, continue to provide a satisfying career path? The evidence from the Vet Futures project is that this is already an issue for the profession.

The BVA is doing some excellent work in this area, and we are keen to look into it as well, because understanding what we can do to improve the recruitment and retention of staff is vitally important for veterinary practice.



Assuming that some form of Brexit does eventually occur, how do you see it affecting independent practices?

One of the problems with Brexit is that there is so much vagueness surrounding it. A RCVS survey last year found that most of those questioned were waiting to see what happened; but there is no doubt that if it were to result in fewer EU vets coming to the UK to work, this would have a serious impact on the profession as a whole – and not just independent practices. It would be helpful if the Government could resolve the uncertainty that exists about the future role of EU citizens in the UK.

In the meantime, I know of some groups and individuals who have been looking at how UK vets can make our EU counterparts feel more welcome and it would be a great message to send out as a profession.

How do you see the role of RVNs developing in practice? Where are the 'red lines' in what they should be permitted to do?

The first thing I did when I bought my practice was to employ a VN (I had inherited two unqualified staff) – and it was the best decision I made! I think nurses are often underutilised in practice, which is both to their and the veterinary surgeon's detriment. So I'm keen that we look at developing the role of the RVN, which we'll be doing both in our involvement on BVA's working groups and in our direct contact with the BVNA.

What aspects of veterinary practice give you the greatest satisfaction?

It's funny, but in some ways I feel that I have come full circle. When I bought my practice, I entered enthusiastically into every aspect of the business – from financial planning and writing promotional material to clearing drains and putting up shelves, as well as all the clinical work! Now I'm doing locum work, I am reminded how satisfying it can be to have explained something to a client and see the look of comprehension when they've understood what is wrong with their animal or been able to make a difficult decision. At its most elemental, veterinary practice is about being presented with a problem and resolving it in a way that is good for the animal, good for the client and good for the vet too; and it's a point worth remembering.

Tell us something about your interests away from practice life.

My wife, Teresa, and I share a fondness for walking. It's nice to have a challenge and we've just finished following the Thames from its source in Gloucestershire 184 miles to the Thames barrier. This year, I'm putting it to good use on behalf of SPVS. I'll be ascending the highest point in each of the UK's main regions to raise money for Vetlife and Vet Support NI. I'm hoping to persuade some colleagues to join me and that it'll be an opportunity to socialise as well as raising money for a worthwhile cause.

We enjoy travelling as well and every year we try to include at least one trip to the Greek Islands, where I'll do some work for local animal charities. I started going eight years ago and fell in love, not just with the islands, but with the people I met. I inveigled Teresa into helping, even though she's allergic to cats, and was thrilled when she said, "I really get why you come here."

It's the perfect combination – we'll do some work in lovely surroundings, socialise in the evenings with the friends we've made and then spend a few days relaxing or exploring the islands. Most of the time I'm neutering cats to help control the stray population out there; but there are no vets on the islands we visit, so often local people will bring animals in to us and we help them as best we can. The lovely thing is that our role enables us to get to know the islands much better than if we simply pitched up as tourists.

Once we arrived by boat from Turkey, and when the Customs official recognised us he cried: "Ah, our beloved vet!" and waved us past the queue. Another time, I was invited to the island school to talk about our work and ended up fielding questions from wide-eyed boys wanting to know what happened to the male cats – which was amusing.

So strictly speaking, it's not away from practice life, but a lovely reminder that – at its best – being a vet is a real vocation that offers great opportunities and rewards. ■



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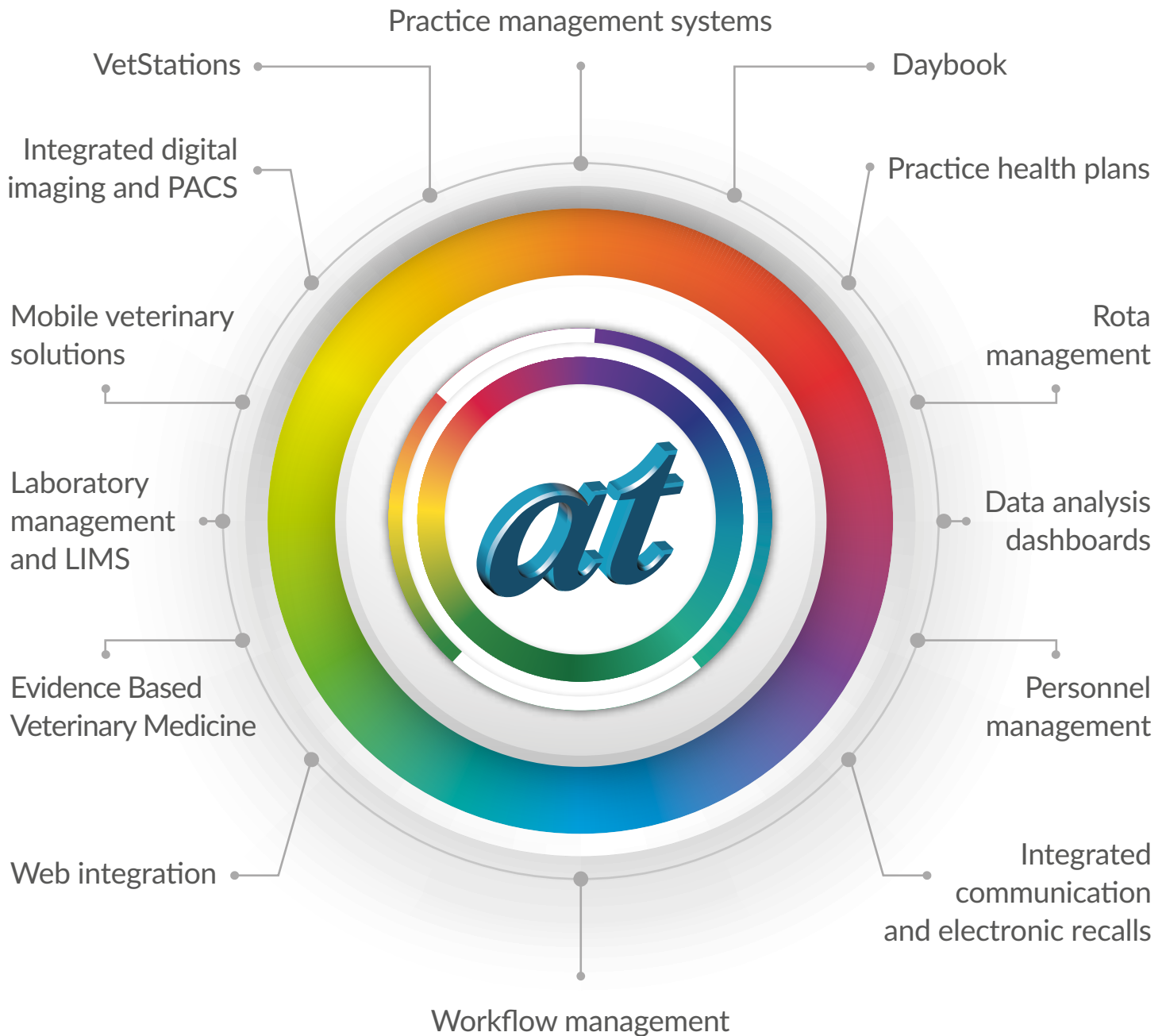




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