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Veterinary PracticeToday

FOR PERSONAL & PROFESSIONAL DEVELOPMENT

Time to consider the bigger picture

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Presentations in dogs and cats

Anorexia in snakes
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UP FRONT...

My journey to work every morning takes about 40 minutes and I spend the time – as well as driving with care – listening to John Humphrys et al. presenting the *Today* programme on Radio 4, in an attempt to keep up with news and current affairs.

I have to say that there are times when I arrive at work feeling quite depressed about life and the world in general. As I write, (23 May, the day after the Manchester bombing), today is no exception.

It is easy to sink into negative thoughts, and there are one or two issues that we address in this edition of *Veterinary Practice Today* which could promote such feelings. I refer to the Wildlife Insight describing the dreadful state of the world's oceans and the deaths of thousands of marine creatures each year because of plastic pollutants; and then the quite substantial number of young graduates who, when encouraged to confess their thoughts about their job (see Management Insight) were less than optimistic, often questioning whether this was the profession for them.

However, one must always adopt the 'glass half full approach'; and when one reads the article by Anne-Marie Svendsen-Aylott on the positive aspects of stress – which shows us that it is possible to increase our coping skills and that we can retrain our brain to focus on the positive – we are given just such advice. The excellent article by Robin Launder on mindsets, describing how the way a person sees themselves and the world around them can shape their whole life and the success they make of it, also gives great hope for human resilience.

This issue of *VPT* is full of articles that show just how positive the veterinary profession can be when it comes to research into – and treatment of – the problems of both small and large animal veterinary medicine. Several show how it is the positive actions of teamwork that gives the best results.

Hilary Orpet and Andrea Jeffery, in their fascinating Comment article, reinforce the fact that veterinary surgeons and veterinary nurses have their own unique role to play in patient care and how it is important for professions to acknowledge each other's input; while Norman Johnston in his dental article explains that it is only by a team effort that we can encourage clients to better understand and help care for their pet's teeth.

Some of those young graduates talking about their jobs seemed very alone. It is the support and teamwork within the veterinary profession that will not only enhance the lives of our animal patients, but also our own, and enable us to change our mindsets from a glass half empty to a glass half full. What the glass contains is up to you. Cheers!

Maggie Shilcock
Editor

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Time to consider the bigger picture

Hilary Orpet
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Hilary is a senior lecturer on the Foundation and BSc Veterinary Nursing Degrees at the Royal Veterinary College. In 2007, she developed the Ability Model of nursing care with Andrea Jeffery, which is currently the only published veterinary model of care in use. She completed her MSc in Veterinary Education in 2011. Hilary currently sits on the RCVS Veterinary Nursing Council.

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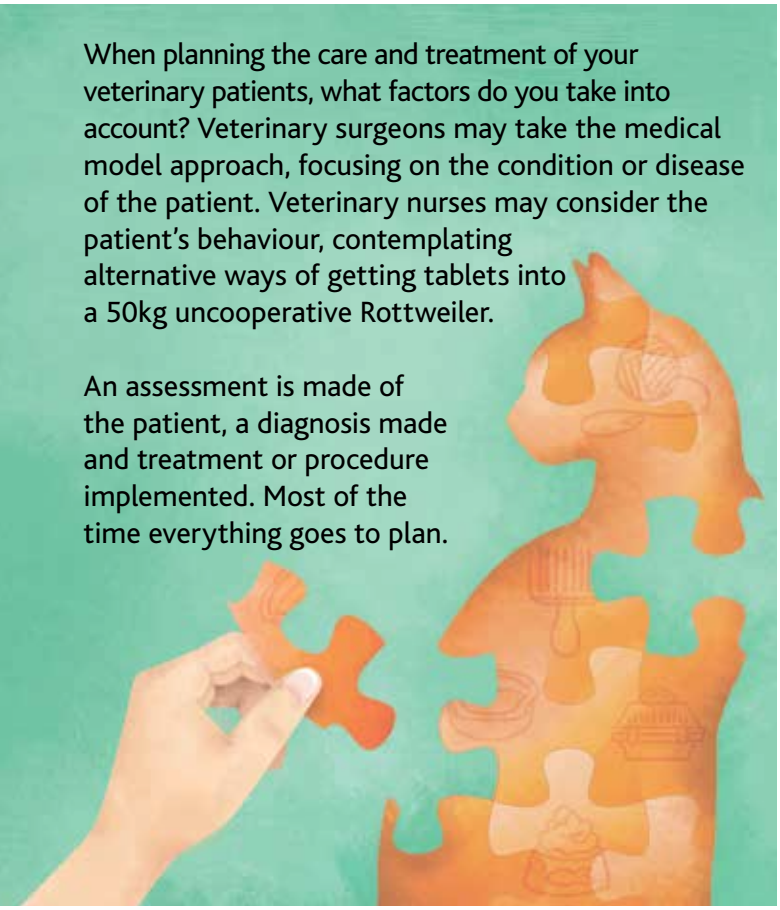

HOLISTIC CARE

However, we are often dealing with a situation in which we have little or no knowledge of the bigger picture. What aspect(s) of the patient or owner's normal routine are going to be affected by – or will affect – the plan? There may be additional financial or cultural limitations on the treatment or procedures that may be prescribed and which could have an impact on client compliance.

Planning the care

In veterinary medicine, the approach to planning the care of the patient that is often taught to veterinary students is the SOAP (Subjective, Objective, Assessment and Plan (**Figure 1**) framework which originated from Weed's Problem-Oriented Medical Information System (Wright et al, 2014).

Traditionally, in veterinary nursing there was little in the way of assessment and planning. Procedures were prescribed by the veterinary surgeon and care was carried out as and when needed, with little documented planning. In 1998, human-centred nursing models of care were incorporated into the curriculum of the first veterinary nursing degree course.

Nursing models of care and care plans have been utilised in medicine since the 1950s, with nursing theorists such as Roper, Logan and Tierney and Orem developing frameworks to

Subjective	Objective	Assessment	Plan
Information given by the client, the overall impression of the patient (bright and alert, subdued etc.)	Data obtained from physical examination, results of blood tests, imaging procedures, biopsy etc.	Analysis of the subjective and objective data leading to differential diagnoses of the problem.	Treatment plan including medication prescribed, further procedures, surgery etc.

Figure 1. *SOAP framework.*

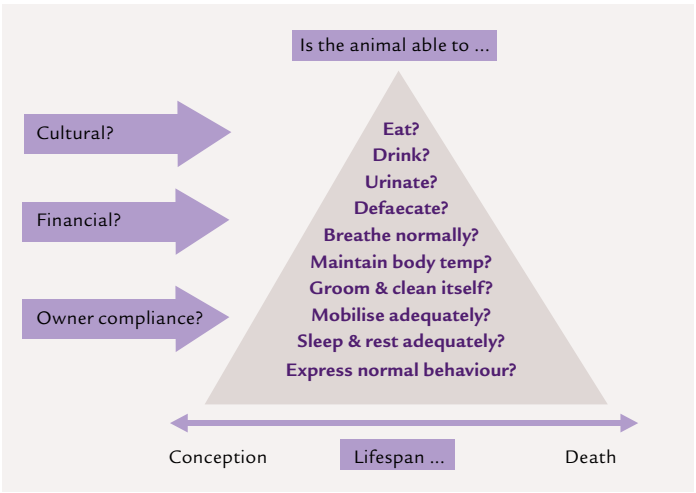

Figure 2. *The Ability Model (Orpet & Welsh, 2011).*

structure the nursing process in the wards (Pearson et al, 2005). In 2007, the only published veterinary nursing model of care – the Orpet and Jeffery Ability Model (**Figure 2**) was developed (Orpet and Welsh, 2011).

This model was designed to provide a structure to ensure the nursing process of assessment, planning and implementation of care of a veterinary patient is not only thorough, involving both patient and client, but also documented (**Figure 3**).

Although the models of care may be taught within veterinary nursing schools, there is little evidence to indicate they are being utilised within practice (Welsh & Wager, 2013). It is suggested there is not enough time to complete a thorough assessment or too much paperwork is involved.

This division between what has been taught and what is practised is widely documented as the theory-practice gap (Pearson et al, 2005). However, if we do not get enough information, we may make the wrong decisions for that particular patient. Getting this essential information ensures other factors – such as the patient/owner normal routines – are taken into account when planning the care.

What is your normal routine?

Many of us have routines or activities that are important to us as an individual. We may have food likes or dislikes or specific dietary requirements. It may be always sitting facing forward on a train or ensuring your bed faces the door. I know of many people who take tea bags away with them when they go on holiday – not because the country they go to will not have any tea; but, of course, because it never tastes the same as their favourite comforting brew.

Whether these activities affect our health or not, they are still important to us as individuals. They make us feel comfortable and when we may be denied these things, we start to feel uneasy, and 'out of our comfort zones'. So how much do you know about your patients' normal routines and why is this important?
We can use the following example of Ezekiel; a three-year-old male cat who has been brought in by his owner following a road traffic accident. It is obvious when the veterinary nurse triages the cat, that on initial examination, the left hind limb has been traumatised and is likely to be broken. The cat is examined by the veterinary surgeon and appropriate treatments are prescribed to help stabilise his condition. Radiographs indicate a left femoral fracture and Ezekiel is taken to surgery the following day. The operation goes well.

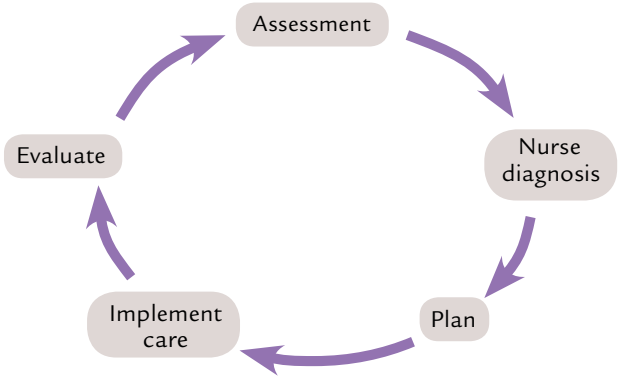

Figure 3. *The Nursing Process (Orpet & Welsh, 2011).*

Pain scoring indicates the analgesia is adequate and the cat is starting to 'weight-bear'. All vital parameters are within normal range, and everything appears to be going well – although the cat is still not eating. Various tempting foods, such as warm chicken, have been supplied for that initial encouragement. The veterinary nurses also report he is not using his litter tray – choosing to urinate in his bed instead.

At this stage in practice, owners are often contacted to elicit what might be the cat's favourite food. You might also be considering investigating any urinary disease that may be causing inappropriate urination. There was nothing wrong with the plan – but lack of information has led to the plan not going as expected.

PATIENT DETAILS	**Name: Ezekiel Jones, Address: Rose Cottage** **Species/Breed: Feline, DSH Sex: Male neutered** **DOB: July 2014**
Is the animal able to...?	**Ability before admission – normal routine**
Eat adequate amounts	Ad lib dry kibble. Occasionally has wet food as long as it is with gravy. Dislikes chicken, loves salmon, eats from flat bowl. Only eats at night.
Drink adequate amounts	Drinks tap water from dripping tap, prefers filtered water or puddles.
Urinate normally	Goes outside normally, no cat flap. Has litter tray at night (dislikes wood pellets).
Defaecate normally	Goes outside normally (see above).
Breathe normally	No problems.
Maintain body temperature	No problems. Likes to lie in the sun or by fire.
Groom itself	Grooms himself, short hair.
Mobilise adequately	No problems: Very active, access to large garden.
Sleep/rest	No problems – owner's bed. Sleeps during day.
Express normal behaviour	Very friendly, lives with small dog and another cat. Dislikes injections and having temperature taken.

Figure 4. *Ezekiel's patient record, based on the Ability Model assessment.*

Now if we rewind this scenario...

Ezekiel's owner first came to the practice almost three years ago when he was a kitten. When she came in to make the appointment, she was offered a 'new client' consultation with one of the veterinary nurses. They took a detailed history of Ezekiel's likes and dislikes, and his normal routines. The owner was also introduced to the facilities of the practice and the services she could expect.

During the consultation, the veterinary nurse was able to acquire knowledge about the client, building a relationship and creating a practice-client bond. The information was kept on file and updated as Ezekiel visited the practice for vaccinations or subsequent consultations about minor ailments. The interest shown in Ezekiel each visit, strengthened the bond with the client.

So, when Ezekiel was admitted – his file was found (**Figure 4**). The client was obviously distressed at this point, so the veterinary nurse agreed to ring her later to update her on his progress.

We can see that Ezekiel does not like chicken but loves tinned or fresh salmon – and is always fed from a flat ceramic bowl. The owner reported that he only seems to eat at night; although she likes to leave some biscuits down during the day in case he gets hungry.

He likes to drink from the dripping tap in the bathroom or from puddles outside. He does not have a cat flap and can usually go out when he likes during the day. At night, there is a litter tray available with some Fuller's earth and soil from the garden.

So, now when Ezekiel was recovering from surgery, he was offered a small amount of tinned salmon which he ate readily that evening. A litter tray was provided with soil rather than wood pellets. He used this overnight and subsequent days whilst hospitalised. The normal routine of removing all food bowls at night was changed and Ezekiel was left biscuits in a flat bowl for his night-time snacking.

The bond the owner had developed with the practice over the years meant that they felt more at ease communicating their fears and concerns during Ezekiel's hospitalisation.

So, if you are reading this on a rare break at the practice – let me ask you some questions. What is the favourite food of the patient in kennel 4? Does the dog in the kennels have any particular command to urinate? Does the rabbit you have just done the dental on, normally drink from a water bottle or a bowl?

You might not think this type of information matters much, but as veterinary professionals we must 'ensure the health and welfare' of our patients (RCVS *Code of Professional Conduct*). This means taking into consideration the individual requirements of that patient, by providing them with most appropriate environment to aid their return to normal health.

Client/practice bond

We know client compliance can be a problem. Whether it is continuing a course of treatment because it is too difficult to administer, or affects the client's lifestyle too much. Perhaps they fail to see the relevance of the treatment or improvements in their pet.

Do we always take the time to find out if our clients are *able* to comply? The client may not always want to provide an insight into why they may struggle – through shame or reluctance to discuss their problems. Abood (2007) suggests that we should move away from the term 'compliance' (consistency and accuracy following a prescribed regime) to using the term 'adherence' (the extent to which a patient agrees to the prescribed treatment). The focus moves away from the authoritarian relationship of giving orders to a relationship where both have equal input into the decisions.

There will, of course, be times when the authoritarian relationship is necessary; but utilising an approach whereby discussion of the client's issues are acknowledged, is also important. A recent survey by Niessen et al (2017) to investigate the reasons that diabetic pets are euthanased identified several factors, including the 'impact on owner's lifestyle' in almost one third of cases (32%).

So do we spend enough time getting to know our clients and discussing what will work for them? By neglecting this important step early in our planning, we may be setting ourselves up to fail the animal in providing appropriate care. If you do not know what is normal for that individual – you have no goals to work towards.

Veterinary team approach

Finally, veterinary surgeons and veterinary nurses too have their own unique roles to play in patient care, and it is important for the two professions to acknowledge each other's input.

During the consultation, the veterinary surgeon's role is establishing the history and clinical data to inform the subsequent diagnosis and treatment plan. This, combined with the nursing assessment of the animal's normal routine and the development of the client-focused bond, can ensure that we do indeed return the patient back to normal. ■

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A closer look at microchipping

It is now over a year (April 2016) since it became law for all dogs to be microchipped – The Microchipping of Dogs (England) Regulations 2015 and The Microchipping of Dogs (Scotland) Regulations 2016.

Under the regulations, it is a legal requirement for all dogs to be microchipped by the age of eight weeks and recorded on an approved database; and for the registered keeper/owner to keep the microchip database up-to-date with their current contact details.

It goes without saying that microchipping is only effective if microchip databases hold the most up-to-date information. A recent study by the BVA stated that 44 per cent of veterinary practices were unable to reunite stray or missing microchipped dogs owing to outdated contact information (www.bva.co.uk/news-campaigns-and-policy/newsroom/news-releases/keep-microchip-database-details-up-to-date-before-it-s-too-late).

It is the owner's responsibility to inform the databases about any changes to their pet's microchip contact details – failure to do so can result in a fine of up to £500. It is true to say that a proportion of owners still find the system confusing and do not keep careful records of the necessary paperwork or a record of their database provider, leading to problems and confusion if details need to be changed or a pet goes missing.

Data under the spotlight

Closer analysis of the situation raises questions. For example, what happens to pet owners' data when they register it with a microchip database? Do they then become a customer of the microchip database company? What happens to the data? Who can access the data held?

Microchip databases clearly hold a great deal of information about pet owners and their pets, and before passing on their client details, practices should be clear on a couple points: is this information being used? If so...how? And by whom?

Practices may be comfortable with additional products and services being offered to their clients, but others may feel this is a step too far. Those practices that are more inclined to the latter might prefer to go for a cleaner, more transparent data service that provides microchip registrations and information updates, only.

The reunification process

If a pet goes missing, an owner should contact their database to report their lost pet and the database will keep a record, as well as match the microchip number up with any 'found' microchip numbers.

If a pet is found, it may be taken to a veterinary practice, but more often than not it will be to a dog warden or rehoming centre. Both will be able to scan the pet for its microchip number and be able to identify the database with which it is registered. It is at this point that procedures can become somewhat cloudy. In theory – and in compliance with the Data Protection Act – it should be the database which then contacts the pet owner to inform them that their pet has been found. It is, however, the case that dog wardens and re-homing centres are given access to database information and can, therefore, contact the owner directly about their lost pet.

Confidentiality, security and consent

Confidentiality and security are paramount for most people, so when we look at the functioning of the whole microchipping process, it becomes questionable just how efficient and secure it is.

The microchipping system involves one agent (the veterinary practice or other qualified professional) to carry out the microchipping; the database – of which there are a number – to hold information; the client, to keep information up to date (at a cost); and third parties, albeit approved ones, who have access to pet owners' details.

In addition to this, when a pet is lost or found, even more people gain access to owners' details, with no clear method of reuniting a pet with their owner. Keeping the process simpler and safer would seem preferable.

The other 50 per cent

It is clear when you look at the microchipping process that the actual implanting of a microchip and the initial registration is only 50 per cent of the job. It's what is done after this that makes all the difference to how effective the system is. With new options available, practices are uniquely placed to provide the complete service of implanting, registration and data updating.

Summary

Veterinary professionals need to be very clear in their minds about how the whole microchipping and reunification process works. It is important to be aware of exactly who they are allowing to access their clients' personal details.

Have they received consent to allow databases to use this information or even pass this information on to third parties?

They need to know what the ongoing costs may be and which databases provide the most efficient and effective service. Implanting the microchip is only the beginning. ■

Norman Johnston
BVM&S DipAVDC DipEVDC FRCVS MRCVS RCVS, American & European Specialist in Veterinary Dentistry

Norman Johnston is a graduate of the Royal (Dick) School of Veterinary Studies, University of Edinburgh. He is clinical director of DentalVets which is a referral dental and oral surgical practice in North Berwick, near Edinburgh.

Before embarking on a specialist career, he spent 21 years in general practice. His qualifications are unique as he is a current diplomate of both the American and European Veterinary Dental Colleges, a fellow of the Academy of Veterinary Dentistry, a registered RCVS Specialist in Veterinary Dentistry and an FRCVS.

He is a past president of the European Veterinary Dental College, the British Veterinary Dental Association and a board member of the Foundation for Veterinary Dentistry. He is also a past chairman and director of VETTrust, an educational veterinary charity based in Scotland.

**Suggested Personal & Professional Development (PPD)*

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DENTISTRY

Dentistry – the team effort and home care delivery

In his last article (Johnston, 2016) the author discussed the concept of 'Need and Delivery' with regard to the dental patient within small animal practice. The need for an effective dental service within any small animal practice is clearly not open to doubt. The mystery is that so many practices tend to either ignore the need or address it with inadequate resources or training. Given the never-ending revenue stream that dentistry generates for practices, this is surprising. Dentistry is a true 'cradle-to-grave' subject.

The assumption that 'need' is a given is a good starting point. From a welfare standpoint, it makes our patients more healthy and happy. Owners tell us this all the time. Yet the culture within many practices still shows a trend for reluctance when it comes to pro-activity.

If we recall that the clear majority (96%) of all practice dental work is generated from the consulting room, it should be crystal clear that the front line staff not only need to look for dental disease on a proactive basis, but also to be trained, confident and assertive in discussing it with owners and booking cases.

To let the owner leave the building without committing to a surgical date will almost certainly count as a missed opportunity to deal with an issue you may have discussed in depth – possibly for as long as a year when the pet returns for another annual check (**Figure 1**). It can sometimes be an uphill battle to book a dental procedure, especially when there can be other issues to discuss within a limited time slot. The message, however, should be given with assertive confidence.

Delivery of the 'dental consultation' can be centred on some very simple tools to help; two of them being very inexpensive – charts and disclosing solution. Behind these tools (and others) must stand knowledge, confidence, commitment and team work.

We also discussed the 'conspiracy of inaction' in the last article, whereby animals are conditioned not to show overt signs of pain or illness. This does not mean they do not *feel* pain. They hide it – sometimes very successfully.

The message

Owners must realise from the earliest days of their pet's life that effective oral hygiene is a partnership between what they do at home on a daily basis and what the practice does professionally on a relatively irregular basis.

Figure 1. *It can sometimes be an uphill battle to book a dental procedure, but the message should be given with assertive confidence.*

Owners remove dental plaque – an evolving biofilm – mechanically with the bristles of a toothbrush, daily. Once calculus (tartar) has formed on the teeth, it cannot be removed with a toothbrush. It is then the role of the veterinary surgeon to remove it with instruments, under a general anaesthetic, in a professional dental procedure. This is the same as routine human dentistry – except in humans it is performed without a general anaesthetic. The patient brushes twice daily and the dentist scales and polishes twice yearly.

How often routine dental reviews are performed in veterinary practice will depend on the individual patient; but twice yearly would be the average for most animals. If every routine dental procedure in the practice results in one postoperative review after a week – again at six months and then every six months – this will obviously need adequate staff resources. For that reason, dental clinics run by nurses make a lot of sense.

Tools

Two excellent articles (Bloor C, 2014 & 2015) describe very well the resources and training that successful nurse-led dental clinics will need. Tools, such as the most recent dental chart – including access to previous charts for comparison, plastic models of teeth, skulls, photo sheets, printed handouts and

literature, plus photographic images all help (**Figure 2**). And photo images of the mouth pre- and post-dentistry are 'pure gold'.

Refer to the dental chart and images frequently and involve the owner. Describe what the scores actually mean and show where in the mouth they refer to. If there are areas of the mouth with both high calculus and gingivitis scores, the owner needs to know the relevance of this and how it relates to what they must do. Normally the most caudal three maxillary teeth are the area of poorest hygiene, followed by the canine teeth.

The charting technique was described fully in the last article. Grade 2 gingivitis means the gums bleed on probing. For the owner, this would mean their own toothbrush covered with blood after brushing. Most people will not tolerate this and return to their dentist quite quickly. This sign, in animals and humans, is normally a sign that professional dental care is required.

Disclosing solution (Plaqsearch or similar) is a powerful, inexpensive and visual motivator when used at the one-week postoperative check-up and all subsequent reviews. The solution is a dual tone dye that is placed onto the surface of the teeth with a soaked cotton bud. The soaked bud is applied to the buccal surfaces of the teeth and left for 30 seconds. The purpose of the two colours is to differentiate mature and immature plaque. New plaque is less than 24 hours old and is a biofilm of bacteria, food debris and salivary proteins. Mature plaque is a thicker biofilm that has mineralised over time and shows owners very clearly areas of poor oral hygiene.

Tooth brushing

The gold standard in oral hygiene for dogs (and cats) is daily tooth brushing. Frequency of brushing less than three times weekly is considered ineffective (Tromp, 1986). Remember that the purpose of tooth brushing is to use the bristles of a toothbrush to mechanically disrupt the evolving biofilm (plaque) on the teeth.

The toothbrush can be sourced easily and inexpensively from a pharmacy or supermarket. The design of a standard toothbrush has stood the test of time, hardly changing over hundreds of years. Fancy designs 'for animals' are rarely worth the expense. The bristles should be soft and the head size and handle length selected with the size of the pet's mouth and the owner's hand in mind (**Figure 3**).

For most dogs over 15kg, a standard adult toothbrush will suffice. Smaller dogs can use brushes designed for children. Some owners use electric brushes. The owner should change the brush once the bristle ends become frayed, which can be every six to eight weeks.

Demonstrate the brushing technique to the owner first on a model or skull. Normally we suggest the owner confines their efforts to the buccal aspect only of the teeth to start with. The buccal aspect is by far the side with the greatest need and if they can only manage for short periods of time, this will provide the greatest benefit. Choose the battles you can win.

Hold the mouth closed with thumb and forefinger above and below. This allows the brush to be moved back and forth using the cheeks as a guide. If possible, they should rotate the brush head in challenging areas (modified Bass technique). This helps the bristles sweep subgingivally and in between teeth. Videos are available online – search

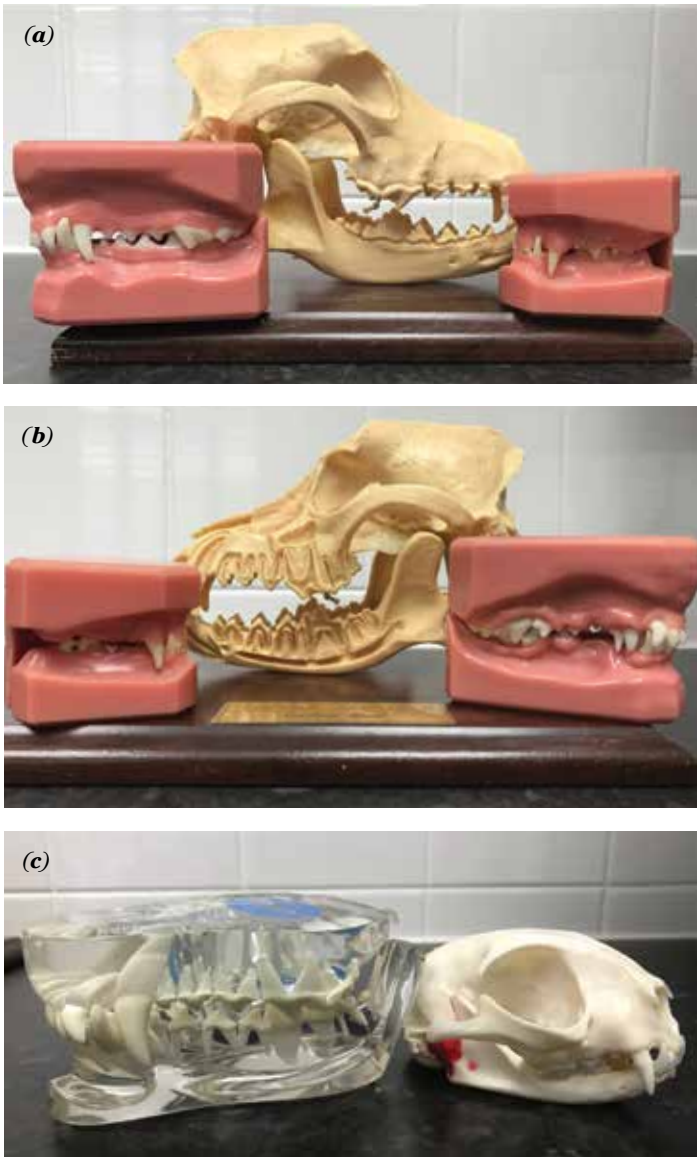

Figure 2. *Plastic models are invaluable tools for client communication: (**a**) normal mouth; (**b**) oral abnormalities; (**c**) plexiglass model showing roots and normal cat skull.*

Figure 3. *A selection of brushes, including generic adult human brushes, Virbac cat brush and finger brushes. Note that finger brushes without bristles are for training over short periods only.*

Figure 4. *A dental kit designed for use in cats.*

Figure 5. *An example of a brand of enzymatic toothpaste.*

Figure 6. *An example of a brand of chlorhexidine toothpaste.*

Figure 7. *Severe gingivitis progressed to advanced periodontal disease.*

for the DentalVetsUK channel on YouTube, for an example.

Toothpaste (or dentifrice) falls roughly into three categories. Human toothpastes should never be used in animals as they cannot spit them out. Agents such as fluoride, detergents or foaming aids are harmful if swallowed on a regular basis.

1. Simple pet shop type pastes

These are often based on a vegetable gum with additives that can include abrasives. Dog and cat dental enamel is thin and abrasives need to be used with care. Human toothpastes are allocated an abrasiveness score with a recommended harmful limit of 150-200. Most dentists prefer paste with a score of less than 70 (http://dendds.com/uploads/RDA_index.pdf). Makers of veterinary pastes are not required to publish an abrasiveness score.

2. Enzymatic paste

Enzymatic Toothpaste (Virbac) provides some additional chemical assistance along with a nice taste and 'soft' polishing agents for improved compliance (**Figures 4** & **5**). The catalyst to the glucose oxidase-lactoperoxidase enzymatic system is saliva with the hypothiocyanite ion the endpoint of the reaction lysing plaque bacteria.

3. Chlorhexidine-based paste

This is the only agent to kill plaque bacteria on immediate contact. It is very effective as a plaque control agent but often compliance can be limited by the bitter taste (**Figure 6**). In the author's opinion, two effective brands are Chlorhexidine paste 0.12% (HS Petcare) and PetDent Oral Gel (Henry Schein Animal Health – code 9009502). Dentisept (AniMedica) is also available as a 0.2% concentration but can be a challenge for owners to use (in the author's experience) owing to its sticky nature. It is not designed to be brushed.

Compliance failure

Those providing dental clinics need to know how to address a failure in compliance (**Figure 7**).

Early on in the heady days 'post-op', owners often comply well with instructions. Their pet is healthy, happy and less smelly to be around. Everything has novelty value and is fun for the pet. They recall the messages given by the clinic and are keen to comply with instructions as best they can.

As time passes, the motivation drops off and there may also be some resistance from their pet. This often happens around three to four weeks following the operation. For that reason, a follow-up call should be scheduled so that the nurse involved can discuss the various concerns the owner may have and possibly invite them to return for a further examination and demonstration. Clearly the same staff member making contact each time will ensure a consistent message, in addition to building a rapport with owner and pet.

Alternatives

The message that once-daily tooth brushing is the gold standard in dental hygiene must be reiterated at every opportunity. It is a simple fact that daily tooth brushing is cheap and very effective. The alternatives are generally neither cheap nor as effective. This is well described in an evidence-led paper (Roudebush, 2005).

If owners cannot be brought on board, they need to know that their efforts with alternative plaque control measures are likely to be a lot less effective and, therefore, their pet will need more frequent professional dental care from the practice. Not only will this cost more in the long-run, it will mean poorer everyday dental health and all the consequences that come from that.

What home care alternatives can be used for cases that fail to comply with daily brushing? This is beyond the scope of a full description in this article, but it is worth reviewing the website of the Veterinary Oral Health Council for options, www.VOHC.org. The VOHC is a not-for-profit organisation that exists to review data supplied by companies with oral health products of this type on the market. Some products in this market come with very poor scientific data of efficacy or safety. *Caveat emptor*!

Many reputable companies, however, do have proven data behind their products and all of them refer to the fact that their product should be used in addition to daily brushing – and not instead of it.

Intervention intervals

Early in this article, mention was made of proactivity in dental care of small animals.

It is a fact that once calculus forms above the gingiva it will also be present within the gingival sulcus, below the gingival margin. This will cause gingivitis. If the calculus is not removed in a timely fashion, the gingival inflammation will increase in intensity. This will cause the soft tissues to pull away from the tooth surface and allow a periodontal pocket to form.

Gingivitis is reversible once the calculus is removed by an instrument or an ultrasonic scaler during a professional dental procedure (**Figure 8**). To wait or delay this procedure will ultimately lead to more significant dental disease and probable tooth loss.

Summary

Effective dental clinics are a necessary part of any clinic's cradle-to-grave preventive medicine programme. Those providing dental clinics require good 'props' and tools but, most importantly, training, confidence and knowledge, to deliver the message with the best possible visual impact. Consistency of message delivery is very important.

An ability to recognise and improve compliance of home care and, if necessary, source adjunctive treatment is important. Pro-activity in advising professional dental procedures on a timely basis will keep disease levels low and ultimately improve the general health of the pets within the practice (**Figure 9**).

Remember that if both calculus and gingivitis are recognised at any consultation, the owner simply does not possess the tools (a toothbrush, for instance) to solve the problem. To delay treatment, therefore, cannot be wise. ■

Figure 8. *Significant calculus and Grade 1 gingivitis of the upper carnassial – so intervention by the veterinary practice necessary.*

Figure 9. *Clean teeth and healthy gums – the aim for oral health.*

PPD Questions

1. At what Grade of gingivitis on a scale of 0 to 3 does bleeding on probing occur?
2. List the three main constituents of dental plaque.
3. Below what frequency is tooth brushing ineffective?
4. Supragingival or subgingival calculus. Which causes the most significant gingivitis?

Answers
1. grade 2
2. bacteria, food debris, salivary glycoproteins
3. three times weekly
4. subgingival.

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Vicky Halls is a Registered Veterinary Nurse and full member of the Association of Pet Behaviour Counsellors, consulting as a feline specialist. She is an enthusiastic supporter of the charity International Cat Care, working on various behaviour and welfare projects, with a particular interest in the complexity of the modern cat/owner relationship. She is a regular contributor to television, radio and specialist publications, author of a number of bestselling books and co-author of several veterinary textbooks. Vicky is also a qualified person-centred counsellor and registered member of the British Association of Counsellors and Psychotherapists.

**Suggested Personal & Professional Development (PPD)*

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BEHAVIOUR

Changes in behaviour and health as cats age

Improvements in nutrition, veterinary medicine and general care in recent years have increased the average life expectancy of pet cats in the UK. With increasing age come changes to the cat's physiology and susceptibility to particular diseases. These changes inevitably have an impact on behaviour.

A study involving cats from Central and South-East England, between September 2009 and December 2012, looked at mortality rates and found that cross-bred 'moggies' lived for an average of 14 years, compared with purebred cats averaging 12.5 years (**Figure 1**). The average age of death was 14 years with a peak in the number of deaths at 16 years.

Another survey of cats aged seven to 11 years of age revealed that 36 per cent of owners reported behavioural problems in their cats (Landsberg 1998), increasing to 88 per cent in cats between the ages of 16 and 19.

How old is old?

The UK-based cat charity, International Cat Care (icatcare.org), has defined feline ages and life stages. Cats are considered to be elderly once they reach 11 years, with two categories – senior cats (aged 11-14 years) and geriatric cats (aged 15 years and above).

In addition, International Cat Care has also provided guidelines to help owners appreciate their cat's age in human terms (**Table 1**), by using the simple formula [(Cat age - 2) x 4] + 24 = human equivalent age.

Physical effects of ageing

Physiological changes associated with ageing affect the senses – for example, the abilities to smell, taste food and sense thirst decline. As cats lose their craving for fluids, they become more vulnerable to dehydration

"With increasing age come changes to the cat's physiology and susceptibility to particular diseases"

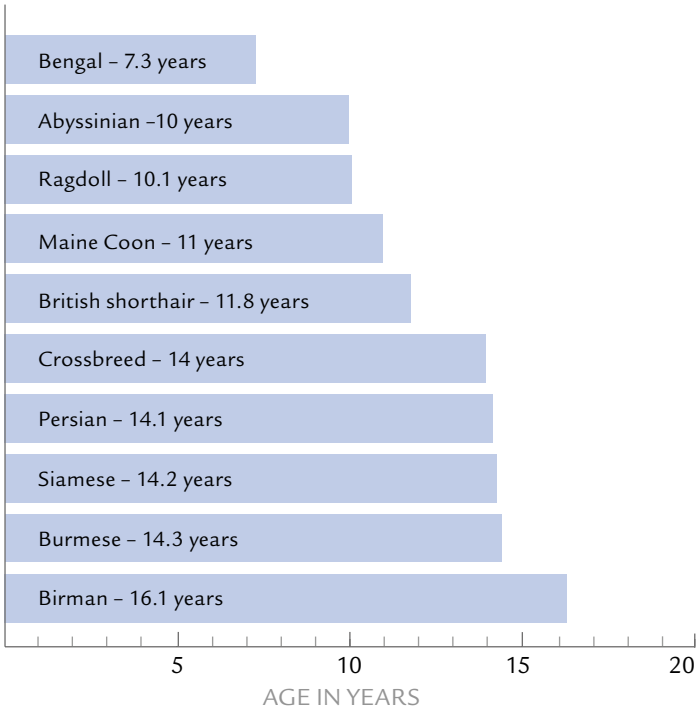

Figure 1. *Average feline life span by breed.*

Age of cat (years)	Equivalent human age (years)
1	15
2	24
3	28
4	32
5	36
6	40
7	44
8	48
9	52
10	56
11	60
12	64
13	68
14	72
15	76
16	80
17	84
18	88
19	92
20	96
21	100

Table 1. Cat-human equivalent age chart (Source: icatcare.org)

Changes in behaviour as cats age compared to when < 11 years	Survey results 1995 (%) [n=1,134 cats]	Survey results 2010-2014 (%) [n=1,581 cats]
Spending less time outside	56	40
Spending more time asleep	not determined	69
House soiling	30	24
Spending less time grooming	25	34
Vocalising or crying for attention	66	52
Vocalising at night	30	30
As sociable or more sociable with people	81	91
More sociable with other animals in the house	24	10
Less sociable with other animals in the home	26	18

Table 2. Behavioural changes associated with ageing in cats (Source: Caney & Halls, 2016)

and the reduction in their senses of taste and smell can cause inappetence and weight loss. Older cats, as a result of this and their less efficient digestion and reduced ability to process fat and protein in their diet, may need to increase their appetite by as much as 25 per cent to maintain bodyweight (Taylor et al, 1995).

A loss of hearing is a common consequence of old age too. Deaf cats typically sleep very soundly, then awake startled when touched. Many also miaow more loudly than previously – their voices sounding like guttural yowls at night, when they wake and may try to attract the attention of their owner or seek comfort.

Changes to the eyes, such as thinning of the iris, iris pigment changes and nuclear sclerosis may occur. Cats are extremely good at adapting to – and compensating for – loss of sight, when it occurs gradually. If sight is lost suddenly, as a consequence of retinal detachment, for example, owing to systemic hypertension, the cat is more likely to be disorientated and distressed. A general decline in an ageing cat's sight may also increase sensitivity to bright light.

Skin loses its elasticity and claws become brittle and remain protracted, getting caught in carpets and furniture. Old cats shed the outer sheaths of their claws less easily, resulting in thickened and overgrown claws that can curl round and get stuck into the toe pad.

There is a general decline in the cat's immune function as it ages and reduced mobility as muscle tone reduces, bone and cartilage quality diminishes and joints become stiff and painful.

Common health problems of the elderly cat

As the cat is a self-reliant species, it is extremely efficient at masking signs of illness and pain. This means that disease is commonly not detected until it is extremely advanced.

There are a large number of illnesses that commonly affect older cats including:

- bowel, liver and pancreatic problems
- brain tumours
- chronic kidney disease (CKD)
- cognitive dysfunction syndrome (CDS)
- constipation
- dental problems
- diabetes mellitus
- hyperthyroidism
- osteoarthritis and mobility problems
- systemic hypertension
- tumours
- urinary tract infections.

Behavioural effects of ageing

As cats age, their behaviour alters too, often as a direct result of the physiological changes taking place or owing to illness – for example polydipsia and polyphagia in cats with diabetes mellitus or a dramatic alteration in an individual's sleep/wake cycle as its cognitive abilities decline with advancing cognitive dysfunction syndrome. Because cats often adapt gradually to these changes, they are rarely apparent to owners who may not be looking for specific signs of ageing.

Behaviour can also change as a result of changes to the cat's emotional or psychological state, including increased dependency, insecurity and a reduced ability to cope with stress and adapt to new situations generally. Common behavioural changes observed in the elderly cat include:

Reduction in...

- hunting
- general activity levels
- time spent outside
- playing
- grooming
- appetite
- adaptability to change.

Increase in...

- sleep
- vocalisation
- dependency on (attachment to) owner.

Alteration in...

- sociability – either more or less social.

The authors of *Caring for an Elderly Cat* (Caney & Halls, 2016) conducted two large-scale surveys of elderly cat behaviour and health in 1995 and between 2010-2014 – in total more than 2,500 owners participated in the research (**Table 2**).

About a third of the cats in the 1995 survey had one or more chronic illness or disability – the most common being chronic kidney disease, osteoarthritis and deafness. Ten per cent of the cats in the 2010-2014 survey were deaf or suffered from loss of hearing.

General warning signs

Early treatment can make a significant difference to the quality of life and longevity of cats affected by a variety of age-related medical conditions. Therefore, vigilance for early signs of ill health is recommended so that an early diagnosis can be made and appropriate treatments started.

Owners should be encouraged to be vigilant for the subtle changes that can be significant and merit veterinary attention, namely:

- bad breath
- balance problems
- change in body condition – 'lumps' or 'bumps'
- change in eating habits – dropping food
- change in urine or faecal output
- difficulty passing urine or faeces
- discharge from eyes, ears or nose
- disorientation or distress
- excessive drinking, drinking more frequently or a larger volume per day
- house soiling – passing urine and/or faeces outside the litter tray
- hyperactivity
- lethargy
- loss of appetite or having a more variable appetite from day to day
- rapid or laboured breathing
- reduced grooming/loss of coat condition
- stiffness, lameness or difficulty in jumping up or down
- uncharacteristic behaviour – hiding, aggression, excessive vocalisation
- weight loss or gain.

Preventive and general care advice

As cats get older they generally find it more difficult to maintain their own cleanliness, so the veterinary team should offer preventive and general care advice to owners about extra TLC items that may need to be carried out as their pets age. Overgrown claws or a matted coat can be extremely uncomfortable, yet easily avoided with some guidance and some additional routines.

Long-haired cats

Long-haired cats are particularly susceptible to the complications of lack of mobility and loss of effective grooming. They may have difficulty in keeping themselves clean and soiling may occur around the anus; and in certain areas, where there is the most movement, the coat may become matted.

Hairballs are a common problem in older cats – hair is swallowed during the grooming process but a sluggish digestive system can delay its normal passage through the gut, causing complications such as chronic vomiting or constipation.

Additional grooming of the elderly cat will often be necessary, with special care being taken over any areas where bones are prominent or less well covered with muscle.

Teeth

It is challenging for owners to open their cat's mouth to inspect its teeth. However, there are numerous indicative signs that they can monitor – such as the presence of any growths, reddening of the gums or evidence of dental disease. Halitosis, drooling, a 'chattering' jaw, loss of appetite and pawing at the mouth may all be signs of dental disease.

Monitoring toilet habits

Owners should be encouraged to check the indoor litter tray for blood in the urine or stools, consistency of stools, and other indicators of disease such as malodorous or bloody urine. The quantity and frequency of urination may also indicate a problem – urinary tract infection, for example – if it changes.

Conclusion

It is important for owners to appreciate that old age is not a disease and that illness is not an inevitable consequence of ageing or cannot be treated.

Quality of life should always be considered as the overriding factor; but cats can experience comfort and good welfare in their latter years with the necessary understanding and early intervention. ■

"Owners should be encouraged to be vigilant for the subtle changes that can be significant and merit veterinary attention"

PPD Questions

1. When referring to a cat's age as equivalent to that of a human, what age would a 12-year-old cat be?
   A. 84 human years
   B. 42 human years
   C. 64 human years
   D. 48 human years

2. Which of the following are considered to be common health problems in the old cat?
   A. hyperthyroidism
   B. urinary tract infections
   C. constipation
   D. all of the above

3. Which of these can be general warning signs for owners of old cats to look out for?
   A. difficulty passing urine or faeces, change in urine or faecal output and house soiling
   B. bad breath, change in eating habits, dropping food, drooling and pawing at the mouth
   C. disorientation, lethargy, reduced grooming and loss of coat condition
   D. all of the above

4. Which of these are common behaviour changes seen in cats as they age?
   A. reduction in hunting
   B. increase in playing
   C. reduction in sleep
   D. all of the above

Answers
1. C 2. D 3. D 4. A

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*Suggested Personal & Professional Development (PPD)

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PHYSIOLOGY & WELFARE

Heatstroke – an avoidable emergency

Although I have worked for many years in emergency services, I am still surprised that the number of Heatstroke patients is so high. We need to question whether there is anything else we can do as animal welfare advocates – beyond producing simple notice boards enlightening clients as to the dangers, prevalence, significance and prevention of the condition.

By the time heatstroke cases are presented to the veterinary surgery, significant fluid loss is invariably evident. Prognosis is usually guarded too, because affected animals are commonly experiencing systemic inflammatory response syndrome or multiple organ dysfunction syndrome.

A study completed by Smarick (2009) concluded that half to a quarter of heatstroke patients die. According to one study into heat-induced illness in dogs (Vets Now, 2017), those actively cooled before arriving at the veterinary practice had a lower mortality rate (19%) than those not cooled prior to arrival (49%).

Heatstroke

Heatstroke is the term applied when the animal has an internal body temperature greater than 41°C (Smarick, 2009). It needs to be understood that there is a clear difference between sepsis-induced pyrexia and heatstroke – mainly defined by the physiological effects of the heatstroke.

There are two different classifications of heatstroke: exertional heatstroke and non-exertional heatstroke.

Exertional heatstroke

This is commonly seen after extremely strenuous exercise – cases I have experienced have been in individual dogs following 'lamping', for example. However, it is more often the consequence of owner ignorance – those people who think that it is a lovely idea on hot days to take their dogs to the seaside (**Figure 1**) or to the park for a picnic with the family.

Figure 1. *Heatstroke is often the consequence of owner ignorance with respect to exercise and how dogs keep cool in hot weather.*

Figure 2. *Even the provision of drinking water may be insufficient to prevent heatstroke on very hot days.*

The owners commonly take balls or toys along and encourage their dogs to run, to chase around and have "lots of fun". They may even be provided with water by their owners (**Figure 2**). But this is not enough, because the dogs will be unable to reduce their temperature significantly unless they are in the shade and have access to water – as at the seaside – in which to submerse their whole body.

Dogs are not used to the elevated temperatures either, requiring approximately 60 days to acclimatise to an increase in environmental temperature (Vets Now, 2017).

Non-exertional heatstroke

This is most frequently seen in dogs left in cars on a hot day – even for as short a period as just 10 minutes, with the windows open. This form of heatstroke can also be the result of taking a dog to the

park for extended periods of time in the heat with no shade and limited drinking water.

Physiological aspects

Smarick (2009) describes heatstroke as hyperthermia associated with systemic inflammatory response syndrome leading to multiple organ dysfunction syndrome, if not treated – or if presented for treatment too late.

To fully understand the animal's body reaction to heatstroke, the physiology of thermoregulation must be understood.

Thermoregulation is controlled by the hypothalamus. It responds to the temperature rise as detected by special cells from the blood stream and tissues by means of a negative feedback loop (**Figure 3**).

The body responds to the rise in temperature by stimulating different cooling methods:

- increased panting (dogs)
- sweating through the foot pads (cats).

These methods are only effective if the animal has not reached too high a temperature and has started to show signs of systemic inflammatory response syndrome.

Some specific breeds of dogs struggle to pant effectively or cool their bodies down – brachycephalic breeds, such as pugs, are a prime example; thick-coated breeds, such as huskies; or brachycephalic dogs with laryngeal hyperplasia and/or paralysis (Smarick, 2009).

The animal also has significant internal protective mechanisms that will start responding and will cause a release of proteins. If its temperature is too high, these internal mechanisms may also fail and will result in cell death. This, in turn will cause a rise of lactate in the blood.

If they have already sought veterinary advice, the owners may have commenced cooling methods prior to arrival at the veterinary practice. If not, then emergency cooling methods will need to take priority. Even if the owners have started the process, the animal will probably still require emergency treatment – the reason being that if the individual's temperature has been significantly high for a period of time, then it may have already started to develop other internal disorders.

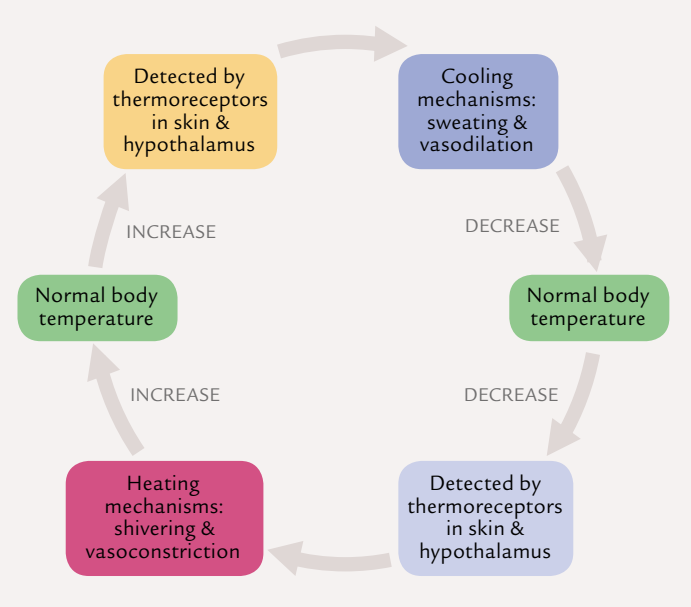

Figure 3. *Thermoregulation is controlled by the hypothalamus.*

In any event, triage should be completed straight away, bearing in mind that key signs of heatstroke are:

- excessive panting
- excitability, and an inability to settle
- elevated body temperature
- hypersalivation
- tachycardia/tachypnoea
- 'glassy' eyes
- darker coloured mucous membranes – possibly purple, blue or red
- petechial haemorrhage
- collapse
- seizures
- unconsciousness.

Emergency treatment

This starts with the safe, controlled lowering of the patient's body temperature – hopefully already commenced by the owners following advice given prior to presentation at the veterinary surgery.

There are several recognised methods of reducing the body temperature:

- placing the animal directly on stainless steel surfaces of kennels
- putting the animal on intravenous fluid therapy – this should be at room temperature, not chilled, because this can cause pain on administration, vasospasm and vasoconstriction (Tobin, 2011).
- putting cold water on the animal and then directing fans towards it – being careful not to dry out the eye (Helman and Habel, 2017).
- ice packs can be placed on clear skin surfaces, such as the abdomen – these must be wrapped in towels or cloth as they may otherwise cause cold burns.

Whatever method(s) are used, it is very important to cool the patient slowly because sudden changes in body temperature can result in the animal going into shock.

Nursing considerations

The patient will need regular monitoring during the concurrent cooling methods – including rectal temperatures taken every five minutes, along with checking vital signs. The veterinary surgeon will discuss a suitable temperature at which to stop cooling the patient, because rebound hypothermia can occur.

The patient will also be suffering some degree of shock, so shock management protocols must be in place, including intravenous fluid therapy. It is important that the individual's fluid deficit – along with ongoing losses – is accounted for.

The patient will require a full blood profile with a focus on coagulation to monitor for disseminated intravascular coagulation. There will also be a need for renal and hepatic profiles to monitor for any damage from the dehydration deficit.

Heatstroke patients will commonly be suffering respiratory distress and, therefore, may require oxygen supplementation. This could be provided by humidified nasal prongs/catheter or flow by oxygen. Oxygen tents should *not* be used, because they can result in increased body temperatures. In unconscious animals, there should be consideration of endotracheal intubation.

The patient may be an emergency case, but standard nursing protocols must not be forgotten. Completion of a nursing care plan will ensure all the nursing needs of the patient are met; so during the nursing procedure, veterinary nurses should try and reduce the patient's exposure to stress because increased stress can result in a higher body temperature. The patient may become recumbent so recumbency nursing will need to be considered too.

Urine production should be monitored to assess renal function, as a reduced urine output could indicate renal damage. This is best completed using a urinary catheter with a collection bag and will require nursing care to ensure reduced exposures to infection.

The patient will require intravenous catheter care with changes of cannula as required and any key signs of phlebitis or infection will require a move to an alternative site. There will be a need to monitor closely for over-infusion of fluid. This can present with bubbling from the nose, coughing and fluid may be heard on auscultation of the lungs. There will be a requirement for some form of analgesia, although non-steroidal anti-inflammatories (NSAIDs) are not recommended owing to the state of shock, and the gastro-intestinal status of the animal.

The patient will require intensive nursing care for possible coagulopathies, renal damage and resulting gastrointestinal disorders.

The owner will also need support – not only at the initial telephone call or the start of the treatment, but also throughout therapy because the chances of mortality are high. They may require emotional support as they may be suffering from guilt and regret.

Conclusion

Heatstroke is an emergency disorder that could be reduced by thorough owner education. It is beneficial to have a notice board in the waiting room educating the owners on how to manage their animals on hot days (**Figure 4**). As advocates of animal welfare, veterinary nurses should make this a priority. ■

- reduce outdoor exercise on hot days or take your pet out when the temperatures are lower
- walk your dog early in the morning or late at night to avoid the warmest part of the day
- NEVER leave animals in a parked car in direct sunlight – whatever the length of time – or on warm days even when there is cloud cover
- NEVER leave animals in hot rooms, such as a conservatory or even a tent, for long periods of time
- research places to exercise your pets when taking them on days out – some educational parks now have areas to keep your pets cool
- avoid long car journeys, if possible – if not, ensure you either have air conditioning on or windows are open to circulate the air
- spray your dog with cool water or hose him – if you have a paddling pool allow him to use this to keep cool.

Figure 4. *Advice to clients on preventing heatstroke.*

PPD Questions

1. What is the approximate death rate in cases of heatstroke?
   A. 10-15%
   B. 20-30%
   C. 25-50%
   D. 60%

2. How long can dogs take to acclimatise to a new temperature?
   A. 10 days
   B. 20 days
   C. 40 days
   D. 60 days

3. Why are oxygen tents/cages not the most suitable to deal with heatstrokes?
   A. size of the patient
   B. increased heat in enclosure
   C. not effective method for oxygen support
   D. size of the tent itself

4. What is the normal urinary output for dogs?
   A. 1-2ml/kg/hr
   B. 2-4ml/kg/hr
   C. 3-4ml/kg/hr
   D. 5-6ml/kg/hr

5. Chilled intravenous fluid therapy should be avoided because it can induce:
   A. shock
   B. vasospasm and vasoconstriction
   C. vasodilation
   D. phlebitis

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

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In 2012, Paula achieved her Veterinary Technician Specialist (VTS) Anaesthesia and Analgesia accreditation, and currently serves on the AVTA examination committee. In July 2016, she joined Manchester Veterinary Specialists working as a senior surgical nurse. Paula has been a guest speaker at the BSAVA Congress and the London Vet Show.

*Suggested Personal & Professional Development (PPD)

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ANAESTHESIA

Age is just a number – physiological characteristics in paediatric small animals

Anaesthetic management of paediatric patients may prove challenging – the aim being to resemble homeostasis. General anaesthesia has profound effects on the bodies of cats and dogs; so having a knowledge and understanding of their normal physiological functions and what makes anaesthesia in paediatric patients different to that of adult patients is vital to prevent unnecessary harm.

It is important that each individual patient is considered on a unique basis, which should, hopefully, avoid automatic selection and support the provision of safe anaesthesia. Based on the American Animal Hospital Association guidelines, the term paediatric refers to puppies and kittens that are less than six months old.

Cardiovascular system

The neonatal heart is poorly compliant with a low myocardial contractile mass, reduced ventricular compliance and, in effect, a fixed stroke volume. The resting cardiac index is also high, which means there is little in reserve to respond to physiological changes.

Sympathetic innervation is underdeveloped and so, again, the ability to respond to changes in heart rate and blood pressure to maintain homeostasis is limited. Parasympathetic innervation is mature from birth; so in the presence of hypothermia, hypoglycaemia or certain drugs these patients may experience episodes of bradycardia and hypotension owing to the parasympathetic dominance (Dugdale, 2010).

Along with that, baroreceptor reflexes in the aortic arch and carotid sinus lack the ability to respond to major changes in blood pressure. With a limited cardiovascular reserve, altered anaesthetic requirements and exaggerated hypotensive responses during general anaesthesia, the monitoring of systemic blood pressure is made all the more important.

Respiratory system

Puppies especially have a large tongue in comparison to the smaller oropharyngeal cavity and there is the potential for airway obstruction following administration of sedative or anaesthetic drugs. It can prove challenging to intubate the trachea, as it is very narrow and the tracheal rings are quite flexible. The procedure should be performed gently and with as little force as possible to avoid trauma (Hartsfield, 2007).

Oxygen demand and consumption is high throughout a paediatric's normal, increased – yet less efficient – workload of breathing. These patients demonstrate a sinusoidal respiratory pattern, showing little to no end expiratory pause. Pulmonary functional reserve is minimal and so hypoxia can occur during airway obstruction or apnoea and a small functional residual capacity predisposes them to atelectasis.

Paediatric patients demonstrate a high minute volume as the resting metabolic rate and demand for oxygen is already high. The neonatal rib cage is compliant but weak intercostal muscles are easily subject to fatigue; and immature respiratory chemoreceptors mean they are less sensitive to changes in oxygen and carbon dioxide levels.

When using capnography, the exhaled carbon dioxide concentrations may be diluted owing to the small tidal volume and high inspired fresh gas flow rates, producing falsely low end tidal carbon dioxide values. End tidal carbon dioxide monitoring is a valuable adjunct for verification of correct endotracheal tube placement (Fletcher et al, 2012)

Renal function and fluid balance

Glomerular filtration matures a few weeks after birth, so initially these patients are less able to concentrate urine and cannot tolerate large volumes of fluid (Dugdale, 2010). Current fluid therapy guidelines recommend an initial anaesthetic rate of 5ml/kg/hr in dogs and 3ml/kg/hr in cats (Davis et al, 2013) to support haemodynamic changes under anaesthesia; however, care should be taken to avoid acute fluid loads especially, or else they will struggle to excrete water and regulate electrolytes (Rigotti and Brearley, 2016).

Drugs dependant on renal excretion may have a prolonged period of activity

"As with most patients under anaesthesia, neonatal and paediatric patients are particularly vulnerable to anaesthesia-induced hypothermia"

and so this should be taken into consideration when devising an anaesthetic plan. Total body water percentage is greater too, which will alter the volume of distribution of some drugs and adult albumin levels are not reached for several weeks meaning that a greater free active portion of protein-bound drugs could potentially lead to overdosing.

Hepatic system

Functional maturity of the liver is incomplete, which means that metabolism and excretion pathways are immature, affecting drug elimination (Pettifer and Grubb, 2007). The ability to metabolise will increase as hepatic blood flow increases. Increased sensitivity to drugs can manifest in exaggerated responses or prolonged duration of action, so consider adjusting doses accordingly or maybe altering dose intervals. Also consider whether any of the drugs administered may be antagonised.

Another concern is that the mechanism to maintain blood glucose is poor. These paediatric patients already have limited glycogen stores (Rigotti and Brearley, 2016) – then adding to that a stressful event, such as anaesthesia, a potential period of fasting, and their already high metabolic rate will inevitably exhaust those levels. Blood glucose should be monitored routinely throughout the perioperative period so that any periods of hypoglycaemia can be detected and treated accordingly.

Gastrointestinal system

The lower oesophageal sphincter is weak and so our concerns would be if the patient were to regurgitate and aspirate gastric fluid (Rigotti and Brearley, 2016). This highlights nicely the importance of endotracheal intubation. We should also consider the position of the patient upon induction. Ideally the patient should be in sternal recumbency with the head higher than the body, and we should have suction readily available.

Additional considerations

Handling

Another point to consider is the attention given to handling these patients. Laxity of ligaments and separated growth plates puts them at risk of joint displacement – in dogs, most growth plates close between four and 12 months and physeal closure in cats is usually complete between seven to nine months (Pfeil and DeCamp, 2009).

As is the case when we consider our geriatric patients, paediatrics should be placed on soft padded surfaces and their joints should retain their natural position.

Hypothermia

As with most patients under anaesthesia, neonatal and paediatric patients are particularly vulnerable to anaesthesia-induced hypothermia (**Figure 1**). This results from impairment of the central thermoregulatory control mechanism, together with an already immature thermoregulation system that is, furthermore, affected by anaesthetic drugs, low ambient temperatures, exposed skin or an open body cavity.

Figure 1. *The use of a paediatric incubator to recover a 12-week-old pug following anaesthesia.*

Figure 2. *Illustrating the use of a cushioned heat source and soft positioning aids on a three-month-old puppy under sedation for radiography.*

Increased fresh gas flow rates will also contribute to hypothermia because the heat energy the patient uses in warming up the cold gases will reduce body temperature (**Figure 2**). Paediatric patients have a large surface area-to-mass ratio and little subcutaneous insulating fat. Their ability to vasoconstrict and conserve heat is altered and the mechanism for the process of heat production is immature. Hypothermia is also a complication of hypoglycaemia.

Adverse effects can include altered drug responses, prolonged recoveries, and cardiac irritability, along with respiratory depression, impaired wound healing from poor perfusion and oxygenation, reduction in metabolic rate and a reduction in minimum alveolar concentration requirements.

To resemble homeostasis, we should be looking at maintaining normothermia as soon as possible, and this can be achieved by pre-warming the patient. This works by warming the periphery so that once induction of anaesthesia has taken place – when we would usually see a drop in core temperature – pre-warming will reduce the gradient for which the core temperature will need

Factor	Effect
↑ Body water	Alter volume of redistribution
Hypoalbuminemia	Free active portion of protein bound drugs
↓ Body fat %	↓ fat tissue for redistribution
↑↑ BBB permeability	↓ % drugs reaching the brain
Immature hepatic metabolism	Alters duration/effect of drugs
Immature GFR	Delayed termination of drugs
↑ Metabolic rate/O_2 demand	Effects uptake of inhalant gases

Table 1. Summary of pharmacological considerations

to compensate (Poveda et al, 2013). Pre-warming can begin from the time that premedication is administered – or even earlier.

Pharmacological considerations

The following are key pharmacological factors that need to be taken into account when anaesthetising paediatric patients (**Table 1**):

- a high total body water percentage will alter the volume of redistribution of some drugs
- hypoalbuminemia results in a greater free active portion of protein-bound drugs – barbiturates, ketamine and the non-steroidal anti-inflammatory drugs, for example – be familiar with drug doses and titrate to effect
- low body fat percentage means there is a small adipose tissue compartment for drug redistribution
- increased blood-brain barrier permeability which will allow for a greater percentage of drugs to reach the brain
- immature hepatic metabolism, manifesting in prolonged drug metabolism, altering the duration of effect of some drugs
- immature glomerular filtration rates means that termination of drugs through excretion is delayed
- a high metabolic rate, with a high oxygen demand and consumption, will affect the uptake of inhalant anaesthetics.

Summary

Age is an important, independent risk factor of morbidity and mortality (Brodbelt, 2007). So, with paediatric animals having their own functional differences – and their characteristics being more distinct the younger they are – it makes monitoring vital signs and organ function during the perioperative period particularly important because of the limited physiological reserves these patients possess. ■

PPD Questions

1. Paediatric patients demonstrate a:
   A. low minute volume
   B. high tidal volume
   C. high minute volume
   D. low respiratory rate

2. Paediatric patients have a limited stroke volume (SV), therefore cardiac output, (CO) is dependent on:
   A. mean arterial pressure
   B. heart rate
   C. preload
   D. systolic arterial pressure

3. Owing to their mature parasympathetic innervation, what episodes might these patients experience under general anaesthesia?
   A. bradycardia and hypotension
   B. tachycardia and hypotension
   C. bradycardia and hypertension
   D. tachycardia and hypertension

Answers
1. C 2. B 3. A

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Cardiac emergencies in the dog and cat

The clinical presentation of the veterinary patient with cardiac disease can be varied, non-specific and unique to their species. Common presentations of the cardiac emergency are collapse and/or respiratory distress, both of which could be mistaken for disorders of other body systems.

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Heart failure refers to the inability of the heart to meet the metabolic needs of the body (Silverstein & Hopper, 2015). The ensuing clinical signs are generally a consequence of either reduced cardiac output or congestion – often a combination of both (**Table 1**).

Systemic changes secondary to heart disease can be broken into the stages of acute and chronic – the former occurs within seconds to minutes involving the sympathetic nervous system (SNS) and the latter, known as compensated heart failure, is a consequence of the renin-angiotensin aldosterone system (RAAS) (Hall, 2011).

Activation of the SNS leads to increased cardiac output, elevated heart rate and increased blood flow to major organs, which over time results in increased myocardial oxygen demand and persistent tachycardia. Activation of the RAAS leads to maladaptive myocardial and vascular remodelling, as well as fluid retention (Silverstein & Hopper, 2015).

Diagnostic tests for the emergency cardiac patient

A thorough history and physical examination is paramount to allow early decision-making regarding therapy. Important questions can be answered through a history (signalment, history of cough, breathing difficulties, collapse, seizures, weakness, weight loss) and complete physical examination (ascites, cyanosis, observation of breathing pattern, head position, tracheal and thoracic palpation, femoral pulses) (Gompf, 2008).

A visual check of the patient will enable an assessment of respiration to assist disease localisation if abnormalities in breathing present, and nasal or ocular discharge may be consistent with left failure (serous) or non-cardiac causes of respiratory signs.

Auscultation

Factors to be considered during thoracic auscultation include:

- is there a murmur or arrhythmia – note the grade of the murmur, is the arrhythmia regular or irregular?
- are the cardiac sounds reduced – fluid in pericardial space, fluid in pleural space or displaced heart?
- are respiratory noises heard in all fields – reduced by pleural fluid, absent owing to pneumothorax, impaired through consolidation or mass effect, increased by turbulence in airway, or crackles consistent with pulmonary oedema or consolidation?
- are pulses palpable – absent because of arterial thromboembolism [ATE], reduced or absent as a result of arrhythmia, hypoperfusion/obstructive shock or ATE, asymmetrical caused by ATE, or asynchronous resulting from arrhythmia?

A common error in the management of the emergency cardiac case is the pursuit of diagnostic tests in the unstable patient. It is acceptable to delay diagnostic procedures until the patient is more stable, even if this is not until the clinical signs have resolved.

Electrocardiogram (ECG)

Monitoring of both heart rate and rhythm is necessary in the emergency patient, regardless of underlying disease. Cardiac arrhythmias vary in their significance and must be interpreted in conjunction with both a detailed history and thorough physical examination because not all arrhythmias necessitate intervention.

For example, sinus tachycardia of 180 beats per minute in a Labrador retriever with a history of haematochezia and haematemesis is significant, but not likely to be cardiac in origin; whereas, ventricular tachycardia of 165 beats per minute in a Doberman pinscher with a history of

Table 1. Clinical signs of heart failure (Silverstein & Hopper, 2015)

Physical examination findings related to reduced cardiac output	Physical examination findings related to congestive heart failure
depressed mentation	pulmonary oedema
weakness	pleural effusion
lethargy	ascites
hypothermia	

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Figure 1. *An example of ventricular tachycardia.*

collapse may point more to a cardiac emergency.

Without an ECG, however, the clinician would be unaware that the Labrador retriever has a sinus tachycardia probably caused by hypovolaemic shock requiring aggressive fluid therapy; and the Doberman pinscher has ventricular tachycardia requiring urgent anti-arrhythmic therapy (**Figure 1**).

Telemetry units can be useful not just for the large patient but also to capture the ECG associated with a particular clinical event (**Figures 2** & **3**).

Once the ECG is obtained, what questions need to be answered to decide if intervention of an arrhythmia is required? The following guidelines will be of assistance:

- signalment of the patient
- what is the heart rate?
- is there a P-wave for every QRS complex?
- is there a QRS complex for every P-wave?
- other distinguishing features:

(a) response to vagal manoeuvre (only supraventricular tachycardia would)
(b) width of the QRS
(c) QRS fusion beats are pathognomonic for VT
(d) are there clinical signs (such as collapse or syncope) associated with the arrhythmia?
(e) does the patient have evidence of a non-cardiac cause of its clinical signs – meaning focus should be on managing the underlying cause?

Thoracic radiographs

A common pitfall is the urge to perform radiographs in the patient with respiratory distress at presentation, when the patient is the most unstable. These should be withheld in the unstable patient and therapy initiated based on history, examination and other diagnostic aids requiring less intervention. Expected changes on thoracic radiographs in heart failure include (Gompf, 2008):

- enlarged cardiac silhouette (also see dorsally displaced trachea, displaced auricular appendage in left atrial enlargement)
- venous congestion
- alveolar consolidation of hilar and caudal lung lobes (pulmonary oedema)
- other changes in cardiac disease – such as pleural effusion and globoid heart (pericardial effusion or dilated cardiomyopathy)

Echocardiogram

A complete echocardiogram is often not indicated in the emergency setting; however, two measurements can be useful to the emergency clinician.

The left atrium : aorta ratio[LA:Ao] has a normal range in cats of 0.8-1.3 and in dogs <1.5). This measurement requires a two-dimensional, short-axis view at the level of the left atrium (Burkitt and Davis, 2012). An increase in the LA:Ao is consistent with fluid overload and would support the use of diuretics.

Fractional shortening is a measurement of myocardial contractility and myocardial failure (per cent values less than 25% are abnormal). This measurement requires a short-axis view of the right parasternal window, both two-dimensional short-axis view and M-mode (Burkitt and Davis, 2012) and evaluates left ventricle function by measuring the diameter of the left ventricle during contraction and relaxation.

Other factors to consider include blood pressure – normal ranges (Silverstein & Hopper, 2015) in dogs being systolic 150^{+}/-20mmHg, diastolic 85^{+}/-10mmHg, with

Figure 2. *A 3-Lead Holter monitor with electrodes placed on the dog's thoracic cavity.*

Figure 3. *The same dog (as in Figure 2) with 3-Lead Holter monitor attached.*

a mean of 105+/-10mmHg; and in cats, systolic 125+/-10mmHg, diastolic 90+/-10mmHg, and a mean of 105+/-10mmHg.

Blood gas analysis is useful to evaluate oxygenation and acid/base status; and cardiac biomarkers are naturally occurring substances used to identify cardiac disease. Examples of these biomarkers include cardiac troponin, endothelin and natriuretic peptides and these can be used to detect myocardial ischaemia and necrosis (Shaw et al, 2004); to differentiate between cardiac and non-cardiac causes of respiratory distress (Payne et al, 2011); to differentiate between neoplastic and idiopathic causes of pericardial effusion (Shaw et al, 2004); and to differentiate between cardiac and non-cardiac causes of pleural effusion (Hezzell et al, 2016).

The negative aspects of cardiac biomarkers are their lack of availability to the emergency clinician and their elevations in non-cardiac disease (such as gastric-dilation volvulus and sepsis); so elevations must be interpreted with caution.

Pericardial effusion

The pericardial space is a potential space that is clinically relevant only when it accumulates with fluid. The most common cause of pericardial space disease is haemorrhage from a bleeding tumour with haemangiosarcoma (right atrial) over-represented. Other causes include chemodectoma, lymphoma, pericarditis, idiopathic and coagulopathies.

Cardiac tamponade causes clinical signs of obstructive shock owing to higher intrapericardial pressures compared to right intracardiac pressure (Burkitt and Davis, 2012). This appears echocardiographically as right atrial and right ventricle collapse. Patients with cardiac tamponade or pericardial effusion without tamponade – but clinical signs of collapse or reduced cardiac output – require pericardiocentesis.

A thorough history is pertinent prior to this procedure as contraindications to pericardiocentesis may include coagulopathy and atrial rupture owing to mitral valve disease with severe left atrial dilation.

Cardiogenic shock

Cardiogenic shock is defined as impaired cellular metabolism owing to cardiac dysfunction, despite adequate intravascular volume (Silverstein & Hopper, 2015) with clinical signs consistent with hypoperfusion, including impaired perfusion parameters, with or without concurrent signs of forward failure. Cardiogenic shock comes with a poor prognosis where management must include early diagnosis and aggressive treatment of the underlying cause and pharmacologic support of impaired cardiac output.

Feline arterial thromboembolism (FATE)

Cats with myocardial disease are more inclined to develop FATE (Silverstein & Hopper, 2015), which is associated with a guarded prognosis. A recent study of 250 cats with FATE by Borgeat et al found that of those cats treated, the median survival was 94 days, with one cat alive 12 months after presentation (Borgeat et al, 2014).

This study found factors associated with a poor prognosis included hypothermia and failure to receive prophylactic anti-thrombotic medication. Other studies have cited more than two limbs affected – absence of motor function, hyperphosphataemia, congestive heart failure at presentation and bradycardia were associated with a worse prognosis (Smith et al 2003, Moore et al, 2000).

Multiple therapies exist, such as surgical or catheter thrombectomy or fibrinolytic drugs. However, conservative medical therapy has been found to be as effective (Silverstein & Hopper, 2015).

Important first steps for management of the FATE cat are both analgesia and management of heart failure. Regarding the use of anticoagulants, there is no proven benefit for the use of unfractionated heparin

Table 2. Summary of drugs that are useful in the cardiac emergency

Drug	Dose	Mechanism of action
Frusemide	0.5-4mg/kg IV/IM/SC/PO to effect (maximum 8 doses) or CRI 2-15mcg/kg/min	Loop diuretic that acts on the thick ascending limb of the loop of Henle
Spironolactone	Dog: 1-4mg/kg PO q12-24h	Potassium-sparing aldosterone antagonist diuretic that acts on the late distal tubule and collecting duct
Sodium nitroprusside	Dog: 1-15mcg/kg/min	Produces nitric oxide in vascular smooth muscle and acts as a direct vasodilator
Dobutamine	Dog: 2.5-20mcg/kg/min Cat: 2-10mcg/kg/min	Synthetic catecholamine that stimulates 1-adrenergic receptors increasing myocardial contractility
Pimobendan	Dog: 0.25-0.3mg/kg q12h Cat: 1.25mg/cat q12h (anecdotal)	Balanced ionodilator acting as a positive inotrope and vasodilator
Amlodipine	Dog: 0.01-1.5mg/kg q12-24h Cat: 0.625mg/cat q24h	Calcium channel blocker that acts on vascular smooth muscle
Clopidogrel	Dog: 1mg/kg PO q24h Cat: 18.75mg/cat PO q24h	Irreversibly binds to platelet receptor P2Y12 and interferes with platelet aggregation
Acetylsalicylic acid (aspirin)	Dog: 5mg/kg PO q24h Cat: 5mg/kg PO q48h	Inhibits platelet cyclooxygenase, thereby preventing thromboxane generation

over low molecular weight heparin; but the failure to use aspirin or clopidogrel – or both – is associated with a poor outcome (Borgeat et al, 2014), with a clear benefit seen with the use of clopidogrel based upon the FAT CAT study. This study found that in feline patients with a previous history of ATE, the use of clopidogrel over aspirin was associated with a longer survival and longer time to repeat thrombus (Hogan, 2015).

Monitoring must include renal status and potassium for re-perfusion injury. Changes often seen in echocardiography, consistent with ATE, include dilated left atrium and spontaneous echo-contrast (**Figure 4**) and, occasionally, thrombus within a cardiac chamber.

Table 2 summarises drugs that are useful in the cardiac emergency, including their mechanism of action and doses (Silverstein & Hopper, 2015; Gordon & Kittleson, 2008). This list is not exhaustive as it is beyond the scope of this article and the author recommends *Small Animal Clinical Pharmacology* (Maddison JE et al, 2008) for a more in-depth discussion and for further information regarding cardiac pharmacology. ■

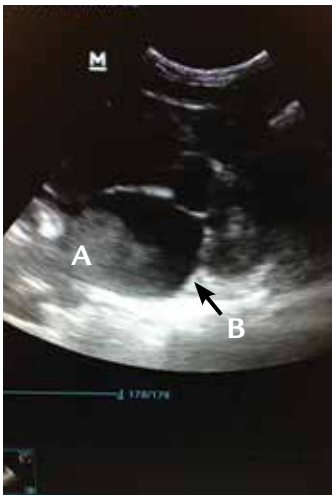

Figure 4. *Echocardiographic short axis view of the left atrium revealing spontaneous echo contrast (A) within a dilated left atrium (B).*

PPD Questions

1. Which of the following has not been shown to be associated with a worse prognosis in feline arterial thromboembolism?
   A. hypothermia
   B. failure to receive prophylactic anti-thrombotic medication
   C. tachycardia
   D. congestive heart failure

2. What is the mechanism of action of dobutamine?

3. The normal LA:Ao for cats, found via a short-axis view of the left atrium is:
   A. 0.3-0.8
   B. <1.2
   C. 1-1.5
   D. 0.8-1.3

Answers
1. C – bradycardia is associated with a worse prognosis, not tachycardia
2. Dobutamine is a synthetic catecholamine that stimulates 1-adrenergic receptors into increasing myocardial contractility
3. D.

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POISONS

Summer breaks – with pets, without problems

Whether it be odd days out during the summer months or owners taking their pets with them on UK-based holidays, the ever-inquisitive dog – and sometimes cat – will find a whole new range of things to investigate during this time.

Adders

One of the summer 'staples' at the Veterinary Poisons Information Service (VPIS) is enquiries regarding adder bites – in 2016, we were consulted on 101 cases, the majority of which were dogs that had been bitten.

The European adder, *Vipera berus berus*, is the only venomous snake native to the UK. Commonly found on dry, sandy heaths, sand dunes, rocky hillsides, moorlands and woodland edges, it may be that owners who are on holiday in that area are unaware of its presence. It is not an aggressive species, but will attack if it feels threatened; and it is telling that dogs and boys of all ages – with or without sticks – are generally the two categories most often involved.

Not all bites result in envenomation, so there may be cases where a yelp is heard, the adder is seen, puncture marks are observed on the skin but no clinical signs develop. However, a common picture when a bite has occurred, is a dog that is in pain, lethargic, hyperthermic and hypersalivating with the presence of oedema that may or may not spread extensively.

The venom is a complex mixture of high molecular weight proteins – mainly proteases, peptide hydrolases, hyaluronidase and phospholipases (Siigur et al, 1979; Calderón et al, 1993; Samel et al, 2006).

Hypovolaemia and local oedema result from an increase in vascular permeability – caused initially by the release of pharmacologically active substances, such as histamine, serotonin, bradykinin and prostaglandins; and, later, as the direct result of venom on the heart and blood vessels. Local haemorrhage is, however, rare and usually a consequence of cytolytic and haemolytic factors.

Cardiac effects may result from impaired circulation and poor perfusion of the myocardium, owing to coronary spasm and hypovolaemia (Pelander et al, 2010). Renal impairment may be caused by hypovolaemic shock.

All symptomatic dogs develop local effects. Localised painful swelling may occur within minutes of the bite and in most cases is present within two hours – in VPIS cases it was sometimes up to six hours. If the bite is to the face, then the swelling may affect the animal's ability to eat and drink and to thermoregulate. Without the antivenom, swelling will persist at 24 hours and may increase (Lervik et al, 2010) – indeed, the swelling can last several days.

Raised blood levels of creatinine kinase (CK) may occur as a consequence of muscle damage, but there is no correlation between the degree of swelling and the CK value (Lervik et al, 2010). Necrosis is rare (<3% of VPIS cases).

Systemic effects can occur in about two hirds of dogs (VPIS data). Shock, collapse and hypotension may occur rapidly (<10% of VPIS cases). Other typical signs include mental status changes, varying from lethargy and depression to coma; there may also be, pain, tachycardia, hyperthermia, bruising, pale mucous membranes, hypersalivation, vomiting, panting, tachypnoea and lameness. Respiratory distress occurs occasionally (<2% of VPIS cases). Coagulopathy, renal, hepatic and cardiac effects may also occur.

It is important that the owner does not interfere with the bite site in an attempt to remove the venom, or apply a tourniquet – these measures could introduce infection, aggravate bleeding and restrict circulation.

Any animal with clinical effects should be observed for at least 12 hours, with intravenous fluids and antivenom (if applicable) being the main treatments. In addition, there should be full monitoring of vital signs and, if possible, ECG monitoring on admission, and at 12 and 24 hours.

"It is not an aggressive species, but will attack if it feels threatened; and it is telling that dogs and boys of all ages – with or without sticks – are generally the two categories most often involved"

We would recommend the administration of antivenom in the following situations:

- all cases where the bite was to the facial region, because severe swelling may impair thermoregulation
- all cases where the swelling is significant or has spread beyond the next major joint proximal to the bite
- any animal with hypotension unresponsive to intravenous fluid therapy
- any animal with evidence of coagulopathy
- any animal with an ECG abnormality.

For maximum effect, it should be given as soon as possible – although for animals with systemic effects, there will be a beneficial effect even when it is given days after the bite.

Analgesia should definitely be provided – preferably opioid rather than non-steroidal because of the risk of renal impairment after adder envenomation.

Routine use of an antibiotic is not required as infection is not common. In a review of 53 cases of canine adder bite, 19 per cent received antibiotics but none developed signs of infection (Lervik et al, 2010). A prophylactic broad-spectrum antibiotic should be considered, however, in any dog with widespread necrosis.

There are no studies evaluating the effect of antihistamines, such as chlorphenamine, on the outcome of adder bite in dogs. They have been used in many cases and are theoretically of benefit because the venom causes a release of endogenous histamine. Antihistamines also have a sedating effect that may be beneficial.

Although frequently used, there is no role for steroids in the treatment of adder bites in dogs – except in rare cases of anaphylactic reactions to antivenom (Warrell, 2011).

Vipera berus berus.

Jelly fish – dead or alive – seem to hold a fascination for dogs.

The initial swelling is not an inflammatory response but the result of the cytotoxic effect of the venom. Steroids can also slow and diminish the response to antivenom and increase the risk of infection. Steroids must *not* be given when antivenom is used.

Jelly fish

Staying on the venomous creatures theme, jelly fish – dead or alive – seem to hold a fascination for dogs, so owners should be aware of the potential risk when a visit to the beach is in the offing. The nematocysts in the tentacles will continue to fire even when the jelly fish is dead, and will cause pain and swelling when they come into contact with the skin or mucous membranes.

Over the past 25 years, the VPIS has received 182 cases of dogs exposed to jelly fish, and the most commonly reported clinical effects – seen in more than 80 per cent of dogs – are skin and buccal irritation, vomiting and diarrhoea.

Treatment of oral exposure is essentially supportive with analgesia, antihistamines and steroids and, when skin exposure occurs – less common in dogs than humans owing to their fur – the following protocol can be followed:

- remaining tentacles should be pulled off the skin (not rubbed off) with a towel or stick; with care being taken not to expose the rescuer/carer
- the area should be irrigated with seawater not fresh water
- the area must not be rubbed with sand
- a number of chemicals have been used (alcohol, meat tenderiser, ammonia, baking soda) but are not recommended because they may cause further discharge of the nematocysts

"... remaining tentacles should be pulled off the skin (not rubbed off) with a towel or stick"

- where there is significant exposure and the dog is in distress, then hot water immersion may be beneficial – the affected area should be immersed in hot water (about 45°C) for about 20 minutes. This is obviously not practical in situ and only reserved for serious cases.

Prophylactic use of antibiotics is not required, as a secondary wound infection is a rare complication.

Other 'beach hazards'

At the other end of the toxicity spectrum is ingestion of substances such as suntan lotions, creams, sprays or wipes and after-sun preparations, all of which are considered to be of low toxicity. Depending on the quantity ingested, only mild, self-limiting gastrointestinal upset is to be expected, and the only treatment required would be oral fluids.

Seaweeds (kelps) are not in themselves toxic; however, if a dog did decide that eating or chewing large quantities of seaweed was a good idea, then be aware of the risk of salt water poisoning – this is also true for dogs who chase balls and otherwise play in the sea. Although this risk might seem low, we have around 20 serious cases on file of dogs exposed to sea water in recent years.

Beaches, are of course, the perfect place for picnics, but anywhere there are picnics, there are (often) cool packs and (always) food.

Cool packs – seen by the non-discriminating dog as a variation on the chewy toy theme – will, indeed, often be chewed or punctured, and a frequent concern of owners is that these packs contain antifreeze. This is not the case, because they mostly contain propylene glycol, often coloured blue, which is chemically inert and of low toxicity. Some dogs may experience mild vomiting and diarrhoea, although treatment is unlikely to be required.

The usual precautions should be taken with the picnic feast – keep pets well away from onions, garlic, grapes, raisins, chocolate and alcohol.

If barbecues are a feature of the holiday, the use of firelighter blocks and liquids, containing paraffin or white spirit, may present an aspiration risk to the lungs, if ingested. The systemic toxicity of kerosene and other paraffinic hydrocarbons is low and, therefore, vomiting should not be induced. Lung sounds must be checked if the dog has a cough or is tachypnoeic.

Activated charcoal is of limited use and treatment is, therefore, supportive and symptomatic. If there is evidence of buccal irritation, a bland diet would be recommended and care should be taken to ensure adequate hydration and nutrition. Ideally, an observation period of 12 hours would be recommended.

When staying away from home, care should be taken to ensure the owners' medicines are as securely out of reach as normal, and that any 'holiday medications' such as antihistamines, analgesics and antiseptics are also kept away from the inquisitive family pet.

Summary

The family holiday or day out should be a source of fun and enjoyment for all the family – including the much loved pets – and a little care and attention devoted to preventing some basic poisoning issues will ensure that a good time is had by all. ■

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Less heat, more light

The last year has witnessed a wave of antipathy from within the veterinary professions towards the breeding and owning of brachycephalic breeds of dogs and cats. This movement, although precipitated by welfare concerns, has been further justified by the concurrent rise in the popularity of such breeds, largely as a consequence of their high media profile and ownership by celebrities.

In May 2016, the BVA and BSAVA issued a joint statement: 'BVA and BSAVA's members are seeing concerning trends in dog and cat health and welfare linked to the rise in ownership of brachycephalic breeds and we are unequivocal in the need for all those with roles to play – including vets, breeders, breed societies, the pet-buying public as well as others – to take action to combat the health problems that brachycephalic breeds experience due to extreme conformation.

'Both organisations are committed to using scientific evidence and data – now readily available – to understand and tackle extremes of conformation. BVA and BSAVA both strongly recommend that animals which show extremes of conformation that negatively affect their health and welfare should not be used for breeding.'

Response to pressure

In response to a petition from the veterinary community, signed by thousands of veterinary professionals, the Kennel Club set up a multi-stakeholder working group to look at practical, evidence-based solutions to health concerns in brachycephalic breeds.

A statement, issued after the working group's first meeting, said: 'It was encouraging to have support for a collaborative approach towards improving the health of brachycephalic breeds, which will further the work already being carried out by the Kennel Club, breed communities, and veterinary researchers in this area.

'It is crucial that the improvement in the health of brachycephalic breeds is based on evidence to ensure maximum impact...'

It is good then to see that the results of various studies are beginning to emerge which shed light on the genetics of brachycephalic breeds and what it is that attracts owners to these breeds in the first place.

It's in the genes

In a paper published in *Current Biology,* scientists say they have uncovered a genetic mutation that is linked to brachycephaly in dogs, and could also shed light on birth defects that affect the skull formation of human infants. A mutation that was found to disrupt the activity of a gene called SMOC2, was strongly linked to the length of a dog's face, and individuals with the mutation had significantly flatter faces.

Researchers at the Roslin Institute analysed 374 DNA samples from pedigree and mixed breed dogs, which were being treated at the Royal (Dick) School of Veterinary Studies. CT scans were taken of all the dogs and their genetic information was compared with measurements of their skulls. In this way, the team were able to pinpoint DNA variations that are associated with different head shapes.

Ill-informed choices

In a collaborative study, researchers from the RVC, London, and the University of Plymouth, found that the perceived health of the breed was of less concern in owners who purchased a brachycephalic dog, compared to owners of longer-faced breeds.

The paper, published in the journal *Animal Welfare*, found that owners of brachycephalic dogs were:

- more likely to use puppy selling websites to find their dog;
- less likely to see either parent of their puppy; and
- less likely to see any health records.

In the light of their findings, the researchers make several recommendations, including moderating the use of brachycephalic dogs in the media, educating the public regarding the consequences of breeding animals based on their looks and promoting responsible puppy-buying practices for all breeds of dog.

They also recommended identifying and promoting breeds with fewer health conditions that fit the lifestyle niches associated with brachycephalic dog owners.

Responsibility to 'say it how it is'

In its coverage of Crufts 2017, *The Times* highlighted what it said was known as 'bad nose day' owing to the number of pugs, and French and English bulldogs that are shown during the toy and utility dog groups. Responding, in a Letter to the Editor, BVA president, Gudrun Ravetz, wrote:

'We, and many others, have been raising concerns for a long time and so we were pleased to see your report shine a spotlight on some of the serious health problems suffered by flat-faced dogs. Our members see brachycephalic breeds' health problems – from breathing difficulties to eye ulcers and painful spine abnormalities – in veterinary practices across the UK on a daily basis, and flag it as one of their top animal welfare concerns.

'We need to put a stop to these dogs' wrinkly faces, big eyes and curly tails – which can cause so many life-limiting health problems – being seen as appealing characteristics...'

The evidence from the latest research should be put to good use in this respect and we, as veterinary professionals, should give it as high a profile as we have done with our protests. ■

CQ Awards celebrate another successful year

The 2017 Central Qualifications Graduation and Awards Ceremony, held at Central Hall, Westminster, drew a full house this year. This memorable day was a true celebration of the hard work and achievements of the veterinary nurses who have qualified during the course of the past academic year.

Thanks to the support of staff from 12 colleges and over 400 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 their proud families and friends looked on.

CQ graduates from far and wide

Graduates attending the event on 10 June in London came from Centres as far north as Newcastle and Lewes in the south, and Monmouth and Suffolk in the west and east respectively.

On the day, 55 nurses and two educators were presented with their awards and badges by Professor Alice Roberts.

- Abbeydale Vetlink, Monmouth
- Askham Bryan and Newcastle College, Newcastle
- Bicton College, East Budleigh
- Bishop Burton College, Beverley
- Bridgwater and Taunton College, Bridgwater
- Central College of Animal Studies, Suffolk and Kent
- Chichester College, Pulborough
- Goddard Vet Group, Wanstead
- Oaklands College, St Albans
- Plumpton College, Lewes
- Reaseheath College, Nantwich

Veterinary Nursing Educator Awards 2017

This year saw the launch of CQ's first 'Veterinary Nursing Educator of the Year Awards'. These have been established in order to recognise the hard work and commitment of all staff who support students studying for veterinary nursing qualifications.

The Awards were open to anyone involved in training and educating veterinary nurses in the UK and over 100 nominations were received.

"She goes above and beyond for her students, really helpful and a great teacher"

"Truly committed to her students and their success. I couldn't ask for a better clinical coach"

"Outstanding tutor. Teaches in a way understood by all students"

"She goes above and beyond everyday, to progress our practice and educate our junior staff to the highest standards"

"She is very inspiring and supportive of all her students, a great tutor and teacher"

"She is a dedicated, passionate veterinary nurse who aims for excellence in her teaching of VN students"

With so many excellent nominees it was no easy task to choose only two award winners. However, the two candidates who stood out, above the crowd, were Kirsty Gwynne and Karen Saddleton.

"CQ has got it right. When nurses qualify they have really learnt their craft and CQ is playing an important part in helping to produce nurses who demonstrate relevant, safe skills. Educators can contact them in the confidence that they will provide help, information and advice about managing courses and student education"

Kirsty Gwynne, 2017 Educator of the Year Award winner.

"CQ maintains very high standards making sure that when veterinary nurses qualify they have an embedded knowledge and are able to maintain very high standards. CQ reviews and updates its syllabus as veterinary nursing processes and procedures are modernised and developed…"

Karen Saddleton, 2017 Educator of the Year Award winner.

Kirsty Gwynne

Grad DipVN RVN Cert Ed C-SQP V1

Kirsty started her career in small animal practice, by gaining her VN qualification in 2001. She then went on to hold a head nurse position before moving into academia, mixing this with part-time locum work.

She worked in the academic environment for three years, but found that she was losing touch with the clinical aspects and skills required for veterinary nursing. She felt the need to be able to combine the very necessary academic skills with the clinical skills required to make a rounded veterinary nurse and with this in mind she joined Abbeydale Vetlink Veterinary Training, becoming a co-director.

Kirsty has been in this role for nine years and when asked what she most likes about it she simply replied – "everything". She is very 'hands on' and is involved in teaching, arranging TP visits and appraisals, course development and marketing. She is also passionate about providing student support.

Asked what the award meant to her Kirsty replied, "a great deal". She explained that she had been "beavering away" for many years, very happy to be under the radar, but that it was great to actually be recognised for what she did. She said that she was proud to receive the award, but aware that there were so many others who also worked hard in their educator roles.

In her spare time, Kirsty loves horse riding and is just starting to 'event' her young horse. She also likes mountain biking, but emphasised that being with friends and family was the most important part of her life.

What nominators said about Kirsty…

"Kirsty is a fantastic teacher at the college, you can tell she is passionate about teaching"

"She relates everything to 'in practice' and dedicates her time to ensuring her students understand"

"She is never too busy to help her students"

"Brilliant tutor, very experienced, a fun and understanding person and I'm not sure I would have passed the course without her"

Karen Saddleton

RVN REVN PTLLS MBVNA Cert SA Nutrition

Karen qualified as a veterinary nurse in 1994 and has worked at Stowe Veterinary Group since 2001. She is a tutor for veterinary nurses specialising in practical aspects of the course.

Karen takes pleasure in providing the practical knowledge that helps to embed the theoretical side of veterinary nursing and finds it rewarding to see just how much new students enjoy their veterinary nurse training.

"Veterinary nursing is changing all the time and the course standards are very high, so it is important that all students are provided with the support they need – particularly in their first year when they have to learn so much new information, which can be very daunting. It is at this stage that they may lose confidence and a tutor can be very important in giving students the confidence they need to succeed," said Karen.

When asked how she felt about winning the award, Karen said that she was honoured and humbled that her name had been put forward.

On a more personal level, Karen revealed that her pets comprise chickens, two rescue cats and a number of fish. She loves to watch her two children playing their respective sports of tennis and rugby and is currently supporting her daughter as she sits her GCSE exams.

What nominators said about Karen…

"Karen could not have done more for all of us throughout our studies"

"No one could be more deserving of this award"

"Karen always has our best interests at heart"

"She worked tirelessly and she needs to know how much we appreciated her"

CQ

CENTRAL QUALIFICATIONS™

Learning and teaching are what make us human

Special guest speaker at the CQ Graduation and Awards Ceremony was Professor Alice Roberts – medical doctor, academic, writer and broadcaster. In a fascinating talk, she spoke of the link between the evolution of humans and the development of culture, and what it is that makes us different from all other animals.

She explained that, although in our minds we have the concept of being separate from nature, this begins to fall away when we look back at our family tree, the 'tree of life'. She dispensed with many of the so-called abilities that 'make us human' – opposable thumbs are not just a human ability, smiling and laughing is not restricted to humans and, although humans are habitually bipedal, very many primates can walk on two legs if they wish – or have a need to.

The earliest hominids were very ape-like, so just when did we start to diverge? Professor Roberts told her audience that our brain is what marks us out from other animals, it being much larger than that of any other animal or primate. However, it is not just the *size* of the human brain that marks us out as being different, it is how we *use* our brain that really distinguishes us – how we watch, copy, communicate and create, and in so doing develop a culture.

Culture is the key

Culture depends on being able to copy, co-operate and pass information on to future generations. This is behaviour that is learnt and passed on from one to another and it is significant that it is only humans who have such an extended childhood during which there is constant learning. Although chimpanzees can learn from each other – for example, by copying the use of a twig to remove insects from their nests and, therefore, have a simple culture – our culture is very different and complex.

"… to be human is not just to *copy* what you see – as is the case with chimpanzees – it is the ability to actually *teach* each others how to do things"

Photo: University of Birmingham

Professor Roberts went on to explain how this complexity has developed. She said that over three million years ago we started to use modified stone tools – a significant difference from all apes who may use tools, but never ones that are modified. Around 1.8 million years ago, 'tear-drop' tools started to be made which could fit into the palm of the hand; and then half a million years ago, hand axes and a much more developed stone 'tool kit' appeared, enabling our ancestors to use different tools for different needs. This was the 'arrival of the modern mind'.

Over 100,000 years ago, the first evidence of the beginnings of human art appeared and from 50,000 years later we can see good examples of cave painting – communication through symbols. People had started thinking in a more complex way and, from then on, thinking became more and more developed. Professor Roberts put this sudden explosion of creativity down to an increase in the population and its movement – bringing more minds together to be more creative. It is this concept of multiple brains working together as a continuous unit over time and generations that can have such a massive cumulative effect.

From cave painting we moved forward to writing, printing and, ultimately, to today's internet – all ways of putting information into people's minds and, by so doing, creating our culture. Professor Roberts said that some of the innovations of today will form our future culture.

Ability to teach makes us special

She explained that to be human is not just to *copy* what you see – as is the case with chimpanzees – it is the ability to actually *teach* each other how to do things. To be human is also having the power to hold an abstract thought in your mind which you can then translate via the brain into a working image. To be an effective teacher you have to be able to imagine the gaps in your pupils' minds and fill them with the required skill or knowledge.

Professor Roberts concluded her talk by telling the graduates that the learning they had undergone to gain their nursing qualifications was now going to be put into practice, but she said that they would never stop learning. She added that she hoped they had – through their course and studies – gained a love of learning which would continue throughout their whole lives. That, she said, is "what makes you human".

"To be human is also having the power to hold an abstract thought in your mind which you can then translate via the brain into a working image"

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Aimi graduated from the Royal (Dick) School of Veterinary Studies in 2009 and has since worked within the equine sector of a mixed practice in Northumberland. She enjoys all aspects of equine ambulatory work, as well as being responsible for the care of hospitalised patients.

Aimi recently completed her Certificate in Advanced Veterinary Practice (Equine Medicine) which has developed her special interest in all things medical.

**Suggested Personal & Professional Development (PPD)*

COMMUNITY REVIEWED™

WOUND MANAGEMENT

Equine wound management – advanced management and complications (Part 2)

In this article – the second of a two-part series [*VPT* 5(3): 36-40] directed towards new graduates and those in mixed practice who see the occasional equine wound – we shall consider the application of bandages and casts, the use of skin grafts, approaches to wound infection and the complementary role of adjunctive therapies.

Bandages and casts

Correct bandaging techniques are useful for securing dressings in place and protecting against trauma and swelling. In many cases, better immobilisation and more cost-effective management might be achieved using casts – especially during the proliferation phase of wound healing once any infection has been controlled (Booth et al, 1999).

Other advantages offered by casts include maintenance of constant humidity, increased local temperature and superior protection (Booth et al, 1999). Casts can, however, cause wounds if they are poorly fitted or as any limb swelling reduces – indeed, 'cast rubs' may prove more problematic than the initial wound, highlighting the importance of careful monitoring (Booth et al, 1999).

Skin grafts

Skin grafts can be used during the proliferative phase once a healthy granulation bed has been achieved (Knottenbelt, 1997; Stashak et al, 2009) and are also indicated where epithelialisation is the limit to healing (Knottenbelt, 1997; Stashak et al, 2009; Theoret, 2009).

Types of skin graft include island grafts (pinch, punch and tunnel), sheet grafts (full or mesh sheet) and hybrid techniques (Meek technique) (Knottenbelt, 1997). Use of skin grafting techniques should be considered in very large wounds as their ability to increase the rate of epithelialisation may prove more economical than months of bandaging (Theoret, 2009).

Wound infection

Most traumatic equine wounds that present in equine practice are contaminated (<6 hours after trauma), colonised (6-8 hours after trauma), critically colonised (>12 hours after trauma) or infected (>24 hours after trauma) (Adams et al, 1999; Booth et al, 1999; Stashak et al, 2009). Broadly speaking, systemic antibiotics are seldom required.

Wound infection is one of the most significant factors associated with complications in equine wound healing, such as partial/complete dehiscence, exuberant granulation tissue and sequestrum formation (Adams et al, 1999; Knottenbelt, 1997; Stashak et al, 2009).

As stated, the incidence of infection can be reduced by ensuring careful surgical debridement of all wounds in the early stages to assist with the patient-mounted acute inflammatory response (Stashak et al, 2009). Wounds with a draining tract are more susceptible to infection, as the exudate provides an excellent culture medium: and management of such wounds may require placement of a Penrose drain to reduce the accumulation of exudates (Stashak et al, 2009).

Antibiotics may be given to prevent bacterial colonisation of a contaminated wound. However, prolonged courses of antibiotics are unnecessary and should be avoided to safeguard against the development of antibiotic resistance (Morley et al, 2005; Stashak et al, 2009). A single dose with broad-spectrum antibiotics (penicillin/gentamycin, for example) may be all that is warranted to prevent colonisation of a freshly contaminated wound (Morley et al, 2005).

If the wound is infected, a sample should be collected for bacterial culture pending a failure in response to empirical antibiotics; and the duration of treatment should be kept to a minimum (Morley et al, 2005).

Systemic antibiotics may have poor penetration into wound locations, indicating a role for the use of antibacterial dressings – silver, charcoal, hypertonic saline and manuka honey dressings (Adams et al, 1999; Jones et al, 2006; Lusby et al, 2002; Stashak et al, 2009; Willix et al, 1992). Antibacterial dressings are more effective than antibiotic creams, which can occlude the wound and adversely affect healing (Jones et al, 2006). Antibacterial dressings are only indicated for management of critically colonised or infected wounds in combination with wound debridement (Jones et al, 2006).

Wound infection is recognised as delayed healing, swelling, lameness, poor granulation quality, copious exudation and presence of biofilms (Knottenbelt, 1997). In some cases, including wounds associated with synovitis or osteomyelitis,

Figure 1. *Intravenous regional perfusion with gentamycin for management of a pastern wound.*

Figure 2. *Management of EGT by excision prior to application of topical corticosteroid.*

intravenous regional perfusion using concentration-dependent drugs, such as aminoglycosides, may be useful (**Figure 1**).

Adjunctive therapies

Hydrotherapy

Hydrotherapy is emerging as a treatment modality for equine wound management. It is understood that the agitation of the water and injected air debrides the wound and dilutes bacterial content (Hess et al, 2003).

The scientific evidence supporting hydrotherapy in horses is limited. There are some reports in human medicine that suggest that the pressure generated at the wound surface can actually be detrimental to wound health (Hess et al, 2003).

Ultrasound

Ultrasound can be used therapeutically in wound management as it has thermal effects that assist with remodelling in the late phases of scar maturation to improve outcome (Hess et al, 2003). At lower intensities, the non-thermal effects of ultrasound are thought to facilitate wound healing by causing 'cavitation and streaming' (Breuing et al, 2005; Ennis et al, 2006; Hess et al, 2003; Kavros et al, 2007; Kavros et al, 2008).

'Cavitation' is the formation of gas bubbles and 'streaming' is a unidirectional, steady mechanical force. These effects cause changes in cell membrane permeability and thus the diffusion of cellular metabolites (Hess et al, 2003). Ultrasound is also thought to help promote collagen synthesis, cellular recruitment, angiogenesis, stimulation of macrophages and fibroblasts, wound contraction and fibrinolysis (Breuing et al, 2005; Hess et al, 2003; Kavros et al, 2007; Kavros et al, 2008; Young et al, 1990).

In human medicine and laboratory studies, there is evidence supporting the use of ultrasound for managing wounds (Breuing et al, 2005; Ennis et al, 2006; Hess et al, 2003; Kavros et al, 2007).

Non-healing wounds

Exuberant granulation tissue (EGT) is a common complication of wounds of the distal limb in horses. It generally reflects an 'inhibited healing cascade with the development of a refractory wound' (Knottenbelt, 1997). EGT is a more prevalent complication in horses compared with ponies, thought to be associated with areas of high motion, infection, bony sequestrum, foreign material, necrotic tissue or inherent chronic inflammation perhaps owing to iatrogenic factors, such as application of irritant or caustic substances (Knottenbelt, 1997; Wilmink et al, 1999).

Management of EGT involves investigation – radiography, microbiological culture – and controlling causative factors along with excision and application of topical anti-inflammatory drugs, such as corticosteroids (Knottenbelt, 1997) (**Figure 2**). Pressure bandages or Celox (Medtrade) bandages may be necessary to control excessive bleeding. Casting should be considered to immobilise the limb if excessive wound motion is thought to be a causal factor (Knottenbelt, 1997).

Silicone dressings can be used in the management of recurrent EGT that fails to respond to excision. They are applied under tension to the wound; but they lack absorptive capacity which can compromise wound health.

'Neoplastic transformation' should be considered in a chronic granulating wound that is failing to heal and a biopsy performed to confirm this suspicion (Knottenbelt, 1997; Stashak et al, 2009). Differential diagnosis includes squamous cell carcinoma and sarcoid (Knottenbelt, 1997; Stashak et al, 2009).

A poorly healing wound may also be an indicator of patient metabolic status. Malnutrition or protein-losing enteropathy, secondary to a helminth burden with associated hypoproteinaemia, and pituitary pars intermedia dysfunction are all conditions that might affect the patient's ability to mount an inflammatory response (Hess et al, 2003; Knottenbelt, 1997; Stashak et al, 2009).

Summary

In summary, every equine wound is different and the ideal management will be determined by accurate assessment and close monitoring of the healing progress.

It is easy to become fixated upon treatment of a wound in isolation, neglecting the overall clinical state of the patient. As veterinary professionals, we must ensure that we adopt a holistic approach in order to safeguard the welfare needs of our patients. ■

PPD Questions

1. Give four advantages of using bandage casts for wound management.
2. Name four types of antibacterial wound dressing.
3. Name six risk factors for exuberant granulation tissue formation.

Answers

1. immobilisation, cost effective, maintain constant humidity and temperature, protection
2. Manuka honey, charcoal, hypertonic saline, silver
3. infection, wound overlying high motion areas, sequestrum, necrotic tissue, foreign material, inherent chronic inflammation.

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**Suggested Personal & Professional Development (PPD)*

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LAMINITIS

Update on pathogenesis and clinical management of laminitis

For as long as horses have lived alongside humans, laminitis has been recognised. As Aristotle observed in 330BC, '...Among horses, those at pasture are free from all ailments except foot-ill, but they suffer from this and sometimes cast hooves'.

Laminitis is one of the most common and debilitating diseases that affects both horses and ponies – frequently progressing to become a chronic problem that can ultimately lead to the death of the animal. As such it has significant economic and welfare implications.

Many factors have been implicated in triggering an acute laminitic episode and, recently, it has been proposed these can be grouped into three distinct pathophysiological pathways (Katz & Bailey, 2012):

- inflammatory laminitis – includes starch/grain overload, oligofructose overload and black walnut induction model
- endocrinopathic laminitis – includes insulin-induced laminitis, corticosteroid-induced laminitis and acute episodes of laminitis in animals with pituitary pars intermedia dysfunction (PPID)
- contralateral limb laminitis.

It is likely that in individual cases there may be interplay between these three forms, with elements from different pathophysiological pathways playing partial roles. Ultimately, all can result in the same clinical end point – with laminar separation leading to potentially life-threatening movement of the pedal bone (P3); which rotates and/or sinks in relation to the hoof capsule owing to gravity and the weight of the horse pushing down, together with the force from the deep flexor tendon on the palmar/plantar attachment to P3 (**Figure 1**).

Inflammatory laminitis

Historically, much has been written about inflammatory laminitis resulting from grain overload and endotoxemia; but it is now recognised that the majority of laminitis seen by veterinary surgeons in general practice is associated with pasture grazing and underlying metabolic and endocrine disease (Johnson P et al, 2010).

Endocrinopathic laminitis

PPID, commonly called equine Cushing's disease (**Figure 2**), and equine metabolic syndrome (EMS) together are now recognised to be the primary drivers for the majority of laminitis cases – either on their own or in some animals both conditions may coexist making treatment and management more complex (Frank & Tadros, 2014).

It is most common in horses over the age of 15 with its incidence increasing with age (Tadros & Frank, 2013); although it is now being reported with increasing frequency in younger horses with laminitis. It results from

"...but it is now recognised that the majority of laminitis seen by veterinary surgeons in general practice is associated with pasture grazing and underlying metabolic and endocrine disease"

Figure 1. *Radiograph showing rotation of the pedal bone.*

Figure 2. *Laminitis is commonly associated with Cushing's syndrome in older ponies that classically develop a long, curly coat.*

Figure 3. *Obesity expressed as regional adiposity.*

hyperplasia or neoplasia of the pars intermedia and, while its involvement in laminitis is well established, the exact mechanisms by which this occurs are still relatively poorly understood (Durham, 2017).

EMS is a collection of endocrine and metabolic abnormalities associated with a predisposition to laminitis in horses, ponies and donkeys of all ages (Frank et al, 2010). Most importantly it is associated with:

- insulin dysregulation resulting in insulin resistance (IR) and hyperinsulinaemia
- obesity – in particular regional adiposity resulting in a large neck crest and fat pads over the shoulder, tail head or prepuce/mammary region (**Figure 3**).

All of these factors combine to predispose those affected to pasture-associated laminitis. But note that not all horses with EMS and insulin dysregulation are obese – just as is the case with humans, some will be in lean or show normal body condition.

Pasture-associated laminitis

This is generally associated with 'good-doers' – the fat, 'cresty' native ponies. Unfortunately we are diagnosing it more frequently across the breeds as significant levels of obesity are now seen commonly in all horses, ponies and donkeys.

It is considered to be more prevalent in the spring and autumn, when the grass is particularly high in non-structural carbohydrates (NSCs) such as simple sugars, starches and fructans (Geor, 2009). Historically, we focused on NSCs/fructans following reports on the experimental induction of laminitis by giving high doses of fructans in a single bolus to healthy horses. For many years, it was widely considered that horses were simply eating too much sugar-filled grass.

More recent studies have demonstrated that, even on high quality grass/forage, horses and ponies will struggle to consume the levels of NSCs demonstrated experimentally to induce laminitis – even over a 12- to 17-hour period. It is now considered that the threshold amount of NSCs, such as fructans, required to induce laminitis is significantly lowered in susceptible animals, most likely as a result of concurrent hyperinsulinaemia (Frank & Tadros, 2013). This goes some way towards explaining why, in a group of horses all eating the same grass, only some will develop laminitis.

Clinical management

For many years, we only treated – with limited efficacy – the symptom 'laminitis', using non-steroidal anti-inflammatories (NSAIDs), drugs and therapeutics to improve blood flow within the foot, frog/sole supports and remedial farriery. While this is still important in the acute phase, in the majority of cases the long-term strategy is based on identification and management of the underlying endocrinopathy (**Figure 4**).

PPID can be ruled in or out by testing ACTH. A basal resting sample is easily obtained at any visit, although care should be taken in animals that are stressed or in pain as this may affect the result. You can improve confidence in diagnostic interpretation by performing a TRH stimulation test, which takes a mere 10 minutes.

Take an EDTA baseline blood sample and then administer TRH (usually easiest obtained from the diagnostic laboratory you choose to use). Then take a second EDTA sample after 10 minutes. This test has improved sensitivity and specificity compared to a basal ACTH assessment alone.

Insulin dysregulation is best identified by performing a sugar challenge test on a fasted horse. A blood sample obtained from a fed horse at any time of day is of limited value because there are few published data on normal insulin parameters. For a sugar challenge test:

- fast the horse(s) overnight
- take serum and OxF samples for insulin/glucose estimation
- feed the horse(s) 1g/kg glucose/dextrose in 1g/kg low sugar chaff/1ml/kg water or drenched with Karo syrup 15ml/100kg – there is increasing evidence suggesting a higher dose of 45ml/kg Karo syrup may be more reliable
- take serum and OxF samples two hours after feeding with glucose dextrose or after 75 minutes when Karo syrup has been fed.

Figure 4. *Management of the acute laminitic crisis.*

- NSAIDs
- strict 'box rest' on deep supportive bed
- removal of shoes, use of sole pack or frog supports can be of benefit in some cases
- dietary restriction
- X-rays can be of benefit in severe acute cases to aid prognosis
- investigation of underlying endocrinopathy.

Assessment of obesity can be done by weight, body condition score, neck circumference, girth and abdominal measurement. Continued assessment of these values is essential to monitor ongoing weight change.

Adiponectin has been looked at recently as a measure for assessing obesity, but its added benefit over established tests is still unclear.

Medium-and long-term management of chronic laminitis

The doses of medicines commonly used in the therapy of PPID and EMS are given in **Table 1** (Durham AE, 2017).

Where underlying PPID is identified, this should be managed – most commonly by treating with oral pergolide daily for life.

Dietary restriction and management for weight loss and to prevent hyperinsulinaemia is the *most* important – and often most challenging – factor in long-term management of EMS (**Figure 5**). It can be useful to encourage clients to measure neck, girth and abdominal circumference every few weeks and to keep a record of these to monitor trends more accurately than can be achieved by visual observation alone.

Under 'feral' conditions, native ponies, especially, will gain weight through the summer months when food is plentiful, then lose it during the winter (Geor, 2009). Modern husbandry practices often mean there is no hardship through winter, resulting in progressive weight gain or continued obesity.

Levothyroxine has been shown to be useful in obese patients to bring about weight loss and improve insulin sensitivity. While the exact mechanisms by which this occurs are unclear, it is no longer thought to be a consequence of concurrent hypothyroidism.

The use of metformin had been much debated over the years owing to studies demonstrating that poor plasma levels are achieved in the horse. It is now generally thought to work at a gut level to block glucose absorption and, as such, can be useful if fed before turnout when strict dietary control is difficult. It is, however, no substitute for proper dietary management.

Exercise is invaluable, especially in horses with EMS, once you are confident that acute inflammation is resolved and the horse is no longer at risk from pedal bone destabilisation. This aids weight loss; but, more importantly, improves insulin sensitivity.

"Dietary restriction and management for weight loss and to prevent hyperinsulinaemia is the most important – and often most challenging – factor in long-term management of EMS"

Extra care should be taken in EMS horses that have an enforced rest period because this can result in insulin deregulation and increased risk of laminitis. Remedial farriery, aided by regular X-rays, is essential to correct any pedal bone movement; and routine monitoring of insulin levels is useful, although it is important to remember that, in some horses, long-term insulin dysregulation may remain.

Conclusion

While we still have a long way to go – and new research often seems to muddy the waters further – we are slowly making progress in our understanding of this often frustrating disease; thereby enabling better management and improved survival and quality of life in the horses committed to our care. ■

PPID	Pergolide (0.0002 - 0.01mg/kg PO q24hours)	■ begin at lower end of dose range and increase as required ■ inappetence is common.
	Cyproheptadine (0.25mg/kg PO q12-24 hours)	■ may be used alone or in combination with pergolide ■ expensive.
EMS	Levothyroxine (0.1mg/kg PO q24hrs for 3-6 months; then taper to 0.5mg/kg PO q24hrs for 2 wks; then 0.025mg/kg PO q24hrs for 2 wks)	■ must be used alongside dietary control.
	Metformin (30mg/kg PO q12hrs)	■ ideally, immediately before grazing or feeding.

Table 1. Doses of medicines commonly used in the therapy of PPID and EMS (Durham AE, 2017)

Figure 5. *Dietary restriction – using 'muzzle grazing', for instance – is important in the management of laminitis.*

PPD Questions

1. Why do only some horses in the same field develop laminitis?
   A. their intake of NSCs is greater as they simply eat more grass
   B. their threshold point at which NSCs induce laminitis is significantly lower
   C. they eat only in the areas with very high sugar grass
   D. they are only turned out to grass at times of day when sugars are thought to be highest

2. Endocrine laminitis results from which of the following (note all that apply)?
   A. PPID
   B. EMS
   C. PPID and EMS concurrently
   D. hypothyroidism

3. PPID is diagnosed by:
   A. TRH stimulation test
   B. fasted insulin-glucose
   C. glucose challenge
   D. high-dose Karo challenge

4. EMS is best managed in the long term by:
   A. long-term metformin
   B. lifelong levothyroxine
   C. retirement
   D. dietary management to reduce/eliminate obesity, combined with regular exercise

Answers
1.B 2.A, B & C 3.A 4.D

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Reading the signs

When we observe an older person with arthritis, we will notice that they move stiffly and have difficulty standing up and sitting down. We will probably also note the expression of pain on their face and sympathise with their illness.

Sadly, when most people observe an old dog or cat walking slowly along and taking their time to sit or stand, they are likely to comment that the animal is "getting old and slowing down". What they don't usually consider is the pain that the dog or cat is in because the animal has no way of expressing this verbally or facially – or, rather, we are not adept at recognising the subtle signs that indicate pain.

The most important thing in assessing pain in any animal is knowing what normal should look like so that abnormal can be identified. Most animals do not show obvious pain – those in distress will often simply retreat to a 'safe' place until they feel better; others will carry on regardless.

The horse has been a classic example of the latter behaviour and it is to our great discredit that humans have often used the species – particularly as a beast of burden – mercilessly, ignoring any idea that it may be suffering or in pain. Yet horses *do* show subtle signs of pain in their body language and behaviour – a decrease in normal activity, lowered head, general staring and lack of interest in their environment and, of course, stiffness and reluctance to move.

Significant step forward

Our ability to recognise this pain more effectively is improving and new research has shown that it is now possible to detect pain experienced by horses by observing their facial expressions. A project led by equine orthopaedics specialist, Sue Dyson, from the Animal Health Trust (AHT), has developed an 'ethogram' – a catalogue of behaviours – for equine professionals and owners to help them identify signs of pain.

Having formulated the ethogram, Sue and her team asked various people to apply this catalogue of behaviours to photographs of horses' heads while they were ridden. For example, could the assessors see the whites of their eyes, could they notice different ear positions and could they notice a 'tightness' in the muzzle? They found that the assessors were reasonably reliable in identifying these different facial expressions.

Sue then investigated whether the ethogram could be used to distinguish between sound and lame horses. During this stage, she applied a pain score of 0-3 to each feature of the ethogram – ears, eyes, muzzle and so on – and then totalled them to find out an overall pain score for each horse.

Results showed there was a significant difference in pain score given by the assessors for clinically lame and sound horses. So application of the ethogram could potentially save horses from needless suffering and chronic injuries as owners and trainers are able to recognise pain sooner and, therefore, provide treatment earlier.

Turning the tables

Being able to recognise pain in horses through their facial expressions is a fascinating development; but it doesn't end there. In research led by Amy Smith of Sussex University, psychologists studied how 28 horses reacted to seeing photographs of positive versus negative human facial expressions.

When viewing angry faces, horses looked more with their left eye – a behaviour associated with perceiving negative stimuli – and their heart rate also increased more quickly and they showed more stress-related behaviours. This suggested that horses had a functionally relevant understanding of the angry faces they were seeing – interestingly, the effect of facial expressions on heart rate had not been seen before in interactions between animals and humans.

It has been known for a long time that horses are a socially sophisticated species but this is the first time it has been seen that they can distinguish between positive and negative human facial expressions. The research shows that horses have the ability to read emotions across the species barrier.

Other senses too

Scientists have found that horses also convey their emotions through their vocal communication – whinnying and neighing – noises often packed with incredibly detailed information. The frequencies

and lengths of horse whinnies change depending on whether an individual is having a positive or negative emotion, and just how intense their feelings are at that moment. This was discovered in experiments when horse companions were separated and, later, reunited.

Previous work has shown horses to be very sensitive to the body signals of humans too. Adult horses notice and react to differences in human body orientation, head orientation, and opening or closing of the eyes and are more likely to approach humans who seem to be paying more attention to them by facing and looking at them. If humans seem not to be paying attention to them, horses tend to walk into their field of view and try to establish eye contact.

Young horses are less good at picking up on these body signals which suggests that horses get better at reading human body language as they age, having gained more experience through interaction with humans.

As more work is carried out on equine communication, perception and behaviour, it will influence the way they are understood and cared for. The more that is discovered, the more we will be able to improve their welfare standards. ■

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FINANCIAL PLANNERS CII CHARTERED

Sheep vaccines – benefits and limitations

Routine vaccination of both commercial and pedigree sheep flocks is commonplace in the UK, and is used as a means of protecting them against a variety of infectious diseases.

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Emily graduated from the Royal Veterinary College, London, in 2010 and began work at Scarsdale Vets LLP, a member of XLVets, in Derby immediately after graduation.

Her areas of clinical interest include suckler cow fertility, calf management, sheep and smallholder medicine. She is currently working towards her Advanced Practitioner Certificate (CertAVP PAP) which she will complete later this year. In her spare time, Emily enjoys country walks with her husband and her Border terrier, 'Baxter'.

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PATHOLOGY

Why use vaccines?

Prevention is better than cure – whether via appropriate biosecurity, minimising exposure of animals to disease risk factors or vaccination (**Figure 1**). Although the first two factors are considered good practice, vaccination should only be used where and when necessary.

Increased vaccine usage may also reduce antimicrobial drug usage, which is of vital importance and of both national and international concern. Veterinary surgeons are regarded as a credible source of information and guidance, yet farmers don't automatically follow vaccination advice, as most seem to take a calculated risk (Garforth et al, 2013).

Vaccine choice depends on flock risk and – for some diseases – seasonal risk. Diseases against which vaccines are commercially available in the UK are summarised in **Table 1**, although some products will require a Special Import Certificate from the Veterinary Medicines Directorate.

What can we vaccinate against?

Clostridial disease

Vaccines protecting sheep against clostridial disease are some of the most widely used in the UK. Clostridial disease is caused by toxins produced by bacteria within the genus *Clostridium*. The bacteria, which are commonly found in the soil, are either ingested (and the toxins absorbed through the gut) or are involved in other localised tissue infections.

Clostridial diseases in sheep are summarised in **Table 2**.

Clostridial vaccines are some of the most cost-effective available with different vaccines protecting against various combinations of clostridial disease (**Table 3**). Some vaccines carry protection against *Pasteurella* spp., which plays an important role in pneumonia and sudden death in young lambs.

The choice of vaccine will depend on risk of disease, farm history and the requirement (or not) for pasteurellosis cover.

Foot rot

Foot rot, caused by *Dichelobacter nodosus* and *Fusobacterium necrophorum*, leads to significant losses. Disease is typically seen in late spring/early summer but also in housed animals over winter. Farmers tend to manage foot rot using one or more of the following measures: foot trimming, topical disinfectant and systemic antibiotic injection (Winter et al, 2015). Vaccination protects against only *Dichelobacter nodosus*, and should not be administered within six weeks of shearing or within four weeks of lambing.

Vaccination has been associated with a 20 per cent reduction in the prevalence of lameness (Winter et al, 2015).

Infectious abortion

Enzootic abortion of ewes (EAE) caused by *Chlamydophila abortus* and toxoplasmosis (*Toxoplasma gondii*) accounts for around 70 per cent of all diagnosed cases of abortion in ewes (NADIS, 2017). Both of these diseases are zoonotic and pregnant women should avoid contact with pregnant ewes.

EAE causes late-term abortions (2-3 weeks pre-lambing) with aborting ewes – mainly via vaginal discharge and placenta – being the main source of infection for other ewes. Abortions usually occur in pregnancy after the initial infection; so disease can be

Table 1. Commercial sheep vaccines available in the UK

Disease	Vaccine available
Chlamydophila	Mydiavac, Enzovax, Cevac Chlamydia
Bluetongue	Zulvac 8, Bluevac BTV8
Schmallenberg	SBVvax
Toxoplasmosis	Toxovax
Orf	Scabivax
Foot rot	Footvax
Pasteurella (*M. haemolytica*)	Heptavac P Plus, Ovipast, Ovipast P Plus
Pasteurella (*P. trehalosi*)	Heptavac P Plus, Ovipast, Ovipast P Plus
Clostridia	Bravoxin 10, Heptavac P Plus, Ovipast, Ovipast P Plus, Covexin 8
Louping ill	Louping Ill Vaccine
Johne's disease	GUDAIR

brought in by apparently healthy ewes. Vaccination – between four months and four weeks pre-tupping – of uninfected animals protects against abortion; and in animals already latently infected, both abortion rates and shedding are reduced.

Toxoplasma infections occurring in the first 60 days of pregnancy result in foetal death. Infections between 60 and 120 days of pregnancy result in abortions, mummifications, stillbirths and the birth of weak lambs; whilst infections after 120 days result in the birth of normal healthy lambs.

Infection is via the ingestion of oocysts that have been passed in cat faeces. Therefore minimising the contact between sheep and cats plays a key role in the control of the disease. Aborting ewes are not a source of infection to other animals and vaccination, at least three weeks prior to tupping, will stimulate immunity in ewes.

Figure 1. *Prevention is better than cure – whether via appropriate biosecurity, minimising exposure of animals to disease risk factors or vaccination.*

Orf (contagious ecthyma)

Orf virus (*Parapox ovis*) is most common in lambs from six to nine months old, although all ages are susceptible. The disease typically presents as proliferative lesions around the coronary band and mouth, which become infected by secondary pathogens, such as *Staphylococcus aureus*, resulting in scab formation. Virus persists in scabs for many months; which act as a source of infection for other animals, although spread also occurs via fomites.

Vaccination through scarification with a live virus – typically in the axilla or inner thigh – will shorten recovery time of infected lambs and may prevent

Table 2. Diseases of sheep caused by *Clostridia* spp

Species	Clinical signs	Age affected
C. sordellii	Abomasitis and sudden death	Young lambs and adult sheep
C. tetani	Generalised muscular rigidity and spasms, death	All species
C. botulinum	Progressive symmetrical weakness and motor paralysis, death	All species, requires ingestion of toxin
C. chauvoei	'Blackleg' – infectious myositis, myonecrosis and toxaemia, death	Sheep of all ages
C. septicum	'Braxy' – inflammation of the abomasal wall, toxaemia, death	Weaners and yearlings in winter
C. novyi	'Black Disease' – acute toxaemia, death	Adult sheep in good condition (seasonal prevalence associated with liver fluke migration)
C. haemolyticum (*C. novyi* Type D	Bacilliary haemoglobinuria, toxaemia, death	All ages of sheep in summer and autumn
C. perfringens Type A	Haemorrhagic enterotoxaemia	
C. perfringens Type B	Lamb dysentery	▪ young lambs, increased incidence as lambing progresses ▪ primarily hill breeds
C. perfringens Type C		
C. perfringens Type D	Pulpy kidney – death usually first clinical sign	Lambs 3-10 weeks old and lambs post weaning, on good nutrition
C. perfringens Type D	Focal symmetrical encephalomalacia – depression, lethargy progressing to ataxia, recumbency and death	Young lambs and lambs after weaning

Table 3. Commercially available clostridial vaccines in the UK, with licensed claims and durations of immunity

		perfringens A	*perfringens B*	*perfringens C*	*perfringens D*	*novyi B*	*septicum*	*sordellii*	*haemolyticum*	*tetani*	*chauvoei*
Blackleg vaccine		x	x	x	x	x	x	x	x	x	12m
Bravoxin 10	Adult immunity	12m	12m	12m	12m	12m	6m	12m	6m	12m	6m
	Colostral immunity	12w	8w	8w	12w	12w	2w	12w	none	12w	2w
Heptovac P Plus	Adult immunity	x	12m	12m	12m	12m	12m	x	x	12m	12m
	Colostral immunity	x	3w	3w	3w	3w	3w	x	x	3w	3w
Lambivac	Adult immunity	x	12m	12m	12m	x	x	x	x	12m	x
	Colostral immunity	x	12w	12w	12w	x	x	x	x	12w	x
Ovivac P Plus	Adult immunity	x	x	x	12m	x	12m	x	x	12m	12m
	Colostral immunity	x	x	x	12w	x	12w	x	x	12w	12w
Covexin 8	Adult immunity	x	12m	12m	12m	12m	6m	x	6m	12m	6m
	Colostral immunity	x	8w	8w	12w	12w	2w	x	none	12w	2w
Covexin 10	Adult immunity	12m	12m	12m	12m	12m	6m	12m	6m	12m	6m
	Colostral immunity	12w	8w	8w	12w	12w	2w	12w	none	12w	2w

infection, although the efficacy is debatable (Winter & Clarkson, 2012). The vaccine must be administered at least seven weeks before lambing, because until 'scabs' have dropped off, ewes are still contagious and great care must be taken to prevent contamination of any areas to which ewes and lambs will have subsequent access.

Care should be taken when prescribing this product as the vaccine is live and able to persist in the environment. Full precautions are listed in the Summary of Product Characteristics.

How can we ensure that vaccines work effectively?

For vaccines to stimulate the immune system effectively, ewes must be fit and healthy at the time of vaccination. Adequate body condition, appropriate nutrition, not suffering concurrent disease or having a large parasite burden are all requirements for optimal vaccine success.

Where immunity is already being challenged, the immune system's ability to produce an adequate response will be limited, possibly leaving the animal at risk of disease despite vaccination. The same issue can occur when too many vaccines are administered concurrently, leading to the immune system being overwhelmed.

The vaccine must be given at the correct dose rate, via the correct route of administration and must be given at the correct time – both within the correct vaccine booster window or the time interval for a

***Figure 2**. Storage of medicines in the refrigerator is essential. Note the 'fridge' thermometer for recording maximum and minimum temperatures, and clear labelling of 'fridge' medicines for farmers.*

***Figure 3.** Cool bags are also useful.*

It is important to remember to give vaccines at the correct time before lambing if the vaccine is intended to stimulate colostral antibodies.

second part of a primary vaccine course.

It is important to remember to give vaccines at the correct time before lambing if the vaccine is intended to stimulate colostral antibodies – this is usually four to six weeks before lambing. The immunity provided to lambs from this vaccine is entirely dependent on their receiving a sufficient quantity of suitable quality colostrum. It is essential that lambs receive 10 per cent of their bodyweight in colostrum within the first six hours after birth to ensure that passive transfer of immunoglobulins is successful.

Other vaccines are required prior to tupping – toxoplasmosis and enzootic abortion vaccines, for instance – to protect the ewe from disease before this high-risk period. Vaccinating too close to the tupping period can result in ewes still being infected with live vaccine when introduced to the ram.

Appropriate storage of vaccines is essential to ensure their viability is retained (**Figure 2**). They must remain chilled until use for them to be effective – this includes after the farmer has collected them! Reminding farmers to bring a cool bag with them to collect the vaccine and ensuring that they are refrigerated as soon as possible is important (**Figure 3**).

If a two-dose vaccine course is required, a new vial of vaccine will be required for the second dose because, once opened, vaccines should be used within eight to 24 hours. ■

PPD Questions

1. Which two species of bacteria are implicated in ovine foot rot?
2. What extra disease do some clostridial vaccines also carry protection against?
3. What quantity of (good quality) colostrum does a newborn lamb require to ensure passive transfer of immunoglobulins?
4. What is the main requirement for the storage of vaccines to ensure efficacy?

Answers
1. *Dichelobacter nodosus* and *Fusobacterium necrophorum*
2. pasteurellosis
3. 10 per cent of bodyweight in the first six hours after birth
4. appropriate refrigeration.

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CATTLE LAMENESS

Developments in treating cattle lameness – introducing EDPET and some new thoughts on toes (Part 2)

In the first article in this two-part series [VPT 5(3): 56-58], we explored some of the 'game changers' emerging from research on the relationship between hoof structure and function, the vital importance of nutrition and housing in late pregnancy, and treatment of claw horn lesions. This next point is arguably common sense, but recent research drums it home.

EDPET is key

EDPET stands for early detection, prompt effective treatment. It is success factor number four of the AHDB Dairy Healthy Feet Program, which consists of low infection pressure, good hoof quality and horn shape, low forces on feet and early detection, prompt effective treatment.

By itself, EDPET has the potential to, perhaps, be the largest 'game changer' of all. But it is not always easy to practise and it requires a mindset change, mainly because detecting early lesions (mild lameness) requires mobility scoring. The thresholds for lameness detection must be much more sensitive than the majority of farmers are currently using.

The research to support EDPET is compelling. Groenevelt et al, (2014) followed the lameness prevalence within four herds over a winter housing period. Cows were randomly assigned into treatment and control pairs, but remained within their management groups with exactly the same housing, feeding and management. All cows were mobility scored every two weeks.

The only difference between the control and treatment cows was that the treatment cows were trimmed (treated) by one of the researchers within 48 hours if they were found to be lame (mobility score 2 or 3), whilst the control cows were left until the farmer intervened following their normal protocols. The farmers were blind to the control or treatment groups and treated any lame cows from either group as they saw fit.

Firstly, after 18 weeks, the treatment group saw a reduction in lameness prevalence to 18 per cent (MS 2 or MS 3), whilst the control group was unchanged at 34 per cent lame. Secondly, the farmers, left to their own devices, simply failed to treat the majority of lame cows. Of those that were treated, the average delay before treatment (from first being recorded by the researchers as MS 2 or MS 3) was 38 days for the control group.

Thomas et al, (2015 & 2016) were also able to demonstrate the importance of early treatment. Depending on the treatment applied (see earlier), treated cows with claw horn lesions of duration two weeks or less had a 69-85 per cent cure rate (to MS 0 or MS 1) after five weeks (Thomas et al, 2015). Those cows with a longer delay – which included cows that were lame at the start of the study (chronic cases) – had a much-reduced cure rate of only 15 per cent after five weeks (Thomas et al, 2016).

Take home messages

- farmers, left to their own devices, are unlikely to detect and treat lame cows soon enough
- any delay results in a much poorer success of recovery
- NSAIDs are required in the first instance
- EDPET is important for all types of lameness, not just the claw horn lesions.

What is the correct toe length?

Dr Toussaint Raven famously described the Dutch trimming method in 1985 (Toussaint Raven, 1985). The toe length in 'cut one' of steps one and two was 75mm. For many trimmers in particular, this directive is as incontrovertible as any one of the Ten Commandments that Moses wrote on his tablet of stone. Heretics at Nottingham University have dared to question whether, in fact, 75mm is the ideal toe length (Archer et al, 2015). Could we be over-trimming claws leading to thin soles and predisposing to claw horn lesions?

Cadaver claws were X-rayed to measure the pedal bone length. A calculation was made for a safe trimming length of the toe, assuming a sole thickness of 5mm. There was a large variation in pedal bone sizes, and the age of the cow was a significant determining factor.

Figure 1. *Cross-section of an amputated digit showing necrosis of the distal pedal bone typical of toe necrosis. Note the open tract to the tip of the toe – this does not necessarily mean this was the primary route of infection.*

A one-size-fits-all approach is probably unrealistic.

It also becomes apparent that we may not all be measuring from the same point, so care is required to ensure a consistent approach. The researchers concluded that 75mm (plus 5mm sole depth) would be too short for 55 per cent of cows, as measured from the skin/perioplic horn border; and that 90mm would be a safer length for inexperienced trimmers because this would rarely be too short.

Take home messages

- there is not a one-size-fits-all toe length
- cows ≥4 years old should have a slightly longer toe length
- 90mm (from skin/perioplic horn border) is a safe trimming length but not necessarily correct
- more work is probably needed to help determine best trimming guidelines.

Toe necrosis

Toe necrosis is often dairy farmers' most pressing concern regarding lameness treatment (personal observation). Whilst the incidence of new cases may not be as large as other lameness lesions, cows with necrotic toes do not recover (**Figure 1**). Affected cows are always lame and walk with a characteristic 'toe-up' stance.

Chronic cases are often "managed" within the herd by regular trimming of the toes and blocking. However, the pedal bone necrosis – which is pathognomonic for necrotic toes – is always present; and whilst the cow may be able to survive for a long time within the herd, the condition will necessarily be chronically and unremittingly painful.

Depending on culling policies and the rate of new cases, the prevalence of affected cows in some herds can be as high as five per cent (personal observation).

Treponeme bacteria, responsible for digital dermatitis infections, have been associated with these and other 'non-healing' hoof lesions (Evans et al, 2011). There are probably two main routes of infection:

- toe ulcers or apical white line lesions; classically over-trimming or overwear, including post-housing or transport of fattening cattle – for example scrabbling on concrete and/or metal checker plate floors (Gyan et al, 2015)
- retrograde infection from the coronary band, under the wall (Atkinson, 2012) (**Figure 2**).

"Could we be over-trimming claws leading to thin soles and predisposing to claw horn lesions?"

Figure 2. *Cross-section of digit showing infection at the apex of the pedal bone and a tract from the coronary band, beneath the dorsal hoof wall.*

Figure 3. *An amputated digit showing a typical toe necrosis lesion with a split inner wall and a digital dermatitis lesion at the coronary band.*

In dairy cattle in the UK, the second type seems the most prevalent. Many cases have a digital dermatitis lesion near the coronary band on the dorsal hoof wall or interdigital space on the dorsal aspect which may have been the primary lesion (**Figure 3**).

The most common ethical form of treatment has been to cull the cows or perform a digit amputation. Digit amputation is usually a very successful treatment but it is useful to have alternatives. Radical reaction can also result in resolution, but

Figure 4. *The digit of a heifer with toe necrosis three weeks after resection of the dorsal wall and toe tip. The lesion is no longer infected and new horn covers the sensitive soft tissues.*

where the lesion began at the coronary band, it is necessary to remove all under-run wall, which is a difficult and time-consuming exercise.

Figure 4 shows a resolved case after such a resection in the claw of a young heifer.

Take home messages

- be aware of the alternative route of infection other than apical white line or toe ulcers
- radical resection may be a viable treatment option, but often requires a thorough dorsal wall resection.

Summary

There is still some way to go to gather all the answers for treating lameness. Hopefully, further research on this topic will give us some more pointers.

The world of cattle hoof care is a fast-moving one and veterinary surgeons are still at the forefront of research in this area. In order for this work to have an impact and improve the lives of cattle, as well as make dairy farms more sustainable, the veterinary profession holds many of the keys and should not be shy in coming forward to carry the baton.

This might be by educating and training farmers and foot trimmers, working with independent foot trimmers, or including foot trimmers as part of their vet-led teams. ■

PPD Questions

1. EDPET stands for what?
   - A. every day prompt early treatment
   - B. early detection, prompt effective treatment
   - C. evaluate, detect, pare, examine and treat

2. Which is true for cows with toe necrosis?
   - A. lesions will eventually heal after repeated trimming and application of antibiotic
   - B. eventually, cows learn to cope with the lesion – by blocking the sound claw and judicial use of NSAIDs, cows can reasonably be expected to remain in the herd for a long time
   - C. radical resection may be an alternative treatment option but digit amputation remains the treatment of choice for many chronic lesions

3. What is the most appropriate toe length for trimming the hind claw of an adult Holstein cow (≥4 years old)?
   - A. it is not possible to say
   - B. 75mm
   - C. 80mm
   - D. 85mm
   - E. 90mm

Answers
1. B
2. C – The approach taken in answer (B) is very common, but in my view entirely unethical owing to the chronic pain associated with these lesions
3. A.

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No hiding place

Not many months go by without there being a major news story about a dramatic outbreak of viral disease in humans somewhere in the world – Ebola and Zika being recent cases in point.

These immediately elicit media responses highlighting that these epidemics are the consequence of poor education and biosecurity locally and have the potential for global spread through widespread transport of both people and products, without satisfactory controls in place. Something must be done.

Yet, it is interesting to speculate whether the penny has dropped with 'the man on the Clapham omnibus' as to just how significant the risks are becoming of lethal disease pandemics appearing in hitherto 'safe' areas of the world and that, with the phenomenon of 'globalisation' now firmly embedded as the 'norm', there is no hiding place – for neither man nor beast.

If there is a general lack of awareness with regard to the spread of *human* disease, how much greater is the ignorance amongst the general public of the potential dangers of the spread of livestock diseases? Unless you are a farmer by profession, of course – or a backyard poultry keeper in Cumbria, Lancashire or Merseyside in the middle of May 2017.

On 15 May, Defra issued a statement announcing 'Measures put in place to reduce the spread of avian influenza will lift as planned across most of England today ... However, the measures will remain in place in targeted areas following evidence of heightened risk in these areas.'

Defra's latest risk assessment showed that although the overall risk in England had not increased, there was a heightened risk in parts of Cumbria, Lancashire and Merseyside. Recent cases in backyard flocks suggested that infection was still either circulating in wild birds or present in the environment.

The statement concluded that poultry keepers in the restricted zone were required 'to observe existing disease prevention measures, such as minimising movement in and out of bird enclosures, cleaning footwear, keeping areas where birds live clean and tidy and feeding birds indoors.'

But surely not us?

Many veterinary professionals had their ears bent by irate clients who "only have a few chickens" and cannot understand why they have "to be treated the same way as the big poultry farm up the road". Yet it is often from the backyards across the world that mutated viral diseases, such as 'bird flu' and 'swine flu', emanate; and in backyards that they are fulminated with potential zoonotic consequences.

So it behoves us all to take time out to explain this to our clients at every opportunity. Even if not a threat to human health, those viruses that infect livestock have a devastating effect on production costs, the availability of food and prices to consumers.

The fact remains that viruses are highly adaptive, no respecters of geopolitical divides and can be disseminated over vast distances by infected animals, people and – increasingly – opportunistic vectors. There is much that has yet to be determined in this latter respect; but incremental steps are being added constantly to our understanding.

Case in point

Bluetongue virus and Schmallenberg virus infect cattle and sheep, causing huge economic losses to farmers across the world. Both diseases are vector-borne; and, until now it has not been clear whether biting midges or the movement of animals made the most significant contribution to transmission.

A new model that can determine vectors for bluetongue and Schmallenberg virus has been developed by scientists at the Pirbright Institute and researchers hope the model could be applied to other diseases to help better inform control strategies. Writing in *PLOS Computational Biology,* they report on the use of the model to establish that 90 per cent of bluetongue transmission between farms is a result of midge dispersal, while for Schmallenberg it is 98 per cent.

"Previous models, used to study the 2007 bluetongue outbreak in the UK, were able to show how the disease spread, but were not sophisticated enough to determine the primary route of transmission which is crucial in helping to bring an outbreak under control quickly," explained Simon Gubbins, from the Institute.

"Our new model is able to distinguish between disease that is spread through midge movement and through animal movement. For both viruses, we have shown that insect movements account for the majority of spread between farms. Animal movements play an important role in introducing disease to new areas, but they cannot sustain an epidemic on their own.

"Importantly, the approach we have established for bluetongue and Schmallenberg virus could also be applied to other diseases spread by biting midges."

Researchers say that by enabling a better understanding of the impact of biting midges and animal movement in transmission, the new model will help ensure outbreak control strategies and procedures are better informed. It may also change the way livestock movements are controlled and will enable more accurate predictions about the spread of an outbreak and where and when it would be best to vaccinate.

And with a number of cases of bluetongue (BTV-8) in cattle confirmed in northern France this summer, this kind of information could not be more timely or relevant – especially if you are a livestock farmer in the south-east of England or the owner of a few backyard sheep. ■

Ángela Lorenzo
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Ángela graduated from the University of Las Palmas de Gran Canaria in 2008. She spent the first years of her veterinary career working mainly in small animal practice in her homeland of Tenerife, working for a donkey charity in Portugal and volunteering in two wildlife centres.

In 2013, Ángela moved to the UK and, after some time studying English and a short period in small animal practice, was selected for an internship at the RSPCA Wildlife Centre, Stapeley Grange. Following this, she spent the next two years combining small animal practice and working as a locum in different wildlife rehabilitation centres across the country.

In September 2016, Ángela started a postgraduate course in conservation medicine at the University of Edinburgh and has been working at the Wildlife Aid Foundation.

**Suggested Personal & Professional Development (PPD)*

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REHABILITATION

Ethics and practicality of wildlife rehabilitation

Why rehabilitate wildlife? To answer this question, it is very important to understand the impact that wildlife has on our lives and to appreciate the role of wildlife rehabilitation in our society.

It is known that the health of human communities is sustained by the maintenance of biodiversity and ecosystems' functions (Alonso et al, 2012). Healthy ecosystems are relatively stable; but they are very sensitive to change, such as fluctuations in population and species loss (bjc.berkeley.edu, 2017). When a species disappears from a particular area, other species or populations of the same species will 'take over', causing a loss of equilibrium in the whole ecosystem. This affects all its communities, including humans.

New diseases – affecting domestic animals, native wildlife and/or humans – may appear in the area, and overgrowth of certain populations or the establishment of new species not previously present, may also lead to environmental degradation.

Sadly, human activity has a massively negative impact on wildlife populations. Thus, although some people might argue that we should not intervene and leave nature to take its course, the truth is that most casualties presented to wildlife rehabilitation premises are sick, injured or have been left orphaned as a result of anthropogenic causes (**Figure 1**).

Some examples of causes for admission to wildlife rehabilitation centres, that are directly related to human activity, are:

- road traffic accidents (RTAs)
- poisoning
- dog and cat attacks; and
- shooting (**Figure 2**).

Figure 1. *A long-tailed tit – most casualties presented to wildlife rehabilitation premises are sick, injured or have been left orphaned as a result of anthropogenic causes.*

Figure 2. *Many causes for admission to wildlife rehabilitation centres are directly related to human activity – a radiograph of a kestrel shot with an airgun.*

Figures 3 *&* ***4.*** *Wildlife rehabilitation centres take care of hundreds of hedgehogs every year.*

But there are also many less obvious and indirect causes for wildlife casualties, the effects of which humans are still to blame. These include pollutants, habitat degradation, 'spill over' (transmission of disease from domestic to wild animals) and climate change, among others.

Based on all the above, I believe it is our duty to redress our mistakes by trying to give all these animals a second chance, by returning them back to the wild in a state of fitness that will allow them to thrive.

Moreover, British native species – such as the iconic hedgehog – have experienced dramatic declines in recent decades.

According to the report, *The State of Britain's Hedgehogs, 2015,* rural populations of hedgehogs have been reduced in number by at least 50 per cent and urban populations by 30 per cent between 2000 and 2014 (BHPS & PTES, 2015). Wildlife rehabilitation centres, such as the Wildlife Aid Foundation, take care of hundreds of hedgehogs every year, contributing to the conservation of this species, as well as many others (**Figures 3** & **4**).

Wildlife rehabilitation – when and how

In the UK, there is little regulatory framework for wildlife rehabilitation (BVZS, 2017). Therefore, the responsibility falls to those people/organisations willing to rehabilitate wildlife to do so in a way that best suits the animals' needs in compliance with the existing animal welfare legislation. It should always be acknowledged that 'good intentions' are not enough to give the animals the care they deserve, but rather that expertise and appropriate facilities are needed.

People in charge of such facilities, together with their staff, should be familiar with the species they will be treating, and should be well trained (**Figure 5**). Guidelines on wildlife rehabilitation, such as those provided by the British Veterinary Zoological Society (BVZS), are very useful material for veterinary professionals who are – or could be to some extent – involved in wildlife treatment and rehabilitation.

The five welfare needs, stated in the Animal Welfare Act 2006, should always be granted, and knowing the natural history of the different species is essential to achieving this aim (www.legislation.gov.uk, 2017). These five needs are:

- suitable environment
- suitable diet
- to be able to exhibit normal behaviour patterns
- to be housed with, or apart from, other animals; and
- to be protected from pain, suffering, injury and disease.

A 'suitable environment' would be as far away from humans and potential predators as possible, in order to avoid unnecessary stress, and to prevent species from imprinting and habitualisation. Furthermore, social structure and behaviour must be taken to account. This is particularly important for those species that live in groups, and which should be housed according to their natural patterns – for instance, young animals that need socialisation in early stages of life.

Human contact with animals should be limited to what is strictly necessary to provide the care they need while in captivity, which is basic veterinary care, feeding and

Figure 5. *Staff should be familiar with the species they are treating and should be well trained.*

Figure 6. *Human contact with animals should be limited to what is strictly necessary to provide the care they need while in captivity, which is basic veterinary care, feeding and cleaning.*

Figure 7. *'Fitness for release' should be very carefully evaluated – a buzzard undergoes an eye examination.*

cleaning (**Figure 6**). Imprinted animals have little chance of survival in the wild, as they no longer behave in the same way as their wild counterparts. When animals are repeatedly exposed to certain stimuli, they become used to it and will no longer fear potential threats, such as humans and predators. These concepts of imprinting and habitualisation will be addressed in depth in a coming article.

Where wildlife in particular is concerned, not only diet (that must provide all the necessary nutrients) but also foraging methods and feeding patterns are key for successful rehabilitation – because many wild animals may not feed in captivity if the diet is not provided at the correct time and in the correct way, enabling them to recognise it as food.

Facilities are another important factor when it comes to animal welfare and successful rehabilitation. The enclosures should be adequate for each particular species, set at the right temperature and kept away from noise and the presence and smell of predators. Although enclosures may need to be limited in size and kept fairly stark for sick/injured animals in treatment or early recovery, they must be large enough and stocked with suitable enrichment for the animals to show normal behaviour during the latter stages of the rehabilitation process.

When the ideal facilities are not readily available, however, veterinary practices can still play a crucial role in wildlife rehabilitation by providing first aid treatment. In this case, all efforts must be made to keep the wild casualty away from domestic animals, people and noise, and casualties should be transferred to suitable facilities as soon as they are available.

Treatment vs euthanasia

On admission – and sometimes even in the field – important decisions must be made quickly in order to avoid unnecessary suffering and/or stress to the animal. The three possible courses of action, after the first assessment of a wildlife casualty, are: 'immediate release', 'immediate euthanasia' or 'first aid and reassess'. When several casualties are presented at the same time, a good triage is essential to decide the order of treatment.

Many factors must be taken into account when deciding whether a wild animal should undergo rehabilitation or not; but animal welfare must be the paramount consideration.

Are the injuries – or is the patient's condition – causing unacceptable levels of suffering that are unlikely to be relieved in the short term or might lead to chronic pain? Can the expertise and environment necessary to address the animal's welfare needs be provided?

Secondly, 'fitness for release' should be very carefully

Figure 8. *Every single species deserves to be treated with respect and protected from suffering.*

evaluated (**Figure 7**). What are the chances of the casualty achieving a state of fitness similar to that of its wild counterparts, which will allow it to thrive and display normal behaviour patterns after release? The ultimate goal of wildlife rehabilitation should almost always be releasing the animal back into the wild, with very few exceptions, such as, non-releasable individuals of endangered species that might, in certain circumstances, join breeding programmes for conservation purposes.

It is vital to remember that keeping wild animals in a captive environment exposes them to what may be considered unacceptable and unjustifiable levels of chronic stress. It is also important to be aware of those species that it is illegal to keep or release, and those that can only be released with a licence – these species are included in Schedule 9 of the Wildlife and Countryside Act 1981.

Finally, the potential duration of treatment and rehabilitation should be taken into account. This is especially important in migratory and territorial species, because release sites may not be available or suitable when the animal is finally ready for release – another consideration being the welfare implications of keeping a wild animal in captivity for long periods of time.

Unfortunately, many of the wildlife individuals presented to rehabilitation centres (except for orphans) are badly injured or debilitated by disease at the moment of admission. This is a consequence, in part, of the stoic nature of most wild animals that have evolved in a way such as not to show signs of weakness, as a strategy that gives them a better chance to survive in the wild. In many cases, this weakness is what makes it possible for us to 'catch' animals that would otherwise easily escape when approached.

Furthermore, an underlying, debilitating condition may be part of the reason for accidents, such as RTAs or cat and dog attacks, making these wild animals 'easy targets'.

Based on all these factors, it must be decided whether euthanasia might be the 'kindest' course of action or whether treatment should be undertaken. If in doubt, treatment and frequent reassessment is advisable. Seeking expert advice when in doubt is also always encouraged.

Every life matters

The Wildlife Aid Foundation believes that every single species deserves to be treated with respect and protected from suffering (**Figure 8**). This applies to all creatures, large and small, from the big iconic predators to the smaller so-called 'pests'. A complete food chain is fundamental to human survival and the presence of wildlife is an integral part of that cycle.

Every species plays a role in the many ecosystems that form the biosphere. Through wildlife rehabilitation, we help to maintain the equilibrium and give every animal the care it deserves, and perhaps the second chance we owe them. Because every wild life matters. ■

** The Wildlife Aid Foundation is always looking for volunteer veterinary surgeons and nurses, who want to learn more about how to care for British wildlife. If you are interested in this unique experience, please contact us via our website, www.wildlifeaid.org.uk*

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**Suggested Personal & Professional Development (PPD)*

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SNAKES

Anorexia in snakes – common causes and treatments

It is vital to understand that anorexia in reptiles is a symptom and not a disease. Anorexia can have a wide range of underlying causes – infectious disease, husbandry deficiencies, metabolic and sometimes normal physiological processes.

Husbandry related anorexia

A significant proportion of anorexia cases will be directly or indirectly connected to husbandry, so any snake presenting with a history of anorexia should have a thorough husbandry evaluation performed. This should include evaluation of:

- heating
- lighting
- humidity
- substrate
- vivarium size and material
- cleaning, and
- feeding regimens (type, size and frequency).

Pre-prepared husbandry questionnaires can be a time-saving adjunct to the consultation – although, if they are provided to the owners before the practice visit, they allow them to look up the 'correct answers' to put on the form which negates their purpose and makes the information less reliable than that obtained by direct questioning.

The origin of the snake – captive bred, captive farm or wild caught – should be identified. Fortunately, wild-caught snakes are now rare in the UK pet trade and, when they do present, some simply do not adapt to captivity and fail to eat – often termed a 'maladaptation syndrome'.

Stress in reptiles can be a common cause of anorexia. Along with the husbandry, it is important to ask about handling – who handles the snake, the frequency of handling and time out of the cage? It is important to remember snakes are not a domesticated pet – although many commonly kept species tolerate handling well, some species are easily stressed by excessive or rough handling, which can result in anorexia.

The location of the cage in the house is important. Is it in a high traffic area that can lead to nervousness and striking at the glass in sensitive species? Are there loud noises or excessive vibrations? Some shy reptile species may not feed when being watched or if there is too much external activity around the vivarium. Other species are very specific with regards to feeding times – crepuscular reptiles feed best at dawn and dusk.

Nocturnal reptiles may not feed at all if food is offered only during the day, even if they are in perfect health. Some clients provide night-time heat using light-emitting bulbs – reptiles require a day/night photoperiod and lights should never remain on for 24 hours a day.

A snake vivarium must have adequate places for the occupant to hide in order to feel secure. Terrestrial snakes require hides such as caves and tunnels. Generally, at least one hide per snake in the cool end and one hide in the hot end allows thermoregulation, whilst retaining options for seclusion.

For arboreal snakes, however, hides on the floor are clearly not adequate. Branches with artificial or living foliage are used to provide sufficient cover for the occupant to feel secure. Many owners make the mistake of sacrificing vivarium width for extra height for arboreal snakes – this makes horizontal thermoregulation difficult to achieve.

Reptiles from temperate climates may have a period of dormancy; which usually begins in the autumn. This is part of their preparation for 'brumation' during the winter. Brumation allows reptiles to survive winter temperatures that are below their preferred optimum temperature zone (POTZ). Some species will enter brumation regardless of the temperature of their environment. It is presumed this is instigated by other triggers such as photoperiod, humidity and possibly atmospheric pressure.

Brumation is often associated with a period of anorexia. However, it is incorrect to make assumptions; and snakes – in cases where anorexia is suspected to be as a result of brumation – are still best examined for any underlying cause of illness. Making assumptions that anorexia is caused by brumation can mean disease in the early stages is missed until it has developed into a more serious condition.

The husbandry history needs to identify whether

> "A significant proportion of anorexia cases will be directly or indirectly connected to husbandry..."

Figure 1. *Blood sampling a Burmese python to investigate any underlying cause of anorexia.*

Figure 2. *Mid-abdominal swelling caused by a gastric carcinoma in a king snake.*

the correct diet is being fed. The majority of carnivorous snakes kept in the UK will be maintained on a diet of frozen, thawed rodents – but exceptions do apply. Many garter snakes prefer a diet of fish and rough green snakes are insectivorous. Just because adults readily accept frozen, thawed rodents doesn't mean the juveniles will immediately take to the diet voluntarily.

A common cause of anorexia in juvenile snakes arises from attempting to feed rodents to species that in the wild would mainly eat lizards – *Lampropeltis* spp, for instance. It is important to convert these snakes onto a diet which will be readily available; and, in this respect, 'scenting' rodents by using 'shed' lizard skin can meet with success.

Another example is found in royal pythons. They will commonly prefer gerbils – supplied frozen and thawed before feeding – as a food source. If, however, there is not a reliable commercial source of these rodents as feeder animals, it can lead to problems later in life when shortages from distributors mean rats or mice are the only option but the snake is wedded to eating gerbils.

Normal physiological causes of anorexia are seen commonly in snakes (**Figure 1**). Gravid females will frequently stop feeding during gestation. Some species of python, such as green tree pythons, also maternally incubate the eggs and will refuse food during this period. This can lead to a significant loss of condition owing to the prolonged 'fast' during a period of increased metabolic demands.

Many snakes will also be anorexic during the process of shedding (ecdysis) – a snake's vision is impaired as the eyes cloud in the days prior to shedding. It is also important to note that hatchling snakes will often refuse feed until after their first shed.

Non-infectious disease

Gastrointestinal problems may lead to anorexia. Stomatitis causes oral pain and dysphagia in advanced cases, in which the underlying reasons include trauma (striking at feeding tongs, striking at glass), immunosuppression resulting from poor husbandry and secondary opportunistic infection. Stomatitis may also precipitate oesophagitis or gastritis.

Dental disease may be seen in some snakes. Tooth loss is seen occasionally as a sequela to severe stomatitis and leads to dysphagia and a difficulty for the snake to hold prey and prehend it to the back of the mouth. Owners commonly report animals striking the prey – but with it subsequently falling to the floor without being consumed.

Overfeeding is actually a common long-term cause of anorexia in snakes. When surveyed, many reptile owners report feeding time to be their favourite aspect of reptile keeping. This may partly be the reason snakes in captivity are frequently overfed, often accompanied by obesity resulting from reduced exercise compared with wild counterparts. This obesity, in turn, predisposes to hepatic lipidosis, which often presents as non-specific symptoms – commonly starting with anorexia.

Gastrointestinal neoplasia is seen sporadically in reptiles – carcinomas being the most frequently identified at the author's practice (**Figure 2**). Diagnostic imaging, endoscopy and biopsy techniques are routinely used in combination to make a diagnosis.

Solitary lesions may respond favourably to surgical excision; however, many cases involve diffuse or disseminated lesions requiring either systemic or invasive surgical treatment. Extra-mural, non-gastrointestinal masses can lead to functional obstruction and anorexia (**Figure 3**).

Impactions and foreign bodies – while certainly more common in lizards and tortoises – can be seen periodically in snakes. Substrate material may be ingested when animals strike for food, especially if rodents are wet after being thawed and substrate has stuck to their fur and been ingested.

The impactions are rarely radio-dense, so ultrasound imaging or CT scanning are often used to diagnose rather than radiography. Upper GI endoscopy can also be beneficial and is technically straightforward in snakes.

> "The husbandry history needs to identify whether the correct diet is being fed"

Infectious disease

Parasitic disease can lead to anorexia. The protozoal disease cryptosporidiosis can cause anorexia and, commonly, regurgitation in snakes. A mid-body swelling or blue discolouration is occasionally reported associated with the disease. Outbreaks are particularly common at breeders and shops, mainly affecting hatchling and juvenile animals; and poor husbandry, hygiene and inadequate temperatures can precipitate its spread amongst a collection.

Gastrointestinal nematodes and cestodes are rare in captive-bred snakes but can commonly be seen in captive-farmed and wild-caught specimens. Part of the investigation into anorexia should involve a complete faecal screen, including examination of a direct preparation, plus flotation and stained cytology samples.

Cryptosporidia stain positive with acid-fast stains. The reliability of diagnosing the organism on faecal screens, however, is low – so faecal examination can be combined with examination of gastric lavage samples to increase the sensitivity.

Paramyxovirus, herpes virus and adenovirus are the most commonly reported viral causes of gastroenteritis associated with anorexia in snakes. Viral infections are often accompanied by immunosuppression and leukopaenia – many of the affected animals also suffering from secondary bacterial, fungal or parasitic infections.

Diagnosis of viral infections can be challenging because many commercial diagnostic tests lack sensitivity and specificity, while intermittent shedding and access to suitable tissue at biopsy can make PCR analysis challenging. Serology for many viral infections – other than when rising titres are identified – often only confirms exposure and not active infection.

Ectoparasites, such as *Ophionyssus* spp, are implicated in the spread of viral disease amongst collections and good monitoring and prompt treatment of ectoparasites is vital.

Treatment summary

Given that anorexia is a symptom and not a disease, it is vital that the underlying cause is identified so that correct treatment can be instigated.

Husbandry modifications are a vital part of any treatment regimen, so it is vital to warn owners that, without the correct husbandry, many of these cases will fail to recover.

Patients may often require nutritional support in the form of gavage feeding with semi-elementary diets to correct negative energy balance and prevent secondary metabolic complications. The increased stress associated with tube or assisted feeding has to be weighed up against the benefits. ■

"Part of the investigation into anorexia should involve a complete faecal screen, including examination of a direct preparation, plus flotation and stained cytology samples"

Figure 3. *Oral mass in a green tree python that presented with anorexia.*

PPD Questions

1. Gastrointestinal nematodes are a common cause of anorexia in pet snakes. True or false?
2. Royal pythons commonly present as being anorexic owing to a preference for lizards in their diet. True or false?
3. Which three normal physiological behaviours are associated with anorexia?

Answers
1. false
2. false
3. brumation, gestation, incubation, ecdysis.

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Wildlife emergencies – what to expect at this time of year

Simon Cowell, CEO of the Wildlife Aid Foundation, writes...

In 'normal' years, nature follows patterns and it is easy to predict which events will happen at what time. This year, however, has been far from normal – everything started much earlier. At the Wildlife Aid Foundation, we saw our first orphan – a squirrel – in February, well over a month earlier than we would have expected (**Figure 1**).

Baby birds started arriving soon after, followed by foxes and badgers. The tide did not stop and, by May, garden birds were having second broods. Consequently, in July and August, there could well be a third wave of youngsters, particularly baby birds, which, if injured, may end up in veterinary practices.

Recently, we were called to a veterinary surgery that had taken possession of a baby tawny owl, which had been brought in by a member of the public who had found it wandering around on the ground. Tawny owls sometimes nest on the ground and as the youngster was not injured, the best course of action would have been to try and return it to its nest. Unfortunately, however, the receptionist at the practice had not taken any contact details or information about where the owl was found.

In late spring and well into summer, deer will also be having their young and it is common to be contacted by concerned members of the public who come across apparently stranded young fawns. It is very important not to rush in unless the animal is in obvious distress or danger. The best course of action is to observe at a distance, because most of the time the mother will be out of sight, but nearby.

If in doubt, call a wildlife centre for advice and if the fawn does need to be handled, always wear gloves and rub it with mud or grass to make sure no scent is left on the animal – parents will reject young that have human scent on them. In some species, particularly hedgehogs, the adults will even eat their young.

Gardening injuries are common in summer. Hedgehogs hiding in long grass and bushes are susceptible to strimmer injuries and nests and burrows can be disturbed by tree surgeons and builders carrying out work.

Figure 1. *An orphaned squirrel being fed.*

Figure 2. *A hedgehog caught in football goal netting.*

We are regularly called out to rescue animals caught in garden football nets and other types of netting (**Figure 2**). For this reason, we ask anyone with netting in their garden to raise it a foot or so off the ground – with football and sports netting this can be done when it is not in use, with fruit netting, this should be done when it is first put up. We also advise that anyone with chain link fences on their land checks them regularly because animals frequently get stuck in these.

Finally, in mid-summer, older, inexperienced young will be venturing out and this, sadly, will lead to road traffic accidents. Foxes, deer and badgers are the most common species to come to grief on roads – badgers and deer are particularly at risk as they are active at night and are difficult to see on unlit carriageways.

They do have a light-reflecting surface at the back of their eyes, called the tapetum lucidum, which helps them see better in the dark, so if drivers see flashes of light at the side of the road, it could well mean an animal is there and about to cross. ■

The Wildlife Aid Foundation (WAF), www.wildlifeaid.org.uk, promotes close co-operation between veterinary practices and wildlife charities that can offer rehabilitation and ongoing treatment following emergency triage.

Reference

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Plastic – the threat to ocean wildlife

The environmental impacts resulting from the accumulation of plastic waste are huge – and increasing. It is estimated that the life span of the average plastic bag is between 200 to 400 years; while a plastic bottle may take up to 450 years to fully break down. Of the 300 million tonnes of new plastic we use every year, eight million tonnes end up as waste in our oceans.

As this plastic waste is carried by ocean currents, much of it breaks up into tiny particles that – in some locations – outnumber plankton by a ratio of 26:1. A high proportion of these particles carry toxic chemicals, such as bisphenol A (BPA), phthalates, pesticides and polychlorinated biphenyls (PCBs).

Most marine debris (80%) comes from 'run-off' from land-based waste – litter, waste and debris from construction projects, ports, marinas, and commercial and industrial facilities. There is also waste blown out of refuse containers, trucks, and landfills.

Food containers, packaging and plastic bags comprise the largest component of marine debris; while some is blown into the water or carried by streams, rivers, storm drains and sewers. Ocean-based sources, such as overboard discharges from ships and discarded fishing gear, account for the other 20 per cent.

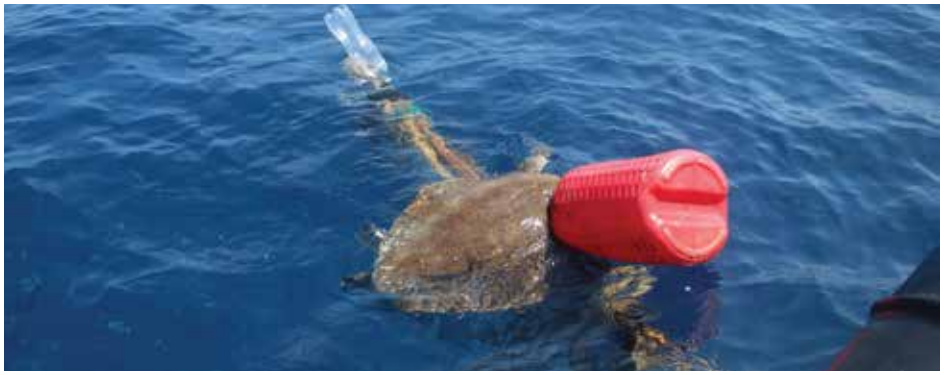

Photo credit: Coast Guard News via Visualhunt.

How does plastic affect ocean wildlife?

Plastics accumulate because they don't degrade in the way many other substances do. They will photodegrade on exposure to the sun; but they do so properly only under dry conditions – so water inhibits this process. In marine environments, photodegraded plastic disintegrates into ever smaller pieces, even down to the molecular level. When floating plastic particles photodegrade down to zooplankton sizes, plankton feeders attempt to consume them and, in this way, the plastic enters the ocean food chain.

Over 600 species of marine life are known to suffer directly from plastic pollution, including endangered species such as the Hawaiian monk seal, loggerhead turtle and sooty shearwater.

Many animals that live on – or in – the sea consume plastic, mistaking it for their natural prey. Plastic debris, when bulky or tangled, may become permanently lodged in the digestive tracts of these animals. An example of this is turtles that will attempt to consume plastic bags because they resemble jellyfish when immersed in water.

Seabirds also consume plastic, and can starve to death when their stomachs become impacted. Those that feed on the ocean surface are especially prone to ingesting floating plastic debris; and adults may also feed these items to their chicks, resulting in detrimental effects on chick growth and survival.

Aquatic life can be threatened through entanglement in plastic fishing nets left or lost in the ocean by fishermen. Known as ghost nets, these entangle fish, dolphins, sea turtles, sharks, dugongs, crocodiles, seabirds, crabs, and other creatures, restricting movement and causing starvation, laceration and infection, and – in those that need to return to the surface to breathe – suffocation.

Another growing concern for the marine ecosystem is the use of 'microplastics' – little beads of plastic less than five millimetres wide, commonly found in hand soaps, face cleansers, and other exfoliates. These microplastics pass through water filtration systems and into the ocean because they are so small – the beads being especially harmful to filter feeders.

In August 2000, an autopsy on a dead Bryde's whale near Cairns, Australia, revealed that its stomach was tightly packed with food, together with six square metres of plastic rubbish, including supermarket bags, food packages and fragments of rubbish bags.

Not only do plastics have a devastating effect on marine ecology and the populations of sea creatures, they can also have repercussions on human health. When we consume foods derived from the sea, we also ingest and absorb the toxins that these creatures have ingested – resulting in deleterious effects to fertility, brain development and chromosomal abnormalities.

How can we minimise the impact?

The bare fact is that consumers – that is all of us and our clients – hold the key to answering this question.

We can *all* help to reduce marine pollution simply by making a stand against the unnecessary volume of plastic used in everyday life – including in veterinary practice – to wrap and encase the food we eat and the products we use. We are the major players who can drive down the use and disposal of such vast quantities of plastic.

We must:

- petition manufacturers to use less packaging in their products;
- encourage 'regulators' to take a more enlightened view of food safety; and,
- radically reduce, re-use, and recycle plastics at both a personal and professional level.

By taking such a proactive approach – and sharing it with our clients – we can move nearer towards protecting irreplaceable marine life and preserving the health of future generations. ■

Practice performance – keeping your finger on the button

Most of us who use our computerised practice management systems to the full are able to generate the kind of information and statistics that, in retrospect, tell us how well our practice has been doing over the last few weeks or months. In reality, however, most managers only tend to look at six- or 12-monthly reports to see what has been happening.

"Ultralink can be used to generate useful information for any of your practice processes and activities – it's your choice – enabling you to make immediate changes to improve performance"

Looking retrospectively at practice statistics may be interesting; but, all too often, we let these historical figures pass us by without actually acting upon the information they offer. How good it would be to be able to see these data in 'real time' and to have the opportunity to act on today's figures, now.

Need for 'real time', now

For the busy practice manager or owner, to have this kind of information at their fingertips would not only be time-saving but also mean that "I must generate those statistics when I have time" is no longer an issue – everything you need will be there in 'real time' on your screen. So you can constantly monitor your practice and gain a true feel for its performance, and engage with the proactive management of service levels across all your branches.

"Monitoring all aspects of your practice's performance is the key to driving forward improvements"

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Flexible

You can set up separate dashboards for use by different members of your staffing team or to suit your practice requirements – financial reports, appointment or sales analytics and client or patient demographics, for example. Privilege levels can be set for reports and whole dashboards, ensuring practice data are available only to staff in the positions requiring particular information.

Compatible

Integration with Spectrum DDS software enables reporting on areas such as sales, stock, appointments, microchipping, pet health parameters, reminders and insurance claims.

Every dashboard – and the individual reports contained within it – can have a specific update schedule assigned, allowing you to customise how you view your practice information. Reports can be set to update when best suits your practice – with manual updates at the click of a button.

Intuitive

Ultralink comes pre-loaded with a range of common reports covering every aspect of your practice. These can be amended and customised, or new reports may be created using the in-built report editor.

With over 35 different methods of inputting, interacting with, processing and outputting data, the report editor allows for an unlimited number of unique reports to be created.

Data from Ultralink reports can also be exported and saved for easy integration with Microsoft Excel or other programs.

Key features

- select, customise and create reports easily with an intuitive drag-and-drop interface
- display results in various formats
- view key real-time data
- create dashboards in any size and available throughout your practice
- dashboards tabs can be rotated on screen
- separate dashboard for use by different practice members or to suit your preferences
- ability to restrict access to reports and to whole dashboards
- export results for printing or to use in programs, such as Microsoft Excel.

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Changing how you cope with stress – where does resilience come from?

In the last edition of *Veterinary Practice Today* [5(3): 66-68], we talked about where stress comes from and how it is dependent on a combination of what level of threat we perceive in a given situation and the level of coping skills we have at that time. By understanding the mechanisms that drive stress, we can turn the picture around and begin to identify what drives our personal resilience.

Anne-Marie Svendsen-Aylott
CandMedVet, MRCVS

Anne-Marie is an Inspirational Leadership coach and trainer. Her focus is on helping businesses create a culture of change where employee motivation and happiness is in focus. All her training is grounded in research and psychology and provides in-depth skills in communication.

Anne-Marie qualified as a veterinary surgeon, has worked for many years in sales, marketing and training and now runs the company, PurpleCat Coaching.

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STRESS

Where do we start?

Not surprisingly, increasing resilience is linked directly to the two areas of (1) reducing the threat and (2) increasing our coping skills (**Figure 1**).

Reducing the perceived threat

The most important aspect is to realise that our society as a culture is strongly biased towards a negative perception of stress. In essence, stress has become a label that is assigned indiscriminately and that has been linked with a constant drive to do more … and more.

As human beings, there are days when we are on top form. We seem to accomplish the most amazing things – we feel great, we have high energy levels and we are cracking on with our jobs. Then there are the other days – you know the ones. We wake up feeling a bit tired, we may have twisted a muscle the other day, we had an argument with a friend or a family member, and we may have an ongoing dialogue in our head about a problem we are experiencing. It is unrealistic to expect that we can do the same amount of work on a day when we feel like that.

So the first step is to be realistic in your expectations of yourself. Consider changing them into aspirations. Aspirations drive us – but we do not expect them to be fulfilled in the same automatic way as expectations.

In the short term, most of us are capable of doing extra work. Over time, our spare capacity is steadily eroded, and consequences start to arrive. An important part of managing the threat is to realise which part of it is related to work overload. Work overload is defined as what happens when job demands exceed the time and resources available to deal with them (Kirch, 2008).

Figure 1. *Resilience is about growing, not just in spite of adversity, but because of it (Image: Alan Levine).*

Resources can be divided further into skills and external resources, including time and assistance. No matter how good someone is at handling stressful situations, long-term work overload will result in burnout and the resulting physical, mental and emotional exhaustion.

It is vital we remember that our thoughts about stress can either help us or hinder us. By realising that some degree of stress actually can have beneficial effects on our bodies, the threat perception is already reduced – and the stress less likely to cause problems (Keller et al, 2012).

The second step of reducing the perceived threat is to recognise that it is almost always about what we can do (our behaviour) rather than about who we are (our identity). Yet as human beings we are very good at mistaking a lack of coping skills as meaning that we are not good enough, bright enough or capable enough.

> "So the first step is – be realistic in your expectations of yourself. Consider changing them into aspirations"

'a mental state in which an organism forced to bear aversive stimuli – or stimuli that are painful or otherwise unpleasant – becomes unable or unwilling to avoid subsequent encounters with those stimuli, even if they are "escapable," presumably because it has learned that it cannot'

Figure 2. *Learned helplessness.*

Figure 3. *Emotional state control is about recognising the emotions as they arise and pro-actively changing the meaning of the event or the situation in order to change the emotion into a more positive one (Image: Pat Pilon).*

- **emotion** – a transient and spontaneous feeling such as anger, sadness, happiness
- **state** – pervasive and sustained emotions
- **mood** – long-term, less specific and less intense emotional states.

Figure 4. *Definitions.*

Because our identity is something that is quite set in our minds, the problem is that this perception that stress is linked to not being good enough at our job, very quickly starts to erode our confidence and our resources.

There is a state known as 'learned helplessness' which is seen in both humans and animals that have learned that whatever they do, nothing is going to change (**Figure 2**). The interesting thing is that this state tends to spill over into other areas of our lives where we *do* have the skills and the possibility of doing something. Learned helplessness becomes a state of apathy whereby we essentially give up.

By changing our focus from our identity to our *behaviours*, we are able to bypass the state of learned helplessness and go straight to our coping strategies. Rather than being lost in "I can't", we start to focus on *how* we *are* going to cope. We also know that over time, as we successfully manage situations that were originally stressful, we may learn to increase our self-efficacy – in essence, we grow our resilience by successfully coping with stress (Ashokan et al, 2016).

Increasing coping skills

There are a number of strategies that have been shown to be useful in increasing coping skills (Allen et al, 2002; Connor-Smith & Flachsbart, 2007; Jamieson et al, 2012; Sharma et al, 2014; Thoern et al, 2016). Some of the broader ones are to:

- develop realistic positivity
- reappraise the physiological response/the situation
- pro-actively utilise relaxation techniques.

Develop realistic positivity

Realistic positivity is about re-training the brain to focus on the positives rather than the negatives, whilst still being aware of what is really going on. Realistic positivity is closely linked to emotional intelligence skills – the first of which is self-awareness and the second is self-management. In order to be able to change the way our brain thinks, we have to first be aware of where it is at and what impact it has on us from an emotional perspective (**Figure 3**).

One of the key defining skills of highly resilient people is the ability to effectively control their state – so while they feel the initial emotion, they quickly reassess it and decide whether it is appropriate in the situation or whether it needs to be changed. One of the ways that we change emotions into emotional states and sometimes into moods, is by how we translate that emotion with our internal voice – so-called 'mindchatter'(**Figure 4**).

It is important to realise that our brains go through life generalising everything and making assumptions of what things and events mean. It is a survival mechanism – after all, the brain is the most expensive organ in the body from a fuel perspective (less than two per cent of the total weight using around 20 per cent of the glucose), so from an evolutionary angle, it makes sense that as many functions as possible are automated.

These automated functions can be hard to identify, but what we say to ourselves (or to others) can give us good insights into the assumptions with which we have programmed ourselves. If some of those assumptions are focused on the glass being half empty, then we have set ourselves up for a negative attitude and approach to life.

A key aspect of re-training the brain is to let go of negative judgement. It is OK to get it wrong – and we all make mistakes. Focus instead on moving on and rewarding the positive thoughts and the positive actions. The difference between just positivity and realistic positivity is that when we are realistic, we acknowledge the fact that, 'yes', we made a mistake and 'yes', it could go wrong. And then we learn from our mistakes and we go on to do our contingency planning – to avoid spending undue time agonising about what we could have done differently and focusing instead on the future and on changes in systems and procedures; whether they are actual processes in the practice or just ways we think and analyse things.

Reappraising

Reappraising the response helps in putting a new meaning to what is going on. Reminding yourself that the physiological stress response is there to help you actually prevents a spiral into anxiety and further physiological arousal. We work better with a bit of adrenaline going through our bodies (Aschbacher et al, 2013; Dhabhar et al, 2012) and, by seeing it as positive, it becomes a tool rather than something to hold us back.

Similarly, it is useful to develop a keen sense of humour and to re-interpret what is going on around you. There is a

"Laughter is good for us and well worth pursuing"

Figure 5. *Relaxation is a highly individual thing. For most people, enjoying and appreciating nature has been shown to have a positive effect in reducing cortisol levels (Image: Hartwig Kopp-Delaney).*

reason that professionals who are routinely under high stress and who see serious injuries and emergencies develop a particular dark sense of humour. It is a coping mechanism, a form of looking at things differently and changing the response in the body to a more relaxed one. Laughter is good for us and well worth pursuing.

Reappraising situations can also come in the form of reframing – changing the meaning of the situation into one that is more positive. So... "We are inundated with work today" could be changed into "We are busy so that means I won't be made redundant" or "We are busy – what a great team to be working with" or "We are busy, so I will do something extra nice for myself tonight!"

By using the coping skill of cognitive reappraisal/reframing, we can change our interpretation of the situation and of the initial emotion and find a healthy way of thinking about the scenario. For example, rather than becoming stressed about a full 'ops list' and an acute emergency, we may think about how the whole team comes together to support each other, how the clients are sympathetic and understanding, and how we get an opportunity to delegate aspects of the emergency and thereby help increase someone else's confidence. It is important to recognise that this is an active skill that requires work, effort and discipline to sustain.

Proactive relaxation

It is important to use relaxation techniques proactively (**Figure 5**).

Most of the damaging effects of stress come from long-term sustained increases in cortisol. By using relaxation techniques – such as mindfulness meditation, exercise and cuddling pets (yes, the research is strong on that one too) – you can reduce the cortisol levels and help recharge your batteries. Some people relax best when around friendly company while others need that time alone.

And finally...

While it is tempting to reach for the smartphone, it may be worth noting that there is research which demonstrates that smartphones do not necessarily help reduce stress. Think about using your five senses.

Relaxation in our time and age comes from two different areas – relaxing the body through exercise, stretching, massages and so on; or relaxing the mind through reducing the sheer amount of thinking going on. Smartphones tend to do neither. ■

"While it is tempting to reach for the smartphone ... there is research which demonstrates that smartphones do not necessarily help reduce stress"

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Robin Launder

Robin Launder is the founder of Behaviour Buddy, a company that specialises in evidence-based CPD. Robin regularly speaks at conferences, schools and businesses about his twin specialisms of mindset theory and neuroscience.

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PSYCHOLOGY

Mindset matters – and here's why

Mindsets – the way you see yourself and the world around you – can shape your life. When that mindset is about a core concept such as intelligence, its power to shape is even greater.

According to Professor Carol Dweck of Stanford University, the originator of mindset theory, the way you think about intelligence can either lock or unlock your potential, weaken or strengthen your resolve, dampen or fire your creativity. It can even affect your level of intelligence.

There are two intelligence mindsets – fixed and growth. Here's Dweck on the difference between the two (Morehead, 2012):

'People with a fixed mindset believe that their basic abilities, their intelligence, their talents, are just fixed traits. They have a certain amount and that's that … Those with a growth mindset understand that their talents and abilities can be developed through effort, listening to feedback and persistence. They don't necessarily think everyone's the same or anyone can be Einstein, but they believe everyone can get smarter if they work at it.'

Fixed and growth mindsets, though, aren't only found in individuals, you also see them in organisations. And that corporate mindset can itself have an influence on the potential, resolve and creativity of the whole organisation. Get it right and everyone flourishes – the employee, the client and the organisation. It's win, win, win. But if you get it wrong, it's lose, lose, lose. You get 'fed-up' employees, dissatisfied clients and a stagnating organisation.

So how do you embed mindset theory into your organisation? Well, here are five tips to show you how. And by the way, the tips work for all organisations too – whether it is a school or a factory or an office or, say, a veterinary practice.

Talk about mindset theory

People with a fixed mindset cannot really imagine that someone could ever have a growth mindset – and vice versa. Mindsets exist without question. They are a part of our core belief system; with each presenting a truth so obvious that any other way of seeing the world is near unimaginable. The thing is, however, only one of the mindsets is correct (growth, of course), but the other seems no less correct to those who hold it.

So you need to make Dweck's ideas familiar throughout your practice. Have conversations about mindset theory; share her book (Dweck, 2006) and articles; show her online videos; put up mindset posters; run CPD sessions; invite a speaker in to talk to the staff group; share this article. Do all of that – plus the four tips that follow – and everyone benefits.

The growth mindset employee ends up with an extra dose of 'growth' – and no doubt a bit of empathy for those who are fixed; and the fixed mindset employee gets to see how their own mindset is disabling them. More than that, they are now able to make a choice that wasn't previously available to them – to act in either a fixed or a growth mindset way. They couldn't make that choice before because they didn't know the choice existed.

Explain neuroplasticity

As we've all experienced, learning a new skill is difficult – and the more complex it is, the more difficult it is to learn. Take driving, for instance. You have to concentrate on your feet, concentrate on your hands, and then somehow coordinate both at the same time. And while you're getting to grips with all of that, your instructor has the cheek to tell you that you've got to look at the road too.

In the beginning, learning to drive is difficult; but, as we know, it gets increasingly easier – to the point, in fact, that if you've been driving for a while you can do all of the above without even thinking about it. More than that, you can also listen to the radio, have a conversation and plan your day. And how is all of that possible? Well, it's down to something called neuroplasticity.

Neuroplasticity refers to the brain's ability to hardwire skills into its neural network. It is often shortened to plasticity – plasticity because something is said to be plastic if it can flex its shape and yet retain that shape. And that's precisely what your brain can do. Your brain literally grows new connections between brain cells. To start with, your brain has to use conscious effort to perform the skill (and not very well at that); but once it is 'hardwired', the procedure is performed unconsciously, automatically and efficiently.

"You see, if you can do something right away, then that's not learning, that's just doing what you can already do"

Neuroplasticity is a word that everyone – student, teacher, parent, lollypop lady, veterinary practice manager ... everyone! – needs to know and understand; because if they do, then they know and understand how their brain learns.

Embed stretch, feedback and stickability

Let us look at each in turn. Stretch refers to doing something that has a degree of difficulty – if there is no difficulty, there's no learning. Feedback is, well, feedback. It clarifies ideas, rectifies mistakes and tweaks performance. It shows you your blind spots or near-blind spots. The trick is to be open to feedback, to assess it objectively and to incorporate it willingly.

And lastly there is stickability. Stickability is the act of supergluing yourself to a task. If the superglue comes unstuck, then stickability is also the process of re-application. Stickability is falling down seven times and standing up eight.

Consider these three zones – the comfortable, the stretch, and the panic. Fixed mindset people want to be in the comfortable zone. In this zone they get to do what they've always done, which means that effort is not needed and they won't fail. That's the appeal. Unfortunately, in the comfortable zone, there is also no learning or development. So, if you want progress to happen, it is a 'no-go' zone.

Another no-go zone is the panic zone. Why? Because in this zone you become so overwhelmed by pressure and stress that learning is impossible.

"Neuroplasticity is a word that everyone needs to know and understand; because if they do, then they know and understand how their brain learns"

For progress to happen, people need to be in the stretch zone. If you stay in the stretch zone, stay with that degree of difficulty, changes will happen in the brain and learning will take place. Further, over a relatively short period of time, the stretch zone will become the new comfortable zone; and the panic zone, which was once outside your reach, will become the new stretch.

This is the learning process in action – and if you help your colleagues to understand this process, then you are helping them understand how to learn, progress and flourish.

An addendum

But teaching about stretch, feedback and stickability is not enough – hence this addendum. You also have to model it. If you want your colleagues to stay out of the comfort zone, to be open to feedback, to keep going regardless of setbacks and difficulties, then you have to model those three things yourself. If you do, then your team will believe that you believe those things to be important. At the same time, you'll be showing them how it's done. So model it!

Use the true meaning of the word 'fail'

For most people most of the time, the word 'fail' is used in a fixed mindset way. It is a synonym for words such as rubbish, loser, worthless, stupid and idiot. It connotes with emotions such as embarrassment, humiliation and shame. But this usage is as wildly inaccurate as it is unhelpful. In reality, 'fail' is an acronym for First Attempt in Learning.

You see, if you can do something right away, then that's not learning, that's just doing what you can already do. It can also stand for Fourth Attempt in Learning or Fifth Attempt in Learning or Fiftieth Attempt in Learning. It really doesn't matter which because every time you fail you get a learning opportunity, a feedback loop that allows you to refine your attempts until you get it right – or even better than right. It's called trial and error and it is the principle way that we learn.

Who has the most failures? Think about that question for a moment. Who would you say has the most failures? Now, your temptation might be to say 'those who are least successful' – but you would be wrong. It is actually the high achievers. By failing the most, they learn the most. Mozart mainly didn't compose masterpieces; Michelangelo mainly mucked it up; Messi mainly misses the goal. But because they fail, they have more learning opportunities, and those opportunities mean that they gain more successes. And as this process continues – incrementally and over time – the successes become spectacular.

Failure, then, is not something to be feared, it is something to be embraced. To fail is to learn, and that's the true meaning of the word – the meaning that needs to be embedded in the workplace. Sure, you need to mitigate and check the dangers of failure (you'd be business-bonkers not to) but the point remains: success comes from failure, and a fear of failure leads to stagnation.

Use descriptive rather than evaluative praise

If you tell people that they're clever or that their work is brilliant, then you are doing them no favours whatsoever. Sure, they will feel good (and you'll feel good because you made them feel good) but actually you will be inducing a fixed mindset. They will love your praise so much that they will do whatever they can to protect that praise.

So, to make sure that you always think that they are clever, around you they will stop taking risks. If they fail, you see, you might change your mind about their intellectual abilities. They may even reduce their effort. Why? Well, if they have to work hard at something then they can't really be that clever, can they. Things for them should come easily, shouldn't they. So, then, around you, rather than progress, they might begin to plateau, perhaps even fall back.

Praise is important; but the praise you want is not evaluative (as above), it is descriptive. Descriptive praise focuses on four areas of performance – effort, progress, process and detail. Here is an example – not from the workplace of adults, but the workplace of children – school.

- effort: "Grace, well done for your hard work."
- progress: "When I saw your picture last week, you hadn't really managed to capture its movement; but now I get a real sense of the train coming towards me."
- process: "You've thought hard about perspective and been careful about how you've shown it."
- detail: "The way you've drawn the smoke, how the track narrows, the size of the engine at the front, all add to the sense of movement."

And how about another sentence on effort? "What are you going to do to make the picture even better?"

It is not always necessary to give all four elements of descriptive praise – often it is enough to focus on one or two. But what you must not do (ever!) is praise outcome or intelligence. Do that and, paradoxically, outcomes will worsen and intelligence will reduce.

And finally...

One other thing – and it's vitally important! Repeat the above tips over and over again (and again). Fixed mindsets are fixed in two ways – fixed about the concept of intelligence, but also fixed in that they are difficult to budge. The problem is one of habit. If it has been your habit to think in a fixed mindset way, then that habit will do its utmost to hold on to you. Yes, we might understand and accept the reality of Dweck's work, but that doesn't mean that we are free of fixed mindset thinking. All smokers know the dangers of smoking, but not all smokers quit.

So, to help someone break free of fixed mindset thinking – or to become even more growth mindset than they currently are – you need to repeat the advice over and over again (and again). The more you repeat the tips, the more people will 'get it'; the more they get it, the more they believe in it; the more they believe in it, the more likely they are to make growth mindset choices. And when you and your colleagues are in that position, well, that's when potential is truly released – the potential of the individual and the potential of the veterinary practice.

The more you repeat the tips, the more people will get it; the more they get it, the more they believe in it; the more they believe in it, the more likely they are to make growth mindset choices; and the more growth mindset choices they make, the more they will experience the power of stretch, feedback and stickability. When you, your colleagues and the organisation are in that position, that's when potential is truly unlocked. ■

"Failure, then, is not something to be feared, it is something to be embraced"

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Confession is good for the soul

On the balcony in the ICC at this year's BSAVA Congress there was a stand called 'Vet Confessionals' – slightly hidden from view, but walked past by a large number of delegates on their way to the exhibition.

The stand simply provided cards on which anyone could write secret thoughts, anonymously, about their job. Post-it notes were also provided on which replies/support/comments could be written – the post-it note then being stuck to the original 'confession' card.

It was a simple idea which clearly appealed to a significant number of delegates – and the comments made interesting reading. Judging by the number of cards on display, the confession was clearly seen as a benefit: and, perhaps, as confession is intended to do, the very act of writing on the card helped to relieve the pent-up anxiety.

For some this may have been the first time they freely admitted their feelings about their job. So many expressed the same theme of feeling lost in the veterinary world in which they were working*. One very poignant – but positive – comment, went something like: 'Put the drugs back in the medicine cupboard – tomorrow is another day'; others listed lack of support or feelings of disillusionment, of being in the wrong job.

There was, however, one comment that seemed somewhat incongruous. It just said: 'No, I don't do this for the money'. The fact that this was written in bold capitals suggested it was a genuine strongly held belief in protest against veterinary costs and charging – certainly that was how it came over when read amongst the others.

While one can respect this view – and leaving aside the fact that all veterinary professionals should be in their roles because animal welfare is of paramount importance to them – it is a very unrealistic and naïve one for anyone employed in private practice. If they don't do it for the money, then their attitude towards the practice business ethic and policies and procedures on charging is unlikely to be favourable and they are going to be frustrated constantly by the need to charge for what they do – at a realistic rate.

It is difficult in this day and age to understand how a veterinary student can spend five years at veterinary school – as well as seeing practice – and not understand that the business of veterinary practice resides in the 'private sector' and relies on charging clients a fair price for work provided.

Yes, it is good to be altruistic; but this has to be merged with a degree of practicality. Veterinary surgeons are intelligent people who must be able to see that animals cannot all be treated for free and that a totally charity-based veterinary service is not a viable option.

So where does it all go wrong? This particular 'vet confessional' made uncomfortable reading, despite the fact that there were those offering encouragement to the card writers.

There is clearly a problem, one which is at the risk of being discussed ad infinitum without being resolved. There is an onus on veterinary schools to do more to educate students in the business of veterinary practice – although it is recognised that management and business education has improved and increased significantly over the past few years.

There is a responsibility for careers advisers to understand better – and to discuss more fully – the veterinary profession, in an honest and pragmatic way with potential students. And there is a big responsibility on students themselves to address their concerns and feelings and, perhaps, come to terms with some of the issues in veterinary practice for which they were, maybe, not sufficiently prepared – or simply not suited.

It is good to welcome all the help and support now being provided for young veterinary professionals – and older ones in some cases too – but most of this is closing the door after the horse has bolted. We are addressing the symptoms not the cause.

We do need to be careful that we do not invoke a 'nanny state'. A good example of this is the current trend for weather forecasters to tell us that the prospect

of heavy rain may require us to take our umbrellas if we venture out, or that wet roads may be tricky to drive on. Yes, it is a pet subject of mine!

The current spate of 'TV vet' programmes is not helpful to potential veterinary surgeons either; and these shows – for that is what they are – also give the wrong impression to clients. The emotive, glossy images tell a small part of the story; and, of course, it is only the 'entertaining' bits that make 'good TV' and are shown to the audience.

We don't, in any way, want to be putting school students off becoming veterinary professionals – indeed, we may need many more once Brexit has been completed; but we do need to 'tell it how it is' and encourage the would-be vet to really question their reasons for their career choice and their ability to stay the course – not just in veterinary school but in the big wide commercial veterinary world outside. ■

*** www.vetconfessionals.com**

Industry Profile

Your name: Brian Faulkner BSc(Hons) BVM&S, CertGP(SAM) CertGP(BPS) MBA MSc(Psych) MRCVS

Position & Company: Small animal practice owner and president of the Society of Practising Veterinary Surgeons (SPVS)

What does it mean to you to be the 2017 president of SPVS?

It is an honour, of course, to be entrusted with the leadership of one of our profession's longest standing societies – set up in 1933. I never really had any ambitions to become 'political'. I joined the SPVS Council in 2011 in order to contribute to the growing field of business and management CPD within the profession and one thing led to another.

Before I knew it, I was the SPVS officer for CPD – which role I carried out for three years, joining alliances with the VPMA's CPD stream. I also acted as the SPVS 'lead' for our Celtic Manor congress for two years before becoming president at our AGM in January 2017.

I see my presidency as a role whereby I represent the interests of veterinary surgeons working in practice, as well as those owning and running practices.

What are your ambitions for your presidential year?

The guiding theme for my presidency is the same as my guiding theme for my work as a veterinary surgeon and a veterinary practice owner. This is to help SPVS members in their pursuit of the critical areas that deliver what I call the 'triple bottom line' of veterinary success – patients, people and profit.

The prevention and resolution of disease should always be every qualified veterinary surgeon's priority and SPVS is firmly behind that. But veterinary practice is also a 'people' business, so SPVS will continue to support and promote well-being in conjunction with wider initiatives, such as the RCVS 'Mind Matters' project and Vetlife.

And finally profit. It is 'funny' that our profession still 'hears' that word profit as somehow dirty or shameful. I think, I know from my consultancy work, that so many people hear profit and think profiteering – the immoral and unethical pursuit of profit – as if it somehow equates with the exploitation of animals and people. This is why profit is deliberately third in my patients, people and profit trilogy.

SPVS has a role in helping those of its members who wish to make their veterinary organisations more profitable – not for reasons of greed, but because better profitability brings better choices. Better profitability means that we don't have to work all hours just to make ends meet; better profitability reduces financial uncertainty and fosters autonomy, all key variables in well-being.

What are your feelings on the effect Brexit will have on the veterinary industry?

Maybe in positions of status, such as being SPVS president, I am expected to sound insightful and intelligent on this subject! The honest answer is that I have no more of a clue as to what it will mean and how it will play out than anyone else reading this. I hope it doesn't mean an exodus of – or continued unwelcoming message to – our European colleagues, who are an essential part of our profession.

By the time this profile goes to press you will (hopefully) have completed the Ten2London Marathon challenge. Please tell our readers a little about the experience.

This was an incredible project and I loved every moment of it – from the planning and logistics, to the training, the nutrition, the mental preparation, as well as the last 10 days of actually running a marathon every day. Each day was very different and, although I didn't have a favourite, it was a massive thrill to run around some of the most beautiful parts of the British Isles and to have such a supportive team.

It is hard to believe that this time last year I had not run a marathon and now I've completed 10 in 10 days and raised over £15,000 for the Brooke in doing so! The challenge pushed me physically and mentally and I am pleased to have completed it without any injuries that a good rest won't fix!

Finishing at the London Marathon was emotional and I'm incredibly proud about what we've done and achieved and seeing our videos at www.ten2london.co.uk brings back so many memories. And yes I would definitely do another marathon – but not 10 more in 10 days!

What inspired you to take your MBA and move into management training?

The arrival of the 'corporates'. I realised in the mid-90s that the corporates were here to stay and so I thought I needed to acquire a proper education in business and management in order to compete with them – or join them! My MBA opened my mind to a whole new world of social science.

Having been educated in natural sciences with its focus on facts and right answers, social science and its focus on the ambiguity of economics, psychology and politics was a revelation. I realised that these were the concepts that I was longing to understand – both in the consulting room as well as in people management.

How do you balance your life as a practising veterinary surgeon and a lecturer, trainer and speaker?

Life is busy and it means that I have to plan my time well. I work in my own surgery on Mondays, Tuesday and Fridays as well as every other Saturday morning. I do my non-clinical work on Wednesdays and Thursdays. This means I tend to leave home on Tuesday evening after consults to be where I need to be for Wednesday morning and I return home on Thursday night, sometimes late, especially if I have been working abroad.

"I would not be surprised if a bigger non-veterinary brand name – Boots, for instance – joined the party by buying out one of the larger groups maybe"

Everything works well if travel plans go to plan – but typically, as I write, I am sitting in an airport facing a 45-minute delay on my flight which means I will not arrive home until after midnight.

You have always been an independent veterinary practitioner. What do you see as the value and advantages of remaining independent?
I have always said that I am unemployable because I am too autonomous not to be my own boss! I just like being a small practice and I enjoy the close family culture that it allows me to create and maintain. Of course, there are the financial challenges of competing against the prices that larger groups can afford to offer; but I believe that as long as an independent practice provides a personalised standard of service, it should do well.

What is your vision of the veterinary industry in 2027?
Honestly, who knows?! More and more consolidation is going to happen. I would not be surprised if a bigger non-veterinary brand name – Boots, for instance – joined the party by buying out one of the larger groups maybe. Market forces – and probably regulation – will force further change.

I suspect the traditional supporting roles within practice of nurse and receptionist will have evolved into an (even) higher and more advanced status. I wouldn't be surprised if veterinary education split into species-specific streams – and hence qualifications – during the latter half of the veterinary education course.

We lose a significant number of new graduates each year, owing mainly to disillusionment with the profession. How can we encourage new graduates to stay within the profession?
The expectation that a new graduate can come out and fly on 'day one' is unrealistic. In pharmacy, they have a pre-registration year which is like a work-based apprenticeship where mentoring is essential. I think something such as this should become more formalised in the veterinary industry.

I also think some employers should not be allowed to employ new graduates unless they hold some sort of mentorship 'badge' or qualification; because I see and hear some real horror stories of how vulnerable graduates are treated and not supported.

From my consultancy work, I can tell you that a 'sweat shop' approach to veterinary practice – in which we try to cram so many consultations into a veterinary professional's day as a way of trying to keep the cost of each consultation lower, with the resultant time pressure that many then find themselves under – are the biggest drivers out of our profession; as well as being the biggest causes of diminished well-being for those who remain in it.

I hope that 10-minute appointments will soon be obsolete. I believe that employers – of whatever size – who address this problem well, will become the preferred employers for veterinary surgeons; as well as enabling those veterinary professionals to deliver better client service and financial returns.

I see it all the time – practices that allow veterinary surgeons more time, make more money and have happier teams and happier clients.

If you were to offer only one piece of advice to the new graduate, what would it be?
May I have two? 1) Do not choose a job that does 10-minute consultations, and 2) realise that uncertainty and doubt about what is causing symptoms is inevitable, so don't let that doubt turn into self-doubt.

"I also think some employers should not be allowed to employ new graduates unless they hold some sort of mentorship 'badge' or qualification"

Where there is uncertainty (and urgency) there is the potential for stress and veterinary work has plenty of both of these variables. We all need to learn effective ways to conceptualise and to manage this uncertainty; which is what I have tried to address via my 'Colourful Consultation' model.

When – and if you ever – have any spare time, how do you relax?
Family, football and friends. My wife and I have two children – Freya, 12 and Seth 11. We have three pet lambs, six alpacas and, soon to be, two Labradoodles since one of my favourite patients has just given birth to seven pups.

I am a big Manchester United fan but have had to relinquish my season ticket owing to time commitments. I also enjoy cycling, especially in the south of France, and climb Mont Ventoux at least once a year – even if it is at a snail's pace! ■

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