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Veterinary PracticeToday

FOR PERSONAL & PROFESSIONAL DEVELOPMENT

Not enough experienced vets

Where does the responsibility lie?

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A core level skill

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UP FRONT...

In our 'Comment' piece in this issue of *Veterinary Practice Today*, the author poses the following two fundamental questions. Are veterinary schools choosing the right kind of candidates for modern veterinary practice? Are they presenting a realistic image of the day-to-day professional life and realistic expectations of finding employment commensurate with dreams and expectation?

These questions have been prompted – quite rightly – by the increasing focus on the well-being of vets and nurses in practice and the measures being introduced to support them. But more importantly, these questions spell out the crying need for those responsible for selecting students – notably the veterinary schools – to address the root causes of the mental health problems at a much earlier stage.

Whichever way you look at it, the selection of students for the veterinary undergraduate courses in the present UK veterinary schools is, at best, incoherent – and at its worst, a mess. And with other universities now queuing up to offer veterinary degrees, unless some kind of overall order is established to more closely manage the selection process, chaos will ensue.

While much of the current focus of the veterinary media is on the high numbers of EU-trained vets who are working in the UK and the effects of Brexit on their futures, questions should be asked of the vet schools as to the criteria used for undergraduate selection, especially with regard to students from overseas.

RCVS data show that admissions of overseas students (excluding those from EU countries) to the first year of the veterinary course (2014/2015) in at least two of the current UK veterinary schools were, respectively, 50.8 and 37.2 per cent of the total intake.

Another vet school proudly announces, 'Every year we welcome students from countries other than the UK onto our veterinary course. There are no restrictions on how many non-UK applicants we can admit, and non-UK candidates are assessed according to the same criteria as UK applicants'.

Surely these statistics and attitudes cannot be explained on any basis other than the potential extra revenue overseas students bring with them?

And as most of these students leave the UK immediately following graduation, it certainly isn't tackling the problem of a shortage of 'home-grown' UK vets in practice. Indeed, it is probably contributing to the shortfall.

So where do the universities' loyalties lie? With the veterinary profession and its actual needs; or with their need to balance budgets? Surely the universities have a moral responsibility to UK veterinary practices and the animal-owning public to provide continuity and sustainability in the stream of practice-oriented graduates they release.

David Watson
Editor

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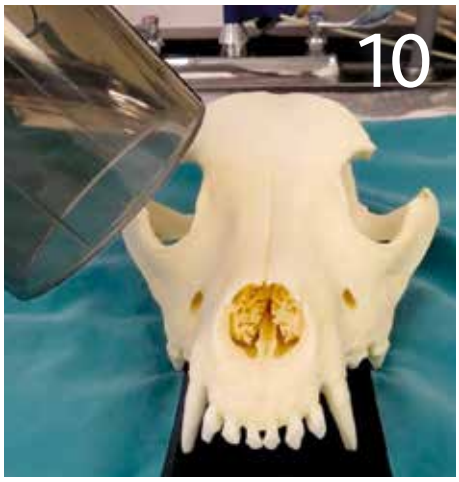

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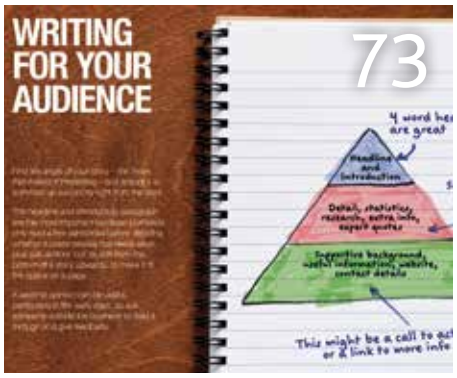

Industry

Not enough experienced vets – where does the responsibility lie?

Mike Dale
MA VetMB MRCVS

Mike Dale qualified from Cambridge veterinary school in 1975. He has worked in a variety of small animal practices in Nottingham, Cornwall and the South East and has managed a referral centre. He has experience of clinical directorship, practice partnership and ownership and has co-designed and built a veterinary hospital in Kent.

Mike and his wife, Mercia, a PR consultant, share their home with a kind and clever Rhodesian ridgeback, Zula.

Focus on veterinary graduate progress has never been more acute – thanks to a national awareness of mental welfare at work, concern over dropout rates, European politics and the emergence of new and innovative teaching establishments. Graduate development is of concern to the profession, the employer and the individual.

EDUCATION

The Royal College of Veterinary Surgeons expects to see its members conduct themselves properly in interactions with colleagues, the public and patients, without bringing it into disrepute. New graduates are largely well briefed about the requirements; but in terms of handling real-life situations, communication skills differ widely – according to experience, personality, upbringing and culture. Communication deficiencies need to be recognised promptly and modified.

I was told frequently by my mentors that I never had more retrievable information stuffed in my head than on the last day of my final examinations! Continuing professional education involves prioritising that information and absorbing the almost daily influx of new stuff according to current clinical relevance. The College sets targets and numerous resources are available for maintaining standards – albeit often at significant financial cost.

The employer has a financial and, hopefully, moral interest in supporting a graduate's early steps. The incumbent faces awesome learning curves in terms of acquiring practical competence, communication skills and investigative planning – all under time and emotional pressures. Corporate involvement has promoted the parameter of 'average transaction fee' to be an additional stressor. Ideally, the employer should provide training, supervision, mentoring and parochial support; but is, unsurprisingly, tempted to tailor that support to their own business needs ahead of those of the individual.

For many, the single goal has been to graduate, with little thought of what might happen next. The reality of general practice can be a real shock compared with the 'distilled' caseload of teaching schools. It is reported that schools do not always present realistic employment opportunities to prospective students. With a highly intelligent, intensively trained individual, hungry for experience and impatient for the opportunity to implement newly acquired professional skills, the potential for exploitation – conscious or unconscious – is immense. And it happens.

Immediate concerns

Let us look first at what a new graduate is faced with:

- find work – that is, persuade an employer that they can 'hit the ground running' learning and earning; doing minimal harm in the learning and justifying their existence in the earning
- probably adapt to living alone, organise personal finances – managing a salary, repaying student loan – and work closely with a group of strangers

"Are they [veterinary schools] presenting a realistic image of the day-to-day professional life and realistic expectations of finding employment commensurate with dreams and expectation?"

"What is needed first is acknowledgment – by all – that workplace pressures are a widespread reality, are detrimental to productivity, well-being and professional standards"

- learn practice policies and technical preferences, local disease issues, find and learn how to use equipment and learn unfamiliar drug presentations. Learn to use a practice management system, rarely with adequate instruction or sufficient time to familiarise
- appear outwardly confident and knowledgeable in the consulting room. Listen to – and understand – clients' needs, make a thorough clinical examination of every patient, prepare an investigation and treatment plan and deliver it in a seemingly impossibly short period of time
- learn to deal with clients' ignorance, grief, fear, anger, incompetence or unexpected kindness
- overcome personal tiredness, exhaustion, self-doubt, mystification and frustration. Maintain friendships and partnerships, stay motivated, eat healthily, exercise and sleep soundly.

How do they do all this? Who helps them master these early hurdles and grow into confident, effective veterinary surgeons proud of themselves and of their profession?

There are four basic areas of challenge.

Practical skills

Practical proficiency generates confidence in oneself, one's clients, colleagues and patients. Abilities differ and experience from extramural studies and veterinary school rotations will be varied. People learn at different speeds.

A graduate facing a new procedure or technique requires close guidance for the first time – ideally reinforced by doing several more on their own soon after, but with help close by if needed. Mentors need to be competent, patient, sensitive and always available.

General practice does not present a succession of conveniently different teaching scenarios. In my first five months, I faced nine gastric torsions; but it was two years before I had to perform a Caesarean on a bitch.

Some new graduates recall ...

"I received a long tirade of destructive criticism. They didn't even stop when I began crying. I was so cross with myself, but they just kept on."

"He didn't seem to get that I'm left-handed. Eventually one of the nurses showed me a better way. She was left-handed herself."

"The vet who volunteered to look after me gave me a three-month review. It was great to be able to focus on where I needed to improve and to voice my own concerns."

Communication

To do the best for the patient, the veterinary surgeon needs the skills to elicit as accurate a history and identification of the problem as possible. To keep the client 'on side' they need to be proficient at translating often complicated clinical situations into simple layman's language. Rapport, empathy and clarity must temper professional decisiveness.

Communication between colleagues is greatly facilitated by clear established lines of reporting and regular departmental and practice meetings. The meetings *must* happen, be concise and have defined purpose. Is that always so?

One of the greatest sources of misunderstanding, cultural confusion or downright conflict is management by email.

"Nobody spoke to me directly. I just received a stroppy e-mail from the regional manager that was sent at 4am in the morning! What they'd been told bore no resemblance to what actually happened."

Clinical knowledge

When do any of us stop learning? The new graduate, however, is aiming for that level where they feel they know as much as the client can reasonably expect them to know and not to feel silly when they need to seek more specialist support.

There is no substitute for personal experience; however, experience rubs off when you are exposed to senior colleagues discussing cases, commenting on those "common things that occur commonly" and reciting fond stereotypes, such as cockers with AIHA or Westies with atopy.

Formal CPD is invaluable; but the availability of a coach and mentor is essential.

Looking after the Self

Burnout, 'compassion fatigue', depression and suicide are not exclusive to our profession; but all have some root in the way that early professional employment experience forms our beliefs that become the foundation of our actions and expectations. When the expectation of being a happy effective, confident, rewarded veterinary surgeon – able to 'mend' and save all your patients – becomes confounded by long hours, clients with no funds, pressure to earn money, poor pay and unsympathetic management, the ensuing mental jaundice is profoundly damaging and, in extreme cases, life-threatening.

Room for improvement

The challenges to new vets are clear then and the need for ongoing effective support is indisputable. Many recent initiatives appearing in the form of CPD and support programmes are to be applauded and welcomed; and support for acquiring practical skills and clinical knowledge today is, of course, widespread – though not by any means complete.

The Royal College PDP programme is a useful measure of new graduates' acquisition of experience; but several individuals interviewed regarded it as just a 'tick box exercise'. I constantly met comparison with the nursing clinical coach system and it seems the PDP works best when an informed, dedicated mentor is actively engaged with the graduate's progress. This does not always happen.

Many corporate groups and some charities have recently evolved excellent graduate development programmes that are used to attract and support young employees. They represent great strides in early clinical training; although it is important that outside these courses, a coaching and mentoring presence persists in the workplace. Time and the need to maintain turnover targets will always be the enemies of ideal clinical support for graduate development.

There is scope for more proactive encouragement by the College for employers to train and support coaches and mentors. As we have seen, to be effective these teachers need to be trained themselves and to be given time in the working day to support their 'coachees'.

The internet is a superb source of instant education and instruction from peer-reviewed sources. It is to be hoped that all practices allow constant access for their employees during working hours; whilst respect for employers' time and investment is reciprocated by employees not abusing the resource by lingering on social media pages.

Similarly, there are resources for communication training – notably the very professional workshops provided by VDS and those within veterinary school training. The problem often is that those most in need of training are the least aware of their own deficiencies and this becomes a challenge for management.

Trained managers can be taught to broach these issues sensitively. My experience as a neuro-linguistic programming (NLP) practitioner is that once a person recognises that the source of their 'communication hiccup' is their own behaviour, they quickly find life in the consulting room becomes a whole lot more fun.

Mental well-being has finally achieved prominence in the professional consciousness. Interest and discussion have increased exponentially. There seems to be a move to review the whole selection, training and workplace structure.

Wake up and smell the coffee

Are veterinary schools choosing the right kind of candidates for modern veterinary practice? Are they presenting a realistic image of the day-to-day professional life and realistic expectations of finding employment, commensurate with dreams and expectation?

> "What is missing is the guaranteed existence of senior colleagues, well trained in mentoring and coaching with the time, resources and willingness to support, guide and motivate"

A recent paper by Whittington et al demonstrates a strong correlation between carefully tailored feedback to students and graduates and the development of a 'growth mind-set' using reflection and support to review setbacks and develop positivity towards the next incident rather than giving up.

Graduate programmes are the 'building blocks' of graduate support together with initiatives such as Mind Matters and Vet Helpline; yet the 'mortar' holding it all together, remains inadequate. What is missing is the guaranteed existence of senior colleagues, well trained in mentoring and coaching with the time, resources and willingness to support, guide and motivate.

It is difficult to see that coming to pass in the ever-hardening commercial environment of general practice.

Perhaps one solution may be to establish a new layer of teaching in the form of a postgraduate year in general practice clinics attached to referral centres, teaching units and larger independent groups? Stretching the training term without postponing the graduate's earning potential might allow more room for skills acquisition and coaching by trained teachers.

Our goal of well-being in our profession through supported graduate development might be influenced by different student selection, better preparation of those students and a great deal more attention to providing workplace support.

What is needed first is acknowledgment – by all – that workplace pressures are a widespread reality, are detrimental to productivity, well-being and professional standards. A lesson, perhaps, for non-veterinary ownership – that at the end of the day, adequate vocational reward for the veterinary professional will result in better financial reward for the shareholder. ■

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Susan Thorne
BSc(Hons) BVMS MRCVS

Originally from rural Argyll, Susan graduated from the University of Aberdeen with a BSc(Hons) in Zoology in 2006, before continuing her studies at Glasgow University Veterinary School where she graduated in 2013. During her university vacations, she visited Africa several times, studying predators ranging from lions to Great White sharks.

After some time in general practice, Susan joined DentalVets in North Berwick on a dentistry and oral surgery residency in 2015, supervised by Dr Norman Johnston.

Her hobbies range from competitive sailing in the summer to skiing in the winter.

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DENTISTRY

Dental and oral radiography

Dental radiography is essential for the diagnosis, treatment and planning of canine and feline oral pathology and conditions. It is a core level skill to which all small animal practitioners should have access and be able to operate efficiently.

Approximately 70 per cent of each tooth is embedded root structure. This is invisible during gross dental examination and its condition can only be assessed via dental radiography. Most dental pathology results in radiographic change to the roots and surrounding bone, making a dental examination incomplete without radiography. All veterinary practices performing dentistry should be able to take diagnostic dental radiographs efficiently.

Radiography units

Dental radiography units should be easy to manoeuvre and located next to the dental station. They can be wall-mounted on an arm, on a trolley, or hand-held (**Figures 1** & **2**). When units are located away from the dental area or are cumbersome, they tend to be used less often.

Modern units are easy to operate having fixed kV and mA values, the only variables being exposure time and film/focal distance. Calibration will depend on the age of the machine. Modern machines have the kV set in the range 65-90 with the mA between 7 and 15. The mA regulates the quantity of X-radiation produced while kV indicates the acceleration force of the electrons and, therefore, their penetration potential.

Film focal distance (FFD) is the distance from the tube's focal spot to the film; whereas, object film distance (OFD) is the distance from the object being imaged to the film. The normal rules on radiation physics require as great an FFD as possible with as small an OFD as possible. The FFD used depends on the type of collimation device on the unit and ranges from 15-20cm.

Most units come with a position-indicating device (PID) at the end of the tube head to collimate the beam and protect both operator and patient. This can be a pointed plastic cone (closed-end PID) or a lead-lined tube with an open end (open-ended PID). The open-ended PID provides greater protection against secondary radiation.

Digital processing

Digital processing is the most common method of processing images in veterinary dentistry. There are two main types – direct and indirect.

Direct (DR) digital processing

This uses a CCD or CMOS sensor and is only available in size 2 plates (31mm x 41mm) or less, which is not large enough for dog canines (**Figures 3** & **4**). Images are instant but the sensor in the mouth is vulnerable and very expensive to replace if damaged.

Indirect (CR – computed radiology)

This involves processing using a photostimulable phosphor plate (PSP). Plates are available from size 0 to size 5 and

Figure 1. *Unit wall mounted next to dental table.*

Figure 2. *Remote control panel.*

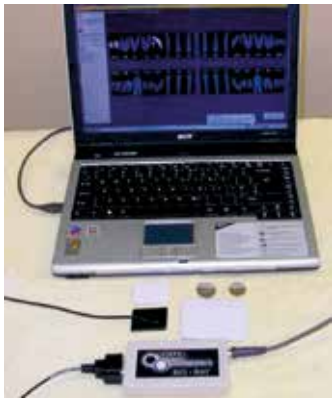

Figure 3. *Direct processing.*

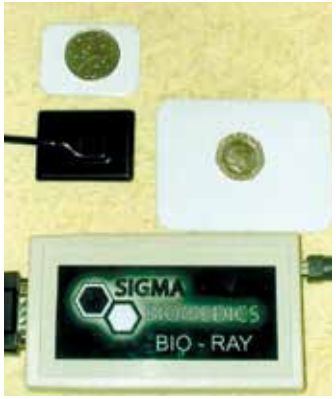

Figure 4. *Size 2 film on the left.*

"It is increasingly popular for practices to perform full-mouth radiographs in all patients at first examination; and then at regular intervals during their life, to monitor for progressive dental pathology"

Figure 5. *Indirect digital processor.*

Figure 6. *Conventional film.*

Figure 7. *Self-developing film.*

Figure 8. *'Chairside' developer.*

require a separate scanner to process (**Figure 5**). This takes longer than direct imaging (20 sec); but the sensors are relatively inexpensive to replace.

Film processing

Conventional films

For conventional dental radiography, small dental films are used (**Figure 6**). In the author's opinion, the most reliable films and the most useful sizes are Ultraspeed Kodak DF58 (31mm x 41mm) and Ultraspeed Kodak DF50 (57mm x 72mm).

Self-developing film

These are expensive, archive poorly, only available in size 2 and, in the author's experience, the film contrast is poor (**Figure 7**).

Analogue film

Analogue film is processed either manually or automatically. Most automatic developers will not take small dental films; so most practices using these films have a small 'chairside' developer (**Figure 8**). This allows films to be developed in the operating room.

Dental radiographic protocol

It is increasingly popular for practices to perform full-mouth radiographs in all patients at first examination; and then at regular intervals during their life, to monitor for progressive dental pathology. Experience with animals has shown that owner history and gross clinical examination is rarely sufficiently accurate to ensure significant pathology is not missed.

Studies have shown that, since 1998, the diagnostic 'harvest' from full-mouth radiographs justifies it. Radiographs of teeth without visible lesions uncovers clinically important findings in 28 per cent of dogs (Kim CG et al, 2012; Verstraete FJ et al, 1998) and 42 per cent of cats (Verstraete FJ et al, 1998).

In the absence of full-mouth radiographs, the following protocol is advised:

All 'missing' teeth

Remember, teeth not present in the mouth may not actually be missing. Examples are retained roots following fracture, resorption or inappropriate extraction. Also embedded or impacted teeth are common, often with an associated odontogenic dentigerous cyst and bone loss. Teeth can also be missing congenitally.

Periodontal pockets over 4mm

Assessment of 'attachment loss' of teeth with periodontal disease, including prognosis of the target and adjacent teeth and their treatment options, is not possible without dental radiographs.

All damaged or abnormal teeth

Trauma to teeth can present in many ways. Fractures of the crown may or may not cause pulp exposure-complicated or uncomplicated crown fractures. Movement of the tooth within the alveolar process during trauma – causing subluxation or intrusion – will often compromise the pulpal blood supply and /or cause haemorrhage in the pulp. In both cases, pulp necrosis follows.

Feline tooth resorption lesions

Full-mouth radiographs of cats should follow any discovery of feline tooth resorption (TR). One study described the mandibular 307/407 to be 'sentinel teeth'. If affected by TR, there is a 93 per cent chance that other teeth in the mouth will have similar pathology (Heaton M et al, 2008). Regular, repeated full-mouth radiographs are advised for cats with TR lesions to monitor progression throughout their life.

Pre-& post-extraction teeth

These should be examined to investigate their morphology and to ensure that complete removal has taken place with no damage to adjacent structures.

Criteria for acceptable radiographs

Radiographs can be considered to be 'acceptable' if they show:

- good contrast of enamel, dentine, cancellous bone and cortical bone
- the target tooth centrally on the radiograph
- a minimum of 2-3mm of bone visible around the root apices
- no superimposition of other structures.

Simplified intra-oral technique

A simplified intra-oral (film in the mouth) technique, after Woodward, describes simply three predetermined angles that are the same for each patient. When learning, it is best to have the patient in dorsal or sternal recumbency. The three angles to remember are: 20°, 45° and 90°.

The starting angle is 0°, when the tube head is aligned vertically and perpendicular to the table surface. If your patient is in true sternal recumbency, the tube head should align with the nasal philtrum (**Figure 9**).

If you can read the angle from your X-ray machine, it should now read 0°. From this angle, you add the set number of degrees depending on which tooth you are imaging.

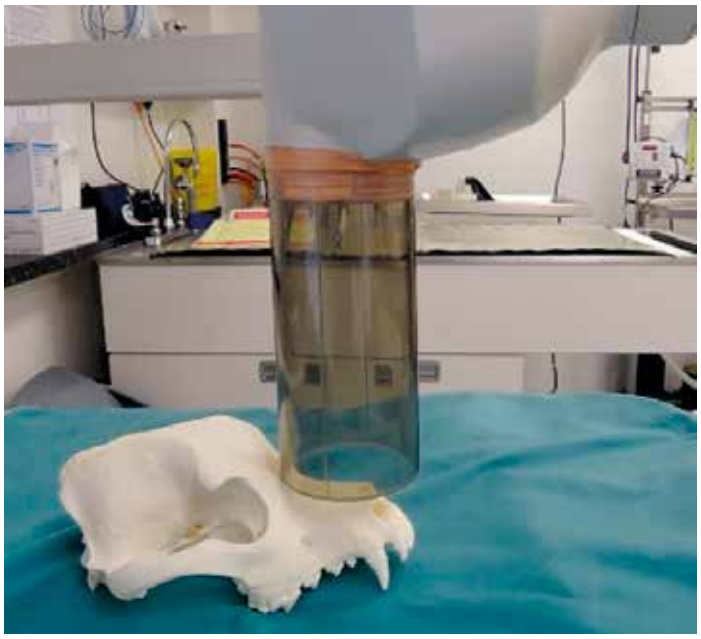

Figure 9. *Intra-oral positioning.*

Angles and positions: dogs

For dogs, size 2 plates can be used for the incisors and mandibular third molars. Use size 4 or 5 plates for all other teeth.

Maxillary and mandibular incisors

The film should be placed perpendicular to the nasal philtrum and flat against the incisors and palate. Aim the beam at 0°, roughly perpendicular to the table top and aligned with the philtrum of the patient's nose. Rotate the tube head 20° rostrocaudally, from the vertical over the target teeth and film.

For the mandibular incisors, the principle is the same, except the patient is in dorsal recumbency (**Figure 10**).

Maxillary canines

The film should be placed in the mouth, under the canine and against the palate. Aim the beam initially at 0° to the table top and along the philtrum of the patient's nose. Then tip the beam so it is angled between 20° and 45° towards the midline and over the canine. The canine imaging angle varies between 20°-45° depending on the width of the maxilla. This is breed dependent; so use a smaller angle for a narrower maxilla (**Figure 11**).

Mandibular canines

Initially start in dorsal recumbency for simplicity. Place the film and angle the beam as for the maxillary canines. When in its final position, turn the tube head in a rostrocaudal direction. As the mandibular teeth are closer to the contra-lateral teeth than in the maxilla, this angulation will stop superimposition of teeth from the opposite side (**Figure 12**).

Maxillary and mandibular premolars

The film should be placed perpendicular to the nasal philtrum, flat against – and covering – the maxillary or mandibular premolars. Tip the beam to 45° and aim over the premolars onto the film/plate.

Maxillary fourth premolar and molars (3 roots)

In sternal recumbency, the film should be placed perpendicular to the nasal philtrum, flat against and covering the maxillary fourth premolar and molars. The film must be as far back in the

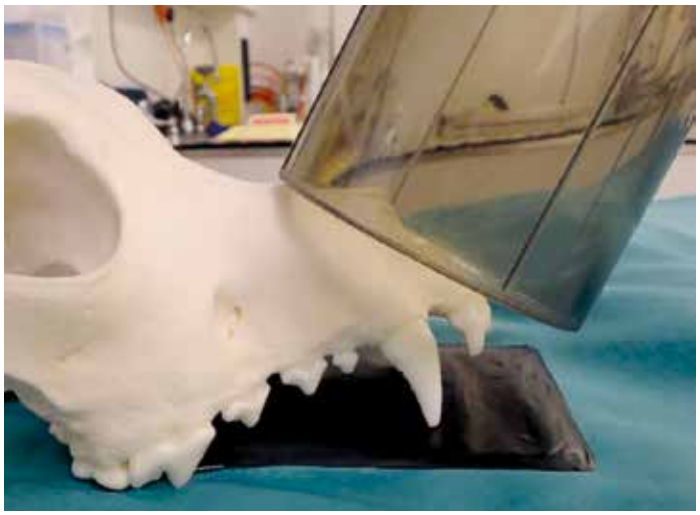

Figure 10. *Incisor view.*

Figure 11. *Maxillary canine view.*

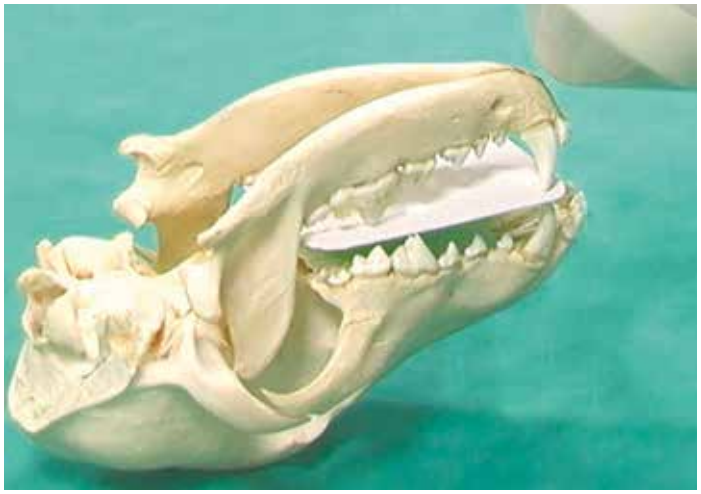

Figure 12. *Mandibular canine view.*

"Most dental pathology results in radiographic change to the roots and surrounding bone, making a dental examination incomplete without radiography"

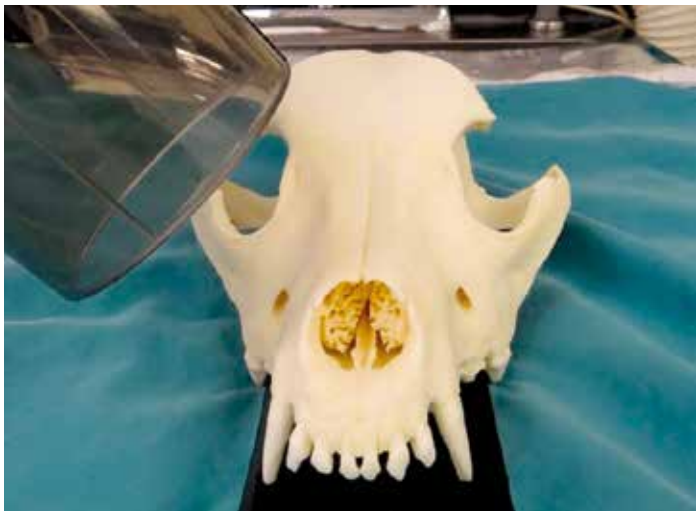

Figure 13. *Maxillary fourth premolar view.*

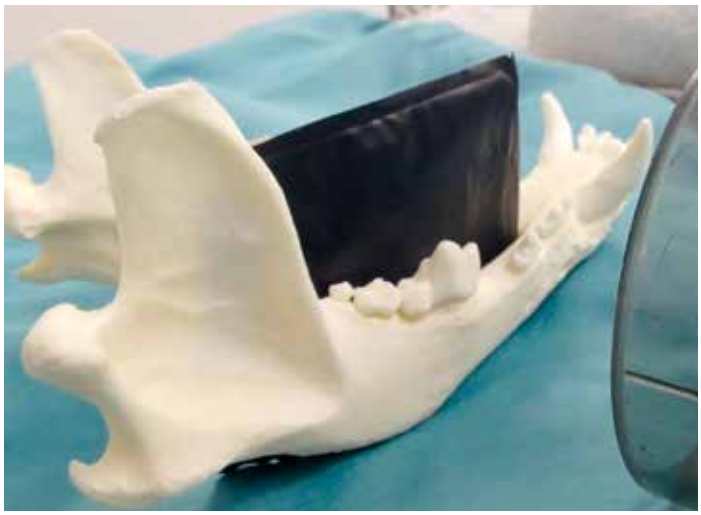

Figure 14. *Mandibular molars.*

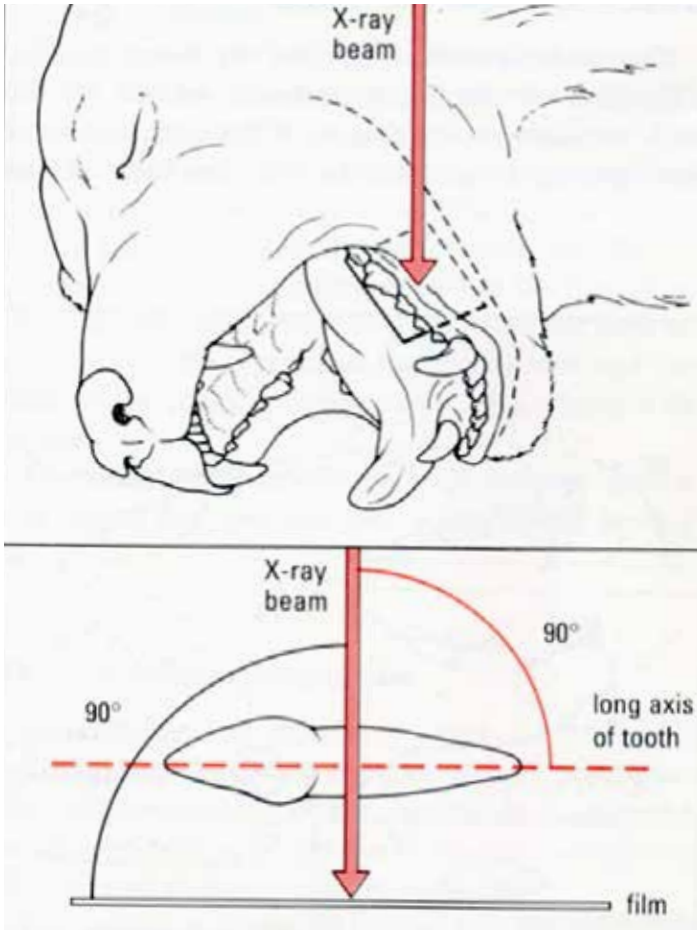

Figure 15. *Small size.*

Figure 16. *Conventional approach.*

mouth as possible to image all three teeth. Tip the cone head so the beam is angled at 45° from the nasal philtrum.

The fourth premolar has two mesial roots and one distal root (**Figure 13**). A true lateral projection will superimpose the two mesial roots. A second – and often third – image is required to separate the two mesial roots and visualise them individually. The beam can be either aimed rostrocaudally or caudorostrally for this image to separate the two mesial roots.

The first projection should be caudorostral as it provides the best chance of capturing all three roots on one image. Usually at least two images will be required of this tooth to fully assess it and to be able to apply Clarke's Rule (aka SLOB) to identify both the mesial roots. Often a dorsoventral (DV) projection is also useful to visualise the mesiopalatal root clearly.

Mandibular premolars/ molars

The film should be placed between the tongue and teeth, parallel to the nasal philtrum. The beam is angled perpendicular to the film at 90°. This technique can often be used for premolars as far rostral as the third premolar, but this is dependent on how far caudal the mandibular symphysis extends (**Figure 14**). The third molar can be a challenge and is often seen as missing in small breeds. A small size 2 film, held in place with a swab, is often best for this tooth (**Figure 15**).

Angles and positions: cats

For feline patients, size 0 or 2 films should be used.

Feline maxillary and mandibular incisors, canines, mandibular premolars and molar

For all these teeth in cats, use the same technique as described for dogs.

Feline maxillary premolars and molar

The feline maxillary premolars and molar are difficult to image as the zygomatic arch superimposes over the tooth roots when standard angles are used. Three different techniques have been developed to overcome this:

1. Conventional approach – place the film perpendicular to the nasal philtrum, flat against the palate to allow imaging of the maxillary premolars and molar. The film must be placed as far back in the mouth as possible to visualise all four teeth. The beam should be angled at 60º from the vertical/nasal philtrum and turned in a rostrocaudal direction (**Figure 16**).

2. Extra-oral technique – position the patient in lateral recumbency, with the target teeth nearest the table. Place the film extra-orally (on the table). The mouth is held open with a radiolucent gag. The beam should be aimed through the open mouth onto the target teeth and film. There is no specific angle for the beam and is positioned by line of sight. This technique pushes the zygomatic arch upwards on the film. Turning the cat skull approximately 20º dorsally will give good access to the target teeth with the beam (**Figure 17**).

3. Intra-oral, near parallel – place the film diagonally across the mouth resting between the lingual aspect ipsilateral mandibular PM3 and PM4 and the palatal aspect of the contralateral maxillary cheek teeth. The beam is angled approximately 70º from the nasal philtrum, which is nearly parallel to the plate (**Figure 18**).

Plate placement

Most plates or films have an embossed dot on a corner. Intra-orally place the dot away from the tooth being imaged to ensure it does not interfere with the image. The dot differentiates between the left and right sides of the image. On images where side needs to be determined, a small paper clip can also be placed on a designated side to assist. Place the film intra-orally so that the entire tooth and its root is covered by the plate – the roots can be longer than you think! Place the tip of the crown at a corner of the film to give the best chance of the entire root being imaged. The film should be placed as close to the tooth as possible, without distortion, to reduce the OFD. Props such as cotton swabs or paper towels will keep the plate or sensor in the correct position.

Conclusion

Mastering dental radiography and applying the outcomes to cases intra-operatively is the single biggest factor that will improve your ability to investigate, diagnose and successfully treat dental cases. ■

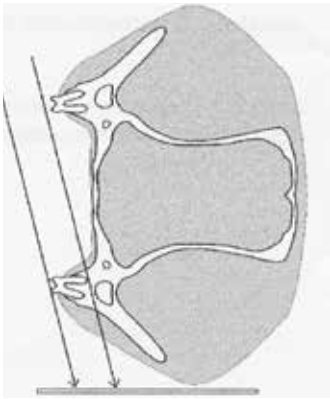

Figure 17. *Extra-oral technique.*

Figure 18. *Intra-oral, near parallel view. (Photo: Dr Tucker)*

PPD Questions

1. What are the two different types of digital film processing available?
2. In the absence of full-mouth radiographs, what pathology should always be radiographed?
3. What main criteria should be present in a diagnostic radiograph?
4. Describe in detail how to radiograph a dog's maxillary canine.
5. Name the three different approaches to radiograph feline maxillary cheek teeth.

Answers

1. direct digital processing (DR) and indirect (CR)
2. all 'missing' teeth; all teeth with periodontal pockets over 4mm; all damaged or abnormal teeth; full-mouth radiographs of cats if feline TR is found in 307, 407; pre- and post-radiographs of any treated or extracted teeth
3. good contrast of four main hard tissues – enamel, dentine, cancellous bone and cortical bone; target tooth should be central and the main focus of the radiograph; minimum of 2-3mm of bone should be visible around the root apices; no superimposition of structures; good handling and developing of the film
4. the film should be placed in the mouth under the canine and against the palate. Aim beam initially at 0° to the table top and along the philtrum of the patient's nose. Then tip the beam so it is angled between 20°- 45° towards the midline and over the canine. The canine imaging angle is between 20°- 45° depending on the width of the maxilla
5. conventional approach; intra-oral, near parallel; extra-oral technique.

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Paula Hill
RVN VTS(Anaesthesia & Analgesia)

Paula Hill qualified as a veterinary nurse from Myerscough Agricultural College in 2000. Her strong interest in anaesthesia and analgesia led her to referral work, principally as a surgical nurse since 2007.

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 – anaesthetic considerations in paediatric small animals (2)

There are many factors that need to be considered prior to anaesthetising a patient. A physical examination will help to identify 'at-risk' patients and it will also contribute to overall planning from the pre-anaesthetic period and into recovery. Planning will help to avoid any negative events or, at least, prepare the anaesthetist for such events.

Preparation is the key

A thorough physical examination is essential prior to induction of anaesthesia – and an important factor in paediatric patients that requires special consideration if there is any history of congenital abnormalities. Thoracic auscultation can prove challenging in patients with fast heart and respiratory rates; and if they are lively or noisy. A blood glucose measurement will establish a baseline from which to support frequent monitoring throughout the perioperative period – and careful weight recordings are particularly important to permit accurate dosing (Farry, 2010).

It is not recommended to withhold food from unweaned puppies and kittens (Farry, 2010). Once weaned, a maximum of two to three hours is adequate; otherwise there will be concern about hypoglycaemia and the hydration status of the patient.

The introduction of patient safety checklists is an invaluable tool and is recommended by the RCVS Practice Standards Scheme. Checklists should help to manage time more efficiently – possibly reducing the overall period under anaesthesia – and also to help avoid the loss of information between hand-overs (**Figure 1**).

- outline an order to perform key procedures during the anaesthetic period
- reinforce safe practices
- highlight anticipated critical events
- improve teamwork
- improve communication

(Source: www.ava.eu.com)

Figure 1. *Objectives of a checklist.*

Premedication

This will contribute to intraoperative cardiovascular stability, perioperative analgesia and the quality of recovery, and should support the needs of the patient. Ideally, choose drugs that will require minimal metabolism, have a short duration of action and ones that can be antagonised. Avoid premedication agents that have a significant effect on the cardiovascular system. Ultimately, use agents with which you are familiar and acquaint yourself with the doses and subsequent effects on the body.

Induction

Ideally, the patient should have a patent intravenous peripheral catheter securely placed and, if the patient will tolerate it, pre-oxygenate using a snug-fitting mask. The functional residual capacity is minimal, so there is a risk of hypoxia. Hypoxia will exacerbate some congenital abnormalities – for example, it can reverse a shunt if there is a ventricular septal defect, because hypoxia causes pulmonary hypertension. A hypoxic event whilst the senses are developing could also damage sensory organs (Rigotti and Brearley, 2016). Place electrocardiograph pads/clips on the patient and have a laryngoscope available to help visualise the larynx. Use an appropriately sized blade and have a selection of endotracheal tubes readily available (**Figure 2**).

Induction agents include propofol and alfaxalone (O'Hagen et al, 2012ab). Both are rapidly metabolised by the liver and they both have dose-dependant cardiorespiratory depressant effects, such that the drug should be injected slowly over one to two minutes to achieve the desired effect, helping to reduce the occurrence of induction apnoea observed following administration.

For very small doses, the active agent may be diluted with saline to support more accurate dosing. Ketamine can also be used for induction of anaesthesia, usually combined with a benzodiazepine. In dogs, it is metabolised by the liver and in cats it is excreted via the kidneys. The sympathetic response seen in adults following administration may not be seen in paediatric patients owing to their immaturity, and it is widely used for anaesthesia and analgesia in human neonates and children, supporting haemodynamic and respiratory stability (Bhutta, 2007).

Breathing systems

A non-rebreathing system is typically used in paediatric animals because it adds minimal mechanical 'dead space' and imparts little internal resistance to gas flow. The fresh gas flow rates need

Figure 2. *The use of a laryngoscope to facilitate tracheal intubation.*

to be adequate as the little-to-no end expiratory pause can lead to rebreathing and hypoxaemia (Hughes, 2016).

When performing intermittent positive pressure ventilation, care should be taken not to cause barotrauma, because these patients have a small tidal volume. If using mechanical ventilation, a pressure cycle will keep the flow constant over the inspiration period and terminate once a set pressure has been achieved (Hammond and Murison, 2016).

Inhalation agents

Both isoflurane and sevoflurane cause dose-dependant cardiovascular and respiratory depression. They support a quick induction owing to their increased respiratory rate and cardiac index – so excessive depths can be achieved quickly. Inhalant minimum alveolar concentrations in humans and animals vary with age, being greatest in the neonate and least in the elderly (da Cunha, 2015).

Face mask induction in some species is related to an increase in mortality rates and is, therefore, no longer recommended (Johnston, 2002). Environmental exposure and pollution to personnel is also a risk. It does highlight the importance of having a balanced anaesthetic protocol. Isoflurane and sevoflurane are largely removed from the body via the lungs and their pharmacokinetic characteristics enable a rapid adjustment to depth.

Recovery

The recovery period is the final objective and close monitoring and observations should continue well into this phase of anaesthesia. Consider the patient's neurological status and give the necessary support and comfort, as required.

Active warming should continue until normothermia has been achieved. Human paediatric incubators work well and provide a warm environment into which oxygen can be delivered – something that is required for the patient to maintain tissue oxygenation because postoperative shivering can increase oxygen consumption 10-fold (Sullivan et al, 2008).

Check blood glucose again and, as soon as the patient is able to eat and drink, offer highly digestible food. Many human hospitals support an 'enhanced recovery' programme – enhanced recovery is a modern evidence-based approach that helps people recover more quickly after having major surgery. Research shows that the earlier people became mobile – and commence eating and drinking – the shorter their recovery time (www.rcoa.ac.uk).

Pain

The official definition of pain by the International Association for the Study of Pain (www.iasp-pain.org) is 'An unpleasant and emotional perception associated with actual or potential tissue damage'. Animal pain assessment brings its own challenges because the inability to communicate does not steer away from the possibility that an individual is experiencing pain – regardless of age – and paediatric patients may not exhibit overt signs of pain. If a poorly managed painful experience occurs during the development of the nervous system, it may influence future nociception (Mathews, 2005).

In humans, studies suggest that infants exposed to an unmanaged painful episode retain a memory of that experience and their response to future successive painful episodes is altered – which may be to their detriment over their whole life (Mathews, 2005). Pain is sometimes described as the fifth vital sign (Lynch, 2004) and successful recognition and management of pain can make for a speedier recovery and improve patient welfare.

Pain recognition can be challenging. We can assess its intensity, observe its duration and location subjectively; but we can only surmise how the animal experiencing pain must feel and what their quality of life may be. Pain management depends upon a chain of actions that include anticipation, early intervention and evaluation of responses from individual patients (Hellyer et al, 2007).

Again, in human literature, the use of appropriate

"Non-steroidal anti-inflammatory drugs should be reserved for more developed paediatric patients where cardiovascular and renal systems are more competent"

pain-scoring tools has been recommended in guidelines set by both the Royal College of Nursing and the Royal College of Paediatrics and Child Health (Stewart et al, 2004). There is no gold standard validated pain-scoring tool and the difference between parental self-assessment, nursing and doctor assessment of a child's pain can be quite marked (Stewart et al, 2004) – something to which we can relate in veterinary patients.

The short form of the Glasgow Composite Measure Pain Scale validated both for dogs and cats can be located at www.gla.ac.uk/schools/vet/sah/services/anaesthesiaand painmanagement.

Analgesics can be administered systemically and local anaesthetic blocks used where possible. Opioids – in particular the Mu agonists – are the most potent analgesic agents available, providing some degree of sedation.

A conservative approach to dosing may be adopted, because entry across the blood-brain barrier is easier; although in human literature, analgesic requirements may be higher at certain stages of development (Mathews, 2005). During her own research, the author has found that there is nothing to suggest this doesn't happen in veterinary patients and so it is important that we dose to effect and monitor closely.

Local anaesthetics can complement the anaesthetic plan and form part of the analgesic plan by supporting multimodal analgesia. They can have significant anaesthetic-sparing effects, allowing the amount of volatile agents required during anaesthesia to be reduced and side effects lessened. Lidocaine, bupivicaine and ropivicaine can be used for this purpose (Rigotti and Brearley, 2016).

These are amino amide link local anaesthetics and their metabolism may be prolonged owing to the immature metabolic pathways of the liver. It is important to know the toxic levels and to calculate doses accurately in order to avoid overdosing because, in paediatric patients, the smaller nerves are not yet fully myelinated.

The use of lidocaine should be taken into consideration as it will contribute to the overall dose of the local anaesthetic. For accurate doses, it is worth drawing up the required amount into a syringe and applying it directly over the larynx.

Non-steroidal anti-inflammatory drugs should be reserved for more developed paediatric patients where cardiovascular and renal systems are more competent.

Conclusion

Immaturity can impact on a patient's ability to tolerate anaesthesia.

Plan, prepare, and be familiar with drug actions and doses. Endeavour to use the minimum effective dose required to achieve the objective.

We want to resemble homeostasis because these patients have limited physiological reserves which make them less able to respond to altered homeostasis. ■

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Nicola works as the senior medical nurse at The Veterinary Hospital in Plymouth. She graduated from Hartpury College with an Honours Degree in Equine Science, and subsequently qualified as a veterinary nurse in 2002. Nicola has been an officer of the BVNA and past editor of the Veterinary Nursing Journal. She sits on the Veterinary Products Committee for the Veterinary Medicines Directorate, and has written for many veterinary publications and textbooks. Nicola won the BVNA/Blue Cross Award for Animal Welfare in 2010, and various SQP awards in 2011, 2012, 2013 and 2014.

*Suggested Personal & Professional Development (PPD)

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NUTRITION

Making a nutritional recommendation

Feeding the correct diet is a vital aspect of maintaining health and in the management of disease. Understanding nutrition and its role in both health and disease is an important skill for all veterinary professionals, and your advice will frequently be sought by your clients to recommend a balanced diet for their companion animal – avoiding both nutritional excess and deficiency.

Many owners will ask if a specific diet that they are currently feeding is "any good" for their pet. In these cases, it is not only the food that needs to be looked at but also the pets' overall body condition, energy levels and health status. One diet may suit one dog exceptionally well and another not so well. The 'best diet for the pet is the one that the pet does best on'.

Nutritional assessment

It is important that all animals undergo a nutritional assessment, in order to give good clinical advice regarding nutrition. Nutritional assessment can be based on visual observations – such as body condition score and muscle condition scores – and specific measurements, such as weight, and plasma protein measurements.

When calculating a lean body mass for an individual, the animal must be visibly assessed and palpated. Use of the body condition score (BCS) index is the method of choice, but cannot recommend an actual figure for the ideal body weight. The BCS can be based on a five-, seven- or nine-point scale. Some breeds do not suit some aspects of the BSC index. For example, whippets and greyhounds in good condition have limited fat cover.

> "The 'best diet for the pet, is the one that the pet does best on' "

So a muscle condition score (MCS) should be utilised alongside the BCS (**Figure 1**). It is especially important to use the MCS when initiating a weight-loss diet, as dramatic losses could be the consequence of a drop in muscle mass and this needs to be prevented.

'Overcoat syndrome' occurs when a MCS of 1 or 2 is present; but the animal is carrying excessive amounts of weight. The large fat deposits mask the muscle wastage that is occurring. This can easily occur in animals that suffer from a dramatic decrease in food consumption – in acute anorexia, for example.

Other aspects of physical examination of the patient should be taken into consideration. These aspects include hair coat quality and skin condition, evidence of peripheral oedema or ascites – which may indicate hypoproteinaemia – and clinical signs, such as neck ventroflexion or tetany, that indicate certain deficiencies in micronutrients.

The use of body condition scores can prove to be very useful with patients suffering from chronic conditions that can affect weight and body condition. Patients suffering from cardiac conditions may develop ascites and this fluid collection can cause an overall gain in body weight. The patient's body condition score, however, may actually be decreasing as lean body mass is lost. This highlights the importance of monitoring BCS alongside weight at every consultation.

The World Small Animal Veterinary Association (WSAVA) has published excellent nutritional recommendation guidelines, available at www.wsava.org/guidelines/global-nutrition-guidelines. These include detailed guidance on how to incorporate them into veterinary practice.

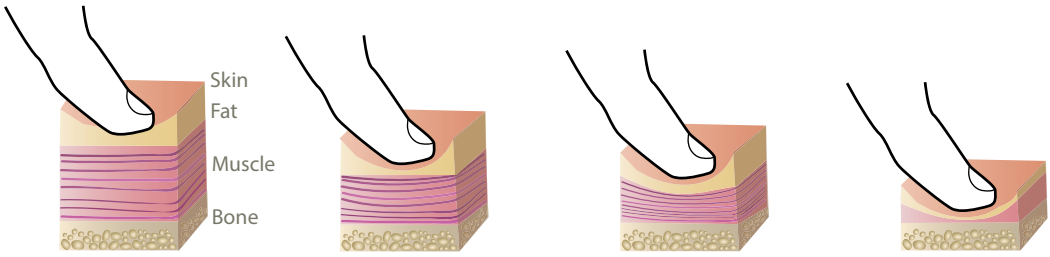

Figure 1. *Muscle condition score (Freeman et al, 2011).*

"Comparisons should only be made when using dry matter basis (DMB) percentages, or when based on energy content..."

Food comparisons

The quality of the food – especially the true digestibility of individual nutrients and the overall digestibility of the diet – cannot be assessed from the food label; only quantities. The bioavailability of nutrients is not disclosed on the label, and this does need to be conveyed to owners when they compare foods.

The typical analysis states the percentage of protein, oil (fat), fibre, ash and moisture (when over 14%). In the USA a guaranteed analysis is used, where percentages again are used, but a minimum and maximum value of each nutrient is given.

The moisture content of the diet has a direct effect on the remaining ingredients – moist diets being more dilute than dry diets. Thus direct comparison of the typical analysis is inaccurate when moisture contents differ. Comparisons should, therefore, only be made when using dry matter basis (DMB) percentages, or when based on energy content – per 100Kcal.

For example, Diet A might contain 0.52% phosphorus on a DMB, but Diet B might contain 0.8% on a DMB. So, for a renal patient, you might assume that Diet A would be a better food to feed. However we also need to look at the overall amount consumed – Diet A might be a low calorie food, and if it needs to be fed at higher levels, the overall consumption of phosphorus might be more than if we fed Diet B.

Proprietary diets are those made on a commercial basis. They are 'processed' and fall into two basic categories – complete or complementary.

Complete diets

Complete diets are those that provide a nutritionally balanced and adequate diet when fed as the sole source of food. All of the nutrient components are provided in the correct ratio, for the specific life stage, and do not require any additions from any other food source. In fact, adding other food sources to the diet in large quantities can make the overall daily intake of food nutritionally unbalanced.

Complementary diets

Complementary diets are those that do not provide a nutritionally balanced diet when fed alone. These diets are designed to be fed in combination with another diet, in order to form a balanced and adequate intake.

All treats and snacks are labelled as complementary foods and should only make up a small portion of the daily ration. Figures for treats are normally between five and 10 per cent. A 4kg, neutered, adult cat will need roughly 238Kcal per day, which equates roughly to a maximum of 23 calories a day in treats.

Homemade diets

It is relatively common for cats and dogs to be fed homemade diets. If prepared well – and careful consideration has been made to ensure that they are balanced – homemade diets can serve some purpose in certain cases – in food trials, for instance. Many homemade diets contain excessive quantities of protein and carbohydrates, and are limited in vitamins and minerals, especially calcium.

If owners do wish to pursue the use of a homemade diet, examples of a diet should be obtained from the veterinary practice. It is also advisable that the animal has its BCS, weight and clinical health

examined regularly, to ensure that the diet is balanced and no deficiencies are present.

Pet food labelling

There are many terms used by pet food manufacturers – open, fixed and closed formulation, natural foods, organic, breed and life-stage specific, hypoallergenic – and understanding these terms is vital in order to interpret the basis of the diet and to give pet owners a nutritional recommendation.

Some of these terms have very strict definitions, as in organic; whereas others do not – for example, hypoallergenic. Some have very loose definitions – for example, natural. Other factors, such as availability of the diet, pack sizes, price and owner preferences also need to be taken into account.

Owner preferences can include whether the food is manufactured 'ethically', organic foods, wet foods rather than dry, and in some cases owners will specify that they want to avoid diets that contain artificial colourants and preservatives.

Interpretation of pet food labels is only part of finding out if that diet is one that you would recommend. Other elements to take into consideration are whether the manufacturing company performs batch testing on their foods, were palatability trials conducted, who formulates their diets, who processes the food and how?

Monitoring nutritional interventions

Once an animal has been assigned to a specific dietary regimen, the animal should be reassessed after an appropriate period of time. This does depend on the animal, severity of disease (if any present), its original nutritional status and the type of nutritional intervention received. Regular weighing of the animal, BCS, MCS and blood haematology and biochemistry parameters can all be utilised in these cases. Animals that are placed on diets that alter urinary parameters – for example pH – should have these parameters monitored regularly.

"Always ask to see the published research work on which the nutritional company has based the formulation of its diets"

Animals that are hospitalised should be weighed at least twice daily and, depending on clinical health, this may need to be performed more often. All medications and fluid therapy flow rates are based on body weight; and, if the animal is severely dehydrated, dose rates will need to be adjusted carefully as the animal is re-hydrated.

As veterinary professionals, we should practise evidence-based medicine. This is the same for nutrition; although there are very few studies looking at the benefits of specific diets, many are on specific nutrients. A degree of extrapolation is required between the feeding of a diet that contains that specific nutrient and the studies looking at that nutrient. This makes the application of an evidence-based approach quite difficult to interpret, because the bioavailability of that specific nutrient within a diet is not always studied.

Always ask to see the published research work on which the nutritional company has based the formulation of its diets. Some companies already publish a list of references in their product information book. ■

Reference

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Kate Parkinson
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Kate Parkinson graduated from the University of Bristol in 2006. Since graduating, she has travelled to over 30 countries and worked as a veterinary surgeon in Australia, New Zealand and the UK. She currently lives in East Anglia and works as a freelance small animal locum for her company Lend a Paw Locums, http://lendapawlocums.co.uk

**Suggested Personal & Professional Development (PPD)*

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LOCUMS

Locum life

It is Saturday night and I'm driving home from the clinic. My notes are typed, referral letters written, condolence cards signed. The clinic vet will return on Monday morning. They'll hopefully be pleased with my work, but they have my card if there are any questions. I drive home and record my mileages and expenses for the week, draw up an invoice and settle my accounts. I'm already looking ahead to the next date in my diary.

My name is Kate, and I'm a locum.

Like many people, I fell into 'locuming' by accident. I worked for several months as a locum whilst travelling around Australia; and, after a brief stint back in the UK, I spent two-and-a-half happy years working at a fantastic practice in New Zealand. Unfortunately, my father was then diagnosed with heart disease. Home seemed distant, and we made the tough decision to return to the UK – and during the trip back, my partner proposed!

Locum work gave me the flexibility to work round my father's surgery dates and provide care whilst he recovered. The next year, locum work gave us the time to organise our wedding. By then, it was clear I enjoyed the job. I liked the challenge of getting to grips with new practice environments, meeting different people, and running my own small business. So I decided to become a 'career' locum.

So you want to be a locum?

How to find work

There are many locum agencies who will help you find employment; but bear in mind that agencies charge a 'finder's fee' to the practice that employs you. You can also to introduce yourself to practices as a freelance locum or contact colleagues in the area. Many locums do both – it's up to you.

What sort of work?

Decide in advance what work you want. It's best to be honest about your skills. Nobody – not the client, not the practice, not the patient and not you – wants to be placed in a difficult situation if you can't handle something the clinic considers routine.

You'll be expected to hit the ground running and you often don't get to follow up your own cases, so it's best not to 'locum' straight out of university. Every new graduate has different levels of skills and confidence, but in general I'd suggest at least three to four years of clinical experience.

You'll be expected to see patients in a timely manner, deal with any emergencies effectively, respond to messages, fill prescriptions, work well with the practice team and clients, document cases thoroughly and pass on test results.

Where to work?

Most locums choose where to work based on location. I prefer to work near home, when possible, and restrict my working radius to an hour's drive each way. Good transport links are important, so consider this whilst setting up your locum business. Alternatively, decide if you'd be content with spending part of the year living away from home. Many locum jobs come with accommodation.

Work patterns

Long-term locum work is not for everyone. Over 60 per cent of locums work this way for less than three years. Just over 25 per cent work as a locum for three to 10 years; and only two-and-a-half per cent locum for over 15 years (Recruit4Vets, 2017).

Flexibility is one of the great advantages of locum work. You can locum for a week or a month or a year, slotting work between family commitments or study or travel. Even permanent veterinary professionals can pick up extra locum shifts at the local emergency centre.

Advantages of locum work

First, flexibility. Second, flexibility. Third, flexibility!

Joking aside, other advantages are the pay, the ability to choose your own hours and location and the chance to learn new skills in different environments. I love being able to control my own work patterns. Research has shown that having more control over your work produces happier, healthier workers (Leka, 2003).

Disadvantages of locum work

A locum's hourly rate is higher than an employed

> "I liked the challenge of getting to grips with new practice environments, meeting different people, and running my own small business"

veterinary professional and the pay comes with certain responsibilities. As a business owner, you'll be expected to handle your own finances. Hire a good accountant, and don't be afraid to ask for advice from colleagues. You'll be expected to pay for your CPD, RCVS membership, and indemnity insurance, and you won't get paid sick leave or holidays. Expect to budget for periods of unemployment, especially if you have financial commitments, such as a mortgage.

You may feel isolated if you enjoy working as part of a practice team, and the practices for which you work are likely to be less supportive of your clinical development.

So you want to hire a locum?

A permanent veterinary professional has two bosses – her practice and her client. A locum veterinary professional has three – the patient, the practice and herself – and it's important to keep them *all* happy. Looking after a practice while the owner is away is a huge responsibility, and the last thing locums want to do is fall short of expectations. There are a few things that it's best to discuss in advance.

Basics

Make sure your locum meets basic licensing requirements by using the RCVS website. If possible, check the locum's previous work via references. Ensure your expectations are clearly spelled out. Is the locum required to be in the building the whole time, or can they go out over lunch? Do you have preferred referral practices? What is the locum's daily rate, weekend rate, and overtime rate? When does their overtime rate kick in?

Money matters

A locum is not always going to make you money, but a good locum should allow you to have a pleasant break from practice. Charging appropriate fees is much easier if clear pricing structures are in place – preferably written down or saved on an easily-accessible intranet. Some clinics charge for nail clips, some don't. Some clinics charge for giving wormers in the consult room, some don't. Many clinics have loyalty schemes, which can be tricky when you're not used to them.

No surprises

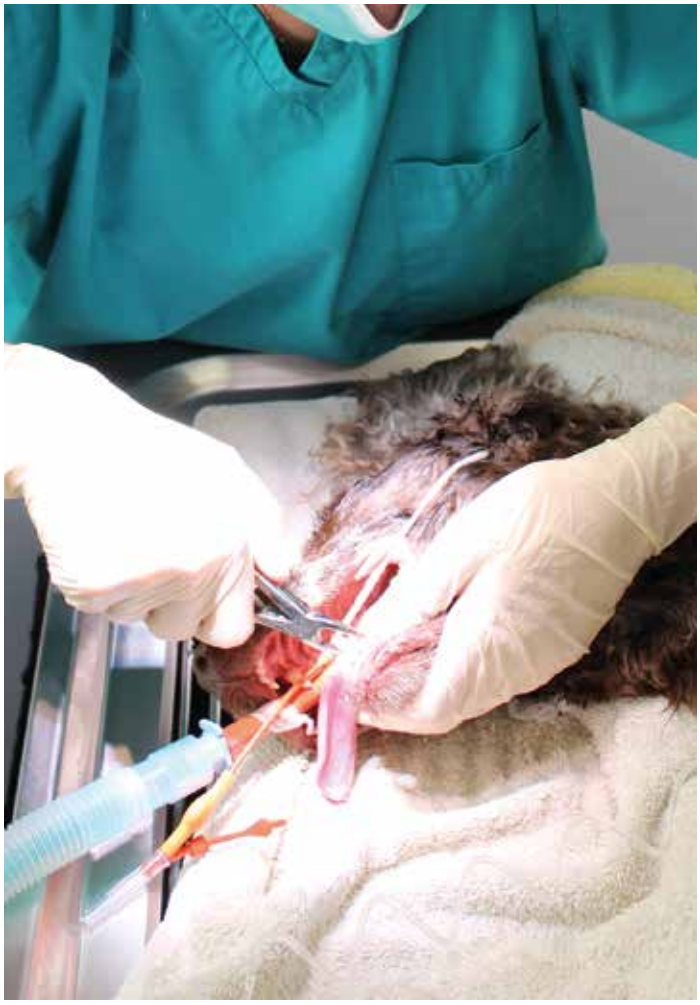
It helps a great deal if clients know they will be seeing a locum. Nobody wants to spend the first five minutes of a 10-minute consult explaining why Doctor Regular isn't here to see 'Fluffy' for his recheck "like he promised". You cannot force your clients to see a locum, and some will inevitably choose to wait until your return.

Locums don't know your staff, clinic, prices, or layout, so the first few consultations might take a little longer. A tour of the computer system is always helpful – there are plenty of practice management systems out there. Clear clinical notes are invaluable, and your locum will appreciate a heads-up on any complex cases. If your staff know that there have been problems with a client previously – if 'Killer' always needs a muzzle, or if Mr Smith always struggles to tablet 'Tibbles', then it helps to know beforehand.

Practice protocols

Clear practice protocols save time. A list of vaccination, flea and wormer protocols and any special offers can be invaluable – standard vaccination protocols for cats, dogs, and rabbits (including kittens and puppies), for example, and standard worming and flea treatment protocols for cats and dogs.

A breakdown of your loyalty scheme with a list of discounts will always come in handy, together with any billing idiosyncrasies. Is your clindamycin billed under 'Antirobe' but now you use 'Zodon'? Is microchipping billed under 'microchip', 'identichip', 'back-home', or all three? Is payment at the time, or are accounts allowed?



"You should be honest about your competency and clear about what you are – and are not – willing to do"

Does the practice run laboratory tests in house, send them out, or both? What is the turnaround time?

Can the practice hospitalise animals overnight? Are there any codes that are necessary to access the practice, pharmacy, or drug safe?

What are the veterinary nurses comfortable doing? Can they take blood samples, take radiographs, or scale and polish teeth?

If there are multiple veterinary professionals working in the practice, it's important to establish responsibility for inpatients. Are patients the responsibility of the vet who admitted them, the vet on operations, or the vet on night duty? What about lab results?

Don't forget, responsibility runs both ways – when the locum leaves, he or she needs to pass their cases to the permanent vets and establish responsibility for any pending lab results.

And if all this seems like a lot of work, ask your staff to help.

They'll probably find it easier than to deal with the inevitable flood of locum questions during evening consults.

Potential problems

Setting out clear responsibilities and establishing the infrastructure will avert most crises and let you enjoy your holiday. Locums should have their own professional liability insurance.

All locums I know appreciate feedback from their clinics and this rarely comes from agencies. If you are unhappy, inform the locum, the agency – or preferably – both. If you are happy, let your locum know. We always appreciate repeat business because it means we're doing something right!

Conclusion

I have found locum work personally rewarding and would recommend it as an alternative career option. It's easy to find work by advertising or through agencies. You should be honest about your competency and clear about what you are – and are not – willing to do.

Flexibility is one great asset of the job, but don't forget that there are downsides to locum life and that it can be tough not being part of a team.

As a clinic owner, there are several easy ways to maximise your locum experience. Clear practice protocols and pricing structures are invaluable, and responsibilities should be established in advance. Locums can often seem a necessary evil, but they can also be a great asset to your practice, a helping hand, and an aid to achieving a good work-life balance. ■

Acknowledgment

The author would like to thank the staff of Swaleside Veterinary Surgery and Orwell Veterinary Group, as well as Kristina Peters DrMedVet MRCVS, for reviewing the article.

"Flexibility is one great asset of the job, but don't forget that there are downsides to locum life and that it can be tough not being part of a team"

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

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

**Suggested Personal & Professional Development (PPD)*

COMMUNITY REVIEWED™

CLIENTS

Who is an owner? How can we reach and teach them?

Compliance, in a social psychology setting, is described as a change in behaviour owing to a direct and explicit request from another. In a medical context, compliance can be as simple as expecting a client to take a certain medicine at specific intervals. However, in behaviour counselling, reaching a client and obtaining compliance by teaching them, is not as straightforward.

Determining the exact treatment procedure within behaviour modification can be a detailed process. By definition, regardless of species, a 'companion' animal will have at least one human being caring for them. We need, therefore, to explore the role we professionals play in relation to our clients and establish what barriers there may be to their following treatment instructions. In addition, we have to explore methods of influence (particularly social) and where ethical boundaries may lie with regard to animal needs and owner choices.

The word companion can mean 'a person or animal with whom one spends a lot of time' or, more insightfully perhaps, 'each of a pair of things intended to complement or match each other'. The irony within pet behaviour is, of course, that it can be this very companion dynamic that can develop, maintain or exacerbate the problems that both pet and owner are experiencing.

Rarely can the situation improve without the owner's full compliance, their understanding and their preparedness to undertake the changes that are suggested. Practitioners within any pet industry quickly realise that the human factor is a key factor in the success of ownership – be it administering prescribed drugs or ensuring appropriate nutrition, training their dog, or simply recognising illness or problematic behaviours before the welfare of the pet is unduly affected.

A further aspect to this human-centred approach is the risk to professionals, employees and others working in the field, when the owners fail to keep to the necessary treatment plans and general ownership responsibilities. Failure to achieve compliance can lead to frustration on the part of the professional team, leading to reduced performance result, lower self-esteem and potential burn-out. This can be particularly so when the behaviour practitioner – often a lone specialist within their own practice – does not have the support of a network of colleagues.

Links to trade bodies, such as the Association of Pet Behaviour Counsellors (APBC), can serve to provide external guidelines and support; but this must be accessed willingly, long before the practitioner meets the inevitable difficulties associated with the vagaries of behaviour counselling in an applied setting.

Who is the client?

Loosely stated, the client is whomever – or whatever – has the most powerful influence over the results of the behaviour programme. The correct client(s) must be targeted at the outset. Commonly, the appointment booking is made with a single client, but the pet usually experiences a much wider influence in their daily lives.

The field of behaviour change and social health psychology has examined this – an area of study where harmful human habits, such as smoking or excessive consumption of alcohol or food, must

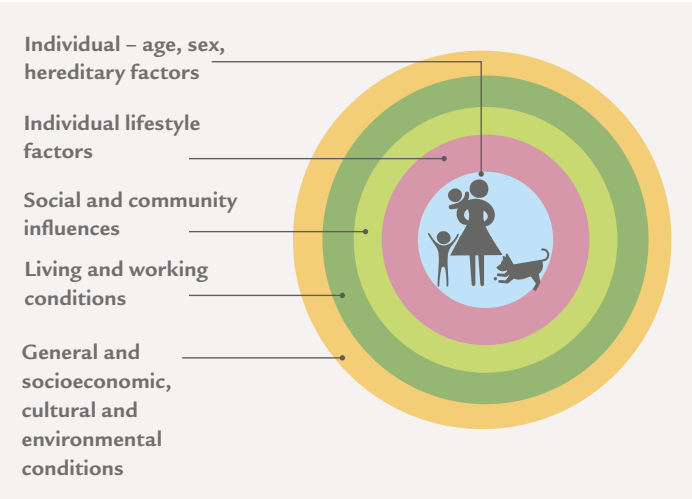

***Figure 1.** 'The surrounding context overrides individual cognitive factors' (Stern, 2000).*

be understood in order to educate and alter the human's seemingly self-destructive tendencies. This wider social influence on behaviour must be taken into account when deciding which factors to target to help modify the pet's own behaviour.

It is argued by Stern (2000) that, in the field of behaviour change, 'The surrounding context overrides individual cognitive factors'. **Figure 1** illustrates not the exact social structure but the wider framework of influence. Set apart from the pet's own history, those surrounding the pet have the initial, direct impact. This includes other pets, humans of all ages, and also each one's hereditary factors and learned behaviours.

Beyond this comes the individual lifestyle factors of the owner and family; plus, perhaps, other people involved in the pet's direct care. Furthermore, their living and working conditions, social and community influences all play a powerful role. Beyond this, we are also working within socioeconomic, cultural and environmental conditions.

In general, what matters with an individual pet might be identified as the behavioural analysis itself rather than relying on a broader – and often inaccurate – depiction of what a breed 'type' is like. Equally, with an owner, we reach them not through prejudging their social or financial 'status', yet we must ensure that these features are addressed at the consultation. For example, a person living in a small village environment with a dog that is lunging and barking at people and other dogs can quickly become a social pariah and may consider relinquishment on the basis of a small community's opinions.

Alternatively, someone of low economic status and with young children may find it difficult to provide adequate nutrition and exercise for a dog, given the time and cost involved. A cat owner living near a busy main road may be reluctant to allow the cat to leave the home in case of injury to their beloved pet, regardless of the impact such curtailment may have on their cat's fur chewing and persistent, potentially stress-induced, urinary infections.

Such factors are best assessed through a home visit for behavioural assessment. A clinic simply does not permit these important features to be taken into account, regardless of the client's openness.

Influencing client behaviour ethically

When a behaviour problem has been identified, a behaviour modification plan is put into place. The client and other caregivers must all agree to the plan – or at least be given the option of not having to follow suggestions and instructions.

Failure to undertake this 'coping planning' means that clients may show willingness to follow your lead but will then be prevented by their peers, who may attempt to persuade them otherwise (**Figure 2**).

- assess social context of pet and owner – make plans on this basis
- obtain all clients' agreement about all intervention measures
- enquire about support network (this may include other dog owners in the local area who can go for walks with the client and dog)
- prepare owners for 'familiar others' and objections they may raise
- plan for follow-up sessions before leaving

Figure 2. *Checklist for 'coping planning'.*

Social conformity of this type can be the result of a desire by the client to fit in, or be liked. He or she may wish to 'do the right thing'. Indeed, it could even be their wish to conform to a social role through identification. Alternatively, some clients may not wish to conform – by refusing to put their dog on a lead or provide suitable vaccination, for example.

An ethical approach means that practitioners toe a fine line between compliance and giving clients a choice; and obedience, where specific orders are given that must be followed. Whilst you may consider this level of forceful instruction is never likely, the most simple example is the threat of a fine for not picking up dog excrement in the street. No-one would want dog poo on their shoe, and yet, it is still left on the path and adequate disposal has had to be enshrined in law (and yet this is still not followed).

Clients are more susceptible to our influence owing to our status as perceived authority figures. Expert opinion has a stronger influence. Clients who are under pressure or in crisis are again more likely to conform. In addition, any situations where the outcomes or details appear to be ambiguous mean the client is vulnerable.

One can all too easily examine the possible influences of TV dog training personalities upon the population to illustrate how people will accept and comply to even the most harsh and potentially harmful treatment of their pets in the hope that it will resolve their problems – see Asch, Zimbardo and Milgram's separate works on influence; or a summary in *Thoughts about Higher Education* (2014).

Communication – "Are you with me so far?"

Obtaining understanding from clients is key if they are to follow the plans set. Often a multiple-page behaviour report is given, with paragraphs of description of the problem. The danger of this is that it is not adequately task-directed.

As many behaviour modification techniques involve a form of practical intervention and animal training, appropriate forms and checklists to monitor progress are essential. Put simply, the client cannot comply if the instructions are vague or unspecific! (**Figure 3**)

- simplify client goals
- provide specific desired actions
- repetition of instruction
- make specific advice statements
- provide handouts
- request use of client diary and notes

Figure 3. *Checklist for better communication.*

Objections – "Yes but..."

Clients will often question and debate instructions and this can be frustrating and appear argumentative to the practitioner. However, objections are an important part of the planning and negotiation process. There is a chance that the client does not fully understand, and needs further explanation.

Use the following phrases to maintain and encourage compliance and agreement:

- "I am glad you brought that up" (Welcome)
- "So what you are saying to me is..." (Re-state)
- "Putting this issue to one side for a moment" (Apart from)
- "Obviously, at this stage..." (Side step)
- "You're absolutely right" (Agree).

Reasons these assist compliance:

- shows you are listening
- helps avoid arguing
- softens the objection
- restates the objection positively
- gives you thinking time
- you can check you explained it properly.

Figure 4. *Checklist for handling client objections.*

"Rarely can the situation improve without the owner's full compliance, their understanding and their preparedness to undertake the changes that are suggested"

It may be that the client's view of the situation does not meet the facts presented, creating cognitive dissonance. This is an entirely normal human behaviour. Often an objection is offered as a simple self-test of the client's own confidence in the treatment on offer (**Figure 4**).

Summary

Specific counselling techniques are a further study option for individual consultations. It is essential to focus on the needs of the pet and to recognise that if the client does not change their behaviour by complying with practitioner instruction, the pet's circumstances will not improve.

Our goal is not to order clients to obey. Rather, we must negotiate with them on the animal's behalf. As advocates, we empower and also enable the client to comply with our requests as autonomously as possible. ■

PPD Questions

1. Using the objection handling suggestions (**Figure 4**), find three ways to handle the following objection: "My dog won't work for food."
2. Why might a client's family need to be involved with the behaviour assessment session?
3. What are the advantages of a home visit in relation to obtaining compliance?

Answers

1. this is about handling objections; whilst client reporting is important, all dogs need to eat. It is something about which you need to collect data. It may be that they have not used a high-value food reinforcer, or that they are pairing it with too heavy a distraction level, and so on. The objection can be handled thus:
"I'm glad you brought that up. We can work on ways to get your dog to work for all kinds of rewards."
"So what you are saying to me is that your dog is not keen on the treats you are offering?"
"Obviously at this stage we are putting a plan together, so let's consider that as part of what we agree to do."
2. the pet is influenced not only by the client sitting in front of you but lives with a wider group of people and pets of all ages and abilities. This must be assessed along with the behaviour modification plan to help ensure that this plan can be safely and properly implemented.
3. learning occurs in context – not only relating to the triggers of specific behaviours but also in the general lifestyle and economic context of the pet's owner. A home visit enables a thorough assessment of the wider influences on the owner's and pet's behaviours.

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Diane James

Diane James works for the Blue Cross Pet Bereavement support service and tutors its accredited bereavement e-learning course. She lectures on pet loss at conferences and congresses, contributes articles to several different magazines and newspapers, and has appeared as a pet bereavement adviser on ITV This Morning, *BBC* Breakfast Time *and ITV* News.

*Suggested Personal & Professional Development (PPD)

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BEREAVEMENT

How has management of pet bereavement improved?

As a nation, we tend to shy away from talking about death and dying. In many countries, death is celebrated in the same way as a birth – a celebration of the life – yet many of us seem to have difficulty even using the correct terminology. The majority of people, steer away from using the words died, dying or death – instead we hear references to "passed on", "passing", even the word "lost" is used. So if we are struggling to discuss human death, then why do we expect people, working or dealing with pet bereavement, to be any different?

We are labelled as a nation of animal lovers. As such, you will have experienced clients who are prepared to ask – and expect to pay for – the best and, sometimes, impossible. This includes after-death body care, so how has the way that practices and organisations deal with the upsurge and interest in pet bereavement changed in recent years?

Many different organisations have become established, dealing with various areas of pet loss – from home euthanasia, specialist crematoriums, pet bereavement training, various artefacts and objects for memorialising the pet, and more (**Figure 1**). It has become a multi-million pound business; in fact, a real growth area in the pet industry.

Figure 1. *Many different organisations have become established, dealing with various areas of pet loss.*

What has changed to make a difference?

Years ago, when a pet was put to sleep or died as the result of an accident or incident, it may shock some to learn, that unless the owner took the body away to bury, it was invariably stored in a shed or outhouse. Bodies just piled up there ready for collection by a 'man in a van', taking them to places that would dispose of them in many different ways.

Now we offer the client myriad ways to remember their beloved pet. The pet cremation process has improved massively since the days of the storage shed. The client can now decide on individual cremation and can rest safe in the knowledge that they receive back ashes from the pet they sent – documented, tagged, computerised and checked from start to finish.

One question often asked of those in 'pet loss professions', is, how do I know these are my pet's ashes? Having visited a pet crematorium and seen it, I can now answer that, truthfully, I was impressed with the care, love and attention that these beloved pets receive at the end of life's journey. A quiet waiting room for the owner, literature to help them with their loss, plenty of different memorial items at varying prices; but, perhaps, what struck me the most, was the genuine empathy and respect the team had for their role and their clients.

"It is useful if members of the veterinary practice team – at various levels – have completed pet bereavement training"

So how have things changed in practices?

In many practices, we have seen a new approach to dealing with bereavement – including purpose-built rooms and entrances and exits for clients who have suffered the loss of a pet. These rooms have been furnished such that they have a calming and soothing effect, and I often have requests for advice on layout, colour and contents – something unheard of in the past.

Whilst some practices have a telephone in the room, with a direct line to the pet bereavement support service; others have a separate quiet area, literature on pet loss and the prerequisite box of tissues. Even if this is a corner of the reception area, it's an improvement on having nothing at all.

In some practice reception areas, an LED candle may be placed on the desk, with a sign explaining to clients that when the candle is lit it means that a pet has just been put to sleep and that, as a consequence, it would be appreciated if they could keep a respectful silence and that their appointment might be delayed. Other practices have 'slide signs' on the door so people don't enter, or a white board located near the room to indicate the need for privacy.

It is useful if members of the veterinary practice team – at various levels – have completed pet bereavement training. Many branches have a dedicated pet bereavement adviser; although it is vitally important that both client and adviser realise they are not trained counsellors but are in a supporting role. This can be invaluable to the practice because it ensures that the empathy, understanding and care is in place; and practices will usually see an increase in client retention, when previously the loss of a pet could cause the owner to leave.

This switch in loyalty is often the result of a number of factors – from simply not wishing to renew the memory of the room in which euthanasia was carried out, or in which the operation or procedure took place; to how they felt they were treated by the practice, through lack of care or empathy.

Clients will sometimes claim that "the vet is to blame". This is invariably just part of the so-called five stages of grief (Kübler-Ross E, 1969). These are:

- denial of the illness or loss
- anger – often seen, but not acceptable if directed at any individual or is personal
- bargaining – "Please just keep him alive for one more Christmas"
- depression – which may see the client ringing the practice many times a day or visiting to seek comfort, or even a person sadly being at the lowest ebb anyone could ever be
- acceptance – the final stage of learning to live each day as it comes, and possibly, through acceptance, that it was for the best.

Communication

This is also an area that has improved over time. In the distant past, the client accepted that the word of the veterinary surgeon was 'gospel'; and that no matter what, their actions would be in the animal's best interest. Although in a few quarters, these views of the veterinary professional have not changed, something that has increased is the enhanced empathy.

Figure 2. *Remember to remove the collar from a pet – but only after the pet has been put to sleep.*

Did that cold, unfeeling, uncommunicative vet, who carried out procedures robotically, ever really exist? Of course he did. We all knew one like that. We held them in the highest respect and in awe; and we were a little afraid of their brusque and apparently uncaring nature. In fact, most of them were brilliant vets who simply had a poor bedside manner. Then we had the vet with the best bedside manner, but less skill and experience. They were loved by the team and clients, because they showed the care and empathy, that was lacking in their other colleague.

We realise now that we are all different and, no matter how much we train or teach bereavement skills, a person has to show empathy from the heart. This cannot be taught. But what is it?

Empathy

Surely it's the same as sympathy? No. Sympathy is when you see the situation from your own point of view, through your own eyes – it is how *you* feel. Empathy is when you see things from the client's perspective and through *their* eyes – it is when you have an insight into *their* world. It's not difficult to understand, but it makes a massive difference to the person on the receiving end of it.

It should be noted that when a client is facing the situation of being told bad news, or being with their pet at the end, they will be in a heightened state of awareness and will remember every word and action that takes place. The way they are communicated with will affect how they deal with the situation at the time and afterwards.

Attention to detail

There are other aspects of bereavement management that have also seen an improvement – many of them initiated by members of the practice team, especially the front-of-house team. Such ideas include remembering to remove the collar from a pet – *after* the pet has been put to sleep. To do it prior to

the event can cause added distress; to not do it at all can upset the owner when, at a later date, they decide they want it after all; or if they do leave and forget it, bagging it up and labelling it will be a great help if they return to collect it within a few weeks of the loss (**Figure 2**).

Sending a condolence card has become standard practice, with some practices having cards of their own design. I also hear of packets of forget-me-not seeds being put in with the card, or the pet bereavement support service wallet card. These cards can be an excellent way to show the client how much you care and the extent of your empathy. There are some things, however, that can undo the good work.

A card that is printed with the same generic message or signature, has no pet name on it and is just a gesture with no sincerity behind it, will soon become evident to the client and can do more harm than good. Sadly too, I have witnessed instances when the clients chose not receive the card in the way it was intended – preferring a short, hand-written note on practice headed paper, or no card at all, because in their view the latter is frivolous. In a practice where clients have formed a long and personal relationship, you will know what to do for the best.

Removing the pet from the practice database may seem like an obvious thing to do; yet time and again we hear of vaccination or appointment cards being sent out to the owners of dead pets.

Technology can be a great aid to customer service if used in the right way, but it has to be properly managed and kept constantly under review.

Conclusion

I am a firm believer that we have come a long way with how we handle pet bereavement – but still have a long way to go.

Making pet bereavement part of a 'charter', course or policy, will only work if it is paid more than just lip service; and any training is from a reputable source and is accredited.

This training can – and will – make a significant difference, and practices that have done it are reaping the benefits through better customer retention, happier clients, and staff who are aware of self-care and how to deal with such sensitive issues as they arise. ■

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PPD Questions

1. What are the five stages of grief?
   A. guilt, blame, depression, acceptance and denial
   B. denial, anger, bargaining, depression and acceptance
   C. anger, bargaining, depression, acceptance and guilt
   D. denial, depression, guilt, anger and acceptance

2. What is the best way to advise a client to get support for pet loss?
   A. contact their GP
   B. call the Pet Bereavement Support Service
   C. see a qualified pet loss counsellor
   D. speak to friends or family

3. What is empathy?
   A. feeling sorry for the client and letting them know
   B. sympathising with the client
   C. letting the client know you have suffered the same as they have
   D. seeing the issue through the client's eyes – as the client sees it

Answers
1.B 2.all 3.D

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**Suggested Personal & Professional Development (PPD)*

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POISONS

Poisons and agents causing haematological issues

There are a number of reasons why animals may develop haematological issues – injury or trauma, infectious diseases, parasites, development of tumours, genetic defects or metabolic diseases. Additional causes are agents involved in cases of poisoning – some of which are commonly seen and well established, others less so.

The three main categories of poisonous agents that cause haematological issues are: foods – namely onions and brassicas; drugs, such as paracetamol; and household items, such as anticoagulant rodenticides, coins, nuts and screws.

Foods

It is well known that all members of the *Allium* species (onions, spring onions, leeks, chives, garlic), when ingested by animals, can cause issues of Heinz body anaemia – with cats and dogs being highly susceptible to *Allium* toxicosis. Effects may occur from a single large dose or smaller repeated dosing, and toxicity is expected in animals that ingest >0.5% of their bodyweight (>5g/kg) (Cope, 2005).

The main toxin, n-propyl disulphide, depletes the enzyme glucose-6-phosphate dehydrogenase (G6PD) within erythrocytes. Lower G6PD concentrations diminish the protective effect of the antioxidant, glutathione, as the glutathione remains in the oxidised state. This results in a mixed sulphide bond between haemoglobin and glutathione, which precipitates within the cell resulting in the formation of Heinz bodies.

Erythrocytes that contain Heinz bodies are usually removed from the circulation by the recticuloendothelial system, thereby inducing anaemia (Lincoln et al, 1992). Japanese and Korean breeds of dog may be more susceptible because of an inherited trait characterised by erythrocytes with high concentrations of gluthathione.

Brassicas – such as kale, broccoli, cauliflower, cabbage and Brussel sprouts – contain S-methylcysteine sulphoxide (SMCO) that is converted during normal fermentation in the rumen to dimethyl disulphide, which is toxic to red blood cells. Dimethyl disulphide oxidises haemoglobin and this is visible as Heinz bodies in the red blood cells. This results in haemolytic anaemia – haemolysis of cells occurring as a result of oxidative damage (Knight and Walter, 2003).

Toxicity, however, arises only when large quantities are fed over long periods. The effects are particularly severe when animals are fed only brassica crops; thus poisoning, if seen, is usually in ruminants.

Treatment for the ingestion of any *Allium* species or brassica comprises decontamination with an emetic and activated charcoal; but, thereafter, is essentially supportive because there is no antidote. Antioxidants – such as vitamin E, ascorbic acid and acetylcysteine – are unlikely to be of benefit (Cope, 2005); although a high protein diet may be beneficial to promote restoration of glutathione stores (Simmons, 2001).

Drugs

Of the drugs involved in causing haematological clinical effects, the most commonly reported to the Veterinary Poisons Information Service (VPIS) is paracetamol which was fully discussed in a previous issue of *Veterinary Practice Today* (Ellison, 2015).

Paracetamol

Exposure is often accidental, such as a tablet dropped on the floor and eaten by a cat, although, sadly, there are a number of cases where a well-intentioned owner has given paracetamol to their cat or dog in an attempt to relieve the perceived – or actual – pain of the animal.

Cats, compared to other species, are very sensitive to paracetamol because they have a limited ability to metabolise it to non-toxic metabolites. In particular, they may develop methaemoglobinaemia, haemolytic anaemia, Heinz body formation and hepatic necrosis.

Treatment is advised for intakes >20mg/kg – which, essentially, means *any* ingestion given that the most common presentation of paracetamol is capsules or tablets of 500mg and would comprise gut decontamination and antidotal therapy (acetylcysteine with SAMe and vitamin C).

Dogs have a better capacity to metabolise paracetamol, and would only require treatment for ingestion of >150mg/kg.

Naproxen

Still in the area of analgesics, naproxen has been linked with anaemia. Although there is no specific information on the mechanism of this effect, it may be a consequence of blood loss – either

gross or occult – caused by microbleeding from the gastrointestinal tract. In humans, haemolytic anaemia is a rare adverse effect of naproxen use in humans; but, again, the mechanism is unknown.

In cases dealt with by the VPIS, haemorrhagic diarrhoea, haematemesis and regenerative anaemia have been reported frequently. Also reported – but less often – the cytotoxic drug hydroxycarbamide, and 5-fluorouracil, an antimetabolite drug used in the treatment of cancer, have also been shown to cause effects on the haematological system.

Hydroxycarbamide

This acts by inhibiting ribonucleoside diphosphate reductase; and, thereby, interferes with DNA synthesis without affecting RNA or protein synthesis. It is effective in the S-phase of mitosis, and this is the mechanism of bone marrow suppression. It is not, however, clear why hydroxycarbamide causes methaemoglobinaemia in cats and dogs; it not reported in humans in therapy or in overdose.

In overdose or accidental ingestion, it is expected that clinical signs would present within the hour. Initially, methaemoglobinaemia with pale mucous membranes, collapse, tachycardia, tachypnoea, respiratory distress and cyanosis would be observed, followed by bone marrow suppression with leucopenia, thrombocytopenia and anaemia one to six days later.

Although a toxic dose is difficult to establish because of the small number of cases reported, we would advise that any animal that is symptomatic should be assessed for methaemoglobinaemia, and that dogs which have been exposed to >80mg/kg (the maximum therapeutic dose), should be treated. For adult cats, any exposure over a total of 500mg should be treated, whereas a younger cat should be treated for any amount.

Allium *species (onions, spring onions, leeks, chives, garlic), when ingested by animals, can cause issues of Heinz body anaemia.*

After an emetic and activated charcoal, oxygen should be given to animals with respiratory distress. If the individual is unresponsive and methaemoglobinaemia is suspected – chocolate-brown blood that does not change on exposure to air, dyspnoea unresponsive to oxygen, normal oxygen saturation – then methylene blue (methylthioninium chloride) should be given.

Blood count and platelets should be monitored and, if results are abnormal within the first week, monitoring may be required for a further one to four weeks. Liver and renal function should also be checked, and any bone marrow suppression treated supportively.

5-fluorouracil

This is used dermally in humans for the treatment of pre-malignant and malignant skin lesions, although it is not widely used in veterinary medicine owing to its narrow therapeutic index. Since 2014, there have been 15 canine cases and four feline cases reported to the VPIS involving the cream preparation of 5-fluorouracil, and exposure has been from both ingestion and dermal contact.

The onset of clinical effects is usually less than one hour; but sometimes up to five hours, and death can occur six to 16 hours after ingestion (Dorman et al, 1990; Albretsen, 2001).

Common effects are vomiting, ataxia, tremors, respiratory distress and convulsions. Some animals may become anxious, hyperexcitable with hyperaesthesia and severe personality change – affected animals have been described as 'demented' with aimless running to a state of exhaustion.

Bone marrow suppression is not commonly observed because most animals with severe fluorouracil poisoning do not survive (Albretsen, 2001). Onset is four to seven days post-ingestion and manifests as pancytopenia with severe neutropenia and thrombocytopenia. This is accompanied by the risk of secondary infection. Coagulopathy and raised LFTs may also occur.

Treatment should be given for exposure to any amount; although, as with many instances in toxicology, there is no specific antidote. If the exposure was dermal, the animal should be stabilised – if necessary – and then thoroughly washed and dried.

If ingestion was recent and the animal has no neurological signs, give an emetic, activated charcoal and gastro-protectants. Blood counts should be monitored and liver and renal functions checked.

Less obviously, exposure to metallic zinc, such as some coins, screws, nuts and bolts can also represent a hazard.

X-rays should be undertaken to confirm the presence of foreign bodies in the gastrointestinal tract.

In animals that survive the initial neurotoxicity, there is risk of bone marrow suppression and haematology should be checked four to seven days following exposure. Further monitoring will be required if there are any abnormalities.

Any animal with evidence of bone marrow suppression should receive antibiotic cover because of the risk of infection, although steroids are best avoided because of their immunosuppressant effects.

Rivaroxaban

This is an antithrombotic agent used in humans and is starting to be investigated in animals for use in thrombotic syndromes (Yang et al., 2016).

Rivaroxaban is a highly selective, potent factor Xa inhibitor that disrupts the blood coagulation cascade, inhibiting both thrombin formation and development of thrombi. It does not inhibit thrombin (activated Factor II) and has no effect on platelets.

Overdose may cause bleeding leading to the formation of a haematoma from a wound or after trauma, gastrointestinal haemorrhage, haematuria and bleeding from skin or injection sites. An increase in clotting parameters – prothrombin time (PT) and activated partial thromboplastin time (aPPT) occurs within a few hours but usually resolves within 24 hours.

Animals at risk of bleeding complications include those who have any of the following (Xarelto SPC, 2013):

- severe renal impairment
- hepatic disease associated with coagulopathy
- also receiving azole-antifungals (e.g. ketoconazole, itraconazole, voriconazole)
- these are strong CYP3A4 and P-glycoprotein inhibitors and they will increase systemic exposure to rivaroxaban
- congenital or acquired bleeding disorders
- active ulcerative gastrointestinal disease
- recent gastrointestinal ulcerations.

Rivaroxaban is rapidly absorbed, so an emetic is unlikely to be worthwhile; similarly, activated charcoal should only be considered if ingestion was very recent (<1 hour). If the animal is at particular risk of bleeding, observation for 24 hours should be considered, with cage rest and limited physical exercise.

The prothrombin time (PT) should be checked at four hours. If this is normal, the animal may be discharged, but the owner advised to return if there is any evidence of bleeding – bruising, bleeding gums, nose bleeds, haematuria, for example. If the PT is prolonged, the animal should be admitted for monitoring of clotting and supportive care, if required.

There is no antidote. Vitamin K and protamine are not expected to affect the anticoagulant activity of rivaroxaban so, in the event of bleeding complications, treatment is symptomatic as required – including mechanical compression, surgical intervention, fluid replacement and haemodynamic support, blood transfusion, fresh frozen plasma, platelets.

Household items

Of the household agents likely to result in adverse haematological effects, the most obvious are anticoagulant rodenticides, discussed fully in an earlier edition of this journal (Ellison J, 2015). Less obviously, exposure to metallic zinc – such as some coins, screws, nuts and bolts – can also represent a hazard.

The VPIS can provide advice on the likely lead content of coins, depending on the date, country of origin and denomination of the coinage, although it is fully appreciated that this might not be known once the animal has swallowed the coin.

Severe intravascular haemolysis is the most consistent clinical finding in

acute zinc poisoning (Meurs et al, 1991). The cause is unclear – it is not immune-mediated. It may be caused by inhibition of erythrocyte enzymes, direct damage to the erythrocyte membrane, or increased susceptibility of erythrocyte to oxidative damage (Breitschwerdt et al, 1986). Changes in erythrocyte morphology are similar to those seen with lead poisoning.

The onset of clinical effects varies with the dose; but can be hours or days and likely to be extended if coins are ingested. In most cases, owners are unaware of exposure until the animal becomes unwell. Recovery can take 48 to 72 hours, or longer, after removal of a zinc foreign body.

Ingestion of a zinc-containing foreign body causes gastrointestinal upset with vomiting, anorexia, fever, depression and diarrhoea (sometimes bloody). Depending on the dose and form, ingested haemolytic anaemia with haemoglobinuria occurs hours to days later. There may also be pale to yellow discolouration of mucous membranes, continuing anorexia, depression and weight loss – convulsions may occur in severe cases (Luttgen et al, 1990).

X-rays should be undertaken to confirm the presence of foreign bodies in the gastrointestinal tract and any foreign bodies should be removed (surgically or endoscopically) once the animal is stabilised. Zinc concentrations usually decrease rapidly after removal of the foreign body. However, in severe cases the animal may become progressively worse and die days after the foreign body has been removed.

In severe cases, monitor the full blood count – including PCV, RBC and platelets, electrolytes, renal and liver function and clotting profile. Monitoring should continue for 72 hours after removal of the zinc (Osweiler et al, 2011) and, if possible, measure the zinc blood concentration.

Treatment is essentially supportive, aimed at controlling the haemolytic crisis and preventing renal, hepatic and pancreatic injury. Intravenous fluids, antiemetics and H2 receptor antagonists should all be used; and chelation therapy may be considered (calcium EDTA/edetate calcium disodium) but is controversial and of questionable value once the source of zinc has been removed from the gastrointestinal tract (Talcott, 2001).

If you see an animal with unaccounted-for haematological issues, it may be useful to consider a toxicological reason for the clinical signs, or to question the owner further about any agents to which the animal may have unwittingly been exposed. ■

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'Designer dogs' at significant risk of theft and ill health

UK police forces dealt with 1,774 dog thefts in 2016 – an increase of 19 per cent compared with two years earlier. This works out to just under five thefts a day, although the real numbers may be much higher.

The 2016 figures showed a sharp increase in the number of cases involving brachycephalic dogs – with reported thefts of French bulldogs rising from eight in 2014 to 24 in 2016 (three times more); while the theft of pugs has risen from four to 36 (eight times more) over the same period.

Research by Direct Line Pet Insurance found that popular locations for dog thefts were gardens (23%), inside the home (11%) and while out walking – but off the lead – with their owner (11%). Around one in five dogs are returned; either as a result of the thieves being caught or because the animals were abandoned after being stolen.

Price of popularity

It can be no coincidence that as the popularity and price of brachycephalic breeds rises, so does the number that are stolen. It is even sadder when one considers that the appeal of these 'sought after' dogs comes in the face of a whole host of chronic conditions and suffering for the animal.

The most common conditions seen in brachycephalic dogs relate to their obstructed upper airways and may include snoring, rapid breathing (tachypnea), noisy breathing when inhaling, frequent panting, difficulty eating or swallowing, coughing and gagging, inability to perform physical activity – especially in warm, humid weather – and occasionally physical collapse.

A study by the Royal Veterinary College (RVC), London, has also shown that brachycephalic dogs are more susceptible to corneal ulcerative disease – being 11 times more likely to be affected by corneal ulceration than non-brachycephalic dogs, and that pugs had more than 19 times the risk of corneal ulceration compared with cross-bred dogs.

Researchers at the RVC have also found that brachycephalic breeds are the most likely breed types to encounter obstetrical

problems. Compared with crossbreeds, French bulldogs were 15.9 times more likely and pugs 11.3 times more likely to have dystocia.

Misguided choice

One would have expected that with all the problems affecting these dogs, potential owners would reject the idea of owning brachycephalic breeds. But, sadly, appearance supersedes health for many people. In fact, appearance is often the top reason why owners purchase brachycephalic dogs – finding their small size and 'baby-like' features attractive and overriding any concern for the health of the individual.

A Danish study found that owners' experiences with health and behaviour problems in the dogs did not always seem to dissuade them from acquiring a dog of the same breed again either. An exception to this was found for owners of French bulldogs, where the experience of health and behaviour problems was associated with decreased intention to acquire the same breed again.

With all the accumulating evidence that these breeds suffer from a range of chronic and severe health conditions – linked directly to their brachycephalic features – it is very worrying that people still prioritise looks over health and well-being.

Wider concerns

RVC research has shown that owners of these breeds are generally younger and more likely to use puppy selling websites to find their dog – so not seeing their puppy's parents or asking for health records add further to the potential and real concerns regarding malpractice in the dog and puppy trade and, of course, makes the resale of stolen dogs so much easier.

There is still a vast amount of ignorance and lack of understanding and awareness of the problems of these breeds. Owners often smile when they describe how their pet "snores or snorts" – finding it endearing rather than worrying!

And, sadly, despite all the warnings about purchasing puppies and dogs from 'dubious sources', there will always be those who are tempted by a cheaper price; and there will always be those people looking to make a quick profit from criminal activity.

So what is the answer?

The good news is that at the end of October the Department for Environment, Food and Rural Affairs confirmed that breeders of puppies and kittens who knowingly produce animals with genetic defects will now be liable for prosecution under the Animal Welfare Act 2006.

Veterinary professionals must continue to discourage the ownership of brachycephalic dogs and cats and to broadcast the problems faced by these breeds; to have more educational material on display in veterinary practices; and to continually explain proactively the distress and discomfort – as well as the potential life-threatening conditions – brachycephaly can cause.

Beauty may be in the eye of the beholder, but as a profession we need to motivate prospective owners to demand dogs that do not suffer from welfare problems related to extreme conformation and inbreeding. There is nothing beautiful about a dog that cannot breathe properly. ■

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ANAESTHESIA

Equine anaesthesia – (2) maintenance and monitoring

Horses are high-risk patients for general anaesthesia. Registered veterinary nurses (RVNs) involved need to have specialist knowledge and training, so that all possible risks to the patients are reduced. This article is part two of a three-part series and will discuss the main considerations involved in the maintenance and monitoring of equine patients during general anaesthesia.

Maintenance of general anaesthesia (GA) in horses can be achieved either by administering intravenous (IV) anaesthetic agents or by inhalational anaesthetic agents.

Total intravenous anaesthesia in horses

Total intravenous anaesthesia (TIVA) is generally used for short procedures or situations where orotracheal intubation has proved problematic. The 'triple drip' is the most commonly used technique. It involves administering a combination of an alpha-2 agonist, usually xylazine or detomidine, with guaiphenesin and ketamine (Taylor & Clarke, 2007).

This technique is best confined to procedures lasting less than two hours; and oxygen should be supplemented if the procedure is to last more than 30 minutes. One of the main disadvantages of TIVA is that it can cause an ataxic recovery.

Intravenous (IV) anaesthetic agents are sometimes used on their own during GA in horses to assist with maintenance. An example of this would be a 'top up' of ketamine used to prolong anaesthesia in the field.

Thiopental is a barbiturate-based anaesthetic agent which is sometimes used to cause rapid anaesthesia if a patient suddenly wakes up during an anaesthetic. Thiopental comes in a powder form and must be reconstituted with sterile water to form a 10% solution for injection (Murrell & Ford-Fennah, 2012). Care must be taken when administering thiopental, because repeated doses can saturate body fat, and this may lead to a prolonged recovery from anaesthesia, which is undesirable.

Inhalational anaesthesia

This is the most common way of maintaining GA in horses. The technique involves administering inhalational anaesthetic agents, and to allow this to happen, the patient must be intubated.

Orotracheal intubation

Once the patient has been safely anaesthetised in the knock-down box, members of the veterinary team can enter and begin the process of orotracheal intubation. The tube provides a secure airway for the delivery of anaesthetic gases – a 20-25mm internal diameter tube is suitable for most adult horses (Murrell & Ford-Fennah, 2012).

Tubes must be cleaned carefully and hung up to dry after use. Once dry, they should be covered to keep them clean – rectal sleeves lend themselves well to this purpose (**Figure 1**). Prior to use, the cuff on the endotracheal tube must be inflated and checked for leaks (Murrell & Ford-Fennah, 2012).

Orotracheal intubation in the horse should be performed as follows (Murrell & Ford-Fennah, 2012):

- the endotracheal tube should be lubricated to reduce trauma to soft tissues during intubation
- the mouth of the patient should be kept open with a gag
- the head and neck of the patient should be extended
- the tongue should be pulled to one side of the mouth and the tube slid between the dental arcades to the back of the pharynx. The end of the tube must disarticulate the soft palate to allow communication between the oropharynx and the larynx (**Figure 2**).
- correct positioning of the tube should be checked by observing for breathing through the tube.

It is important to inflate the cuff of the tube to ensure a seal in the trachea and to prevent the horse from breathing around the tube. Over-inflation of the cuff may cause pressure necrosis of the trachea or occlusion of the lumen of the tube. This must be avoided.

Figure 1. *Orotracheal tubes must be cleaned carefully and hung up to dry after use. Once dry, they should be covered to keep them clean – rectal sleeves lend themselves well to this purpose.*

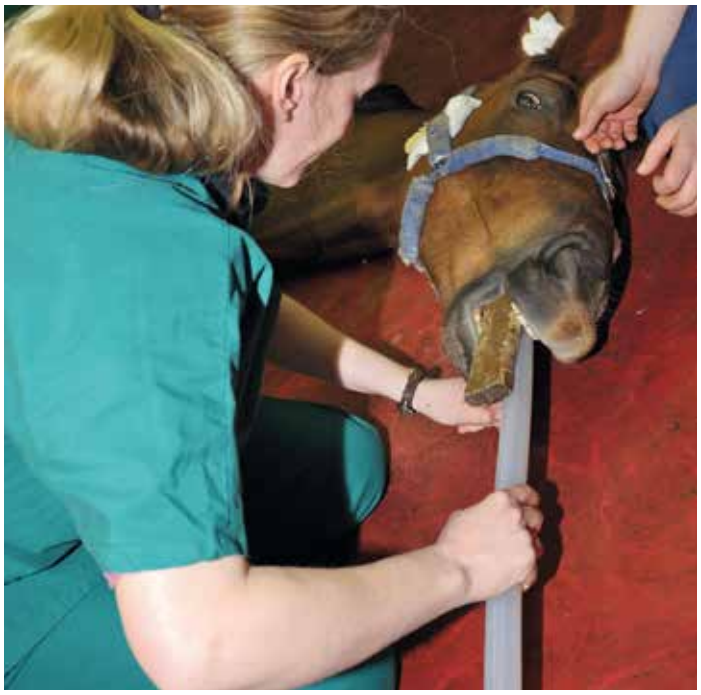

Figure 2. *A nasal tube should be placed to create a patient airway during recovery.*

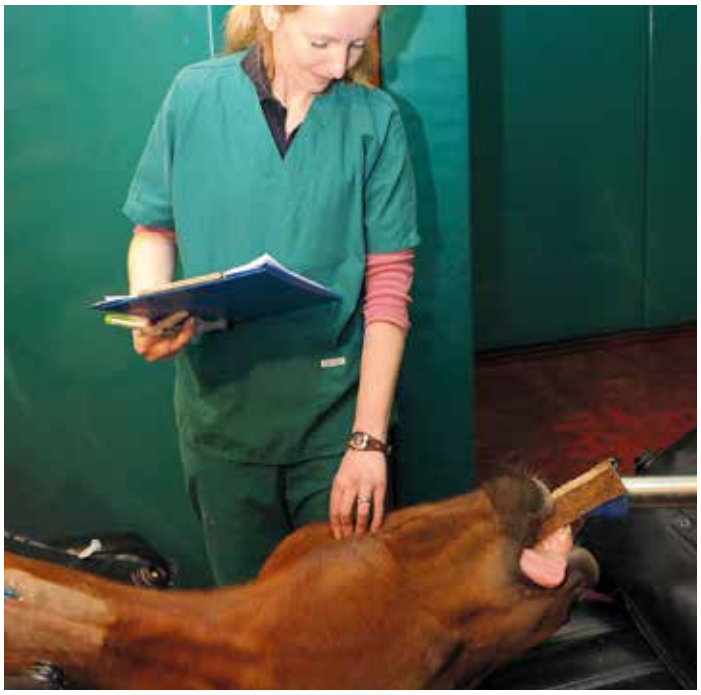

Figure 3. *TPR examinations should be carried out regularly on equine patients following a GA.*

Table 1. Advantages and disadvantages of rebreathing anaesthetic circuits (Murrell & Ford-Fennah, 2012)

Advantages	Disadvantages
Low fresh gas flow rates	Care with nitrous oxide as it can accumulate to toxic levels within this system
Low volatile agent consumption rate	Slow rate of change of anaesthetic concentration in the circuit
Expired moisture and heat are conserved	Soda lime must be changed regularly
Less atmospheric pollution	Cumbersome and heavy
	Expensive to purchase

Table 2. Pharmacology and clinical use of inhalant anaesthetic agents in horses (Murrell & Ford-Fennah, 2012)

Inhalant agent	Physical properties	Clinical use	Side effects
■ Isoflurane	■ volatile liquid ■ colourless ■ non-flammable ■ non-explosive ■ pungent smell ■ light-stable	■ in common use ■ rapid recovery from anaesthesia ■ no liver metabolism	■ severe respiratory depression ■ vasodilation of peripheral blood vessels, causing hypotension
■ Sevoflurane	■ colourless gas at standard pressure ■ stored as a liquid in nitrous oxide cylinders	■ lower blood solubility than isoflurane ■ more rapid recovery from anaesthesia ■ less potent than isoflurane ■ no liver metabolism	■ will cause dose-dependent respiratory and cardiovascular depression
■ Nitrous oxide	■ colourless gas at standard pressure ■ stored as a liquid in nitrous oxide cylinders	■ limited use in equine anaesthesia ■ weak anaesthetic agent ■ to prevent hypoxia, cannot be administered at concentrations >60% ■ risk of accumulation when used in rebreathing circuits at low fresh gas flow rates	■ minimal cardiovascular depression ■ minimal respiratory depression ■ accumulates in gas-filled viscera and body cavities

Once the horse has been intubated, an anaesthetic machine is connected to the endotracheal tube and an inhalation anaesthetic agent is delivered mixed with oxygen, to maintain anaesthesia.

Equine anaesthetic circuits

Rebreathing anaesthetic circuits are commonly used during equine anaesthesia. The circle system is the most widely used, although the to-and-fro system can be used in some situations. Rebreathing circuits incorporate an absorbent agent, soda lime, to absorb carbon dioxide. This allows the circuit to be used with low fresh gas flow rates (Murrell & Ford-Fennah, 2012).

Commercial soda lime preparations contain an indicator dye that changes colour as the soda lime becomes exhausted. This change in colour occurs owing to a change in pH, and indicates when the soda lime needs to be replaced (Murrell & Ford-Fennah, 2012). This change in colour should be noted by the RVN and the soda lime should be changed regularly.

The RVN should always check the anaesthetic machine carefully for leaks before use. The advantages and disadvantages of rebreathing circuits are displayed in **Table 1**. Circle systems are available for small and large animals, and most large animal circuits are suitable for horses weighing more than 100kg. Foals or ponies weighing less than 100kg should be put on a small animal circle circuit.

Inhalant anaesthetic agents

Isoflurane is the most commonly used agent in equine anaesthesia. It causes a rapid induction and stable anaesthesia. Recovery from isoflurane anaesthesia is sometimes associated with disorientation and a degree of 'violence' that can lead to injuries (Taylor & Clarke, 2007). To reduce this risk, it is common to use sedation during recovery when isoflurane has been used as the inhalation agent. The RVN should be aware of this, and assist the anaesthetist to prepare and administer an appropriate sedative during the recovery phase.

Isoflurane affects most body systems – with the most significant being the respiratory and cardiovascular systems. It causes peripheral vasodilation and, therefore, hypotension, which can be severe (Taylor & Clarke, 2007). The RVN should take measures to monitor blood pressure in order to prevent post-anaesthetic complications.

Isoflurane is a potent respiratory depressant, so tidal volume is relatively high and the respiratory rate is relatively low (Taylor & Clarke, 2007). Intermittent positive-pressure ventilation (IPPV) is, therefore, usually required. The RVN should also anticipate this, and ensure that a means of administering IPPV is available via a ventilator, for example. Other inhalational anaesthetic agents are available for use in horses and these are displayed in **Table 2**.

Positioning equine patients for surgery

Careful positioning of a horse under GA is vital to reduce the risk of post-anaesthetic complications, such as myopathy and neuropathy. Whilst this is the responsibility of the anaesthetist, the RVN can be extremely useful during this phase – assisting and making sure that the patient is positioned correctly for the procedure in question.

Positioning in lateral recumbency

The lower limb should be pulled forward to prevent compression of the triceps muscle by the full weight of the body of the horse and the upper limb. Padding should be placed between the limbs so that the upper limb is supported and the limbs should not be in full flexion or extension (Murrell & Ford-Fennah, 2012).

Positioning in dorsal recumbency

Square positioning on the operating table is essential, so that the weight distribution is uniform between the different muscle groups.

The neck should be straight but not overextended, to prevent stretching of the recurrent laryngeal nerves; and both the neck and head should be raised slightly to reduce the risk of nasal oedema developing – horses are obligate nasal breathers, so this could cause a significant problem during recovery.

The legs should be relaxed and slightly flexed (Murrell & Ford-Fennah, 2012).

Monitoring horses during GA

Monitoring of the anaesthetised horse is carried out to ensure that physiological function and the depth of anaesthesia are adequate (Taylor & Clarke, 2007). Careful monitoring is essential, so that abnormalities can be detected as soon as they occur, and remedial action taken.

A written record of every equine anaesthetic performed should be kept detailing anaesthetic agents given and intra-operative monitoring. This record is important for a number of reasons (Murrell & Ford-Fennah, 2012):

- a visual record of cardiovascular and respiratory variables allows changes to be identified more easily and more quickly
- an archive resource is particularly useful if an animal has to have further anaesthetics
- these records provide accurate epidemiological data, which can contribute to an evidence base
- it is a legal document that records the standard of care given to a patient.

Although anaesthesia in horses must be induced and monitored by a Member of the Royal College of Veterinary Surgeons (MRCVS), the RVN can act as an extremely useful assistant during this process.

Monitoring the depth of anaesthesia

Measurement of the depth of anaesthesia depends almost entirely on indirect assessment of parameters that are dependent on central nervous system (CNS) depression (Taylor and Clarke, 2007). Clinical assessment of the depth of anaesthesia is notoriously difficult to achieve in the horse, and mainly relies on clinical observations.

The eye

Appropriate ocular monitoring reflexes are:

- the palpebral reflex is elicited by gently running a finger along the free margin of the upper eyelid. This reflex is usually retained during surgical anaesthesia.
- lacrimation and rapid nystagmus are associated with lightening of anaesthesia
- the corneal reflex is closure of the eyelids in response to pressure on the cornea and is not commonly used.

The eye reflexes must be interpreted with knowledge of the effects of the anaesthetic agents being given in mind. So with inhalational agents, the palpebral reflex is usually reduced but not abolished; and the eye rotates medially and ventrally (Murrell & Ford-Fennah, 2012).

Monitoring the cardiovascular system

Pulse

The pulse should be regularly palpated – at least every

five minutes – throughout anaesthesia (**Figure 3**). The horse is well supplied with superficial arteries: the facial, transverse facial, great metatarsal, common digital or digital arteries are all accessible (Taylor & Clarke, 2007).

The heart can also be auscultated at regular intervals using a stethoscope.

Mucous membranes

The mucous membranes should be pale pink in colour.

Mucous membrane colour and capillary refill time give some guide as to oxygenation and the adequacy of perfusion. The mouth is the best place to assess the mucous membranes and a capillary refill time of more than two seconds is a cause for concern (Taylor & Clarke, 2007).

Arterial blood pressure

Arterial blood pressure (ABP) provides a great deal of information on the cardiovascular system and is the most important aid to monitoring the anaesthetised horse (Taylor & Clarke, 2007). Arterial blood pressure can be measured using direct or indirect methods.

Direct methods require cannulation of an artery – the facial artery is most commonly used – so that either an anaeroid manometer or pressure transducer and oscilloscope can then be used for ABP measurement.

Indirect methods use oscillometric devices that measure the magnitude of arterial pulsations in an air-filled cuff, which is placed around the base of the tail. Indirect methods are less accurate than direct methods (Murrell & Ford-Fennah, 2012).

The association between hypotension and myopathy is well established (Taylor & Clarke, 2007). Mean ABP should be maintained at or above 70mmHg throughout the anaesthetic to reduce the risk of the patient developing a post-anaesthetic myopathy (PAM).

It is important to mention here that IV fluids should be administered to horses under GA as standard procedure – in order to help maintain adequate perfusion and prevent dehydration.

The electrocardiogram

The electrocardiogram (ECG) provides information about the electrical activity of the heart and can be useful in the diagnosis of arrhythmias. The ECG will not, however, give any information on cardiac output; so blood pressure monitoring, together with regular palpation of the pulse, should carried out to create an overall picture of patient progress.

Monitoring the respiratory system

Respiratory rate and rhythm

Movement of the chest wall and rebreathing bag should be monitored regularly (at least every five minutes). Respiratory frequency below four breaths per minute is almost certain to be inadequate, and intermittent positive pressure ventilation (IPPV) should be considered in these cases (Taylor & Clarke, 2007).

Arterial blood gas analysis

Arterial blood gas analysis provides information on respiratory system and metabolic function and arterial carbon dioxide, oxygen concentration and pH are the most useful indicators of respiratory function. Carbon dioxide concentration indicates the adequacy of alveolar ventilation.

The normal arterial carbon dioxide concentration is 35-45mmHg; so increases in this indicate hypoventilation, decreases suggest excessive alveolar ventilation (Murrell & Ford-Fennah, 2012).

Pulse oximetry

Pulse oximeters measure the pulse rate and provide information about the adequacy of arterial oxygenation and peripheral perfusion. In horses, they tend to underestimate the haemoglobin saturation, but can still be used to detect changes (Murrell & Ford-Fennah, 2012).

A haemoglobin saturation greater than 94 to 95 per cent is desirable during anaesthesia.

Capnography

Capnography measures the concentration of carbon dioxide in a sample of gas drawn from the end of the endotracheal tube, and indirectly reflects arterial carbon dioxide concentration.

Capnography is useful for measuring trends, particularly in horses that are being ventilated (Murrell & Ford-Fennah, 2012).

Conclusion

During anaesthetic monitoring, the veterinary surgeon and RVN must use their professional experience and the readings from machines to piece together an accurate picture of how the patient is progressing under the anaesthetic. No one variable should be relied upon or overlooked.

Any abnormalities should be detected and treated quickly to avoid a potentially life-threatening situation from developing.

Cardiopulmonary resuscitation, anaesthetic recovery and post-anaesthetic complications will be covered in part three of this article series. ■

PPD Questions

1. What does TIVA stand for?
2. What type of anaesthetic machine is most commonly used in equine anaesthesia?
3. Name two disadvantages connected with the use of isoflurane in horses.
4. Name an easily accessible superficial artery used for monitoring the pulse during an anaesthetic in the horse.
5. What value should ABP be maintained at or above during an equine anaesthetic?

Answer
1. total intravenous anaesthesia **2.** the circle system **3.** it causes a fast, disoriented recovery and is a respiratory depressant **4.** the facial, transverse facial, great metatarsal, common digital or digital arteries **5.** 70mmHg.

References

Murrell JC and Ford-Fennah (2012). 'Anaesthesia' in: Coumbe K (ed) Equine Veterinary Nursing 2nd edn John Wiley & Sons, West Sussex.

Taylor PM and Clarke KW (2007). Handbook of Equine Anaesthesia 2nd edn, Saunders Elsevier, London.

Implementing health plans in your practice

A steadily increasing number of practices are now offering pet health plans to their clients. Health plans allow the practice to help pet owners receive the support they need to manage their pets' health and fitness, as well as providing an excellent way to spread the cost of their preventive health care. The practice benefits too, with increased client loyalty, a higher visit frequency and a regular monthly income through health plan payments.

It sounds almost too good to be true, but if health plans are offered and administered efficiently and effectively, they can be one of the great success stories for a practice. Well-designed plans and easy administration are the key to this success, although creating plans for maximum uptake requires thought and flexibility.

If only...

Most health plans provide a number of options, depending upon the age and requirements of the pet. Even better would be a system where – as well as standardised plans – there is total flexibility to set up new ones, so that it is just a case of 'mixing and matching' to create the ideal bespoke plan for the client. In this way, each plan would have a customised quota of available goods and services, together with a payment schedule and stock items assigned to it.

Health plans and the associated finance should be easy and flexible to set up, such that a client has the option, for example, of making 12 equal payments, agreed variations in payment or paying an initial set-up fee with direct debit payments starting later. Whatever the choice, the administrator needs to be able to set this up easily and quickly.

We often hear that the administration of health plan payments and goods and services can be a headache for practices and they easily lose track of how much of the plan's contents has been used up and what is left for the rest of the year. What is required here is an invoicing system that monitors client payments and records what items have been used from the plan. That way, when a client selects one of their plan's products, the practice invoicing system automatically records this, adjusts the products and services remaining in the plan, and at the same time adjusts the product numbers in the stock control system.

Marketing material plays a vital part in promoting health care plans too and life is made considerably easier if this can be supplied by the plan provider, who will probably be better and quicker than practices attempting 'in-house' production.

A practice may wish to administer the plan itself or hand it to the plan provider. Either way it is still very useful to have a record of – and be able to monitor – each client's payment schedule quickly and easily.

Help is at hand

It is no easy task to have all the above features built into your health plan; but help is at hand from Spectrum's Practice Health Plans (PHP) which are an integral part of AT Veterinary Systems' flagship management software.

The health plans featured within Spectrum allow you to create bespoke product and service packages for your clients, helping you to provide unique value which in turn boosts revenues and increases competitiveness. ■

Spectrum's great PHP features include:

- standardised plans – including puppy programmes, worming/flea packages and vaccination sets available for all clients
- ability to generate individual client plans at will
- each plan has a customisable quota of available goods and services, together with a payment schedule and stock item(s) assigned to it
- plans can be created for any period of cover, between any dates. Payments can be set up manually or automatically, with equal monthly instalments and with an initial fee, if required
- plans can be added to the client or animal record, and edited at any time
- bespoke marketing materials
- a unique invoicing system for PHP products that records all outgoing stock – enabling efficient and accurate stock control and reordering
- simple plan management with graphical displays of plan allowances, payments and progress
- an optional servicing facility to eliminate practice administration time associated with collecting payments.

Radiography techniques and their interpretation in practice

Possibly the most common radiographs taken in private practice are those of the distal limb. This article will focus on foot radiographs, but the principles discussed here can be applied to images taken of other parts of the limb.

Gemma Tyner
BVSc MRCVS DACVIM

Gemma works at Penbode Equine Vets – a member of XLVets – having returned from lecturing at St George's University, Grenada. She qualified from the University of Pretoria, South Africa, and then completed an internship focusing on equine emergency and critical care at The Ohio State University, USA and Scone Equine Hospital, Australia.

Following this, Gemma undertook a residency in large animal internal medicine at the New Bolton Center, Pennsylvania, where she achieved board certification in large animal internal medicine.

**Suggested Personal & Professional Development (PPD)*

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IMAGING

Optimising technique relies on a thorough understanding of the anatomical structures being imaged and the equipment used. Interpretation relies upon a good working knowledge of normal anatomical variants and common artefacts found when imaging the focal structure.

Technique

It is very important to have clear objectives for the radiographs you require. A thorough physical examination, lameness evaluation – and, possibly, diagnostic nerve blocks – are important steps prior to radiographic evaluation.

Poor technique can render images non-diagnostic and create errors in their interpretation. Developing a sound protocol for each view will enable the practitioner to optimise the utility of the images. The following are factors and techniques to consider when developing a protocol for each view.

Environment

A quiet, clean, flat and spacious area in which to work is helpful. Optimise the environment before bringing the horse over, and position the machine and the horse in order to reduce their movement as much as possible.

Restraint

When you are ready for the horse, make sure it is well restrained. A competent handler who is focused on the job and a proper sedation plan will increase safety and reduce stress. The use of a nose or neck twitch is often sufficient for an anxious horse, but it is better to have the animal slightly sedated rather than to have it moving.

Some horses will twitch and jerk under butorphanol, which is likely to impair image quality and increase the number of repeat exposures. For this reason, try to limit the amount of butorphanol used. A ratio of 1:1 detomidine hydrochloride : butorphanol is adequate to optimise sedation without incurring too many of the negative effects from either drug. Detomidine alone requires higher doses and the sedation achieved is not as smooth as when coupled with butorphanol.

Making sure the horse stands square and has its weight well balanced will allow proper plate and generator position without the need to accommodate non-traditional postures.

Preparation

When taking foot images, cleaning all the surfaces will limit errors in interpretation as a result of poor technique; and having the horse cleaned before your arrival will reduce preparation time.

Packing the hoof to reduce air artefact can add soft tissue opacity and may have implications on the exposure factors. Packing is not necessary for all views and when done must be done meticulously to avoid air-bubbles. Another option is to place the foot in a water bath, which displaces all the air.

Removing the shoe is not always possible or necessary; but it does optimise the image by reducing the scatter which will, otherwise, diminish detail of the image. When imaging for the navicular bone or fine detail in P3, removing the shoe is more important.

Assistance

Go over what you are trying to achieve, giving clear instructions to your assistants, before picking up all the heavy equipment. If your assistant is unsure of what you are trying to achieve, he or she will not be able to respond to some of the limitations that they may face during the acquisition of the images.

Give clear instructions regarding radiation safety with respect to exposure (to the direct beam and scatter) to people assisting with the radiographs as well those in the nearby environment.

Equipment

Knowing your equipment and setting up as much as possible before getting the horse over is helpful. Knowing what 'pre-sets' your machine has and how to make some fine adjustments on it will help improve the image quality. It is helpful to know the optimum focal distance for the machine being used.

Marking and labelling the image correctly is important for record keeping and interpretation of the images. The marker should indicate which limb is being radiographed and should either go on the dorsal aspect or the lateral aspect of the limb (**Figure 1**). With oblique views, the marker sits on the dorsal-most aspect

Figure 1. *Markers must be used to indicate which limb is being radiographed.*

Figure 2. *The lateral medial (LM) projection will highlight the pedal bone's dorsal surface, palmar/plantar surface and its relationship to the dorsal hoof capsule and the foot's weight-bearing surface.*

or the lateral-most aspect, depending on the obliquity of the image. Sometimes the marker can be used to measure against – this is helpful when advising on hoof trimming.

Placing the plate in direct contact, even leaning it on the horse's limb, will reduce magnification and image blurring caused by relative movement of the plate to the specimen and also to the X-rays.

Blocks are required when radiographing the hoof. Make sure the height of the blocks work with the generator so that the beam can be appropriately centred.

Focus

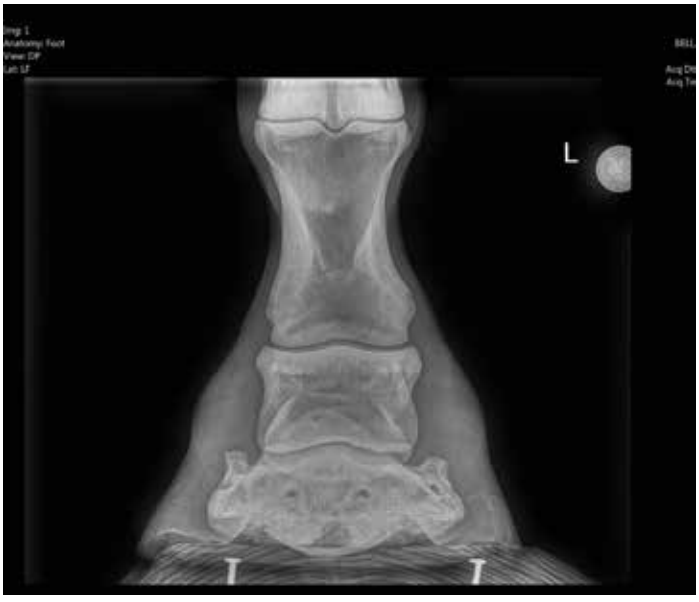
Having clear objectives and knowing the relationship between the bones, the limb position, the plate position and the X-rays will help you to align the beam and the plate with the structure of interest. Knowing what each projection will highlight will help you choose the projection for the pathology anticipated, based on the work-up to this point. For example, when aiming to assess a joint/fracture space, making sure the beam cuts through the space will help open it up.

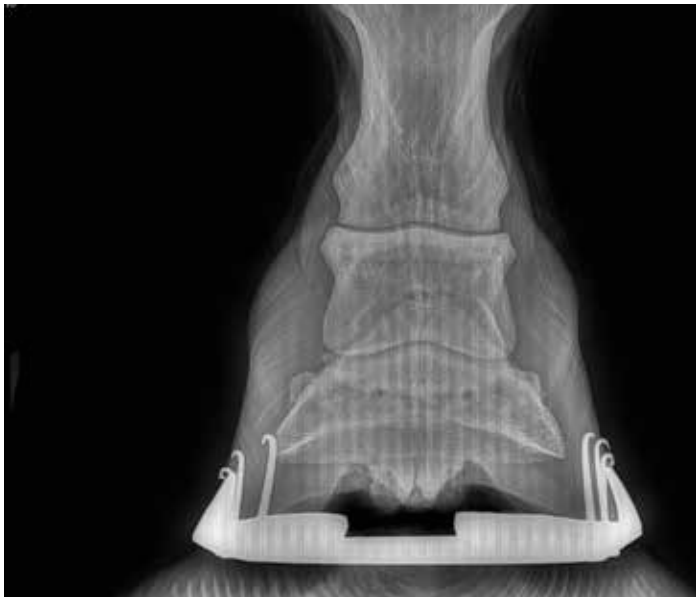
The following short notes offer directions on how to take specific views.

Lateral medial (LM)

This projection will highlight the pedal bone's dorsal surface, palmar/plantar surface and its relationship to the dorsal hoof capsule and the foot's weight-bearing surface (**Figure 2**). Alignment of the bony column can be assessed, as well as the coffin joint and the navicular bursa and bone.

Correcting for medial lateral imbalance can be challenging.





Figures 3 *&* ***4.*** *The dorsal palmar/plantar (DP) view will highlight lateral medial hoof balance, allow for measurement of the medial and lateral hoof wall length and angle, as well as assess proximal and distal interphalangeal joint symmetry.*

Figures 5 *&* ***6.*** *The proximopalmar (45°) distopalmar image will facilitate investigation of the flexor cortex, flexor surface, and axil portion of the medullary cortex of the navicular bone, as well as the palmar processes of the distal phalanx.*

If you are angled backwards (essentially a DLPMO) then the lateral palmar process will project plantar to the medial one. If you are angled skyward then the medial aspect of the solar surface of P3 will be highlighted at the bottom of the image.

Dorsal palmar/plantar (DP)

This view will highlight lateral medial hoof balance, allow for measurement of the medial and lateral hoof wall length and angle as well as assess proximal and distal interphalangeal joint symmetry (**Figures 3** & **4**).

Dorsoproximal (45°) palmardistal oblique (DPr-45- PDiO)

This projection highlights the solar margin of the distal phalanx and will also allow inspection of the distal interphalangeal joint and the insertions of the collateral ligaments.

Dorsoproximal (60°) palmardistal oblique (DPr-60- PDiO)

This image will highlight the navicular bone's proximal and distal borders as well as the synovial fossa. The solar margins and palmar processes of the distal phalanx can be observed. This view is particularly helpful when focusing on the wings of the pedal bone, especially with a tunnel, which will elongate the wings and allow for better assessment.

Proximopalmar (45°) distopalmar

This image will facilitate investigation of the flexor cortex, flexor surface, and axil portion of the medullary cortex of the navicular bone, as well as the palmar processes of the distal phalanx (**Figures 5** & **6**). The hoof placement required for this image can be painful to achieve for horses with pathology in the palmar structures of the hoof.

Exposure factors

The use of modern digital radiography (DR) systems gives the advantage of more exposure latitude (more shades of grey) in a single projection. This makes it possible to see both bone and soft tissue detail in the image. Most systems come with pre-set exposure factors but they do not limit the operator to these factors, which can be tailored for individual patients to further improve image quality.

As with traditional radiography, kVp controls the 'energy' of the beam and consequently the contrast of the image. Increasing the kVp will result in less contrast and less (grey scale) detail. The mAs still denotes the exposure time (the resultant number of rays used). When mAs is too low, the image will be under exposed (generally too light). With digital systems, reducing the distance will improve patient penetration.

If an image appears dark enough but has a grainy appearance, it may help to decrease the kVp by 15 per cent and increase the mAs by at least 20 per cent to provide better saturation of the DR panel and decrease scatter radiation. This will aid in soft tissue detail.

Interpretation

When interpreting images, take the time to go through all the aspects of the radiograph by using the checklist in **Figure 7**. It is always helpful to compare findings with the opposite limb and relate them to the rest of the patient examination.

Common pathology and artefacts

The following common pathologies can be noted radiographically when assessing the coffin bone:

- misalignment with P2 could represent traumatic dislocation and flexural deformities
- narrowing of the distal interphalangeal joint may indicate infection or reduced use – septic arthritis may be associated with joint effusion and a widened joint space radiographically
- alterations in the position of P3 relative to the hoof wall may indicate laminitis (past or present) and the clinician should look for gas shadowing. Up to a 4° angle of divergence is acceptable for the tangential lines of the hoof wall and the dorsal aspect of P3
- the tip of the distal phalanx may also indicate previous episodes of laminitis and fractures
- the extensor process should be evaluated for fractures or evidence of extensor tendon tearing
- judging the chronicity of lesions can be tricky in the P3 – aside from the extensor process, the periosteal covering of the distal phalanx is very primitive. Unlike the long bones that show new bone deposition after a week, P3 will only show this after a month

- markings and labels
- alignment (is the image a true lateral/DP etc?)
- collimation
- exposure factors
- soft tissue detail
- bony structure detail (shape, density, relation to other bones)
- radiolucent effects (e.g. gas lines, fracture lines)
- radiodense opacities (e.g. superimposition and sclerosis).

Figure 7. *Radiograph interpretation checklist.*

- the solar surface of P3 should be evaluated for evidence of osteomyelitis – this can sometimes be challenging as the vascular channels in this bone may become very pronounced with age. Comparison with the opposite limb is often helpful
- the wings should also be assessed for sclerosis, fracture and evidence of side bone formation. Multiple ossification spurs may be appreciated
- the sub-solar aspect of the distal phalanx should be evaluated for evidence of pathology relating to an adjacent abscess.

Conclusion

Good technique will facilitate the acquisition of excellent diagnostic images. Technique relies on the operator's knowledge of the anatomical structure under review and his or her ability with their diagnostic imaging equipment.

Having clear objectives before starting to take images will go a long way to improving the quality of the image and reducing the number of exposures used.

Using a well-constructed protocol to set up for taking images and giving clear instructions to those helping will also improve technique and, therefore, image diagnostic utility. ■

PPD Questions

1. Is **Figure 2** a true lateral?
2. In **Figure 3**, how can the coin be used to aid interpretation of this radiograph?
3. In **Figure 4**, what change would reduce scatter and improve image detail?
4. Does the red circle in **Figure 6** highlight a fracture line?

Answers
1. no
2. it will indicate laterality and can be used as a reference for measurement
3. removal of the shoe
4. no, it shows superimposition of two structures.

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Egglestone RB (2009). Radiology and Ultrasonography of the Equine Foot Proceedings of the AAEP Focus Meeting on the Foot, Columbus, OH, USA, 2009.

Veterinary Advances (App), Equine Radiology, http://veterinaryadvances.com/apps/equine-radiography

Equine vets buck the trend

One of the particularly interesting things to emerge from the British Equine Veterinary Association (BEVA) annual congress this year was the growing antipathy towards corporatisation of the equine sector of the profession. At the end of a well-attended debate, only 28 per cent of voters agreed with the motion 'Corporatisation is inevitable and will benefit vets and their clients', with 72 per cent disagreeing.

The corporatisation of veterinary practices across the UK is a growing trend and it is claimed that the biggest veterinary group, CVS, has acquired 32 equine practices during the past two years alone. Yet it remains a controversial process, with strong views on both sides about the potential advantages or drawbacks to veterinary professionals, their clients and their patients.

In what was reported to be a robust, good-humoured congress debate, Keith Chandler, former BEVA president and member of the acquisitions team at Independent Vet Care, and Karl Holliman, partner and director at Cliffe Veterinary Group and past chairman of XL Equine, argued for corporatisation. Their supporting witnesses were Lesley Barwise Munro of AlNorthumbria Vets, which was sold to CVS in 2015, and Julian Samuelson, a former managing partner of Bell Equine, which was sold to CVS earlier this year.

Andrew Harrison, a partner at Three Counties Equine Hospital and Tim Greet, who recently retired as an equine partner at Rossdales, adopted an opposing stance. Their supporting witnesses were Louise Radford, a qualified vet who now works in the pharmaceutical industry, and Nenad Zillic, partner at the Barn Equine Surgery.

Corporate approach

The pro-corporatisation team advocated that obvious commercial and business advantages, together with the scale and diversity of a corporate structure, can give veterinary professionals greater potential for a more flexible career path and advancement within the industry, plus a more sustainable working career in equine practice.

Karl Holliman pointed out that corporates enable greater purchasing power, better health and safety resources, improved career structure and the freedom for employed veterinary surgeons to focus on clinical expertise rather than becoming bogged down with practice management.

Keith Chandler went on to argue that selling to a corporate is a solution to the problem of succession planning. In a climate of unwillingness for younger vets to buy into practice, selling allows partners to realise the value they have built up and release that equity to do something else.

Other side of the fence

Opposing the motion, Tim Greet said that those points were all very well, but that the good reputation the profession currently enjoys is based on service to clients and, above all, the animals "in our care". Clinical – rather than commercial – elements drive practice, and partners are light on their feet and can respond quickly to decisions without referring to "a ponderous corporate hierarchy". Tim argued that clients like continuity and the quickest way to lose them is to send in different vets. A bespoke approach to client care is what is needed, rather than hard targeting.

Building on this argument, Andrew Harrison suggested that the only veterinary professionals who really benefit from selling out are those who have one eye on retirement. Younger partners may be able to pay off the loan they took out to buy into practice in the first place, but are then likely to take a considerable drop in salary and be given a middle management job – moving from the "pilot seat into the passenger seat." He purported that young vets cannot afford to buy into practices because the industry is being "fuelled by the corporates who are falling over themselves competing to buy equine practices and squeezing out our fellow professionals".

Pro-corporatisation witness, Julian Samuelson, maintained that since Bell Equine had been sold to CVS, there had been no change to client service, no restrictions on clinical performance and that no targets had been imposed to achieve set revenues.

Anti-corporatisation witness, Louise Radford, made the point that big corporates could exert pressure on pharmaceutical companies to drive down prices, which would reduce their capacity to invest in research and development trials and CPD, to the ultimate detriment of the veterinary industry as a whole.

Strengthening tide against

At the start of the debate, 44 per cent of the audience had agreed with the motion and 56 per cent disagreed. However, after an hour of candid discussion, the tide of opinion against the motion had strengthened considerably, with 72 per cent of the veterinary audience in opposition. ■

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Paul Rodgers
BVSc MRCVS

Paul qualified from Liverpool University in 1978. From 1989 until his retirement in March 2017 he was a director in the mixed, mainly farm animal practice of Allen and Partners Veterinary Services, conducting about 25,000 cattle bTB skin tests annually. He is currently one of the directors and deputy senior official veterinarian for Iechyd da (Gwledig) the delivery partner for TB testing for South Wales.

In 2011, Paul was part of a working group updating the Official Veterinary TB Testing Instructions. He is an adviser to the BCVA, has presented at its annual conference and contributed to Cattle Practice. *Paul chairs the XLVet bTB focus group, is a trained trainer and regularly conducts courses, including TB Test Quality Assurance and Cymorth TB (WG bTB biosecurity project).*

**Suggested Personal & Professional Development (PPD)*

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GOATS

An overview and update on bovine TB

Bovine tuberculosis (bTB) is a chronic, infectious, primarily respiratory disease caused by the slow-growing bacterium, *Mycobacterium bovis* (*M. bovis*). It is mainly a disease of cattle and other bovines, but can affect a wide range of mammalian species (including deer, pigs, camelids, cats). Until milk pasteurisation, better meat inspection and bTB testing in the 1930s, bTB was a common cause of human disease and death in the UK.

Disease status in the UK

Control of bTB has cost £500m in the last 10 years (Defra, 2014) and the average cost of an outbreak is £34,000 (£20K Government; £14K farmer). Links to the current Defra bTB statistics are available from www.tbhub.co.uk and an interactive mapping site for England and Wales can be found at www.ibtb.co.uk.

bTB control in other countries

Australia declared official freedom from bTB in 1997, having started in 1970, by:

- whole-herd test and slaughter, including complete de-stocking
- movement controls, quarantine and 'trace-back'
- no bTB reservoirs in wildlife – including feral cattle and buffalo removal.

> "Control of bTB has cost £500m in the last 10 years (Defra 2014) and the average cost of an outbreak is £34,000..."

Although New Zealand (NZ) is a world leader in bTB control in the face of an extensive wildlife reservoir, their target for freedom from bTB in herds is not until 2026. The lesson from NZ is not just the control of possums – an ecologically damaging non-native mammal – but their 'adequately funded, long-term control programme which cannot be changed at the whim of politicians' (Livingston, 2012).

Three-legged stool

There is an analogy for bTB control based upon the structure of a three-legged stool:

- testing of cattle (deer and camelids) and slaughter of infected animals
- restriction of movement from infected herds and infected areas (including local contact between herds)
- control of wildlife vectors.

For successful control of bTB, all of these three legs need to be in place. The steady increase in bTB incidence in some parts of the UK since the 1980s suggests this is not the case.

Cattle testing

In the UK, the two main diagnostic tests for bTB

Figure 1. *Diagram of the Bovine Immune Response to Diagnostic Tests. The time-line is variable depending on factors, such as animal age.*

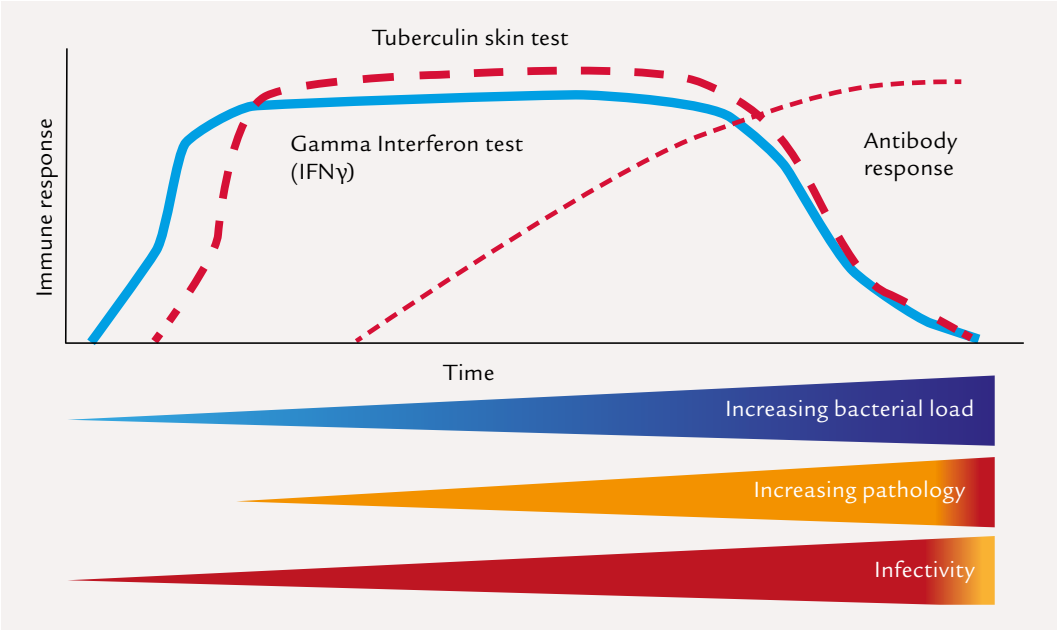

Figure 2. *Poor cattle handling.*

Figure 3. *The consequence of poor cattle handling.*

are the single intradermal comparative cervical tuberculin (SICCT) test and the interferon gamma test (IFNγ), with disease being 'confirmed' by post-mortem examination (PM).

In 1890, Koch demonstrated the action of a purified protein derivative (PPD or tuberculin) using a subcutaneous test. Moussu and Mantoux developed a caudal fold intradermal test in 1908 with a sensitivity of 88.5 per cent and specificity of 96.12 per cent. From 1935, the Ministry of Agriculture & Fisheries developed the comparative test, the procedure for which is essentially the same today (Patterson, 1959).

The SICCT test as described in Council Directive 64/432/EEC is the officially recognised test and is the internationally accepted standard for detecting *M. bovis* in cattle. Official veterinarians (OVs) are contractually obliged to follow the 'OV Instruction' and must sign a TB52, which is a veterinary certificate. However, this test is based on 1930s technology and husbandry.

In the author's opinion, the OV Instruction is excessively prescriptive – and, if cattle handling is less than ideal, the test can be impractical and dangerous to deliver.

The IFNγ test is carried out on live blood cells, usually taken by Animal Plant Health Agency (APHA) staff. Immune cells from infected cattle, stimulated with bovine and avian tuberculins (same as used in the SICCT) respond by releasing IFNγ, which is measured.

Diagnostic tests are judged by parameters including:

- sensitivity (Se) – proportion of truly diseased animals detected as positive in the diagnostic assay
- specificity (Sp) – proportion of truly non-diseased animals that are correctly identified as negative by a diagnostic test.

"In the authors' opinion, the economic and social harm from bTB justifies humane badger culling – within the constraints of the Bern Convention – as part of the control programme"

The SICCT (standard interpretation) is, at best, 80 per cent sensitive and 99.98 per cent specific (Strain et al, 2016); but sensitivity is higher at the herd level. The IFNγ test has higher Se (90%) but lower Sp (99.5%). The principle that a higher Se gives a lower Sp is also true for the SICCT severe interpretation. If the two tests are run in parallel, in the absence of an external source of re-infection, the likelihood of recurrent bTB breakdown should be reduced (de la Rua-Domenech et al, 2006).

Post-mortem sensitivity is at best 50 per cent, but much lower when testing frequently. Contrary to farmer belief, post-mortem examination is not considered the Gold Standard. This is illustrated by **Figure 1,** along with the importance of early detection of infected animals before they become anergic (de la Rua-Domenech et al, 2006).

For the SICCT, it is better to use Test Performance, which takes into account practical delivery of the test. The quality of bTB testing is not only affected by the attitude, knowledge or ability of the OV performing the test; but can also be influenced by other factors (Rodgers, 2015), especially cattle handling facilities (**Figures 2** & **3**).

It is worth noting that in areas where there is no infected wildlife, these tests have successfully eradicated bTB.

Cattle movement

Translocation of disease by cattle movement and local spread to other herds and wildlife has contributed to the increase in bTB since the 1980s. Many farmers do not consider bTB when purchasing cattle. A truly closed herd is the only way to eliminate this risk.

The area of the vendor and recent test history should be considered; and Risk-based Trading and the recent Bovine TB Herd Accreditation under CHeCS (www.checs.co.uk/bovine-tb-herd-accreditation) can further inform decisions. A pre-movement test is no guarantee that an animal is uninfected (**Figure 1**) and 60-day isolation, followed by a post-movement test, should be used.

Rules for the devolved governments can be found on the TB Hub.

Wildlife

The only wildlife control measure that has evidence for its efficacy in reducing bTB in cattle is badger culling, including that from the Randomised Badger Cull Trial

(Jenkins et al, 2010). There is no evidence that vaccination of badgers has reduced cattle bTB incidence; and badger vaccination requires 10 times the human doses of BCG, so supply and cost may be limiting factors.

In the authors' opinion, the economic and social harm from bTB justifies humane badger culling – within the constraints of the Bern Convention – as part of the control programme. Badger vaccine could be used as a secondary measure. It is important that preventive biosecurity measures are also employed.

Biosecurity visits

There have been government biosecurity projects in Wales since 2009 (Rodgers, 2015). These projects have shown that private veterinary surgeons have the best chance of getting changes in farming practice to reduce the risk from the biosecurity hazards identified at their visit. Adequate time should be spent looking round the farm and farm buildings – it is surprising what will be identified.

It should be remembered during the visit that the farmers involved may be suffering from stress – it is known that of farmers referring themselves to the Farming Community Network Helpline (03000 111 999), 31 per cent include bTB as one of their problems. With this in mind, the farmer should have equal 'ownership' of any veterinary recommendations, which must be realistic, achievable and timely, with proper follow up. ■

There is a detailed section on biosecurity in the TB Hub, www.tbhub.co.uk.

> "The only wildlife control measure that has evidence for its efficacy in reducing bTB in cattle is badger culling..."

Badger foot print with characteristic large kidney shaped pad.

PPD Questions

1. For your county, how many new bTB Incidents were there and how many animals were slaughtered?

2. A client complains, "The Ministry has taken 10 of my best animals and none of them had anything". How would you explain this?

3. What is the maximum gap under a door to prevent badger access?
   A. 15cm
   B. 10cm
   C. 7.5cm

Answers
1. use the links from the TB Hub to look at the dataset spreadsheet for your county
2. use easily understood language – e.g. "The chances of your animal not having bTB was 1 in 5000"; "post-mortem examination is like looking for a grain of salt in a pile of sand"; refer to Figure 1
3. 7.5cm – this and other biosecurity information is on the TB Hub, www.tbhub.co.uk

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Management of economically important farm animal diseases

Ed van Klink
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Ed van Klink joined the University of Bristol School of Veterinary Science as senior lecturer in veterinary public health in 2011. During his career, he has spent some time in animal disease control, as a research assistant in food hygiene and as a 'government vet' for 26 years.

Ed has carried out consultancy work in animal and public health policy and legislation in many countries in eastern Europe, South America and South East Asia, and has worked in a variety of positions – as a district veterinary officer in Zambia, and as a policy officer in the fields of notifiable disease control, food safety, and animal health and welfare in The Netherlands. Currently, Ed and a colleague are setting up a bee unit for teaching purposes at Bristol.

*Suggested Personal & Professional Development (PPD)

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DISEASE CONTROL

Diseases do damage to farming livelihoods, and this damage can be extreme in certain cases. In this article, some aspects of economically important diseases will be discussed, with emphasis on how management of these conditions fits in with disease management at national – and even supra-national – levels, and where the individual veterinary practitioner and their clients fit in.

We can all recall – and remember – outbreaks of disease that have caused utter devastation to the farming industry as a result of the extent of their spread. The outbreak of foot-and-mouth disease in the UK in 2001 is still fresh in the memory of many within and outside the industry, as is the outbreak of classical swine fever in The Netherlands in 1997/98. And the constant threat of bovine TB in several regions is an example of how endemic diseases can continuously influence performance in the sector – not just at farm level, but with wider implications.

Some examples

It is fairly obvious why diseases such as foot-and-mouth disease, classical and African swine fever and avian influenza are generally – if at all possible – controlled to the extent of eradication. In most cases, these diseases cause so much damage that in the modern livestock industry, their presence cannot be accepted.

At national and international levels, guidelines and legislation have been drafted that govern how these diseases should be dealt with. But this is not the same everywhere in the world – for example, in several African countries, some of these diseases are still present and spread virtually unchecked, mostly as a result of an inadequate veterinary services infrastructure.

The fact that the livestock industry in those countries is not as intensive and high producing as ours, means that the damage done in comparable terms is less of an issue than in Western countries.

Trade is overriding factor

A central theme in the requirement to control serious animal diseases often proves to be the trade in livestock and livestock products. Without proper disease control infrastructure, countries will not be able to engage in international trade in these products. Central to the engagement of countries in international trade is that they conform to the Agreement on the Application of Sanitary and Phytosanitary Measures (the SPS-agreement) of the World Trade Organisation (WTO, 2017).

This agreement allows countries to take part in international trade in animals and animal products if they can assure that the receiving trade partners are not exposed to serious animal diseases. What needs to be done in order to comply is described in the Terrestrial and Aquatic Animal Health Codes drawn up by the World Organisation for Animal Health (OIE, 2016a, 2016b).

Many countries will opt for eradication of diseases that are on the so-called OIE list, especially if they engage in exporting animals and animal products. The UK has achieved freedom from disease for Aujeszky's disease in pigs, for brucellosis in cattle and other species, and enzootic bovine leucosis, for example. Several Scandinavian countries, as well as some other countries in Europe, have gone further, eradicating infectious bovine rhinotracheitis (IBR) and bovine virus diarrhoea (BVD).

Advantages of control programmes

As soon as a country has set up a disease control or eradication programme for a certain disease, it can immediately restrict access to their territories for animals and certain products from areas where that particular disease is still present. Scotland is officially free of bovine TB for example, and is getting a programme for organised control of BVD underway. This means that transporting animals – and some animal products – from other areas in the UK to Scotland may be restricted, as both diseases are endemic in the rest of the UK.

Even if a centrally organised programme is not present, it is still possible to assist individual farmers in getting rid of certain diseases from their farms. Depending on the

"A central theme in the requirement to control serious animal diseases often proves to be the trade in livestock and livestock products"

disease, removal of positive animals or vaccination – or combinations of the two – may be instruments that can be used. In any case, high levels of biosecurity are in order, particularly with respect to buying in animals from insufficiently known health status.

For many of the diseases that are relevant in this respect, the introduction of animals from the outside is by far the biggest risk factor for farm breakdowns. Therefore, buying in animals should be limited as much as possible. Markets are one of the best ways in which to spread disease!

Some individual programmes

IBR eradication programmes will normally start with vaccination of the animals on the farm with differentiating vaccines (DIVA-vaccines). These allow the detection of infected animals as opposed to vaccinated animals because the antibodies formed against the vaccine virus can be distinguished from those that are formed against field virus. The vaccination will prevent spread of the virus within the herd and, over a period of time, the carriers of the disease can gradually be phased out through culling.

Control programmes against Aujeszky's disease usually follow the same pattern.

For the control of BVD, vaccination is also used. Here, it is of little use to detect animals with antibodies; because it is the permanently infected animals, that will shed virus constantly during their lifetime, that are much more important here. Generally, at some point, samples will be taken from parts of the herd to identify PI-animals.

Bovine TB is also one of those diseases for which countries apply for freedom from disease status. Control proves to be complicated, especially in cases where a wildlife reservoir is present. However, though the wildlife reservoir undoubtedly does contribute, the extent of that contribution is generally exaggerated. There are far more important risk factors, as previously stated – and for keeping a herd from breaking down, biosecurity is key, particularly closing the herd down to introductions of animals from unknown sources. Aside from that, there are measures which can be taken to reduce exposure of animals to the wildlife reservoir. There are some working groups that will advise on badger-proofing farms.

Conclusions

Control and management of economically important animal diseases, such as IBR, BVD, bovine TB and Aujeszky's disease are often organised centrally at national level in order to improve the trade opportunities for the national livestock industry. Where that is not the case, it is still possible for individual farmers to achieve eradication on their

"As soon as a country has set up a disease control or eradication programme for a certain disease, it can immediately restrict access to their territories for animals and certain products from areas where that particular disease is still present"

farm. This requires a variety of measures depending on the disease, including vaccination, culling of carriers or serologically positive animals.

In some cases, the direct advantage of having more opportunities for trade may not always be immediately clear; although it is likely that more direct trade between farms with high animal health status will develop over time, bypassing (high-risk) markets.

For some diseases – BVD being one of them – it makes perfect economic sense to try to eradicate it at farm level, because there are direct advantages in terms of better performance overall and fewer general disease problems. ■

"For some diseases, it makes perfect economic sense to try to eradicate it at farm level, because there are direct advantages in terms of better performance overall and fewer general disease problems"

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PPD Questions

1. 1. Which bacterium causes the most frequent gastrointestinal infections in people?
   A. *Campylobacter* spp.
   B. *Escherichia coli*
   C. *Listeria monocytogenes*
   D. *Salmonella* spp.
   E. *Yersinia enterocolitica*

2. What is the paralytic syndrome called that can result from a Campylobacter infection
   A. Calmet-Guerrin syndrome
   B. Creutzfeldt-Jacob syndrome
   C. Gerstmann-Sträussler syndrome
   D. Guillain-Barré syndrome
   E. Imposter syndrome

3. *Escherichia coli* spp. survive easily in the environment. Where can they survive for months if not properly cleaned regularly?
   A. feed trench
   B. grass silage
   C. straw bales
   D. teat cup linings
   E. water troughs

4. What is the most important source of contamination for carcasses in the abattoir?
   A. cutting blades of saws
   B. electrical goad
   C. floor of the lairage
   D. hands of the Official Veterinarian
   E. skin of the animal

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

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David qualified in 1974 and after nine years in farm animal practice worked as a veterinary investigation officer for the AHVLA in Carmarthen and Winchester, retiring in 2013. He has a special interest in the health and welfare of all farmed ruminants and in diagnostic pathology.

David is honorary vet to the British Goat Society, chairman of the Goat Veterinary Society, an honorary reader at the University of Surrey and visiting lecturer at London, Bristol, Liverpool and Glasgow universities. He is also a former president of the British Cattle Veterinary Association.

*Suggested Personal & Professional Development (PPD)

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TB IN GOATS

Bovine TB in goats

No matter how and why they are kept, *all goats* are classified as farm animals and are potentially susceptible to bovine TB and the implications of its control. This article gives some background information on the disease, which is still comparatively uncommon in goats.

In the UK, it is estimated that there are between 98,000 and 100,000 goats kept – a small population when compared to cattle and sheep. This population, however, has a very varied makeup, including a significant commercial dairy sector predominantly housed all year round, with individual herds of up to 4,000. There is an important fibre sector (both Angora and Cashmere), and a small – yet increasing – meat sector.

Some goats are kept purely as a hobby for home milk provision and showing; and others, such as the Pygmy goat, are kept purely as pets – being particularly popular in public attractions and open farms.

No cases of bovine TB were confirmed in goats between 1950 and 2007. This led to a decision to suspend routine testing of goats for TB unless they were on a holding on which cattle were also kept. Goats are generally considered to be 'spillover hosts', in that they are most susceptible to infection when the local background levels in cattle and the local wildlife population, particularly in badgers, are high.

In 2007, infection re-emerged in goats for the first time in over 50 years, in a small group of hobby goats. Over the next five years, two more incidents were again confirmed in small hobby herds, including one in Wales in a pedigree Golden Guernsey herd – which was unfortunately sold and dispersed around England and Wales while still infected.

All goats were traced, and this outbreak and the two previous incidents were all brought under control through repeat tuberculin skin testing in the affected herds and slaughter of all test-positive ('reactor') goats. Of significance – and in support of the 'spillover' concept – all goats were infected with the local geographically distinct TB spoligotype.

In late 2013, however, TB was confirmed in a large commercial dairy goat herd in the west of England, in adult goats sent for post-mortem examination (PME) at the AHVLA Langford VI Centre – these goats had been recently purchased and were culled owing to clinical signs including weight loss and respiratory signs. Lesions were widespread.

It transpired that they had originated from another herd in the NW of England, in which disease had not been identified. The spoligotype was not the local profile, but that of the more northerly herd in which – by skin testing – TB was confirmed. One further unrelated outbreak has also been confirmed more recently in another commercial herd.

So since 2007, to the best of the author's knowledge, there have been only six incidents, and none in the 50 years prior to this.

"No matter how and why they are kept, all goats are classified as farm animals and are potentially susceptible to bovine TB and the implications of its control"

What are the clinical signs?

Owing to the widespread TB testing programme in the UK, clinical disease in cattle is rarely reported. In goats, however, once infection gains access to a herd, infected individuals may quickly show early clinical signs. These may include weight loss, inappetence, reduced milk yield, dyspnoea and coughing.

In areas in which there is a known background TB problem in the cattle and wildlife populations, TB should be considered as a possible differential diagnosis if this spectrum of clinical signs is identified. This becomes particularly relevant if coughing or dyspnoea continues, despite treatment for other infectious causes.

These same principles also apply, in 'TB-free areas' if a history confirms that goats may have been purchased recently from a known infected area.

What is the disease pathogenesis?

Post-mortem studies have shown that in the affected goats in the 2008 outbreak (many of which were subjected to detailed post-mortem examination), the typical localised 'tubercle' lesions did not always develop. Instead, large abscesses were produced with more liquid pus (**Figure 1**).

If these abscesses erode into the airways, then cases can quickly become 'open' – with dissemination via the

"Owners of infected pet goats may ask for their animals to be treated for TB – this is not permissible"

respiratory route. Lesions have also been widely evident in other organs, including the liver (**Figure 2**) and spleen, in which more typical caseous and calcified lesions can also develop.

Testing in the larger herds, has shown very widespread infection, undoubtedly in part caused by the greater shedding of infection as a result of this pathogenesis; but also by the fact that in each herd, goats are housed in close proximity with each other 24/7 (**Figure 3**).

What are the potential sources of TB for goats?

As already stated, goats are considered as 'spillover hosts'. It follows, therefore, that infection may originate from three potential sources:

- from infected cattle, if goats are kept in the same airspace, or in close proximity
- from other infected goats entering the herd
- from local wildlife, particularly badgers.

Goats have evolved as browsing animals and, when kept outdoors, are more likely to stray into hedgerows, field margins and woodland than their grazing cattle counterparts. This can increase their risk of direct or indirect contact with badgers and badger latrine areas.

As the large commercial herds are mainly housed all year – with little or no contact with cattle or other goat herds – the risk here is of badger access to buildings or feed stores. Most commercial herds will feed TMR rations based on maize silage, to which hungry badgers may be attracted.

Indirect spread of infection can result from access to contaminated equipment – the practice of sharing equipment between smaller herds being a particular risk factor.

What if I suspect disease?

TB is a notifiable disease, and any suspicion should be reported to – or discussed with – the Animal and Plant Health Agency (APHA) in England, Wales and Scotland. Private tuberculin skin testing of goat herds (or individual animals) of unknown TB status can be permitted, and must be undertaken by an approved 'official veterinarian' (OV) holding the 'TT qualification', provided that the owner is willing to pay for the test.

Owners must be made aware of the repercussions of a positive test result; such as herd restrictions, reactor slaughter and further compulsory testing. Before this testing is undertaken, clearance must be obtained from the local APHA office, and this same office should be informed of the results of any such testing. Any subsequent actions necessary will vary between the devolved administrations.

One of the main reasons that this permission must be sought is that once a TB skin test has been undertaken, it leads to a period of desensitisation – when there is a danger that false negative results may be obtained. Such a dialogue should ensure this cannot happen.

Suspicion of disease should also be reported if lesions suggestive of TB are encountered during a post-mortem examination – the same applies to lesions identified in an abattoir at meat inspection.

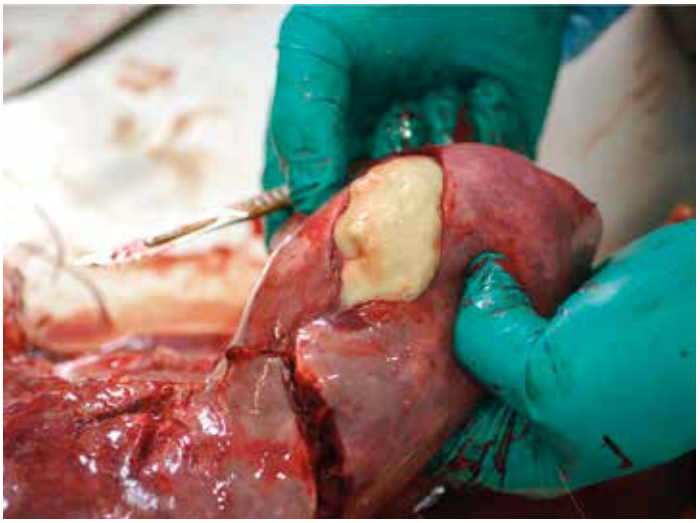

Figure 1. *A bovine TB abscess in lung tissue (Crown Copyright 2017, with kind permission of APHA).*

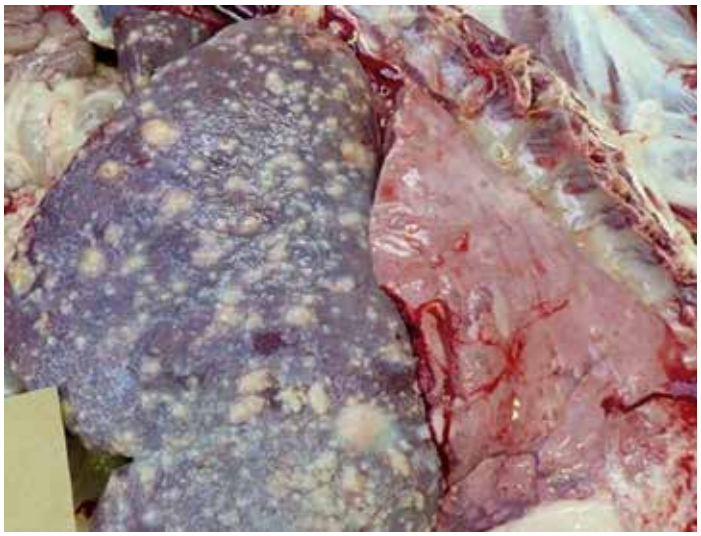

Figure 2. *More typical TB lesions in liver (Crown Copyright 2017, with kind permission of APHA).*

Figure 3. *Commercial dairy goat herds housed all year round – TB infection can spread rapidly if it gains access.*

Owners of infected pet goats may ask for their animals to be treated for TB – this is not permissible.

If dairy goats test positive to the skin test, or if TB is confirmed in a herd of dairy goats, APHA will inform the local authority. Until movement restrictions have been lifted, the owner will be responsible for ensuring that all milk produced by the herd is pasteurised before it can be sold to the public.

The occupational zoonotic risks are also assessed, in conjunction with the local Health Protection Team. If there is genuine concern of significant exposure, then TB screening may be offered.

What tests are currently available?

The current official test is the single intradermal comparative cervical test (SICCT) or skin test as used in cattle. As the neck region is very narrow in goats, the usual procedure is to inject the avian tuberculin on one side of the neck, and the bovine tuberculin on the opposite side – ensuring that the injection is intradermal and not subcutaneous, because the skin can be very thin, particularly in younger goats.

Field experience in investigating outbreaks, has confirmed that the test is very predictive of disease, with a specificity of around 98 to 100 per cent, but with a sensitivity of around 84 per cent.

If Johne's disease vaccination (with Gudair vaccine) has been undertaken within a herd, or if purchased goats have previously been vaccinated, then this vaccine may interfere with the interpretation of tests for TB. In TB-infected herds, a likely consequence of an apparent cross-reaction to avian tuberculin would be a drop in the sensitivity of the screening tests for TB in vaccinated animals. This can result in some animals infected with *M. bovis* being wrongly classified as negatives or inconclusive reactors (IRs) rather than reactors – and the fate of inconclusive reactor goats in TB control programmes has been problematic.

As stated, routine statutory skin testing of goats is not a mandatory requirement in the UK – although they have been included in local initiatives in Wales.

Circumstances in which a test may be required include:

- for 'diagnostic' purposes – for example, when suspect lesions of TB have been reported during post-mortem examination or post-mortem meat inspection of goats, to assess levels of infection in the herd of origin
- when the causative bacterium of TB (*M. bovis*) has been identified in goats by laboratory culture of samples
- when TB has been confirmed in a cattle herd or other livestock adjoining (or co-located with) a goat herd
- to allow removal of movement restrictions following the disclosure of TB test reactors, clinical cases or confirmed slaughterhouse cases
- when goats have moved onto a farm from another herd in which TB has been confirmed (tracings).

As is the case with the camelid sector, there has been much interest in the potential use of serological tests to supplement or replace the SICCT (the latter is the current EU test of choice). The test is a multiplex serology test using antigen arrays to detect antibodies to specific *M. bovis* antigens, and has been employed with Defra approval for assessment – alongside SICCT testing – in recent herd breakdowns.

Figure 4. *Goats are browsing animals and thus more likely to 'forage' where badgers are active.*

The declared sensitivity in one herd tested was given at 95 to 98 per cent, with 98 to 100 per cent specificity. Further validation is required, but from experience to date, serological testing is looking very promising indeed. APHA has used this test alongside the skin test when dealing with individual incidents.

How can I keep goats TB free?

Risk-based, pre- and post-movement testing (following APHA notification) of all – or a proportion of – goats should be considered, with the risk being largely dependent on the geographical area from which goats are being purchased. Remember goats are 'spillover hosts'.

As there could still be goats which were incubating the disease at a stage when no available test could detect it then, in an ideal world, any incoming goats should be isolated for around eight weeks and then retested before they join the herd.

Wildlife sources

Grazing goats in an area where TB in badgers is at a high level will always be a risk, particularly as goats are browsing animals and thus more likely to 'forage' in hedgerows and woodland where badgers are most likely to be active (**Figure 4**).

For housed goats, the risk is of infected badgers coming into housing and infecting goats either directly or indirectly via contamination of their food supplies. Maize silage in clamps or when spread out to feed is highly attractive to badgers, and can be readily contaminated by TB excretions. This is particularly important during the hours of darkness, when buildings are quiet and less active.

When taking steps to reduce access by badgers to goat housing, each holding will differ, but the following points (adapted from the Defra publication, *Do you know what is happening in your feed store?*) should be considered.

Keep badgers away from stored goat feed and straw bedding

It is important to make walls and doors of feed and bedding stores secure, especially if they are used for storage of 'straights' or include concentrate feed. Doors to these feed store doors must be kept shut, especially in the evening and at night because this is the peak time for badger visits; and there should be no gaps in doors and walls that allow access to badgers.

If a feed store is accessible to badgers and too costly to modify, it is worth considering storing feed in a

different building or in secure containers. When building a new feed store, consider ways of preventing wildlife access – foundations 45cm deep will prevent badgers burrowing beneath them.

Make farmyards less attractive to badgers

This too is mostly related to access to food. Do not leave feed easily accessible in the farmyard as this is an attraction to badgers, and avoid feeding goats on the ground, despite its being accepted that this is common practice on many goat units. Consider ways of preventing badgers from gaining access to feed.

While it may be difficult to keep badgers out of goat housing completely, it makes sense to make such housing more difficult for badgers to access. Ensure silage clamps are well covered and consider protecting the open face by electric netting at times when access is not needed.

Be aware of high risk areas at pasture

Feeding at pasture may be a higher risk than feeding in the farmyard, especially in high-risk areas such as badger latrines and active setts at pasture. Allowing goats access to woodland should be avoided.

Note that feed and water troughs can become contaminated by wildlife, so keep an eye out for such signs of contamination and clean these out regularly. If using molassed, salt or mineral blocks, consider taking measures to make them more difficult for badgers to access – by suspending them maybe. And remember that badger carcasses are a potential source of disease, so dispose of them sensibly.

What happens if TB is confirmed in a goat herd?

There is currently no legislation that covers the actions taken by APHA/ Defra and no compensation is payable in England – although there are compensation scales in Wales.

We are currently awaiting the final outcome of a 'TB in Non-Bovine Species Consultation' to which the Goat Veterinary Society and others within the goat sector responded. We have been assured that this legislation will soon be in place – but in the meantime, any new incident is likely to be dealt with on a locally agreed risk-based strategy involving testing and culling – with negotiation regarding any compensation. ■

PPD Questions

1. Goats are kept in the UK for many reasons. From the list below select which type of goat enterprise is potentially susceptible to bovine TB
   - A. commercial dairy goats
   - B. pedigree show and hobby herds
   - C. Cashmere and Angora goats
   - D. goats kept as pets or at public attractions
   - E. goats reared for meat.

2. List the five most commonly reported clinical signs.

3. What should you do if you suspect TB in a live goat?
   - A. arrange immediate euthanasia and post-mortem examination
   - B. treat the goat symptomatically, and tell the owner to report back
   - C. assess the local risk factors and, if the goat is kept in a high-risk TB area, contact APHA to discuss next steps
   - D. carry out a TB skin test – you have your McClintock syringes in the car!
   - E. place the goat in strict isolation as there could be a zoonotic risk and advise the owner to seek medical advice.

4. Routine TB skin testing of goats is not currently undertaken in the UK, but give at least three reasons why you may be asked to undertake such a test on a client's herd by APHA.

Answers

1. all equally susceptible
2. weight loss, inappetence, reduced milk yield, dyspnoea and coughing
3. C, although D and E may be steps to be taken, skin testing can only be undertaken in consultation with APHA.
4. when suspect lesions of TB have been reported during post-mortem examination or post-mortem meat inspection of goats, to assess levels of infection in the herd;
   – when the causative bacterium of TB (*M. bovis*) has been identified in goats by laboratory culture of samples;
   – when TB has been confirmed in a cattle herd or other livestock adjoining (or co-located with) a goat herd;
   – to allow removal of movement restrictions following the disclosure of TB test reactors, clinical cases or confirmed slaughterhouse cases;
   – when goats have moved onto a farm from another herd in which TB has been confirmed (tracings).

Further information

Goat Veterinary Society: www.goatvetsoc.co.uk/goat-health/tuberculosis/

APHA instructions on TB testing in goats: http://ahvla.defra.gov.uk/External_OV_Instructions/TB_Goat_Instructions/Updates/index.htm

Defra fact sheets for owners: www.gov.uk/government/publications/tuberculosis-in-goats

Duty to speak out

In the 2015 'Voice of the Profession' survey, 64 per cent of UK veterinary surgeons chose welfare at slaughter or pre-stunning, as a top priority for the Government to tackle. In addition to this, nine out of 10 vets believed consumers should be better informed about slaughter methods.

It should, then, be with great concern that we learn that the number of animals killed without pre-stunning has risen sharply, according to the British Veterinary Association's (BVA) analysis of the latest survey released by the Food Standards Agency (FSA).

Slaughter without stunning unnecessarily compromises the welfare of animals at the time of death; however almost a quarter (24.4%) of sheep and goats slaughtered between April and June this year had their throats cut without first being made insensible to pain. An increase from 15 per cent in 2013, when the EU and UK-adopted legislation allowing an exemption for animals that are slaughtered for religious purposes came into force.

The number of chickens being slaughtered without pre-stunning has soared from three per cent in 2013 to 18.5 per cent in 2017, the FSA figures also revealed.

Call for all

BVA senior vice president, Gudrun Ravetz has commented: "This huge increase in the number of sheep, goats and poultry that are not stunned – or not stunned effectively – before slaughter is a grave concern to our profession. Millions of individual animals are affected, making this a major animal welfare issue.

"The supply of meat from animals that have not been stunned massively outstrips the demand from the communities for which it is intended and is entering the mainstream market unlabelled.

"In the light of these official figures we reiterate our call for *all* animals to be stunned before slaughter. If slaughter without stunning is still to be permitted, any meat from this source must be clearly labelled and the supply of non-stun products should be matched with demand."

The BVA has taken great care to point out that its concerns have nothing to do with the expression of religious beliefs; but rather with the practice of killing by throat-cutting without pre-stunning. Its continuing concern is for the welfare of those animals that are not stunned.

The Association is calling for one, clear, mandatory EU-wide method of production food labelling system, which should include requirements relating to animal welfare outcome safeguards. The current voluntary labelling system is confusing for consumers and should be amended so that they fully understand the choice they are making when purchasing such products.

Stunning anomaly

Although the BVA's position on welfare at slaughter is clear, as a result of the current absence of a legal requirement for all animals to be stunned prior to slaughter, a separate stand-alone position statement has been developed on the option of post-cut stunning.

In a statement, the BVA declares: 'We recognise that while pre-stunning is superior from a welfare point of view, should non-stun slaughter continue to be permitted, post-cut stunning offers a valid means of reducing the suffering of animals at slaughter. Therefore, the option of post-cut stunning is not equivalent to pre-cut stunning but presents a highly desirable refinement if government policy does not change.

'Where an immediate post-cut stun is applied, we believe that the requirement for sheep/goats to remain stationary for a minimum period of 20 seconds is unnecessary as stunning renders the animal immediately unconscious and insensible to pain.'

Open eyes

The recent announcement that all slaughterhouses in England will have to install CCTV as part of government plans to monitor animal welfare is to be welcomed as a step in the right direction. Under rules being phased in over the next year, FSA official veterinarians will be able to ask to see footage of all areas where livestock are held. Slaughterhouses found to be failing in their welfare standards could face a criminal investigation or lose staff licences.

Currently, keepers of animals bred for meat must meet animal welfare laws and codes of practice, which cover the treatment of livestock – including how they are fed, housed and transported, as well as how they are killed.

As a profession it behoves us all to remind ourselves of that fact and not shun our moral and ethical responsibilities – irrespective of whether we are in small, large or equine practice – to ensure that the welfare of the animals we eat is maintained to the very last second of their lives. And that we lobby our clients, who are also the consumers of these animals, to do the same. ■

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Workflow management

Effective management of practice workflows can be difficult to get right, especially as practices grow in size – both in staff numbers and in procedures and treatments.

Hospital appointments, outpatient visits, laboratory tests, regular maintenance, equipment usage, meetings and regular consultations are just a few of the tasks and procedures that have to be organised in the normal working day. Increased practice size accentuates the problem of organisation – of making sure everything and everybody are in the right place at the right time. Trying to do all this manually is not only time-consuming, but also prone to error simply because of the magnitude of the task.

Thank goodness, then, for AT Veterinary System's Spectrum Workflow Management module; which provides an efficient and effective way to manage so many of the integrated activities of the practice, thereby saving time and using resources far more efficiently.

Workflow management made easy

The Spectrum module is designed to handle the workflow of any task or activity within the practice and can assign the task to a specific location, time or person, as well as scheduling any equipment required.

It can also schedule a recurring task – for example, checking car inventories every month – and there can be a 'to do' list for each individual, mapping out their activities and tasks for the day. Tasks and procedures can also be booked in from different sites and branches and resources can be re-directed.

The module allows for as many 'whiteboards' as are needed – there can be boards for people, locations, tasks, equipment and so on, with easy switching between the different items and activities. These 'real time' schedules mean that all personnel know the status of any task at any time; with each being assigned an unscheduled, pending, started, completed or closed status.

It is important to have one person who acts as the overall task manager, co-ordinating the tasks that others may have entered into the system, so that consistency is maintained.

Fully integrated and reflective

The Spectrum Workflow Management module also allows information to be integrated within your client database, saving valuable time in transferring details. In addition to this, laboratory information can also be automatically linked to individual patient records via Spectrum's Lab Link module.

Reflection on work done is an important aspect of good practice in veterinary clinical and management procedures. In this respect, information from Workflow Manager can be used retrospectively to manage workflow better and to find improvements in working practices and efficient use of time and resources.

This is an excellent way, for instance, of looking at practice/personnel efficiency and how well individual pieces of equipment are being used, or specific procedures are being carried out.

Workflow Manager

Workflow Manager is appropriate for use in any medium-to-large practice where significant amounts of time need to be spent planning the integration of activities and resources.

Special features and advantages of Workflow Manager include:

- dynamic workflows are generated based on task schedules, distributing work in a logical structure for optimised resource management
- task libraries can be built with tasks scheduled according to your time frames – tasks can then be posted to whiteboards, ready to be assigned, viewed and completed
- multiple whiteboards display tasks categorised by employee group, clinic, department or equipment type
- tasks can be placed into folders and arranged in a hierarchy, with facilities to group sequential tasks together in a 'macro'. Tasks within a macro can be given offset timings, allowing procedures with multiple stages to be scheduled clearly, with time offsets for sub-procedures. This feature is ideal for multiple stage lab tests
- when a task is added to the daily schedule, the invoicing prompt feature provides the option to link the user directly to invoicing
- resources can be assigned to tasks, allowing you to identify under-resourced and over-resourced areas; while task conflicts, overuse of laboratory machinery, practice areas and imaging equipment can be avoided
- a period of availability can be set for each resource, allowing for routine maintenance or specialist clinic hours – while regular scheduled tasks can be created effortlessly
- tasks that have been assigned to a specific user or tasks that are available for action, appear in a personal 'to do' list, for the logged-in user
- task status updates can be entered at any stage of the process, along with notes
- whiteboards provide an interactive display of practice activity. Each whiteboard can be uniquely customised. For example, lab procedures may be listed by priority or equipment type, surgical procedures arranged by surgeon, and routine maintenance activities scheduled by location
- tasks can be altered through a simple drag-and-drop system, changing the assignee, time, location, equipment and so on
- Workflow Manager can be used alongside any modern practice management system (PMS)

For more information, contact AT Veterinary Systems:

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Designed and produced by AT VETERINARY SYSTEMS www.vetsystems.com

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Sonya qualified from Bristol University in 2013. After beginning her professional career in small animal practice, she now works at Highcroft Exotic Vets where she sees a wide variety of exotic species and is in the process of completing her CertAVP(ZooMed). She has a special interest in reptile medicine and surgery, but enjoys all aspects of being an exotic species veterinary surgeon.

Sonya runs North Somerset Reptile Rescue in her spare time.

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FISH CONSULTATIONS

Are you floundering with your fish consults?

Fish are very popular and fascinating pets. They are often considered fantastic first pets for children because they are colourful, hypoallergenic, quiet and clean, yet – mistakenly in some ways – they are thought of as being simple to keep. There are various ways of keeping fish; ranging from large pond collections or goldfish in a tank, to complex living coral reefs (Ford, 1981).

As a veterinary surgeon seeing a variety of fish species, it is important to ensure that you not only have the basic knowledge to take a helpful clinical history, but also the essential equipment with which to be able to perform a thorough clinical examination (Noga, 2013).

Fortunately, most of this is inexpensive and readily available in modern veterinary practices. The only major piece of equipment that is essential is a high-quality microscope with 10X, 40X and 100X objectives (Noga, 2013).

Other essential equipment should include the following (Noga, 2013):

- latex gloves
- simple surgical instruments (scalpel, fine and coarse forceps and scissors)
- histopathology pots
- culture swabs
- microscope slides and cover slips
- water testing kits
- pH meter
- soluble anaesthetic
- aquarium bag
- various-sized nets
- air stones and pumps
- large water storage vessels
- otoscope
- ophthalmoscope and, in some cases,
- advanced imaging modalities are helpful (**Figures 1a** & **1b**).

Home visits

Many clients will be unable – or will refuse – to bring in their fish for a clinical examination; performing home visits, therefore, is commonplace when dealing with sick fish.

***Figures 1a** & **1b.** Sometimes advanced imaging modalities are helpful.*

Undertaking home visits has its advantages because, during such visits, the exact set-up can be assessed. This should include any biological and mechanical filtration methods, water temperature, disinfection protocols, how the system is aerated, how the set-up smells, the condition of the fish – not just the sick ones, the stocking density, and the behaviour of the fish (Noga, 2013; Scott, 1981).

It is wise to take a small selection of lightweight equipment with you that will allow you to take samples on site, and to bring back safely any patients if further investigations – such as anaesthesia, euthanasia or post-mortem – are needed (Noga, 2013).

Regardless of whether you are presented with a fish at your practice or you perform a home visit, a thorough clinical history must always be performed (Noga, 2013). Questions should include:

- for how long did the client condition the tank?
- how long has the system held fish?
- what fish are affected and which ones are not?
- are the fish showing behavioural changes?

Water quality paramount

Because water quality issues are by far the top reason for death in fish (Gratzek, 1981; Scott, 1981), details on the client's filtration methods and water conditioning period are essential. Filtration comes in two forms – biological and mechanical filtration (Noga, 2013; Scott, 1981).

Biological filtration

Biological filtration is most often achieved by utilising gravel in the tank, or having various different types of media inside the filter itself. Gravel should be 2 to 5mm in diameter and 7 to 8cm in depth (Noga, 2013; Scott, 1981). Bacteria responsible for converting toxic ammonia and nitrites into nitrates – still toxic in large amounts, but less toxic than the previous two molecules – are cultivated

on the gravel during the conditioning period (Gratzek, 1981; Scott, 1981).

When gravel becomes clogged up with organic material, however, ammonia can build up which will cause illness and even death (Noga, 2013; Scott, 1981).

Mechanical filtration

Mechanical filtration is the act of drawing the water in the tank though a medium that traps large particles of waste – this is achieved more effectively by utilising an 'under-gravel' filtration system. The detritus in the gravel bed should be cleaned out every 14 days and a 10 per cent water change performed weekly to prevent excessive levels of nitrates building up. When new water is added, it should be either three days old and aerated or have been treated to remove the chlorine (Noga, 2013; Scott, 1981).

Before any fish are added to a system it should first be conditioned. This initial conditioning period is essential prior to the introduction of any species of fish into any system. Adding fish too early can cause 'new tank syndrome' – a rapid increase in ammonia, nitrites and nitrates that can kill off many – if not all – fish (Gratzek, 1981; Scott, 1981).

During this conditioning period, the nitrifying bacteria (*Nitrosomonas* spp) responsible for the oxidation of ammonia to nitrites, and *Nitrobacter* spp, the bacteria responsible for the conversion of nitrites to nitrates, colonise the surfaces of the gravel and filtration media. Without these bacteria, deaths are common (Gratzek, 1981; Scott, 1981).

Core water quality parameters should always be taken into consideration whenever any fish disease is suspected. The parameters that should always be assessed are ammonia, nitrite and pH. Oxygen content and temperature of the water are also part of the core measurements; however, these parameters should be assessed on site by the owner or during a home visit (Noga, 2013).

Figure 2. *Most fish will tolerate a gross examination and basic testing when they are conscious and held gently.*

Figure 3. *A skin scraping being taken using a scalpel while the fish is adequately restrained.*

When requesting water samples for analysis, half a litre of fresh water should be provided, and the sample analysed immediately for accurate results. Most commercially available tests are based on the addition of a known volume of water added to different chemicals, which then react to produce a colour change. The amount of substance present is proportional to the intensity of the colour change (Noga, 2013).

Clinical examination

Whenever possible, a clinical examination should be performed with the fish in their normal environment; and, in particular, accurate observation of any abnormal behaviour that the fish may be exhibiting. Fish that have an ectoparasite infestation often flick their bodies or rub themselves. Unwell fish will often group together away from healthy fish in areas of flowing water. Very sick fish, or those with swim bladder issues, will often be in dorsal

Figure 4. *Carrying out a 'fin snip'.*

Figure 5. *Visualising the gill arches.*

recumbency or spend excessive periods of time on the surface of the water (Noga, 2013).

Videos of behaviours should be taken by the client if a home visit is not possible.

When fish are sick or blind, they will often undergo a colour change. This is owing to their inability to maintain normal pigmentation – which is under neuroendocrine control – and other vital bodily functions will take priority when they are sick (Noga, 2013).

Reddening of the body is often a sign of septicaemia or skin wounds. Abdominal swelling (dropsy) can be caused by a wide range of issues, such as metabolic imbalances, neoplasia, obesity or even egg retention. Gills can also exhibit gross lesions and should be assessed during the clinical examination.

Diagnostic sampling

Samples to aid in diagnosis should be taken from all sick fish and examined as soon as possible (Noga, 2013; Scott, 1981). Care should be taken when taking samples because the skin of fish is delicate and susceptible to iatrogenic injury, so latex gloves should be used. This also minimises the risk of zoonotic disease spread (Noga, 2013).

Most fish will tolerate a gross examination and basic testing when they are conscious and held gently (**Figure 2**); but for other procedures, sedation or anaesthesia should be considered. It must be remembered, however, that the use of sedatives and anaesthetic agents can compromise the diagnosis of skin and gill pathogens (Noga, 2013).

The eyes and skin should be checked and scrapings taken – a spatula or scalpel are gently scraped along the surface, in a cranial to caudal direction, while the fish is being adequately restrained (**Figure 3**). Care should be taken not to scrape too large an area because this will result in an open wound that can become infected or cause fluid imbalances (Noga, 2013).

The sample must be placed onto a microscope slide immediately, followed by a drop of water, then a cover slip, before examination under a microscope (Scott, 1981). The best place to take a skin scraping is behind the pectoral or pelvic fins. A 'fin snip' (**Figure 4**) can also be performed using a fine pair of scissors and placing the sample on a slide for microscopic examination (Noga, 2013).

Skin biopsies should be taken of any gross lesion, using fine scissors to remove part of the leading edge of a lesion (Noga, 2013).

The gills should be examined grossly and gill snips and squashes analysed. Healthy gills are bright red. A pair of fine scissors are inserted into the gill chamber, opened to lift the operculum until the gill arches are seen (**Figure 5**). The tips of several primary lamellae can then be cut and transferred to a slide and a cover slip applied (Noga, 2013; Scott, 1981). It is not uncommon for debris to be stuck in the gills, especially if the fish has been lying in sediment. This can be washed away gently by rinsing (Noga, 2013).

Faecal samples can be assessed by removing faecal material from the tank. They are not very sensitive for diagnostic purposes, but helminth ova and protozoa

Figure 6. *Obtaining a blood sample from a sedated fish.*

can be identified. The most accurate way of obtaining a faecal sample is when the fish is anaesthetised. A fresh smear and faecal flotation should be performed – and both these methods should be employed because the flotation liquids can damage fragile piscine coccidia that will only be demonstrated on fresh smears (Noga, 2013).

Biochemical and haematological analysis is not commonly performed to investigate fish disease; although it is helpful in some situations.

Blood samples should be performed on sedated fish, when they are held in dorsal recumbency. A needle is pushed through the skin near the base of the caudal peduncle. The needle should make contact with the vertebral column, negative pressure applied to the plunger of the syringe and then the needle withdrawn slowly until blood is obtained (**Figure 6**). Blood can be taken from the heart in larger fish (Noga, 2013).

Conclusion

It is vitally important that any veterinary surgeon treating fish should not only have a selection of readily accessible equipment at hand but also that they are familiar with the ideal questions to ask in order to take an in-depth clinical history and to perform a thorough clinical examination. There are many simple diagnostic tests that can be performed on both conscious and anaesthetised fish to help form a diagnosis; although, in the majority of cases, the illness is the consequence of stress and water quality issues. ■

PPD Questions

1. The equipment needed to examine and treat fish is complex and expensive. True or false?

2. Home visits are the ideal situation in which fish should be seen to assess their environment at first hand. True or false?

3. Water quality issues are the main reason fish get sick. True or false?

4. During 'new tank syndrome' what is elevated?
   A. nitrates
   B. nitrites
   C. ammonia
   D. oxygen

5. Which of the following diagnostic tests should be performed on sick fish?
   A. blood tests
   B. faecal test
   C. skin scrapes
   D. gill and fin snips
   E. all of the above

Answers
1.false 2.true 3.true 4.A&C 5.E.

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Wildlife emergencies – what to expect at this time of year

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

As the nights draw in and the ambient temperatures drop, veterinary practices could well start to see small, second-brood hedgehogs that are in trouble. Each year, in late autumn and early winter, our wards fill up with baby and juvenile hedgehogs that are not big enough to survive the winter.

Hedgehogs often have second litters late in the summer and early autumn if weather conditions allow. These young face a precarious battle to put on enough weight to survive hibernation. If they have not reached around 500g by this time of year, it is unlikely they will survive; so we take them in, keep them warm and feed them until they can be released in the spring. We usually have around 200 that must be fed and kept above 15°C to prevent them hibernating – and they eat their way through 15,000 cans of food at considerable expense.

Hedgehogs in big trouble

Often the animals are brought in to us by the public and it is likely that many people who find hedgehogs at this time of year will take them to veterinary practices if they do not know of a local wildlife centre or hospital close by. Any such patients should be checked for malnutrition, injury, dehydration and infestation first and then referred to a wildlife centre. Remember to keep them warm while they are with you.

If a member of the public calls you because they have discovered a sleeping adult hedgehog, advise them not to touch, disturb or uncover it. Young will be rejected and even killed by parents if the adults detect human scent on their offspring. In hibernation, a hedgehog's heart rate will slow to as low as two beats a minute, so they can appear dead. The golden rule is always to call the local Wildlife Aid Foundation Centre, www.wildlifeaid.org.uk

Hedgehog numbers have crashed in the UK and are down 96.6 percent in the last 60 years. It is estimated that if current rates of decline continue, hedgehogs will be extinct in the wild in 10 years' time – which will be a tragedy. They need all the help they can get.

Always check bonfires

Another common problem we see at this time of year are burns caused by bonfires. We ask the public to check bonfires for hedgehogs and other individuals before lighting them because animals looking for shelter will often hide in piles of wood and leaves. We also ask the public to clear discarded fireworks and dispose of them safely after Bonfire Night.

While people diligently lock their cats and dogs inside during the festivities, they often overlook the impact fireworks have on wildlife. The burnt-out tubes left over from rockets can trap curious animals and spent wire sparklers are another potential hazard.

Other winter problems

If we have a 'cold snap' in the coming weeks, you may see cases of antifreeze poisoning, which need urgent medical attention. Although it is becoming less commonly used, antifreeze can be fatal for wild animals if spilt on driveways. Most of you will be aware that it causes injuries to cats and dogs that lick and ingest it – this is also the case with wild animals, that are attracted to its taste and smell. It causes horrible internal burns.

Road accidents also increase during the winter as the afternoons get darker and animals roam in search of food and shelter. Deer are commonly hit and sadly are difficult to treat, particularly if they break limbs. Foxes and badgers, however, are resilient creatures and we have several orthopaedic specialists who volunteer their time to help.

We have treated thousands of cases over the years, which would likely otherwise have been euthanised, and given them a second chance in the wild. So we ask that should you encounter a wild animal that has been involved in an RTA, please use your clinical judgement and do not needlessly euthanise it if it can be saved humanely. There are hundreds of wildlife hospitals who will help, www.wildlifeaid.org.uk, 09061 800132. ■

The WILD acronym

W – Wildlife centre, have the details of your local one available and call it for advice
I – Information, get as much as possible about the animal and the circumstances in which it was found
L – Location, where was the animal found, be as precise as possible
D – Details, take contact details of the person who found it.

Is it a dog? Is it a ...?

Would you recognise a Japanese raccoon dog or 'tanuki' if you were presented with one? And how much do you know about this new 'pet'?

A stray raccoon dog *(Nyctereutes procyonoides viverrinus*) was recently found in a Birmingham school playground. The RSPCA team who rescued it were unable to confirm whether it was lost or had been abandoned; and the lack of a microchip meant that no owner could be identified.

This was not an isolated incident because raccoon dogs are becoming more popular as pets – it is possible to buy them for as little as £60 and there are numerous advertisements on the internet for their sale.

Threat to wildlife conservation

Raccoon dogs do not make good pets. They are wild animals that require a great deal of space and their needs cannot be met in a typical domestic environment. In recent years, the RSPCA has dealt with a number of call-outs to stray pet raccoon dogs that have either escaped or been deliberately released into the wild, and the charity is now calling for the sale of raccoon dogs to be banned.

Although it is an offence under the Wildlife and Countryside Act 1981 (as amended) to release raccoon dogs – or allow them to escape – into the wild because they are a highly invasive, non-native species posing a serious level of threat to native species, it is currently legal to keep and sell them as pets in England and Wales, without a licence. However, they have recently been listed under Invasive Species Regulations, so in time it should become illegal to sell them.

Conservationists fear that they could begin to breed in the wild, creating a population explosion that threatens to overwhelm weaker native species. This happened in Scandinavia when they spread from the Soviet Union – where they were released to be hunted for fur – and has resulted in Finland struggling to evict an estimated 250,000 unwelcome animals.

Wrong animal in the wrong place

Despite their superficial similarity, raccoon dogs are not closely related to the North American raccoon. They are native to east Asia and are a member of the Canidae

family, which includes foxes, wolves and domesticated dogs. Their natural life span is three to eight years and, typically, in the wild they live in packs. Their natural habitat is in woodland and forest areas close to water. They are happy living in marshes and near ponds, where they often forage for food such as toads and frogs and ground nesting birds. Their curved claws allow them to climb up trees, and they've been observed looking for fruit and berries amongst the branches.

Unchecked by natural predators, raccoon dogs can have a devastating effect on the native fauna; and, being fast breeders, they can quickly out-compete native foxes and badgers for space and habitat. They are predominantly nocturnal, and unique in that they are the only canids to go into short hibernation spells during the winter.

They have thick fur with a dense undercoat and it is this feature that in its native countries – particularly China – is so sought after and where the animal is farmed for its fur.

Raccoon dogs are not particularly aggressive and can be hand-fed; but it may take a while for a dog to allow the owner to approach without fear and generally they are not of a disposition to be handled without protest.

They don't bark or wag their tail, don't crave attention, will eat almost anything, sleep most of the day and don't have to be kept inside at any time, summer or winter – provided there's a dry place to sleep.

If kept outside, they need to be in fenced areas of at least 30m^2 per couple of animals, with fences at least one metre high and dug into the ground for at least 30cm, because racoon dogs are good at digging and climbing.

The raccoon dog may look cute and cuddly but we should not be fooled. It is not a pet; it is a wild animal not suited to domestication; it needs a lot of space, a specialised diet and, apparently, is 'very smelly'. And last but not least, it has the potential to wreak havoc amongst our country's wildlife.

Social media culpable ... again

Their growing popularity as household pets in Britain has its origins in their appearance on social media. So racoon dogs are yet another example of people seeing a 'cute' animal and purchasing it without any thought or research into how they will look after it.

The sooner it becomes illegal to sell or keep these animals the better. ■

Team engagement – a sometimes long, but worthwhile, journey

Your teams are one of the most valuable assets in your business and, as far as finances go, the most heavily invested.

Kristie Faulkner
CertVBM RVN

Kristie has 20 years' experience working within the veterinary industry – with experience ranging from head nursing to practice management at Banfield Pet Hospital UK (US), a short stint in pharmaceuticals, five years with Onswitch as a business consultant/business development director, and now operations manager (Midlands) for White Cross Vets.

Having seen the industry from all angles, her experiences have left Kristie with a passion for both quality veterinary and customer care provided by efficient and motivated team members within a well-run business.

Imagine you purchase an item of equipment, expecting that the investment in this piece of kit will make your life/diagnostics/efficiencies much better – yet it breaks down, or just doesn't work as you expect it should. You would be on the telephone to the engineer, whose visit might uncover that the set-up and maintenance was not carried out correctly and was, therefore, the crux of the problem. Who would you blame?

Your 'equipment' – in the form of your practice teams – has the added complexity of being human, with each member having their own strengths, weaknesses and desires to succeed. Yet, without the correct vision, culture and nurture, they too may well break down or under-perform.

Shared vision

Your vision for your practice is the bigger picture, the end goal, the ideal. What does that ideal look like in the future of your practice, and which type of people are with you? If it is crystal clear in your head, is it the same – or a somewhat muddled version – for your teams?

If you want to be the 'best in town', or most innovative, most caring, most client-focused, and so on, what does this look like exactly? And do your teams know what this looks like? A shared vision about the culture you want to create or improve is imperative in your plan for the practice. A happy, motivated and functioning team of individuals who know what role they play in helping to reach said vision, will enable your practice to get there – and in a shorter time frame.

Culture is critical

A positive culture can be notoriously difficult to create and maintain – certainly as businesses grow – but it is a key element in reaching team engagement. Your culture defines who, as a veterinary practice, you are; and where your products and services may be – and frequently are – duplicated. Your culture is your personality.

There is a less visible level to culture which is entrenched – for instance, it can be focused on money; how a business has been run historically; or how innovative, customer-focused or team-oriented it is within its fundamental blueprint.

At the more visible level, culture can show the patterns or style of a company that 'new starters' are automatically encouraged to follow – and that result in client sound bites such as "they are really friendly", "they always have a smile" and "they are really lovely to the pets".

So how would others describe your practice teams after spending a little time with them? What is the message that they take away about your people? This is referred to as 'cognitive culture'.

'Emotional culture' is often conveyed through non-verbal cues – with body language and facial expression. How often are people laughing and smiling? How often are

"As hippy as it may or may not sound, smiling is infectious"

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people grumpy and miserable looking? How positive is this non-verbal communication within your business?

Positive emotions are consistently associated with better quality performance and customer service, and can be measured by areas such as financial performance, absenteeism and team turnover. As hippy as it may or may not sound, smiling is infectious.

Principles and values

A company's values sit at the core of its culture. How true the directors/partners/owners are to these values is more important than how impressive the values may sound. Keep it simple, but keep it true. How important is being collaborative, responsible, innovative or passionate about great pet care to you?

Principles and values are what a company believes and how it behaves, so day-to-day decisions and strategic planning should be made based on whether they 'stack up' against those values.

Canny recruitment

There are wants and needs for both employer and team member when it comes to recruitment. The team member will want to know that there is vision and purpose within the company; whilst needing training, development, remuneration and working conditions alongside for a fulfilling work life.

The employer will need to know that the skill sets and attitude are there that will fit with the business need, plus its culture and values. And both will need to feel that there is a sense of 'belonging' and 'rightness' to the appointment.

Clear job descriptions and expectations for the role are a key starting point for successful recruitment. If new team members don't really know what is expected of them – or what kind of practice you are – then they can't necessarily be blamed for not fitting the mould. Applicants may seem like gold dust for certain roles within our profession at the moment, but it is so important not to take the first pair of hands that may come along. The 'pain' of waiting for someone who 'fits' outweighs the disadvantage of welcoming the wrong person and disrupting the team.

Structured interviews with questions based around your values or principles is important to gauge how well the candidate aligns his/herself, along with questions designed to elicit preferred or unwanted answers to the direction in which you want your clinic to go. For example, "What does a great client experience look like to you?", "What do you think nurse clinics can bring to the table?" and "What does great clinical quality mean to you?". These questions can give you a feel for how important these areas are and, therefore, indicate how forward-thinking an individual may – or may not – be.

Using the same questions and interview format is important because you can really differentiate between rehearsed, clueless, natural or genuine answers. 'Trial days' are also very useful to meet the candidate again. They give an opportunity for the teams to meet him or her and provide a different set

"A positive culture can be notoriously difficult to create and maintain – certainly as businesses grow..."

"'Trial days' are also very useful to meet the candidate again. They give an opportunity for the teams to meet him or her and provide a different set of feedback outside of the interview environment..."

of feedback outside of the interview environment – plus allowing the candidate to see what you are about on a day-to-day basis.

Motivate your team

For teams to be motivated and productive, the elements that actually motivate individuals need to be investigated. Herzberg's Motivator – Hygiene Factors show us that there are 'hygiene factors' such as pay, security and working conditions that can cause job dissatisfaction if they are not in place; and motivating factors, such as recognition for accomplishments, increased responsibility and opportunities for growth.

If a team member is fundamentally unhappy with the volume of extra hours expected of them above and beyond their contract, or the conditions in which they are frequently made to work, it is going to be nigh on impossible for them to come in to work every day ready and willing to do what is expected of them – plus, ideally, beyond what is needed.

It is important to invest not only in the written contract – taking care of the hygiene factors – but also the unwritten, 'emotional contract' too.

The emotional contract is easier to think of as an emotional bank account. The more deposits made by the employer, such as small gestures of thanks for a hard day – lunch paid for by the practice, a giant cookie, bunch of flowers for an individual having held the fort in the midst of a sickness bug – the higher the emotional balance. Team nights out, CPD trips and generous Christmas parties can all help to bond the team and strengthen the emotional contract.

If team members feel that you think of them as individuals, care about them and appreciate them, the more likely it is that you will be able to make a 'withdrawal' when needed – things such as working overtime or on a scheduled day off when the wheels fall off, or generally able to request that little bit more from them from time to time when you need them. If the team member feels that they are just a number – or that you simply don't care how hard they have been working – then their emotional bank account will be firmly in the red, with no funds to withdraw.

Measure your team

Measuring team engagement can be tricky; but, as with everything, if it isn't measured then you never know how far you have come or, indeed, you have stayed stuck in the mud. Annual and biannual appraisals are often ignored or done as a tick-box exercise, thus rendering them a waste of time.

Appraisals should be a review of the past year in terms of what has been done well, and where there may be room for improvements – in planning for the future and strengthening relationships between line manager and team member. They are not an opportunity for a 'whinge fest' for either side; and with annual meetings plus ad hoc 'one-to-ones', this should rarely be the case.

Team turnover, absenteeism and client surveys are also great measures. If you are getting positive results on surveys such as Gallup 12, your sickness records aren't taking up most of the hard drive and you don't have team members jumping ship in droves, then you may well already have an engaged team – or certainly be in good shape to build on what you have.

Another measure to monitor is the financial picture. A happy, motivated and engaged team will be more productive for you, your clients and their pets alike, and this should be reflected in your profit and loss account. ■

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The power of proactive PR

Harnessing the power of positive, proactive public relations can ensure favourable media coverage to create a positive impression of your practice. It can also shift public perception, inspire key people, achieve wider recognition, build your audience, and make a difference to your bottom line.

Andrew Rea

Andrew Rea is a freelance public relations professional who works with the BSAVA's PR & Communications team. He helped to produce a proactive PR guide for members, chairs PR-related discussions at the annual congress and works across a host of media relations and marketing activities.

He is also an award-winning music festival founder (2000trees Festival) and university lecturer (BIMM Bristol) in event management and music industry management, having started life as a journalist on daily newspapers. He has two cats, Aston and Villa, and a young daughter who pulls their tails.

**Suggested Personal & Professional Development (PPD)*

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PUBLIC RELATIONS

The veterinary profession has seen extraordinary changes in recent years and, arguably, none more so than in the rise of organised, marketing-savvy practice groups. It was not so many years ago that practices could not advertise themselves, but that has all changed and with it comes a rising tide of PR activities aimed at gaining favourable media coverage and a positive social media profile, as the profession faces up to life in the fast-paced 21st century.

The BSAVA recently produced a handy, '*How-to...*', 28-page proactive PR guide*, to explain what PR is, what difference it makes, and to equip members with some simple tools and techniques, insider insight and motivation to harness the power of public relations. It includes practical advice, top tips, real-life success stories, strategic support, press release templates and a host of story ideas, focused on delivering the following objectives to:

- equip BSAVA members with a clear and concise '*How to...*' guide to follow from scratch
- share sound media relations practices – including real-life success stories (case studies) – to demonstrate measurable results
- build confidence and encourage participation to help practices and the industry achieve a strong, honest and reliable voice through positive media coverage nationwide.

What is PR?

Public relations is often seen as a long-term strategy of reputation management to achieve balanced media coverage and maintain a 'positive halo' of the profession. It is also a way to engage your audience in a more subtle and cost-effective way than 'paid-for' advertising.

By building strong working relationships with the media you can influence opinion, marginalise the unethical behaviour that dominates national headlines and help maintain a respectable image of the profession in the eyes of the public – your clients. This is especially true at a local level, because your practice is part of the community.

Writing in the '*How to...*' guide, Ross Allan, veterinary surgeon and BSAVA public relations officer stated, 'I would encourage the whole profession to look at PR, the benefits are fantastic. It's great for our practice brand to be out there in the public eye, it's a good way of engaging with stakeholders and it's a more subtle and cost-effective form of maintaining contact with our current and potential customers than advertising.

'It's also very difficult for our customers to get access to good, reliable, honest information about pet care, so I think vets should step up and talk a bit more about what they are doing.'

What difference does it make?

Whether appearing in your newspaper, on radio, TV, a blog, a consumer website or social media, PR can be an excellent way to market your practice, build your personal profile and promote the services you offer. It also presents a positive image of the profession to your local community. And remember, your competitors are also thinking about PR activities too!

Here are five basic principles to get you started.

Develop a clear media strategy

A 'big picture' PR strategy is an important first step towards success – it is better to be on the front foot with

"A 'big picture' PR strategy is an important first step towards success..."

Figure 1. *Getting young people interested in veterinary science can make a great PR photo.*

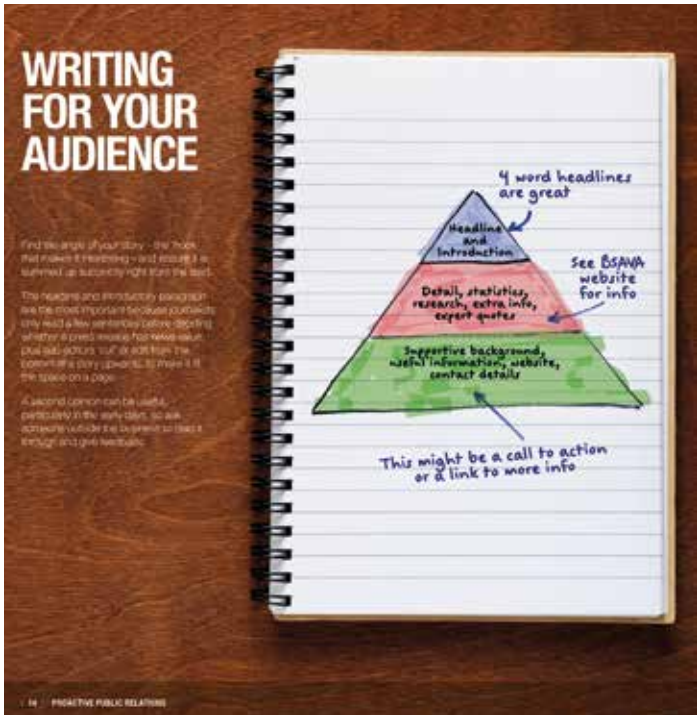

Figure 2. *Writing a 'top down' press release.*

a clear vision and plenty of positive news stories to tell. Outlining your objectives and designing a road map for reaching those goals will enable purposeful progression and measurement at the end of the process. More importantly, you can reflect and plan to improve results next time.

Outline your key objectives and prioritise the results in order of importance – for example, a better image of the practice, increasing footfall of exotic pet owners, boosting your personal profile, sharing 'human interest' pet care success stories, standing out from the crowd, balancing coverage against negative 'national' news headlines, or just being seen and heard as expert veterinary professionals as part of a wider marketing strategy to help the business.

Deciding who is the best person to look after your PR is important – someone who can reliably make a consistent contribution can be the most useful. Also consider whether your PR will include internal communications for staff and stakeholders, social media and digital marketing.

Exercise
Write a few sentences in glowing terms about your practice, your team and about yourself as a professional. This will give you a sense of your individual tone of voice and can be a useful starting point.

Be creative and generate newsworthy stories

Journalists are always looking for a news 'hook' – the unusual, unexpected, quirky, interesting and innovative, or something with real human interest. A timely response to a topical issue or sound bite quotes are often strong enough 'hooks' for a story to be published.

Generating newsworthy ideas can be a fun team-building exercise, particularly if it is time shared with colleagues engaging in a creative process outside the daily veterinary tasks. Consider what your clients would find interesting, helpful or reassuring – for example, real-life cases, a new twist on common pet problems, helpful top tips or innovative solutions.

Exercise
Discuss unusual cases you've dealt with and consider how you might write a press release for the local media the next time your practice deals with a similar case. Find the 'angle' of your story – it needs to be recent (or a new development) and relevant to the audience. Position your practice as part of the community – you're local to them (**Figure 1**).

The BSAVA has a range of resources available to members, such as client information sheets on its website packed with useful information on a wide variety of topics – from the pros and cons of adopting a rescue dog to a questionnaire to assess separation anxiety. These may spark an idea, support a press release with evidence and help.

Impactful photography

As the saying goes, 'A picture is worth a thousand words'. An arresting image, fun photo or even whacky PR stunt are all valuable tools that tell a story just as well as words and can be enough to sway a publication to use your story.

It is worth spending time thinking how best to illustrate your press release too. So could your team use props to create a more exciting image or help to tell the story? Do any of your team have an interest in photography that you can nurture for PR purposes?

Exercise
Look at what photographs your local media are using, for inspiration and clarity.

Write a press release

Try writing a snappy headline in the style of your target

media. Find the angle of your story – the 'hook' that makes it interesting – and ensure it is summed up succinctly right from the start (**Figure 2**).

The headline and introductory paragraph are the most important because journalists only read a few sentences before deciding whether a press release has news value; plus sub-editors 'cut' or edit from the bottom of a story upwards, to make it fit the space on a page.

Pitch a story

Sometimes 'media relations' is as simple as calling a journalist with a story. More strategically, it is about building longer term relationships to get into their contacts books as a trusted, useful source of information, advice and expert commentary.

Journalists want to hear your news and views – you are the experts. Make sure it is a story their readers want to hear, rather than purely a sales message for your practice. If you want an advert, you should buy advertising space!

Pitching a story by telephone builds interest before submitting the press release. It is important to have the press release completed, as a resource to draw on if the journalist asks questions and so you can send it straight away by e-mail.

Your pitch should give a brief overview of the strongest news 'hook' to encourage journalists to see this as relevant and interesting to their readers. There is competition for space and their time, so be brief yet persuasive and 'sell in' your news for consideration.

Always ask journalists to let you know if they are going to use your press release. They may not call you back to discuss it, but a follow-up call from you a few days later, asking if they need any further information, is an effective memory jogger and can make a difference.

More advanced work

There are occasions when the news agenda is beyond your control, and you may be asked to comment on more negative news in a reactive way – perhaps a national veterinary issue or a customer complaint to a local newspaper. This can be more complicated and it may be best to seek professional PR advice if your practice finds itself in the eye of a media storm owing to a difficult situation.

There are some basic rules if you are keen to handle media enquiries yourself.

Talk to journalists

The media and news stories move fast and sometimes in directions that are hard to predict. Good journalists will always be thinking about getting a good story – to them a conversation is 'on the record'. Always assume this is the case.

You may call to pitch a story and find yourself being asked a series of questions of wider public interest, to see if there are other stories worth writing about and to assess how useful you are as a contact for giving 'newsworthy' quotes. Some examples may be negative news, such as pet diets, vaccinations, animal cruelty or commercial charges.

In short, you are being asked for your expert commentary. Be aware of this fact, but don't shy away from being helpful. Building good working relationships with journalists, by giving them something to work with, is a sure-fire way to attract more regular media coverage.

You want to be on their radar and they want a 'vet says' news hook, so be helpful – work out what you want that quote to be in advance. Good

> "Good journalists will always be thinking about getting a good story – to them a conversation is 'on the record' "

preparation is thinking through and writing down a series of stock answers to common 'vet industry' questions.

Working with the media can be a time-consuming exercise, often at short notice, but a foot in the door for regular 'expert vet' commentary on a range of topics can give you more freedom. For example, you could pitch to write a regular column to offer reliable advice and case studies – either on a topic of your choosing or in response to readers' letters. In return for your time and expertise, you and your practice will gain regular exposure and become a trusted guide for readers.

Preparation for interviews

Journalists can frame things in a negative light by asking 'loaded' questions or using hypothetical 'worst case scenarios' to lead you (and your comments) in a certain direction. Your job is to achieve balance to a story as the voice of reason – remember you are the expert, draw confidence from that.

Before talking to journalists, ensure you know about the publication, interview format, audience, and the interviewer if for radio/ TV. Decide on your goal for the interview and think about what you want to say.

Prepare three key messages – think of sound bites and headlines and work out how to bridge to key messages, with planned supporting facts, figures and case study examples.

How to measure success

In business terms, the financial return-on-investment (ROI) is important. You can measure PR coverage using a crude advertising value equivalent (AVE), which is based on how much an advert would cost to fill the same size as the PR cutting – usually multiplied four to six times, because on average we read a news article for four to six times longer than an advert.

You can also look for a spike in increased footfall to the practice and enquiries generated.

Community engagement is also significant following a positive article/interview – a good buzz among staff, feel-good factors for stakeholders, or nice client comments that can all lead to a happier working environment.

Having developed a clear media strategy to decide what success looks like at the start of this PR exercise, we can measure against those objectives and key performance indicators. The key is to build on your efforts and work out how to make a real difference to the practice by attracting 'positive halo' media coverage. ■

***A full version of the '*How to...*' guide is available for BSAVA members to download from the website, www.bsava.com**

Where to invest your time and money online

It is no secret that budgets are shrinking and client bases are growing; so if you are going to invest your time and money online, where should you focus your efforts? In an informative session at the 2017 SPVS/VPMA Congress, Susie Samuel, founder of Vet Help Direct, gave delegates some practical tips and advice.

Clara Ashcroft
BA(Hons)

Clara writes for Vision Media – a media agency specialising in marketing, communications and design services for the veterinary industry, and a publisher of veterinary websites, news websites and consumer magazines.

Susie's first tip was to make a list of marketing objectives. These are a group of goals that a business sets when promoting products or services to potential customers. For a veterinary practice, this list might include acquiring new clients, increasing awareness of the practice in the local area or encouraging more pets to attend dental checks. When defining your objectives, they must meet what are known as the S.M.A.R.T criteria – they should be specific, measurable, achievable, realistic and timely.

Establish your audience

The next step is to define your target audience. A clearly defined idea of who you are talking to helps you to determine where and how to market your practice. Susie explained that you can learn a great deal about who your clients are and where they come from by looking at your practice management system. Most practice management systems offer comprehensive animal and client data profiles, giving you information such as the client's location, how often they visit the practice, and how much money they spend on their pet.

You can also learn about your clients through Facebook by using a tool called 'Audience Insights'. If your practice has a Facebook page, navigate to facebook.com/ads/audience_insights and click 'people connected to your page' (you will need to be logged in to do this). Assuming that you would like to find out more about your cat-owning clients, under 'interests' click 'hobbies and activities', 'pets' and select 'cats'. The search will deliver all sorts of interesting information, such as the percentage of your 'followers' who are male and own cats, what their relationship status is and what their job title is likely to be.

Another way to find out more about your clients is to create a survey. Using your existing email list, ask your clients a few simple questions about themselves, their interests and their contact preferences. Tools such as SurveyMonkey, SmartSurvey and eSurv are all free to use and allow you to create and send surveys with ease. Once the results are in, these tools let you view a summary of your data, create custom charts and download results in multiple formats. To

"... you can learn a great deal about who your clients are and where they come from by looking at your practice management system"

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ONLINE MARKETING

encourage clients to fill in your survey, you might like to offer an incentive – 10 per cent off their pet's next visit perhaps?

Client personas

Once you have identified what matters to your clients, you can then start to build up client personas. A client 'persona' is defined by marketing company HubSpot as 'a semi-fictional representation of your ideal customer, based on market data about your existing customers'. They will help you to tailor your website content, messages and practice services to the specific needs, behaviours and concerns of your clients.

You can develop as many personas as you wish, but for a small practice, three or four should be enough to represent your audience. Hubspot provides examples of companies who have created marketed personas and there are templates for making personas of your own. Most contain the same basic information, such as who the person is, what they value, and how they prefer to be contacted.

Client personas force you to look at things through someone else's eyes. Once created, pretend these fictional characters are new and existing clients. Viewing them as existing clients will help you to allocate budget and time, choose a suitable language in which to speak to them and to plan preventive care communications. Viewing through the eyes of a new client, you may be able to work out what information they need from your website, what impression of the practice they might have and, again, allocate budget accordingly.

Websites

Once you know who your clients are, the next step is to decide how you are going to target them. Susie explained that a well-designed website is the most important tool in your marketing kit because it will be at the centre of your internet marketing campaign. Everything else – emails, social media, videos – will link back to your website at some point. She recommends avoiding the use of stock images on your website as they don't really tell the client anything about the practice. If budget allows, invite a professional photographer into your practice to really capture how your staff care for animals.

Email marketing

Email is another important marketing tool, although it is still very much under-used. As well as being a great way to promote your services, email marketing is an inexpensive way to drive traffic to your website and educate clients about their animals.

To gain the most from e-marketing, Susie recommends segmenting your email lists so that you can provide content that is more relevant to your clients. The more information you collect from your clients, the more you will be able to tailor emails to suit their needs. At a minimum, divide your list into dog, cat and rabbit owners. Rotate the sets if you don't have the time or budget to email everyone at once. If you can, customise each email with the client's name and the name of their pet. This might be tricky, however, if the client owns more than one animal.

Reviews

As more people use their smartphones to find out information about goods and services, reviews are becoming increasingly important. According to Susie, 63 per cent of customers are more likely to buy something from a website that has user reviews. Registering your practice with popular review websites, such as Yelp and Google My Business, will also help to increase your search ranking. Many of these sites allow you to install a review 'widget' on your website so that the reviews are easy to find.

"Client personas force you to look at things through someone else's eyes"

Facebook

With more than 1.86 billion active users, Facebook is the world's leading social network. A recent change to the website's algorithm, however, means that posts by friends and family take priority over posts by brands. For this reason, Susie recommends investing in Facebook advertising. This will allow you to reach an audience beyond your existing followers and will drive more traffic to your website. She suggests setting aside £30 to £180 a month for Facebook advertising; with the option to set up your post so that it reaches the type of audience you want to attract – for example, people in a specific area. A small amount of money can go a very long way.

Other platforms

For veterinary practices working with a limited budget, the digital marketing strategies described above may deliver the best results; although there are a few other strategies that you should consider if time and money allow. The first is to improve your internet search rankings.

Susie explained that it adds enormous value to be at the top of search engines naturally – for example, through search engine optimisation (SEO). But until your website is up to scratch, it pays to invest in tools such as Google AdWords. This places a sponsored link at the top of the page when people search for phrases related to your business. You pay a small amount every time the link is clicked, but *you* set the budget and can change it whenever you want. Experts recommend that you start at around £30 a month and increase or decrease the budget depending on the advert's success, measured as the number of 'click-throughs'.

Online videos can also be an effective way to show off your practice. Even a few seconds of a vet or vet nurse talking about how much they love working for the practice can have very powerful results. Other ideas include showing the relationship between your veterinary professionals and their clients (with the consent of the owner), or educational films, such as how to brush your dog's teeth.

Another social media platform to explore, if you think you have clients who will use it, is Instagram. According to a recent study (Jang et al, 2015), 90 per cent of Instagram users are under the age of 35. Some ideas for posts include patient selfies, puppy and kitten photos, staff achievements, practice awards and open days.

Measure and test

Measuring how well your marketing campaigns are doing is time well invested. Not only does this reveal what is – and isn't – working for your business, it also suggests how you can improve it. One the most popular tools that can help you to track the effectiveness of your marketing campaigns is Google Analytics – a free service that tracks and reports website traffic (search 'Analytics Academy' for more information).

When it comes to measuring the success of social media campaigns, all the major sites have built-in analytics. If one of your S.M.A.R.T goals is to attract new clients, keep a note of the baseline figure. As new clients join the practice, ask how they found you and record their responses on a spreadsheet.

Embracing technology

In an age where information is freely accessible to everyone, digital marketing is essential. However, with changes happening so fast it can be hard for the busy veterinary practice to keep up.

In this article, we've looked at some tools you can use to market your practice that will allow you to focus your time and money. By testing out these methods and measuring their effectiveness, you will find out what works best for your practice and how you can drive it forwards. ■

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"I don't get paid until Friday"

It's a well-worn phrase and one that most veterinary professionals will – from time to time – have heard in one form or another.

We all know that if the same client went into their local supermarket, presented a basketful of groceries at the check-out counter and then repeated that phrase, they would not be walking out of the shop with any goods!

Yes, veterinary practice is *not* the same as Tesco and we *do* have a duty of care to animals; but – and it is a big but – this does not give anyone the excuse to accuse us of only caring about the money and not the pet when we ask for payment; or perhaps even refuse non-essential treatment until a client has paid.

Bearing in mind how much veterinary surgeons and nurses care for animals and the years they have spent training for their jobs, it is not surprising that they are upset when they hear phrases such as, "We are very upset that you refuse to treat our dog – even when we have promised to pay you at the end of the week. You clearly only care about the money and not about the animals".

Financial facts of life

Payment at the time of treatment is vital to maintain cash flow for small businesses such as veterinary practices. Even a short delay with the money coming in can cause huge cash flow problems. Bad debt in clinics often runs into thousands of pounds and can be crippling.

Veterinary practices are private businesses. They are self funding and what they earn is used to pay for all the costs that running a business involves – including paying wages. This is just a fact of life; yet it appears to be a fact that a certain section of the pet-owning population seems unable to grasp or accept.

There are many things the pet owner can do to help alleviate those emergency situations that involve veterinary bills – by taking out pet insurance, for example; by having a pet savings account; or by investing in the practice's pet health plan to provide preventive health care for their pet. And, dare it be said, by not taking on more pets when money for their care is already stretched or absent.

The sad fact is, of course, that responsible owners do this already. It is almost always those who do not plan who then accuse the practice of profiteering.

Veterinary practices are well aware that emergencies and pet illness can result in large unexpected bills and many still extend payment periods for clients genuinely caught in this unexpected situation. However, this has to be carefully considered and it is worth remembering that so often these arrangements fall at the first hurdle.

Some practices now work with outside agencies to set up direct debits and this may well be helpful in some instances; although not for the determined poor/non-payer.

So the bottom line is, actually, 'Yes, vets are in it for the money' – if this means paying the mortgage and putting food on the table and, if you are a practice owner, paying for the upkeep of practice premises and all that goes with running a business.

Things to be done

So what choices does the practice have?

Go ahead with all treatment, trust that owners will pay and take the hit when they don't. And by doing so, also take the risk that when the word gets around that you 'give treatment free of charge' there will be a stampede to your door?

Or refuse to carry out all but essential treatment to prevent suffering and then, probably, feel bad on the animal's behalf about having to make this decision?

Neither of these choices is satisfactory and it is probably the case that this thorny issue will never be totally resolved. But what is important is that the practice needs a sensible, workable policy on payment. Of course, each case is different, but staff and clients need to know the practice's stance.

We also need to improve our ways of reinforcing to the public the fact that veterinary practice is a business just like any other; and although those working within it care passionately about the health and welfare of animals, they, like any other employees, need a pay packet at the end of the month.

It is a fact that some client debt will always remain a feature of practice life. However, can practices insure against this or do they increase prices for those who do pay to cover the bad debts of those who don't – in the same way that shop owners add a margin onto goods to cover for shoplifting? Should there be compulsory insurance, just as there is now compulsory microchipping?

The possibilities are endless. In the meantime, practices must 'grasp the nettle' – by being a little more up front with clients, by not apologising for the size of bills, and being happy to charge for a job well done. ■

Industry Profile

Your name: Cathryn Mellersh BSc PhD
Position: Head of genetics
Company: Animal Health Trust

Your first degree was in genetics – what was it that attracted you to this subject?

I have always loved genetics, ever since the time I first studied it during my A-level Biology course. It struck me as such a very neat and tidy topic, and I couldn't stop wondering at how nature could evolve such a clever molecule as DNA.

How did you come to be in your current field of research?

Largely by accident. I studied something completely different for my PhD and didn't really enjoy it very much. But when I finished by PhD, my now-husband still had a year to go, so I took a 'post-doc' position in the laboratory of Dr Jeff Sampson – identifying some of the first microsatellites identified in the canine genome.

My intention was to complete a year and then move on to something different. Suffice to say, I stayed in Jeff's lab for four years and have been in the field of canine genetics ever since.

What did it mean to you to win the award at the prestigious International Canine Health Awards in 2015?

I was nominated for the award by several members of the dog breeding community, which made the award all the more meaningful. My work is centred around understanding the genetic basis of inherited diseases in dogs and developing DNA tools that breeders can use to reduce disease prevalence and improve the genetic health of the animals they breed. So to be nominated by the very stakeholders we try to help was very rewarding.

The 'Give a Dog a Genome' (GDG) project goes from strength to strength. What are the long-term implications for canine welfare based on its continuing success?

The GDG project is already changing the speed with which we can identify mutations associated with inherited diseases in dogs. As it progresses, we will continue to get better and better at identifying disease mutations – not just the easy-to-spot mutations, but also the mutations that are more difficult to identify. This means we will be able to find new mutations and develop DNA tests much earlier in the process of disease emergence – often from very small numbers of DNA samples.

People tend to think that the diseases that affect a given breed are static, but that is far from the case. DNA is dynamic, and new mutations arise all the time. The sooner we can find these new mutations and develop DNA tests, the easier it is to 'nip new diseases in the bud' – before the mutations have had chance to spread within a breed. As long as breeders use the tests of course!

> "So the dog is certainly helping advance our understanding of human inherited disease"

How do you see your research developing and what are the possibilities?

I would like to get better at investigating the genetics of genetically complex diseases, as well as the single-gene disorders. Studies involving complex diseases require large numbers of DNA samples, often from dogs with conditions that require diagnosis by a specialist veterinary surgeon. So I would like to develop a larger network of specialists who are interested in helping us tackle inherited diseases in dogs and are prepared to work with us by collecting DNA from patients that are affected with diseases we are investigating. Or, better still, to approach us with ideas for new studies that will address diseases that have important health and welfare implications for dogs.

I approach all such studies as true collaborations, with plenty of opportunities for intellectual input from the specialists – and it goes without saying that clinicians who contribute to our studies in this way are included as co-authors in our publications.

How easy is it to obtain funding for your research, and is Brexit likely to have any effect on this?

Funding is always a challenge. I am very fortunate that my research is currently supported very generously by the Kennel Club – as well as breed clubs and individuals. I also have additional funding from UK funding bodies, such as the PetPlan Charitable Trust and also from the American Kennel Club Canine Health Foundation.

So currently I don't have any funding from the EU, but I have had in the past, and certainly Brexit won't make it any easier to obtain such support. The Animal Health Trust is a registered charity and receives no government funding, so securing funds is a constant challenge.

What role can the veterinary general practitioner play in tackling hereditary diseases in dogs?

Veterinary general practitioners have a large role to play in tackling hereditary diseases in dogs. They will be the first port of call for many people thinking of breeding from their dog for the first time, so they need to be able to advise on which clinical screening and DNA tests should be considered, based on the breed of the dog.

The list of DNA tests available continues to grow very rapidly, so vets can't be expected to know every test available for every breed, but they should know where to look for the most up-to-date information. And once the owner has had their dog tested, they might return to their veterinary practice for breeding advice. So being able to offer sound genetic counselling is also very important, particularly with respect to breeding from 'carriers'. All too often owners are advised not to breed from a carrier, which is not necessarily the best advice – we often tell owners it's OK to breed from their carriers provided they are mated to a DNA-tested, clear dog.

What are the possibilities of your research leading on to help prevent inherited disease in humans?

Our work in dogs sometimes identifies genes with a novel disease association, and these same genes can cause the same condition in humans. An example is the gene we found was responsible for a form of inherited ataxia in Parson Russell terriers (called CAPN1). This has now also been shown to be the cause of

a similar disease in humans, and research is being done to understand its role in disease aetiology.

So the dog is certainly helping advance our understanding of human inherited disease.

How important is it to educate the general public about canine hereditary disease?
It is hugely important – but also a significant challenge. Most people don't seek much advice or do any research before they buy a dog. If they choose to buy their puppy from a reputable breeder, then they might receive some education. Unfortunately, however, the poorly informed and downright unscrupulous breeders outnumber the good breeders.

It would be my dream come true for the public to have a better understanding of inherited diseases and health problems that arise from extreme conformation.

What is your vision of the veterinary industry 10 years from now in terms of preventive disease?
We are currently seeing an explosion in ownership of brachycephalic dogs and dogs where poor genetic make-up is being perpetuated by breeding and popularisation. How do we convince the public that these dogs are suffering?

I think part of the reason these dogs are so popular is that the public sees them everywhere. I think that if they ceased to be used for advertising and were given less media exposure, their popularity would decline naturally. Perhaps it needs a celebrity who has bought a brachycephalic dog to stand up and talk about their dog's health problems?

"Perhaps it needs a celebrity who has bought a brachycephalic dog to stand up and talk about their dog's health problems?"

"It would be my dream come true for the public to have a better understanding of inherited diseases and health problems that arise from extreme conformation"

I am assuming you have dogs yourself. What are they?
I have two lurchers. One is an 'old lady' of nearly 14 who only now is starting to show signs of age. The other is one of the few dogs in the country to have had a successful hypophysectomy (pituitary gland removal) that she needed because she had a benign mass on her pituitary gland – which goes to show that mutts can have health problems too!

When you have spare time how do you relax, and what interests do you pursue?
I enjoy spending time outside, walking my dogs, keeping chickens and gardening. I try to keep fit by open water swimming, cycling and jogging (very slowly!). ■

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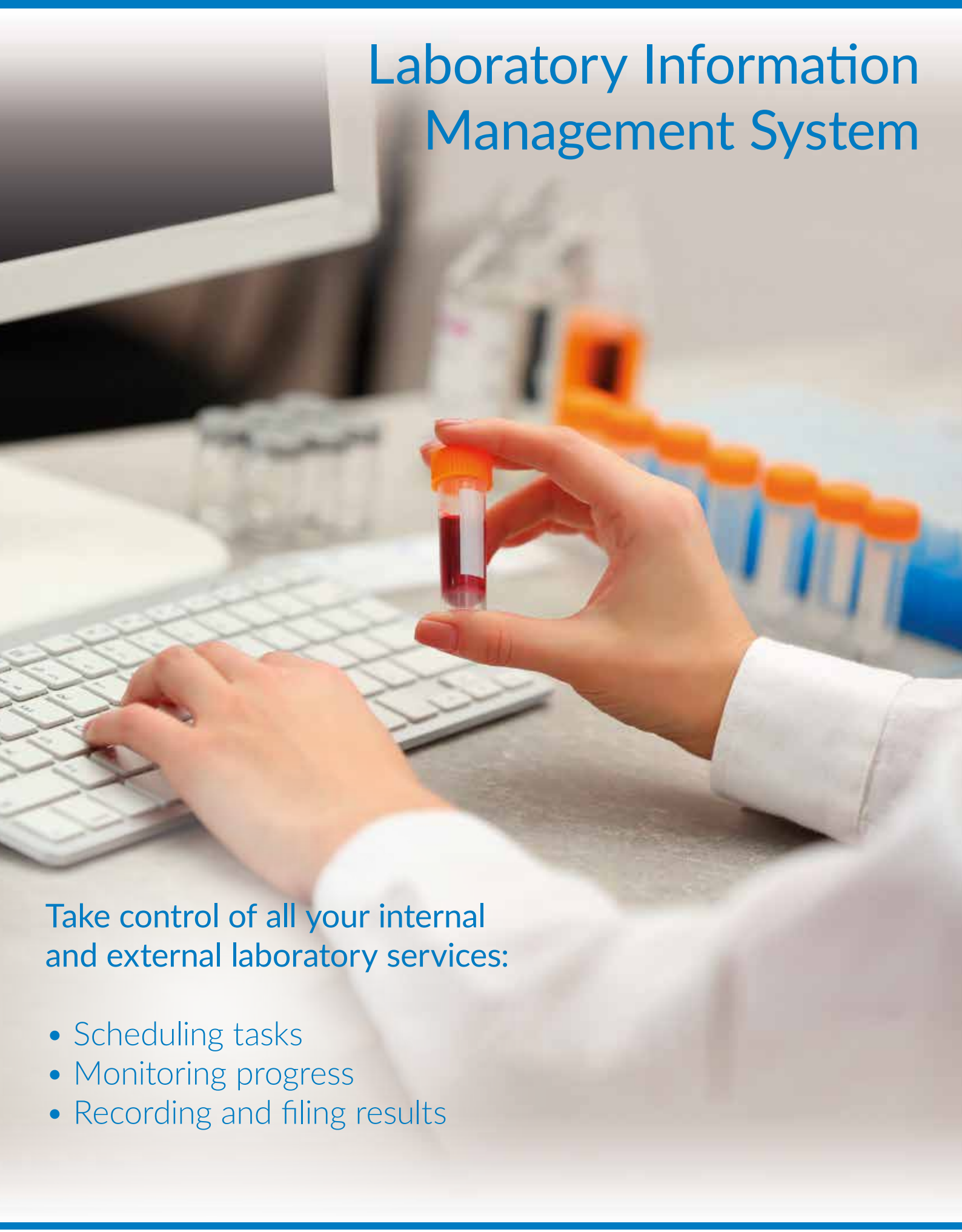

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- Recording and filing results

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ROTA manager

The easy and efficient way to manage rotas

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