VNJ

VETERINARY NURSING JOURNAL

Improving the welfare of both wildlife and cats

Understanding the endocrine system

Oral care for companion animals

Life-stage nutrition for dogs and cats

The Voice of British Veterinary Nursing | Volume 38, July 2022

BVNA
British Veterinary Nursing Association

Avid MicroChip Products

PETtrac MicroChip Database

Supplying veterinary professionals for over 30 years

- Smaller MicroChips available with a thinner needle
- Free trial packs of MicroChips available
- FREE breeder transfers with no time limit
- Instant MicroChip registration via VetXML & Vet Envoy or through our easy to use website
- 24hr reunification database, PETtrac (DEFRA Compliant)
- Free reminders for clients to keep their details up-to-date
- Free marketing & support materials

Contact us for your FREE trial pack

0800 652 7 977
www.avidplc.com

FREE Online Transfers For Breeders

Welcome

Nikki Ruedisueli, RVN | nicola@bvna.co.uk
VNJ Editor, Head of Learning and Development at BVNA

Welcome to the July issue of VNJ, which covers topics such as balancing the welfare of both cats and wildlife, life-stage nutrition for dogs and cats, the endocrine system, communicating information to clients, and advice for students preparing for practical assessments.

We hope you enjoy reading the professional thoughts, experiences and advice of other vet nurses, and warmly invite you to share yours too. We're excited about the range of topics covered in the articles we've received from readers and would like to thank everyone who has submitted a feature. If you'd like to contribute to *VNJ* but aren't sure where to start, please be assured that we're a friendly team and can mentor you through the submission process.

Writing articles contributes to your CPD hours, and we'll pay between £40 and £100 for each article published. If you have an idea for a piece you'd like to submit, please get in touch via vnj@bvna.co.uk.

You may have noticed we're using environmentally friendly paper for the journal. Another way you can reduce our use of paper is to opt to receive *VNJ* in digital form (via email) instead of in print. To join the 400 members who have already opted to do this, go to your BVNA profile on the website and untick the 'request to receive a printed copy of *VNJ*' box.

As always, your Council members are working hard to represent you in a variety of working parties. You can find out more about the VN Diversity, Inclusivity and Widening Participation (DIWP) Working Group (a VN Futures initiative led by the BVNA) and about the role models in the industry who are leading the way.

As I sit writing this in the middle of a thunderstorm, I wish you all a lovely summer! I hope you can take time away to relax and look after yourselves.

Contents

ISSN:1741-5349

Advertising enquiries: kevan@bvna.co.uk.

Feedback and article submissions: vnj@bvna.co.uk.

Veterinary Nursing Journal is designed by Salt Media and printed by Latcham Press.

Volunteering

Stories from vet-nurse volunteers

Vet nurse and BVNA Council member Matt Wright shares his experience of volunteering with StreetVet.

Volunteer Matt Wright, RVN

Charity StreetVet, UK

The sense of love and responsibility felt by homeless people for their animals is profound, whether the bond has been formed before or after becoming homeless. Jade Statt and Sam Joseph recognised this and founded StreetVet in 2016 to support homeless people's pets with veterinary care, advice and medication. The registered charity now provides support in a number of towns and cities across the UK, including Cambridge, where vet nurse Matt volunteers.

In 2018, I had some free time and wanted to give back to my community, so I applied to volunteer with StreetVet. I completed the extensive application process and paperwork, which included making sure I had insurance cover in place (you could be covered by your practice insurance but it's best to check). My first shift was in January 2019 and I've been volunteering regularly ever since.

StreetVet welcomes as much help as you can comfortably commit to so, initially, I volunteered every couple of months; now I put my name forward every week. I love being part of a close-knit team with people from different practices and walks of life who share the same goals.

New volunteers are shown the area by a lead volunteer. This could entail walking around the streets with a vet, talking to the locals to see how they and their pets are getting on, just as you'd chat with a client in practice.

I'm now a lead volunteer so I've taken on more responsibility. I know StreetVet's clients and they know me – mainly because I'm highly recognisable as a fairly big lad with a beard! I'll be out on the street and clients will often shout, *'Hi Matt, how are you?'* or the dogs will recognise me and come running over. It's very rewarding.

StreetVet founders Jade and Sam

Since the charity began, over 1,000 dogs have been helped, along with a few rabbits and cats. A pet is often the centre of a client's world and provides much needed comfort, companionship and emotional support. The love is such that a client will sometimes go without food so they can feed their pet.

At the moment, most hostels won't allow homeless people to stay overnight with their animals. This means they have to sleep on the street if they don't want to be parted from their pet, so StreetVet is developing a scheme to give accreditation to hostels that take in homeless people with their pets.

StreetVet tailors its support to the needs and resources of the area. In Bournemouth, for example, a team visits locations where homeless people are known to hang out, in case there are any animals in need of care. Once a vet has given their diagnosis, follow-up treatment is provided by volunteers who make rounds with backpacks and trolleys stocked with medications and food.

Other StreetVet centres partner with soup kitchens and hostels. Some teams cover a vast area, such as Devon, so they'll be at designated locations at specific times. The Cambridge team works closely with three hospitals, while other teams are supported by local practices which offer specialist skills, see local homeless pets, or carry out a few operations free of charge each month.

StreetVet is also supported by commercial partners and public donations, as well as celebrity advocates such as Paul O'Grady and Sue Perkins. They're fantastic at raising awareness of the charity's work through social media.

In addition to the help offered, the admin team at Head Office actively reaches out when specific items are needed. Companies donate products, time and food, which can make a big difference to the lives of the pets. An example was the lifetime's worth of medication provided by a drug company for a beautiful Mastiff with a long-term heart condition.

StreetVet also has an Amazon list, which is a popular and easy way for the public to contribute items like bedding, toys, water bowls and reflective jackets. Specific items are also donated, such as the replacement harness provided for a dog called Bullseye in Cambridge.

Volunteering with StreetVet is hugely rewarding but it does come with challenges. It can be upsetting to hear how people came to their way of life, often not by choice but through unfortunate circumstances. You can't help but feel frustrated at the lack of support for young people who live on the streets, or for homeless war veterans who, having served our country, now only have the companionship of a dog.

Spending time with homeless clients is an emotional experience: it's humbling and puts your own life into perspective. They genuinely value the time you spend with them as, sadly, they're used to people just walking past and ignoring them. They don't expect you to provide care in the way that clients in practice would. Their appreciation and the positive effect your time and skills can have on their life, and that of their pet, is hugely rewarding.

Even though you're aware of the need to maintain a professional distance, it's hard not to care deeply about the welfare of the clients and their animals. You get to know them all and, if you hear they're ill and in hospital or they're not in their usual place for whatever reason, you worry and find yourself on the lookout for them.

StreetVet is currently facing a shortage of volunteers in the face of high demand, so I'd appeal to other veterinary professionals to spare a few hours here and there to support the charity, if they can. Aside from the sense of reward that comes from helping others, you'll make new friends and enrich your skills, which will also benefit your career and practice.

I've learnt so much by spending time with StreetVet's clients and caring for their pets. I've probably gained as much from the experience as I've contributed, and highly recommend it to other vet nurses.

Get involved

Visit www.streetvet.co.uk or scan the QR code to register your interest, or visit the social media pages of your local team for more information.

BVNA Congress 2022

BVNA Congress is always packed with learning opportunities and 2022 will be no different. You can find full details and up-to-date information on the BVNA website but here's a quick look at what's on the agenda this year.

Building Resilience

This year's theme is 'Building Resilience', and you'll see resilience streams taking place every morning during the weekend. These sessions will leave you feeling boosted and armed with practical strategies to build and maintain your resilience and wellbeing. Vetlife will also join us and provide a Wellbeing Hub, where you can speak to one of the team for guidance and support.

Friday 7 October

Keynote Speech

Nicola Lakeman, MSc BSc (Hons), RVN, VTS (Nutrition)

Nicola is the Nutrition Manager for IVC Evidensia and has contributed to many veterinary publications and textbooks. She is editor of *Aspinall's Complete Textbook of Veterinary Nursing* and a consultant editor on *The Veterinary Nurse*. Nicola has won the BVNA/Blue Cross Award for Animal Welfare, SQP Veterinary Nurse of the Year, and SQP Nutritional Advisor of the Year. She has recently gained her master's degree in Advanced Veterinary Nursing at Glasgow University. Nicola's inspiring keynote talk will be about building resilience.

Advanced Nursing (Surgical)

Sponsored by Vets4Pets

Passionate about surgical nursing? This stream is perfect for RVNs looking to advance their skills and knowledge. Featuring dentistry, orthopaedics, surgical wounds and safe surgery for rabbits, there's something for everyone. We will also welcome RCVS Knowledge to discuss the development of its Canine Cruciate Registry.

Behaviour

Sponsored by ABTC

The ever-popular behaviour stream returns to provide visitors with implementable strategies to help nurses meet the behavioural needs of their patients – whether canine, feline, equine or exotic. Delegates will also learn more about the newly launched Learning Pathway in Behaviour, a joint project between BVNA and ABTC.

Saturday 8 October

Nursing the Feline Patient

Sponsored by iCatCare and KVP EU

Handling a fearful or anxious cat in practice can be challenging, so how can we make the vet visit as fear-free and positive as possible for our patients? Join us to discuss this and more in a brand-new stream dedicated to nursing the feline patient.

Student Veterinary Nurse Symposium

Calling all SVNs! This year, we will introduce the first Student Veterinary Nurse Symposium. Our student Council members have helped us devise a full-day stream designed to support SVNs with their studies and provide an introduction to clinical practice. Learn how to make calculations friendly, take the stress out of anaesthesia troubleshooting, remove the panic from ECC cases, and demystify care bundles.

VN Leadership Summit

Sponsored by CVS UK

Are you in a VN leadership role, or working towards one? Whether you're an experienced leader or want to venture into leadership and management, the one-day Veterinary Nurse Leadership Summit has lots to offer. Join us as we delve into personality types, the transition from colleague to leader, and effective team communication.

Sunday 9 October

Applied Nutrition

Sponsored by Hill's Pet Nutrition

We will explore the evidence base for clinical nutrition, discuss the key role of the RVN in making recommendations to clients, and navigate pet-food labels. The day will conclude with two applied clinical nutrition sessions, covering weight and mobility, and gastrointestinal and post-operative nutrition.

Anaesthesia and Analgesia

Sponsored by Burtons

This stream will be packed with practical hints and tips to apply directly to nursing practice. We'll highlight the key role the RVN plays in enabling a smooth surgery for their patient – from preparation and airway management to monitoring, ventilation and post-operative pain management.

Research Bites

Drop into the Research Bites session on Sunday, where there will be presentations from the abstract and poster submissions. Both registered and student veterinary nurses can submit abstracts from research or clinical audits they have carried out, or evaluations of a specific case that has been treated in practice. This is a great opportunity to hear how your fellow veterinary nurses are adding to evidence-based vet nursing practice.

There will also be plenty of social events, practical workshops and seminars you can join over the 3 days. Workshops and seminars feature something for everyone and for all career levels, with topics including wound management, SVN wellbeing, calculations and rehabilitation, to name a few. We also have seminars on pay and professional development, creating feline blood drives, and a case-based comparison of the approach to the management of feeding tubes in both human and veterinary medicine. Check out the BVNA website to register for these sessions.

Plus

Lecture Streams

- Emergency and Critical Care
- Nursing the Equine Patient
- Advanced Nursing (Medical)
- Rehabilitation
- Wildlife, Zoo and Exotics
- Wound Management
- Caring for the Geriatric Patient

Special Events

- VN educators conference
- Practical workshops and seminars
- Dinner dance and awards evening
- Pub quiz
- Fringe events
- VN Futures
- Exhibition and exhibitor showcase

Find out more at www.bvna.org.uk/events

Mental-health
FIRST AID
AT WORK

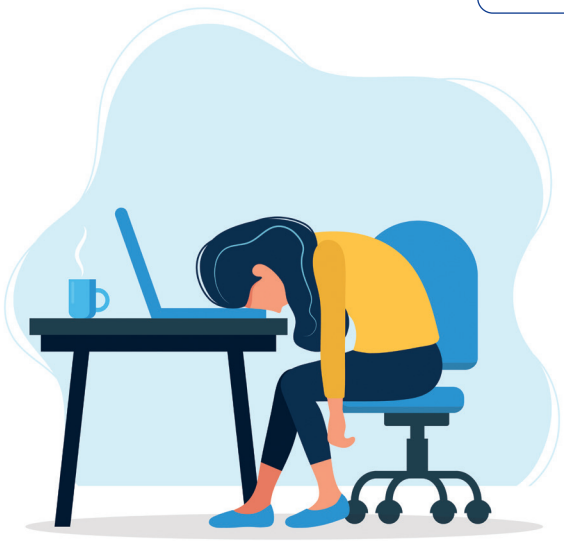
As levels of stress and anxiety rise, BMAS highlights the role of mental-health first aiders in the workplace.

Nicky Ackerley

HR Support Consultancy

nickyackerley@hrsupportconsultancy.co.uk

Nicky is the owner of HR Support Consultancy. She has a BA(Hons) in Business Studies, is a member of the Chartered Institute of Personnel and Development, and has been a practising HR manager for over 20 years. HR Support Consultancy has been providing the BVNA Members Advisory Service (BMAS) (formerly the Industrial Relations Service) since 2002.



Mental health has become a major concern as a result of the Covid-19 pandemic, which has affected almost everyone – both personally and professionally. The stress of this alone is now being recognised, alongside other upsetting and inescapable global issues.

To add to this, our personal lives are often busy and conflicted, with access to support services currently limited due to pressure on both supply and demand. Pressure at work can further escalate levels of stress and anxiety.

It's inevitable that the effects of mental ill-health will have an impact on the workplace. It's estimated to cost UK employers up to £45 billion each year (Deloitte 2020) and affects attendance, performance, turnover and presenteeism. Approximately one in four people in the UK will experience a mental illness each year and the largest causes of sickness absence for our country's workforce are depression, stress and anxiety.

'The largest causes of sickness absence for our country's workforce are depression, stress and anxiety'

People don't always realise they're mentally ill and, even when they do, they may be unsure how to seek help, or be unwilling to do so. There's still a stigma around poor mental health, making it more difficult for people to discuss it. Managers can also be uncertain about how to intervene and support an employee who may be struggling with a mental-health challenge.

Employers have a duty of care to ensure their employees work in a safe environment and this includes measures to ensure risks of mental harm are managed, as well as risks of physical harm.

The Health and Safety Executive produces guidance on six areas of work associated with poor mental health if not properly managed: demands, control, support, relationships, role, and change. These are known as the Management Standards.

An increasingly popular intervention in the workplace has been the implementation of mental-health first aiders. These are employees who undergo a short training session on how to recognise the early signs and symptoms of common mental-health conditions found in the workplace.

Trained mental-health first aiders support colleagues and guide them to professional help if required. Promoting a greater awareness of mental health in the workplace is another important part of the role.

There are many organisations that deliver mental-health first aid training. Their aims are usually to:

- Provide information on mental health
- Develop skills in spotting signs, symptoms and triggers
- Develop confidence in talking to colleagues with symptoms
- Provide signposting to extra support
- Develop safeguarding skills for those supporting others

Research by the Health and Safety Executive on the impact of having trained mental-health first aiders in the workplace revealed mixed results. Positive effects of the training included raising employees' awareness of mental-health conditions, and providing a better understanding of where to find information and professional support.

However, although employees were more confident about helping individuals who were experiencing mental ill health or a crisis, the presence of mental-health first aiders did not appear to have influenced any changes to the management of mental health in the workplace (HSE 2018).

On balance, having members of staff who have undertaken some training to help and support employees experiencing mental-health challenges might be something to consider in your workplace. Training courses are usually short (one or two days), with some tailored specifically to supervisors and managers.

For advice about this or any other employment matter, please contact advisoryservice@bvna.co.uk

Science Shorts

Stay up to date with the latest research

High-flow nasal cannula oxygen therapy in human and veterinary medicine

Philip Krawec and others, University of Tennessee, Knoxville

Respiratory distress is a common clinical presentation in both human and veterinary medicine. Oxygen supplementation can be provided by several different methods, including high-flow nasal cannulas, which are increasingly popular in human hospitals and are available for veterinary use. The authors explain the potential applications in veterinary hospitals of these devices, which deliver high flow rates of heated and humidified oxygen at an adjustable fraction of inspired oxygen.

Topics in Companion Animal Medicine
https://doi.org/10.1016/j.tcam.2021.100596

Potential markers of acute stress in canine saliva

Takanori Kooriyama and Niwako Ogata, Rakuno Gakuen University, Hokkaido (Takanori Kooriyama)

Several novel treatments are now available for the treatment of fear and anxiety in domestic animals. Accurate methods for detecting such states are therefore needed to identify individuals that need treatment and to monitor effectiveness. The authors review current knowledge of the biochemical markers of the canine stress response found in saliva. They suggest that markers of salivary analytes indicating activity in the sympathetic-adrenal-medullary (SAM) axis and immune system should be examined, alongside commonly used tests of salivary cortisol levels.

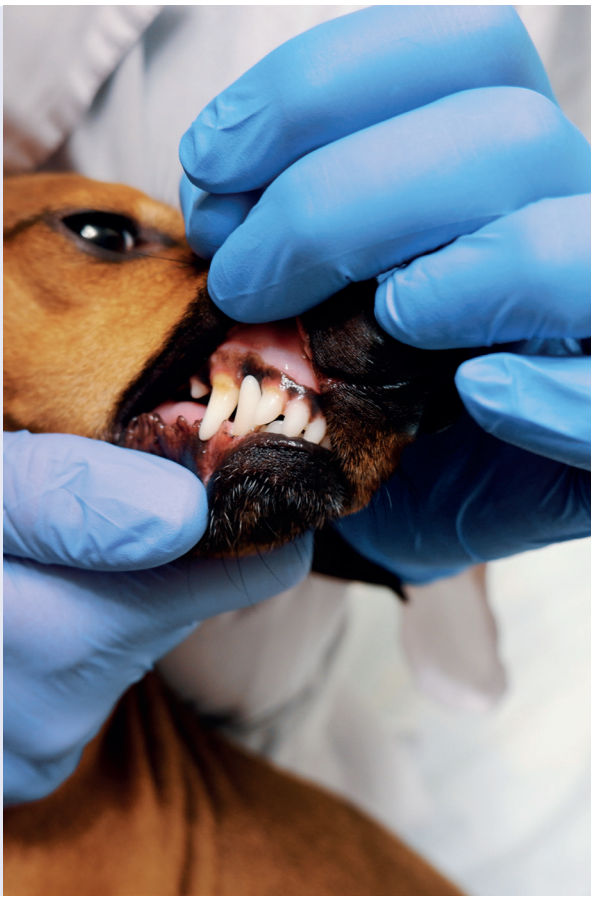
Research in Veterinary Science
https://doi.org/10.1016/j.rvsc.2021.10.009

Analysis of the oral cavity microbiome in healthy dogs and those with periodontitis

Brook Niemiec and others, Southern California Veterinary Dental Specialties, San Diego

Mammalian mouths may contain a huge variety of different microbial species. Some are beneficial for the host while others may be involved in disease processes like periodontitis. The authors used DNA sequencing to identify fungi present in dogs with periodontal disease. They found fungal species in all samples, including 320 species from 135 families. ***Cladosporium*** sp., ***Malassezia restricta*** and ***Malassezia arunalokei*** were isolated most frequently. Fungi of the ***Didymellaceae*** and ***Irpicaceae*** families, and of the order ***Pleosporales***, were significantly associated with different stages of periodontitis.

American Journal of Veterinary Research
https://doi.org/10.2460/ajvr.20.11.0200



Correlations between the results of non-invasive and rectal temperature measurements

James Barton and others, University of Liverpool

The Covid-19 pandemic has led to the wider use of non-contact infrared thermometers (NCITs). Assessing a patient's body temperature is a fundamental part of any veterinary examination. Using rectal thermometers will provide an accurate reflection of an animal's core body temperature but the procedure can be difficult in fractious patients. The authors compared the results achieved using a rectal instrument with those achieved with a NCIT. When used in both feline and canine subjects, the NCITs consistently underestimated body temperature. Hence, the authors do not recommend non-invasive methods for measuring body temperature, based on the current available technology.

Journal of the American Veterinary Medical Association
https://doi.org/10.2460/javma.21.09.0403

Indications and outcomes for puppies undergoing mechanical ventilation

Elyzabeth Lemieux and others, Tufts University, North Grafton, Massachusetts

Mechanical ventilation has been used with increasing frequency in small animal practice over the past 25 years but such methods are costly and require a knowledgeable and dedicated clinical team. The authors describe the clinical features and outcomes in 59 cases involving puppies treated at six hospitals between 2006 and 2020. The most common underlying disease conditions were pneumonia, non-cardiogenic pulmonary oedema and trauma. The overall survival rate was 39%, including 19 non-brachycephalic and four brachycephalic dogs. The latter breeds were less likely to survive than dogs from non-brachycephalic breeds.

Canadian Veterinary Journal 62(8), 839–842

Use of topical analgesia to reduce pain from catheter placement in cats

Carol Chávez and others, University of the Americas, Santiago

Placement of peripheral catheters is necessary in the management of many patients in small animal practice, but for some cats this will cause pain and stress. The authors investigated the effect of a topical anaesthetic cream, containing lidocaine and prilocaine, on the expression of behaviours associated with stress in 20 cats undergoing venepuncture prior to ovariohysterectomy procedures. Cats receiving the anaesthetic cream 30 minutes before peripheral catheter placement showed significantly less evidence of stress. Routine use of topical anaesthesia is considered feasible in non-emergency cases.

Journal of Veterinary Behavior
https://doi.org/10.1016/j.jveb.2021.07.011

Early neutering of kittens and the incidence of orthopaedic disease in later life

Evangelia Maniaki and others, University College London

Degenerative joint disease is one of the leading causes of chronic pain in cats. The authors investigated the association between various early-life risk factors and the incidence of owner-reported mobility changes in cats aged 6 years and over. They found that 29.8% of the 799 cats recruited for the study had some mobility changes. Obesity, outdoor access and a history of trauma all appeared to predispose cats to developing degenerative joint disease when they reached middle age. However, neutering before the cat reached 6 months old appeared to diminish that risk.

Journal of Feline Medicine and Surgery
https://doi.org/10.1177/1098612X21991456

Bacterial contamination of environmental surfaces in a teaching hospital

Claudia Verdial and others, University of Lisbon

Contaminated surfaces are an important reservoir of infection in medical facilities, which can readily transfer bacteria to hands and equipment. The authors investigated the level of bacterial contamination in the isolation and containment unit of a major veterinary teaching hospital. They found that the highest loads in the isolation rooms were in cages, the highest in the preparation area were in handheld sponges and, in staff rooms, telephones were the worst affected surfaces. The most frequently isolated organisms were ***Enterococcus*** species. Revised disinfection protocols reduced bacterial counts in the unit by 90–99%.

Irish Veterinary Journal
https://doi.org/10.1186/s13620-021-00197-z

Influence of breed and bodyweight on the incidence of periodontal disease in dogs

Corrin Wallis and others, Waltham Petcare Science Institute, Leicestershire

Periodontal disease is one of the most common conditions affecting dogs but is probably under-diagnosed in primary care practices. The authors examined the clinical records from 3 million dogs treated by clinics in a major US veterinary chain to identify the influence of body size and breed on periodontal disease. The breeds most frequently diagnosed with this condition were in the extra-small (6.5–9 kg) and medium-small (9–15 kg) size categories. Age, obesity and time since last dental treatment were also predisposing factors.

The Veterinary Journal
https://doi.org/10.1016/j.tvjl.2021.105717

Reversible infertility in a male dog following ketoconazole treatment

Anna Domosławska and Slawomir Zduńczyk, University of Warmia

There is little published data on the causes of infertility in male dogs, although there is evidence that a variety of veterinary drugs can adversely affect spermatogenesis. The authors report a case in which low libido and azoospermia were detected in a 7-year-old American Staffordshire terrier, which had been treated for 3 months with the antifungal agent ketoconazole for a persistent ***Malassezia*** dermatitis. The drug is known to be associated with infertility in male rodents. The dog's sperm quality and testosterone levels returned to normal when ketoconazole treatment was withdrawn.

Acta Veterinaria Scandinavica
https://doi.org/10.1186/s13028-021-00616-9

Effect of group size on wellbeing in domestic cats

Lauren Finka and Rachel Foreman-Worsley, Nottingham Trent University

Living in multi-cat households is often considered problematic by animal behaviourists, who have demonstrated links between group housing and reduced wellbeing. However, the impact of group size has rarely been the primary focus of feline behaviour studies. The authors review the literature on the effects of environment on cat welfare. Their results highlight the complex, multifactorial nature of cat wellbeing and its links to the social environment. They argue that other factors may have a more important influence on cat welfare than simply the numbers living within a particular household.

Journal of Feline Medicine and Surgery
https://doi.org/10.1177/1098612X211013741

Early postoperative hydrotherapy in dogs undergoing intervertebral disc surgery

Abtin Mojarradi and others, IVC Evidensia, Helsingborg

Hydrotherapy is an important element in the postoperative care of dogs treated for thoracolumbar intervertebral disc extrusion. There are no current guidelines on when to begin this form of physiotherapy. The authors recorded the incidence of postoperative complications in 83 dogs undergoing disc surgery. In 26 cases, complications were reported, but the majority could not be directly attributed to the postoperative treatment. However, the timing of the postoperative care may have been a factor in one surgical site infection and one dog with a further extrusion of the treated disc. The authors urge caution until the risks and benefits of early hydrotherapy are investigated further.

Journal of Small Animal Practice
https://doi.org/10.1111/jsap.13412

Awareness of faecal microbiota transplantation among small animal practitioners

Silke Salavati Schmitz, Royal (Dick) School of Veterinary Medicine, Edinburgh

Faecal microbiota transplantation (FMT) has become an approved treatment for ***Clostridiodes difficile*** infections in human patients. The technique has been applied in veterinary patients but is not yet widely used. The authors investigated the awareness of the procedure among small animal practitioners. There were 155 responses from 13 countries to an anonymous online questionnaire. The majority (71%) had never used this method but, in those that had used it, chronic enteropathy was the most common indication followed by parvovirus infection and acute diarrhoea.

Topics in Companion Animal Medicine
https://doi.org/10.1016/j.tcam.2022.100630

Effects of Cushing's syndrome on cognitive function in dogs

Carolina Castilhos da Silva and others, Federal University, Rio Grande do Sul

Cushing's syndrome is known to be associated with cognitive impairment in human patients but, to date, there have been no published studies reporting similar effects in dogs with the equivalent condition. The authors describe a matched case-control study involving 19 dogs with Cushing's syndrome and 38 healthy controls. Their findings show that the disease may be linked with various neurological changes, including memory dysfunction, compulsive behaviour, depression and anxiety.

Journal of Veterinary Behavior
https://doi.org/10.1016/j.jveb.2021.07.014

Assessment of the health impact of obesity in pet rabbits

Antonia Vania Adji and others, University of Copenhagen

Although rabbits are used as a laboratory model in studies of obesity in humans, there is little reliable data on the prevalence and effects of obesity in the pet rabbit population. The authors review current knowledge of the risk factors and health impact of obesity in this species. They identify links between obesity in rabbits and osteoarthritis, pododermatitis, hepatic lipidosis, atherosclerosis, insulin resistance and post-anaesthetic complications risk. They offer recommendations on the prevention and treatment of this condition in rabbits.

Journal of Exotic Pet Medicine
https://doi.org/10.1053/j.jepm.2022.02.003

BVNA Council update

Members supporting a sustainable future for the veterinary nursing profession

VN Diversity, Inclusivity and Widening Participation (DIWP) Working Group

Overview VN Futures initiative, led by BVNA, to actively address diversity and inclusivity in veterinary nursing

It is generally acknowledged that there is a lack of diversity in the VN profession, so we need to attract people with varying backgrounds and experiences. Your Council members have created the VN Diversity, Inclusivity and Widening Participation (DWIP) Working Group to explore how we can encourage people from different backgrounds, ethnicity, experience and abilities into the veterinary nursing profession.

The group aims to enlist allies and role models to help drive change within the veterinary nursing profession, through education, building awareness and creating career aspirations in veterinary nursing for everyone.

We will work with the RCVS Diversity and Inclusion Group (RCVS DIG) and other allies and parties who are striving for the same goal. This will help to ensure that messages are consistent and that we are all working in alignment when exploring solutions for widening participation in the profession.

Diversifying our workforce means we can better represent the clients who come into the practice. The profession will also benefit from a broader range of perspectives, which will strengthen teams and ultimately benefit the welfare of animals and improve the experiences of their owners.

How do role models make a difference?

Role models from a range of social backgrounds, ethnic groups and with different life experiences will inspire others to join the veterinary nursing profession by providing a focus for aspiration. This visibility prompts change and growth; it opens the next door.

We would like to share stories to inspire others to join the profession and widen participation, and show those already in the VN profession they are not alone. We hope to open up conversations, address challenges and change the culture of the veterinary profession.

Who are our role models?

- **RVNs who have entered nursing from a challenging socio-economic background or entered the veterinary nursing profession as a second career**
- **Black, Asian and minority ethnic RVNs**
- **Male RVNs**
- **LGBTQIA+ RVNs**
- **RVNs suffering from chronic illness**
- **RVNs who have a disability**
- **RVNs with mental health challenges**
- **Neurodivergent RVNs and those with additional learning needs**

What has the DIWP Working Group done so far?

GENDER IDENTITY BILL OF RIGHTS (USA)

We hope to support the PrideVMC Gender Identity Bill of Rights for the Veterinary Profession by becoming a signatory. You can find out more about the Bill and the rights it encompasses at https://pridevmc.org/gibor/.

ROLE MODELS CAMPAIGN

The campaign champions our inspirational role models and gives you the space to share stories and experiences. Check out the BVNA website to see our role models' stories at https://bvna.org.uk/working-for-you/.

VN FUTURES SCHOOL AMBASSADORS

This group supports DIWP and the role models campaign by using diverse imagery, case studies and career pathway demonstrations to provide the representation and visibility needed to foster widening participation in the profession.

How can you get involved?

Share the videos, podcasts and stories from our role models, so people can see for themselves that veterinary nursing is accessible to all.

Join the VN Futures School Ambassador scheme to access resources you can take to schools to promote the veterinary nursing profession. Find out more on the VN Futures website at www.vnfutures.org.uk.

Improving the welfare of both wildlife and domestic cats

Emma Onyejekwe, RVN, APVN (Wildlife)

thewildlifevetnurse@outlook.com

Emma qualified as a veterinary nurse in early 2019 and now works in a small animal practice, where she is the cat and wildlife advocate. She has an interest in medical nursing as well as wildlife nursing and conservation. Emma has volunteered in the UK and abroad, including working with monkeys, rhinos, pangolins and a host of British wildlife. She enjoys extending her knowledge and experience of wildlife nursing.

ABSTRACT Hunting behaviour is often considered normal for domestic cats and the impacts on wildlife are often discussed. Estimated figures are often published and some of these have been included in this article. Several wildlife rescues were contacted for their data. These data are for prey known to have been caught by a cat. Therefore, the number could be substantially higher, and other prey animals could have sustained injuries from cats or subsequently died before being taken to a wildlife rescue. By understanding cat owners' perspectives on their pets' hunting behaviour, suitable changes may be made to reduce predation on wildlife, thus improving the welfare of both wildlife and cats. Veterinary nurses can aid in responsible cat ownership to help minimise the impact on wildlife.

Keywords domestic cats, responsible pet ownership, wildlife, predation, welfare, wildlife-friendly, cat behaviour, wildlife casualties

Introduction

The dynamic between domestic cats and wildlife is often an emotive topic, with conflicts arising from both cat and wildlife enthusiasts. The debate normally focuses on whether cats should be kept indoors or allowed to roam freely outside. As registered veterinary nurses (RVNs), we may speak to new cat owners about the advantages and disadvantages of both lifestyle options for their pet. However, we may not mention the impact cats can have on wildlife. In this article I will cover cat owners' perspectives on hunting behaviour, the data for cat-attack victims in wildlife rescue centres in the UK, and what cat owners can do to help reduce wildlife predation. With this information we could help improve the welfare of both cats and wildlife.

Cat owners and cat behaviour

There are 10.9 million pet cats living in the UK, with 72% of cats having access to both indoor and outdoor environments (PDSA, 2020). A cat's hunting behaviour is often considered normal and natural, and something for which cat owners may not take individual responsibility for preventing or reducing (Crowley et al., 2019). This is probably due to the historical role of cats in pest control and their subsequent 'self-domestication' (Crowley et al., 2020a). A study by Baker et al. (2005) revealed a mean predation rate of 21 prey/cat/annum. This would mean that around 229 million prey animals may have been caught and brought home by cats in 2020 alone. Some prey could appear unharmed and are immediately released, but many are injured and some may be presented for treatment in wildlife rescues or veterinary practices (Saunders, 2016), which is likely to result in welfare implications for these prey animals.

In the PAW report (PDSA, 2020), 14% of cat owners said one pet behaviour they would like to change was bringing wildlife into the house/killing wildlife. A recent study identified five types of cat owners:

- Concerned protector (who focuses on their cat's safety)
- Freedom defender (who prioritises their cat's independence)
- Tolerant guardian (who allows outdoor access but dislikes their cat's hunting behaviour)
- Conscientious caretaker (who feels some responsibility for managing their cat's hunting behaviour)
- Laissez-faire landlord (who is unaware of the issues surrounding roaming and hunting behaviour in cats)

(Crowley et al., 2020b)

By understanding the owner's perspective of their cat's predation on wildlife, we could encourage owners to make changes that still align with their views and beliefs.

Wildlife casualties due to cat attacks

The author contacted several wildlife rescues to obtain current data on wildlife casualties which the finder or wildlife centre considered to be due to cat attacks. HART Wildlife Rescue reported that around 17% of its total patient admissions in 2020 were known cat-attack victims. HART Wildlife Rescue also reported that 1 in 5 of their avian admissions, and 1 of 4 of their rodent, lagomorph and bat admissions, were known cat-attack victims. Of all cat-attack admissions across the wildlife rescues, the most common species were birds, at 82–88%. Rodents were a smaller percentage at 10% (across a couple of wildlife rescues). Secret World Wildlife Rescue reported that 77% of its cat-attack victims were brought in between March and August, with 85% being birds. Tiggywinkles Wildlife Hospital reported that, between March and June in 2020, nearly a quarter of all bird admissions were the result of an attack by a cat or dog.

The percentage of rodent cat-attack victims presented to wildlife centres could be low because rodents are mainly caught at night, whereas birds are caught in the day when owners are more likely to see them. Another factor could be owners perceiving rats and mice as pests or vermin, so they may not attempt to rescue these animals. This in itself may be a welfare concern. An additional possibility is that owners do rescue the prey but then release them, perceiving them as unharmed. Many of these animals are likely to suffer protracted deaths. Cats can cause penetrating wounds that are often more extensive than external examinations show and can be contaminated with

Pasteurella multocida (Müldorfer et al., 2011). Small birds and mammals can sustain thoracic and abdominal injuries from cat attacks and may require fluid therapy, broad-spectrum antibiotics, pain relief and treatment of dyspnoea (Mullineaux & Keeble, 2016). Wound management may also be required for these wildlife casualties and, in cases with extensive damage, euthanasia may be indicated (Mullineaux & Keeble, 2016).

A study by Baker et al. (2018) highlighted several factors affecting the likelihood of surviving cat-attack victims being released. These were the species, age and the time it took for the bird to be transported to a wildlife centre. The welfare of these cat-attack victims could be improved if owners, rehabilitators and veterinary professionals were able to effectively identify life-threatening injuries during triage (Baker et al., 2018). This could be achieved by veterinary practices and wildlife rehabilitators working more closely and sharing knowledge. The author would encourage veterinary practices to ensure that a full and thorough clinical examination is provided during the triage process for all cat-attack victims. Veterinary surgeons have a duty to provide first aid and pain relief to prevent suffering to all species, which may include euthanasia (RCVS, 2021). The author recommends veterinary practices have a list of drug doses for pain relief and antibiotics for birds, rodents and bats.

Data from one wildlife rescue centre revealed that 31% of cat-attack victims were released. The author believes more can be done to reduce predation, which would result in fewer animals being admitted into wildlife rescues and veterinary practices, and could improve the welfare of these animals.

How cat owners can reduce predation on wildlife

One way predation could be stopped altogether would be to keep cats indoors. However, the author understands that this may not be suitable for all cat owners, due to their personal beliefs or if the cat already has access to the outdoors. A study by Crowley et al. (2020b) highlighted that cat owners in the UK currently feel outdoor access is fundamental and a component of cat care. All five types of cat owners disagree that cats should be kept solely inside to stop them hunting, while three of the types felt strongly that cats should have outdoor access (Crowley et al., 2020b).

RESTRICTED OUTDOOR ACCESS

Owners who would like their cat to have access to the outdoors but are concerned about the risks to their cat could consider fencing their garden or providing an outdoor cat enclosure. Cats can climb fences so the fence would need to be at least 2 metres in height to be effective (Cats Protection, 2021d; iCatCare, 2018a). The fence should be close-boarded to ensure the cat cannot get through the fence, and this will also be safer for any wildlife that tries to visit the garden. The author suggests providing a small gap (13 cm × 13 cm) in the fence, to allow hedgehogs to pass freely. This size of gap is often too small for pets but will allow hedgehogs to continue their usual nightly walk to find food and a mate (Hedgehog Street, 2021). An outdoor cat enclosure may be built as an alternative.

Cat owners unwilling or unable to make changes to their gardens could consider restricting access to the outdoors at night. Cats are generally more active from dusk until dawn, and this is a prime time for most wildlife. According to the latest CATS report, 46% of cats given outdoor access are able to come and go freely during the night (Cats Protection, 2021b). Cats Protection and International Cat Care recommend keeping cats indoors at night to keep them safe from dangers like road traffic accidents (Cats Protection, 2021c; iCatCare, 2018b).

Bats are known for being active at night. It is estimated that over 30% of bats rescued by bat carers have been attacked by cats (Bat Conservation Trust, 2021). Only 14% of these are released, with 56% not surviving and 30% unable to return to the wild. Bats caught by cats can sustain patagial injuries, which can range from small holes in their patagium to large tears. These injuries can lead to wound infection and/or subcutaneous emphysema (Couper, 2016). The most important time to keep cats indoors at night is from mid-June until the end of August, as adult bats will be caring for their young during this time (Bat Conservation Trust, 2021). The Bat Conservation Trust suggests that if cats cannot be kept indoors all night, they should be brought indoors half an hour before sunset and kept in for an hour after sunset.

CAT COLLARS

A study conducted by the Royal Society for the Protection of Birds (RSPB) found that cats with a bell collar returned 41% fewer birds and 34% fewer mammals than those with a plain collar (Nelson et al., 2005). Those with an electronic sonic device on their collar returned 51% fewer birds and 38% fewer mammals (Nelson et al., 2005). However, it has been noted that some cats can learn to stalk without activating the bell, and a study by Cecchetti et al. (2021) said cat bells have no discernible effect. In this study, the Birdsbesafe® cat collar reduced the numbers of birds caught and brought home by 42%, but had no discernible effect on mammals. Some cat owners are concerned about the potential safety risks of a collar, the potential effects on the cat's welfare and the potential intolerance of a collar by their cat (Crowley et al, 2020b).

DIET AND ENRICHMENT AT HOME

In the 'indoor versus outdoor access' debate, physical risks such as road traffic accidents are often raised against outdoor access, whereas risks to the emotional wellbeing of a cat are highlighted against an indoor-only lifestyle (iCatCare,2019). Problem behaviours, such as scratching furniture, can be caused by boredom or frustration, so cat owners with indoor-only cats are encouraged to take more responsibility for providing a rich and stimulating environment (iCatCare, 2019). It has been noted that outdoor cats tend to be slimmer than indoor-only cats (iCatCare, 2019), and one way to combat weight gain and boredom is by using puzzle feeders. Conversely, a study by Cecchetti et al. (2020a) found a 33% increase in predation on wildlife when using puzzle feeders for outdoor cats. However, this was attributed to device novelty, insufficient training of owners and/or cats, or the inability to easily access food, resulting in hunger or frustration. The study also revealed that households that introduced a grain-free food with high meat-derived proteins saw a decrease of 36% in wildlife captured and brought home by cats (Cecchetti et al., 2020a). Another study by Cecchetti et al. (2021) revealed that cats rely on food from their owners even if they frequently kill wild animals. The persistence of hunting therefore may be a physiological or behavioural need that is unmet by their environment and/or diet (Cecchetti et al., 2021). Well-fed cats will still hunt and, even in cats with some nutritional deficiency, hunting is unlikely to alter their macronutrient intake, as cats often only consume a small amount of their prey (Cecchetti et al., 2021).

When cats display hunting behaviour they release endorphins. Playing with a cat to encourage them to stalk, pounce and chase can replicate this hunting behaviour and keep them mentally stimulated (Cats Protection, 2021a). Fishing-rod toys with feathers can be a good way to mimic prey, but it is important to periodically allow the cat to 'catch and kill' the toy to avoid frustration (Cats Protection, 2021a). A bond can develop between cats and their owners during play, which often has a positive effect on both parties' wellbeing. In the study by Cecchetti et al. (2020a), there was a decrease of 25% in animals captured and brought home by cats when 5–10 minutes of daily play with a feathered toy was introduced.

NESTING SEASON AND FLEDGLING BIRDS

Baker et al. (2005) found that predation on birds was greatest in spring and summer, and probably reflected the killing of juvenile individuals. Minimum predation rates for the house sparrow, dunnock and robin were moderately high (Baker et al., 2005). House sparrows are on the Red List of Birds of Conservation Concern (Stanbury et al., 2021), and Baker et al. (2005) believe the impact of cats on this species warrants further investigation.

Based on the data provided by several wildlife rescues, the author also believes the percentage of birds attacked by cats could be reduced by providing clients and members of the public with more information on the nesting season and fledgling birds. In the spring and summer, it is common to find young birds sitting on the ground or hopping about without their parents (RSPB, 2021b). The most familiar fledgling birds are juvenile garden birds that are old enough to leave the nest but are still supported by their parents. These fledglings often spend a few days on the ground while their flight feathers complete their growth (RSPB, 2021b). This makes them more likely to be targeted by cats as they are unable to fly away. The RSPB states that cats should be kept indoors until the fledgling is airborne because, in a conflict of interest between wild and domestic animals, the domestic pet must give way (RSPB, 2021b).

WILDLIFE- AND CAT-FRIENDLY GARDENS

To reduce the chances of cats catching garden birds, it is advisable to avoid feeding birds at ground level and to place feeders high off the ground (RSPB, 2021a). Bird feeders encourage birds to congregate more than usual, which increases the transmission of diseases and infections (BTO, 2021). It is therefore recommended that feeding stations and bird baths are regularly cleaned with a suitable disinfectant (BTO, 2021). Some diseases can cause death, which may lead to wider population decline (BTO, 2021), and cats may be more likely to predate on weakened birds.

Where nest boxes are provided, they should be carefully located to ensure cats cannot reach them or sit by them. Placing spiny plants or an uncomfortable surface beneath bird feeding stations and nest boxes has been suggested (RSPB, 2021a).

Cats and wildlife benefit from fresh water and shelter in gardens. If ponds are present, these should have sloping sides to provide an escape route for both cats and wildlife (Trevorrow, 2019). Log piles and tree stumps can provide a refuge for wildlife and a scratching surface for cats (Trevorrow, 2019). Some garden hazards can be harmful to both cats and wildlife. These include garden chemicals such as wood preservatives for fences, and pesticides such as slug pellets (Trevorrow, 2020). To create a hedgehog-friendly garden, any product that kills slugs, snails or insects should be avoided (Hedgehog Street, 2017).

Conclusion

Not all cats are hunters, and some may be more proficient and prolific hunters than others. Although there is no scientific evidence of the impact of cat predation on bird population decline (RSPB, 2021c), and the frequency of individual killings is low, the cumulative effect may be more severe in areas with a high density of cats (Cecchetti et al., 2021). The welfare of birds and small mammals is likely to be greatly compromised as a result of hunting by cats. Veterinary professionals, especially RVNs, can support and provide guidance to cat owners – during consultations, through display boards and via social media posts – to encourage responsible cat ownership that includes considering wildlife. Awareness of cat-attack data, alongside owner-type identification, may encourage change. By suggesting positive ways to improve the welfare of cats and wildlife, more progress could be made in this subject area.

Acknowledgements

The author would like to thank Secret World Wildlife Rescue, HART Wildlife Rescue, East Sussex Wildlife Rescue & Ambulance Service, Vale Wildlife Hospital & Rehabilitation Centre, and Tiggywinkles Wildlife Hospital for providing data on their cat-attack wildlife admissions in 2020. The author would also like to thank the University of Exeter and SongBird Survival for their research into cat owners and wildlife, on which this article is based.

Further reading

The Cats, Cat Owners and Wildlife project sponsored by SongBird Survival. Available at: https://www.exeter.ac.uk/research/esi/research/projects/cats/

REFERENCES

Baker, P. J., Bentley, A. J., Ansell, R. J. & Harris, S. (2005) Impact of predation by domestic cats ***Felis catus*** in an urban area. Mammal Review. 35 (3–4), 302–312.

Baker, P. J., Thompson, R. & Grogan, A. (2018) Survival rates of cat-attacked birds admitted to RSPCA wildlife centres in the UK: implications for cat owners and wildlife rehabilitators. Animal Welfare. 27 (4), 305–318.

Bat Conservation Trust (2021) Bats and Cats: advice for responsible cat owners. Available from: https://www.bats.org.uk/about-bats/threats-to-bats/cat-attacks [Accessed 17 December 2021].

British Trust for Ornithology (BTO) (2021) Good hygiene practice. Available from: https://www.bto.org/how-you-can-help/providing-birds/feeding-garden-birds/hygiene [Accessed 17 December 2021].

Cats Protection (2021a) Cats and play. Available from: https://www.cats.org.uk/help-and-advice/cat-behaviour/cats-and-play [Accessed on 17 December 2021].

Cats Protection (2021b) CATS (Cats and Their Stats) report UK 2021. Available from: https://www.cats.org.uk/media/10005/cats-2021-full-report.pdf [Accessed 17 December 2021].

Cats Protection (2021c). Cats at night. Available from: https://www.cats.org.uk/help-and-advice/home-and-environment/cats-at-night [Accessed 17 December 2021].

Cats Protection (2021d). Garden and outdoors. Available from: https://www.cats.org.uk/help-and-advice/home-and-environment/garden-and-outdoors [Accessed 17 December 2021].

Cecchetti, M., Crowley, S., Goodwin, C. E. D. & McDonald, R. A. (2020a) Provision of high meat content food and object play reduce predation of wild animals by domestic cats. Current Biology. 31 (5), 1107–1111.

Cecchetti, M., Crowley, S. L., Goodwin, C. E., Cole, H., McDonald, J., Bearhop, S., & McDonald, R. A. (2021) Contributions of wild and provisioned foods to the diets of domestic cats that depredate wild animals. Ecosphere. 12 (9), e03737.

Couper, D. (2016) Bats. In: Mullineaux, E. & Keeble, E. (eds.) BSAVA Manual of Wildlife Casualties. 2nd ed. Gloucester, British Small Animal Veterinary Association, p. 181.

Crowley, S. L., Cecchetti, M. & McDonald, R. A. (2019) Hunting behaviour in domestic cats: an exploratory study of risk and responsibility among cat owners. People and Nature. (1), 18–30.

Crowley, S. L., Cecchetti, M., & McDonald, R. A. (2020a). Our wild companions: domestic cats in the Anthropocene. Trends in Ecology and Evolution. 35 (6), 477–483.

Crowley, S. L, Cecchetti, M., & McDonald, R. A. (2020b). Diverse perspectives of cat owners indicate barriers to and opportunities for managing cat predation of wildlife. Frontiers in Ecology and the Environment. 18 (10), 544–549.

Hedgehog Street. (2017) Slug pellets. Available from: https://www.hedgehogstreet.org/slug-pellets [Accessed 17 December 2021].

Hedgehog Street. (2021) Link your garden. Available from: https://www.hedgehogstreet.org/help-hedgehogs/link-your-garden/ [Accessed 17 December 2021].

International Cat Care (iCatCare). (2018a) Fencing in your garden. Available from: https://icatcare.org/advice/fencing-in-your-garden/ [Accessed 17 December 2021].

International Cat Care (iCatCare). (2018b) Outdoor cats. Available from: https://icatcare.org/advice/outdoor-cats/ [Accessed 17 December 2021].

International Cat Care (iCatCare). (2019) Indoor only or outdoor access? Available from: https://icatcare.org/indoor-only-or-outdoor-access/ [Accessed 17 December 2021].

Müldorfer K., Speck S. & Wibbelt G. (2011) Diseases in free-ranging bats from Germany. BMC Veterinary Research. 7, 61.

Mullineaux, E. & Keeble, E. (2016) First aid and emergency care. In Mullineaux, E. & Keeble, E. (eds.) BSAVA Manual of Wildlife Casualties. 2nd ed. Gloucester, British Small Animal Veterinary Association, p. 52.

Nelson S. H., Evans A. D. & Bradbury R. B. (2005) The efficacy of collar-mounted devices in reducing the rate of predation of wildlife by domestic cats. Applied Animal Behaviour Science. 94 (3–4), 273–285.

PDSA (People's Dispensary for Sick Animals). (2020) PAW (PDSA Animal Wellbeing) report 2020. Available from: https://www.pdsa.org.uk/media/10540/pdsa-paw-report-2020.pdf [Accessed 17 December 2021].

Royal College of Veterinary Surgeons (RCVS) (2021) Code of Professional Conduct for Veterinary Surgeons. 3. 24-hour emergency first aid and pain relief. Available from: https://www.rcvs.org.uk/setting-standards/advice-and-guidance/code-of-professional-conduct-for-veterinary-surgeons/supporting-guidance/24-hour-emergency-first-aid-and-pain-relief/ [Accessed 17 December 2021].

Royal Society for the Protection of Birds (RSPB). (2021a) Bird-friendly gardens. Available from: https://www.rspb.org.uk/birds-and-wildlife/advice/gardening-for-wildlife/animal-deterrents/cats-and-garden-birds/bird-friendly-gardens/ [Accessed 17 December 2021].

Royal Society for the Protection of Birds (RSPB). (2021b) Finding baby birds. Available from: https://www.rspb.org.uk/birds-and-wildlife/advice/how-you-can-help-birds/injured-and-baby-birds/baby-birds/ [Accessed 17 December 2021].

Royal Society for the Protection of Birds (RSPB). (2021c) How many birds do cats kill. Available from: https://www.rspb.org.uk/birds-and-wildlife/advice/gardening-for-wildlife/animal-deterrents/cats-and-garden-birds/are-cats-causing-bird-declines/ [Accessed 17 December 2021].

Saunders R. (2016) Other insectivores and rodents. In Mullineaux, E. & Keeble, E. (eds.) BSAVA Manual of Wildlife Casualties. 2nd ed. Gloucester, British Small Animal Veterinary Association, pp.152–153.

Stanbury, A., Eaton, M., Aebischer, N., Balmer, D., Brown, A., Douse, A., Lindley, P., McCulloch, N., Noble, D., & Win I. (2021) The status of our bird populations: the fifth Birds of Conservation Concern in the United Kingdom, Channel Islands and Isle of Man and second IUCN Red List assessment of extinction risk for Great Britain. British Birds 114 (12), 723–747. Available from: https://britishbirds.co.uk/content/status-our-bird-populations [Accessed 17 December 2021].

Trevorrow N. (2019) Cat-friendly garden design – Part 1. The Cat. Summer. 24–26. Available from: https://www.cats.org.uk/media/4465/cat-friendly-garden.pdf [Accessed 17 December 2021].

Trevorrow N. (2020) Cat-friendly garden planting ideas – Part 2. The Cat. Autumn 22–24. Available from: https://www.cats.org.uk/media/4466/cat-friendly-garden-2.pdf [Accessed 17 December 2021].

Reflective professional development notes. To access hyperlinks to the references, scan the QR code on page 3.

Part 1

Life-stage nutrition for dogs and cats

Rachel Lumbis, MSc, BSc(Hons), PGCertMedEd, CertSAN, RVN, FHEA

WSAVA Global Nutrition Committee

Rachel qualified as a veterinary nurse in 2002. She developed an interest in companion animal nutrition and completed the City & Guilds Certificate in Small Animal Nutrition in 2006. She is a passionate advocate for correct nutrition and educates veterinary surgeons and veterinary nurses on the subject, in the UK and overseas, as a member of the WSAVA Global Nutrition Committee and a past member of the European Veterinary Nutrition Educators Group. Rachel is a former lecturer in veterinary nursing and Course Director for the BSc and FdSc VN degree programmes at the Royal Veterinary College. She is currently embarking on a PhD.

ABSTRACT Dogs and cats have unique nutritional requirements that vary throughout life, highlighting the importance of feeding a diet suited to their age and physiological state. The plethora of pet foods makes it challenging for owners to decide what and how much to feed. Therefore, the veterinary healthcare team must be able to provide accurate advice regarding optimal life-stage nutrition.

Part 1 of this article introduces nutritional assessment guidelines for small animals and explores the terms commonly used to describe canine and feline life stages. It also considers the dietary adaptations required during adulthood, gestation and lactation.

Keywords companion animal nutrition, life stage, dietary requirements, canine, feline

Introduction

The majority of pet owners consider their pets as family members and strive to ensure they have a long and healthy life (Cohen, 2002; Bontempo, 2005; Carlisle-Frank & Frank, 2006). As one of the most important considerations in the maintenance of health, nutrition plays a critical role in the management of many diseases – a reflection of its acknowledgement as the fifth vital assessment, after temperature, pulse, respiration and pain (Freeman et al., 2011).

Prior to domestication, dogs and cats were primarily kept as working animals, living outside and being fed raw meat or table scraps. Numerous developments in companion animal nutrition, together with the current notion of dogs and cats as pets and family members, have resulted in the development of a wide array of foods. The UK pet-food market is currently worth £3.2 billion (PFMA, 2021).

The provision of correct nutrition is an essential component of responsible pet ownership, and owners are becoming increasingly aware that it is a key factor in optimising pet health and wellbeing. With the current availability of such a broad range of pet foods, owners can select the food they believe to be most appropriate for their pet, taking into account a number of considerations, including personal preferences and circumstances. Yet, considerable confusion and misinformation exist regarding nutritional facts and dietary choices. The appealing marketing strategies and health claims can make diet selection challenging, with many owners finding this the most difficult aspect of pet ownership (Schleicher et al., 2019).

The primary role of diet is to provide sufficient nutrients to meet metabolic requirements while giving the consumer a feeling of wellbeing (Bontempo, 2005). An overall goal of veterinary nutrition is to feed for ideal health, performance and longevity. Life stages for cats and dogs are identified in **Table 1**. However, cats and dogs age at varying rates. Although age designations can help identify the physical and behavioural changes associated with different life stages, these are influenced by many factors and are not absolutes.

Normative and developmental stage thresholds have recently been identified by Harvey (2021) using chronological categories. These represent normative cognitive and neurological ageing in domestic family dogs, and capture age-related developmental trajectories for the majority of dog breeds. A longer lifespan is expected in smaller breeds of dogs than larger breeds, yet individual variation increases toward the latter years, with biological age potentially differing from chronological age (FEDIAF, 2017). As a result, precise age delineations are not proposed for the life stages of mature adult and senior dogs (Creevy et al., 2019).

Table 1. Definition of life stages for cats and dogs (Creevy et al., 2019; Quimby et al., 2021).

Species	Kitten/puppy	Young adult	Mature adult	Senior	End of life
Cats	Birth to 1 year [a]	1–6 years [a]	7–10 years [a]	>10 years [a]	Terminal stage
Dogs	Birth to reproductive maturation and cessation of rapid growth. Generally, 12–24 months, varying with breed and size.	Cessation of rapid growth to completion of physical and social maturation, which occurs in most dogs by 3–4 years old.	Completion of physical and social maturation until the last 25% of estimated lifespan (breed and size dependent).[b]	The last 25% of estimated lifespan through to the end of life. [b]	For **cats and dogs**, the initiation and duration of this period is variable and dependent on specific pathologies.

a Note that age designations are influenced by many factors and are not absolutes.

b The onset of ageing is heavily influenced by a variety of factors, including size and breed, therefore precise age delineations are not proposed by Creevy et al. (2019) for mature adult and senior dogs.

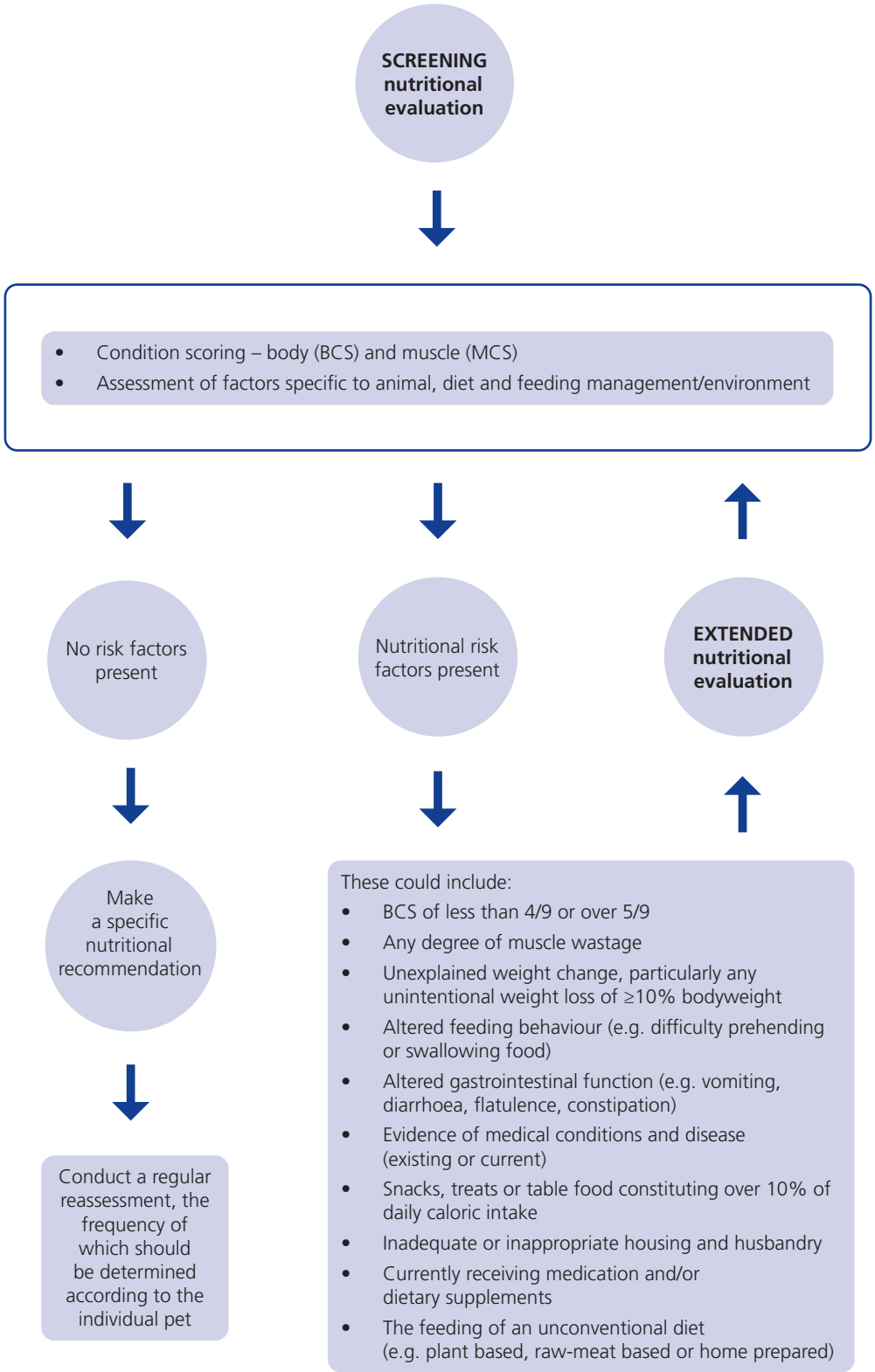


Figure 1. The nutritional assessment process using the WSAVA Nutritional Assessment Guidelines for Dogs and Cats (modified from Freeman et al., 2011 and reproduced from Lumbis & Rinkinen, 2022).

The life-stage nutrition concept recognises the need for dietary adjustment as pets age (FEDIAF, 2021). Feeding below or above an optimal nutrient range can have a negative effect on biological performance, health and life expectancy (Pet Nutrition Alliance, 2017). Therefore, a diet should maintain a lean body condition and meet the individual needs of the animal – taking into consideration the species, age and physiological status, and the reduction in disease-risk factors. A one-size-fits-all approach is not appropriate, and diets labelled 'for all life stages' are formulated for reproduction and growth.

Continued expansion of the pet food market may prohibit thorough knowledge of every available diet, but the veterinary healthcare team should at least be able to provide advice on basic and life-stage nutritional requirements.

Nutritional assessment

Regardless of age and life stage, a nutritional assessment should be conducted on every dog and cat at every visit to the veterinary practice and is something in which pet owners should be actively involved.

In 2011, the World Small Animal Veterinary Association (WSAVA) Global Nutrition Committee launched Nutritional Assessment Guidelines for Dogs and Cats to help the veterinary healthcare team and pet owners ensure that dogs and cats receive optimal nutrition tailored to their needs (Freeman et al., 2011). These guidelines provide a framework for the veterinary healthcare team to assist them in making a nutritional assessment, and specific nutritional recommendations, for every patient at every visit **(Figure 1)**.

An initial screening evaluation involves the review and evaluation of animal-specific factors, diet-specific factors, feeding management and environmental factors. If any nutrition-related risk factors are identified, a follow-up extended evaluation must be conducted, a framework for which is published online (AAHA, 2010). Life stage may influence the approach taken to conducting a nutritional assessment of a dog or cat, with specific considerations for each stage outlined by the American Animal Hospital Association (AAHA, 2021a; AAHA, 2021b).

While awareness of the concept of nutritional assessment is apparent, consistent implementation of this in practice is lacking (Lumbis & De Scally, 2020). The veterinary consultation is identified as a primary contact point for nutritional discussion with a client (Lumbis & de Scally, 2020), yet nutrition is not discussed at most veterinary appointments (Bergler et al., 2016; Morgan et al., 2017). A reported 57–90% of pet owners believe a nutritional recommendation from the veterinary healthcare team to be important, but only 15–23% perceive they have received one (AAHA, 2003; Flocke et al., 2013). Teaching owners how to assess their pet's body condition and muscle condition accurately and objectively, alongside other important factors, is crucial to the early detection of secondary health conditions in all life stages.

A consistent and detailed approach, involving all members of the veterinary healthcare team, is fundamental to effective nutritional assessment and the provision of dietary recommendations and protocols. Identification, training and utilisation of a nutrition "champion" can further promote the inclusion of nutrition as a standard component of patient care, and help reinforce good nutritional practice throughout the veterinary clinic (Creevy et al., 2019). A wide range of non-branded practical aids have been developed by the WSAVA for the veterinary healthcare team, to help address nutrition at every patient visit and make nutritional assessment and recommendations more efficient. Non-branded educational materials are also available for pet owners (WSAVA, 2021). Diet choice should maximise longevity and quality of life, and contain the recommended nutrient levels for the life stage and lifestyle of the pet.

Feeding during adulthood

The adult life stage begins once animals have reached maturity. For cats and small- to medium-sized dogs, this is generally around 12 months of age, but can be from 18 to 24 months in large and giant breeds of dog. Cats and dogs should be fed a complete and nutritionally formulated diet that will meet the appropriate nutritional requirements for adult life stage and individual lifestyle, and also maintain a lean body condition. The latter has proven benefits in dogs, including improved longevity and quality of life (Kealy et al., 2002; Salt et al., 2019) and is surmised to have similar health benefits in cats (Fascetti & Delaney, 2012).

Routine supplementation is not required, and treats should be limited to less than 10% of daily calorific intake (Freeman et al., 2011). The breed and size of pet should be evaluated for targeted and precise nutrition, along with the identification of an optimal weight range, body condition and muscle condition (Creevy et al., 2019). Obesity is an inflammatory condition resulting in oxidative stress and secondary health conditions, the prevalence of which is rising at an alarming rate. Each unit increase above ideal (a score of 5) on a 9-point body condition score (BCS) equates to 10–15% excess bodyweight. Therefore, regardless of age, a weight-loss programme should be instigated in animals with a BCS over 5. Similarly, animals with a below-ideal BCS, and those with an unintentional weight loss of 10% or more, should be investigated as a priority.

Where appropriate, adult maintenance diets formulated for neutered animals, the prevention of weight gain, and canine work and performance should be recommended. Providing ongoing advice to owners regarding enrichment, play and exercise is also key (Quimby et al., 2021). Species-specific key nutritional factors and energy requirements of adult cats and dogs can be found, respectively, in **Table 2** and **Table 3** (overleaf). Predictions of energy requirements that consider husbandry, neuter status and, possibly, activity level may be more accurate than those based on bodyweight and age alone (Bermingham et al., 2010; Bermingham et al., 2014).

Table 2. Key nutritional factors of young healthy adult cats and dogs (FEDIAF, 2021). Unless otherwise stated, minimum recommended nutrient levels are provided, with units expressed per 100 g dry matter. MER, Maintenance energy requirement.

Key nutritional factor	Cats		Dogs	
Based on a MER of:	**75 kcal/kg$^{0.67}$**	**100 kcal/kg$^{0.67}$**	**95 kcal/kg$^{0.75}$**	**110 kcal/kg$^{0.75}$**
Water	Animals should have unlimited access to clean, fresh water. The daily fluid requirement can be calculated using one of the following formulas: 50–60 ml/kg/day or 1–2 ml/kg/hour.			
Protein	33.3 g	25 g	21 g	18 g
Fat	9.0 g	9.0 g	5.5 g	5.5 g
Calcium (Ca)	0.53 g	0.40 g	0.58 g	0.5 g
Phosphorus (P)	0.35 g	0.26 g	0.46 g	0.4 g
Ca:P ratio	1:1 (min)–2:1 (max)		1:1 (min)–2:1 (max)	
Potassium	0.80 g	0.60 g	0.58 g	0.50 g
Sodium	0.10 g	0.08 g	0.12 g	0.10 g
Chloride	0.15 g	0.11 g	0.17 g	0.15 g
Magnesium	0.05 g	0.04 g	0.08 g	0.07 g

Table 3. Daily energy requirement (DER) and maintenance energy requirement (MER) of healthy adult cats and dogs (FEDIAF, 2021). Recommendations may overestimate energy needs by 10–60% (National Research Council, 2006). These amounts should therefore be starting points, rather than absolute requirements, and must be modified for each animal, taking into account animal, dietary and environment-related factors. ME, Metabolisable energy.

Species	Neuter status and activity level	Average DER (kcal/kg BW$^{0.67}$)
Cats	Neutered and/or indoor cats	52–75
	Active cats in lean body condition	100
Dogs	Age (years)	Average MER (kcal ME/kg$^{0.75}$)
	1–2	130 (125–140)
	3–7	110 (95–130)
	>7	95 (80–120)
	Activity level	Average DER (kcal ME/kg$^{0.75}$)
	Obese-prone	≤90
	Low activity (<1 hour/day) (e.g. walking on the lead)	95
	Moderate activity (1–3 hours/day) (low-impact activity)	110
	Moderate activity (1–3 hours/day) (high-impact activity)	125
	High activity (3–6 hours/day) (working dogs, e.g. sheepdogs)	150–175
	High activity under extreme conditions (racing sled dogs 168 km/day in extreme, cold conditions)	860–1240
	Breed-specific differences	
	Great Danes	200 (200–250)
	Newfoundlands	105 (80–132)

Feeding for gestation and lactation

This life stage is considered to be the most physically challenging, with significant nutritional demand placed on the dam and offspring, both of which are in a positive energy and nitrogen balance (Fascetti & Delaney, 2012). A bitch or queen should be an ideal weight and body condition before breeding and fed an appropriate complete diet. Dietary intake should provide all necessary energy and nutrient requirements to support maintenance and milk production of the bitch or queen, in addition to the growth and development of puppies or kittens. Provided the diet is of good quality and is specifically formulated for the required species and life stage, routine supplementation is not required and can be detrimental to the dam and foetus.

Key nutritional factors of healthy cats and dogs during reproduction can be found in **Table 4**, with energy requirements for both species outlined in **Table 5** (overleaf). Immediately before and post parturition, food intake may reduce, but lactation is considered to be the most demanding life stage, prompting a rapid increase in food and energy requirements. Fresh food and water should be easily accessible **(Figure 2)**.

Figure 2. Lactation is the most physically demanding life-stage, requiring easily accessible fresh food and water. Photo courtesy of Harry Bardsley.

Cats

Energy intake increases shortly after conception, so queens should be fed a diet formulated for growth before breeding and this diet should be continued until weaning. Throughout gestation, energy requirements increase by an estimated 25–50% (Gross et al., 2010). A suitable diet will be energy-dense, highly digestible and palatable, and should be fed ad libitum (Fascetti & Delaney, 2012) with close monitoring of body condition. Following weaning, a diet suitable for the adult life stage should be reintroduced, feeding an appropriate quantity for maintenance energy requirements (MER) (Fascetti & Delaney, 2012).

Table 4. Key nutritional factors of healthy cats and dogs during reproduction (FEDIAF, 2021).
Unless otherwise stated, minimum recommended nutrient levels are provided, with units expressed per 100 g dry matter.

Key nutritional factor	Cats	Dogs
Water	Water requirements increase significantly during this life stage, particularly during lactation, so animals should have unlimited access to clean, fresh water. Some animals may be reluctant to leave the nest box in the post-partum period, so water should also be readily accessible. Requirements will vary according to maintenance needs, type of food (moist/dry) and milk production. The daily fluid requirement can be calculated using one of the following formulas: 50–60 ml/kg/day or 1–2 ml/kg/hour.	
Protein	30 g	25 g
Fat	9 g	8.5 g
Calcium (Ca)	1.0 g (min)	1.0 g (min)–1.6 g (max)
Phosphorus (P)	0.84 g	0.9 g
Ca:P ratio	1:1 (min)	1:1 (min)–1.6:1 (max)
Potassium	0.6 g	0.44 g
Sodium	0.16 g	0.22 g
Chloride	0.24 g	0.33 g
Magnesium	0.05 g	0.04 g

Table 5. Daily energy requirements of the healthy queen and bitch during gestation and lactation (FEDIAF, 2021). These should be used as guidelines rather than absolute requirements and must be modified according to each animal, taking into account body condition and weight.

	Life stage		Energy requirement
Cats	Gestation		140 kcal/kg $BW^{0.67}$
	Lactation (no. of kittens)	<3	100 kcal/kg $BW^{0.67}$ + 18 kcal × kg BW × L
		3–4	100 kcal/kg $BW^{0.67}$ + 60 kcal × kg BW × L
		>4	100 kcal/kg $BW^{0.67}$ + 70 kcal × kg BW × L
	L = 0.9 in weeks 1–2 of lactation; 1.2 in weeks 3–4; 1.1 in week 5; 1 in week 6; 0.8 in week 7.		
Dogs	Gestation	0–5 weeks	132 kcal/kg $BW^{0.75}$
		>5 weeks	132 kcal/kg $BW^{0.75}$ + 26 kcal/kg BW
	Lactation (no. of puppies)	1–4	145 kcal/kg $BW^{0.75}$ + 24 n × kg BW x L
		5–8	145 kcal/kg $BW^{0.75}$ + (96 + 12 n) × kg BW × L
	n = number of puppies; L = 0.75 in week 1 of lactation; 0.95 in week 2; 1.1 in week 3; 1.2 in week 4.		

Dogs

Canine gestation is an average of 63 days in length, split into three trimesters. Unlike queens, the energy requirements of bitches do not increase until the final trimester of gestation. A complete commercial diet designed specifically for canine adult life-stage should be fed during the first two trimesters to maintain optimum body condition. During the final trimester, calorie intake increases by 30–60%, depending on litter size, and can be met by switching to a complete commercial diet designed for canine growth. Large-breed growth diets are formulated to slow growth and prevent developmental orthopaedic disease, so contain limited fat and energy and controlled levels of calcium, making them unsuitable for feeding during pregnancy and lactation. Adequately fed bitches gain 15–25% more than their pre-breeding weight during gestation and 5–10% more during the post-partum period (Debraekeleer et al., 2010).

Conclusion

Appropriate feeding protocols and diet choice play a critical role in the care and clinical outcome of healthy and clinically affected companion animals. The veterinary healthcare team plays a fundamental role in providing optimal nutrition-related support and owner education, appropriate to the species, life stage and health status of pets. Life-stage nutrition tailors dietary requirements to optimise longevity, performance and health, and to prevent disease. A one-size-fits-all approach to the nutritional support of cats and dogs is not appropriate, and a nutritional assessment, with identification of any risk factors, is essential as part of wider regular health screening.

Part 2 of this article (in a future issue of *VNJ*) will review the appropriate species-specific nutritional adaptations required during growth and senior stages of life, and will consider how these can be met through dietary provision. It will also examine the vital role veterinary nurses play in educating pet owners about optimal nutrition and dietary choices.

Acknowledgements

Thanks to Dr Cecilia Villaverde Haro, BVSc, PhD, DACVN, DECVCN, and Dr Marge Chandler, DVM, MS, MANZCVS, DACVN, DACVIM, MRCVS, for their valued comments on this article.

REFERENCES

AAHA (2003) The path to high-quality care: practical tips for improving compliance. Lakewood, CO: AAHA.

AAHA (2010) Extended Nutrition Evaluations. Available from: https://www.aaha.org/globalassets/02-guidelines/nutritional-assessment/nutritionevaluationform.pdf [Accessed 29 May 2021].

AAHA (2021a) Nutrition and Weight Management. Available from: https://www.aaha.org/aaha-guidelines/life-stage-feline-2021/nutrition-and-weight-management/ [Accessed 4 June 2021].

AAHA (2021b) Life Stage Checklists. Available from: https://www.aaha.org/aaha-guidelines/life-stage-canine-2019/life-stage-checklist/ [Accessed 4 June 2021].

Bergler, R., Wechsung, S., Kienzle, E., Hoff, T. & Dobenecker, B. (2016) Ernährungsberatung in der Kleintierpraxis – ein Arbeitsfeld für spezialisierte Tierärzte [Nutrition consultation in small animal practice – a field for specialized veterinarians]. Tierärztliche Praxis Ausgabe K: Kleintiere/Heimtiere. 44 (1), 5–14. Available from: https://doi.org/10.15654/TPK-150154.

Bermingham, E., Thomas, D., Morris, P., & Hawthorne, A. (2010) Energy requirements of adult cats. British Journal of Nutrition. 103 (8), 1083–1093. Available from: https://doi.org:10.1017/S000711450999290X.

Bermingham, E. N., Thomas, D. G., Cave, N. J., Morris, P. J., Butterwick, R. F. & German, A.J. (2014) Energy requirements of adult dogs: a meta-analysis. PLoS ONE. 9 (10), e109681. Available from: https://doi.org/10.1371/journal.pone.0109681.

Bontempo, V. (2005) Nutrition and health of dogs and cats: evolution of petfood. Veterinary Research Communications. 29 (suppl 2), 45–50. Available from: https://doi.org/10.1007/s11259-005-0010-8.

Carlisle-Frank, P. & Frank, J. M. (2006) Owners, guardians, and owner-guardians: Differing relationships with pets. Anthrozoös. 19 (3), 225–242. Available from: http://dx.doi.org/10.2752/089279306785415574.

Cohen, S. P. (2002) Can pets function as family members? Western Journal of Nursing Research. 24 (6), 621– 638. Available from: https://doi.org/10.1177/019394502320555386.

Creevy, K. E., Grady, J., Little, S. E., Moore, G. E., Groetzinger Strickler, B., Thompson, S. & Webb, J. A. (2019) 2019 AAHA Canine Life Stage Guidelines. Journal of the American Animal Hospital Association. 55 (6), 267–290. Available from: https://doi.org/10.5326/JAAHA-MS-6999.

Debraekeleer, J., Gross, K. L. & Zicker, S. C. (2010) Feeding reproducing dogs. In Hand, M. S., Thatcher, C. D., Remillard, R. L., Roudebush, P. & Novotny B. J. (eds.). Small Animal Clinical Nutrition. Topeka, Mark Morris Institute, pp. 281–294.

Fascetti, A. J. & Delaney, S. J. (2012) Feeding the healthy dog and cat. In Delaney, A. J & Delaney, S. J. (eds.). Applied Veterinary Clinical Nutrition. Ames, Wiley-Blackwell, pp. 75–94.

FEDIAF (2017) FEDIAF Scientific Advisory Board Statement: Nutrition of senior dogs. Available from: https://fediaf.org/images/FEDIAF_SAB_Statement_Nutrition_of_Senior_Dogs_fin.pdf [Accessed 9 June 2021].

FEDIAF (2021) Nutritional Guidelines For Complete and Complementary Pet Food for Cats and Dogs. Available from: https://fediaf.org/self-regulation/nutrition.html#guidelines [Accessed 30 October 2021].

Flocke, A., Thiemeyera, H. & Kiefer-Hecker, B. (2013) Dog and cat nutrition practices of owners visiting veterinary clinics. Proceedings of the 17th Congress of the European Society of Veterinary and Comparative Nutrition,19–21 September 2013, Ghent, Belgium.

Freeman, L., Becvarova, I., Cave, N., MacKay, C., Nguyen, P., Rama, B., Takashima, G., Tiffin, R., Tsjimoto, H. & van Beukelen, P. (2011) WSAVA Nutritional Assessment Guidelines. Journal of Small Animal Practice. 52 (7), 385–396.

Gross, K. L., Becvarova, I. & Debraekeleer, J. (2010) Feeding reproducing cats. In Hand, M. S., Thatcher, C. D., Remillard, R. L., Roudebush, P. & Novotny B. J. (eds.). Small Animal Clinical Nutrition.). Topeka, Mark Morris Institute, pp. 401–413.

Harvey, N. D. (2021) How Old Is My Dog? Identification of rational age groupings in pet dogs based upon normative age-linked processes. Frontiers in Veterinary Science. 8, 643085. Available from: https://doi.org/10.3389/fvets.2021.643085.

Kealy, R. D., Lawler, D. F., Ballam, J. M., Mantz, S. L., Biery, D.N., Greeley, E. H., Lust, G., Segre, M., Smith, G. K. & Stowe, H. D. (2002) Effects of diet restriction on life span and age-related changes in dogs. Journal of American Veterinary Medical Association. 220 (9), 1315–1320. Available from: https://doi.org/10.2460/javma.2002.220.1315.

Lumbis, R. H. & De Scally, M. (2020) Knowledge, attitudes and application of nutrition assessments by the veterinary health care team in small animal practice. Journal of Small Animal Practice. 61 (8), 494–503. Available from: https://doi.org/10.1111/jsap.13182.

Lumbis, R.H. & Rinkinen, M. (2022) Veterinary nutritional assessment: the importance of an interprofessional approach. The Veterinary Nurse. 13 (5), 2–7.

Morgan, S. K., Willis, S. & Shepherd, M. L. (2017) Survey of owner motivations and veterinary input of owners feeding diets containing raw animal products. PeerJ. 5, e3031. Available from: https://doi.org/10.7717/peerj.3031.

National Research Council. (2006) Energy In Nutrient Requirements of Dogs and Cats. Washington, DC, National Academies Press, pp. 28–48.

Pet Nutrition Alliance. (2017) LifeStage Nutrition. Available from: http://petnutritionalliance.org/site/wp-content/uploads/2017/05/Life-Stage-Nutrition.pdf [Accessed 5 June 2021].

Pet Food Manufacturers Association (PFMA) (2021) Statistics. Available from: https://www.pfma.org.uk/statistics [Accessed 26 May 2021].

Quimby, J., Gowland, S., Carney, H.C., DePorter, T., Plummer, P. & Westropp, J. (2021) 2021 AAHA/AAFP Feline Life Stage Guidelines. Journal of the American Animal Hospital Association. 57 (2), 51–72. Available from: https://doi.org/10.5326/JAAHA-MS-7189.

Salt, C., Morris, P. J., Wilson, D., Lund, E. M. & German, A. J. (2019) Association between life span and body condition in neutered client-owned dogs. Journal of Veterinary Internal Medicine, 33 (1), 89–99. Available from: https://doi.org/10.1111/jvim.15367.

Schleicher, M., Cash, S. B., Freeman, L. M. (2019) Determinants of pet food purchasing decisions. Canadian Veterinary Journal. 60 (6), 644–650.

WSAVA (2021) Global Nutrition Toolkit. Available from: https://wsava.org/wp-content/uploads/2021/04/WSAVA-Global-Nutrition-Toolkit-English.pdf [Accessed 6 May 2021].

Multiple-choice questions

1. What is the correct order of the five vital assessments?

a. Nutrition, temperature, respiration, pulse, pain
b. Pain, nutrition, pulse, respiration, temperature
c. Temperature, pulse, respiration, pain, nutrition
d. Respiration, pulse, temperature, nutrition, pain
e. Pulse, temperature, respiration, pain, nutrition

2. Which life stage is considered to be the most physically challenging?

a. Growth
b. Young adult
c. Mature adult
d. Lactation
e. Senior

3. Which of the following is the recommended daily energy requirement of a healthy queen during gestation?

a. 75 kcal/kg $BW^{0.75}$
b. 100 kcal/kg $BW^{0.67}$
c. 132 kcal/kg $BW^{0.75}$
d. 140 kcal/kg $BW^{0.67}$
e. 145 kcal/kg $BW^{0.75}$

4. Large-breed growth diets contain:

a. Limited fat, moderate energy, controlled levels of calcium
b. Moderate fat, controlled levels of energy, limited calcium
c. Limited fat and energy and controlled levels of calcium
d. Controlled fat and moderate levels of energy and calcium
e. Moderate fat and energy and limited levels of calcium

5. The recommended Ca:P ratio for a healthy adult dog or cat is:

a. 1:1
b. 1:1–1.6:1
c. 1:1–1.8:1
d. 1:1–2:1
e. 2:1

Answers: 1. c 2. d 3. d 4. c 5. d

Reflective professional development notes. To access hyperlinks to the references, scan the QR code on page 3.

Oral care and the reduction of periodontal disease in companion animals

Kelly Huitson, RVN, BSc (Hons)

Kelly achieved a BSc (Hons) in Animal Behaviour and Welfare degree before qualifying as an RVN in 2017. She has since worked in first opinion, emergency and referral practices, and has recently completed the BVNA Oral Care Nurse Certificate. Kelly loves the variety and scope involved in being an RVN. She has a wide range of clinical interests, including wildlife, exotics, analgesia and dental. In her spare time Kelly volunteers for the BDMLR, pampers her three cats and goes on countryside walks with her two dogs.

ABSTRACT By the age of 2 years, it is estimated that 80% of dogs have periodontal disease (Stott, 2019), as do 70% of cats over 3 years old (Ackerman, 2020; Cullen, 2011) and 80% of older cats (Milella, 2012). Early treatment of periodontal disease can prevent the complications of systemic disease, infection and malnutrition (Stott, 2019). Heart, liver, kidney and respiratory health can all be compromised by periodontal disease (Milella, 2012) and early intervention is deemed the only way to prevent periodontal disease from progressing.

Keywords oral, dental, periodontitis, gingivitis, teeth, tooth

Periodontal disease

Periodontal disease is a group of inflammatory diseases and can be divided into two stages: gingivitis and periodontitis. Gingivitis is the inflammation of the gingiva caused by bacteria, and can be reversed by good oral care at home, whereas periodontitis is irreversible and causes tooth mobility and attachment loss (Stott, 2019).

Plaque is a microbial community within a matrix of polymers of bacterial and salivary origin (Milella, 2012) which can build up on a clean tooth within hours and cause gingivitis within 48 hours (Milella, 2020a). Plaque is soft and not always obvious on the tooth surface, whereas calculus is mineralised plaque that can only be removed by scaling the teeth (Milella, 2009). This rough deposit encourages the proliferation of further plaque and bacteria (Fletcher, 2015).

Halitosis, hypersalivation, anorexia and alterations in behaviour are the most common signs of periodontitis that are noticed by owners (Stott, 2019). On closer assessment, changes in gingival colour, gingival bleeding, periodontal abscesses, gingival recession, tooth mobility and pathological fractures can often be seen (Stott, 2019). Dental radiography can be used to give a more complete understanding of the extent of the periodontal disease, particularly vital in the case of tooth or jaw fractures, severe periodontal disease, resorptive lesions, missing teeth and oral swellings (Milella, 2011).

It should be noted that some suggestions have been made on the method of scaling and the effectiveness of polishing teeth. Fletcher (2015) discusses these studies and concludes that manual scaling is less efficient than ultrasonic scaling, while different ultrasonic scaler techniques can cause damage to the enamel surface, particularly if contact time is over 5 seconds or the tip is used instead of the flat surface. In addition, the same study concluded that polishing with a soft prophy cup after scaling increases the calculus removal and does not increase enamel damage when combined with a fine prophylaxis paste.

Dogs

The breeds deemed most at risk include toy and small dog breeds (Stott, 2019), border terriers (Summers et al., 2019), toy poodles, King Charles spaniels, greyhounds and brachycephalic breeds (Westgate, 2021; Woodmansey, 2019). Maltese terriers and those with dental disease in their familial groups are also more at risk (Partridge, 2018). Non-congenital dental diseases requiring veterinary intervention can include trauma such as fractures, discoloration and erosion through chewing hard materials.

A fractured crown with pulp exposure will catch a dental explorer probe, as opposed to abrasion in the case of slow long-term wear, where abraded teeth will have brown tertiary dentine present and a smooth surface. If the pulp is exposed, the tooth must always be presumed to be painful and requires extraction or root-canal treatment (Milella, 2020a). As 93% of discoloured teeth contain necrotic pulp, extraction or root canal treatment is always recommended (Milella, 2020a).

Cats

Maine coon and oriental breed cats can be particularly susceptible to periodontal disease (Milella, 2012). Cats of any breed that are over 4 years old are at risk of feline odontoclastic resorptive lesions (FORLs), with as many as 29% of all cats found to have them (Milella, 2020b). These require a radiographic assessment to determine the level of root resorption to reduce the amount of iatrogenic damage the veterinary surgeon may cause searching for non-existent root remnants during extractions (Bloor, 2006). FORLs are classified as Type 1 or Type 2. Type 1 FORLs present with significant inflammation at the gingival margin and have lesions at the neck of the tooth. The root remains unchanged radiographically, while the neck and crown are radiolucent, with some resorption at the furcation and alveolar bone. Type 2 FORLs present with very little gingivitis, sometimes with discoloration of the crown, and the radiography shows lamina, root structure and periodontal ligament loss, with the root density equal to that of the surrounding bone (Milella, 2020b). Removal of teeth affected by either of these lesions is recommended as this is a progressive and painful condition. Type 1 FORLs require the removal of the whole tooth including the root, whereas in the case of Type 2 FORLs without endodontic disease or periodontitis, crown amputation is acceptable (Milella, 2020b).

Feline chronic gingivostomatitis is an excessive inflammatory response to the presence of plaque and often extends beyond the mucogingival junction into the tissues of the entirety of the oral cavity. In these cases, full-mouth extractions are recommended (Milella, 2020b).

Rabbits

Dental disease in rabbits can be congenital or acquired (Druce, 2015). Rabbit breeds predisposed to congenital dental malocclusion, a precursor of dental disease in rabbits, include the lionhead and Netherland dwarf breeds, as well as other similarly short-faced breeds (HPC, 2021; PDSA, 2021; RWAF, 2021; VCA, 2021).

Acquired dental disease, including malocclusion, causes teeth to be worn insufficiently or unevenly and is a progressive condition (Lord, 2012; Druce, 2015). Reduced appetite, bruxism (teeth grinding), salivation, hair loss on the face, epiphora (excessive tear production), weight loss, gut stasis, nasal discharge, reduced coat condition, abscesses and reduced faecal output are all indicators of rabbit dental disease (Druce, 2015; Lord, 2012). Diet, genetics, trauma and infection are all causative factors in rabbit dental disease (Lord, 2012). The duration of time spent grazing and the abrasiveness of the diet are all factors in the sufficient wearing of healthy rabbit teeth. Offering a diet composed of 80% high-quality grazing of grass or hay (Speight, 2017), small volumes of commercial pellets and some fresh leafy green vegetables increases the time spent on chewing in a natural, figure-of-eight motion, wearing down teeth in a more uniform fashion (Druce, 2015). Avoiding muesli diets limits the animal's ability to selectively feed (Lord, 2012). For rabbits unaccustomed to hay or reluctant to eat it in large volumes, a variety of hay types and methods should be offered. Rye, timothy, fescue, cocksfoot and meadow grass are all suitable for adult rabbits, and hay can be offered in large trays for foraging, in raised racks, bowls or containers, or stuffed into tubes to provide enrichment and interest (Speight, 2017).

A dental handpiece and burr should be used where rabbit incisor length requires reducing. In congenital dental disease, removal of the incisors may be recommended by the veterinary surgeon (Druce, 2015). Cheek teeth and spurs can be burred to restore normal occlusion surfaces where dietary management alone is insufficient, although owners must always be made aware that this is a long-term condition which is likely to reoccur, depending on the causing factors and changes implemented in the rabbit's routine (Druce, 2015).

Nutrition

Nutrition and oral hygiene modifications can help reduce the risk from periodontal disease in all pets (Stott, 2019). While food sources alone cannot prevent periodontal disease, dry food is considered the best nutritional option for preventing periodontal disease in dogs and cats, with entirely dry-fed dogs having a 22% chance of developing periodontal disease. Mixing wet and dry food increases this chance to 30%, and home-prepared meals increase the risk yet further to 41% (Stott, 2019). Similar results have been proven in cats fed a specific dental diet (Milella, 2012), however, the nutritional status and requirement for the pet as a whole must always be considered, as dry diets can be detrimental to those with poor renal, urinary or gastrointestinal concerns (Stott, 2019).

The popularity of raw diets has grown in recent years, and while the debate about their suitability for pets is a cause of contention in many veterinary practices, it should be acknowledged that feeding bones can decrease cosmetic tartar evident on pets' teeth. However, it does not reduce periodontitis or plaque, and it can increase the incidence of fractures, as well as the associated risk to the rest of the gastrointestinal tract (Chandler, 2018; Davies, Lawes & Wales, 2019; Freeman et al., 2013) – although there is some debate on the prevalence of obstruction or perforation in raw versus cooked bones (Freeman et al., 2013). The Raw Feeding Veterinary Society (2021) promotes the chewing of 'appropriately sized' raw bones, never cooked or large limb bones, and agrees that more research should be undertaken to quantify the risk-benefit in this discussion.

Oral care at home

Following professional intervention, an absence of appropriately diligent home care will result in the return of periodontal disease and gingivitis scores within 3 months (Stott, 2019). This home care can take the form of both mechanical and chemical plaque-removal techniques. While only 2% of dog owners comply with regular toothbrushing, this is considered the best method for preventing periodontal disease (Cullen, 2011; Stott, 2019) when completed at least 3 days per week (Robinson, 2019). In cats, it was found that no owners who began toothbrushing continued past 6 months (Milella, 2012).

Toothbrushing should be introduced slowly to habituate the patient to the process. Initially, begin with head restraint and examination of the buccal (outer) teeth surfaces (Ackerman, 2020), then advance to placing a small amount of pet-appropriate toothpaste on a canine tooth or inner cheek. Once the pet readily accepts this, the toothpaste can be gently massaged on to the buccal teeth and gums. When this routine has been established, the toothpaste can be applied to a brush and this introduced to the back teeth initially, working forward towards the incisors (Milella, 2009). Active toothbrushing in young animals should only be commenced once all the adult teeth have erupted, although animals should be encouraged to allow oral examination from a young age (Milella, 2009). Teeth should be brushed at a 45° angle to the gingiva, with medium-bristle toothbrushes. While human toothpaste is contraindicated due to the presence of fluoride (Stott, 2019), enzymatic and chlorhexidine-based toothpastes are shown to have the highest effectiveness at reducing plaque build-up (Ackerman, 2020). Finger brushes are deemed inappropriate due to their inability to actively clean the subgingiva (Ackerman, 2020).

Owners should always be made aware of the risks of animals showing aggression due to pain or fear during toothbrushing, and a demonstration in the consult can primarily assess how the patient is likely to tolerate the procedure, as well as demonstrating safe practice (Ackerman, 2020).

If toothbrushing is not possible, oral spray and gel containing cetylpyridinium chloride can effectively reduce calculus, halitosis and plaque occurrence, but can cause mucosal irritation and tooth staining in the long term (Stott, 2019). Chlorhexidine gel and mouthwash at 0.12% concentration prevent and reduce plaque build-up and gingivitis, and can remain active in the oral mucosa for 12 hours (Milella, 2012). Water additives are less effective than either toothbrushing, gels or sprays as the product's contact is not ensured on the tooth surface (Cullen, 2011) and their tolerance by the patient can be varied.

A list of approved dental products from the Veterinary Oral Health Council (VOHC) gives reliable accreditation to the oral-care products available, including toothpaste, oral gel, spray and water additives, dental chews and treats, and dental diets. The VOHC also explains whether plaque or tartar is prevented and whether products must be purchased from a veterinary clinic (VOHC, 2021).

Dental chews claim to reduce the requirement for veterinary treatment of dental disease, mainly by the abrasive action they have against the tooth surface. In dogs, they have been shown to reduce halitosis by 45%, plaque by 32% and calculus by 60% (Stott, 2019). This varies according to the structure and composition of the chew, as well as the length of time and mechanical action the pet chews with.

Some chews, such as the Pedigree Dentastix daily oral care chew and Dentastix Advanced chew, contain ingredients designed to slow the mineralisation of plaque to tartar, giving owners more opportunity to brush the teeth before mineralisation occurs (Milella, 2020a). Greenies are designed specifically according to breed size, and may last even longer (Milella, 2020a). For cats, Dentabites have been specifically designed to cause abrasion on the tooth surface, rather than shatter when chewed, by having a lower density (Milella, 2020b).

Conclusion

Early assessment of young pets can be undertaken in nursing clinics to make owners aware of congenital defects which may affect the animal's dentition, as well as to promote good standards of oral health (Baxter, 2007). Using a model to demonstrate to owners how to brush teeth, explaining the effects of poor oral hygiene and providing them with written information to take home helps improve their compliance (Barnes, 1994).

It is important to discuss the safety and effectiveness of dental chews, rawhide and biscuits (Jevring, 1994) with visual displays for the owners during regular nursing consults (Bowden, 1996). After dental treatment has been conducted, nursing recall appointments will demonstrate the team's commitment to their pets' health (Bloor, 2009) and could potentially improve client compliance.

REFERENCES

Ackerman, N. (2020) Dental nurse clinics – brushing up on your knowledge. Vet Times. 20 (9), 6–7.

Barnes, J. (1994) Career File 12: Veterinary Dental Nurse. Veterinary Nursing Journal. 9 (2), 61–62.

Baxter, C. J. K. (2007) The dental clinic. Veterinary Nursing Journal. 22 (7), 17–18.

Bloor, C. (2006) Intra-oral radiography. Veterinary Nursing Journal. 21 (4), 13–16.

Bloor, C. (2009) Oral homecare – the role of the VN. Veterinary Nursing Journal. 24 (8), 17–19.

Bowden, C. (1996) Encouraging good dental practice. Veterinary Nursing Journal. 11 (4), 120–122.

Chandler, M. (2018) Raw food diets: what, why and why not? Available from: https://www.vettimes.co.uk/article/raw-food-diets-what-why-and-why-not/ [Accessed 3 September 2021].

Cullen, E. (2011) VN's role in dentistry and dermatology. Veterinary Nursing Journal. 26 (1), 30–31.

Davies, R. H., Lawes, J. R. & Wales, A. D. (2019) Raw diets for dogs and cats: a review, with particular reference to microbiological hazards. Journal of Small Animal Practice. 60 (6), 329–339.

Druce, K. (2015) Dental disease in rabbits – malocclusion. Veterinary Nursing Journal. 30 (11), 309–311.

Fletcher, S. (2015) Evidence-based veterinary medicine: Should we be polishing teeth? Veterinary Nursing Journal. 30 (11), 312–315.

Freeman, L. M., Chandler, M. J. & Hamper, B.A. (2013) Current knowledge about the risks and benefits of raw-meat-based diets for dogs and cats. Journal of the American Veterinary Medical Association. 243 (11),1549–1558.

HPC (2021) Dental problems to look out for in your rabbit's teeth. Available from: https://www.thehealthypetclub.co.uk/dental-problems-in-rabbits/ [Accessed 22 November 2021].

Jevring, C. (1994) The task of a toothbrush. Veterinary Nursing Journal. 9 (1), 13–14.

Lord, B. (2012) Management of dental disease in rabbits. Veterinary Nursing Journal. 27 (1), 18–20.

Milella, L. (2009) Tooth brushing – is it worth the effort? Veterinary Nursing Journal. 24 (8), 21–24.

Milella, L. (2011) Dental radiography. Veterinary Nursing Journal. 26 (11), 395–398.

Milella, L. (2012) Prophylactic dental care in cats. Veterinary Nursing Journal. 27 (1), 14–16.

Milella, L. (2020a) Understanding the need for dental treatment in dogs. Available from: https://www.vettimes.co.uk/article/understanding-the-need-for-dental-treatment-in-dogs/ [Accessed 3 September 2021].

Milella, L. (2020b) Understanding the need for dental treatment in cats. Available from: https://www.vettimes.co.uk/article/understanding-the-need-for-dental-treatment-in-cats/ [Accessed 3 September 2021].

Partridge, B. (2018) Small animal dental disease: Part 1. Available from: https://www.vettimes.co.uk/article/small-animal-dental-disease-part-1/ [Accessed 3 September 2021].

PDSA (2021) Dental problems in rabbits. Available from: https://www.pdsa.org.uk/pet-help-and-advice/pet-health-hub/symptoms/dental-problems-in-rabbits [Accessed 22 November 2021].

Raw Feeding Veterinary Society (2021) RFVS Position statement 1.0: Benefits, Bugs, Balance and Bones. Available from: https://rfvs.info/rfvs-position-statement-2021/ [Accessed 3 September 2021].

Robinson, A. (2019) Toothache? How to get your teeth into dentals. Available from: https://www.vettimes.co.uk/article/toothache-how-to-get-your-teeth-into-dentals/ [Accessed 3 September 2021].

RWAF (2021) Rabbit dental problems. Available from: https://rabbitwelfare.co.uk/rabbit-health/illness/dental-problems/ [Accessed 22 November 2021].

Speight (2017) The nutritional needs of rabbits. VNJ. 32 (5),144–147.

Stott, L. (2019) What is the VN role in preventing dental disease in dogs and why is this so important? Veterinary Nursing Journal. 34 (5), 131–134.

Summers, J. F., O'Neill, D. G., Church, D. et al. (2019) Health-related welfare prioritisation of canine disorders using electronic health records in primary care practice in the UK. BMC Veterinary Research. 15, 163.

VCA (2021) Dental disease in rabbits. Available from: https://vcahospitals.com/know-your-pet/dental-disease-in-rabbits [Accessed 22 November 21].

VOHC (2021) Accepted Products. Available from: http://www.vohc.org/all_accepted_products.html [Accessed 3 September 2021].

Westgate, J. (2021) Study digs teeth into canine dental disease. Available from: https://www.vettimes.co.uk/news/study-digs-teeth-into-canine-dental-disease/ [Accessed 3 September 2021].

Woodmansey, D. (2019) Dental disease a major factor in two canine health studies. Available from: https://www.vettimes.co.uk/news/dental-disease-a-major-factor-in-two-canine-health-studies/ [Accessed 3 September 2021].

Reflective professional development notes. To access hyperlinks to the references, scan the QR code on page 3.

Author's dog, Eddie. Photo: Nicki Fox

The sugar drop

Breeders of toy dogs claim giving honey to puppies helps prevent juvenile hypoglycaemia – is this a fact or a myth?

Nicki Fox, CertVNECC, APVN (Wildlife), RVN

Fox RVN Locum Limited

Nicki qualified as an RVN in 2018 while at a practice in Surrey. She was a mature student, having previously worked in the financial industry for over 12 years. Once qualified, Nicki left permanent employment and took a leap into the locum world. She has now been a locum for a number of years, working in general practice and referrals. Nicki's passion for tiny dogs, birds and wildlife flourishes at her countryside home, where she has five dogs, a cat, three horses and five chickens.

ABSTRACT The professional relationship between breeder and veterinary team has always been complex and often misunderstood. This article details the personal insights of a veterinary nurse's direct experience with reputable licensed chihuahua breeders and their approach to juvenile hypoglycaemia in their toy-breed puppies. The article challenges whether what breeders call 'sugar drop prevention' is in fact a myth or whether there are benefits to giving honey daily to puppies under 12 weeks of age. With toy breeds being bred smaller and smaller, should we, as veterinary professionals, be doing more in practice to identify and support puppies with juvenile hypoglycaemia, and can early intervention make a difference?

Keywords small breed, honey, sugar drop, hypoglycaemia

In the past, my pet dogs have always been rescued rather than sourced from breeders. However, in 2018, I decided to purchase a dog from a reputable licensed breeder. There were many reasons for this but, chiefly, having always taken on dogs with pre-existing issues (mainly rescued from work as a result of my inability to say 'no'), I wanted a dog with a clean slate to add to my family unit.

Having already visited the breeder, I collected my little fluffball when he was 10 weeks of age, and named him Eddie. The breeder was highly professional, knowledgeable and a genuinely caring individual. Once I had been through all the necessary paperwork and was about to depart with Eddie, the breeder handed me a gift bag full of toys, treats and puppy information. She also gave me a jar of honey and recommended giving half a teaspoon to the puppy each day.

Naturally, as a veterinary professional, I was almost quick to discard this instruction. Why would anyone think this necessary? Surely if my puppy was healthy, no intervention should be required? But it got me thinking about whether there was any logic behind her recommendation. Having spoken to a few breeders, I am told that 'sugar drop support' is common and seen as effective. Having a curious mind, I asked some colleagues and embarked on my own research.

What we already know

We know that low blood sugar can be a big problem in puppies, particularly in toy breeds, regardless of whether they appear completely healthy (Lewis & Reineke, 2020). This is due to under-developed storage of energy and immature liver function needed to maintain sufficient levels of blood glucose (BG) in the event of stress and starvation. Toy breeds are even more susceptible to hypoglycaemia due to their higher metabolic rates and higher energy requirement per unit of body mass, in comparison to larger breeds (Metropolitan Veterinary Associates, 2021).

Due to their tiny size, they are also more susceptible to hypothermia, which can also lead to hypoglycaemia, due to lack of food intake and gut motility (Schermerhorn, 2020). Hypoglycaemia also occurs as a result of an infestation with intestinal parasites, which can alter normal digestive motility (Purina, 2021). The clinical signs include lethargy, weakness, altered mentation, poor appetite, tremors, twitching, seizures and eventually becoming comatose (Lewis & Reineke, 2020).

When an animal is presented to the clinic with a BG of <60 mg/dl or 3.3 mmol/l with supportive clinical signs, they are usually treated with intravenous dextrose (Idowu & Heading, 2018). As with any medication or supplement, careful consideration should be given to the potential risks or contraindications – see **Table 1**.

Table 1. Considerations and contraindications of feeding honey to canines.

Considerations/contraindications	Comments
Tooth decay	Will only occur if given in large amounts, well into adult life.
Obesity	Will only occur if given in large amounts, well into adult life.
Botulism spores	Some literature states that raw honey should not be given to puppies with compromised immune systems as it may contain botulism spores. Botulism is rare but is extremely dangerous (Galban & Vite, 2018).
Diarrhoea and vomiting	Under-developed immune and digestive systems can be sensitive. Honey given in large amounts causes indiscretions.
Bee allergies	Rare.
Other underlying causes	May be secondary to another underlying condition, i.e. Addison's disease, insulin-producing tumours, liver disease or diseases that affect glycogen storage (Purina, 2021).

How would the average person know whether intervention is required or whether their puppy is just sleepy? How can we educate owners on what is normal for their puppy, and when they should seek veterinary help? Honey is good for infected wounds as it has antimicrobial and antifungal properties. It is also used to reduce the symptoms of allergies as it can aid in the reduction of inflammation (Burke, 2017). So should we encourage owners with tiny breeds to keep honey at home in case of emergency?

What breeders say

Most of the breeders I have spoken to recommend honey during the early stages of development. Some breeders wean their puppies later, at 5–6 weeks if the mother is happy to continue, and move them on to a dry complete food once they are a little bigger.

The breeders explained that they monitor their puppies' energy levels closely, detailing how much they have eaten and at what time, and also noting times of activity and sleep. Breeders will feed small, regular meals throughout the day and find that moments of hypoglycaemia are typically seen first thing in the morning when the animal has been without food all night. The breeder will then give a small amount of shop-bought honey, orally. The honey provides a potent input of energy, faster than a normal meal could provide. Improved mentation has been seen within 5 minutes of administration.

I am also told that hypoglycaemia has commonly been seen in puppies that have recently been taken away from their mother and placed in a new home. This could be caused by stress. This is the reason for the breeder giving the new owner a jar of honey and a care sheet on collection day.

Figure 2. Hand-reared puppy.

Breeders give half a teaspoon either once daily, or as and when they feel it is required. One breeder stated that she only gives honey when one or more clinical signs are apparent **(Figure 1)**. She also uses the honey sparingly, as she has noted that diarrhoea has occurred post-administration.

Clinical signs of hypoglycaemia
Lethargy
Weakness in limbs and head carriage
Altered mentation
Poor appetite
Tremors
Twitching
Seizures
Collapse

Figure 1. Possible clinical signs identified by a breeder.

According to one breeder, most of the puppies requiring hand rearing **(Figure 2)** needed honey supplementation at some point during their time with them. When I questioned this, I was told it is common for the mother to reject weaker pups to focus on the stronger ones – a simple but sad truth in nature, where the mother diverts her resources (warmth and milk) when she senses a puppy may be too weak to survive. The rejected pup is commonly smaller than normal, requires extra close attention and would be more susceptible to hypoglycaemia than the average toy-breed puppy.

When I investigated this further, it made sense that hypoglycaemia would prove more frequent, as hand-reared puppies are highly vulnerable to infection and are more susceptible to diarrhoea and constipation (PDSA, 2021). Toy-breed puppies are already at higher risk of hypoglycaemia and hand rearing will push those boundaries further, without the natural care of the mother.

Shop-bought honey is often too thick for puppies to ingest, so breeders will add water, give smaller amounts, or simply add it to the drinking water.

Feedback suggests that the use of honey at home has saved many puppies' lives, having been found completely flat and apparently lifeless and been turned around efficiently by honey supplementation. The breeders felt that the puppy may otherwise have died due to the delay that would have resulted from travelling to a veterinary practice before giving the

honey. My response to this would be to consider whether we can be sure the "clinical signs" seen are in fact related to hypoglycaemia and not just normal puppy exhaustion following bursts of exercise.

On presentation of a puppy with hypoglycaemia in the clinic, it is common practice to test their BG levels and provide treatment, then to check these levels again post-treatment, to ensure adequate correction, and then again every 2–4 hours for recurrence. As this is not possible at home for a breeder, how can they be absolutely sure this has corrected the problem? Or even if this was the problem in the first place?

When I asked my colleagues and the breeders about the breeder and veterinary surgeon (VS) relationship, all were united in their negative experiences. Breeders claim that in the majority of cases their VS disregards what they have to say and does not take them seriously as a knowledgeable, credible individual.

The majority of breeders will only breed from lines they are familiar with, in order to promote the breeding of "normal" healthy toy breeds. However, selective breeding (usually from the runt) to create desired characteristics (the 'teacup'), such as tiny heads and legs and bulbous eyes, have caused the veterinary profession to question the ethics of this selective approach.

What veterinary teams say

Having spoken to numerous VSs and veterinary nurses about the use of honey at home, it appears to be a common conception that breeders use products or techniques that have not been clinically proven to work. In an industry driven by research and clinical studies, the veterinary professionals I have spoken to feel that, although honey may not actually cause harm, it is unlikely to be necessary for proactive supplementation. However, in the event of an emergency, the general consensus is that the use of honey should be encouraged. The low risks involved with honey consumption **(Table 1)** far outweigh the high risks involved with a hypoglycaemic crisis.

In human medicine, medical professionals provide glucose supplementation for neonatal hypoglycaemia in a hospital environment, so why do we not encourage this in an equivalent veterinary environment?

Turner (2019) states that raw honey should not be fed to puppies, due to differences in the properties of ingredients. The honey bought from supermarkets is usually highly processed and retains very few natural nutrients and contains high amounts of sugars. As a result, it appears almost transparent. Raw honey is generally much thicker and yellower in colour. Raw honey keeps its natural vitamins, minerals and enzymes. Due to this enriched substance, Turner states that puppies will struggle to process such raw, potent ingredients because of their under-developed immune and digestive systems. Raw honey is also free from artificial sweeteners, preservatives and added sugars. When we look at this from an emergency perspective, in hypoglycaemia the fundamental element is the ability to provide an instant hit of sugar in times of crisis. Therefore, it does not matter which product is given as it is only for short-term use.

Summary

To obtain a balanced view, I began my research by asking my colleagues and reputable breeders about their experiences and views on juvenile hypoglycaemia. When progressing to peer-viewed literature, I found limited sources of information on the effect of honey on puppies under the age of 12 weeks.

The feedback I have received from various toy breeders suggests that honey has proven positive results when given both proactively and reactively at home. This anecdotal evidence would suggest that honey has its place in medicine, for uses other than allergies and wounds, and should be considered and encouraged when purchasing a puppy that is smaller than average.

I have also concluded that not enough is done in practice to help prevent cases of juvenile hypoglycaemia. By the time the puppy has come to us in the clinic, it is already very unwell. By educating toy-breed puppy owners, we could prevent, rather than having to react to, life-threatening related problems.

As these toy breeds appear to be getting smaller, should we, as veterinary professionals, be doing more to educate our clients (and breeders' clients) about the presentation and treatment of hypoglycaemia at home?

Eddie was not a tiny puppy but I did offer small amounts of honey when he appeared overly fatigued from exercise and excitement. I saw only positive results and, as an owner, felt reassured that the symptoms I saw were a result of depleted energy levels and nothing more sinister.

My own experience and research have really opened my eyes. I will now be integrating new protocols in my clinic, at both the new puppy check (first vaccine) and at less routine presentations. I will endeavour to supply clients with tiny new puppies with additional information detailing the risks and signs of juvenile hypoglycaemia. I will also recommend honey or the use of dextrose gel supplied by the clinic.

Prevention is always better than cure and I feel that, as an RVN, I have a duty to prepare my new puppy clients with as much information as possible, to enable them to care for their dogs properly.

REFERENCES

Burke, A. (2017) C.an Dogs Eat Honey? Available from: https://www.akc.org/expert-advice/nutrition/can-dogs-eat-honey [Accessed 9 March 2021].

Galban, E. & Vite, C. (2018) Neurological emergencies. In Boag, A. & King, L. (eds.)BSAVA Manual of Canine and Feline Emergency and Critical care. 3rd ed. Gloucester, British Small Animal Veterinary Association, p.152.

Idowu, O. & Heading, K. (2018) Hypoglycemia in dogs: causes, management and diagnosis. Canadian Veterinary Journal. 59 (6), 642–649.

Lewis, D. & Reineke, E. (2020) Small animal first aid and emergencies. In Boag, A. & Marshall, R. (eds.) BSAVA Textbook of Veterinary Nursing. 6th ed. Gloucester, British Small Animal Veterinary Association, p. 622.

Metropolitan Veterinary Associates. (2021) Hypoglycemia in Small Breed Puppies and Young Kittens. Available from: https://metro-vet.com/references/hypoglycemia-in-small-breed-puppies/ [Accessed 9 March 2021].

PDSA (2021) Hand rearing puppies. Available from: https://www.pdsa.org.uk/taking-care-of-your-pet/pet-health-hub/other-veterinary-advice/hand-rearing-puppies [Accessed 9 April 2021].

Purina (2021) Hypoglycemia Requires Quick Intervention in Toy Breeds. Available from: https://www.purinaproclub.com/purinaproclub.com/resources/dog-articles/health/hypoglycemia-requires-quick-intervention-in-toy-breeds [Accessed 9 March 2021].

Schermerhorn, T. (2020) Hypoglycemia. Available from: https://www.cliniciansbrief.com/article/hypoglycemia-0 [Accessed 9 March 2021].

Turner, J. (2019) Is Honey Good for Dogs? Available from: https://www.animalwised.com/is-honey-good-for-dogs-3330.html [Accessed 22 February 2021].

Reflective professional development notes. To access hyperlinks to the references, scan the QR code on page 3.

The positive impact of providing support to newly qualified nurses in the referral setting

Jessica E. Hill, BSc (Hons), RVN

Paragon Referrals, Wakefield

jessica.hill@paragonreferrals.co.uk

Jessica graduated with a first-class honours degree in Veterinary Nursing and Bioveterinary Science from the University of Bristol in 2020. She has since completed the nursing Post-Registration Programme with Linnaeus at Paragon Referrals in Wakefield and is now a member of the wards team. Her areas of interest include in-patient care and the impact of human factors on patient safety.

ABSTRACT The initial transition to being a newly qualified nurse in a referral hospital can be daunting, with an expectation to retain all the knowledge learnt as a student, and the uncertainty of navigating a new workplace, working within a large team and adapting to unfamiliar protocols and procedures. The combination of these factors can result in an individual feeling overwhelmed, which may deter nurses from continuing their career in referral nursing, particularly if they feel unsupported during this transition.

A strong support network in practice is a key factor in enabling nurses to thrive. Varying levels of support from different individuals in practice, including colleagues and those at management level, provide newly qualified nurses with several opportunities to gain additional support. Appointing a mentor is also beneficial but it is important to consider the personality of both individuals to ensure the mentee feels comfortable raising concerns and can take full advantage of the support provided.

Keywords support, newly qualified nurses, mentor, mentee

Introduction

After graduating from the University of Bristol in 2020, I was accepted on to the first intake of the Nursing Post-Registration Programme with Linnaeus. The programme includes completing wards, surgical and medical rotations in a referral hospital, with a strong focus on evidence-based practice through the completion of a group knowledge summary and clinical audit on an area of interest.

A clear support structure has been implemented **(Figure 1)** and is available to all nurses on the programme, with the incorporation of five professional development days to help expand and refine skills, including communication and professional resilience, which are crucial for referral nurses.

Weekly meetings with an allocated mentor have provided a consistent way to track progression and development throughout the programme, while also encouraging reflection on successes and challenges. During these meetings, plans are created to establish the best way to utilise the rotations to further develop the required nursing skills.

The transition to being a newly qualified nurse in a referral hospital may have been easier for me, as I had previous experience of rotating through a referral hospital as an undergraduate student veterinary nurse.

One of the main differences between first opinion and referral nursing is the complexity of cases seen, with referral nurses often specialising within a specific area. Referral hospitals will often use more complex equipment than is accessible in first-option practices, including ventilators and advanced imaging equipment such as MRI and CT scanners. A lack of prior exposure to nursing complex cases and utilising this equipment can result in nurses feeling too daunted to apply for positions in referral centres.

In human healthcare, secondment has been used to enable staff development through working temporarily in another part of the same or a different organisation (Hamilton & Wilkie, 2001). The benefits of secondment described within this study include developing autonomy, skills and knowledge (Hamilton & Wilkie, 2001). The post-registration programme enabled me to experience the benefits described within this study.

Regardless of prior experience, the support available throughout this programme has been fundamental in confirming my passion for referral nursing and encouraging me to apply for a permanent position within the hospital. It is crucial when considering personal development to find a balance between utilising the support provided by your colleagues (when needed) and using initiative to develop independence and autonomy as a qualified nurse. This can be one of the most difficult challenges to overcome, as the student-nurse training status provides an added security blanket that is associated with working under the supervision of registered veterinary nurses (RVNs) and veterinary surgeons (VSs).

It can initially be difficult to make nursing decisions independently but supportive colleagues ease this transition, enabling newly qualified nurses to thrive within their practice while also being able to seek guidance when needed. A common feeling among nurses who have completed the programme is that the greatest sense of accomplishment has been achieved following situations in which the nurse has been encouraged to work outside their comfort zone, while still upholding patient safety.

Levels of support

Allocated mentor

Clinical skills supervisors from each rotational area

Clinical and non-clinical nursing leads

Post-registration programme manager

Chief nursing officer

Figure 1. Levels of support on the post-registration programme.

The importance of support for newly qualified nurses

In human nursing, preceptorship is one method that has been introduced to aid the transition from student to qualified nurse and is similar to the post-registration programme that has been introduced by Linnaeus. Preceptorship was first introduced into UK nursing in 1991, aiming to enhance competence and confidence (Irwin et al., 2018). The aim of the preceptorship process is to enable newly registered practitioners to strengthen their skills and knowledge, which is achieved through professional interaction with colleagues (McCusker, 2013).

Little evidence is available detailing the impact of similar preceptorship programmes for RVNs, yet a human nursing study details that 66% of nurses agreed that the preceptorship programme helped them to settle within their new roles and assisted with the transition from student to accountable nurse (Marks-Maran et al., 2013). Although little specific veterinary evidence is available to indicate that this is applicable to RVNs, from personal experience I would agree that the transition period was eased by being part of a post-registration programme. It is equally important to consider the network of support that can be provided by fellow nurses on the same programme, with the benefit of being able to share and empathise with the common challenges faced in practice.

The perceived skills required to thrive in a referral practice may deter newly qualified nurses from applying for these positions. Having an adequate support network in place can help to alleviate concerns that newly qualified nurses have about their skill levels. One study, focused on competence perceptions, identified that 61.3% of student veterinary nurses and 77.3% of RVNs believed it takes between 2 and 5 years to develop experience in the workplace following qualification (Dunne et al., 2020). Ho et al. (2021) similarly identified that it takes time for nurses to feel confident in practice, with respondents claiming they were in their roles for 6 months before their confidence increased.

Newly qualified nurses are not expected to be fully competent in all areas of veterinary nursing but the RCVS has published a set of Day One Competences, which outline the skills that RVNs should be capable of performing following qualification and on entering practice (RCVS, 2015). Providing support to newly qualified nurses, in both first opinion and referral practices, ensures individuals are encouraged to strengthen their skills, allowing them to overcome the anxiousness associated with completing unfamiliar tasks and the fear of being judged by their colleagues.

The introduction of supported programmes should help to alleviate the concerns of newly qualified nurses regarding a lack of experience in referral practice, as one of the main benefits of the programme is the completion of a structured skills list. This means all of the fundamental skills that are key components of referral nursing are covered, with assistance from both a mentor and allocated skills supervisors.

Nursing retention within the veterinary profession may be influenced by the level of support provided in practice. A lack of support for newly qualified veterinary nurses is likely to influence whether individuals continue their careers within the practice in which they are employed and may even result in them leaving the profession.

When considering the support available for newly qualified human nurses, Ho et al. (2021) discuss that nearly half of respondents in their study were offered no support, perceived the help available as not being supportive, or had made unsuccessful attempts to access informal support. The level of support available in the workplace has also been found to influence the transition process for new nursing graduates in Australia (Parker et al., 2014). The structured support system available within this programme aims to retain nurses within the profession.

The positive impact of mentor allocation

A mentor has been described within the literature as an individual who provides supervision and direction (Badger, 2014a). Mentor allocation eases the transition for newly qualified nurses and assists the mentee with the challenges associated with starting a new role in an unfamiliar environment. Although not strictly relevant to newly qualified veterinary nurses, the student–mentor relationship among human nurses has been described as influential in determining the confidence and enthusiasm nurses have at the start of their careers (Kaihlanen et al., 2013). Mentors also influence how students are able to manage and adapt to unfamiliar challenges (Kaihlanen et al., 2013). A large number of human nursing studies describe nurses being mentored by other nurses, and it is likely the mentoring process for RVNs will be more successful if their mentor is also an RVN. Within the Nursing Post-Registration Programme, all mentors are RVNs, which is beneficial as the mentoring process is likely to feel more intimidating if being done by a veterinary surgeon who cannot relate to the specific issues that newly qualified RVNs face in practice. Mentoring is, however, a collaborative process, with the success of the programme being influenced by positive interactions with the whole veterinary team.

Regular meetings with a mentor enable structured plans to be made regarding progress, and the use of a skills list, similar to those used for student veterinary nurses, aids this process. This makes it clear to the mentee which areas and skills need to be developed. Discussing and noting challenges experienced highlights any recurring issues that may need to be resolved. Planning ahead enables both the mentee and the mentor to understand what actions need to be taken in order to make further progress and can enable the identification of weak areas where the mentee needs to gain further experience to develop their clinical skills.

Qualities of a successful mentee

While having a strong support network in place is a key component of preceptorship programmes, the qualities of the mentee will also influence the success of the programme. These can include:

- Using initiative – do not solely rely on your mentor but work with different nurses in practice to develop your own skills.
- Asking questions – regardless of the level of qualification, this enables you to learn and develop your nursing skills. Questioning clinical decisions if you are unsure of the reasoning behind them also ensures the whole team feels comfortable speaking up and raising concerns.
- Taking control of your own learning, including reaching deadlines set and developing your nursing skills.
- Communicating – this plays a fundamental role in the preceptorship process. It can initially be difficult in a new team but has positive impacts on patient welfare and your own development.
- Being proactive – including replying to emails and asking to work with challenging cases that allow you to develop your skills.
- Showing enthusiasm – this helps you gain the most from the preceptorship experience.

Qualities of a successful mentor

Consideration of the qualities of the mentor and the mentee is important to ensure the mentee feels comfortable and able to take full advantage of the support a mentor is able to provide. Similar to the relationship between a clinical coach and a student veterinary nurse, communication is a key component for successful mentor allocation. As described by Badger (2014b), the number of years since qualification should not be the main focus when determining whether an individual is suited to the role of mentor. Building this relationship through regular meetings will develop trust. Some key qualities of a mentor include being:

- Approachable – to ensure the mentee feels able to ask questions and raise any concerns, and to develop trust in the relationship.
- Organised – being able to fit the mentor role around their job, despite the difficulties in allocating time when busy in practice.
- Honest – sharing past experiences of challenges and mistakes can help the mentee feel more comfortable in sharing their own concerns.
- Supportive – guiding the mentee to develop their own independence is important, allowing them to use autonomy and also encouraging skills development.

While the mentor is the main individual to whom the mentee will turn for support, it is still important to consider additional staff members who can provide assistance if needed. This is one reason the post-registration programme has been so successful: the benefit the additional levels of support provide. This also relieves some of the pressure from the mentor as it is important to remember that while often working as full-time RVNs, these individuals will also experience their own stress in practice, especially if they have additional commitments alongside mentoring.

Utilising support available in practice

Although multiple levels of support may have been introduced to support newly qualified nurses in practice, these may not be successful if an individual does not feel able to utilise the support available. Also, some practices may not have implemented a structured support system, and it is important that nurses are encouraged to ask for additional support if needed. If nurses are feeling deflated in their current practice and, as a result, are not making progress then it may be worth speaking to the head nurse, management or a trusted colleague within the practice to make positive changes in the workplace. It may also be appropriate to seek external support – which is provided by various organisations including VetLife. Moving to another practice where adequate support networks have been implemented is another option. It is important nurses do not suffer by feeling unsupported as there are many practices, both first opinion and referral hospitals, that may be better suited to their individual needs, particularly nurses who are newly qualified.

Conclusion

Overall, being part of a post-registration programme can be fundamental in encouraging newly qualified nurses to continue their careers in referral nursing and to further develop their skills within the same hospital. Mentor allocation can also ease the process of moving into an unfamiliar practice and navigating the challenges associated with being a newly qualified nurse, while also enabling structured plans to be created to facilitate personal development.

There are various benefits to providing support to newly qualified nurses, including allowing them to develop confidence in utilising and adapting their nursing skills in both patient care and communication with the rest of the veterinary team. A strong support network also encourages nurses to ask questions without fear of judgement. Creating a safe environment to enable this is crucial for patient safety and the mental wellbeing of nurses.

I am grateful to my mentor who, along with the post-registration programme manager, supported me through my first year of qualification and ultimately encouraged me to apply for a permanent position in the hospital.

REFERENCES

Badger, S. (2014a) Role of the Nurse Mentor – Part 1. Veterinary Nursing Journal. 28 (12), 412–414.

Badger, S. (2014b) Role of the Nurse Mentor – Part 2. Veterinary Nursing Journal. 29 (2), 62–65.

Dunne, K., Bremerton, B., Duggan, V. & Campion, D. P. (2020) Competence perceptions of veterinary nursing students and registered veterinary nurses in Ireland: a mixed methods explanatory study. Irish Veterinary Journal. 73, 10.

Hamilton, J. & Wilkie, C. (2001) An appraisal of the use of secondment within a large teaching hospital. Journal of Nursing Management. 9 (6), 315–320.

Ho, S-S., Stenhouse, R. & Snowden, R. (2021) 'It was quite a shock': A qualitative study of the impact of organisational and personal factors on newly qualified nurses' experiences. Journal of Clinical Nursing. 30 (15–16), 2373–2385.

Irwin, C., Bliss, J. & Poole, K. (2018) Does preceptorship improve confidence and competence in newly qualified nurses: a systematic literature review. Nurse Education Today. 60, 35–46.

Kaihlanen, A-M., Lakanmaa, R-L. & Salminen, L. (2013) The transition from nursing student to registered nurse: the mentor's possibilities to act as a supporter. Nurse Education in Practice. 13 (5), 418–422.

Marks-Maran, D., Ooms, A., Tapping, J., Muir, J., Phillips, S. & Burke, L. (2013) A preceptorship programme for newly qualified nurses: a study of preceptees' perceptions. Nurse Education Today. 33 (11), 1428–1434.

McCusker, C. (2013) Preceptorship: professional development and support for newly registered practitioners. Journal of Perioperative Practice. 23 (12), 283–287.

Parker, V., Giles, M., Lantry, G. & McMillan, M. (2014) New graduate nurses' experiences in their first year of practice. Nurse Education Today. 34 (1), 150–156.

RCVS (2018) Day One Competences for Veterinary Nurses. Available from: https://www.rcvs.org.uk/document-library/day-one-competences-for-veterinary-nurses/ [Accessed 23 May 2021].

Reflective professional development notes. To access hyperlinks to the references, scan the QR code on page 3.

Preparing for OSCEs

Personal reflections, tips and advice

Vanessa Dawson, RVN

Bromyard Vets, Herefordshire

nessdawson39@gmail.com

Vanessa qualified in 2021 and currently works at a small animal practice in Herefordshire. Since qualifying, Vanessa has completed her BVNA Oral Care Nurse Certificate and her Advanced Programme in Veterinary Nursing in Wildlife. Her favourite aspects of veterinary nursing are ward duties, nurse consults and laboratory work.

Before qualifying, veterinary nurses (VNs) are required to sit objective structured clinical exams (OSCEs) – there's no getting out of it! For some, they can be extremely nerve-racking while others may find them hard to revise for. However, for many VNs, the stations covered in the OSCEs are tasks we do every day in our jobs, just with someone watching over us.

I was very nervous about my OSCE. On reflection, I think this was because OSCEs are the final exam between being a student and a registered veterinary nurse (RVN). It is normal to feel nervous before any type of exam but it is important to manage those nerves so they don't get the better of you. Everyone has a different strategy for controlling nerves but, for me, it was trying to stay calm and make revision fun so it stuck in my mind.

On the day

On the day of your OSCEs, remain as calm and relaxed as you possibly can. There will be a quick briefing before the exam begins so be sure to ask any questions you might have.

Before each station you have time to read the task. These tasks won't be new to you as they are the ones you would have been revising for weeks prior to the exam and that have been signed off on your NPL or ePortfolio. Read them through thoroughly. The rest of the time before the buzzer goes off is yours – use it wisely and start to plan what you are going to do when you enter the station. Plan methodically so you know what you will do first. Don't panic!

Once you have entered the station, remain calm and take it one step at a time. You have 6 minutes to complete each station which is a lot longer than you might think. The examiner is there for you to ask questions or to speak to – if they are not allowed to answer your question, they won't. You are allowed to talk yourself through the task, which I did – you'll be surprised how much this helps. If there is a layperson there to help you, use them – they are there for that reason. Just tell them what you want them to do or where you want them to hold the animal.

Remember to take a drink around with you to stay hydrated and prevent a headache halfway through the exam. You can even take a few sneaky sweets to keep your energy levels up.

'You are allowed to talk yourself through the task … you'll be surprised how much this helps'

After the exam is over, don't spend hours panicking about how you did; you can't change anything so why worry yourself over it? One of the worst things you could do (I did this) is to go back through the scenarios and check you performed all the steps. It just makes your nerves worse for results day. Take the evening of the exam off and relax with friends or family.

My OSCE day

On the morning of my OSCEs, I travelled for 3 hours to get to CQ headquarters where I was taking the exam. I arrived 2 hours early as the traffic was nowhere near as bad as I expected. I then sat and did some last-minute revision before sunbathing in the car (it was boiling). It is best to plan your journey so you get there early; heavy traffic is not a valid excuse for arriving late.

At the briefing, my nerves were starting to get the better of me. I was shaking and didn't really know what to think. The first station I had was a drip-line set up. Should have been easy, right? Just run the drip through the line in a sterile manner and then do the calculation. It did not go like that, thanks to my nerves. I was so shaky and panicky that my drip line had multiple air bubbles and I did the calculation wrong. I came out of the station and wanted to cry. I then realised that I couldn't let my nerves take over this exam. So, I went into the second station and took my time, double checked everything I did and left that station slightly less shaky.

I then entered the third station: gowning and closed gloving. Everything went fine until I pulled the wrong tab on the sterile gown. As soon as I realised what I had done I asked if I could restart. The lovely examiner said 'yes', and quickly set up the station again for me. I had obviously wasted some of my 6 minutes, but I remained calm and, luckily, I managed to do it correctly the next time and still have a minute spare. So remember, you can restart at any point during each station, although you'll only have the remaining time left to complete the task.

I think making a mistake on the third task gave me a huge confidence boost because the remaining nine tasks seemed to go much more smoothly. Before I knew it, I was on my final task – the new communication task. I had been worrying about this one for weeks but I just acted like the layperson was a client I speak to on a regular basis. Everything went fine.

After the exam, I went out for some food. Annoyingly, I had to travel home the same day, but I didn't think about the exam at all. Results day came and I passed 11 of the 12 stations. I failed my first station due to nerves, so try not to let them get the better of you.

How to revise

This was one of my biggest questions when it came to revising for my OSCEs: how do you even start to revise for a practical assessment? Well, the tasks are things we do on a daily basis so just forget the examiner is there and act as if you are at work – which is easier said than done, I know.

I was able to read through the tasks before sitting my OSCE which enabled me to work out what steps to take to complete the task. The easiest way to make everything stick in your mind is to practise each task physically, over and over again. Whenever you have a spare minute: practise.

'Reading through the tasks is not enough, it's best to physically run through them several times before the big day'

Revising for this type of exam can be difficult when you're not at work. However, tasks such as open gloving can be performed at home, as can communication tasks. Other things I found useful when revising at home were to read through each task and plan exactly which step I would do first, working through the whole task in my head.

I would also emphasise that just reading through the tasks is not enough – it's best to physically run through them several times before the big day. Once I had run through each task and worked out which ones were my weakest, I made extra notes on them and put them in a separate pile. I then performed these tasks considerably more than the others until I felt confident performing them. Overall, I would strongly advise physically practising as often as possible – the more you perform the tasks the more you will remember them.

Vanessa's OSCE tips

- Make revision fun to help you remember
- Practise every task but focus on your weakest
- Keep calm and concentrate on doing things one step at a time
- Use spare time before test tasks to plan
- Mistakes can happen but try to stay in the moment
- Don't be afraid to talk to, or question, the examiner
- Involve the layperson whenever appropriate
- Remember, the tasks are the same as those you do regularly at work
- When it's over, don't reflect and ruminate, instead aim to relax

Understanding the endocrine system

Laura George, DipHECVN, DipAVN (Small Animal), NCertA&CC, CertVN ECC, VTS (SAIM), RVN

Nursing Course Coordinator and Content Editor, Improve International

lauragеorgervn@gmail.com

Laura is an experienced RVN. She began her career in general practice in 2007. In 2010, after qualifying, she moved to Dick White Referrals (DWR) veterinary specialists, where she spent 11 years working in the internal medicine and intensive care departments. She became ICU Nursing Manager before focusing on internal medicine in 2020. In 2021 Laura joined Improve International as Nursing Course Coordinator and Content Editor for its online learning courses.

Laura has multiple advanced veterinary nursing qualifications, the most recent of which is Veterinary Technician Specialist in small animal internal medicine. Laura has also written for, and contributed to, national and international veterinary and veterinary nursing journals.

ABSTRACT The endocrine system is complicated, consisting of various ductless glands around the body which are involved in maintaining homeostasis within the body. Understanding how the endocrine system works, and the function of the hormones being secreted, is key to understanding the pathophysiology of endocrine disorders. This enables us to nurse patients with these disorders to a higher standard. This article will discuss the different endocrine glands, the hormones they secrete and the influence they have on the body, with the aim of providing veterinary nurses with solid foundation knowledge of this anatomical system.

Keywords endocrinology, endocrine, hormones, negative feedback, gland

Introduction

The endocrine system is a complex anatomical system involved in maintaining homeostasis within the body. It consists of various ductless glands located throughout the body, each of which secretes specific hormones. These hormones are chemical messengers that are secreted in response to stimuli and travel, via the bloodstream, to a specific site of action where they will have an effect. Hormonal secretion is stimulated and inhibited by:

- Chemical changes in the blood, for example, changes in calcium or glucose levels
- Nerve impulses
- Other hormones

In normal, healthy patients, the level of hormones in the body will fluctuate while maintaining homeostasis. In diseased animals, these levels may be abnormal – either very low or very high – and measurement of these hormone levels can aid diagnosis of clinical conditions.

Negative feedback loop

The level of some hormones in the blood is controlled and managed by a negative feedback loop. These self-regulating systems prevent over-secretion of hormones by endocrine glands and will reduce the level of secretion once the necessary effect has been achieved in the body **(Figure 1)**. It can be helpful to think of it like a home heating thermostat – if the temperature falls below the desired limit, the system clicks on to increase the heating until the desired temperature is reached. Once the desired limit is met, the system clicks off to prevent overheating. If the temperature falls again, the system will detect this and click on.

Endocrine glands

The major endocrine glands in the canine and feline body (moving cranial to caudal through the body) are:

- Pituitary – anterior and posterior
- Thyroid
- Parathyroid
- Pancreas
- Adrenal
- Gonads – ovaries or testes

Pituitary gland

The pituitary gland (or hypophysis) is located at the base of the brain and is connected to the hypothalamus, which controls its activity. The pituitary is sometimes referred to as the 'master gland' – it is an important site of producing, storing and secreting hormones and it links with the nervous system (the second system involved in maintaining homeostasis) via the hypothalamus. The pituitary gland coordinates the effects of all the other endocrine glands in the body. It is divided into two lobes, the anterior and posterior, and both act independently of each other.

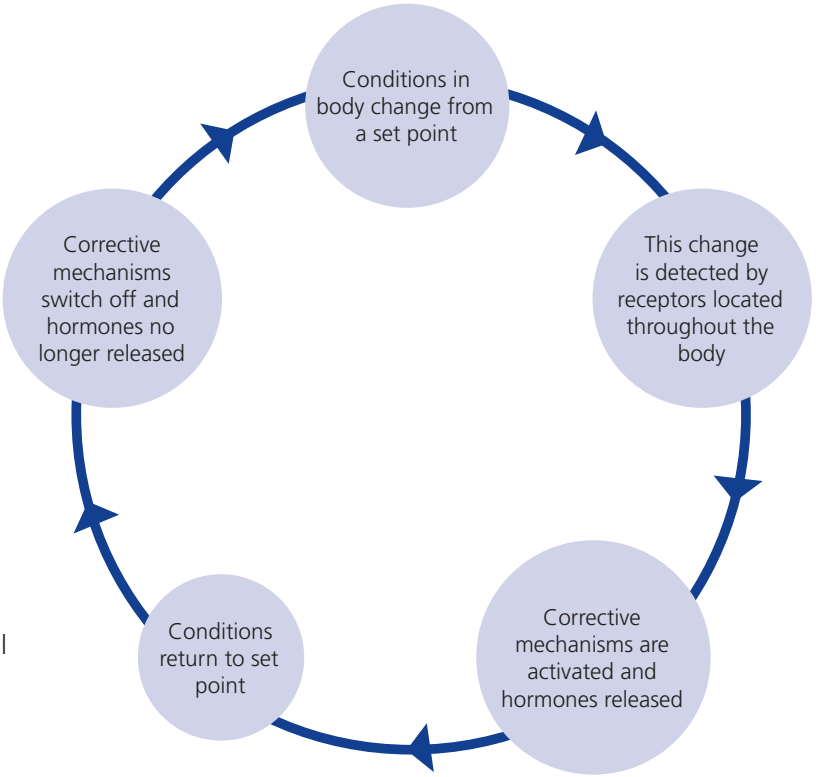


Figure 1. Diagrammatic representation of how the negative feedback loop works.

Anterior pituitary gland (or adenohypophysis)

The anterior pituitary is stimulated to release hormones due to the action of 'releaser' hormones, which are excreted by the hypothalamus and travel via the blood to the anterior pituitary.

Six hormones are released from the anterior pituitary **(Figure 2)**:

FOLLICLE STIMULATING HORMONE (FSH) In females, FSH secretion is stimulated by gonadotropin-releasing hormone (GRH) from the hypothalamus. FSH stimulates germ cells in the ovary to develop into mature follicular cells, each of which contains an ovum. This leads to secretion of oestrogen, and this increased level of oestrogen in the blood inhibits secretion of further FSH by negative feedback.

LUTEINISING HORMONE (LH) Secretion of this hormone is stimulated by the presence of oestrogen. LH causes ovulation (release of the ovum) before causing the remaining follicular tissue to change into corpus luteum which, in turn, secretes progesterone (Davidson & Stabenfeldt, 2020a).

ADRENOCORTICOTROPIC HORMONE (ACTH) stimulates the adrenal cortex to secrete corticosteroids. Over-secretion of ACTH leads to the endocrine disorder hyperadrenocorticism (Cushing's disease) while under-production results in hypoadrenocorticism (Addison's disease).

THYROID STIMULATING HORMONE (TSH) This hormone stimulates the release of thyroxine from the thyroid glands.

PROLACTIN This hormone acts on the mammary glands during the second half of pregnancy. Prolactin stimulates the development of glandular tissues and production of milk in preparation for feeding neonates. Levels of prolactin remain high post-partum to ensure the supply of milk is maintained.

INTERSTITIAL CELL STIMULATING HORMONE (ICSH) In males, secretion of this hormone is in response to GRH. ICSH stimulates the interstitial cells in the testes to secrete male sex hormones, most importantly testosterone.

GROWTH HORMONE (AKA SOMATOTROPIN) This hormone is of particular importance in growing animals and acts on a variety of tissues. Growth hormone affects the rate of epiphyseal growth (in bones), inhibits the formation of fat and increases the rate of amino acid uptake for protein synthesis. Under-secretion of growth hormone in young animals results in dwarfism, while over-secretion leads to gigantism. Over-secretion in adults results in acromegaly.

Follicle stimulating hormone (FSH)

Luteinising hormone (LH)

Adrenocorticotropic hormone (ACTH)

Thyroid stimulating hormone (TSH)

Prolactin

Interstitial cell stimulating hormone (ICSH)

Growth hormone (aka somatotropin)

Figure 2. **The FLAT PIG** mnemonic used by the author to remember the hormones released from the anterior pituitary gland.

Posterior pituitary gland (or neurohypophysis)

The posterior pituitary stores and releases hormones secreted by the hypothalamus. The two hormones released by the posterior pituitary are:

OXYTOCIN This hormone acts during parturition and in the post-partum period. Release of oxytocin is controlled by a reflex arc as a result of the foetus passing through the cervix. Oxytocin acts on the smooth muscle in the uterus, strengthening the uterine contractions to expel the foetus. This hormone is also responsible for stimulating milk let-down; it acts on the smooth muscles of the mammary glands to contract and release the milk (Davidson & Stabenfeldt, 2020b), after prolactin has stimulated the mammary glands to produce this milk. Injections of oxytocin can be administered both in cases of dystocia to assist with parturition and post-partum to release milk in cases where the neonates are having problems feeding.

'Oxytocin acts on the smooth muscle in the uterus, strengthening the uterine contractions to expel the fetus. This hormone is also responsible for stimulating milk let-down'

ANTIDIURETIC HORMONE (ADH) This is also referred to as vasopressin and is released in response to the hydration status of the patient, specifically in response to changes in the volume of extracellular fluid, e.g. blood plasma. ADH primarily acts on the collecting ducts in the renal nephrons and causes changes to the permeability of the ducts to counteract dehydration and over-hydration. In cases of dehydration, more ADH is released, causing more water to be reabsorbed from the urine and returning it to the plasma, thereby decreasing urine production. Conversely, in cases of over-hydration, ADH is not secreted, and water is not reabsorbed from urine and is excreted from the body. Diabetes insipidus is a disorder of the pituitary gland, whereby it stops secreting ADH, which means water reabsorption in response to blood volume does not occur; these patients are polyuric and polydipsic and at risk of severe dehydration if they are unable to meet the increased urine losses with water intake.

Thyroid gland

The thyroid gland consists of a pair of lobes located either side of the trachea, usually at the level of the first or second tracheal rings, and is an important endocrine gland for metabolic control. The thyroid gland consists of two types of cells: follicular cells and parafollicular cells.

FOLLICULAR CELLS Thyroxine (T4) and triiodothyronine (T3) are secreted from the follicular cells (also referred to as thyroid epithelial cells). The T4 and T3 thyroid hormones are the primary influences on the body's basal metabolic rate (Petroff & Greco, 2020) so any disturbances to the levels of these hormones will affect this; many of the clinical signs observed with thyroid disorders are due to this. The thyroid gland needs iodine to be able to secrete thyroid hormones.

PARAFOLLICULAR CELLS (OR C CELLS) Calcitonin is secreted by the parafollicular cells (Kipperman & Rogers, 2012) and has an important role in the regulation of calcium levels in the body. Calcitonin secretion is controlled by the levels of calcium detected in the blood – if calcium levels are high, calcitonin is released to stimulate the deposition of calcium into the bones, thereby lowering the levels of calcium in the blood. Calcitonin works in conjunction with parathyroid hormone (discussed below) to control calcium levels.

Parathyroid glands

The parathyroids are bilateral pairs of glands (so four in total) lying either side of the trachea near the thyroid gland. Only one hormone is synthesised and secreted by these endocrine glands:

PARATHYROID HORMONE (PTH) The main role of PTH is to regulate calcium levels in the blood and, as discussed above, works in conjunction with calcitonin and counteracts its effect. When low levels of calcium in the blood (hypocalcaemia) are detected, PTH is secreted by the parathyroids in response to this. PTH raises the levels of calcium in the blood by three main actions:

- Increases absorption of calcium in the intestines
- Increases retention of calcium in the kidneys
- Increases osteoclast activity which, in turn, increases release of calcium from bone stores

(Kipperman & Rogers, 2012)

Pancreas

The pancreas is classified as a mixed gland as it has both endocrine and exocrine functions (involving the release of digestive enzymes into the duodenum via the pancreatic duct). The endocrine part of the pancreas is found in the islets of Langerhans and these islets consist of three types of cells – alpha, beta and delta cells – each of which are responsible for secreting a different hormone. The endocrine pancreas is important for the control of glucose and insulin levels in the blood, and deficiencies/disturbances in these hormones will result in diabetes mellitus.

ALPHA CELLS These cells are responsible for the secretion of glucagon in response to a decrease in blood glucose (BG). The release of glucagon, in conjunction with adrenaline and corticosteroids, causes glycogen (stored in the liver) to be converted into glucose by the process of glycogenolysis while also increasing the rate of new glucose production from amino acids by the process of gluconeogenesis (Petroff & Greco, 2020) – the final result is an increase in BG levels. Glucagon also inhibits the action of insulin in the body.

BETA CELLS Insulin is secreted from the beta cells in the pancreas in response to increasing BG levels, normally immediately after a meal. Insulin works by increasing the uptake of glucose into muscle cells to be converted into energy; it also converts glucose into glycogen (by the process of glycogenesis) to be stored in the liver ready for release when BG levels fall and by converting any leftover glucose into fat. Insulin is the only hormone in the body that acts to lower BG levels.

DELTA CELLS The third hormone, released from the delta cells in the endocrine pancreas, is somatostatin. This hormone works by balancing the effects of glucagon and insulin to control BG fluctuations.

Adrenal glands

The adrenal glands are paired structures located close to the cranial aspect of each kidney. Each gland consists of an outer cortex and inner medulla; both layers act independently of each other and are controlled by different mechanisms.

Adrenal cortex

The adrenal cortex is the part of the adrenal gland that is considered essential for life, but most conditions effect this part rather than the medulla. The cortex consists of three zones: the zona glomerulosa, zona fasciculata and zona reticularis (Petroff & Greco, 2020). Secretion of hormones from the adrenal cortex is stimulated by ACTH (released by the anterior pituitary) and the hormones are known as corticosteroids. Around 40 corticosteroids are released from the adrenal cortex, but these are classified into three main groups, based on their action:

MINERALOCORTICOIDS The most important mineralocorticoid is aldosterone, and this hormone is secreted from the zona glomerulosa in response to the presence of angiotensin in the blood due to hypotension (as part of the renin-angiotensin-aldosterone system – RAAS). Aldosterone works by increasing the reabsorption of sodium in the kidney, which in turn draws more water into the blood, increasing blood volume and thereby increasing blood pressure.

GLUCOCORTICOIDS Produced in the zona fasciculata (the main site of production) and the zona reticularis, glucocorticoids are essential for life. They regulate all aspects of metabolism either directly or indirectly, and influence carbohydrate, protein and lipid metabolism, along with regulating cardiovascular function and blood pressure (Petroff & Greco, 2020). Another action of glucocorticoids is suppression of inflammatory and immunological reactions and responses. The major glucocorticoid is cortisol.

SEX HORMONES Small quantities of sex hormones are produced in the zona fasciculata and zona reticularis in both males and females.

Adrenal medulla

The medulla is the outer part of the adrenal gland and secretion of hormones is influenced by the sympathetic nervous system. The two hormones from the adrenal medulla are catecholamines – adrenaline and noradrenaline – and both act in a similar way to prepare the body for dangerous/stressful situations – the 'fight or flight response'. Adrenaline and noradrenaline release results in:

- Increased heart rate, ensuring oxygen and glucose are delivered to the brain and skeletal muscles ready for a rapid response.
- Increased respiratory rate and stimulation of bronchial dilation to maximise oxygen intake.
- Dilation of the blood vessels, leading to increased blood delivery to the brain and skeletal muscles. Blood supply to organs that are considered less essential at the time of fight or flight is constricted, e.g. the gastrointestinal tract.

Gonads

Gonads are the sex organs: ovaries in females and testes in males.

Ovaries

A pair of ovaries are located in the abdominal cavity caudal to the kidney and secrete two hormones:

OESTROGEN This hormone is secreted by the mature follicular cells within the ovary. As discussed earlier, secretion of oestrogen is controlled by FSH, which is released from the anterior pituitary. During puberty, oestrogen is involved in the development of female characteristics, including mammary glands. During the reproductive cycle, oestrogen influences behaviour during oestrus and prepares the reproductive tract for coitus.

'Progesterone prepares the reproductive tract for the fertilised ovum and thickens the uterine wall for implantation'

PROGESTERONE This hormone is secreted by the corpus luteum in the ovary. As discussed previously, corpus luteum forms from the remaining follicle tissue post ovulation and LH, secreted from the anterior pituitary, controls the development of corpus luteum and therefore release of progesterone (Davidson & Stabenfeldt, 2020a). Progesterone prepares the reproductive tract for the fertilised ovum and thickens the uterine wall for implantation. Progesterone is important throughout pregnancy as it desensitises the smooth muscle in the uterine wall, so it is unable to contract and the foetus remains in place. As pregnancy comes to an end, the corpus luteum degenerates and progesterone levels fall, allowing the smooth muscle to regain the ability to contract in preparation for parturition.

Testes

The testes are male sex organs and, in adults, this pair of glands lie outside of the body cavity, within the scrotal sac. The hormone secreted by the testes is:

TESTOSTERONE This hormone is secreted from the interstitial cells within the testes and secretion is influenced by ICSH, which is released from the anterior pituitary (Romano & Brinsko, 2020). Similarly to how oestrogen works in females, testosterone is responsible for development of male characteristics, for example, muscle development and penis size, while also influencing male behavioural traits including aggression, sex drive and territorial behaviour. Testosterone also stimulates spermatogenesis, the process of sperm production in the seminiferous tubules.

Conclusion

The endocrine system is a complex series of glands throughout the body, all of which play a key role in maintaining homeostasis. Understanding where the hormones are released from, their site of action and the influence/effect they exert is a solid foundation to being able to understand the pathophysiology that occurs in endocrine disease and disorders.

REFERENCES

Davidson, A. P. & Stabenfeldt, G. H. (2020a) The ovarian cycle. In Klein, B. G. (ed.) Cunningham's Textbook of Veterinary Physiology, 6th ed. St Louis, Elsevier, pp. 436–442.

Davidson, A. P. & Stabenfeldt, G. H. (2020b) The mammary gland and lactation. In Klein, B. G. (ed.) Cunningham's Textbook of Veterinary Physiology, 6th ed. St Louis, Elsevier, pp. 458–471.

Kipperman, B. & Rogers, B. (2012) Endocrinology. In Merrill, L. (ed.) Small Animal Internal Medicine for Veterinary Technicians and Nurses. Ames, Wiley-Blackwell, pp. 11–67.

Petroff, B. K. & Greco, D. S. (2020) Endocrine glands and their function. In Klein, B. G. (ed.) Cunningham's Textbook of Veterinary Physiology, 6th ed. St Louis, Elsevier, pp. 394–428.

Romano, J. E. & Brinsko, S.P. (2020) Reproductive physiology of the male. In Klein, B. G. (ed.) Cunningham's Textbook of Veterinary Physiology, 6th ed. St Louis, Elsevier, pp. 471–480.

Reflective professional development notes.

BVNA
British Veterinary Nursing Association

BVNA AWARDS 2022

RECOGNISING AND REWARDING VETERINARY NURSES

Nominate a veterinary nurse for a BVNA Award today

The Jean Turner Veterinary Nurse Ambassador Award

Do you know a veterinary nurse who has been a positive role model and advocate for the veterinary nursing profession?

Above & Beyond for Feline Welfare Award (iCatCare sponsor/Co-brand) (Presidential chosen charity)

For a veterinary nurse who has gone the extra mile to improve and maintain feline wellbeing, in either a clinical or non-clinical environment.

The #SupportMeSupportYou Award

Is there a veterinary nurse who has paved the way for promoting mental health support and equality within the profession?

VNJ Writer of the Year Award

This award is for articles which have encouraged discussions, inspired change, or improved clinical standards in practice.

Whose article has inspired you?

To find out more about the Awards, read the Terms and Conditions, and to nominate, go to bvna.org.uk/blog/bvna-awards-2022/ or email bvna@bvna.co.uk for more information.

Nominations close at midday on 31 July 2022.

Three finalists from each Award category will be invited as our guests to attend Congress on Saturday 8 October and the Dinner Dance & Awards in the evening.

Partner Sponsors

Hill's

Vets4Pets
Putting your pet first

Media Partners

vntimes

A breakthrough IN PARASITE PROTECTION FOR CATS

NEW ACTIVE: Tigolaner

Felpreva®

3 MONTHS' flea & tick protection PLUS treatment against roundworm, tapeworm & ear mites, ALL in a SINGLE spot-on

Felpreva® contains tigolaner, emodepside and praziquantel (POM-V). See the datasheet at www.noahcompendium.co.uk. The SPC and further information is available from Vetoquinol UK. Advice should be sought from the medicine prescriber. Use medicines responsibly – see www.noah.co.uk.

For more details, please contact:

+44 (0) 1280 814500 uk_office@vetoquinol.com www.vetoquinol.co.uk

vetoquinol
ACHIEVE MORE TOGETHER

Art8692