



9th International
Veterinary Behaviour
Meeting



PROCEEDINGS OF THE

9th International Veterinary Behaviour Meeting

Lisbon, Portugal

26–28 September 2013

INCORPORATING

19th meeting of the European Society of Veterinary
Clinical Ethology (ESVCE)

3rd annual meeting of the European College of
Animal Welfare and Behavioural Medicine (ECAWBM)

3rd annual meeting of the Portuguese Association
of Behavioural Therapy and Animal Welfare (PsiAnimal)

EDITED BY

D. S. Mills, G. Da Graça Pereira, D. M. Jacinto

ESVCE



EUROPEAN COLLEGE OF
**Animal Welfare
and Behavioural Medicine**



Associação Portuguesa de Terapia
do Comportamento e Bem-Estar Animal

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This collection of papers was first presented at the 2013 International Veterinary Behaviour Meeting comprising the 19th Annual Congress of The European Society of Veterinary Clinical Ethology (ESVCE), the 3rd Annual Congress of The European College of Animal Welfare and Behavioural Medicine (ECAWBM) and the 3rd Annual Conference of The Portuguese Association of Behavioural Therapy and Animal Welfare (PsiAnimal). The meeting took place in Lisbon, Portugal from 26–28 September 2013 and was hosted by the PsiAnimal in conjunction with ESVCE and ECAWBM.

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Preface

It has been a few years since I have been involved in editing the proceedings of the IVBM, and I can still clearly remember editing the first ones in 1997. This is perhaps testament to the power of negative reinforcement, but it has also been a pleasure, in many ways. I have had the good fortune to work with many excellent individuals along the way, and learnt much from all of them. One of the joys of science is sharing ideas and it being OK to change them in light of new information. IVBM has been at the heart of this process, helping many of us to view the science and practice of veterinary behavioural medicine in new and refreshing ways. The inclusion of the Animal Welfare and Ethics dimension in recent years, only enhances this process. We hope everyone gets to share in this process at Lisbon. However, despite my excitement at this meeting, I am sad to say that my original co-editor Sarah Heath, had to withdraw for health reasons. Sarah will be known to many of you, and has worked tirelessly to promote the discipline at national, European and international level. If you are grateful for there being IVBM meetings or a European Society of Veterinary Clinical Ethology or European College which recognises this discipline as a specialty, you have a lot to thank Sarah for and so, I am sure we all hope she will soon be able to join us again. Sarah, thank you for everything you have done to help the profession. These proceedings are dedicated to you.

Goncalo and Diana have worked tirelessly to ensure that the work of contributors has been accurately relayed to me, and any errors in the editing process are my own, for which I apologise. I am sure there will be some, but I hope, that for once I haven't edited Karen Overall out of the proceedings! Twice she has been the unfortunate recipient of editorial errors – in 1997 we accidentally printed the same paper twice in place of one of her contributions, and we somehow missed out a paper altogether in 2005. I was mortified, but Karen seemed to find it amusing and perhaps this reflects the spirit of IVBM. We come together in good faith, to do our best, but recognise that none of us are perfect, but we learn and have a good time along the way.

On that note I wish you all a great meeting. Like many others I look forward to catching up with old friends and making new ones and learning much.

Daniel S. Mills Lincoln 2013

Welcome from IVBM conveners

PsiAnimal

Dear Colleagues and Friends,

It is a great pleasure to receive you all at the 9th International Veterinary Behavior Meeting (which joins the 19th Meeting of the European Society of Veterinary Clinical Ethology, 3rd Annual Meeting of the European College of Animal Welfare and Behavioural Medicine and the 3rd Annual Meeting of the Portuguese Association of Behavioural Therapy and Animal Welfare – PsiAnimal) held in Lisbon, Portugal.

This meeting is aimed at bringing together individuals and organizations currently working in the fields of Animal Behaviour, Veterinary Behavioural Medicine, Welfare and Ethics. It provides a unique opportunity for meeting and networking with a diverse range of experts, academics and professionals from all over the world, for sharing information and learning about the most recent research findings. We have a fantastic programme during these 4 days and I want to thank all who submitted papers and are here presenting their great scientific work. There are 4 invited speakers in the State of the Art lectures that will add lots of discussion and interest. They are: Gary Landsberg (Canada), Karen Overall (USA), Kendal Shepherd (UK) and Xavier Manteca (Spain). Many thanks to them for accepting our invitation.

At the end of each working day the social programme will make this Meeting unforgettable. It will start with a Welcome Drink with a Portuguese Wine Tasting Session, followed by dinner at a winery themed restaurant. The day after will include a dinner meal and an unforgettable Fado experience (the quintessential expression of the Portuguese soul, and a music genre recognized by UNESCO as an intangible cultural heritage) while enjoying traditional Portuguese food. Finally the Gala dinner will be at Lisbon castle with an outstanding sunset view over the city. Portuguese people are recognized all over the world for their way of receiving people and I am sure that all of us will enjoy each moment, especially with lots of good food and environment.

You can also ramble through and lose yourself among Lisbon's colorful and picturesque streets, full of captivating details and breathtaking views, or enjoy its Mediterranean climate in the nearby Atlantic beaches or along the Tagus River...

This Conference was only possible due the sponsors that kindly supported us. Most of them will be on stands during the Conference and will freely pass on information about their products relating to behaviour and welfare. I want to

include here a special thanks for the Director of the Faculty of Veterinary Medicine of Universidade Lusófona, Professor Laurentina Pedroso, who gave us all her support including all the facilities of this University to develop this project.

Finally I have left my last few lines for my Portuguese team. Without them it was impossible to achieve the goals that PsiAnimal proposed for the organization of this Conference. I want to name them all in order to publicly thank each of them and without any preference (but alphabetic order!): Carla Rodrigues, Diana Jacinto, Helena Costa, Raquel Matos, Sara Fragoso and Válter Alves. Without each one of you, who accepted me exactly as I am with all my working schedules, goals, plans and deadlines, this was never going to be possible. In this team I want to mention the promotion made by the national veterinary journal *Veterinária Atual*, through its Editor, Sónia Ramalho. Last words for my kind students, future veterinarians already sensitized to behaviour, welfare and ethics, who will provide logistic support during the Conference.

We are here in Lisbon receiving you all with arms wide open, at what promises to be a stimulating and enjoyable event!

Welcome and hope to see you here in Lisbon in the future!

Gonçalo da Graça Pereira PsiAnimal President

Welcome from ESVCE

Dear Delegates,

It is a great pleasure to welcome you to the 19th meeting of the European Society of Veterinary Clinical Ethology (ESVCE), which is being held in Lisbon, Portugal.

The meeting takes place in the course of the 9th International Veterinary Behaviour Meeting and in conjunction with the 3rd annual meeting of the European College of Animal Welfare and Behavioural Medicine) – ECAWBM (formerly ECVBM-CA) and the 3rd annual meeting of the Portuguese Association of Behavioural Therapy and Animal Welfare (PsiAnimal).

ESVCE not only encourages and aims to facilitate co-ordination of research and other contributions to knowledge related to diagnosis, therapy, prevention, and control of behaviour problems in animals; ESVCE also aims to further the education in veterinary clinical ethology and to encourage communication and co-operation among its members and with other behaviour oriented organizations.

From its infancy nearly 20 years ago to now, veterinary ethology have become widely recognised as a special field in veterinary medicine, not only in Europe but worldwide. ESVCE comprises members from thirteen European countries and such a meeting not only gives an overview about the state of the art and science in the field while playing an important role for achieving ESVCE's goals – it also means a chance for delegates from all over the world to come together for learning, discussions, meeting old friends and finding new ones.

For this meeting, our boards have attempted to address the feedback from behavioural practitioners with a program that keeps the balance between research, case reports, and reflections from veterinary behavioural practice. In addition some excellent speakers, being Karen Overall from the USA, Kendal Shepherd from the UK, Gary Landsberg from Canada and Xavier Manteca from Spain have been invited, adding to this conference an extra touch of scientific glamour.

The congress would not be possible without our sponsors. Without their sponsorship events like these would not be possible. We would like to encourage you to visit their stands in the commercial exhibition during the congress.

A big thank you goes to them but also to all helpers. I will not start naming them all as for sure I will forget someone ... But the PsiAnimal folks deserve our special thanks for organizing a congress in this wonderful venue. And of course I thank all delegates: with your participation you make this meeting an event.

In the name of the ESVCE board I wish you an interesting and pleasant stay in Lisbon and hope you will enjoy the congress.

Barbara Schöning ESVCE President

Welcome from ECAWBM

Dear Delegates,

On behalf of the European College of Animal Welfare and Behavioural Medicine I would like to welcome each of you to the 9th International Behaviour Meeting. This is a joint event with the European Society of Veterinary Clinical Ethology and PsiAnimal (Associação Portuguesa de Terapia do Comportamento e Bem-estar Animal).

It's an exiting time for our college as we continue to grow and advance in the field of applied animal behaviour, including the behavioural medicine and the animal welfare subspecialties.

We cannot thank enough the local organizing committee for all their efforts in organizing and promoting a complete scientific program, a set of very promising invited lectures and last but no least a very tempting social program.

The scientific program of our college day would have not been possible without the help of the scientific committee.

I would also like to thank all our sponsors for helping us in making this meeting possible. Don't forget to spend some time at the commercial exhibition for the last update on products and resources related to our field.

As you know Lisbon is a great tourism (and food and wine) destination. There will be plenty to do and see while we are there and I encourage you to spend a few extra days to appreciate Portuguese hospitality.

I look forward to personally greeting you during the meeting.

Jaumé Fatjó ECAWBM President

Invited speakers' presentations/notes

- Gary Landsberg
- Kendal Shepherd
- Karen Overall
- Xavier Manteca

Handling the difficult cat: From clinical examination to blood sample

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Veterinary visits can quickly become unpleasant for many pets. How the visit is managed can determine whether the outcome is positive or negative. The goal should be to make each visit positive. The use of drugs can prevent injury as well as avoid an unpleasant outcome for the cat.

Preventive strategies

During every veterinary visit, beginning with the very first kitten visit, every effort should be made to insure a feline friendly veterinary experience, using special treats, toys, catnip and gentle handling to build positive associations, while minimizing or preventing unpleasant experiences. Problems can be prevented by considering each component of the visit; crating, travel, procedures, the hospital environment, and the attitudes and actions of the veterinarian, staff and pet owner to accentuate the positives and eliminate the negatives.¹

Cat communication

Learn to recognize body postures, facial expressions and vocalizations that indicate a relaxed state, a desire to positively interact as well as signs of fear and anxiety. Move slowly and watch closely because signs of fear can be subtle and change quickly. Calm cats may explore and seek interactions. As fear increases, the cat may become tenser, ears turn horizontally, the back begins to arch, tail and feet tuck under the body and pilo-erection occurs. If approached further or the cat is unable to escape there may be increasing escalation with flattened ears, twitching tail, pupil dilation and hissing or growling. Unless safety is an issue, cease and

step back until the cat settles. Then proceed slowly with treats, toys, or catnip to encourage positive outcomes.

Why are cats aggressive at the veterinary hospital?

The main reason that cats display aggression is fear and anxiety. Once fearful, continued approach or restraint can lead to aggression. If the pet learns that aggression is successful at removing the threat, the behaviour is negatively reinforced. Fearful responses or fear evoking actions by owners, veterinarians or staff will further increase fear and aggression. The greater the restraint, the more the resistance.

Minimizing fear from travel through procedures

i) Positive crating and travel

The cat should control/choose to enter using treats, bedding, catnip or Feliway to entice the cat. Reward approach and entry – consider clicker training. Crates with top entry or a removable top may be more practical for handling. Once adapted begin to accustom the cat to carrying and car rides while giving treats and food toys.

ii) Feline friendly veterinary environment – facility, scheduling and flow of activity

Consider separate cat and dog waiting areas, separate times of day for cat appointments and cat dedicated exam rooms. Be prepared to direct the cat into an open exam room to avoid potential fear evoking stimuli.

Sensory input will strongly influence the emotional response of the cat. Examination and procedures should be performed in rooms where fear evoking sounds can be minimized. Odours should be removed by gentle washing and the use of animal odour eliminators. Feliway or Felifriend can help calm. The emotional state of both owners and staff can either help to calm or evoke fear. Consider the surface where the cat is being examined to maintain warmth, comfort and security (e.g. blankets, towels, or bedding).

Cats that are hospitalized may do best if kept in their own carrier inside a hospital cage.¹ Hospital cages should be warm and comfortable, with bedding, litter, toys, the cat's own food, and an area for perching. Cat wards should be separate from dog wards to minimize sounds and odours. Lowered lighting, classical music, a Feliway diffuser and lavender aromatherapy may help to calm.

iii) Feline friendly handling

Train staff in feline friendly handling to assist in insuring a calm, positive experience. While greeting the client and taking the history, open the carrier and allow the cat to come out on its own onto the floor, a chair or exam table. Approach slowly and avoid reaching, staring, or sudden movements. If the cat will not come out voluntarily try leaving treats in front of the carrier or enticing it with treats or a toy. Avoid reaching in or grasping by the scruff. Instead remove the top of the cage and lift the cat out, with the aid of a towel if necessary. Some cats will be more comfortable remaining in the bottom half of their carrier for some or all of the examination.

Offer high value food treats throughout procedures to encourage and maintain a positive experience. During the examination and procedures proceed slowly and rely on the cats' responses and body language to determine the best techniques and preferred location (on your lap, on the floor, on the table, bottom half of the carrier). Physical contact should be minimal unless the cat solicits. Always use the least amount of restraint necessary to achieve success, and if practical allow the cat to select the position that it would prefer whether sitting, standing or lying down. (e.g. vaccines, blood collection, cystocentesis). Use your arm or body or a towel in front of the cat's chest to maintain the cat in place if it pushes forward. Where necessary use a towel or blanket to swaddle the cat or cover its head to help it feel more secure. Learn a variety of towelling and handling techniques to be able use strategies that are appropriate for the pet, the situation, and the procedure to minimize fear, and insure safety. Injections should be warmed to room temperature, and given with a new small gauge needle, while distracting with treats. Some cats accept and enjoy gentle massage between the ears. A topical anaesthetic or transmucosal opioid might be used to reduce pain. Be certain to keep records of any problems and how they might be best managed for future visits.

Managing the fearful cat

When the cat is too fearful to manage with low stress handling, the options would be to:

- a) finish the procedure with a combination of calm management, minimal restraint, high value rewards and products such as blankets, towels or perhaps a cat bag
- b) dispense anxiolytic medication for the next visit or give injectable sedation for the present visit or
- c) desensitization and counterconditioning prior to the next visit if the owner is willing, able and has the time and patience to gradually expose the cat to each

component from crate to car ride, handling, mock procedures, clinic and staff, while pairing with favoured toys, treats, catnip or massage.

Sedative effects are most profound, predictable and potentially reversible with intramuscular sedation. Restraint for injection can generally be accomplished with a towel or blanket or rarely a net or gloves if required for safety. An anaesthetic induction chamber may be effective but anaesthetic levels are more difficult to gauge and staff exposure to the gas may be an issue. Optimal and balanced sedation would include combinations of butorphanol (or an alternate narcotic), low dose dexmedetomidine or medetomidine (if no cardiac compromise), and midazolam (for anxiolytic, muscle relaxant and amnesic effects). In more fractious patients ketamine might be added (see table 1). Acepromazine might be used in place of the narcotic but is less reliable in cats.

Table 1: Doses for intramuscular sedation²

DRUG	DOSE
Butorphanol ^a	0.2 mg/kg (range .1–.4 mg/kg)
Dexmedetomidine	0.002–.01 mg/kg
Midazolam	0.05–0.2 mg/kg
Ketamine (if needed)	2 to 5 mg/kg

^aCan substitute buprenorphine at 0.02–0.04 mg/kg, morphine at 0.2 to 1 mg/kg, hydromorphone at 0.5–.2 mg/kg or fentanyl at .005–.02 mg/kg

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Further resources

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Handling the difficult dog – from attitude to muzzle

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In describing a dog as 'difficult', we mean one which is at risk of displaying aggression and biting when handled closely, thus putting veterinary staff as well as clients at risk. Historically, such a dog has been handled with as much force as is necessary to prevent the contact of teeth with human skin. However, unless the underlying emotional and learned causes of canine aggression are taken into account, simple physical restraint carries serious implications for a patient's mental welfare as well as risking severe behavioural deterioration in the future. Such deterioration may not only be shown within the confines of the veterinary clinic but may also spread into the wider world, carrying a risk to public safety as well as the client's family and friends.

To address these concerns, it is first necessary to understand how the experience of veterinary handling, either in a single episode or over time, may inadvertently undermine a dog's confidence in being able to communicate fear and unease to companions in the face of threat. The domestic dog has been strongly selected for appeasing and threat-averting gestures which ought to result in the immediate cessation of threat. Yet many veterinary procedures are inherently threatening to dogs and success of veterinary treatment may inevitably involve ignoring a dog's attempts to avert threat. If these attempts are unsuccessful, the failure of otherwise adaptive behaviour can produce extreme emotional conflict with aggression as a result. By such means, a puppy who seemed to be 'fine' when presented for its first vaccination, meaning that although looking nervous, it did not try to bite, is not so 'fine' later in life and is now a potential danger.

In an ideal world, all dogs ought to be brought up to enjoy the veterinary experience, not only to reduce risk to human attendants but to ensure that any animal can receive the best of veterinary care and attention. But in the absence of this utopia, what can immediately be done to address a dog's fear-based aggression and, as a consequence, reduce the risk the dog poses to all those it comes into contact with, improve its emotional welfare and enable the best veterinary care?

Both short-term and long-term solutions need to be addressed. Is this a dog which needs urgent thorough examination and diagnosis right now – or a dog which, year by year, has become less handleable with each successive veterinary visit? Many immediate changes in context, which therefore alter the predictive value of the environment to the patient for the better, can be made to improve both inward emotion and outward behaviour, which as a consequence, reduce a dog's need to display aggression. The conditioned emotional response to obedience commands (see diagram) is particularly useful in altering a dog's perception of the environment for the better and allowing a 'window of opportunity' to guide behaviour appropriately.

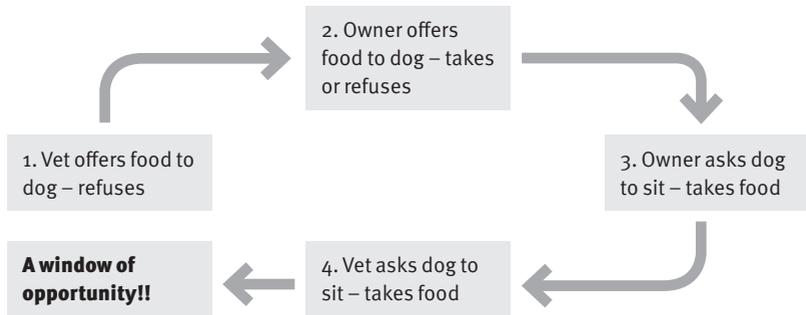
In the longer term, desensitisation and counter-conditioning protocols can be used to prepare a dog, not only to tolerate, but even to enjoy all the facets of veterinary attention. To do so involves breaking down the context into its constituent parts, as if it were a jigsaw, and ensuring that, before the jigsaw is reassembled, the patient tolerates all individual pieces – being touched on various parts of the body, having a foot held, seeing a syringe and needle or eardrops, etc.

Conditioning a dog at home using positive rewards to management and safety devices, such as head halters and muzzles, is also essential but, other than in an emergency, these devices should not be used to handle, and therefore threaten, a dog with impunity simply because they cannot bite. Their value, if correctly used, is, not only in preventing the possibility of a bite, but also in improving a client's confidence in communicating with and handling their pet. By improving the trust between them, then in all contexts aggression becomes less likely.

Whether one's goal is to give the best veterinary care one can, to keep one's clients and the public safe, or to consider the welfare of patients in all its aspects, dogs of all ages must be continually guided towards behaving appropriately. Such an approach must not be reserved for those animal already posing a risk of 'being difficult', but be applied to all patients throughout their veterinary career.

Further reading

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Conditioned emotional responses to obedience commands

Psychopharmacology

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Overview of medication

Medications commonly used to treat behavioural conditions in dogs and cats are usually antidepressants and anxiolytics that fall into 3 main classes:

- the benzodiazepines (BZDs: alprazolam, clorazepate, diazepam, midazolam, oxazepam, clonazepam, lorazepam, temazepam),
- the tricyclic antidepressants (TCAs: amitriptyline, nortriptyline, clomipramine, imipramine, doxepin), and
- the selective serotonin reuptake inhibitors (SSRIs: fluoxetine, paroxetine, sertraline, fluvoxamine, citalopram, escitalopram).

Increasingly we see patients treated with:

- noradrenergic reuptake inhibitors (NRIs: reboxetine)
- dual serotonin norepinephrine reuptake inhibitors (SNRIs: venlafaxine, duloxetine),
- dual serotonin 2A agonist/serotonin reuptake inhibitors (SARIs: trazadone, nefazodone), and
- noradrenergic and specific serotonergic antidepressants (NaSSAs: mirtazapine).

Less commonly used medications, or those with more restrictive populations likely to benefit include:

- monoamine oxidase inhibitors (MAO-Is: selegiline),
- azapirones (buspirone),
- centrally acting alpha agonists which may act as hypotensives, decreasing cardiac output and peripheral vascular resistance (clonidine, guanfacine, medetomidine and dexmedetomidine, all centrally acting alpha_{2A}-adrenergic receptor agonists; dexmedetomidine also affects alpha_{1A}-receptors),
- NMDA antagonists (memantine),
- sympathemimetics (dextroamphetamine, methylphenidate) and
- hormonal agents.

All of these medications cause their effects through modulation of the neurotransmitters serotonin (5-HT), dopamine (DA), noradrenaline/norepinephrine (NA/NE) and/or gamma amino butyric acid (GABA), and their related metabolites (e.g., the excitatory amino acid glutamate, which becomes GABA). Accordingly, any medication, supplement or dietary constituent that shares a metabolic or synthetic pathway with any of these neurotransmitters or medications can affect the amount of any medications available and their utility.

Acepromazine (ACP) is not a behavioural medication and should be avoided in patients with behavioural concerns, especially those with heightened noise reactivity. Phenothiazines can depress the reticular activating system (RAS) affecting body temperature control, basal metabolic rates, vasomotor tone, alertness, emesis and hormonal balance. Phenothiazines can also have – and may be used for – their anticholinergic, antihistaminic, antispasmodic, and alpha-adrenergic blocking effects. The alpha-adrenergic antagonist effect is relevant if clonidine, TCAs, SSRIs, SARIs or SNRIs are concomitantly used. Recent research indicates that acepromazine does not increase the risk of seizure activity, as previously thought, within therapeutic ranges. Any animal who is profoundly fearful or anxious for any reason and who experiences the RAS and alpha-adrenergic blocking effects of phenothiazines will become worse quickly because they are experiencing profoundly scary and unpredictable stimuli that they cannot understand *and so will worsen with such treatment*. Over time, chronic use of acepromazine necessitates higher dosages because treatment re-regulates the dopaminergic system, and is often associated with extrapyramidal motor signs. These signs also worsen any anxious, fearful or panicky responses.

Clients worry about side effects, so it is essential that the veterinary team has an accurate understanding of relevant risk.

- Common adverse effects of psychotherapeutic drugs are usually caused by a blockage of the muscarinic acetylcholine receptors, which have diffuse connections throughout the brain.
- These 'common' side effects are actually not very common and generally manifest themselves as *transient* changes.
- The most common complaints are related to gastrointestinal function, appetite change, sedation or alterations – usually increases – in heart rate.
- For the overwhelming majority of patients any side effects will truly be transient, occurring within the first week; however, if any side effect is *not* transient, clients need to understand that their pet may be experiencing a serious problem.
- For this reason, it is important to encourage clients to help monitor both their animal's response to the medication, and any side effects that they may have.

While many benzodiazepines (BZDs) can be sedative, the BZDs now used most

commonly (e.g., alprazolam, oxazepam, clonazepam) are less sedative than diazepam and clorazepate.

- Because dogs and cats, like humans, can experience a huge range of effects when given a BZD, clients should be encouraged to give any BZD when they can monitor the patient. This means that the first dose or 2 should be given when the client is home and can watch the dog or cat.
- Clients can test and monitor for side effects, and can learn if a BZD is effective for their pet.

Because the most severe side effects of TCAs, SSRIs and the more recently popular serotonin 2A antagonist/reuptake inhibitors (SARIs) can involve cardiac affects, *clients should and can easily learn to take pulse rates, which may be the first sign of developing serotonin syndrome*. Slight increases in pulse rate are not worrisome. Huge, sustained increases in heart rate are problematic. If clients know that their dog's resting heart rate is 65 bpm and with medication this changes to 150 bpm, they can immediately bring this change to their veterinarian's attention. Likewise, if the increase is minor (65 to 75 bpm) the client can take notes and not worry.

- *For this reason, baseline ECGs are recommended for any patient who has had a history of any arrhythmia, heart disease, prior drug reactions, is on more than one medication, and who may be undergoing anesthesia or sedation.*
- Cats may be more sensitive to cardiac side effects than are dogs, and, minimally, a lead II ECG evaluation for any arrhythmias should be done before treating cats with agents that may affect serotonin.

Most behavioural drugs are metabolized through renal and hepatic pathways so knowledge of baseline, pre-medication values is essential. Liver dyscrasias and cardiac arrhythmias may not rule out the use of a drug, but knowing that they exist can serve as a guide to dosage and anticipated side effects. Annual laboratory evaluation can help monitor changes in renal or hepatic function that may affect metabolism of behavioural medications. Should changes occur their magnitude can guide alterations (usually decreases) in the dosages of behavioural medication. Knowledge of intermediate metabolites can also be important: animals experiencing sedation or other side effects with the parent compound, may do quite well when treated with the intermediate metabolite, alone.

Atypical reactions can occur so for any unexplained or sudden illness, laboratory evaluation is essential. If any rare, but profound alteration in hepatic function occurs, immediate withdrawal from behavioural medicine is an option while the patient receives supportive care. While dogs have been known to die of toxic overdose of their owners' medication, there have been few confirmed cases of death due to behavioural medication prescribed for the dog at therapeutic dosages.

The absorption of behavioural medications occurs passively in the small

intestine and the efficiency of absorption is affected by the physiology/metabolism of the patients, whether food is present, and how the medication, itself, is compounded.

Most behavioural medications used are best absorbed on an empty stomach. Food decreases the rate of absorption which may be part of the desired effect, but if a quick peak effect is desired (e.g., as is true for treating panic), full stomachs may alter the rate at which medication is absorbed (but not usually peak levels).

Educated clients will monitor their pets better, will be more willing to use medications and behaviour modification appropriately, and will be more enjoyable clients for their veterinarian. Clients should receive a complete list of all potential adverse responses and should be encouraged to communicate with the veterinarian at the first sign of any problem. Clients are often very distressed after a behavioural consultation and need a written reminder of situations for which they should be alert.

This practice of encouraging clients to be active participants in care and monitoring of their pet is extremely helpful in ensuring that we recognize animals with atypical or serious sedative responses so that we can find more appropriate medications with which to treat them.

All psychotropic medications can interact with other medications. For example, use of TCAs, SSRIs and related drug classes will cause thyroidal values – whether or not supplementation is involved – to read falsely low. It is essential to know about this interaction when evaluating an animal's true thyroid status. This issue is especially germane for dogs, for whom there has been a cyclic vogue for non-specifically treating dogs with behavioural concerns and borderline thyroid values with thyroxin. There is now good evidence showing that most behavioural concerns are not directly associated with any thyroid dysfunction, although such dysfunction may certainly affect behaviour.

Many serotonergic agents are thought to lower thresholds and so are recommended with caution in patients treated with a history of seizures. The story is considerably more complex than this. For both humans and dogs anxiety, itself, may lower seizure thresholds and so *treatment of the anxiety may actually raise the seizure threshold* and allow the patient to successfully decrease the amount of seizure medication needed.

Finally, the client household must be considered when the decision to use behavioural drugs is made. Substance abuse is rampant in humans and some medications used to treat canine and feline behavioural conditions have a high human abuse potential.

No modern pharmaceutical intervention for veterinary patients with behavioural problems is intended to sedate or 'drug' the dog or cat. If this is the outcome, the patient is experiencing an undesirable effect. Options include discontinuation through weaning, altering dosage or frequency of dosing and/or changing medications.

The key to understanding usage of psychotropic medications is two-fold:

- These medications are designed to directly address the underlying anxiety and other neurochemical concerns that are at the root of most behavioural concerns.
- As supported by every double-blind, placebo-controlled study published, these medications speed the rate at which patients acquire new behaviours through positive reinforcement and behavioural modification. It is likely that this synergistic effect is the result of alterations of neuronal chemistry and molecular biology that favours the translation of new proteins. Accordingly, there is no reason to deprive any patient of medication as part of an integrated, holistic, complete behavioural program of humane intervention.

Nutraceuticals

Nutraceuticals, food products that provide health and medical benefits by affecting physiology, and dietary supplements are appealing to clients because they appear to have fewer risks than do pharmaceuticals. This perception is not completely accurate, and nutraceuticals and supplements *can* be directly responsible for undesirable effects and may interact with many classes of medications because of interactions mediated through the cytochrome P-450 system.

The most common roles for compounds found in, or added to diets fall into a few classes:

- neuroprotective agents,
- anti-oxidants, most of which should be neuroprotective,
- ROS/free-radical scavengers, most of which should be neuroprotective,
- precursor neurochemicals which are postulated to affect the behaviours associated with the neurochemical of interest with the intent to enhance cognition or decrease reactivity,
- enzymes, co-enzymes or cofactors for some aspect of Kreb's cycle function or neurochemical production, and
- sources of energy for brain metabolism for enhanced cognition and neuro-protection.

These compounds contribute to the maintenance of cellular metabolism and to efficient neuron-to-neuron communication, processes essential to keeping brain neurons plump, healthy and functional.

Nutraceuticals that are being/have been investigated for effects in veterinary behavioural medicine include:

- Alpha-casozepine (Zylkene®; a constituent of the CALM® Diet [Royal Canin]), an alpha casein derivative, has been used to treat non-specific anxiety in cats

and dogs. Alpha-casozepine is similar in structure to GABA and has an affinity for GABA-A receptors.

- L-theanine (Anxitane®), the levo-rotatory isomer of the theanine. It is naturally occurring in the tea plant and thought to lessen some stress conditions and mild anxiety related problems in pets. L-theanine is an analog of glutamic acid. As such it may inhibit reuptake of glutamate by the glutamate transporter and so increase GABA concentrations. Because high glutamate levels have been associated with neurocytotoxicity, L-theanine may also have a neuro-protectant effect, and may modulate any neurotransmitters that interact with glutamate receptor subtypes (e.g., serotonin, dopamine).
- Harmonese®, a 'natural proprietary blend of a patented extract of *Magnolia officinalis* and a proprietary extract of *Phellodendron amurense*' These compounds have been reported to decrease mild, transient stress and the derivatives honokiol and magnolol from *Magnolia* have been shown to have in vitro GABA_A modulation capability. In one cross-over study of laboratory beagles who were mildly reactive to CDs of storms, but who did not show clinical signs of noise phobia, there was a mild, but significant effect of Harmonese on activity level.
- Calmex®, a VetPlus product, contains a combination of L-theanine, L-tryptophan, an array of B vitamins and *Piper methysticum*.

Author's note: These notes are abstracted from: Overall, K. L. 2013 *Manual of Clinical Behavioral Medicine for Dogs and Cats*, Elsevier.

Assessing the welfare of dogs and cats (Part I)

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The objective of this presentation is to discuss the concept of animal welfare (AW) and its relationship with that of quality of life (QoL). AW can be defined in a number of different ways, but there is a growing consensus that whatever the definition, it has to include three elements: the emotional state of the animal, its biological functioning and its ability to show normal patterns of behaviour. Indeed, it is now widely accepted that an animal's welfare embraces its physical and mental state and that good AW implies both fitness and a sense of well-being. QoL refers to the balance between positive and negative experiences in the life of an animal. Since the subjective feelings of the animal are an essential part of its welfare, a logical argument is that welfare will be reduced by negative subjective states and that it will be improved by positive states such as comfort and play.

Therefore, it is clear that QoL and AW are very closely related and some authors consider that both concepts are simply equivalent. However, QoL is mainly about one of the three elements of welfare, namely the emotional state of the animal. Also, whereas so far most welfare research has focused on conditions leading to poor welfare, the QoL approach considers both pleasant and unpleasant situations and QoL assessment would not be complete without including positive emotional states. This difference between the AW approach and the QoL approach, however, is mainly due to the fact that finding positive indicators of welfare has been very difficult. Finally, AW can be assessed over short or long periods of time, whereas QoL, being the balance between positive and negative experiences, is mainly relevant in the long term.

Assessing the welfare of dogs and cats (Part II)

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Following on from the previous paper (Assessing the welfare of dogs and cats – Part I) this presentation has two objectives: to discuss the basic principles of animal welfare (AW) assessment as applied to dogs and cats, and to discuss the welfare implications of behavioural problems of dogs and cats. AW has to be assessed using a combination of several indicators and these can be conveniently divided into animal-based and resource-based indicators. It is widely accepted that animal-based indicators have several advantages over resource-based indicators, as they provide direct information on the emotional state of the animal. Animal-based indicators include physiological parameters and behavioural changes. Most physiological parameters commonly used to assess welfare are related to the stress response. Although they can be useful in some circumstances, there are several problems related to their validity, reliability and feasibility that should be taken into account. Behavioural changes are among the main animal-based indicators and very often they are the first sign that animals are not coping well with their environment. Chronic stress and pain are major welfare issues and they often result in a number of behavioural changes, including deviations from normal grooming and feeding behaviour, changes in the general activity level and increased aggression. Behavioural problems may be both a consequence and a cause of reduced welfare. For example, many behavioural problems result from negative emotional states, including pain, chronic stress, frustration and fear. In turn, it has been shown that chronic stress or anxiety may result in higher disease prevalence and a shorter life expectancy. Also, animals showing behavioural problems may have fewer opportunities to engage in pleasant activities, such as play and physical exercise. Behavioural problems may also have more subtle effects on welfare, including negative cognitive bias as shown in dogs with separation anxiety.

Assessing the welfare of pigs

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The objectives of this presentation are to discuss some of the main welfare problems in intensive pig production and to introduce the Welfare Quality® protocol as it applies to pigs. In order to understand and improve animal welfare we need to identify the major welfare problems faced by each species. The Five Freedoms developed by the Farm Animal Welfare Council of the UK provided an elegant framework for doing this. These freedoms, which represent ideal states rather than actual standards for animal welfare, include:

freedom from hunger and thirst,
freedom from discomfort,
freedom from pain, injury and disease,
freedom to express normal behaviour, and
freedom from fear and distress.

Chronic hunger in pregnant sows is a welfare problem related to the first freedom. As hunger may increase aggression and lead to distress, restricted feeding of pregnant sows may also compromise the fifth freedom. Insufficient space allowance may lead to both physical and thermal discomfort, particularly in hot climates. Neonatal mortality and painful husbandry procedures such as castration and tail docking are welfare problems related to the third freedom. As for the fourth freedom, housing conditions that prevent the expression of rooting behaviour (due to the absence of adequate enrichment material) may lead to tail biting. Also, the inability to perform nest-building behaviour shortly before farrowing may cause a stress response in sows and this in turn may increase the duration of farrowing and the risk of cerebral hypoxia in piglets. Finally, poor stockmanship and aggressive behaviour are among the main causes of fear and distress. The assessment of these problems and some of the strategies that can be used to prevent them will be discussed, with a particular emphasis on the welfare assessment protocols developed in the Welfare Quality® project.

Assessing the welfare of ruminants

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The objectives of this presentation are to discuss some of the main welfare problems in ruminants, particularly in dairy cattle, and to introduce the Welfare Quality® protocol as it applies to dairy and beef cattle. As explained in the previous paper, the Five Freedoms developed by the Farm Animal Welfare Council provide a very useful framework to identify welfare problems.

Some of the main welfare problems in dairy cattle include inadequate resting behaviour, heat stress, painful conditions such as lameness, mastitis and some husbandry practices, and poor human-animal relationship. Inadequate resting behaviour and heat stress clearly compromise the second freedom, e.g. freedom from discomfort. Lying behaviour has been shown to be a fundamental requisite for good welfare in dairy cows and adequate resting behaviour results in higher milk production and reduced lameness, among other benefits. Cows are strongly motivated to rest and motivation to rest increases as the length of rest deprivation becomes greater. In fact, lying behaviour has a high priority for cattle after relatively short periods of lying deprivation and when lying and eating are restricted simultaneously, cows choose to rest rather than eat. Heat stress is a very common welfare and economic problem in hot climates and the main strategies to prevent it will be discussed. Lameness and mastitis are the most prevalent painful conditions in dairy cattle, but pain may also result from husbandry practices such as tail docking, dehorning and disbudding. Poor stockmanship causes chronic fear and reduced performance and is one of the main welfare problems in all farm species. Animal welfare has to be assessed using a combination of several indicators. One assessment system that can be very useful is the Welfare Quality® protocol, which is based on four principles of animal welfare, namely good housing, good feeding, good health and appropriate behaviour. Each of these four principles comprises several criteria, with an overall total of 12 criteria, and each criterion is assessed through several indicators.

SPOKEN PRESENTATIONS

**Long spoken
presentations**

Putting behaviour into practice: “Has he been behaving himself?”

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Behavioural medicine is often seen as a time consuming, specialist topic, thus precluding it from general practice. This study reviews dog booster vaccination consultations and identifies opportunities for incorporating behavioural medicine into everyday practice.

A mixed methods approach explored how veterinarians support welfare, in particular behaviour. Seventeen routine, dog booster vaccination consultations were videoed, involving six veterinarians in two UK small-animal practices. Thematic analysis identified topics discussed and who instigated the discussion. Post-consultation questionnaires provided participant information and perceptions.

Five main discussion topics were identified: navigation, medical, husbandry, behaviour and cost. Veterinarians led discussion of all topics except behaviour, which client and veterinarian instigated approximately equally, though with inter-veterinary variation. The questionnaire data showed that all clients considered their dog performed one or more behaviours of concern (58 problems in total). However, only 10 were mentioned to the veterinarians, who discussed them only superficially and offered no further avenues for assistance.

Factors impeding discussion of behaviour include veterinarians' experience and/or confidence and clients' perspectives on relevant sources of help (Roshier & McBride, 2012). With respect to these factors, further data analysis identified opportunities where additional questions could have aided disclosure of client concerns, and where behaviour support could have been offered.

The intention of these suggestions is that any veterinarian can apply them, whatever their experience of behavioural medicine. Veterinarians must raise awareness of behaviour and enable clients to discuss behaviour concerns.

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Fact finding: The applicability of the concept of dominance for domestic dogs

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The applicability of dominance in domestic dogs has been discussed during the last decade, among the main arguments contra being: in wild wolves fights about dominance have not been witnessed (Mech, 1999); feral dogs do not live in a pack structure, ritualized displays of dominance are rare and there is little indication of a relationship between dominance and reproductive success (Pal 1998, 1999); and no construction of a rank order in a group of castrated domestic dogs was found (Bradshaw et al 2009). Bradshaw et al also stated that dog behaviour deviates from that of wolves in several aspects, so that results on dominance obtained in captive groups of wolves cannot be applied to dogs. Unfortunately, none of these studies investigated formal signals of dominance or submission. Three quantitative studies (Cafazzo et al, 2010, Trisko, 2011, and van der Borg et al, 2012) confirm the existence of formal submission signals in dogs (e.g. lowered posture, muzzle licks and tail wags shown in a low posture). Moreover, rank orders based on agonistic dominance criteria are identical over different competitive contexts (Cafazzo et al, 2010). Earlier work from Bauer and Smuts (2007) revealed that mounts, muzzle licks and muzzle bites are formal signals of dominance and submission. These results corroborate earlier descriptions of formal dominance in captive wolves (van Hooff & Wensing, 1987, Fatjo, 2007). In humans, non verbal dominance signals include showing a high posture (Kalma, 1991), that coincides with dominance signalling in dogs, suggesting that dogs are likely to interpret human postural information as signals of dominance or submission.

The use of the dominance concept in dogs is therefore scientifically correct and useful to explain certain behavioural expressions to owners. Since in dogs submission-recognition seems far more important than enforcing status,

dominance-based training (e.g. forced role-overs, or other physical punishments) should not be promoted as useful methods to educate (problem) dogs.

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Do dogs having different genotypic and functional backgrounds perform differently in a two-way choice task?

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Recently, there has been growing interest in research on human like cognitive skills of dogs. Various research has reported that dogs had an innate talent to respond to a wide range of vocal or body language gestures of humans (Previde et al, 2007; Kupan et al, 2011). Wolves, on the other hand, were not as successful as domestic dogs when solving a task due to their decreased willingness to look at the human's face (Hare et al, 2002; Miklosi et al, 2003). The performance differences between a dog (*Canis familiaris*) and its ancestor, the wolf (*Canis lupus*), in a food choice task raised an important question of whether different breeds of dogs perform differently in a food choice task depending on their genetic and functional background.

In order to answer this question, we observed the performance of two breeds of dogs, i.e. Siberian Huskies (N=7) and Golden Retrievers (N=7), in a two-way choice task. We furthermore compared the latency of eye contact, number of correct choices, number of direct choices and latency of the selection between those breeds.

Results showed no significant differences in performance of those two dog breeds in a two-way choice task. However, we found that Siberian Huskies tended to display displacement behaviour more often and also were less keen to look at the human face in comparison to Golden Retrievers.

Based on the findings of the present study, one can suggest that although there may be some breed dependent differences in willingness to look at a human's face, human gestural signals are important cues for most of the dogs to solve a task.

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Is dog behaviour reported differently by men and women? Testing inter-observer reliability of the C-BARQ⁴² questionnaire

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Dog-related factors influence human-animal bond characteristics. Moreover, dog behaviour is implicated in dog abandonment and relinquishment. Owners' perception of dog behaviour can be evaluated through the validated Canine Behavioural Assessment and Research Questionnaire (C-BARQ⁴²) (Hsu & Serpell 2003). The aim of this study was to explore differences in evaluation of family dog behaviour between family members.

Forty-seven dogs were independently scored by one male and one female adult member in each household. Each person completed a Spanish language version of the C-BARQ⁴² questionnaire. Factor scores were analysed using Wilcoxon matched-pairs signed rank test and Spearman non-parametric correlation.

A significant correlation, and no significant difference, was found between male and female owner ratings for all C-BARQ⁴² factor scores. Some correlations were more significant than others (p ranged from 2.55×10^{-14} to 0.033) and the gradient of the correlation varied (r ranged from 0.312 to 0.853). The strongest correlations were found for dog-directed aggression ($r = 0.853$, $p = 1.32 \times 10^{-13}$) and stranger-directed aggression ($r = 0.841$, $p = 2.55 \times 10^{-14}$).

The lack of significant differences between male and female owner ratings, and the generally high level of correlation between ratings, suggest that C-BARQ questionnaire is a reliable inter-observer tool for evaluating dog behaviour. Additionally, we can propose that there are not sex differences, between men and women, when evaluating dog behaviour using this scale. Moreover, it seems that aggression is the most reliable factor that report different members of the family.

Further studies are needed to fully elucidate the reliability of C-BARQ⁴² questionnaire.

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Effect of dog appeasing pheromone (DAP[®]) collar on a model of sound-induced fear and anxiety

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A blinded placebo-study using a thunderstorm simulation recording was conducted on 24 adult Beagle dogs to assess DAP[®] collar effect in reducing sound-induced anxiety^{1,2,*}.

The dogs were allocated into 2 balanced treatment groups (placebo and DAP[®] collar) based on baseline anxiety scores when exposed to a thunderstorm recording. Each group was then exposed to additional thunder simulation tests on consecutive days (T1, T2). Each 9-minute simulation included three equal periods; 'pre', 'during', and 'post' thunder. Dogs were video-assessed by a trained observer on a 6-point scale for reactive (increased activity), autonomic (decreased activity) and global anxiety (combined reactive and autonomic).³ Each anxiety score was analysed using a three-way ANCOVA with test (Baseline, T1, T2), treatment, and time ('during' and 'post') serving as main independent variables, and 'pre' thunder serving as a covariate.

All anxiety scores were higher 'during' compared to 'post' thunder ($p < .0001$), but both were consistently higher than 'pre' thunder. Both 'global' and 'reactive' anxiety scores were significantly improved across 'during' and 'post' times compared to placebo at T1 ($p = .001$ for both) and T2 ($p = .007$ for global; $p = .022$ for reactive). DAP[®] significantly decreased global anxiety across 'during' and 'post' thunder times compared to baseline at T1 ($p = .006$) and T2 ($p < .0001$). There was no significant improvement in the placebo group over baseline at T1 and T2.

DAP[®] collars reduced global and reactive anxiety to a thunder recording, possibly by counterbalancing noise-related increased reactivity. This supports the use of DAP[®] for reducing noise-related fear and anxiety.

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*Study conducted in a certified Good Animal Practice facility and approved without reservation by local IACUC.

A model framework for the semi-quantitative assessment of ‘suffering’: Its use in predicting and retrospectively assessing the impact of experiments on animals

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The revised EU Directive controlling animal research requires both a prediction and a retrospective assessment of the degree of ‘suffering’. I propose a way in which a semi-quantitative assessment can be used to indicate when the permitted severity has been exceeded compared with the predicted level. The underlying assumption is that harms are directly reflected in experimental procedures and can be measured by choosing relevant criteria scored in terms of their intensity, duration, the number of animals, at critical time points in an experimental protocol. The second assumption is that for any given criterion the further an animal has deviated from normality, the greater will have been the impact on an animal’s homeostasis. Three increments of deviation are chosen in order to convert them into the recognised severity bands in the legislation of Mild, Moderate and Severe. A score of 0 (normal) or 1, 2 or 3 is then given for increasing deviation from normality. Thus at a particular time point in an experiment the number of animals showing that degree of deviation from normality can be calculated and scored. The predicted severity will be an average of 0, 1, 2, or 3, but if the actual score is more, then the severity band will have been exceeded. This will also allow for on-going monitoring of a project for any weighing of harms and benefits and highlight areas where refinement may be possible.

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The ethics of equine housing

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Horses are social prey animals, continuous grazers and tend to live in groups. Housing them in confinement, in social isolation with limited access to forage compromises their welfare. Thus they should be kept in stable social groups with access to suitable forage. This argument is strengthened from an ethical perspective. Attention to equine welfare does not only start in scientific curiosity, but also acknowledging horses as sentient beings whose interests are undermined if welfare is compromised. This normative starting point has practical consequences.

Taking equine welfare seriously often implies value conflicts, e.g., the claim that group housing systems require more resources. However, if we take equine sentience seriously then it is unclear whether these additional 'costs' can outweigh the risk of compromising equine welfare. We argue that from a moral perspective, the horse's basic interests simply cannot be overruled by such arguments.

Another solution is striving for compromise by altering the environment of the horse to include extra windows, or increase allogrooming opportunities by removing or modifying the top halves of barriers between stables. Regardless of whether this meets the horse's preferences, it touches upon another ethical problem. Animals do not only matter because they can suffer, but because they have an intrinsic value that doesn't coincide with their functional value. Consequently, our actions shouldn't merely strive for limiting harm, but should respect the animal and try to improve their lot. If it is not possible or financially viable to provide living conditions that safeguards equine welfare then perhaps horses shouldn't be kept!

Survey of tail injuries sustained by working gundogs and terriers in Scotland

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Non-therapeutic tail docking was banned in the United Kingdom by the Animal Welfare Act 2006. Secondary legislation passed in England and Wales allows for the docking of certain working dogs and breeds. Scotland, however, made no such provisions. This work was part of a study commissioned by the Scottish Government to ascertain what effect the total tail docking ban had on working gundogs and terriers and whether legal exemptions to the ban should be made.

An internet survey was conducted asking working dog owners in Scotland about injuries sustained by their dogs during one shooting season, to estimate the prevalence of tail injuries, assess the risk of tail injuries in undocked working dogs and identify risk factors for tail injuries.

1005 owners of 2860 working dogs responded. Tail injuries were reported by 29.3% of respondents, affected 13.5% of dogs, were mainly sustained during work (84.6%), and mainly caused by brambles and gorse. Compared to pointer/setters, retrievers or terriers (7.0%; 61/876), spaniels (17.8% (221/1238); p -value < 0.001) and hunt/point/retrievers (HPR) (15.6% (30/192) p -value < 0.001) were significantly more likely to have sustained at least one tail injury, especially if undocked (56.6% and 38.5% respectively; p -value < 0.001). Multivariable logistic regression models indicated that spaniels were 22 times and HPR 11 times more likely to have sustained a tail injury than other breed groups. Docking by one third or shorter resulted in a 20 to 25-fold reduction in the likelihood of tail injury overall. A substantial decrease of spaniels originating from Scotland after the tail docking ban was obvious.

We conclude that docking working HPR and spaniels by one third (but not shorter) would significantly decrease the risk of tail injury in these dogs. These data will provide a quantitative basis for discussion of the ethical issues surrounding the existing legislation.

A multivariate analysis approach to describe the influence of stress on growth in rainbow trout subjected to invasive husbandry maintenance

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In fish rearing, many events relating to husbandry maintenance may be considered stressful. During the stress, glucose is significantly released from the liver. In farmed salmonids, chronic stress can induce a decrease in immune, digestive and reproductive functions. The aim of the study was to assess the influence of stress on growth features in Rainbow trout subjected to invasive husbandry maintenance.

In this preliminary study, 7 groups of 6 trout (mean groups weight = 486.5 ± 38.9 g) were kept in 64L-tanks supplied with mineral water ($7 \pm 0.5^\circ\text{C}$) continuously filtered and oxygenated. Twice a day during 10 days, each tank was cleaned up with an aqua-vacuum, trout were manually fed at 1.5% of their body weight per distribution, and unconsumed pellets were collected. Husbandry maintenance represented around 20% of the daylight period. At the end of the experimentation, plasma cortisol level (PCL), liver weight (LW), weight gain (WG), food intake (FI) and feed conversion ratio (FCR) were measured. Principal component analysis (PCA) showed correlations between the studied parameters (Inertia = 83.0%). A strong positive correlation was found between WG and FI ($r = 0.86$). The FCR was negatively correlated with the WG ($r = -0.94$) and with the FI ($r = -0.72$). PCA showed a negative correlation between PCL and FI ($r = -0.84$). A high stress level seems to influence the food-related behaviour with a decrease in food intake, and therefore a decrease in weight gain because of a poor food conversion ratio.

A multivariate analysis can show correlations between physiological stress and other parameters and then allow researchers to create new tools for stress assessment.

Qualitative behavioural assessment of sheep during commercial road transport

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The present study examined whether observers could distinguish between sheep during road transport under different conditions in Australia.

Using Qualitative Behavioural Assessment (QBA), three factors were compared; trailer crate type (convertible or standard), the breed of sheep (Australian Merino or Fat tail), and the point of origin of the sheep (from sale-yard or feedlot). Sheep were video-recorded as a group during 56 short-haul (1–2h) road journeys and footage (1–2min clips) shown in random order to 26 observers. The routes taken included a period of continuous and stop-start driving from either the sale-yard or feedlot. Sheep selected for filming were located in the front pen of the top deck of the front crate of commercial livestock transport vehicles and footage was selected from the first 15 minutes of the journey.

There was significant consensus ($P < 0.001$) among the observers in terms of how they scored the behavioural responses of sheep in each of the treatment groups. Observers distinguished between the behaviour of sheep transported in different crate types ($p < 0.001$) and between breeds ($p < 0.05$) but not between those loaded at different origins. Sheep in the standard crate were described as more *calm* and *relaxed* while those in the convertible crate were described as more agitated and *anxious* on GPA dimension 1. Fat tail sheep were scored significantly more *agitated* and *distressed* while the merino sheep were described as more *calm* and *relaxed* on GPA dimension 1. No significant difference was detected in the behavioural expression of sheep loaded from the feedlot compared to from the sale-yard. These findings suggest that QBA could contribute to assessing the experiences of sheep undergoing road travel and assist in identifying specific stressors during transport.

Improving welfare in behaviour modification therapy by inducing positive affect through increased predictability and control – A multidisciplinary approach

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Jada, a 1.5-year old female spayed English cocker spaniel was referred for problems of arousal, barking and hypermotricity on walks and during car rides. Problems had started at the age of 4 months and had worsened for the last 12 months despite behavioural therapy.

The behavioural exam revealed emotional and physical arousal in new situations, towards new objects and benign social stimuli, or when anticipating food. The functional diagnosis of Jada's symptoms indicated a negative emotional state (chronic anxiety) and impaired wellbeing.

Initial treatment consisted of management, medication (SSRI) and behaviour modification therapy, including rehabilitation training. After three months, Jada's behaviour had not improved, mainly because food-reward training was not possible due to Jada's arousal in anticipation of food.

A new treatment angle was explored that consisted of restricting training to a setting that was associated with relaxation, thereby excluding all stress-inducing stimuli (including food). In the next stage, cues that predicted clear outcomes were introduced. To Jada, the training context had become predictable, controllable and associated with positive affect. Over the next months, Jada's behaviour improved considerably and within six months, she was able to relax and focus her attention on comfort cues, even in the presence of stimuli previously experienced as threatening.

To the authors' knowledge, this case report is the first to focus solely on inducing positive affect and increasing predictability of the environment to help overcome behavioural impairment in an anxious dog. These results are in agreement with recent developments in human psychology.

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SPOKEN PRESENTATIONS

**Short spoken
presentations**

Development of a model to assess anxiety in cats

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This study sought to develop a model for assessment of anxiety in cats that could be used for testing the efficacy of anxiolytics.

Forty-one cats characterized as anxious ($n=8$), mildly anxious ($n=9$), and non-anxious ($n=24$) by a veterinary behaviourist were evaluated on three 10 minute open field tests; alone, with an unfamiliar cat in a Vari Kennel, or with an unfamiliar human. Behavioural analyses were performed using an overhead camera with Ethovision Analysis software. Analysis of variance with follow-up post-hoc Fisher's tests was conducted using Statistica 11. We also obtained positive control data using diazepam on 8 anxious, 8 mildly anxious and 8 non-anxious cats.

In the open field, anxious cats were more inactive [$F(2, 38)=3.3880, p=0.04$] and showed the least vocalizations [$F(2, 38)=7.42084, p=0.002$] compared to non-anxious ones. This was also true in the presence of an unknown human or cat. There was a trend for non-anxious cats to have more frequent contact with an unfamiliar person than anxious and mildly anxious [$F(2, 38)=2.551868, p=0.091223$] and be in proximity to the human significantly more than anxious and mildly anxious [$F(2, 38)=4.026898, p=0.02$]. Diazepam produced an overall increase in behaviour [$F(1, 9)=26.07247, p<0.001$].

The response of both mildly anxious and anxious cats when exposed to an unfamiliar human provides a model for assessing fear of humans. Vocalization in response to placement in an open field provides a useful model for induced anxiety in non-anxious cats. Both can be used to assess anxiolytic effectiveness of therapeutic agents.

Demographics, lifestyle and behavior in domestic cats: Results of an international survey

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The presentation will describe the results of an international web-based survey of more than 2,700 cat owners who provided detailed information on the demographics, lifestyles and behaviour of their cats. Behaviour in different contexts was assessed by means of 155 separate 5-point frequency scales.

The majority (50%) of owners lived in the USA or Canada, 22% lived in the UK, 21% in Australia, and the rest lived mainly in other European countries. Fifty-three per cent of the cats were male, 96% were neutered, and 80% were either domestic short- or long-haired rather than pure-bred. The cats were acquired from a variety of sources including animal shelters (35%); friends, neighbours or relatives (18%); as strays (15%); breeding catteries (10%); veterinary clinics (7%) and other less common sources. Most (53%) were acquired as kittens (aged 2–6 months) or as young adults (6 months–2 years; 22%), and lived in houses (69%) or apartments/condos (28%). Close to 50% of the cats lived indoors only, 30% lived indoors with limited or supervised access to the outdoors, and only 20% had free access indoors and out. The majority (59%) slept on their owners' beds at night, or in another room in the house (35%), and were left at home alone for an average of 4.5 days/week and 4.6 hours/days. Seventy-eight per cent of cats were described as healthy, and 65% were reported to have no behaviour problems. Of the remainder, 29% were reported as having only minor behaviour problems, 5% had moderate problems, and less than 1% had serious problems.

Detailed analysis of the behavioural data is currently in progress with the goal of examining associations between behavioural variables and different demographic and lifestyle factors. These findings will be discussed.

Fear of thunder in dogs and owner related behaviour: An Italian survey

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Fear of thunder is common in dogs. The aim of this study was to investigate the interaction between individual personality, owner intervention and severity of signs during thunder exposure in dogs.

A 101 closed-item questionnaire was completed online by 611 dog owners. Multivariate analysis was by Principal Component Analysis (PCA) with varimax rotation, orthogonal projections to latent structures regression (OPLS), and PCA-hierarchical cluster analysis (PCA-HCA).

Groups of variables relating to dogs' behaviour during thunder events, owner interventions, and general behaviour of the dogs (not during thunder) were analysed independently by PCA. All models passed tests of model quality (Kaiser-Meyer-Olkin measure, Bartlett's sphericity test).

PCA of owner intervention revealed three principal components (PCs), which explained 69.5% of variance. These were termed 'petting', 'play' and 'punishment' according to the dominant loading variable for each PC.

OPLS of variables relating to dog's response to thunder against owner intervention factor score showed a strong and significant relationship ($R^2X=0.417$, $R^2Y=0.218$; $p<0.0001$) with characteristically different patterns of dog behaviour associated with the three styles of owner intervention.

Based on variables relating to the dogs' general behaviour (not during a thunder event) PCA-HCA identified two subgroups within the population, which were termed 'extrovert' ($n=414$) and 'introvert' ($n=197$) according to the dominant variables in the model. PC scores for behavioural responses to thunder were compared between these groups, and significant differences were found for 6 out of 7 PCs (Mann-Whitney U, $p<0.002$).

This study provides evidence for an interaction between owner behaviour, individual personality and thunder-response in dogs.

Testing for response and reactivity: What working dogs can teach us about measuring ‘normal’

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Much attention is now being paid to understanding cognitive abilities in dogs using tests involving ‘showing’/demonstration behaviours and problem solving. These tests have primarily been conducted using pet dogs volunteered for testing, a non-random and non-representative sample.

Using trained and/or working odour detection dogs and a 14-task assessment tool, we sought to assess similar aspects of cognition and global problem solving behaviours with a focus on attentiveness, novelty response, interest, signalling/showing, problem solving/‘boldness’, handedness and noise reactivity. The standardization of the testing procedures allowed us to evaluate dogs with respect to source (1 of 3 groups), breed (3 main breeds) and individual dog (126 individuals). The results of the assessments varied widely across and within breeds and among the sources. Regardless, 2 broad styles of problem-solving behaviour and behavioural reactivity emerged that may have wide applicability for understanding the behaviour of dogs, in general, especially if measured throughout ontogeny.

Pet dogs are seldom subjected to any kind of standardized behavioural assessment, whether through questionnaire or testing, and we lack assessments of ‘normal’ behaviour. The tests we used and the patterns elucidated suggest that pet dogs could be tested in a reliable/repeatable fashion throughout ontogeny in a way that begins to define normal patterns of reactivity and information acquisition and use. No such data currently exist, but the test outcomes for working dogs suggest that tests could be standardized for pet dogs, data cooperatively shared and behavioural ontogeny quantified. The implications for both research and welfare are non-trivial.

Association of synergic pheromones to control scratching behaviour: Interaction between facial pheromone (F₃) and feline interdigital semiochemical (FIS)

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Concerns related to inappropriate scratching are often reported in behavioural medicine. The aim of the study was to evaluate the effects of the association between F₃ and FIS in order to control scratching behaviour.

15 cats were evaluated during a standardized test: each cat was introduced into an area with two scratching posts; one previously scratched by the cat and a new one never scratched. The scratching post previously scratched by the cat was treated with F₃ or Placebo spray. The new scratching post was treated with the FIS or Placebo liquid. Experimental design use a crossover, randomized, blinded procedure. The treatments were applied on the scratching posts in three different settings (FIS+Placebo / F₃+FIS / Placebo+Placebo) and presented to the cat.

During each test (10 minutes) the cat was left alone in the test area. The first choice, duration, frequency and latency of scratching regarding each setting were evaluated. Two independent observers analysed the videos. 45 tests were recorded.

The cats showed preference for the FIS scratching post in the F₃+FIS setting only (ddl=1; S=6.4; p=0.011, McNemar test). Regarding the F₃+FIS setting, cats scratched for greater duration at the new scratching post (df=2; F=7.79 p=0.002

ANOVA) and with lower frequency on the previously scratched scratching post ($df=2$; $F=3.11$ $p=0.061$ ANOVA) compared to the other settings. Latencies of first scratch in the FIS scratching post were lower in the two settings of the FIS application ($df=2$; $F=5.01$; $p=0.026$ ANOVA).

This study highlights the value of associating two feline chemical messages to redirect scratching behaviour in the cat.

Development and application of a brain atlas for evaluation of canine cognitive decline using PET-MR techniques: Implication for early diagnosis of cognitive dysfunction syndrome

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Canine cognitive dysfunction syndrome (CDS) parallels several features of Alzheimer's disease; both are associated with decline in cognitive function, decreased brain volume, oxidative damage, cellular apoptosis, neuronal loss, and beta-amyloid deposits¹. However, cognitive/behavioural signs likely represent late stages of both diseases. In human aging, an early marker of cognitive decline is decreased cerebral glucose metabolism². The current study sought to establish the feasibility of using ¹⁸F-FDG PET-MR imaging techniques as an objective marker of functional brain decline in canine aging.

An isotropic anatomical atlas of the canine brain was developed using six T₁-weighted anatomical MR scans registered to form an average MR brain template. ¹⁸F-FDG PET-MR data were acquired on five young (average age 2.3 years) and five aged (average age 12.6 years) dogs. Cognitive function was assessed using both object discrimination and variable object discrimination tasks. Age effects were evaluated using independent t-tests.

Analysis of the MR data confirmed cortical atrophy with the third and lateral ventricular volumes found to be 2.13 times larger in aged compared to young dogs ($p < 0.0001$)³. Additionally, uptake in the occipital lobe relative to cerebellum was observed to be ~1.2 times higher in young versus aged dogs ($p < 0.0001$) and varied by task difficulty. Repeatability at 48 hours was excellent ($p < 0.002$).

Future work will further identify differences in uptake associated with cognitive tasks of varying complexity, which may provide an objective measure for determining age-related functional brain changes preceding CDS in client owned animals.

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Play is important, but has to be organized

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In Holland and Belgium, organized dog-dog play and social interaction is an upcoming tendency.

In general we know that play and social interaction between dogs is important (Bekoff, 2007; Miklosi, 2009). In the meantime, the urban city-dog is isolated more and more from other dogs (Coppinger, 2001).

After creating play therapy for shelterdogs, the author started different play and introduction courses for dogs of private owners. Each weekend more than 50 dogs play and socially interact in different classes. The purpose is to learn a wide range of social skills, so dogs can grow into being socially and mentally healthy dogs.

To manage this fragile social process, you have to choose appropriate play-mates. Therefore I test the levels of several social skills, self-confidence, together with other special characteristics (pedigree/individuality) of the dogs. This results in a wide range of classes of, for example, very anxious dogs to very rude dogs; classes for dogs with authority problems with other dogs, and classes for specific play-styles (greyhounds & American Staffordshire bull terriers)

In these special classes, social skills can be learned and practised with similar dogs. Later on, dogs with different social skills and characteristics can be (gradually) introduced.

In this presentation, I will show my techniques, the use of landscaping, but specially the process for selecting dogs on their social skills and other characteristics. Personal testimonies of dog owners will supplement this presentation.

Assessment of the impact of the puppy's education upon the behaviour of the adult animal

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Behavioural problems are very common and are one of the main causes of euthanasia and relinquishment of healthy dogs. The aim of this study was to assess the main aspects of a puppy's education and owner's management (type of training, routines, rewards used, etc.) and analyse the possible influence on adult dog behaviour.

This study was conducted at Bitxus Clínica Veterinaria in Reus (Spain). Forty animals of different breeds were included in the study. An 85 item questionnaire was completed by the owners when they came to the clinic for their annual vaccination. The questions included general information on the dog and other aspects related to the origin of the dog, socialization period, the environment where the dog was living and owner management. The data was analysed by means of chi-square-tests using the statistical package SAS (SAS.9.1.Institute Inc., Cary, NC, USA). A P value of 0.05 was considered significant for all analyses.

It was observed that the use of punishment was associated with worse results both in behaviour and obedience by the dog ($P=0.049$). The socialization of animals carried in the owner's arms the same effectiveness as being walked on leash ($P=0.18$). Moreover, animals of more than 20 kilos had better obedience and responded better to commands than smaller animals ($P=0.049$). Finally, dogs of more than 20 kilos had better walking routines ($P=0.012$).

Pilot study of the genetic basis of canine separation-related distress disorder

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Separation-related distress is estimated to affect 14–29% of companion dogs. It can profoundly compromise the human-animal bond, with affected dogs often being relinquished or euthanased. While many studies have examined the environmental factors involved in the development of the disorder, little is known about the genetic contribution. This project aims to increase our knowledge of the genetics underlying canine separation-related distress.

To date, 227 Labrador retrievers, 177 golden retrievers and 19 Labrador/golden crosses (423 total) have been phenotyped using an owner-based behaviour questionnaire (C-BARQ). Saliva samples have been collected from 220 of these dogs and DNA extracted. A pilot cohort has been genotyped using Illumina CanineHD (170K) arrays and results were analysed with Plink software.

Of the dogs recruited from the general public, 49 (14.3%) have been phenotyped as cases (affected animals). Statistical analysis of the questionnaire data identified significant Pearson correlations between several behaviour phenotypes. Scores for separation-related problems were highly correlated with scores for attention-seeking behaviours ($r=0.457$, $p<0.001$), touch sensitivity ($r=0.358$, $p<0.001$), excitability ($r=0.394$, $p<0.001$) and fear of dogs ($r=0.328$, $p<0.001$), strangers ($r=0.2255$, $p<0.001$) and places/objects/noises ($r=0.351$, $p<0.001$). Scores for separation-related problems were also significantly associated with the source of acquisition ($r^2=0.073$, $p<0.001$) based on a general linear regression model.

It is expected that the mode of inheritance of any behaviour will be complex. Identifying a predisposition to anxiety disorders such as separation-related distress could improve the quality of life of both dogs and their owners.

Homing age influences the prevalence of problematic adult canine behaviour

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Homing puppies before 8 weeks has been associated with lower instance of avoidance and types of aggression in adult dogs (Appleby, Bradshaw and Casey. 2002). Our aim was to study this in Finland where the maternal environment is predominantly domestic, in comparison to studies in countries where kennel breeding is common (Pierantoni, Albertini and Pirrone. 2011).

Online questionnaire-based data on frequencies of problematic behaviours ($n=5067$) was analysed using Chi-Squares, comparing adult dogs homed before 8 weeks (<8), at 8 weeks (8) and 8 to 24 weeks (>8).

Of the dogs, 31% were <8 weeks old, 38% 8 weeks old and 31% >8 weeks old at homing. 93% came from domestic maternal environments. Homing age was associated with avoiding familiar people ($p=0.008$); avoiding, growling and snapping at unfamiliar people outside the home ($p<0.001$, $p=0.005$ and $p=0.02$); avoiding, barking at, growling at and snapping at strangers visiting the home ($p<0.001$, $p<0.001$, $p=0.001$ and $p=0.05$) and avoiding the veterinarian ($p=0.03$). In all cases, >8 week old dogs at homing had a higher than expected prevalence of problematic behaviour than dogs homed at other ages. Homing age was associated with barking at unfamiliar dogs outdoors ($p=0.001$), with higher than expected values in >8 week old homed dogs and lower in <8 week old homed dogs.

This research supports the view that homing after 8 weeks is associated with higher instances of adult avoidance behaviour and some types of aggression.

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Pet dogs' personality: Consistency and change across time

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A recent meta-analysis found moderate temporal consistency of personality in domestic dogs (Fratkin et al 2013). However, prior studies have focused mainly on certain outcomes (e.g. guide dog success) or single traits (e.g. reactivity), and there is a lack of studies on when personality stabilises in dogs and which traits are more amenable to change. Therefore, to investigate individual and group level trajectories of personality development, 72 Border collies were assessed repeatedly between the ages of six weeks and two years. At six weeks, the puppies were tested in a personality test. When the dogs were around six, twelve, and at least 18 months old, their owners filled in dog personality questionnaires. Over fifty dogs furthermore participated in a personality test as adults.

While the results of the six-week test were poor predictors of future behaviour, the owners' assessments of behaviour traits at six months were highly correlated with their later assessments. At the group level some changes occurred as the dogs matured, such as an increase in intraspecific aggression; nevertheless, the rank order of individuals remained relatively stable for the majority of traits. The study provides new insights into patterns of personality development in dogs.

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‘Reactivity to stimuli’ is a contributing temperamental factor to canine aggression

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Canine aggression is one of the most frequently consulted problems in veterinary behavioural medicine, which in severe cases may result in relinquishment or euthanasia. As it is important to reveal underlying factors of aggression for both treatment and prevention, we conducted a questionnaire survey to examine the connection between temperamental traits and aggression. We asked the owners of insured dogs of Anicom Insurance Inc. to answer our questionnaire. The top 17 contracted breeds were included. The questionnaire consisted of general information about the dog, four items related to aggression towards owners, children, strangers and other dogs, and 20 other behavioural items. Aggression-related and other behavioural items were rated on a five-point frequency scale. First, factor analyses were conducted on behavioural items in each breed. Then, stepwise multiple regression analyses were performed using the aggression point as the objective variable and general information and extracted factor points as explanatory variables.

Valid responses ($n=5610$) from owners of dogs aged 1 through 10 years were collected. Factor analyses on 19 behavioural items (response rate over 95%) extracted five factors consistently in 14 breeds; ‘sociability with humans’, ‘fear of sounds’, ‘chase-proneness’, ‘reactivity to stimuli’ and ‘avoidance of aversive events’. By multiple regression analyses, ‘reactivity to stimuli’ was significantly associated with owner-directed aggression in 13 breeds, children-directed aggression in nine breeds, stranger-directed aggression in 10 breeds and dog-directed aggression in seven breeds. These results suggest that ‘reactivity to stimuli’ is simultaneously involved in several types of aggression. This factor consists of items of physical reactivity to sudden movement or sound inside the house, and highly reactive dogs may be prone to express aggression in various situations. Therefore, it would be worth taking account of ‘reactivity to stimuli’ in the treatment of canine aggression.

Attentional and referential focus in working dogs: how much do these dogs watch their handlers' faces?

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For optimal performance, dogs trained for detection work and their human partners must be able to signal well to each other, accurately reading and responding to the other's signals. We examined the response of 39 detection dogs to verbal signals in 2 contexts: when the handler was facing the dog v. when the handler turned away from the dog while giving the verbal request. We hypothesize that detection dogs would respond more quickly and accurately if they can see the handler's face.

All testing was video-recorded, and the videos analysed to determine latency to response, duration of response, and identification of behaviours (both human and dog) used during the 2 verbal test conditions. The 3 verbal requests/commands that the handlers were asked to use were sit, down, and stay. Handlers were requested to use a normal tone of voice and to not use hand signals. Analysis to date indicates that for almost all comparisons, dogs were slower to respond and took longer to complete each request when they were unable to see the handler's face (all $P < 0.05$). Dogs appear to consistently exhibit more signs associated with anxiety when they could not see their handler's face, and it is in these responses and interactions that the focus of my research lies.

The signs of anxiety exhibited by dogs in such partnerships may indicate compromised welfare, and affect team performance, as is true for pet dogs. All dogs benefit from clear, humane signals regardless of how these are delivered.

Shelter dogs and their destiny: A retrospective study to identify predictive factors

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Welfare of sheltered dogs is a topic of growing interest in Italy. The consequences of a long stay in shelter have particular significance, because since 1991 a law (14/08/1991, n.281) prohibits euthanasia of dogs unless they are seriously ill, incurable or proven dangerous.

Captured dogs are recovered for a quarantine period (10–60 days) in the sanitary kennel, if they are not returned to the owner or placed, they are moved to shelters where they remain until adoption or death.

The aim of this work was to identify the relationship between dogs' characteristics and their destiny in order to define useful predictors to better manage their stay in shelter and avoid failures in adoption. We analysed the records of all dogs recovered in a big city sanitary kennel from 2005 to 2010 and subsequently moved to shelters ($n=771$). Descriptive and inferential (Mann-Whitney) statistics were performed in order to investigate possible factors that might affect adoptability of sheltered dogs.

In our sample 76% dogs were adopted, 18% were still in the shelter, 4% died and 2% were euthanized. Females dogs ($p \leq 0.05$) medium and small size more than large ($p \leq 0.05$). Seven per cent of the adopted dogs were returned to the shelter, mostly males, between 11 months and 2 years, and of large size.

Recognising the most significant variables relating to shelter dog destiny would allow better identification of risk factors in order to avoid failures in adoptions.

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The effects of environmental enrichment on the behaviour of shelter dogs

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The objective of this study was to determine if an enrichment program consisting of the provision of a food-toy combined with operant cage-behaviour training increased desirable behaviours and/or adoption rates in shelter dogs.

The study was designed as a prospective study with 107 shelter dogs recruited. Dogs placed up for adoption in a municipal shelter were randomly assigned to either a treatment group (n=48) or control group (n=59). Treatment dogs were exposed to an environmental enrichment protocol consisting of twice-daily cage-behaviour training and provision of a daily food-filled toy (Kong). Behavioural observations were performed by a blinded observer using a scan-sampling technique on day 0 (first day on adoption floor) and again on day 3. Body posture, location in cage, and other parameters of both 'desirable' and 'undesirable' behaviours were recorded. Adoption information and behavioural observation data were compared between groups.

Dogs exposed to the enrichment protocol were significantly more likely to show an increase in either sitting or lying down body postures (as opposed to standing, walking or jumping) compared to dogs in the control group (19/28 [68%] vs. 7/32 [22%], $p < 0.0001$). Next, the experimental dogs were more likely to be observed displaying quiet behaviour compared to control dogs (4/32 [13%] vs. 11/28 [39%], $p = 0.017$). Experimental group dogs were also more likely to show a decrease in an undesirable behaviour – jumping, compared to control group dogs (3/32 [9%] vs. 15/28 [54%]), $p < 0.0001$). The average length of shelter stay until adoption for all dogs in the study was relatively short (experimental group=4 days, control group=3.75 days) with no significant difference in adoption rates between the groups.

Environmental enrichment in shelter dogs appears to increase the display of relaxed body postures and quiet behaviour, as well as reduce jumping behaviour. Results suggest that enrichment programs improve desirable behaviour and decrease undesirable behaviours in shelter dogs which may enhance basic welfare and adoptability.

Short term consequences of preventing visitor access to kennels on the behaviour and physiology of dogs housed in a rescue shelter

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Canine re-homing centres present a range of potential stressors to the kennelled dog and these may impact negatively on their welfare. Despite the presence of visitors to the kennel often being considered a potential stressor, empirical investigation into their impact on the behaviour and welfare of kennelled dogs in re-homing centres is lacking. This study investigated the influence of changing visitor access policy from open access to prohibited viewing at kennels (with organised single meetings with dogs outside of the kennel environment) on the welfare of 15 dogs housed in a dog-only re-homing facility. Data was collected across a number of domains comprising behavioural measures (specific discreet behaviours, response to human approach); physiological measures (cortisol/creatinine ratios; monodialdehyde/creatinine ratios, TBars); sickness events; faecal scoring and noise levels.

A number of behavioural measures were significantly influenced by the intervention, dogs spent significantly more time resting ($X^2=11.128$, $p=0.004$), less time moving ($X^2=21.733$, $p=0.001$) and exhibited significantly fewer episodes of repetitive behaviours (X^2 *Mandrillus sphinx*=9.000, $p=0.011$). In addition, the general kennel noise levels were significantly lower during this time period ($F=9.430$, $df=2$, $p=0.005$). Furthermore, there was some evidence of maintained change once open visitor access policy was returned; noise levels continued to be significantly lower than those recorded in the two weeks preceding the prohibition of visitors to the kennels and time spent moving continued to be significantly

lower. No significant change was seen in the physiological parameters measured or human approach tests.

Overall, the results from this study suggest that restricting visitors from viewing dogs whilst in their kennels may be better for their short term welfare. However, further work is required to explore whether the behaviour changes are sustained in the long term, whether behaviour of dogs when meeting visitors on a one-to-one basis outside the kennel is influenced by a restricted access policy and the influence of such a visitor policy on visitors' perceptions of the dogs, all important factors when considering long-term welfare.

Development of a technique for the determination of air-borne chemical signals in real-life situations involving dogs

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Chemical signals are a key component of canine communication, and anal sac secretions in particular have been implicated in inter-dog aggression. To date, a few published studies describe the chemical profile of the anal sac and associated secretions. However, these may be different to the chemical components of the air-borne signal perceived by dogs and used in communication, for example due to active control over the chemical-profile released, bacterial action on the secretion, or differences in the volatility and diffusion rates of mixture components.

The aim of this study was to develop a technique that can effectively and accurately detect airborne chemical signals from the dog, in situations where animals are engaging in real-life activities or interactions. Several methods using a carbon-based absorbent material (MonoTrap™) or an SPME fibre, combined with gas chromatography-mass spectrometry (GC-MS) analysis, were modified for this purpose and evaluated.

Initial results show that, by using an SPME fibre, low-concentrations of air-borne dog odours can be readily and repeatably sampled, analysed and profiled. Multivariate statistical techniques can be used to differentiate samples from noisy background odour. This allows the identification of dog-specific compounds that may play a particular communicative role.

This study lays the foundation for the accurate detection of chemical signals used during real-life social exchanges between dogs, and potentially other species as well.

Evaluation of dogs suitable for animal assisted interventions

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This study aimed at evaluating if a veterinary behavioural examination and the evaluation of the dog's behaviour during a standardized simulation of an Animal Assisted Intervention (AAI) could be effective to identify dogs suitable to participate in such activities.

Eighteen dogs were recruited and divided into three groups on the basis of their experience in AAI: working (W), in training (T) and untrained pet dogs (U). The standardized simulation of AAI lasted 10 minutes, during which several critical conditions were presented to the dog by an experimenter playing the patient's role. A veterinary behaviour specialist analysed videos for the expression of stress, fear, avoidance and pro-social behaviours and, on this basis, scored each dog on a three point scale (1 = not suitable to participate in AAI; 2 = conditionally suitable; 3 = suitable). A second veterinarian performed a behavioural examination and, similarly, gave the dog a score of 1 to 3.

The sum of the two scores differed between groups ($p = 0.002$, Kruskal-Wallis), with U being significantly different from both T and W. Scores of the simulation and of the examination also differed between groups ($p = 0.015$ and $p = 0.010$ respectively), but in both cases only discriminated W from U, whereas T did not differ from either of the other groups. No correlation was found between the two scores ($r = 0.395$, $p > 0.05$), suggesting they evaluated different aspects.

Both a behavioural examination and a simulation of AAI are necessary to effectively identify dogs not to be involved in AAI.

Aging-related diagnostic variations: A multiple correspondence analysis approach to describe senior and geriatric features in cats

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Clinical and behavioural modifications in old cats have always represented a challenge for veterinarians. Unfortunately most owners regard even huge changes in the feline behaviour simply as age-related ones. The aim of this research was to determine if this population of cats could be grouped according to a combination of behavioural and clinical features, emphasizing possible relationships of these features with senior or geriatric cats.

A total of 117 cats (68 females and 49 males) were divided into a senior group (8 to 14 year old; n=73) and a geriatric group (> 14 year old; n=44). The data set was collected by their usual veterinarian by physical examination and standardized questionnaire. Data obtained from the two groups of cats were explored through Multiple Correspondence Analysis (MCA).

MCA showed feature combinations regarding both clinical (the inertia was 84.3%; geriatric cats are characterised by weight loss and polyuria-polydipsia without diagnosis of diabetes or other metabolic problems) and behavioural features (the inertia was 79.7%; geriatric cats are described by increased vocalisation, both during the day and by night; the presence of compulsive disorders as pacing, circling, licking or hallucinations; a modification in the somaesthetic behaviour with over-grooming or self-sucking; and impairment in cognitive capabilities) as suggested by the literature. Separation-related problems with anxiety were found in the sample, but not correlated to a specific aging period.

Describing the feline aging process could help clinicians and owners to recognise the need for early clinical and behavioural modifications and reduce age-related problems.

Management of repetitive behaviours in a mandrill (*Mandrillus sphinx*)

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'L' is a 5 year old male, adolescent 25kg Mandrill (*Mandrillus sphinx*) who displayed self-injurious repetitive behaviours starting in 2009. These included biting at his right hind leg, dragging his right hindfoot, hair pulling, penis manipulation, kicking and spinning and following his sire in a stereotypic manner. In 2011 he also started biting at and rubbing his chest along the mesh of the off exhibit enclosure. Examination by the facility vets revealed no illnesses or physical abnormalities that could explain the behaviour so 'L' was started on 20mg fluoxetine once a day.

'L' was diagnosed with an Anxiety Disorder manifesting as Compulsive disorder. Neuropathic pain could not be ruled out given that many of the behaviours were directed towards one leg.

Environmental management specifically targeted to 'L' was started. It was not possible to make many changes to the enclosure and feeding because of managing the other mandrills in the group. Behaviour modification involved keepers rewarding 'L' for calm and quiet behaviours. The fluoxetine was increased to 30mg SID and gabapentin started at 250mg BID.

The keepers kept a mood diary for 'L' to help track his anxiety levels.

'L' initially showed good responses to the treatment program. His behaviour then began to deteriorate. He was changed from fluoxetine to mirtazapine 15mg each evening. Three months later his behaviour had improved as shown by his mood diary.

Repetitive behaviours can be difficult to treat. The neuropathology is thought to involve the frontal cortex and/or the basal ganglia as part of the cortico-striatal-thalamic-cortical loop (Mason and Rushen 2006; Stahl 2008). While fluoxetine can be helpful, psychiatric literature suggests that paroxetine and escitalopram may be more effective (Stahl 2008). Mirtazapine can also be effective on its own. It was chosen as it is useful for controlling signs and reducing negative

effects from drug withdrawal when changing from medications with washouts such as fluoxetine (Timmer, Lohmann et al 1995; Spina, Santoro et al 2008).

This case also demonstrates the usefulness of a mood diary for monitoring the effectiveness of treatment.

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The European situation and perspectives on behavioural evaluations of shelter dogs

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To identify the situation in the European Union (EU) with regard to behaviour evaluations of shelters dogs:

1. a literature review was carried out to validate findings, outline strengths and shortcomings and identify supplementary areas of research;
2. the impact of existing literature on EU Member States' (MS) legislation on shelters was questioned; and
3. the approach to the evaluation and adoption process in one specific MS, Belgium, was evaluated at shelter level.

The methodology applied consisted of all Science-Direct peer-reviewed articles examining behaviour evaluations of shelter dogs, email and phone surveys within 21 MS and 51 Belgian shelters.

Results evidence that according to the quality test criteria of Martin & Bateson, (2007), only one validated temperament test (Valsecchi et al, 2011) can be identified, beside several practical and critical papers. Although the Treaty of Amsterdam (1999) recognises Animal Welfare, it does not offer a legal basis for legislation at EU level. Yet, poor legislation and lack of standardisation were observed at MS level. The results of the Belgian survey show a discrepancy between the field reality and current scientific knowledge. In the field, financial restrictions, lack of time, and a moderate 'confidence' in temperament tests results

have been observed. Though, at the same time, there is a demand for a validated temperament test and a 'Risk Assessment Tool' for shelter dogs.

This work reveals that at EU, national and scientific levels, concrete measures must urgently be taken to support the situation regarding behaviour assessments of shelter dogs.

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The effect of animal-assisted activity on behavioral and biochemical stress markers in dogs

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There is a growing body of evidence to support the benefits of animal-assisted activities (AAA) for humans. However, the effect of the interactions on the animal participants has been minimally investigated and the welfare of these animals has been questioned.

Salivary cortisol, in conjunction with stress-associated behaviour, has been utilized as an objective assessment of animal welfare.

Our goal was to test the hypothesis that salivary cortisol concentration and behaviour in AAA dogs will not be different in an AAA environment compared to home or neutral environments.

Fifteen healthy adult dogs registered with an AAA organization were recruited. Saliva samples were collected from each dog every 30 minutes, starting 30 minutes prior to and 30 minutes after a standardized 60 minute session across 3 settings: an AAA session (AS) for college students in the communal area of a residence hall; a neutral session (NS) located in a novel room without interaction with a stranger; and a home session (HS). Each session was videotaped continuously and behaviours were quantified at three separate 5 minute intervals during each session.

A mixed-model repeated-measures ANOVA was used to assess the effect of location, time, and order on salivary cortisol. Friedman's Chi-square was used to analyse differences in behaviour between time points and between settings. Scatterplots and Spearman correlation coefficients were used to assess the correlation

between each behaviour and salivary cortisol. Statistical significance was set at $p < 0.05$.

Salivary cortisol levels were not different in the AS compared to HS, but levels were significantly higher in the NS compared to AS and HS. Dogs exhibited more locomotor activity in the AS compared to HS, but there were no other differences in stress-associated behaviours across settings. There were no significant correlations between salivary cortisol level and behaviours.

AAA dogs did not exhibit significant physiologic or behavioural signs of stress when being utilized for a 60 minute AAA session. However, while in the NS, dogs experienced physiological stress which did not correlate with expression of significant stress behaviour. This finding suggests that these two parameters may not be associated in these environments.

Zylkene® efficacy study in dogs with separation anxiety

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Separation anxiety is a common diagnosis in behavioural practice. It is characterized by vocalization, destruction and urination/defecation in the owner's absence and may cause symptoms such as gastrointestinal disorders or hyperventilation. Alpha-casozepine, a decapeptide isolated from the milk protein casein, is said to have sedative properties in humans and animals.

In this randomized, double-blind study, the effect of the feed supplement Zylkene® (α -casozepine) combined with behavioural therapy was investigated in 75 dogs diagnosed with separation anxiety for a period of four weeks. On the days 0 and 28, two behavioural consultations took place at the LMU in Munich. The behavioural therapy included, *inter alia*, management instructions, a ranking exercise, systematic desensitization to departure cues and the gradual planned departure. In addition every dog owner received capsules of either Zylkene® or a placebo over four weeks according to the manufacturer's specified dose rate (15 mg/kg).

Within the observation period there was no significant difference in treatment success between the Zylkene® and the placebo group. However, the participants of the Zylkene® group needed significantly less training for the same treatment success. Four weeks after withdrawal of the study medication, the dogs in the placebo group showed significantly ($p=0.002$) better behavioural development and significantly ($p=0.032$) greater success in the separation period compared to the dogs of the Zylkene® group. This may be explained by the discontinuation of Zylkene® with its supportive effect or by differences in training consistency between both groups. Except in one dog, no adverse reactions to the supplement occurred in the course of the study. Therefore, Zylkene® is preferable to a psychotropic substance in mild cases of separation anxiety. The most important element in the treatment of separation anxiety remains the behavioural therapy.

Effectiveness of dog appeasing pheromone (D.A.P.)[®] collars applied during the socialization period for prevention of development of fear and anxiety

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This double-blind placebo-controlled D.A.P.[®] collar study included 62 seven-week-old future guide dogs². Sets of 3 collars (DAP or placebo) were randomly assigned and applied consecutively from 7–19 weeks of age. Puppy raisers completed C-BARQ³ at 19w, 6m & 12m and Leader Dog (LD) survey at 3m & 6m.

One C-BARQ section: fear and anxiety, evaluates response to sounds, objects, persons or situations on a five-point scale (0–4). Holding these well-trained dogs to a high standard, a ‘perfect’ response required ‘no signs of fear or anxiety’ and *any* fearful responses were considered ‘poor’. Greater than 90% of all subjects achieved ‘perfect’ for 9 questions. The remaining 10 questions were analysed by Chi square or Fisher Exact test to compare the number of D.A.P.[®] and placebo-subjects achieving a perfect response at 19w, 6m, 12m and all time points combined (C).

When compared to placebo, more D.A.P.[®] subjects achieved ‘perfect’ response to the following: approach by unfamiliar dog 12m ($p=0.038$); sudden or loud noises: 12m ($p=0.064$), C ($p=0.028$); and first exposure to new situations (veterinarian, car, elevator) at 19w ($p=0.022$), 6m ($p=0.046$) and C ($p=0.011$). More placebo-subjects scored ‘perfect’ response to unfamiliar objects on side-walk 19w ($p=0.029$), and bathing C ($p=0.044$), 12m ($p=0.020$).

On LD survey at 3m & 6m, more D.A.P.[®] subjects achieved perfect response to movement 3m ($p=0.0081$) and 6m ($p=0.090$); children 6m ($p=0.048$), animals 3m ($p=0.060$) and noises 3m ($p=0.072$) while there was no evidence placebo-subjects did better.

In conclusion, when applied during the socialization period, D.A.P.[®] was useful in reducing anxiety and fear in puppies during and even beyond the treatment period.

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2. Leader Dogs for the Blind (www.leaderdog.org) Rochester, MI USA breeds Labradors, Golden Retrievers and German Shepherds plus some crosses of those breeds.
3. **C-BARQ** (Canine Behavioral Assessment and Research Questionnaire) Center for the Interaction of Animals and Society of the University of Pennsylvania. (<http://vetapps.vet.upenn.edu/cbarq/>).

He is not suffering ... or is he?

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The Swiss Animal Protection Act (article 3a) states the following: *“The dignity of an animal is the value of the animal, which must be respected in dealing with it. This dignity is not respected if the burden put on the animal is not justified by higher interests. Burden is present especially when an animal experiences pain, suffering or damage, it is caused to have fear or is humiliated, if it is greatly changed in its physical presentation or its abilities or it is overly instrumentalized”*.

As a basis for discussion, three case studies are introduced focusing on possible ethical questions that may arise during behaviour work.

Case I: Sir William, French Bulldog, 7 months, mc, 10kg, showing repetitive behaviour since 10 weeks of age. A complete medical work-up, including neurological examination, showed no abnormalities.

Case II: Spunky, German Shepherd dog, 2 years old, mnc, 40kg, has shown increased ‘unprovoked’ aggression since 6 months of age, has bitten adult daughter, blood tests showed increased kidney values.

Case III: Grace, Beauçeron, 2.5 years, fc, 32kg, generalized anxiety, has bitten once, medically healthy.

To what extent is this dignity – as defined by above-mentioned article – respected, if a dog showing repetitive behaviours is not treated, must live under strict security management measures or only has one area in its home where it feels safe? To what extent are these animals suffering and what treatments are justified?

Different aspects of viewing these questions are presented and discussed.

Welfare assessment in parrots: Environmental and physiological needs. A review

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Welfare means the ability to perform natural behaviours without showing signs of illness, unwanted behaviours or stress. Depending on the species, welfare is built on several needs: appropriate diet, suitable environment, healthcare, opportunities to express normal behaviour and protection from conditions leading to fear and distress. Keeping parrots as pets means meeting their environmental and physiological needs to provide for the conditions of good welfare.

Since psittacine birds are very different and belong up to 350 different species, the physiology of each group leads to very different needs. The range of habitats is wide, the sources of food vary (in composition and location, from the trees or on the ground). Feeding is a very important activity in the pet parrot routine and husbandry must follow precise notions to avoid unwanted behaviours. The ability to fly is too often denied, especially to the Grey Parrot, which is nomadic, and confinement is highly criticized. Anyway, the aviaries have to provide shelter, comfort and safety. Indoor or outdoor they must be protected from toxics, the cold or from too much heat but provide enough ultraviolet radiation. Social life and cognitive needs of parrots is the most difficult need to fulfil since misunderstanding of parrot communication is very common: inappropriate petting, bonding or reckless reinforcement.

Increasing our knowledge about the animal-based and resource-based indicators of welfare assessment is the best way to decrease the risks of welfare problems and avoid disorders in psittacine birds.

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Understanding needs of the cichlid fish *Oreochromis mossambicus*

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Needs are biological requirements to obtain particular resources or to perform particular behaviours. If animals are prevented from fulfilling them, their welfare is likely to be reduced^{1,2}. The aim of this review is to discuss the assessment of some needs in the African cichlid *Oreochromis mossambicus*, and the respective context of occurrence, based on the empirical studies available.

Animals' needs may be assessed through the observation of behavioural reactions in response to the manipulation of specific resources or behaviours in the scope of deprivation, preferences and motivational tests, each of which has its pros and cons³. In this territorial fish, a push-door paradigm is a suitable way to quantify what the animals want, demanding from them attention and a flexible strategy⁴. In this species, the need for substrate varies with context and with different life cycle stages. Social deprivation has high costs, and animals show a similar motivation for access to a social partner or to food, as earlier evidenced in birds and mammals. This species may have the need to be aggressive and thus be highly motivated to perform this behaviour regardless the attainment of a functional goal⁵. But aggression may also be promoted by stress factors or by the absence of suitable outlets for frustration in the context of unstable social groups.

The understanding of these and other specific needs have relevant implications to the management and animal-based welfare assessment of this common fish species in public aquaria, laboratories, aquaculture, or in any other artificial environments.

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Sleep as a cattle welfare measure?

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It is well known that adequate sleep is important for the health and well-being of humans and animals. Therefore effects of management routine on the sleep of cattle are of concern regarding cattle welfare. Few detailed studies of sleep in cattle have been reported mainly due to the lack of a validated method for recording sleep states in cattle.

This group has shown that sleep can be recorded using a non-invasive ambulatory EEG technique in calves (Hänninen et al 2008) and dairy cows (Ternman et al 2012) and sleeping behaviour is a validated measure of the total daily sleeping rhythm in calves (Hänninen et al 2008) but less good in dairy cows. Additionally, a light-weight wireless device for measuring sleeping behaviour in calves has been developed (Hokkanen et al 2011).

Using these methods a series of experiments to study how production factors affect cattle sleep have been performed. The capabilities for 30 new-born calves to cope with the colostrum feeding method (bucket or rubber teat) or rearing environment (with the dam or singly) was assessed: Sucking colostrum increased calves' sleepiness and the amount of NREM sleep. Individually housed calves slept more fragmentarily than dam-reared calves (Hänninen et al 2008). Furthermore, another study with 48 calves proved that concrete floors break calves' sleep and increased sleep duration; social company decreased the proportion of REM sleep and relocation to a new room decreased calves' NREM-sleep. A pilot experiment with 5 dairy cows showed that permanent light (24 hrs) versus short day (4 hrs) resulted in longer REM sleep.

From our work it can be concluded that changes in the frequency or duration of sleep episodes offer a method for assessing how well cattle are adapted to changes in their physical or social environment or diet.

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Development of a methodology for mechanical nociception testing in sows

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Nociceptive threshold tests measure the responsiveness of animals to a controlled noxious stimulus. Decreased mechanical nociceptive thresholds (MTs) have been associated with hyperalgesia, an exaggerated sensitivity to pain, in animals affected by chronic disorders such as lameness. This study describes the development of a methodology to measure MTs in clinically normal sows.

Eight pregnant sows were habituated to the experimental setting and individually tested while standing inside a modified gestation crate. Repeated measurements were taken (i) with a hand-held probe and a limb-mounted actuator connected to a digital algometer (ii) at three anatomical locations (dorsal and lateral metatarsi/metacarpi and ventral aspect of the tail) and (iii) at 1-minute and 3-minute intervals. The sows were tested 3 times per anatomical location and per measuring interval with both methods (probe and actuator). The order and direction (clockwise/counter-clockwise) of the measurements were balanced. MTs are expressed in Newtons (N).

The average MT (\pm SD) was 17.6 ± 8.4 N with an interquartile range of 14.6 N (10.5–25.1) and a median of 16.6 N. Preliminary results show that the average MTs were lower when measured with the probe (14.5 ± 7.9 N) than with the actuator (21.1 ± 7.4 N). In addition, MTs seemed to be affected by the anatomical region,

with higher values recorded for the front limbs (19.2 ± 8.7 N) than the hind limbs (16.7 ± 7.5 N), independently from the side (left versus right) and the exact location of the stimulus (dorsal versus lateral metatarsi/metacarpi). The ventral aspect of the tail yielded the lowest values (11.7 ± 8.4 N). No numerical differences in MTs were observed based on the interval between repeated measurements (1 versus 3 minutes). Our preliminary findings show that average MTs in clinically normal sows differ numerically depending on the anatomical region and the measuring method chosen.

Assessment of lameness and claw lesions in sows

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The prevalence of lameness in sows is currently estimated at between 8.8 and 16.9%^{1,2} and lameness is one of the top reasons for the premature culling of sows^{3,4}. In addition, 88 to 100% of sows are affected by claw lesions^{5,6}. These conditions have a negative impact on the welfare and productivity of affected animals⁷ and should be recognized and treated properly. Different measuring tools are available or under validation and the choice of method will depend on the specific purpose of the assessment. Visual scoring systems can be used efficiently within herd screening programs and certification or assessment schemes⁸, whereas more objective, quantitative methods allow for a detailed study of the characteristics of lameness in research settings. Automated systems, such as kinematics⁹, accelerometers¹⁰ or force plates¹¹, can answer specific research needs by providing precise information on the postural or activity budgets of the animals. The main objective of this paper is to present a comprehensive overview of the current techniques for lameness assessment in sows and to highlight critical areas where further investigation is required. Because sow lameness negatively affects farm profitability, the first section describes some important aspects of lameness management at the herd level. The subsequent sections deal with the available techniques for lameness detection and assessment in individual animals. These techniques are described according to the biomechanical component studied: gait, postural behaviour or weight distribution. Finally, because claw lesions have been associated to lameness and can be easily assessed in living animals, the last part will focus on claw lesion evaluation.

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Preliminary observations of pain indicators in sheep with footrot

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Ovine footrot is a chronic and infectious disease causing lesions of the hoof and severe lameness, suggesting that footrot is a very painful disease with significant adverse consequence on the welfare of sheep. Identification of specific pain indicators is necessary to explore the influence on the welfare of sheep with this and other diseases, as behavioural signs of pain can be obfuscated by the remarkably stoical behaviour of sheep. 43 sheep were identified and assessed for footrot ($n=30$ infected, $n=13$ control) by clinical examination, and observed for signs of pain associated with naturally occurring footrot. All animals with footrot were treated with either antibiotics plus pain relief ($n=15$) or just antibiotics ($n=15$) and observed on day 1 (initial diagnosis), day 7 and on day 90. Lesion scores and lameness scores were assessed for every sheep on each observation day for both infected and control animals. A Spearman's rank correlation between lesion and lameness scoring ($r_s=0.71$, $p=0.000$) across the three time frames is highly correlated confirming that footrot can be a very painful disease. Facial expressions, body postures and continuous behavioural observations along with a startle test are being evaluated to further the understanding of the emotional aspect of this disease and the associated pain. In support of any behavioural changes, physiological parameters are also being assessed including measures such as cortisol, a biochemistry profile of the animal and cytokine analysis, in addition to thermal imaging. This will allow for more accurate evaluation of the impacts of footrot on the health and welfare of the infected animals.

Risk assessment of animal welfare at Nordic small scale lamb slaughter plants

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Over the last decades, the slaughter industry has concentrated its activities into fewer and larger abattoirs, implying potential risks of transport stress, injuries, and impaired animal welfare. Recently, however, there is a trend towards small scale slaughter to supply locally or regionally produced meat. Risk managers at all levels need to assess where animal welfare risks exist at small scale operations.

This study aimed to assess the risks of poor animal welfare at small scale lamb slaughter (line speed maximum 70 sheep/day) in the Nordic countries, and to compare these risks to large scale industrial slaughter. Assessment was done with an individual expert opinion approach during a 2-day workshop. Nine experts from Finland, Iceland, Norway or Sweden knowledgeable and experienced in lamb slaughter procedures; behaviour, physiology and health; scoring schemes; or risk assessment were selected. The methods applied adhered to EFSA risk assessment guidelines. The list of hazards was modified from an earlier study and distributed to the experts before the assessment. No other literature was reviewed specifically for the purpose of the assessment. The highest risks to animal welfare identified in both small and large scale slaughter were related to over-night lairage at the slaughter plant. For most hazards, risk estimates were higher in large than in small scale slaughter. The reverse was true for splitting of groups and separation of one sheep from the group. Small scale slaughter has the potential for improved welfare of slaughtered lambs in comparison with large scale industrial slaughter.

Development of a European veterinary animal welfare curriculum

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The Federation of Veterinarians of Europe (FVE) established an *ad hoc* working group to map animal welfare teaching in undergraduate veterinary education in Europe and also to develop a model animal welfare curriculum for veterinary faculties. The working group with representatives of FVE, the European Association of Establishments for Veterinary Education (EA EVE), and the EU FP7 research project Animal Welfare Research in an Enlarged Europe (AWARE). The first task of mapping education was finalised in December 2012. Secondly, a model animal welfare curriculum was developed, comprising a model syllabus, the corresponding learning objectives and a list of the essential Day One Competences. These should enable veterinary graduates to fulfil their role as primary advisers on animal welfare across all contexts of animal use. The model animal welfare curriculum was designed to be easily adapted and implemented at every veterinary school.

Vet schools were consulted on the content and the feasibility of implementa-

tion of the proposed syllabus. Multiple resources were given. The syllabus was designed to cover all the basic competences related to animal welfare, ethics and law necessary for a responsible, modern veterinary practitioner. Some of these competencies were related to practice e.g. on-farm animal welfare assessments, whereas others were to do with professionalism e.g. effective communication, ethical deliberation and personal development.

The aim is that all European veterinary schools should implement these learning outcomes and corresponding learning objectives and Day One Competences, with the suggestion that they be incorporated and evaluated through the EAEVE/FVE accreditation system of veterinary faculties.

Teaching of animal welfare in veterinary faculties: Outcomes survey

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The Animal Welfare Model Curriculum ad hoc working group from the FVE, EAEVE, and the EU FP7 research project AWARE developed a model animal welfare curriculum for veterinary schools, comprising a model syllabus, the corresponding learning objectives and a list of the essential Day One Competences for veterinary graduates. In order to check the validity and feasibility of the proposed syllabus, a questionnaire was distributed to all European veterinary faculties. Responses were received from 44 veterinary schools from 18 EU countries and 3 NGOs: 93% agreed that the proposed list covered all the important learning outcomes, but only 44% stated that they currently delivered these outcomes. However, 73% stated that they could reach these learning outcomes within the next five years. The majority of responders (82%) considered it was very important that there was a specific course called animal welfare. The main obstacles to strengthening animal welfare teaching were seen as, in order of indicated importance: lack of space in the curriculum, difficulties in organising practical sessions,

financial difficulties, lack of qualified teachers, and low priority within their faculty for animal welfare.

From the draft syllabus, educators taught – in order of most commonly cited: legal issues, animal handling and restraint, professional ethics, stress physiology, humane euthanasia, ethology (> 85%), animal ethics, pain control, and welfare assessment in farm animals (>80%). Only 58% referred to the promotion of positive animal welfare. Animal welfare assessment protocols in companion and laboratory animals were covered by 67% of the schools replying, while those of wild/zoo animals were covered in only 25%. In approximately 75% of schools, animal welfare was seen as a core subject, in other words, students could fail the subject in the same way as other core subjects.

Why teach ethics to veterinary students: A qualitative study

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The importance of introducing veterinary students to ethics is increasingly acknowledged. However, ethics teaching is often embedded and no thorough analysis of the underlying purposes for including ethics in the veterinary curriculum has been presented. Here we present an in-depth study of ethics teaching to undergraduate veterinary students in three European universities: Copenhagen, Nottingham and Lisbon. The research relied on study programs and semi-structured face to face interviews with 17 educators involved in the teaching of ethics related subjects. Transcripts were introduced into NVIVO 10, a qualitative research analysis software and analysed by content.

The analysis showed that ethics teaching was justified in eight different ways, namely preparing students for:

- a) recognizing ethical issues and moral dilemmas;
- b) acknowledging their own moral values and personal standpoints;
- c) respecting the opinion of others;
- d) communicating effectively with clients and the public;
- e) obeying to professional rules and codes;
- f) defending animal welfare;
- g) coping with the demands of the veterinary profession;
- h) awareness of the public perception of professional behaviours.

These eight justifications can be included within three broader concepts:

ethics-as-skills,
ethics-as-rules and
ethics-as-attitudes.

Skills include communication, decision-making and critical thinking. Rules refer to professional standards, ethical guidelines and animal welfare regulations. Attitudes comprise correct professional conduct, virtuous behaviours and appropriate attitudes toward animals and clients. These concepts of ethics were generally used in combination, although they sometimes conflicted. The results here presented contribute to the development of a conceptual framework within which to discuss European veterinary ethics education.

What impacts animal welfare in companion animal veterinary clinics?

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The relationship between veterinary care and animal welfare is an interesting paradox: veterinarians are responsible for ensuring the health and well-being of their patients, yet many aspects of veterinary care have the potential to impact patients' overall welfare. As this area has received minimal investigation, the objective of this research was to identify key veterinary-related factors that are perceived to impact feline and canine welfare, using the Delphi method. Participants were animal welfare researchers, veterinarians with welfare expertise, and randomly selected small and mixed animal veterinarians. Over three sequential rounds of consultation, participants were asked to:

- 1) suggest veterinary-related factors that impact patient welfare;
- 2) assess the relative impact of each factor;
- 3) assess the feasibility of improving each factor.

A total of 78 individuals identified 85 factors; these included aspects specific to the clinic environment (e.g. handling, restraint techniques) and factors that impact welfare in the animal's home (e.g. provision of advice regarding nutrition). The following themes emerged: physical environment of the facility, medical and surgical procedures, routine animal care, staff-patient-client interactions, veterinarian-client communication, staff attitudes and education, and clinic management. Average assigned impact scores (/4) ranged from 1.04 to 3.78, with 70% (60/85) of the suggested factors receiving a score greater than 3. More than 80% of all participants agreed that it would be feasible to improve 68% (58/85) of the factors.

Ultimately, this research is aimed at enhancing the welfare of companion animals in veterinary clinics by identifying key areas for improvement.

Are cats with housesoiling problems stressed? A case-controlled comparison of faecal glucocorticoid metabolite levels in urine *spraying* and *toileting* cats

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Spraying behaviour in the home is often reported to be associated with increased stress levels in cats, but the scientific evidence for this is weak. We therefore examined faecal glucocorticoid metabolite levels (GCM) in subjects using a case-control design. 11 *spraying* and 12 problematic *toileting* cats (assessed as healthy after detailed medical examinations on an initial population of 18 *spraying* and 23 *toileting* cats) were recruited alongside normal control subjects from the same multi-cat (n = 3–9) households. Individual faecal samples were collected by owners after observing them defecate in all but 1 pair in each group; GCM were analysed via enzyme immunoassay (EIA). Participant cats, both ‘cases’ (9 ‘sprayers’ and 8 ‘toileters’) and ‘controls’, were also individually video recorded (in the company of the owners) for 5 minutes in a dedicated room. Population level data were analysed non-parametrically with post hoc pairwise comparisons.

GCM were significantly ($p=0.026$) higher in individuals from *spraying* households (‘sprayers’ and their controls) than from the *toileting* households (‘toileters’ and their controls), but not between cats from the same household.

Proportionally more time was spent moving (as opposed to stationary) by cats from *spraying* houses ($p=0.011$), but again there was no difference between cats from the same house. These results indicate that households in which a cat exhibits urine *spraying*, are generally more arousing, but 'sprayers' are not more aroused than their housemates. Appropriate management needs to be applied to the household, to help alleviate the stress for all the cats, not just the 'sprayers'.

Are cats (*Felis catus*) from multi-cat households more stressed?

Evidence from the assessment of faecal glucocorticoid metabolites

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The number of cats being owned has increased in many countries in recent years, largely due to a rise in the number of multi-cat households. Given the social and territorial characteristics described in feral cats, it is commonly assumed that life in multi-cat households will often be more stressful for resident cats compared to those kept as single pets. This study was aimed at comparing general physiological arousal levels of singly housed cats ($n = 23$) with those from two types of multi-cat household (2 cats per house, $n = 40$; and 3–4 cat per house, $n = 57$), on the basis of faecal glucocorticoid metabolite levels (GCM) measured via enzyme immunoassay (EIA). GCM did not significantly vary as a function of living style (single, pair or group-housing, Random Effects Model, $p = 0.816$). Highly stressed individuals were seen in all three groups. Young cats in 3–4 cat households had lower GCM ($p = 0.024$). Cats appearing to ‘tolerate’ petting had higher GCM levels than cats disliking being stroked (Random Effects Model, $p = 0.027$).

Although it may seem inevitable that the spatial and social circumstances of multi-cat homes make these a more stressful environment for cats, our data indicate this is not so clear-cut. We suggest that, by contrast, single-housed cats may be more susceptible to some of the negative effects of human-initiated cat-directed interaction. Factors other than population size such as the degree of environmental control (e.g. the provision of safe havens) may be more important in controlling stress in domestic cats and further investigation of these factors is warranted.

A case report: Inappropriately rough play behaviour and predatory attacks against people by a tomcat

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The owner of a six-month old tomcat came to seek help because the cat had attacked her face on a near-daily basis. Aggressive behaviour is often accepted as natural behaviour by cat owners. Nevertheless this should not be underestimated since it can cause severe injuries.

The cat's behaviour was diagnosed as human-directed predatory attack behaviour due to unintended encouragement, lack of activity as well as its origin and genetic disposition. The tomcat was also diagnosed with play-related aggression resulting from unintentional encouragement and failed education by its owner. A further diagnosis was reduced motor as well as emotional self-control caused by missing training and early separation from litter.

Therapy consisted of changing the social and physical conditions of keeping the cat, changing behaviour by intervention and training the desired behaviour. Thus, feed management was improved to provide occupation, e.g. by using balls filled with food. Additionally, the apartment was designed in a cat-friendly three-dimensional manner e.g. providing vertical surfaces to climb, high places to sit and hiding/retreating possibilities.

Regarding interventions to change behaviour, attacks against the owner had to be interrupted by means of aversive impulses such as clapping. If successful, the cat was given a prey object to practice allowable hunting behaviour. If not, the cat was carried out of the room for 60 seconds without any comment or emotion (time-out).

Furthermore, a play therapy plan was developed in order to switch inappropriate play and hunting behaviour into play with appropriate objects, i.e. frequently

changing toys, for allowable practice of hunting behaviour.

Within a couple of weeks, behavioural therapy treatment produced a significant improvement. After five months of therapy, the cat showed neither predatory attacks nor inappropriately rough or aggressive behaviour in play towards its owner or other humans.

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Hypersexuality in a neutered male cat towards his owner

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A 3 year old neutered male cat was presented for sudden onset of repeated episodes of mounting behaviour with ejaculation towards his female owner.

The cat also showed restlessness, misdirected predatory behaviour (without appreciable injury), excessive vocalization, and high arousal. He lived exclusively indoors, had little environmental enrichment and owners played with the cat rarely and sometimes roughly.

A clinical examination was conducted in order to exclude medical conditions: haematological, biochemical and urine profiles were normal; hyperthyroidism and cryptorchidism were excluded too. The level of testosteroneaemia excluded abnormal secretion by ectopic tissue. Abdominal ultrasound scan confirmed the normal structure of both adrenal cortices. The presence of sperm cells was ruled out through a seminal microscopic examination.

Mounting behaviour towards people can be observed in case of poor environmental and social stimulation, and may be considered a frustration-related or a displacement behaviour as a result of anxiety.

The cat was treated with 0.5 mg/kg per day of fluoxetine and Feliway® diffuser. Owners were advised to not reward undesired behaviours and environmental enrichment was strongly recommended.

After one month of pharmacological therapy, the frequency and intensity of mounting and other undesired behaviours decreased; but owners did not provide adequate environmental and social enrichment. One month later, mounting behaviour reappeared with increased frequency and intensity, directed also to new targets (a wool blanket and the male owner).

This case suggests that, for successful treatment, owner compliance is needed for both pharmacological therapy and behavioural modifications.

Positive dog training classes in Australia

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Several papers have been published with differing conclusions on the value of training to reduce the incidence of later behaviour problems in dogs (Thompson, McBride and Redhead, 2009; Wilkinson, Ingram, Heath and Creighton, 2009; Ingram, Jones and Heath, 2009; Blackwell, Twels, Seawright and Casey, 2007). There are currently no data on the way positive training classes in Australia are conducted and this survey was designed to provide this information.

A questionnaire was distributed and collected at a large trainers' conference (APDT Australia 2011) and posted as an online survey for members of 2 groups of positive trainers. Responses were received from 117 trainers.

Puppy classes were conducted by 72% of respondents and most used an indoor venue exclusively (71%). Most (87%) had 4–5 practical sessions and 39% included an introductory class for owners without puppies. Exercises most commonly taught were sit (98%), come (96%), drop (92%), health inspection (89%), lead walking (75%) and massage (74%). 77% included off lead play.

Adult classes were conducted by 54% of trainers, generally outdoors (76%). Program length was up to 8 sessions (84%) and 56.5% included an introductory lesson without dogs. Exercises most commonly included were sit, come, drop, lead walking (all 100%), stay (98%), stand (93%), tricks (85%). 25% included off lead play.

Most trainers taught their clients to use a conditioned reinforcer (93%) – most clients chose a word (78%). The most common training aids used were screens (75%) and cones (65%). Only 3 trainers used Adaptil™ diffusers.

While there is a high level of consistency in the cues taught in class, there is a great variation in the way classes are conducted, which requires more detailed investigation to determine their significance.

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Resource guarding in dogs: Achieving expert consensus on definitions, concepts and treatment methods

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Threats or aggression in relation to valued food or objects, often termed resource guarding, is a common form of canine aggression (Beaver, 2009). However, the terminology and concepts surrounding this type of aggression vary throughout the literature. The Delphi method was used (repeated consultations with experts to achieve consensus) to clarify definitions, concepts and treatment methods related to resource guarding in dogs. We contacted 85 canine behaviour experts and achieved a 42% response in the initial round. Consensus was defined as $\geq 75\%$ agreement.

High agreement was achieved on the components of a general definition for this behaviour including: 1) display of threatening or aggressive postures (100%), 2) dog in possession or perceived possession of valuable item (100%), and 3) the presence of a target (85%).

Experts generally use the terms resource guarding (71%) and possessive aggression (29%), and some label food-related aggression separately (50%). There was strong consensus that resource guarding is a normal canine behaviour (96%). However, all identified situations where it is considered abnormal (e.g., no imminent threat, high intensity) and most consider it preventable in some circumstances (92%).

Experts suggested a number of different treatment methods that may be appropriate depending on the individual dog, but interestingly, the group consensus was that some of these methods should rarely or never be attempted. Further research is on-going to clarify some areas, particularly in relation to terminology and underlying motivation. Consistent terminology and concepts are critical for ensuring best practice in both treatment and research of canine resource guarding.

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Dogs with separation-related problems show ‘less pessimistic’ cognitive bias during fluoxetine (Reconcile™) treatment and behaviour modification plan

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There is good evidence that psychoactive medication improves the quality of a dog's response to behaviour modification for the management of separation-related problems (SRP), but it is unknown if the apparent improvement is associated with an improvement in underlying affective state or simply an inhibition of the behaviour. Cognitive judgement bias of ambiguous stimuli has been proposed as a method of assessing underlying affect, and so we aimed to assess whether change in clinical signs during treatment was associated with a related change in cognitive bias.

Five dogs with SRP were treated with fluoxetine (Reconcile™, Elanco) and placed on a standard behaviour modification plan for two months. Questionnaires and interviews were used to monitor dogs' clinical progress, and a spatial cognitive bias test used to assess changes in underlying mood prior to, and during, treatment. Concurrently, seven other dogs without signs of SRP (controls) were similarly tested.

At baseline, dogs with SRPs were significantly slower in their approach towards an ambiguous stimulus compared to control dogs, a response consistent with negative affect. By weeks 2 and 6 of treatment, SRP dogs were no longer different in their judgement of ambiguity compared to control dogs, consistent with the possible normalisation of mood during treatment. In addition, items within the questionnaire used for monitoring the dogs' behavioural progress showed that clinical improvement in SRP was significantly correlated with the performance in the cognitive bias test.

This provides the first objective evidence that psychopharmacological intervention combined with behaviour modification results in positive affective changes in dogs with a clinical behavioural problem.

Dog appeasement pheromone collars (Adaptil®) and anxiety management – how effective are they?

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The use of a synthetic analogue of the dog appeasement pheromone has been recommended for use in the management of anxiety related disorders in dogs. An open label field trial of 105 dogs was conducted to assess the effectiveness of the contribution of the Adaptil® synthetic pheromone collar in the management of a variety of anxiety-related disorders in dogs.

Veterinarians at 28 practices were engaged to identify dogs with signs of anxiety for inclusion in this trial. Dogs with a veterinary diagnosis of anxiety that were not given advice on behaviour modification or administered any psychotropic medication were available for inclusion. Dogs were assessed for baseline signs prior to the application of the Adaptil collar and pre and post signs were compared. Assessment included: number and frequency of signs such as panting, vocalising, salivation, ability to settle, yawning or lip licking, withdrawal (hiding), overgrooming, startle response, muscle rigidity, urination. An Adaptil® collar was then placed on dog and the dog was reassessed one month later.

The number and frequency of the signs were compared using the Wilcoxin sign-rank test for paired observations exhibited by each dog pre collar placement and one month after collar placement.

Results showed a significant reduction in the number and frequency of the signs of common anxiety disorders ($p < 0.001$). There was also a significant reduction in the frequency of specific signs ($p < 0.05$) for all the assessed signs except urination.

This study demonstrated that the use of the Adaptil® collar reduces the signs of anxiety in dogs with common anxiety disorders within the first month of application.

Misuse of pheromones in canine and feline behavioural problems: Two clinical cases

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Pheromones are compounds that are naturally secreted by animals so that they can communicate with members of the same species. Female dogs secrete a pheromone that reassure their pups; the synthetic equivalent of this pheromone can help dogs handle stressful situations and enables them to adapt to new situations (Adaptil®). Similarly the feline synthetic analogue (Feliway®) artificially reproduces the facial marking that is natural to cats, who deposit facial pheromones in known places in order to mark a familiar territory.

In the present study two cases are reported involving incorrect pheromone use.

Case one. A six-old neutered male cat was adopted from a shelter. He presented with some severe behavioural signs (aggression towards the owners, altered awake-sleep cycles, bulimia) and Feliway® plug-in diffuser was recommended by the practitioner. No results after two months, but symptoms increased.

Case two. An adult neutered female mix-breed dog introduced into the family two months before, was highly aggressive towards other dogs and unfamiliar people. An Adaptil® collar was suggested by the practitioner. Threatening barking evolved into overt aggression in a few days; symptoms disappeared when the collar was removed.

In both cases appropriate diagnosis and therapy including the correct use of pheromones improved symptoms in a few weeks, follow-up confirmed the positive results, with no relapse.

Pheromones can be effectively applied to prevent behavioural disorders in dogs and cats but they should be appropriately included as part of the global treatment plan when they are used in behavioural therapy. Practitioners should be properly aware of the mechanisms of pheromone action when they recommend them.

Owner-reported potentially problematic behaviours and owner-interest in professional help

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The 100,000 year-old human-dog partnership can be sorely tested by canine behavioural problems, which may cause dogs to be relinquished to shelters^{1,2}. This study scrutinized the prevalence of owner-reported potentially problematic behaviours, the owner's attitude towards them and their potential modification. The aim was to explore dog owner's perceptions about behavioural problems and to look at their actual willingness to work through the problem.

Owners over 18 years old, directly involved in the pet's care and whose dogs were at least 1 year old were asked to complete an on-line questionnaire. They were first asked generic questions on their dog's behaviour, and then whether or not their dogs exhibited any of 15 behaviours commonly considered to be problematic³. Data were analysed using non-parametric statistics (SPSS).

1,365 owners completed the survey, 409 of whom (30%) thought their dog had misbehaviours they wished to change. Of these 409 respondents, 77% and 62% indicated attention-seeking behaviour and dog aggression respectively when asked to evaluate the 15 behaviours ($p < 0.05$). Only 34% of respondents indicated dog aggression as the behaviour they would modify, and only 2% of owners mentioned attention-seeking. Among all owners who wished to correct their dog's behaviours, 90% were aware of the existence of veterinary behaviourists. A greater proportion considered surgical sterilization as a possible option (83%, $p < 0.05$), compared with 42% who would attend behavioural education courses and 36% who would use drugs to correct the behaviour. Only 5% would give the dog away.

In summary, perception of dogs' behaviours varied significantly depending on whether owners were asked to spontaneously consider it or whether they were first guided by informative descriptions. These findings might suggest a certain

inconsistency in owner interpretation of their dog's behaviour^{4,5}. Owners were willing to solve the problem, and were open in varying degrees to the range of alternative options proposed in the survey.

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Training communication skills: How to organize this?

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Performing a behavioural consultation requires knowledge about normal and abnormal animal behaviour, psychopathology, risk assessment, therapy and training.

During consultation a lot of time is spent talking to owners, communication skills are required to achieve a good quality dialogue and exchange. This requires an understanding of interviewing techniques (open questioning, reformulation), observing the owner (looking at non-verbal communication, owner dog interaction and family interactions), taking care of the emotions of others, motivating the owner (to change habits, to take the necessary steps in training and therapy) and dealing with resistance.

In teaching behavioural medicine emphasis is given on ‘what’ to do, but not on ‘how’ to do a behavioural consultation, or how to communicate with the owners. In text books these items are mentioned. Reading about these skills, is not enough. Training is needed and that is not usually organized yet in vet schools or in congresses.

Zoopsy: the French behavioural group has a long tradition of organizing workshops in communication with clients. During role play under the supervision of a psychiatrist or psychologist, participants can learn about their own communication style and learn to improve it.

We recently organized training sessions in collaboration with a competent person (psychologist specialised in training medical caretakers – nurses, doctors). The experience with such training will be described in detail: how can it be organized, what was the programme and how can a group of people be prepared and have enough security to be able to work on communication skills.

Dog welfare in the waiting room of the veterinary clinic: Owners' and behaviourist's evaluation

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Veterinary visits are known to be stressful for many dogs, so waiting may be stressful too. The aim of this research was to assess dog welfare in the waiting room of the veterinary clinic.

The study was carried out in the waiting room of a veterinary clinic, where only the experimenter and dog-owner dyads were present. Forty-five dogs (31 males and 14 females; 67.4 ± 49.5 month old) were videoed for 3 minutes before the visit. Owners were asked to keep the dog on the leash and to sit on a chair, while filling in a questionnaire about the dog and its history, and their perception of dog welfare. A trained person observed the videos to measure the duration of 19 behavioural signs of acute stress. Owners' and behaviourist's evaluations of dog stress (low, medium, high and very high) were compared through Cohen's Kappa coefficient; their possible correlation with the duration and number of displayed signs of stress was assessed through Spearman rank test ($p < 0.05$).

Two-thirds of dogs spent more than 20% of the time displaying signs of stress, and most dogs (64.4%) showed more than 3 behavioural signs of stress. The behaviourist's evaluation of stress level was correlated with the time spent by dogs displaying signs of stress ($r = 0.639$; $p = 0.000$), while it seems that owners paid more attention to their number ($r = 0.368$; $p = 0.003$). The agreement between owners and behaviourist was low ($K = 0.352$).

Results show that dog welfare in the waiting room is often compromised, and behaviourists should address owners about evaluating dog stress.



Poster presentations

The effects of the different training methodologies in dog's stress behavioral manifestations

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Throughout its domestication, the dog has been trained for a countless number of tasks useful to man. The way the dog is trained may be of particular importance regarding its well-being. Traditional training methodologies mostly employ aversive stimuli, whether in the form of positive punishment, or in the form of negative reinforcement. The employment of aversive stimuli in training may have serious consequences in the well-being of dogs. It causes pain and it puts the animal's health at risk. The connection between aversive training and the appearance of stress signals and behavioural problems has been corroborated in some studies, and it can be named as the primary reason for the vast majority of cases of abandonment and euthanasia.

This presentation aims to compare the effects of the different training methodologies on dog's stress behavioural manifestations. In this field study, we filmed the classes of 18 dogs attending 6 different schools of canine training in the metropolitan areas of Oporto and Braga.

We have observed that the training that led to a manifestation of more stress signals were the ones where aversive training techniques were used. We have also concluded that individual classes, with higher intensity and the need for constant concentration of the animal, are responsible for a larger number of stress signals.

In conclusion, we believe that aversive training techniques are responsible for creating more stress in dogs than the non-aversive ones, so they should be eliminated altogether from canine training.

Integration ability of stray dogs into adoptive families' environment: Preliminary results

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Several researchers have investigated the post-adoption period of shelter dogs in terms of integration into the new home and behavioural problems encountered by new owners^{1,2,3}. The most common behaviour problems displayed by shelter dogs are suggested as fearfulness, escaping, sexual problems, excessive activity and barking^{1,3}. However, up till now no detailed investigation has been conducted on the post adoption period of stray dogs.

The aim of this study was to identify behavioural characteristics of stray dogs in adoptive families' environment during the post adoption period.

The data were obtained from 25 item questionnaires completed by volunteer owners of stray dogs, i.e. dogs of an unknown breed found loose on the street. Fifty five people responded to the questionnaire up until now.

The vast majority of respondents (75%) reported that their dogs showed timidity when they first came home. A large majority of the owners (80%), however, stated that the temperaments of their dogs have changed throughout the post adoption period, mostly in the first 6 months (73%). Seventy five percent of the dogs were reported as becoming more self-confident. The most common behaviour problems currently present in the dogs were indicated as hyperattachment to the owner (40%), escaping (36%), barking (22%) and fearfulness (18%). The majority of the owners reported that they did not have trouble either in house training (75%) or in leash training (69%).

Preliminary findings indicate that although the majority of stray dogs tend to display behaviour problems at the beginning of the post adoption period, they show considerable improvements in their behaviours in a timely manner. Considering these preliminary results of the study, it can be suggested that stray dogs are highly adaptable to live in adoptive families' environment.

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Losing Snoopy: Grieving processes after the loss of a pet

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All over the world, owners suffer with the loss of their pet, which can make the grieving process extremely hard for them. This study aims to understand how the owners deal with the loss of their pets, focusing on the emotions and behaviours presented in this phase. Two scales were used: *Positive and Negative Affect Schedule* (PANAS) (Watson, Clark, & Tellegen, 1988) and the *Pet Loss Survey* (PLS) (Archer & Winchester, 1994), to conduct an online survey of 499 Portuguese individuals, whom had lost at least one pet in the last few years, with ages between 13 and 70 years. This sample consisted of 59 men and 440 women and most of them are single. The significant results of this survey indicate:

- a) an unexpected pet's death causes more suffering than an expected one;
- b) people who only have one pet suffer more than those with multiple pets;
- c) the intensity of feelings does not decrease over time;
- d) people who live by themselves and those who live accompanied show the same results;
- e) women suffer significantly more than men to the pet's death.

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Clashes after the occurrence of autochthonous visceral Leishmania

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Leishmaniasis is a disease caused by *Leishmania* causing infections in humans and animals, especially in tropical countries with hot and humid climates. The presence of an autochthonous case in 2011 triggered a series of actions aimed at identifying *Leishmania chagasi* in the city, divided into sectors:

- a) Great Retreat: left bank of the Rio Paraíba do Sul
- b) South Sector: Village Santa Cecília to High Bridge.
- c) Northern Sector: Amália Garden Quarter Don Bosco.
- d) East Sector: Sixty to Casa de Pedra.
- e) Complex Rome: Herons Park, Rio das Flores, Rome I, Rome II.

The population was instructed to report cases of abandoned properties through the System SAC 156/EPD-VR. From January 2012 to January 2013 were recorded a total of 191 complaints regarding land that constituted a health risk population. The following actions have been reported:

- a) 160 – performed the clean-up of the property,
- b) 5 – were sued
- c) 16 – were deemed unfounded
- d) 10 – were not met.

Sectors A and B* (*autochthonous case) recorded the highest number of registered complaints, a total of 141. According to the available information, the CC Z Municipality, following the protocols of the Ministry of Health underwent a total of 180 examinations of dogs suspects, of which 152 were considered false positives and 28 were euthanized after laboratory confirmation. 27 veterinary medical establishments were inspected, and professionals received technical guidance concerning the implications on health and criminal legislation in force.

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Epidemiology of the canine bite in Lisbon

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Dog bites to humans are a complex problem that involve public health and animal welfare. To prevent them it is necessary to have epidemiological data that allow the identification of risk factors. This study was conceived to investigate the epidemiology of the canine bite in Lisbon environs. Data from Official Animal Collecting Centers (CROA) was obtained. CROAs are municipal shelters where animals involved in accidents, namely attacks to humans and other animals, and relinquished animals are collected till further action is required by the authorities involved.

The data indicate that the main victims are adult women, bit by their own dog or by stray animals. These results were not expected the basis of the majority of published bibliographies, which state that most victims are children, but can be justified due to the place where the information was obtained. It also indicates that the accident usually happens after an undesired interaction, which in the cases found in this study would be petting an unknown animal or approaching a fearful dog. A pattern was not found concerning specific breeds involved in the biting accidents. With this information, it will be possible to create a prevention plan according to the epidemiological characteristics of the city and to create a study that includes the whole country, in order to know its characteristics in their entirety.

Comparison of stress and fear levels in common pheasant hens kept in different housing systems during their laying period

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Fear and stress levels were monitored as a part of the welfare assessment in captive-reared pheasants. During the laying period, pheasants were housed either in conventional cages and underwent beak trimming or were fitted with clip-on spectacles or were left with intact beaks and housed in cages enriched with two perches and a place to hide created by separating one corner of the cage with strips of cloth.

After three months of cage housing, 15 hens from each group were exposed to a tonic immobility (TI) test. Another 45 hens (15 birds from each group) were sampled to assess the heterophil-to-lymphocyte (H/L) ratio. Data were subjected to a Kruskal-Wallis ANOVA and a non-parametric Tukey-type test with ranked sums for pairwise comparisons.

The shortest TI duration (111.40 ± 21.41 s) was found in pheasant hens housed in enriched cages during the laying period. It was lower ($P < 0.05$) than in hens kept in conventional cages. The longest TI duration (361.63 ± 40.61 s) was found in pheasant hens fitted with spectacles. However, the difference between debeaked hens and hens fitted with spectacles was not significant. Also the highest H/L ratio (0.10 ± 0.01) was found in spectacle-fitted hens, however it differed ($P = 0.001$) only from beak-trimmed pheasant hens (0.05 ± 0.01). No difference was found in the H/L ratio in intact-beak hens kept in enriched cages (0.08 ± 0.01) in comparison to both beak-trimmed and spectacle-fitted pheasant hens.

The results show that relatively easy and inexpensive enrichment of the cage environment (two perches and a simple hideout) where breeding groups of

common pheasants are housed during the laying period can contribute to reduced fear levels. However, when considering H/L ratio as a stress indicator enriched cages had no effect on stress reduction in comparison to conventional cages. Further research is needed to define the proper housing of pheasants in commercial rearing facilities.

The influence of crate height on transport induced-stress in captive-reared mallards

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Large numbers of captive-bred mallards are transported from rearing facilities to be released into the wild. They may be exposed to a variety of stressors during transit, including the effects of crate type. Most transport crates available on the market have been designed for poultry, although in practice they are also used for other bird species.

The aim of this study was to investigate the effects of crate type (particularly its height) on stress in captive-reared mallards (*Anas platyrhynchos*). The physiological changes in response to 2-h-crating in crates of either 20 or 26 cm height were monitored in 6-week-old mallards. Data were analysed using a one-way ANOVA with treatment as the main effect and subsequently with a Tukey-HSD test.

Stress in birds is most often documented by increased levels of corticosterone. In our experiment, plasma corticosterone concentrations showed an increase ($P=0.036$) in mallards crated in crates of 26 cm height in comparison with control non-crated birds, whereas no difference in plasma corticosterone levels was found between mallards crated in crates of 20 cm height and control non-crated birds. The results suggest that higher space above the birds during crating may not be associated with better welfare. The different stress levels in mallards kept in crates of different heights might be explained by the differing behaviour of the birds depending on the space available. Birds kept in a restricted floor space may tend to move more vertically if this is allowed by the height of the crate. Movements of one bird over the other may be stressful. Furthermore, safety and stability may be better ensured when the birds do not stand erect during transport.

Our results suggest that crating mallards in lower crates (20 cm) may be less stressful than keeping them in crates allowing vertical movements of the birds.

Assessing cat sociability: Effects of human familiarity and interaction style on the approach of cats in a rescue environment

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Rescue environments are often stressful for cats, and it can be difficult to assess temperament in this setting, as responses to current environmental circumstances may be difficult to differentiate from deeper individual predispositions. In attempting to assess 'human-sociability' in cats under such conditions, it is important to determine relevant mediators in human-cat interactions. The aim of this study was to assess the effect of the familiarity and behavioural style of a person on the behavioural responses of cats. Using a within-subjects design, twenty-six adult cats housed in a rescue centre were placed in a cat carrier and allowed to emerge into an unfamiliar environment containing either a familiar or unfamiliar person, behaving either passively or actively. The cats' behavioural responses were filmed and analysed using Observer 10.5 (Noldus) and GLM ANOVAs in R.

Cats were found to take significantly less time to approach an active person, spent longer in contact with them, and approached, sniffed and rubbed against them more often (all $p < 0.05$). There were however, no significant differences in any of the behavioural responses of cats based on the familiarity of the person, nor were there any significant interactions between familiarity and behavioural style. These results suggest that the behavioural style of a person, rather than their familiarity may be most influential in determining how cats behave towards and interact with humans under certain conditions. These findings will help refine future 'human-sociability' tests in rescue cats, and suggest sociability may not be a function of familiarity in the cat.

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An epidemiological study of DISHA signs in cat

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Physical signs of ageing can be obvious, but mental and cognitive changes might require more careful observation. This study aims to identify behaviour changes due to age in a sample of cats.

352 owners were asked to complete an on-line survey about their cat's behaviour changes. Answers to questionnaires were scored, absolute and relative frequencies were calculated and expressed as a percentage. Chi-square tests were used to identify differences between age groups (group 1 = <7 years, group 2 = between 7 and 10, group 3 = >10).

Cats in different age classes were reported to behave differently during greetings ($p < 0.05$), interaction with the owner ($p < 0.05$), roaming in the home ($p < 0.05$), vocalization ($p < 0.05$), house soiling ($p < 0.05$) and sleep ($p < 0.05$). With age, cats were less friendly and enthusiastic during greetings, appear less interested in interaction with the owner and other animals, roam in the home without a real reason, vocalize without reason, and showed house soiling.

These results show that signs of cognitive dysfunction can be seen in cats and these changes were present more in subjects aged more than 7 years.

Evaluation of cat behaviour in a new type of cattery cage

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Little research has been published on cat behaviour and welfare in the boarding cattery. This study aims to describe the variability of cat behaviour housed in a new type of boarding cattery cage, designed to satisfy the cat's ethological needs.

Sixty domestic cats, 33 male and 27 female, aged from 3 months to 14 years (mean 4.6 years) were housed in cages 2,40m high and divided into four connected floors. Cats were filmed for 60 minutes four times: on the first day 1 hour after their arrival, and on the 3rd, 7th and 10th day of their stay. Seventeen behavioural categories were identified to describe cat activity. A 5 minute scan sampling method was used to analyse videos (12 sample time/video). Descriptive analysis and Kruskal-Wallis test were performed.

During the first day of video, 70% of cats showed behaviour oriented to the environment, in the lying down position and 51% in the sitting position. These behaviours tended to significantly decrease over the videos ($p < 0.05$). The hiding behaviour was shown by 23% of cats during the first video, 14% in the second one and only 5% in the third and fourth. Feeding, grooming and passive behaviours were showed more during 3rd and 4th videos. No cats eliminated and just one cat played in the first video, but these behaviours tended to increase over time. More research, comparing this new type of cage with regular ones, is needed to better understand the effect of the cage on cat welfare and adaptation.

Pinch-induced behavioural inhibition (clipnosis) in cats: Preliminary results on cat susceptibility and cat welfare

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Clipnosis is increasingly used in veterinary practice. The aim of this study was to assess cat susceptibility to clipnosis and its influence on cat welfare.

Forty-one cats were restrained on an examination table during routine veterinary procedures. Twenty-eight cats (16 males and 12 females; 73.5 ± 54.1 month old) formed the CLIP group; 1–2 stationery clips were placed along the cervical dorsal midline. A control group of 13 cats (11 males and 2 females; 89.5 ± 71.8 month old) were restrained through a gentle scruffing.

The effectiveness of clipnosis as a method of restraint was evaluated through the score described by Pozza et al (2008). Stress in cats was assessed through physiological parameters (plasma cortisol, heart rate and pupil diameter). Results of CLIP and control groups were compared with Mann-Whitney tests for cortisol, and Wilcoxon test for heart rate before *versus* after the restraint, and X^2 test for mydriasis ($p < 0.05$).

Susceptibility to clipnosis was found in 82.1% of cats, although a complete response (+3 score) was observed in 39.3% of subjects. Plasma cortisol was not statistically different in the CLIP group (17 subjects, median = 46.3 ng/ml) compared to the control group (11 subjects, 61.8, $U = 85.5$, $p = 0.707$).

Heart rate did not change in the CLIP group (median: 180.0 *versus* 180.0; $Z = -0.991$; $p = 0.322$), whilst it statistically increased after scruffing (median: 180.0 *versus* 200.0; $Z = -2.060$; $p = 0.039$). Mydriasis was observed in 14.3% of CLIP cats and in 69.2% of control cats ($X^2 = 9.970$; $p = 0.002$).

Preliminary results suggest that clipnosis is not more stressful than scruffing in restraining cats during veterinary procedures.

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Tellington-ttouch as a relaxation technique for dogs: A comparison with gentle handling

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Tellington-ttouch is an emerging technique. This form of gentle touch has been found to relax people in care situations, and its use is often suggested for dogs.

The aim of this research was to assess the effectiveness of Tellington-ttouch as a relaxation technique for dogs.

Fourteen dogs (5 males and 9 females; 39.9 ± 27.1 month old) underwent three sessions with an experimenter who was not a t-touch practitioner. After 1 minute to explore the room, dogs were gently manipulated for 4 minutes with casual handling (CA) or with t-touches (TT), or they just stayed with the experimenter without being handled (CT). In the following 4 minutes, dogs were left free and videoed for measuring the duration of behavioural signs of stress (circling, scratching the door, self-scratching, whining, lip licking, restlessness, yawning, shaking and barking). Then, heart rate was measured and saliva taken for cortisol measurement. The order of sessions was chosen randomly. Data was assessed using Friedman and then Wilcoxon tests ($p < 0.0167$).

The Friedman test revealed no statistical difference for heart rate (median values: CA 78.0; TT 75.0; CT 79.5; $p = 0.307$) and salivary cortisol (median in ng/ml: CA 72.6; TT 62.5; CT 67.5; $p = 0.878$). In CT (67.5) the display of signs of stress was higher compared to both CA (6.5; $Z = -3.234$; $p = 0.001$) and TT (11.0; $Z = -3.108$; $p = 0.002$), but no difference was found between CA and TT ($Z = -0.874$; $p = 0.382$).

Preliminary results suggest that Tellington-ttouch, at least when carried out by a not t-touch practitioner, has a similar relaxing effect to gentle handling.

‘Quality of Life in companion animal aggression cases’ – A review of cases in examples of canine, feline and rabbit patients

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Aggression constitutes a large percentage of cases within behavioural referrals and a smaller percentage of problem behaviours within first opinion practice. This paper discusses 3 cases where aggression exhibited by the patient impacts on both the animals’ quality of life and clinical outcome.

Case 1: Tia, an 11 year old entire female Boxer dog. Tia presented with a 10 month history of abnormal mammary growth and had not been presented for veterinary treatment for 4 years prior to this due to exhibition of fear aggression.

Case 2: Chloe, a 6 year old neutered female domestic shorthaired cat. Chloe presented for treatment for acute dysuria but also exhibited fear aggression whilst in the practice. Urinalysis revealed haematuria, high specific gravity and numerous struvite crystals.

Case 3: CoCo a dwarf lop eared rabbit owned by his current owner for 14 months with minimal handling due to his ‘owner directed’ aggression. Examination revealed dental pain from overgrown molar teeth and a ring tag on his leg around which the soft tissue of his proximal hock had grown.

Resolution strategies focusing on: compassionate handling, desensitisation to the surgery and to administration of medications as well as positive reinforcement for cooperation were used in each case to facilitate treatment.

Lack of handling and fear of misbehaviour at the vets compromised health considerably in each of these cases. Training & CPD for veterinary personnel as well as client counselling in the techniques described can facilitate treatment and improve welfare in both owner and pets.

Selection of dogs for assisted interventions, an exploratory study

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There is no official certification for dogs working in animal assisted interventions (AAI) in Brazil. Selection is grounded on intuitive observations based on handler expertise and brief organizational guidelines. Our purpose was to evaluate the selection methods used by three of the biggest non-governmental organizations (NGO 1, 2 and 3) working with AAI in Brazil. To evaluate these methods 22 dogs (NGO1: n=11, NGO2: n=7, NGO3: n=4) that have been approved by NGO's selection protocol were evaluated with internationally recognized behaviour tests, the 2003 Canine Behavioral Assessment and Research Questionnaire (CBARQ), the 2012 Jakovcovic's sociability test and a broad profile questionnaire. Dog groups were heterogeneous regarding breeds and training time (NGO1 11.0 ± 19.5 months, NGO2 30.7 ± 29.2 months, NGO3 16.0 ± 19.4). ANOVA showed a significant difference between groups for the sociability test variable 'total time close to experimenter', (NGO1: 84.9 ± 77.6 sec, NGO2: 196 ± 54 sec, NGO3: 84.0 ± 89.0, $F=5,784$, $p=0.011$), and for the variable 'demand for attention in the day after the IAA activity' (NG1: 0.09 ± 0.3, NGO2: 0.0 ± 0.0, NGO3: 0.75 ± 0.5), $F=9,240$, $p=0.002$). Groups did not differ relative to CBARQ classes (Kruskal-Wallis Test $P=0.6349$), but CBARQ results showed that 81,8% of the animals presented serious behavioural issues.

Our results indicate that the methodology used for dogs' selection in these NGOs has flaws and must be improved. Animals with behaviour issues should be clearly identified. A more adequate and extensive training and professional accompaniment may be useful to solve some of the problems.

Wandering cats in the UK: Predicting attitudes and behaviours of owners and non- owners

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Wandering by cats can cause problems for neighbours, owners and themselves, with an estimated 300k killed on the road in the UK annually. However, little is known about how UK owners manage their cats and perceive the risks and benefits of wandering. ‘The Cats in the Community National Survey’ was an online survey (www.surveymonkey.com/UOLCats) for owners and non-owners, which asked respondents to provide details about their perceptions of the risks and benefits of cats wandering from the home, as well as entering other properties. Both groups also provided details on their perceptions of cat management strategies, and owners stated the methods of containment they used, as well as demographic information regarding their cat. The survey had 4011 respondents (3230 owners, 781 non owners). Completion rates averaged 80%. A Principal Components Analysis showed that risks clustered into two distinct components; the risks to cats themselves and the problems that cats can cause. The predictability of component scores was analysed using forward-backward convergence of multiple regression models. The R^2 value for risks to cats was 0.465 and for problems that cats cause it was 0.345. Significant predictors that were found to converge in both models included cat ownership, being a ‘cat lover’, respondent gender and attitudes towards containment. Our findings highlight a dissonance between willingness to restrict wandering and recognition of the associated risks for cats.

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Canine aggression towards family members: Clinical presentations and causal factors

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The aim of this retrospective study was to describe the main features of cases of canine aggression towards family members in a referral practice and to determine the causal factors related to this problem. For this study, 43 cases of canine aggression towards family members seen at the Animal Behaviour Clinic (Barcelona School of Veterinary Medicine) were analysed and compared with 50 control cases (dogs without canine aggression towards family members). A logistic regression model was applied to detect possible causal factors. When the variability of the data did not allow for correct modelling, the relationship between canine aggression towards family members and the independent variable was analysed by means of chi-square-tests.

According to the owner's description, the postures adopted by the dogs during the aggressive events were defensive (27.5%), offensive (15%) and ambivalent (53.48%). Two individuals (4.6%) showed impulsivity (i.e. lack of warning signals prior to the attack) in all aggressive events, 11 dogs (25.5%) were impulsive sometimes but not always and the rest of the dogs (69.7%) always showed warning signals. Dogs were aggressive in competitive contexts (74.4%), in response to frustration (55.8%) and as a defensive reaction (48.83%) and more than half of the dogs (55.81%) were aggressive in more than one context. Dogs presenting with an underlying painful condition had a higher risk of been aggressive towards family members (OR=14; IC=1.3–165). Being fed from the table was also considered as a potential causal factor (OR=8; IC=2.4–27.9). Finally, the age of adoption was a significant factor where dogs adopted after 12 months of age presented a lower risk of been aggressive towards household members ($p=0.01$).

Modified selection programme in shelter dogs in Mexico: A proposed methodology

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It has been demonstrated that adopted shelter dog's behaviour problems can be a huge source of discomfort to owners, and can frequently result in the animal's relinquishment. The introduction of selection programs in shelters can provide substantial benefits both for shelters and owners, which serve to reduce the incidence of undesirable behaviour in dogs. By raising public awareness of the value of behaviour therapy, and the introduction of selection programs in shelters and adequate post-adoption counselling, it may be possible to reduce the incidence of behavioural problems arising in relinquished dogs.

The objective of this study was to integrate a modified selection program based on SAFER (Weiss, 1997) protocol in shelter dogs, which allows identification of undesirable behaviours to prevent future animal abandonment. The study was conducted in the National Animal Protection, AC shelter in Cuautla, Morelos. We worked with 103 dogs of different sex, race and age, clinically healthy and older than 16 weeks. The modified protocol selection consisted of nine steps. At each step, the dogs were evaluated individually. They were awarded a score of 1–5 and a summation was obtained, indicating whether or not the dog was suitable for adoption. The analysis of the results was performed by descriptive statistics of the proportion of dogs suitable for adoption. This work will establish a precedent in Mexico about the relevance of implementing screening protocols in shelters and lower canine relinquishment.

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Impact of environmental colour on horse behaviour and performance

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In the modern equine industry, constant travelling may lead to chronic stress, instigating welfare concerns of such extensive transport. Stress resulting from transportation can also affect performance in competitions. To assess the effect of environmental colour on the stress behaviour and performance of horses, the responses of 8 adult riding horses to 5 different environmental colours whilst travelling were recorded. Additionally their physical performance was scored on a British Dressage test series trial.

The animals were travelled along a familiar route, with the trailer inner colours (floor and walls) changed for each experimental trial. Heart rates and behavioural scores were recorded during travel, as well as observed reaction to the trailer whilst loading and off-loading. Immediately after transportation, each subject was ridden and scored by a naïve judge on a dressage trial.

Significant differences were found in reaction to loading, behaviour during travel, and heart rate during travel and off-loading. Adverse reactions and refusal to load were found for certain colours (yellow and blue), as well as stress related behaviours during travel (grey, blue and yellow). The green colour causes the opposite effect decreasing stress behaviours during travelling, though green and grey significantly increase heart rate. Differences were also found in dressage scores, with a significantly higher score achieved when the horse travelled in a green trailer.

These findings have relevant implications for those circumstances where travelling is required but stress needs to be minimised and the physical performance improved whilst keeping the horse's welfare in mind.

Canine body language – Interpretation of dog owners

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Man and dog have shared a common evolutionary path for at least 100,000 years. This close proximity has allowed the dog to be particularly skilled at reading human communicative cues. Humans, on the other hand, are less capable of understanding canine body language and this leads to important consequences related to public health and dog welfare.

This study aims to assess dog owners' knowledge on canine body language and to identify the factors that might influence their interpretation. Seven hundred questionnaires containing pictures of different body postures and facial expressions were distributed through 25 veterinary practices in the region of Coimbra in Portugal. The questionnaire included 34 close-ended and semi-opened questions and was divided into 3 sections related to demographics and interpretation of pictures.

The results suggest that owners do not read correctly canine body language particularly ambivalent signals however they seem to know how to safely approach a dog and they recognize submission signals better than dominance. The findings suggest that young owners and people who attended university are better at reading their dog's body language.

These results may be used in the development of educational tools for owners, trainers and other dog related professionals. A better understanding of how people interpret canine body language is the first step for improving the human-animal bond.

Indicators of pain in sheep with mastitis

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Ovine mastitis is an inflammatory disease that occurs worldwide with great economical impact as it remains one of the most important causes of mortality in sheep, and the reduction of the milk yield also affects the lambs' growth rate. It is mostly caused by bacteria such as *Mannheimia haemolytica*, *Staphylococcus aureus* or *Streptococcus spp.*, and affected ewes suffer considerable discomfort and pain, with significant adverse consequence on their welfare. To investigate which behavioural and physiological changes are important indicators of pain in sheep with mastitis, 10 lactating ewes were studied (n=5 infected, n=5 control). Facial expressions, body postures and other behaviours such as ear position are being evaluated in sheep affected by mastitis as well as control, uninfected animals, in addition to assessment of severity of the lesions and bacterial culture to identify the causative agent(s) of the infection. Continuous behavioural observations along with a startle test are being carried out to further the understanding of the emotional aspect of this disease and the associated pain. Body condition score is being registered, as well as survival and growth rates of the offspring. All ewes with mastitis will be treated with systemic antibiotic and pain relief medication, and observed on day 1 (initial diagnosis), day 7 and day 42. In support of any behavioural changes, physiological parameters are also being assessed, including measures such as cortisol and a biochemistry profile of the animal. Cytokine analysis will also be carried out, as the pathogens from the microbiological agents induce the release of inflammatory mediators. This study will allow for more accurate evaluation of the impacts of mastitis on the health and welfare of the infected animals.

Clipnosis[®] as a handling method in cats: Physiological and behavioural welfare indicators

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Scruffing is a general term for holding the skin of the cat's neck, provoking different levels of immobility in animals. Evidence^{1,2,3,4,5} suggest fear as a possible underlying mechanism for this type of immobility. Clipping enters this handling category and has recently been commercialised as Clipnosis[®]. Consequently, restraining cats by 'clipping' has raised welfare concerns.

The present study aimed to investigate if cats, during blood collection, perceived distress resulting from this restraining method, by measuring physiological (blood pressure (BP), heart rate (HR) and blood cortisol) and behavioural parameters (pupil and eyelids aperture, head, ears and tail position, vocalizations).

Twenty seven cats (fourteen males, ranging from 2 to 11 years) presented for clinical re-evaluation using blood collection entered this study. Evaluation of the aforementioned parameters was carried out during cats' blood sampling, first without the clip and on a second visit with clip. Each cat acted as its own control.

Although cats showed higher physiological (difference between BP values before and after the blood sample with Clipnosis[®] were 23.8 mmHg for systolic and 17.8 mmHg for diastolic, 13 bpm for HR and 6.25 ng/ml for blood cortisol, while 16.4 mmHg, 13.1 mmHg, 8.2bpm and 5.27ng/ml without clip) and behavioural signs of anxiety (mean group score without clip was 8.74 and 9.07 with clip) with clip, no statistically significant differences were found. Even though this study could not prove welfare effects of Clipnosis[®], the authors stress the need for additional research of this type of restraint on cat welfare.

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A physiological indicator of stress in African Grey parrots

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Because the number of pet parrots is increasing, it is important to be able to assess the signs of stress or welfare in these species. In a previous work we found that the heterophil to lymphocyte ratio (HLR) could be relevant in parrot species to assess stress as it is used in poultry or free-living birds.

In this study, a group of 35 African Grey Parrot, age and sex mostly unknown, from a rescue center near Paris approved by the French authorities was involved. Twenty two of the parrots tested showed no anxiety signs (NAS). Thirteen of them showed anxiety signs. The HLR was found to be different between AS and NAS groups, significantly higher in the AS group (median = 0.98) compared to the NAS group (median = 0.75) (*Mann-Whitney U test: $U = 71.5$; $p = 0.015$*). The correlation between HLR and the number of anxiety signs was significant (*Spearman's rho: $\rho = 0.72$; $p < 0.05$*).

This study highlights the importance of adding physiological indicators to the evaluation of parrot stress in order to improve the clinical approach for these species. It could also be a contribution to how we estimate the kind of welfare we offer to psittacine birds when we are keeping them as pets.

Anxiety diagnosis in domestic dogs with atopic dermatitis

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In human medicine the relationship between atopic dermatitis and impaired emotional, is well documented. Emotional disturbances act as triggers for pruritic crises, even with appropriate dermatological care. These patients tend to have higher anxiety scores than the average population. The aim of this paper is to identify the level of anxiety in dog patients with atopic dermatitis, compared to an average population.

This study evaluated 58 different breeds of domestic dog, both sexes, with an age range of 6 to 156 months (35 dogs and 23 control group atopic group). We performed a cross-sectional study. Anxiety was assessed by EDED questionnaire (a questionnaire assessing emotional and cognitive disturbances). Statistical analysis was performed by χ^2 test.

It was found that there is a statistical difference in the frequency distribution at $P=0.092$. The results of this study showed that there are high chances as with humans of skin problems caused by atopy in domestic dogs, with trends also present for higher levels of anxiety in these patients compared to the average population, so interdisciplinary attention (ethology & dermatology) could improve control of atopy in domestic dogs and their quality of life, since pruritus is a highly stressful agent.

Search for objective parameters of ‘distraction’ related to guide dog qualification

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‘Distraction’ is one of the temperamental traits that has been reported to be related to guide dog qualification by previous questionnaire surveys including one by us. Objective assessment of ‘distraction’, however, is considered to be difficult, because distractive stimuli may vary among individuals and thus standardized behaviour tests are impractical to set up. In this study we therefore searched for objective parameters that reflect ‘distraction’.

The subjects were 59 candidate guide dogs (Labrador Retrievers) of the Japan Guide Dog Association. After two months of training, we measured behavioural as well as autonomic (heart rate) responses under the following conditions: dogs were first kept quietly in their kennel for 10 minutes, transferred to and isolated in an unfamiliar room for 5 minutes, and then an experimenter entered and stayed within the room for another 5 minutes. One month later, we administered a questionnaire consisting of 22 temperament items to experienced trainers in order to evaluate the temperament traits of each individual dog.

Factor analyses on the results of questionnaire survey extracted five factors, and the ‘distraction’ factor score tended to be lower in the successful dogs than in the failed dogs. By using ‘distraction’ score as an objective variable in the stepwise multiple regression analyses, the following significant association was revealed; dogs with low ‘distraction’ score spent a shorter time exploring the kennel, and spent more time gazing at the experimenter with more elevation of heart rate during the first one minute of the experimenter entering period.

Based upon the negative association of ‘distraction’ with ‘gaze’ or with ‘heart rate rise’, it seems plausible to interpret that ‘concentration’ towards a specific person reflects the other face of ‘distraction’. Further study is needed to apply present finding to early prediction of guide dog qualification.

Using the Quality of Life (QoL) concept to optimize behavioural treatment and follow-up of a female Asian elephant (*Elephas maximus*) suffering from post-traumatic phobia

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A blind 45 year old female elephant (Dora) did not go outside from its housing since an attempt at introduction with another female (Rajah) in its enclosure in November 2011. The newly introduced cow elephant did not aggress Dora, but Dora suddenly showed panic signs and tried to escape. Consequently, the elephants were separated in two different parts of the enclosure.

Six months later, Dora rarely left her housing and then, only for very brief moments. Dora explored very carefully the area nearby its housing, showing static exploration postures, over-reactivity to noises, even familiar noises, and seemed appeased only when inside.

Management of this case involved combined techniques from closely inter-related fields: animal welfare, QoL and behavioural techniques:

- **Counter-conditioning and enclosure enrichment to provide a positive situation outside:** slow food delivering devices installed outside, construction of a special place for medical training, etc
- **Desensitisation and animal based indicators:** when poor welfare signs decreased and positive emotional signs grew, then the slow food delivering device was installed at an increasing distance from the housing.

- **Ability to control its environment:** replacement of electric fence by passive ones, permanent access to her home (secure base) where she can find appeasement after a perceived threat.
- **Medication:** alpha-casozepine was given in order to increase recovery speed.

After 2 months, Dora spends the majority of the day outside, goes to the extreme limit of her enclosure and shows appeased behaviours outside.

From repression to prevention: A positive evolution of the French law on dangerous dog

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In 2008, the French law on dangerous dogs, initially based on breed categories, included a new disposition: each dog that bites a human is now considered as a potential dangerous dog and needs to be evaluated.

This evaluation is made by a vet. Who assesses the behaviours of the dog, but also conditions of life, social environment and ability of the owner to manage the dog. This evaluation is a mix of history talking consultation with the owner and behavioural testing of the dog in the field.

The vet has to assess the danger of the dog on a four point scale and to make recommendations in order to decrease the level of danger and to prevent other aggressions from occurring. These recommendations may be for example obedience training, behavioural treatment, etc. If needed, another evaluation may be recommended after a defined period.

From a sample of dogs evaluated from 2009 to mid-2013, the author describes the relevant and positive effects of such a kind of evaluation, that leads owners to :

- reconsider the potential dangerousness of some behaviours of their dog.
- learn how to better manage their dog.
- discover how unwanted behaviours may be treated and managed.
- learn to how to avoid risk factors of aggression.

Evaluation of biting dogs, although at first sight considered by owners as a repressive law, appears in fact to be a relevant way to manage really dangerous dogs and to prevent potential future aggressive events.

Does where you live or whether or not you own a cat affect your perception of the risks and problems of outdoor cats?

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The wandering behaviour of cats is a potential issue concerning both cat welfare (e.g. risk of fights or injury on the road) and the problems they can cause for local communities. Opinions can be strong and a source of tension, but there has been no work within specific communities examining why people hold a particular point of view.

The aim of the current study was to explore the perceptions of inhabitants within a rural location and a central city location, about the pros and cons of outdoor cats. An intense survey was undertaken in two areas of 500 homes each. This yielded 222 respondents from the rural location and 150 from the city. Initial analysis used univariate chi-squared tests. Rural inhabitants were more concerned about problematic encounters with animals ($p < 0.001$), the leaving of dead prey items ($p < 0.001$) and the killing wildlife ($p < 0.001$) while city dwellers were more concerned about unwanted litters of cats ($p = 0.002$) and disease risk to humans ($p = 0.001$). Cat owners were more worried about cats being poisoned ($p = 0.001$) or upset by another cat ($p < 0.001$) while non-cat owners were more worried about the disease risk for humans ($p < 0.001$). There were no significant differences between owners and non-owners concerning the risk of road traffic accidents, unwanted toileting and killing wildlife.

These findings challenge some popular stereotypes of owners and non-owners concerning attitudes towards cat behaviour and lay the foundation for better intervention and education to minimise the risks and concerns of individuals about cats in the community.

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The social hormone oxytocin: Could it be a marker of welfare in mammals?

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According to the Universities Federation for Animal Welfare, animal welfare may be characterized in terms of five domains, matching the Five Freedoms defined by Brambell in 1965: nutrition, environment, health, behaviour, and mental state. Oxytocin is a neurohormone which has a broad range of behavioural, endocrine, and physiological effects in mammals. This review's purpose is to emphasize the links between each domain of animal welfare and oxytocin.

First, oxytocin is involved in the regulation of food and fluid intake, through the role of the oxytocinergic system in the control of ingestive behaviours. Central oxytocin neurons also constitute part of the thermoregulatory system involved in maintaining body temperature. Additionally, the neurohormone is implicated in pain modulation with antinociception effects, facilitates healing and tissue repair, and has antioxidant and anti-inflammatory properties. Oxytocin is massively involved in the expression of normal behaviours since it has a role in social memory and social recognition. The neurohormone strongly relates to positive social interactions and appears to be important in enhancing sexual behaviours, maintaining social group and forming social attachments, including pair bonding, social and offspring recognition, initiation of parental care, and offspring's attachment behaviour. Finally, oxytocin enhances the buffering effect of positive social interaction on stress responsiveness and reduces stress by dampening hypothalamic-pituitary-adrenal activity. Moreover, the neurohormone promotes calmness, relaxation and alleviation in anxiety.

Because of all its properties, oxytocin could help the animal to cope with its environment and appears to be a clear candidate as a marker of welfare in mammals.

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Evaluation of the efficacy of a new delivery system for Feliway® on urine spraying in cats

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The efficacy of a new delivery system, based on a chemically impregnated mat, which releases the pheromone product over a 7-day period, was tested on urine spraying domestic cats.

Twenty-two households, with at least one cat urine marking who had all been checked by a veterinarian for physical health including urinalysis, were included in the study.

After a one-week baseline data collection period, the new Feliway® product was introduced and replaced every week for a total of four weeks. Treatment was supplemented with instructions on how to clean urine marks. The urine marking was recorded daily throughout the study by owners and the number of urine sprays over time was assessed using a GLM ANOVA.

The level of spraying fell in 80% of subjects after 4 weeks, to an average level of 53% of baseline values. This reduction in spraying was significant ($p < 0.05$). In comparison, the similarly structured trials by White et al (1997) and Mills et al (2001), respectively, reported a fall to 44% of baseline value when using a spray formulation and a decline to 30% of baseline value when using a diffuser as opposed to only 72% when using a placebo. A comparison between the changes seen using the mat with the results provided in the aforementioned diffuser trial found that there was no statistically significant difference between the two products.

In conclusion, all three products lead to a significant reduction in urine spraying in cats and can be applied with confidence in cases with appropriate medical work-up.

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Case report: “Bailey, the Wonder Dog” and the behavior technician’s role in welfare and veterinary care for the senior dog

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Bailey presented for behavioural evaluation for recent onset owner-directed aggression, defensive aggression to unfamiliar people when handled, confusion and night-time waking. Bailey, a 17-year-old, M/N Shih Tzu, was adopted at 5 years of age by Beverly, a 79-year-old woman. Over those 12 years, Bailey required extensive veterinary care including neck surgery due to automobile accident (9 years of age), Cushing’s disease, urolithiasis and atopy. Medical care, grooming or teething brushing had not previously elicited aggression. For 6 months, he experienced night time waking, disinterest in walks, decreased social interaction, disorientation and confusion. Recently, Bailey became so aggressive regarding medical care (especially handling around face/mouth) euthanasia was recommended.

The behaviourist determined a primary diagnosis of cognitive decline and secondary diagnoses of defensive and pain-related aggression. Techniques demonstrated by the behaviour technician included handling, force-free medication and mouthwash administration with respectful interpretation of conflict signs. Senilife® and ADAPTIL® (collar and spray) were recommended for cognitive decline. Bailey’s typical “charming and clever” personality resumed within 3 days. On follow-up at three and six weeks, his emotional, mental and physical well-being continued to improve. Due to the dramatic response, Senilife® and ADAPTIL® were maintained. Bailey’s cognitive and social interactions improved sufficiently, the technician could even perform desensitization and counter-conditioning for scissoring around his face. Medical treatments, routine grooming and long walks were resumed. Several months later Bailey’s health deteriorated and he was euthanized but he maintained the renewed level of cognitive and social interaction up until this time.

Exploration of possible clinical applications for cat appeasing pheromone: Multiple case review

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Dog, rabbit and horse, but not cat, appeasing pheromones have been commercially available. Benefits observed in other species suggest Cat Appeasing Pheromone (CAP) may enhance social interactions or reduce anxiety in felines.

Five client households were selected for trial cases based on behavioural manifestations of feline social tension including urine marking, inter-cat aggression, redirected aggression, and shyness. Case selection was based upon:

- 1) stabilized, simple cases,
- 2) no concurrent new treatment implemented and
- 3) clients known to be capable of reporting observations.

CAP (IRSEA) vials for diffuser were provided for 1 month's duration and the product effects were evaluated by clients.

The owner observations reported suggest beneficial effects of CAP may include: reduction in urine marking, reduced tension between housemate cats characterized by reduced leaving/fleeing following meals, increased time spent together and increased affiliative interacting with other cats. Some cats were noted sniffing and being sniffed by other cats, being groomed by another cat and did not run away when approached during the CAP treatment period. One cat with severe shyness of both people and cats did not report improvement with CAP: all other owners reported improvement in target behaviours during CAP treatment. Curiously, two families reported the cats began sleeping in the owner's beds at night, suggesting the social tension previously prevented this behaviour and alleviation of the feline social tension permitted this affiliative interaction with people.

Cat Appeasing Pheromone may be beneficial for reducing social tension and promoting affiliative interactions.

Case report: Fear causing 'bad behaviour' in a KWPN Dutch harness horse

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A 12YO, KWPN Dutch Harness Mare presented for consistently attempting to bolt whilst being harnessed. The problem, apparent since purchased, was steadily worsening. Aside from this, history taking did not reveal any other negative horse human interactions in other contexts.

Physical examination revealed no abnormalities.

Behaviour observation: The horse paid no attention to her handler whilst being walked around. The horse was harnessed by three different people simultaneously. The horse lashed out with her head and held it up high. She sprung forward (flight behaviour) dangerously. The reins were immediately pulled hard (physical positive punishment) and the horse was sternly commanded to stop (verbal positive punishment). The horse stopped and at the same time was again physically and verbally reprimanded. The horse again bolted and was hit with the whip and again sternly verbally punished.

The horse was diagnosed as being fearful and anxious (with a probable learned component) whilst being harnessed. Pain is an obvious differential when considering this history (Jonckheer-Sheehy et al, 2012) but no supporting evidence was found upon physical examination.

Groundwork exercises (start-stop, standing still, stepping up & back lead work) using positive and negative reinforcement (McGreevy, 2004 pp. 302–309) and a desensitisation & counter conditioning programme (McGreevy, 2004, pp. 91–92) to being harnessed were recommended 3–4 times/week for 10–20 minute intervals for 4–6 weeks. Use of positive punishment and conflicting signals (McGreevy, 2004 pp. 300) were advised against.

The prognosis was guarded as the horse had shown the behaviour for several years and the risk was considerable (700kg horse).

The mare's behaviour significantly improved and she's now used to train beginners to work with harness horses.

Horses even with longstanding problems, can sometimes be successfully re-trained.

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Physical and behavioural data as possible adoption success indicators for shelter dogs

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In Italy, the law establishes that shelter dogs cannot be euthanized unless dangerous or affected by severe or untreatable disease; the number of dogs housed in shelters is therefore considerably increased (Normando et al, 2009), representing both a dog welfare problem and an economic and moral concern for society (Rowan, 1992; Frank, 2004; Frank and Carlisle-Frank, 2007).

Behaviour assessments were proposed to determine the suitability for rehoming. The aim of this study was to score physical and behavioural data as possible adoption indicators of sheltered dogs.

79 sheltered dogs (aged 2 months to 15 years; 29 purebred, 50 crossbreed; 29 neutered, 10 intact females; 5 neutered, 35 intact males) were involved in this study over a period of one year starting from March 2010. The dogs were initially housed alone in 2 x 4m pens with an indoor/outdoor area and daily exercise. Physical (breed, age, sex, size and physical pathologies) and behavioural data of each dog were assessed by a trained examiner using an appropriate schedule. The behavioural data were scored on the basis of a scale from 1 to 4 or according to a binary code yes/no: each characteristic level was assessed on the basis of the ratio between adopted and not-adopted dogs, and analysed using chi square tests (SPSS 12.0, 2003). Adoption success was confirmed (98%) by a standardized telephone follow-up.

Age, size, activity level, sociability toward humans and toward dogs and no aggressive behaviours were significantly ($P < 0.05$) associated with adoption.

It is concluded that some physical and behavioural characteristics of shelter dogs encourage a more acceptable owner-pet relationship and influence suitability for rehoming. In addition, the ascertainment of individual characteristics helped the shelter management to form appropriate pairing between dogs in the unit, improving the welfare of the dogs in the kennel.

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Dog aggression: Characteristics of the dogs and of the victims

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In the last few years, dog aggression has been increasing both in frequency and in severity. In Italy, there are no national statistics available regarding dog aggression. This behavioural problem is also the most frequent and has significant consequences on owner-animal relationships and public safety (Palestrini et al, 2005). The aim of this research is to better understand the problem of aggressive behaviour in dogs in Italy and its relationship with some individual and environmental features.

9230 records regarding dog bites in the period between 1998 and 2005 from 22 different Italian Local Health Authorities (ASL) in 5 different regions of Italy (16 Lombardia, 1 Emilia-Romagna, 3 Piemonte, 1 Liguria and 1 Marche) were collected. We analysed for frequency: sex, age, breed and body size of biting dogs, the target of aggression, sex and age of the victims, the localisation of bite wounds, year and month of aggression. We classified dogbreeds according to Ente Nazionale Cinofilia Italiana (ENCI) and added as a group 11 pit bulls (which are not recognised by ENCI as pure-bred) and as a group 12 mixed breeds.

Mixed breeds (46%) and large sized dogs (43,8%) are the most represented in the reports from ASL. Most aggressions reported in our study involved male dogs (74,4%). Most of the dogs involved in aggressive episodes are between three and seven years of age (44,30%). Aggressions occurred more frequently during Spring and Summer and were more often stranger-directed (67,70%). Most of the victims reported in our study are adults between 31–60 years old and bites are more frequently reported on arms (46,7%) and legs (37,6%).

It is concluded that some characteristics of the dogs and of the victims could influence the problem of dog aggression and its relationship with some individual and environmental features.

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Successful foster child placements: What can be applied to shelter dog rehoming?

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Many parallels can be drawn between a dog-owner relationship and a human foster child-foster parent relationship; one of the most striking of which is that both foster families and dog adopters have the option to withdraw from an emotional social commitment, and return the potential new member of the family to its source. Additionally, there is a process of 'matching' that occurs prior to placement (Weiss, 2012).

There is substantial research in the field of social sciences on the significance of the temperament of human foster parents to the success of a foster child placement (Doelling & Johnson, 1990; Green et al, 1996). However, this rich vein of knowledge appears relatively untapped by those working with rehoming dogs. In order to apply this research to shelter dog placements, procedures such as the matching of temperament, need to be adapted to be relevant to the adopter-dog relationship. The current project has used a modified Delphi method to do this, with a view to increasing the chances of creating a compatible relationship. The measures administered to 100 volunteers at the point of adoption at rescue centres, will be re-administered six months post-adoption, in order to assess their temporal stability. The questionnaire is also being administered to a sample of content dog-owners and those who were relinquishing their dog to a rescue centre, in order to test the hypothesis that owners who are relinquishing their dogs will be less adaptable than those who keep their dogs.

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Thermographic application in pigs: Relationship between surface and core temperature

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Several studies report that body temperature in pigs is a valid indicator for welfare assessment. However, body temperature is difficult to be measured under farm conditions, as the accepted methods for measuring core temperature need handling and restraining of animals. Infrared thermography (IT) has been used in several species as a non-invasive technique to estimate the body temperature by detecting infrared radiation emitted by the body. The aim of this study was to assess the relationship between surface temperatures estimated by IT and core temperature in pigs. Eye temperature was measured in 13 pigs twice (36 and 265 days old). The experiment was performed in the facilities of Bologna University unit with a room temperature of 27°C and 20°C. Thermal images of the eye of each animal were recorded with a thermal imaging camera (Nec Avio TVS500). In order to validate IT data, rectal temperatures were measured using a calibrated digital thermometer. During the measurements, the animals were not manually restrained. Frequency distributions and Pearson correlation between the core and surface temperatures of the pigs were calculated.

Data were normally distributed: the average rectal temperature was $38.9 \pm 0.3^\circ\text{C}$ (min=38.4°C; max=39.5°C) and the average results of the eye temperature were $36.1 \pm 0.9^\circ\text{C}$ (min=34.8; max=37.7°C). Measurements showed that the mean eye temperatures of the pigs estimated by IT were significantly correlated ($r=0.731$, $P<0.001$) with rectal temperature. Based on these results, IT might be a useful non-contact method to measure the temperature of pigs under farm conditions.

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Public attitudes about legislation concerning companion animals – A pilot study

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The public perception of the policies concerning domestic animal adoption in different countries has seldom been investigated. In the present study, 227 answers to an online survey on this topic were analysed. The respondents answered using a 1 to 5 Likert-scale (1 = complete disagreement, 5 = complete agreement). Gender plus past and present cat/dog ownership status of the respondent were used as independent variables in Mann-Whitney U-tests of difference.

Most respondents (76% completely, 8% partially) agreed with compulsory micro-chipping of dogs, but 38% of them were unsure whether micro-chipping was an efficient measure to prevent the phenomenon of stray dogs, 34% agreed and 28% disagreed. Cat-owners reported that micro-chipping was more useful than non-owners. Most (41%, 12%) respondents also agreed that hotels should be obliged by law to accept dogs traveling with their owners, with women agreeing more than men ($p < 0.001$) and dog-owners agreeing more than non-owners ($p = 0.04$) and on the obligation for public shelters to house owned dogs at a low-cost during holidays (34%, 22%); on this matter, women agreed more than men ($p = 0.007$). Most people agreed (64%, 12%) that keeping dogs tied for more than 8 hours/day should be forbidden, with women ($p < 0.05$) and present dog ($p < 0.05$) and cat ($p = 0.009$) owners agreeing more than non-pet-owners. Official dog areas, in which owners are allowed to let their dogs run unleashed, are deemed insufficient by 59% of the respondents (33%, 26%), with no difference between owners and non-owners, but women being more unsatisfied than men ($p = 0.005$).

It is concluded that women and dog/cat owners are more concerned about companion animal welfare than men and non-owners.

Public attitudes to urban cat colonies – A pilot study

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Different countries have adopted different policies concerning feline colonies, but the public perception of these regulations has been seldom investigated. In the present study, 227 answers (149 from women) to an online survey on the public attitude to cat colonies and related issues were analysed. Answers used a 1 to 5 Likert-scale (1 = complete disagreement, 5 = complete agreement). Age (Kruskall Wallis test), gender and past and present dog/cat ownership of the respondent (Mann Whitney U-tests) were used as independent variables.

Forty-three percent of the respondent completely agreed on publicly sponsored cat trap-neuter-release, whereas only 13% completely disagreed. Present dog ownership, cat ownership and increasing age increased the likelihood of agreement (p from <0.001 to 0.03). However the majority of the sample did not find cat colonies in hospitals (38%) and schools (26%) acceptable. Being female or a cat owner increased the likelihood of agreement (all $p < 0.001$ for hospitals; p from <0.001 to 0.03 for schools). There was 60% complete disagreement on a hypothetical legal obligation to neuter non-stud cats, 41% complete agreement on the need to have publicly sponsored cat shelters (with women and current cat owners agreeing more, p from 0.03 to <0.001), and 50% complete agreement on the need for cats to be micro-chipped and officially registered. Thirty-two percent of the respondents did not deem free roaming owned dogs/cats as a danger to wildlife, whereas 36% neither agreed nor disagreed on whether stray pets were a danger to wildlife.

It is concluded that Italian legislation on cat colonies is generally agreed upon.

Plasma A β levels in geriatric hypothyroid dogs suffering cognitive impairment. Preliminary results

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An association between hypothyroidism and Alzheimer Disease (AD) in the elderly has been noted. Aging dogs naturally demonstrate cognitive impairment and neuropathology that model early AD. In a previous study in companion dogs, aged dogs suffering from mild cognitive impairment (mCI) showed higher plasma A β -42 levels than cognitively unimpaired aged dogs (CU) and severely impaired dogs (sCI), suggesting that elevation of plasma peptide levels is produced in an early phase of cognitive decline, and lowers after development of extensive cerebral amyloid plaques.

The aim of the present study was to compare plasma A β -40 and A β -42 levels in animals suffering from Cognitive Dysfunction Syndrome (CDS) and hypothyroid animals showing cognitive impairment (hCI).

The subjects enrolled in the study were sorted into four groups:

- i) CU, n = 31,
- ii) mCI, n = 21,
- iii) sCI, n = 17, and
- iv) hCI, n = 6.

All dogs were screened by routine physical and neurological examination, complete blood count, serum biochemistry and thyroid hormone measurement, and urinalysis when needed. Classification of cognitive status was carried out using an owner based observational questionnaire and A β -42 and A β -40 were measured in plasma using two specific ELISA sandwich kits (ABtest 40 and 42; Araclon Biotech Ltd.). Calculations were carried out using the statistical program SPSS 15.0 for Windows. Plasma A β -42 and A β -40 levels, and the A β -42/40 ratio were defined as dependent variables whose group mean values were compared using Mann-Whitney U tests.

Similar to sCI animals, hCI dogs showed significantly lower levels of A β -42 in plasma than mCI dogs ($p < 0.05$).

These results suggest that hypothyroidism-mediated cognitive impairment could be related to an increased deposition of A β peptides in the brain. Considering this, hypothyroidism should be considered as a potential therapeutic target in dogs suffering cognitive impairment.

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Results of a survey into conflict between neighbourhood cats in the UK

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The current UK pet cat population exceeds 10-million (Murray et al, 2010), with many living in high cat-population-density urban environments. The impact of this on cat welfare is an important area for research.

734 cat owners completed a retrospective online survey in which they rated the impact of neighbourhood cats; frightening or attacking resident cats in their garden, making it hard for resident cats to go outside or chasing them back inside, entering the home to steal food or attack the resident cat. Annual frequency of cat-fight related injuries, the incidence of health problems, and frequency of cat sightings in the garden were also recorded.

41.4% of households reported a level of home invasion by non-resident cats, with 18.7% reporting cats entering the home to fight with their cat. Rates were 51.1% and 24.8% for cats that had a non-secure cat-door (n=137). There was a strong correlation between cats entering the home to steal food and fighting with resident cats in the home (Spearman $r=0.45$, $p<0.0001$). Cats that had experienced untreated cat-fight injuries suffered more frequent episodes of hair loss, coughs & sneezes, lameness and eye infections (Mann-Whitney U (MWU), $p=0.047$, 0.0002 , <0.000001 & 0.001 respectively). These cats also showed higher rates of indoor spraying, hesitancy before going out, and agitation/fear when seeing another cat in the garden (MWU, $p=0.000015$, <0.000001 , <0.000001 & 0.000091 respectively).

Principal components analysis-hierarchical cluster analysis identified a sub-

population of 123 households (16.8%) that experienced a severe problem, with higher ratings for all of the variables associated with cat nuisance (MWU, $p < 0.00001$ in all cases). These households reported significantly more frequent sightings of non-resident cats in the garden and a larger number of individual cats visiting (MWU, $p < 0.000001$ & $p < 0.0002$ respectively).

This study provides evidence for a connection between population-density, inter-cat conflict, and health and behavioural problems in pet cats.

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Epidemiology of canine behaviour problems and owner's intervention

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Epidemiological studies about behaviour problems are a very useful tool for both generalists or behaviourists, and for clinical research. Differences among published data and a possible change in the distribution of behaviour problems might highlight the need to perform local and updated studies. The aim of the present study was to determine the prevalence of behaviour problems in the area of the Veterinary Hospital of the University of Zaragoza (HVUZ) and to investigate general education techniques applied by dog owners.

An interview survey was conducted with 110 dog owners attending the HVUZ for reasons other than behavioural consultation. They were asked about the existence of behaviour problems, the type of technique used to educate their dog and the intervention carried out when a behaviour problem occurred. A descriptive statistical analysis was performed with SPSS for Windows.

The prevalence of behaviour problems in the surveyed population was 69%. The most frequent problem was fear of various stimuli, followed by aggression problems. Positive reinforcement and punishment was used by 96% and 99% of the owners, respectively. Two thirds of the owners whose dog showed a behavioural problem had tried to solve it on their own before asking for professional advice. Nevertheless, only 19% of them got to solve the problem on their own, and more than half finally searched for a professional (veterinarian 38%, dog trainer 34%, and behaviourist 16%).

In conclusion, there was a high prevalence of canine behaviour problems in the surveyed population, and fear-related problems were the most prevalent ones. Most owners combined positive reinforcement and punishment, and more than half wanted professional help when a behaviour problem occurred. Increasing the sample of surveyed owners might help to clarify the relationship between certain education techniques and the occurrence of behaviour problems.

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How do people with different experience interpret canine body language?

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Reading and correctly interpreting canine body language is essential not only for a good human–dog relationship but also to pre-empt undesirable behaviours or dangerous accidents (Bradshaw & Nott, 1995; Shepherd, 2004). The aim of this work was to investigate people's ability to read and interpret dog body language.

33 dog owners, 35 people who never had a dog, 31 vet student dog owners, 33 vets and 30 vets specialist in behaviour were asked to participate in this study. Volunteers were asked to watch 12 different videos of dog-dog and human-dog interactions and fill in a multiple choice questionnaire after each clip, choosing between 9 descriptors which, in their opinion, best described the dog's behaviour. Behavioural categories were neutral, friendly, aggressive, ambivalent, fearful, submissive, playful and not normal. Answers to the questionnaire were scored, absolute and relative frequencies were calculated. Correlation tests were used to identify differences in different people's categories.

Analysis of questionnaire revealed a big difference in the dog's body language interpretation among all the categories of people. Aggression (85%), playful (63%) and not-normal (76%) were behaviours more often identified by all the people. Great confusion and lack of uniformity with regard to other dog's behaviours suggest there are still many gaps in the understanding of human-dog communication.

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The epidemiology of behavioural issues in dog and cat in Portugal: The perspective of the referral veterinary behaviourists

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To increase awareness of Animal Behaviour in Portugal, it is essential to collect current epidemiological data. The main goal of this study was to obtain some of these data from the perspective of veterinary behaviourists.

Although in Portugal, veterinary specialties are not yet defined and regulated, some veterinarians seek training in Behavioural Medicine and, due to the recognition of their work in this area, other veterinary colleagues send them clinical cases on a regular basis.

An epidemiological questionnaire was developed and answered by a group of nine professionals that work in different parts of the country.

This study concluded that the number of cases referred in dogs is three times greater than in cats and that the number of dogs euthanized for behavioural reasons is greater than the number of euthanized cats (70,6% in dogs and 20,4% in cats). The more frequent diagnoses listed for dogs are: aggression (directed toward people, directed toward other dogs and due to fear), separation distress disorder related to the absence of the owner and finally fear and phobias. In cats, they are: aggression between cats in the same household, inappropriate elimination, territorial marking and finally fear and play aggression.

The measurement of this significant national sample and its comparison with realities in other countries can help us to review concepts, to review the

effectiveness of therapeutic processes and, especially, to adopt preventive practices that minimize the appearance of these behaviour problems in our pets.

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Analysis of behaviour changes in 40 cats after gonadectomy

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Gonadectomy is a very common surgical procedure of small animals. This study aims to evaluate possible changes in behaviour in cats after gonadectomy.

Forty cats of different breed and age were recruited. At the time of gonadectomy, owners were asked to fill in a pre-surgery questionnaire including information on their cat's management and behaviour. Changes in the behaviour of cats were monitored using a post-intervention questionnaire through phone contacts at 10, 30, 90, 180 and 270 days after surgery. Answers were scored, absolute and relative frequencies were calculated and expressed as a percentage. Behavioural differences in cats were identified by Mann-Whitney and χ^2 tests.

Analysis of questionnaire revealed that feeding behaviour increased over time ($p < 0.05$): at baseline 7.5% of the owners considered it excessive, this percentage changed to 45% at 10 days and to 82.5% at 270 days ($p < 0.05$). Food intake at baseline was fast for 25% of the owners; at 270 days the percentage increased to 62.5% ($p < 0.05$). Before gonadectomy 20% of cats showed house soiling problems, that significantly decreased after surgery: 5% at 90 days and 0% at 270 days ($p < 0.05$). No significant changes in other behaviours were perceived by the owners.

This is a pilot study; to further investigate the promising results found, we are planning a control group study with a larger sample size and a longer monitoring period.

Organic cause of aggressiveness: A case report

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A six month male mixed puppy arrived at the hospital because of a behaviour problem consisting of aggressiveness against his owners, unknown people, other dogs and household objects such as chairs, and tables.

A complete physical and neurological examination was undertaken. Analytics included a complete haematology, biochemistry, distemper test, free T₄ and TSH. No remarkable irregularities were observed.

Histopathological examination was performed, showing degenerative lesions in the brain, liver and kidneys. These are nonspecific lesions, as occurs in many neurological processes. However CNS involvement, especially the limbic system, justify the observed changes in behaviour. The behaviour described can correspond to a psychomotor partial epilepsy. Moreover, kidneys, liver and central nervous system degeneration is compatible with Lysosomal Storage Disease.

Over 30 human inherited lysosomal storage diseases, with additional subtypes, have been described in which specific substrates accumulate in lysosomes as a result of deficient activity of lysosomal hydrolases. Many of these diseases have also been reported in domestic animals. Thus, gangliosidosis has been diagnosed in Beagle dogs, English Springer Spaniels and Portuguese Water dogs.

On the other hand, glucocerebrosidosis, a glucosylceramide lipidosis known as Gaucher disease has been described in domestic short-hair cats, pure-breed Siamese cats and a miniature Poodle dog. Cholesterol ester storage disease has been described in Fox Terriers, and ceroid-lipofuscinoses has also been described in English Setter dogs.

Finally, this case can be associated to α -fucosidosis because of the multi-organic distribution of the lesions.

Hospitalization in some severe canine behavioural cases: A resource alternative to euthanasia

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Dogs with severe behavioural disorders are at increased risk of being euthanized because of the impossibility to help them adequately in coping with therapeutic strategies prescribed by behaviourists. In some cases there might be a concrete hazard for humans and/or other dogs, as in severe aggressive behaviours which can make dogs really dangerous, but sometimes the owners are simply unable to support appropriately the patients in their rehabilitation.

In the present study seven dogs were partially hospitalized in a rescue shelter as an alternative to euthanasia over the previous 12 months. All dogs were behaviourally and clinically assessed at V_0 ; according to the diagnosis, management instructions and cognitive/behavioural therapy were applied plus a drug if necessary.

Dogs were checked at V_1 (after 15 days ± 3), V_2 (after 30 days ± 3), V_3 (after 60 days ± 3) and followed-up after 60 days ± 3 .

Details and diagnosis were reported for each case as follows:

- **Case one:** German Shepherd, male, adopted from a rescue two months before – separation related disorders with dangerous destructiveness and intolerable vocalizations in the garden, impossible to keep him indoors in the owner's absence due to his adverse behavioural reactions in closed spaces
- **Case two:** Mixbreed, male – deprivation syndrome with fear aggression towards humans
- **Case three:** American Staffordshire, male – hypersensitivity/hyperactivity with impulsive aggression towards humans and other dogs

- **Case four:** Mixbreed, male – hypersensitivity/hyperactivity with impulsive aggression toward humans and other dogs
- **Case five:** Rottweiler, female – sociopathy with severe aggression towards one of the owners and irresolvable conflict with the other household dog (Rottweiler, male)
- **Case six:** American Staffordshire, male – sociopathy with severe aggression towards one of the owners
- **Case seven:** sociopathy, permanent anxiety with chronic and refractory acral lick granuloma

Three dogs were hospitalized in agreement with the owners (case 1, 5 and 6), three dogs were temporarily transferred from other shelters (case 3, 4 and 7), one dog was under legal protection in a suspected case involving human abuse (case 2).

The period of residence in the shelter varied from two-eight weeks, depending on the severity of the behavioural signs and the therapeutic success rate.

The owned dogs were gradually reintroduced into their households; sheltered dogs improved their welfare in the rescue facility and increased their opportunity for adoption.

As in psychiatry hospitalization seems to be very effective in the first weeks of treatment, which may be the most critical. Replication is needed with larger groups, but these results suggest that partial hospitalization may offer an alternative to euthanasia in most severe cases.

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Welfare of exotic pet species in The Netherlands

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Housing conditions, care taking and availability of adequate and correct information at points of sales and with the pet owner are the most plausible situations and contexts where welfare of exotic companion animals might be at stake (Vinke, 1998; Anonymous, 2007).

In the present research, (part of the Research Program on The Welfare of Companion Animals commissioned by the Dutch Ministry of Economic Affairs, Agriculture and Innovation) many stakeholders and organisations, like shelters, rescue centres, pet shops and veterinarians, were approached for in-depth interviews and questionnaires, to get an insight into the welfare problems of exotic companion animals (mammals, birds, reptiles, amphibians and fish).

In the results, specifically, *regular* exotic pet species, like rabbits, guinea pigs, and goldfish, appear the most affected species addressing the nature, intensity and the number/frequency of health and welfare problems during trade and in companionship.

Specific points of interest towards welfare and health were identified for each species. Here, it was alarming to identify that most of the mentioned problems could be classified as *negligence* and serious symptoms could definitely be prevented if owners were better informed and more alert to their animals' health and welfare.

The results of this research should be directly applicable to the discussion and implementation by the public authorities and government of future policy on animal trade and the use of exotic animals as companion animals in The Netherlands. As aforementioned vulnerable species will be probably categorized as *positive* on the *positive list* (art 33, GWWD) in future, this will complicate applicability into the present intended policy.

To effectively improve the welfare of pet animals in the Netherlands, more attention should be paid to education and information and several trade channels

to the consumer should be limited and focussed on species specific products and quality.

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