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Two things make me uneasy: flying and large birds. So I avoid both. Sure, I feed a plethora of winged creatures (Steller’s Jays, Ring-necked Doves, Anna’s Hummingbirds, finches, and both Pileated Woodpeckers and Northern Flickers) from our back deck. I’ve even mustered enough courage to gently wrap a towel around a few errant birds who find themselves flying again and again against our glass railings to assist them with ‘up and over.’

But learning about how people train and then work with raptors on a daily basis to keep travellers and communities safe was eye opening. I’m in awe of the skill and courage these people show as they go about their work. Veterinarians, too, daily deal with these birds who, I imagine, are more difficult to assess and treat than, say, my tiny new Chihuahua, Ella, a recently arrived rescue found wandering the streets of California.

So, I was very pleasantly surprised, as I awaited her first check-up at her veterinary clinic, to see two of the parrots rescued from Greyhaven Exotic Bird Sanctuary (see our story in the June 2017 issue of West Coast Veterinarian). I was able to get quite close, though I lacked the requisite courage to touch them. I was delighted to learn how well they were settling in at their new owner’s home, how much affection she has for them, and that each one has a distinct personality.

As you read the articles in these pages, please pay particular attention to those companies who advertise with us (as well as those who sponsor tables and CE sessions throughout the province). The advertisers in the pages of West Coast Veterinarian provide much needed revenue that allows us to pursue the stories you are reading today. Please support (and thank) those companies you see in our pages; and if a particular company you like is missing, maybe encourage them to support the Chapter through quarterly advertising. Or send me a contact name and number, and let us handle it here at the office.

Email: wcveditor@gmail.com
CHRISS JORDAN, BSc (Hons), DVM, AvM, Dipl. ECVS, MRCVS, graduated from The Royal Veterinary College (RVC) in London, England, in 2008. Following graduation, he spent two years in a primary care small animal practice before returning to RVC where he undertook a rotating internship in the internationally renowned Queen Mother Hospital for Animals. In 2012, he completed his surgical training as a European College of Veterinary Surgeons (ECVS) Resident in small animal surgery, ultimately leading him to becoming an ECVS Diplomate. He works at Tri Lake Animal Hospital & Referral Centre in Lake County.

DAVID LANE, DVM, Dipl. ACVIM (Canids), has been practicing veterinary medicine in BC since his graduation from OVC in 1992, transitioning from mixed practice to exclusively small animals, and then to specializing in canine sports medicine. He operates Points West Veterinary Services, a mobile sports medicine practice operating in both Squamish and Whistler. When not treating pampered dogs, he can be found skiing, kayaking, mountain biking, or recovering afterwards in the hot tub.

KEN LANGELIER, OBC, DVM, graduated in 1981 from WCVM, where he received the award for Outstanding Achievement in Medicine. He is the past recipient of the CVMA’s Humane Award, the British Columbia Federation of Naturalists’ Recognition for Outstanding Achievement in BC VetMed, Dipl. ECVS, MRCVS, graduated from OVC in 1992, and went on to specialize in canine sport medicine. He operates Points East West Veterinary Services, a mobile sports medicine practice operating in both Squamish and Whistler. When not treating pampered dogs, he can be found skiing, kayaking, mountain biking, or recovering afterwards in the hot tub.

CLARE TOMPKINS, BSc, DVM, graduated from OVC 1994, started as a large animal practictioner in rural Ontario, and moved to BC in 2001. A partner in a large mixed animal practice on Vancouver Island for 15 years, she has enjoyed working as a surgeon for the last 15 years. Outside of work, she tries to avoid falling off her green Thoroughbred whom she is turning into an Eventer.

MARINA VOY KESSELMAN, PhD, grew up on a cattle ranch in British Columbia. She joined UBC’s Animal Welfare Program in 2002, and was appointed as a NSERC Industrial Research Chair in 2008. She is recognized internationally for her research on the care and housing of dairy cows and calves.

DANIEL WEARY, D Phil, is a Professor and NSERC Industrial Research Chair at UBC. He studied biology at McGill and Oxford, and went on to co-found UBC’s Animal Welfare Program where he still works and co-directs this active research group. He was recently awarded UBC’s Killam Research Prize.

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I love that veterinary medicine allows for continual learning opportunities. For me, this is the sticking power in my ability to be stimulated in my profession and stay in it. After years of working emergency medicine, I have recently changed over to the general practice side of things. Imagine my dismay at having to do the dreaded dentistry, after years of never wanting to touch a tooth with a ten-foot pole. I never thought I would enjoy this as much as I have. I have also signed on to a contract at a cats-only practice—something else I don’t think I would have previously fully appreciated. I have learned so much about our feline patients in such a short period of time, in particular that they really like to do things their own way. I wonder what else lies ahead of me in this endlessly rewarding profession.

Continual learning also happens for me in my role with the CVMA-SBCV Chapter. I have had great mentorship through our Board of Directors, many of whom have “been there and done that” before my time in veterinary practice. I can always look to them when I need advice on a particular Chapter topic or issue. Our Executive Director has a world of experience at her fingertips, so all of us on the Board of Directors learn from her as well. And on it goes.

Another way for me to continuously learn is through my duties as President of the Board. One of my favourite responsibilities is my attendance at the AGMs of other western provincial associations. There, I network and learn what the other veterinary medical associations are doing for their members. Topics and issues that they face are often very similar to our issues. Their solutions to problems are shared with our Board of Directors and in turn make us a better Chapter. I am continuously challenged to think of new ways to solve our problems.

In January, Al Longair, the CVMA-SBCV Chapter Vice President, went to Victoria to meet with the Lieutenant Governor of British Columbia, Her Honour, the Honourable Judith Guichon, OBC. Dr. Longair spoke with the Lieutenant Governor about the recent West Coast Veterinary story on Olive, the unofficial First Dog of BC, and the contribution of veterinarians to communities throughout the province. It is vital for the Chapter to continue to highlight the important role that veterinarians hold in protecting animal and human health.

The CVMA Annual Conference will be held in Vancouver, July 5-6, in the new JW Marriott Parq Vancouver hotel, next to BC Place. The Conference will offer many lectures, several wet labs, a trade show room, and plenty of social events. This event will welcome veterinarians from across Canada, so it will be a neat opportunity to learn and mingle at the same time.

The Chapter will also be hosting our 2018 Annual Conference in November. We have booked Dr. Marty Becker as our keynote speaker, which will undoubtedly be informative. Our Continuing Education Committee works hard year-round to secure speakers on topics of interest and relevance. If you have any recommendations for future speakers or topics, please let us know.

I hope you all received the Chapter’s Report on the recent CVBC General Meeting. The Chapter believes in transparency between the College and BC veterinarians. We also believe that, as an association, we can help bridge some of the communications between the College and our members. We wish to be a sounding board for our members and ask questions to the College for clarification on your behalf.

As always, please let us know if there is anything your Chapter can do for you, or give us suggestions for what we can improve on.

Sarah Armstrong, DVM, graduated from OVC in 2007. Following graduation, she worked full time in general practice and worked part time at a local emergency practice in Southern Ontario before moving to Vancouver, BC, where she currently works as a locum veterinarian.

ENDERBY VETERINARIAN DR. SUSI CIENCIALA WINS INaugural DR. CARol MORGAN MEMORAL AWard

The winner of the inaugural Dr. Carol Morgan Memorial Award is Dr. Susi Cienciala. The award supports continuing education for veterinarians in Canada and is named in honor of former BCSPCA board member Dr. Morgan, a tireless advocate for animal welfare and ethical veterinary practice, who passed in 2015. Dr. Cienciala is an equine veterinarian at Deep Creek Veterinary Services in Enderby. Her goal is to bring the science of how horses learn to veterinary students in Canada, to both improve the welfare of their patients and to keep them safer as equine veterinary practitioners.

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Dr. John Brocklebank resigned as Deputy Registrar of the College of Veterinarians of BC effective December 31st, 2017. John has been with the College since September 2004, and he has decided it is time to pursue new and resurrected interests. He expressed to Council and to the Registrar his gratitude for the privilege of having served the College and extended similar gratitude to all registrants; the public; and current (and former) staff, inspectors, and committee members who have assisted him over the years.

The wealth of his experience and institutional knowledge will be greatly missed. The CVBC thanks him for his years of dedicated service, as does the CVMA-SBCV Chapter, and we wish him all the best in the future.

Dr. John Brocklebank RETIRES FROM CVBC

The CVMA is part of the Coalition for Small Business Tax Fairness, which opposes the federal government’s tax proposals that would dramatically change the way incorporated small businesses are taxed in Canada. Veterinarians with businesses should work closely with accounting professionals to understand implications to your individual situation. Read the latest information at www.smallbiztaxfairness.ca.

Effective December 1, 2018, a veterinary prescription will be needed to use medically important antibiotics (MIAs) in animals. Health Canada is moving a number of MIAs approved for veterinary use before 2004 to the Prescription Drug List. Health Canada will establish the same level of oversight for those MIAs approved before 2004 as for those approved after. Visit Responsible Use of Medically Important Antimicrobials in Animals section of the Government of Canada website for more information. In addition, as of November 13, 2017, these antimicrobials can no longer be imported for own use. MIAs are available with a veterinary prescription, from a veterinarian or pharmacist, or as a mixed medicated feed from a feed mill. The CVMA is engaged with the Veterinary Drugs Directorate through a sub-committee of the Canadian Animal Health Products Regulatory Advisory Committee. Visit www.canadianveterinarians.net/policy-advocacy/veterinary-oversight-of-antimicrobial-use-in-canada for more information.

The Emerging Leaders Program (ELP) offers an opportunity to explore approaches to personal and professional accomplishments and working relationships. The 2018 ELP takes place on July 5 and 6, during the annual convention in Vancouver. CVMA members who graduated within the last ten years (2007 or later) can apply for full sponsorship to participate (up to two sponsored participants per province will be selected). Visit the Emerging Leaders Program page under the Science & Knowledge section of our website for more information. Applications are due March 23, 2018.

The CVMA has moved its membership management system to a new platform. Access the new CVMA membership portal by visiting www.canadianveterinarians.net and clicking the Login link at the top of the homepage. Please note that your CVMA login credentials have changed to email and password; you should have received an email with your personal login information. Log in to review and update your profile and reset your password. Please notify the CVMA if you experience any technical difficulties.

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Troye McPherson, DVM, was born in Cape Breton, NS, and graduated from the Ontario Agricultural College in 1984 and the Ontario Veterinary College in 1989. She headed to western Canada, where she worked in large animal and small animal veterinary medicine, taught agricultural courses at Lethbridge College in Vermilion, AB, and became the Acting Director of the Animal Health Technology Program at the College for two semesters. She returned to Nova Scotia to continue expanding her knowledge in the profession: in mixed practice, small animal, and emergency medicine; and, as a Federal Veterinarian, meat inspector for a year. She also helped develop a Veterinary Assistant Program at a private business college in Halifax. However, her true calling is as a small animal practitioner. Dr. McPherson is a member of the American Association of Feline Practitioners, is currently the CVMA representative for the Federation of Veterinarians of Europe, and has served on the Council of the Nova Scotia Veterinary Medical Association twice. She lives in Dartmouth with her husband, Patrick, five Border Collies, and four cats.

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**DOGS**

**Behaviour** Changes ranging from lethargy and withdrawal, to aggression and lashing out. **Mobility** Unwilling or unable to move or get up, if already lying down; pacing, especially if the animal is already sitting or lying down; pacing, especially if the animal is standing and it seems difficult for them to lie down. **Lameness** Non-weight bearing—may be indicator of acute pain (e.g., trauma) or chronic (e.g., inflammatory, cancer, etc.). **Respiratory Pattern** Panting; increased respiratory movement; increased effort and rates.

**Vocalization** The perception of some owners that cats cry is incorrect; cats are more likely to endure pain in silence, with the exception of growling at touch to painful area and intermittent or ongoing whining or yowling.

**Mobility** Unwilling or unable to move, particularly if the animal is already sitting or lying down; pacing, especially if the animal is standing and it seems difficult for them to lie down. **Lameness** (usually due to pain) or non-weight bearing—may be indicator of acute pain (e.g., trauma) or chronic (e.g., inflammatory, cancer, etc.). **Respiratory Pattern** Panting; increased respiratory movement. **Loss of Appetite**

**BIRDS, REPTILES, & POCKET PETS**

**BIRDS**

**Behaviour** Fluffed feathers, retreating to bottom of the bird cage.

**RABBITS**

**Behaviour** Hiding. **Loss of Appetite** Decreased appetite. **Bruxism** Grinding of teeth. **Facial Expression** Closings of eyes, cheeks flattened or sunken, whiskers still and pushed away from the face, ears tightly folded and held closer towards the back, squinting of eyes.

**REPTILES**

**Behaviour** Hiding, avoidance, abdominal splinting (tucking), aggression and protection of painful sites, lethargy or anxiety. **Mobility** Difficulty in moving or reduced movement. **Loss of Appetite** Decreased appetite, failure to eat. **Lameness**

**FISH**

**Behaviour** Colour change, increased movements of the bony flap covering the gills of bony fish, withdrawal and isolation among schooling fish, inability to maintain orientation in the water column, decreased evasive capacity. **Loss of Appetite** Decreased appetite.

**GUINEA PIGS**

**Loss of Appetite** Decreased appetite. **Bruxism** Grinding of teeth.

**BOVIDS**

**Behaviour** Changes ranging from lethargy and withdrawal, to aggression and lashing out. **Mobility** Unwilling or unable to move, particularly if the animal is already sitting or lying down; pacing, especially if the animal is standing and it seems difficult for them to lie down. **Lameness** (usually due to pain) or non-weight bearing—may be indicator of acute pain (e.g., trauma) or chronic (e.g., inflammatory, cancer, etc.). **Respiratory Pattern** Panting; increased respiratory movement. **Loss of Appetite**
It is common for upper-year students to advise the incoming class to join every club. In doing so, first-year students frequently remind that attention must be paid to striving for a healthy work-life balance. Clubs like the Wildlife Disease Association organize outdoor hikes and camping trips in addition to their panel discussions with experts in the wildlife field. The Production Animal Club holds lunchtime barbecues in between taking students out dehorning on the farm. For students missing their pets back home, club participation can provide the comfort of spending time with animals. The Equine Club hosts a ‘mare care’ program where teams of students volunteer to groom our teaching horses on a weekly basis. Animal Welfare and Behaviour Club members can take our teaching dogs out for walks.

Clubs encourage classmates from a variety of backgrounds and comfort levels to join as a way to improve confidence and skill in dealing with a variety of veterinary species. The Wildlife and Exotic Animal Medicine Society (WEAMS) offers exotic handling labs, and student members are invited to closely shadow the treatment of wildlife patients in hospital. A subset of WEAMS members work with Jadis, our rescued Red-tailed Hawk, helping with her care and participation in wildlife education events around Saskatoon. One of my classmates memorably mentioned to me that whenever this fast-paced program seems especially overwhelming, spending time in the wildlife ward is a consistent source of reassurance and belonging.

These positive experiences exemplify how important it is for us to keep our eyes focused forward. Veterinary school will be what we make of it, and our clubs prompt us to make a committed effort to keeping our learning fun. This is a lesson that I hope we carry with us beyond our school days and into our careers in the not too distant future. So, I ask you, readers, what are you looking forward to this year?
Developing a Vision of the Ideal Farm

By Marina von Keyserlingk, PhD, and Daniel Weary, D Phil

Farmers and others who work in agriculture sometimes seem to be under siege from critics regarding practices used in modern farming. But simply responding to criticisms provides a poor basis in planning for the future. In recent work, UBC researchers have asked participants how they would describe an ideal farm. Our hope is that the results can help farmers and others develop a vision of what their farms and industry will look like in the decades to come.

We have conducted two studies probing participants’ views on what makes an ideal farm. The first focused on dairy farms and surveyed the views of almost 500 American citizens. We asked a single open-ended question: What do you consider to be an ideal dairy farm and why are these characteristics important to you? The text from these responses was then coded to identify major themes. Participants generally cited more than one characteristic with multiple reasons for each.

The most common issues related to the “cow” herself, reflecting concerns about cow treatment. For example, people commented on the value of treating the animals with “respect,” “fairly,” “kindly,” “dignity,” and “with love.” Participants also mentioned aspects related to the business operation, suggesting that the ideal dairy farm should also be profitable, productive, and efficient. Some participants also suggested that the farm should be small, organic, operated by family farmers, and committed to their community (e.g. offering tours or selling their products locally). Participants also said that the farmers should be educated, loving, and competent.

Some participants also commented on the importance of the quality of production, stating that the ideal dairy farm must produce high-quality milk products, and that these products be clean and safe to consume. However, they rejected the use of hormones, antibiotics, or other chemicals for the purposes of increasing production, but did state that animals should: “Not be treated with synthetic hormones or antibiotics—unless absolutely necessary.” The respondents also suggested that the cow’s quality of life influences the quality of the milk she produces, which in turn influences human health.

Our second study focused on pig farms, and surveyed the views of approximately 200 American citizens. We again asked a single open-ended question: What do you consider to be an ideal pig farm and why are these characteristics important to you? Again, participants generally cited more than one characteristic and multiple reasons. Animal welfare (e.g., space, freedom to move, and humane treatment) was the most mentioned theme: 74 per cent of the respondents referred to this theme when describing or justifying the features they considered important. Most of the respondents focused their concerns on issues such as providing sufficient space to move, proper feeding, allowing for contact with outdoors or nature, absence of pain and suffering, and no mistreatment. Participants also made references in relation to animal sentience, using positive terms such as “happiness” and “intelligence.” The reasons used to justify their views were largely based on ethics with many respondents using words such as “respect,” “decency,” “dignity,” and “humane” to refer to animal treatment.

The role of the business operation (e.g., profitability, compliance with sanitary and environmental rules and regulations, and workers rights) was the second most important characteristic of an ideal pig farm. Some respondents viewed the implementation of modern technology as an important feature of an ideal farm. For example, one respondent stated: “Another aspect of a perfect pig farm is the use of technology and automation. This will make the farm more efficient and more likely to keep the farm profitable.” However, participants also placed great importance on naturalness (e.g., natural feeding), in part because they believed that this would benefit both the pigs and the meat they produce. As stated by one of the participants: “An ideal pig farm is a farm that has wide open space for pigs to roam and feed. This is important as I feel keeping pigs in cramped, enclosed space will help spread disease and infections. The pigs will also produce better meat as they are healthier and less stressed.” As in the case of the ideal dairy farm, participants rejected the use of hormones, antibiotics, and other chemicals for the purposes of increasing production. Thus, participants in both studies argued that the animal’s quality of life influences the quality of the product produced, which in turn may affect human health.

In summary, the findings of these studies point to a suite of practices that resonate with societal values. Both studies also illustrated the importance that respondents placed on the attitudes and values of the people responsible for the animals, and on an animal’s freedom to move and their ability to fulfill natural and highly motivated behaviours like grazing on pasture. The question now is how will the agricultural industries use such results to develop a vision for the future of farming, and what mechanisms can be put in place to see this vision achieved.

A FLUID SCIENCE

BY VERONICA GVENTSADZE, MA, PhD, DVM

“SALMON FARMING DOES NOT CLAIM TO SOLVE ANY FOOD SHORTAGE.”

W hether or not we enjoy eating salmon, this fish is an integral part of the Pacific Northwest in life and in death. It has nourished humans and animals, both on land and in the sea, and fertilized the rainforest itself. Our dogs seem to find it irresistible, especially after it has shufﬂed off this mortal coil and lain around for a while; but while a dog performing its coat with salmon remains may be aesthetically objectionable to its owner, it is not dangerous, as compared to the dog actually eating raw ﬁsh which, even when still alive, can cause Salmon Poisoning disease.1 In the last century this, ﬁsh, itself a symbol of persistence and drive, has been a major driving force of the economy, resulting in purposeful aquaculture of Atlantic salmon right next to the life cycle of wild Paciﬁc salmonids. The resulting picture involves the health and welfare of both wild and farmed ﬁsh, the marine ecosystem as a whole, the species that are used to feed the salmon, the health of people and animals who eat the ﬁsh and its derivatives, and the communities involved in farming and in traditional ﬁshing.

By now, it is a purely academic exercise to ask whether salmon farming should exist at all. A practice that really took off only some two decades ago has become a highly proﬁtable and environmentally inﬂuential industry that is not about to close shop for the asking and protesting. The Department of Fisheries and Oceans has assessed the total harvested value of aquaculture products at $534 million;2 while an economic study by the BC Salmon Farmers Association found that, in 2016, the industry put $1.5 billion toward the BC economy.3 Since the 1930s, small farms raised Coho and Chinook salmon in ocean feed lots. Paciﬁc salmon did not take well to domestication, and farmers eventually switched to Atlantic salmon production, following the examples of Norway, Scotland, and Ireland. Thus, salmon farming became a huge industry in a country that still has no shortage of wild ﬁsh. Overfishing and the resulting decline in wild salmon stock may have been a factor in the 1970s, but this is no longer the case. Together with Shakespeare, we could say, “Oh, reason not the need.” Salmon farming does not claim to solve any food shortage. While crops like wheat and rice, and meat like beef, pork, and chicken are accessible and affordable to most people, salmon’s high status and availability make it a highly proﬁtable item. The drive to eat more salmon has likely contributed to the growth of farming. Atlantic salmon grow quickly to a consistent size good for commercial purposes and are overall resistant to disease. Compared to Paciﬁc species of salmon who are lean marathon-runners, Atlantic salmon are docile and sedentary, which allows them to store and retain and produce a higher percentage of body fat compared to wild species.4 Yet not all fats are created equal, and there is debate about the proportion of anti-inﬂammatory omega-3 to pro-inﬂammatory omega-6 fatty acids in farmed and wild ﬁsh respectively. At the same time, fat is the repository of chemicals a ﬁsh receives either in feed or from its environment, a fact that raises understandable concern among laypersons and scientists alike.

Historically, Atlantic salmon were ﬁrst introduced into Paciﬁc waters for a leisurely rather than pragmatic purpose. Fertilized eggs of Atlantic salmon were put in the waters off the coast of California in 1874 to produce stock for sports angling. More eggs were introduced again and again after the repeated failure of adults to spawn and reproduce. Thus, Atlantic salmon in Paciﬁc waters is a foreign species that has so far proven to be non-invasive. It has been known to escape sea pens but is incapable of interbreeding with Paciﬁc species of salmon.5

One of the greatest concerns is the presence of viruses in farmed ﬁsh that may affect wild species. Piscine reovirus is a robust non-enveloped virus capable of surviving outside the host. Public attention was drawn to it during a recent release of blood from a ﬁsh farm. It is highly contagious but shows low virulence; a civilized virus that prefers to lie dormant rather than destroy its host. It is present in all farmed salmon (who are uniformly vaccinated for it), and has been associated with heart and skeletal muscle inﬁammation, a disease that would be fatal to wild ﬁsh who need to be athletes. Current research, much of it conducted by Dr. Kristi Miller, a scientist with the Department of Fisheries and Oceans, has not established direct or exclusive causation of clinical illness by this virus, although it may be one of the factors. A major challenge is that it is not easy to determine the cause of death of wild salmon: debilitating illness causes them to be predated or to drop to the ocean ﬂoor and become lost to follow-up, as we would say in clinical practice.

Sea lice are crustaceans that are particularly destructive to young salmon, both salmonids and herring (the latter is essential to nutrition and survival of salmon). The use of pesticides on farm pens is controversial since, like any parasite, sea lice are capable of developing resistance. At the same time, not controlling sea lice might put passing wild ﬁsh at risk of infeccion, a topic brought to public attention largely through the action of efforts of Alexandra Morton.6 Many have argued not against the practice of farming as such, but against keeping ﬁsh in sea pens rather than land-based reservoirs. Current practice is only a small fraction of how their operations promiss.7 If the transition from sea to land were to take place on a large scale, it would give the ocean back to native species of ﬁsh and mammals, while leaving behind any chemicals left over from farming and any pathogens (viruses, sea lice) possibly modiﬁed by the presence of farmed ﬁsh. It would solve the issues of ﬂuctuating oxygen levels and of algal and plankton blooms that affect open sea productivity, and of shooting mammals such as sea lions and seals who try to raid the pens (some getting trapped in the nets, others drowning when the tide comes in). It would not alleviate concerns about the welfare of farmed ﬁsh. Their reasoning may be less nuanced than that of mammals, but their senses are exquisite, and their lives in captivity are longer than those of mammalian production species. (Farmed salmon live three to ﬁve years until they are harvested.)

With nothing to do but eat and swim, do ﬁsh suffer from boredom and frustration? This fascinating and much-needed ﬁeld of research leads to theories and deserve attention on their own merit. Conversely, science cannot be accepted on the authority and reputation of its source. Rather than waiting to see what Norwegian, American, and other leading scientists have found and recommended, Canadian scientists should assume leadership in research that is both speciﬁc to this part of the world and of beneﬁt to communities similarly blessed and challenged with the gift of salmon.

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6. “If the transition from sea to land were to take place on a large scale.” Accessed 2022. https://www.alexandramorton.typepad.com/article23794936/tackling-a-sustainable-industry-for-atlantic-salmon-farming/article23794936/.

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I’m not sure if my fondness for orthopedic cases stems from my initial experiences as a surgery tech or because regional anesthesia is one of my favourite things to include as part of a balanced anesthetic and analgesic plan. Cruciate repair is one of the more common operations in any given surgical service. I mostly have experience with Tibial Plateau Leveling Osteotomies. Performing epidurals was one of the first techniques that sparked my anesthesia nerdiness. I was instantly sold on the fact that there were several advanced techniques that veterinarians could be trained in and trusted to perform. As time progressed, I became increasingly more proficient at epidurals and peripheral nerve blocks. Some of these require the use of a nerve stimulator such as the brachial plexus block, which provides analgesia distal to the elbow. Electro-location units are used to identify nerves using a short bevelled, insulated needle that allows the injection of local anaesthetic around the nerve. Femoral and sciatic nerve blocks are relatively new techniques for me; but now I favour them over epidurals in most of the pelvic limb cases I anesthetize because of their efficiency, safety, and reduction in side effects. Combining these blocks provides analgesia for unilateral procedures distal to the coxofemoral joint, employing nerve electro-location in a similar fashion to the brachial plexus block.

Mechanical ventilation utilizing capnography is another favourite of mine when it comes to all things anaesthetic. The majority of cases I manage are mechanically ventilated, not only because I find the anesthetic plane to be more consistent while reducing the percentage of inhalant used, but also because the case itself indicates control of respiration. Many of my neuro patients undergo advanced imaging such as MRI, as part of their diagnostic workup. Patients requiring magnetic imaging must be fully anesthetized, and all employees need to be properly trained and screened for safety purposes before entering the MRI suite. I work with a high field 1.5 Tesla MRI and MRI-compatible monitoring equipment and ventilator. These patients are monitored from the control station, which is outside of the room. Mechanical control of respiration is paramount because the breathing apparatus is used for appropriate gas exchange during spontaneous ventilation. It is also impossible to give intermittent positive pressure ventilation by squeezing the reservoir bag during scanning. As with the neuro patients, ophthalmology patients who undergo phacoemulsification must also be ventilated, although for a different reason. These patients are not only anesthetized but are also paralyzed using neuromuscular blocking agents, eliminating their ability to spontaneously ventilate. The same electro-location unit used for peripheral nerve blocks also acts as a nerve stimulator so that the degree of blockade may be qualitatively and quantitatively assessed via train of four stimulation. Multi-parameter monitoring equipment is placed on all anesthetized patients at our facility. It’s crucial to be able to interpret readings on the capnograph, ECG, and blood oxygen saturation level while obtaining invasive or non-invasive blood pressure readings. This information helps to appropriately manage the patient’s anesthetic plane, analgesic requirements, ventilation, and fluid therapy. Our internal medicine and emergency departments often have unwell or critical patients who require sedation or anesthesia. These patients may need endoscopy, bronchoscopy, exploratory laparotomy, thoracic, or lifesaving surgical procedures. It’s important to closely monitor these dynamic cases, often well into the recovery period.

I feel very fortunate that, at this point in my career, I have supplementary facts that provide me with professional satisfaction. As lead technician, I am responsible for training and teaching the growing team. I love celebrating the achievements of my fellow RVTs when they nail a difficult calculation, successfully perform their first regional block, place an arterial catheter for invasive blood pressure monitoring, or place a central line in a critical diabetic ketoacidotic patient. These are the moments throughout the day that give me an enormous amount of pride in my teammates.

Writing articles, lecturing, and training on-site at local clinics have also proven to be extremely satisfying. It is very rewarding and motivational to have the opportunity to travel to hospitals or speak at continuing education events while interacting with RVTs who have the desire to learn and improve veterinary medicine within the local veterinary community. It excites me to see what the next decade has in store. I hope to continue to advocate for my patients and for RVTs in the profession, inspiring as many as possible to become anesthesia nerds. JAVMA
**Regenerative Medicine Overview**

**Case Report**

Shelby, a five-year-old female Lab, partially tore her MCL tendon during a fall in an agility tunnel. She received a combination of bone marrow aspirate concentrate (BMAC) and platelet-rich plasma (PRP). Eight weeks later, a repeat ultrasound showed substantial regrowth of tendon into the defect. Two years later, she has gone on to set two Canadian dock diving records, as well as earning multiple other titles. Although many practitioners recommend transection of the biceps tendon as a first-line approach to treating such cases, regenerative medicine (RM) offers a viable option for healing the biceps and returning the shoulder to full function.

Regenerative medicine (RM) offers great promise in treating several conditions related to musculoskeletal injury or disease. Growth in this field has been so rapid that, in many cases, the clinical application of these techniques is preceding any peer-reviewed research on their effectiveness. Predictably, this creates confusion in understanding which cases may or may not benefit from RM. EM has extensive coverage release multiple growth factors that reduce inflammation and promote neovascularization and tissue repair. ACS is similar to PRP, but with one main difference: instead of relying on increased platelet numbers for its therapeutic effect, serum is incubated in the presence of glass beads to stimulate production of anti-inflammatory cytokines, particularly IL-1 receptor antagonist protein. In dogs, more research has been done on PRP than on ACS.

Research has consistently shown that PRP significantly reduces arthritic pain in most patients, with approximately 80 per cent showing improved comfort for nine months. If this treatment is coupled with a weight loss and therapeutic exercise program, then the improved mobility often persists even longer. I’ve used PRP successfully in phalangeal, carpal, elbow, shoulder, stifle, and hip joints. Elbow, carpal, tarsal, stifle, and hip joints typically require deeper sedation, but often as a pre-emptive diagnostic test, I do use PRP on its own for tendon repair. PRP has been shown to have a synergistic relationship with MSCs, by releasing growth factors and cytokines that result in stem cell proliferation, migration, and differentiation. Further, PRP can contribute to the scaffold that MSCs need for tissue repair. When injecting MSCs, I always combine them with PRP for optimal effect.

**Products Derived from Adipose or Bone Marrow**

Although many people associate stem cells with tissue derived from embryos or umbilical cords, such cells are less useful clinically when compared to MSCs. Embryonic stem cells are too autogenic, with the potential to develop teratomas. Famously, in one research project, this led to the development of intracardiac teeth, which most would consider a suboptimal outcome. MSCs, on the other hand, are more inclined to form tendon, ligament, muscle, cartilage, bone, adipose, and skin. Technically, when referring to stem cells, I am referring to a pure culture of MSCs with no additional biologic agents. Frequently, these cells have been cultured from an adipose or marrow aspirate that has been submitted to a lab. The lab selects from a line of stem cells, and then expands the number of cells into the tens of millions.

In contrast, techniques that are more inclusive include harvesting SVF, which includes a smaller number of stem cells, but also other helpful components such as T regulatory cells, endothelial progenitors, and macrophages. Similarly, BMAC reflects a mix of many compounds, including MSCs, rather than a pure isolate of MSCs. So, which works better—cultured MSCs, SVF, or BMAC? Cultured MSCs have a greater number of cells, but results from only one cell line, with no other potential beneficial components mixed in. Another consideration is that 24 hours of shipping is enough to negatively affect stem cell performance. In contrast, SVF and BMAC have smaller numbers of fresher cells in a milieu of other beneficial agents. At this point, we don’t know which is best—a high number of weaker homogenous MSCs, or a sample with fewer but fresher MSCs with additional beneficial molecules. Time and further research should eventually answer this question. One thing that early research is showing, though, is that whether you use cultured MSCs, SVF, or BMAC, results are better when PRP is added to the mix.

Until now, I have been talking about autogenous stem cells—stem cells harvested from a patient and returned to the same patient. In contrast, allogeneic stem cells are harvested from a donor and then implanted into the patient. MSCs have surface proteins that act like a Harry Potter invisibility cloak, allowing the MSCs to escape detection from the host’s immune system. Although allogeneic cells are not yet widely available, the time is coming when it will be possible to store vials of canine stem cells on-site, to be thawed, drawn up, and injected as needed.
TAKING WING

WORKING RAPTORS AT THE AIRPORT

BY KEN LANGELEIR, OBC, DVM
W

e all appreciate a safe flight when travelling, but most people don’t know of the unsung heroes at the airport that help prevent bird-strikes and possible disasters for plane passengers. Pacific Northwest Raptors, also known as The Raptors, coordinates bird-strike prevention by keeping gulls, shorebirds, waterfowl, and other birds from many of our airport runways.

Falcons are the jet fighters of the avian world and can use their sharp hallux talons to chase or strike birds in mid-air. Boeing, a six-year-old Peregrine Falcon aptly named after the planes he protects, was par-ticularly gifted and would take on anything from small shorebirds to geese despite his being less than a kilogram in weight. When a large gull moved onto the airfield, Boeing was dispatched, and the gull flew but particularly hard—so hard, in fact, he broke his own leg. Moving onto the airfield, Boeing was dispatched, and the gull flew but particularly hard—so hard, in fact, he broke his own leg. Moving onto the airfield, Boeing was dispatched, and the gull flew but particularly hard—so hard, in fact, he broke his own leg. Moving onto the airfield, Boeing was dispatched, and the gull flew but particularly hard—so hard, in fact, he broke his own leg.

Avian patients are relatively routine in our hospital as we care for many exotics including pet birds, wild birds, and the 150+ raptors of The Raptors. It is very true that birds have been designed to fly but not crash. With hollow bones and thin skin over their heavily muscled frame, collisions can be severe if not lethal and often very challenging to repair. On top of that, in falconry, raptors are considered to be working animals and must be able to chase, strike, or capture prey, so any impair-ment involving their eyes, legs, or ability to fly can be a cause of early retirement. Optimal health is needed along with a good flying weight so that the birds are fit, yet have an appetite to work for their dinner.

Savvenging birds, especially gulls at landfills, have proven to be a problem as they spread garbage away from the intended area, which can both result in damage to machinery, impeding opera-tions, and pose a significant safety hazard. Off site, the gulls can damage neighbouring homes with garbage or their feces where they roost. Spreading of garbage can also affect other forms of wildlife (more rodents) and be a potential health risk. Falcons from The Raptors pay daily visits to landfills to move the gulls on to natural food sources instead.

On Vancouver island, a non-migratory subspecies of Canada Goose was introduced, and the birds have be-come a nuisance with their droppings in public parks, schools, and cemeteries. Geese quickly learn to use alter-native areas when a predatory raptor begins to visit. Veterinary care includes regular physical examina-tions, travel health certification, health care advice, and parasite control, as well as emergency medical and surgical care. Before a raptor is flown, the falconer must always assess the immediate envi-ronment for danger. This can be in the form of wires, fences, oil, or other dangers that the bird may strike while chasing prey—or in addition, it can be the presence of wild raptors that see the falconer’s bird as competition or food. On several occasions, even the falconer was not able to spot a wild raptor in the area, resulting in the falconer’s bird being attacked. One bird in particular, Ace, had the wing web of one wing shredded by an attacking falcon. After sorting out the pieces of skin, I was pleased to see the long thin propytagium ligament on the leading edge of the wing web (essential for flying) had not been severed. Fortunately, as well, the skin and severed muscles were not devitalized, and when they were all sorted and sutured together, we were pleased that the wing healed well and was fully func-tional for hunting again in a few months.

The film industry and commercial photography industry in Canada are doing well, and raptors are often needed on set but first must be given a veterinary health certificate. The Raptors have done many commercial shoots and filmings, including The Big Year, Air Buddies, and A Series of Unfor-tunate Events, along with many other films and commercials.

Birds used for falconry are bred at the centre, and the breeding program is needed to meet the growing demand of non-toxic pest bird control—an environmentally friendly alternative. On the veterinary side, some birds are paired for breeding but may not like their chosen mate at first, and thus break and talon injuries are occasionally seen at our hospital.

“IF I WAS TOLD IN VETERINARY COLLEGE THAT ONE DAY I WOULD BE WORKING ON THE LANDING GEAR OF A BOEING, I WOULD NOT HAVE BELIEVED IT.”

“BEFORE A RAPTOR IS FLOWN, THE FALCONER MUST ALWAYS ASSESS THE IMMEDIATE ENVIRONMENT FOR DANGER. THIS CAN BE IN THE FORM OF WIRES, FENCES, OIL, OR OTHER DANGERS THAT THE BIRD MAY STRIKE WHILE CHASING PREY—OR IN ADDITION, IT CAN BE THE PRESENCE OF WILD RAPTORS THAT SEE THE FALCONER’S BIRD AS COMPETITION OR FOOD.”
Claws’ fractured his wing leaving the The Raptors; Bald Eagle nestling ‘Sir and swallow his entire radio transmitter. off his tail.” and once managed to remove very dexterous with his mouth and once managed to "ELTON, A SPECTACLED OWL, IS AD K L E X C H R I S T M A S " needs for housing, nutrition, and disease control. During these tours and demonstrations, the public is educated on the anatomy, species variations, nutrition, and conservation needs of raptors. I have attended many of these demonstrations and never tire of watch- **NORMAL DEBRIDING AND FLUSHING WITH DRAINAGE, AS DONE IN MAMMALS, DOES NOT WORK IN BIRDS.** up prey in water, pack hunting of Harris’s Hawks, and the fast stoop of a falcon striking a lure in mid-flight. During these tours and demonstrations, the public is educated on the anatomy, species variations, nutrition, and conservation needs of raptors. I have attended many of these demonstrations and never tire of watch- ing the magic of birds performing when they have the choice of flying away (which every once and a while the odd bird chooses to do). Birds are fitted with radio-transmitters in the event they do decide to fly away. Elton, a Spectacled Owl, is very dexterous with his mouth and once managed to remove and swallow his entire radio transmitter off his tail. As soon as it happened, staff rushed him to the hospital. In exotics, one often learns how to MacGyver items to aid in procedures not normally done in pets. Rather than explore through the abdomen to remove the radio transmitter, we elected to take a plastic casing off a urinary catheter holder and cut it to the length needed to reach the transmitter. After anesthetic induc- **NORMAL DEBRIDING AND FLUSHING WITH DRAINAGE, AS DONE IN MAMMALS, DOES NOT WORK IN BIRDS.** up prey in water, pack hunting of Harris’s Hawks, and the fast stoop of a falcon striking a lure in mid-flight. During these tours and demonstrations, the public is educated on the anatomy, species variations, nutrition, and conservation needs of raptors. I have attended many of these demonstrations and never tire of watch- ing the magic of birds performing when they have the choice of flying away (which every once and a while the odd bird chooses to do). Birds are fitted with radio-transmitters in the event they do decide to fly away. Elton, a Spectacled Owl, is very dexterous with his mouth and once managed to remove and swallow his entire radio transmitter off his tail. As soon as it happened, staff rushed him to the hospital. In exotics, one often learns how to MacGyver items to aid in procedures not normally done in pets. Rather than explore through the abdomen to remove the radio transmitter, we elected to take a plastic casing off a urinary catheter holder and cut it to the length needed to reach the transmitter. After anesthetic induc- tion, an otoscope light and long alligator forceps were used to remove the radio transmitter. Surprisingly, in the short time since Elton ingested the transmitter, his stomach acids had already begun to dissolve the casing around the transmitter exposing the corrosive battery acids.

This was not to be Elton’s only incident, and later I had to remove a large primary feather that he had rolled up, swallowed, and got stuck in the back of his throat. Elton is a very special owl at the centre as members of the public often use him when they take short courses on falconry at the centre. My daughter, Caitlin, learned about falconry as a teenager and, at the end of her internship, had to give a public demonstration and lecture on the Spectacled Owl, using Elton. Additional hands-on public education is done on Hawk Walks where members of the public take a walk through nearby forests with a hawk following them and flying to their gloves at various times throughout the walk. Special fundraising events for helping wild raptors are often hosted at the centre. A popular event, International Vulture Awareness Week-end, highlights the plight of rapidly declining worldwide populations of vultures from poisonings. Owl-o-ween has a special focus on owls in the evenings near Halloween. Further to their commitment to raptors, the biologists and falcon- ers of The Raptors also volunteer their time and expertise to help with the nearby Raptor Rescue Society which captures and cares for sick and injured raptors on Vancouver Island in the hope that they can be released back into the wild. On one occasion, two Bald Eagles were brought in that were in a serious territorial battle with one another and had to be net- ted out of the water. One bird had only a few punctures so was dried and quickly released, but the other had an incidental finding of a barbecue skewer present in his stomach. The skewer had probably been scavenged from someone’s meal or discarded garbage. The skewer had penetrated the stomach and was up against and almost penetrating the spinal col- umn. The abdomen was explored, and the skewer was surgically extracted, with the eagle soon healing well enough for release.

Wild birds will often fall from nests, and tree climbers are available to return birds to their nests, make new nests if needed, or place the nestling in with new foster parents (as long as the nestling is of a similar size, they are readily accepted). Occasionally, the nestling bird sustains a severe injury from the fall; one such bird was a Bald Eagle nesting that fractured his humerus. The perfect oblique mid-shaft fracture lent itself to using cerclage wires only (no IM pins), so I named the eagle Cerclage. I chuckled when I saw that his name had been misinterpreted at the rehabilitation centre, and he was now Sir Claws.

Infectious disease is always a concern, especially with the raptors interacting with wild birds. Some species are especially susceptible to as- pergillosis, and constant monitoring for this threat must be done. We have received birds with bumblefoot (pododermatitis) or deep infected wounds and have had success using antibiotic-impregnated polymethylmethacry- late beads placed in the infected site. Normal debridng and flushing with drainage, as done in mammals, does not work in birds. Another concern with birds with open wounds is that we must also be aware when flushing that birds have pneumatic bones that connect to airways. Even the femur in raptors (not pscittacines) is pneumatic and requires special consider- ation when repairing or treating open fractures.

Raptor veterinary medicine will always remain very challenging with the fragility of the patients and limitations of information and instrumen- tation. Seeing a bird fly that was once grounded can be very rewarding. It has been two years since Boeing’s injury, and we are proud to say he is still protecting our airways, although I have never asked how they explain the metal screw in his leg when they take him through airport security. For further information on The Raptors Centre, located in Duncan, please visit http://pnwraptors.com/.

**INTERESTING FACT**

Did you know that falconry is one of the oldest relationships between humans and birds, dating back over 4,000 years? In 2016, “Falconry, a living human heritage,” was inscribed on UNESCO’s Representa- tive List of the Intangible Cultural Heri- tage of Humanity.
MANAGEMENT OF TRAUMATIC WOUNDS

A BRIEF OVERVIEW

BY CHRIS JORDAN, Bsc (Hons), BVetMed, Dipl. ECVS, MRCVS

TWO DIFFERENT DOGS, TWO DIFFERENT WOUNDS, BUT ONE QUESTION: HOW WOULD YOU TREAT EACH DOG?

No two patients with a wound are the same, and all require a tailored management plan. Yet there are both similarities and differences in how you would treat the wounds in each of these dogs. By knowing the patient aspects of each management step, you can optimize the outcome of any cat or dog that you may see with a wound by following a framework for pragmatic and appropriate management.

THE FIRST CASE

A four-year-old, neutered male Cane Corso, was presented shortly after having suffered a 30cm, full-thickness laceration of the left pelvic limb from the cranialateral proximal crus to the dorsomedial aspect of the tarsus from which there was significant active hemorrhage and a transected tendon protruding.

THE SECOND CASE

An eight-year, eleven-month-old neutered male West Highland white terrier, presented shortly after having been attacked by a dog. The case had puncture wounds to its ventral cervical region with significant local inflammation and was dyspneic.

WOUND MANAGEMENT

EACH DOG?

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THE SECOND CASE

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For the purpose of this article, we will consider that these two cases have the described wounds in isolation.

PERSONAL PROTECTIVE EQUIPMENT

All staff dealing with any case with a wound should wear appropriate PPE including disposable gloves to mitigate nosocomial infection and hospital contamination.

PATIENT ASSESSMENT AND STABILIZATION

All cases with wounds will have suffered trauma, so perform immediate triage of every trauma case to include a full-body system evaluation to identify all lesions, place them in order of clinical urgency, and prioritize their management. A minimum database should be obtained to include packed cell volume and total solids, blood urea nitrogen, and glucose.

CASE 1 was mildly tachycardic and had hyperdynamic peripheral pulses likely due to its having lost a significant amount of blood, so was given a 10ml/kg bolus of crystalloids following which it became normocardic and normotensive.

CASE 2 was dyspneic, so was placed in an oxygen cage. Could the dyspnea in this case be due to stress, pain, local swelling, or a respiratory system lesion?

CLASSIFY WOUND

It is important to appropriately classify every wound (size; type, e.g., laceration/shear/puncture; location; partial thickness vs. full thickness; tissues involved; time frame since injury, etc.) as this will focus you to consider the etiopathogenesis of the wound and likely sequelae and thus enable you to tailor an appropriate management plan to each patient.

CASE 1 has a 30cm, full-thickness laceration of the left pelvic limb from the cranialateral proximal crus to the dorsomedial aspect of the tarsus from which there was moderate active hemorrhage and a transected tendon protruding.

CASE 2 has puncture wounds to its ventral cervical region with significant local inflammation.

ANALGESIA

The skin has a high proportion of nociceptors, so injury to the skin is intensely painful. Appropriate analgesia will vary significantly from case to case but unless precluded should always include opioids and non-steroidal anti-inflammatory drugs (NSAIDs).

Local anesthetics are extremely effective so should be considered in every case by way of a topical ‘splash’ block; ‘ring’ block; brachial plexus blocks; radius, ulnar, and median nerve block; femoral and sciatic nerve block; or epidurally.

Gabapentin is an excellent and cheap analgesic with minimal side effects and has been shown to mitigate upregulation of chronic pain pathways which can remain activated long after gross wound healing. Alpha 2 agonists are good analgesics which can also be effective seda- tives if sedation is required.

The presence or absence of a neurological lesion may significantly alter the prognosis, so it is important that a neurological examination be performed prior to administering any drugs which may alter the examination, e.g., for a case with a deep laceration to the caudalateral thigh, should analgesia or sedation have been administered prior to neurological examination, would a lack of a withdrawal reflex be due to the patient being analgesed/sedated or due to transection of the sciatic nerve?

CASE 1 had a deep laceration with concurrent transection of a tendon and blood vessels, so a local nerve could also have been transected. Neurological assessment of the effected limb was performed during immediate triage and prior to administration of any analgesics. The neurological assessment was within normal limits confirming that no significant nerve injuries had occurred, so hydromorphone was administered. Administration of NSAIDs was initially precluded by the suspicion of significant blood loss and associated hypovolemia and concern for an NSAID-associated coagulopathy. A femoral and sciatic local anesthetic block was performed pre-operatively. NSAIDs were only administered when the patient had fully recovered from anesthesia, was normotensive and euvolemic, and in-house biochemistry had confirmed normal renal and hepatic function.

CASE 2 was dyspeptic. Opioids can cause respiratory depression, so hydromorphone was administered at a low dose to reduce respiratory depression. Additionally, a low dose of dexmedetomidine was administered to provide very mild sedation as well as analgesia.

CASE 1 had moderate active hemorrhage, so a pressure dressing was placed initially to provide temporary hemorrhage. Once stabilized, the patient was anesthetized, the dressing was removed, and the lacerated vessels were found to be hemorrhaging so profusely that they were immediately ligated with the patient still in the induction area.

WOUND FIRST AID

Initially, consider whether the wound could be life threatening either through the current extent of the lesion or sequelae to the lesion—any concerns should be immediately addressed.

All wounds should be covered, even with a light dressing, to mitigate nosoco- mial infection and hospital contamination. Should wound-induced local instability have the potential to lead to further trauma to local tissues, a supportive dressing should be placed.

CASE 1 had moderate active hemorrhage, so a pressure dressing was placed initially to provide temporary hemorrhage. Once stabilized, the patient was anesthetized, the dressing was removed, and the lacerated vessels were found to be hemorrhaging so profusely that they were immediately ligated with the patient still in the induction area.

"THE SKIN HAS A HIGH PROPORTION OF NOCICEPTORS, SO INJURY TO THE SKIN IS INTENSELY PAINFUL. APPROPRIATE ANALGESIA WILL VARY SIGNIFICANTLY FROM CASE TO CASE BUT UNLESS PRECLUDED SHOULD ALWAYS INCLUDE OPIOIDS AND NON-STERoidal ANTI-INFLAMMATORY DRUGS (NSAIDs)."
CASE 2 had puncture wounds; subcutaneous damage associated with puncture wounds must be assessed through surgical exploration due to an unknown depth of penetration and the potential mobility of cat and dog skin allowing anything puncturing the skin to have the potential to damage subcutaneous structures over an unknown area. This case was dyspneic, so thoracic radiography was performed which identified gas in the patient’s dyspnea.

CLIP ALL HAIR FROM AROUND THE WOUND
Fill the wound with sterile lubricant and clip all hair from around the wound at least far enough from the margins of the wound to prevent hairs from pronging in to the wound. If clipping of hair reveals more wounds or contusions, continue clipping until it is clear that normal skin has been exposed, to ensure the extent of the wound has been identified.

DECONTAMINATE THE WOUND
Decontamination should be performed as soon as possible but ideally within six hours of the wound occurring and definitely within twelve hours to remove the majority of bacteria. Wear sterile gloves to improve dexterity and allow deep exploration of larger wounds. Remove any gross debris. Lavage the wound with copious amounts of fluid. Sterile isotonic crystallloid is recommended because no benefit of antiseptic solutions for wound lavage has been demonstrated. Additionally, no contraindications of using a ‘rub table’ and associated hose to decontaminate a wound. A 35ml syringe and 18-gauge needle have been shown to generate an appropriate pressure for wound lavage through providing enough pressure to remove bacteria and debris from a wound but not too much pressure as to lead to further tissue damage. A ‘three-way tap’ and giving set can be attached to a 35ml syringe and 18-gauge needle to facilitate lavage. Alternatively, a crystallloid fluid bag in a pressure infusion bag with an 18-gauge needle on the end of a giving set can be used. Should a wound have subcutaneous ‘pockets’, consider swapping an 18-gauge needle for an 18-gauge intravenous catheter which can be introduced in to subcutaneous pockets to facilitate a more thorough lavage.

CASE 1 had wound lavage performed using a 35ml syringe and an 18-gauge catheter on a ‘three-way tap’ with a giving set from a bottle of sterile isotonic saline attached to the third port.

DEEP CULTURE
Following decontamination, take a deep swab of the wound for culture, this does not necessarily need to be for culture and sensitivity but is useful to submit for culture and sensitivity should a wound not respond appropriately to empirical antibiotic therapy.

Guards of swabs of the superficial aspect of a wound often does not represent the bacteria deeper in the wound.

ANTIBIOTIC THERAPY
Broad spectrum antibiotics should be administered intravenously as soon as possible but after a deep culture has been obtained. The first 24 hours of antibiotic administration required will vary from case to case but up to 48 hours of intravenous antibiotics followed by 5 days of oral antibiotics is sufficient for the majority of cases.

CASE 2 had an extensive skin wound making it easier to assess exactly which tissues had been traumatized. This case had lacerations to branches of the dorsal pedal artery which were ligated soon after induction to anesthesia, there was transection of the tendon of the tibialis cranialis and transsection of the crural extensor retinaculum. The distal aspect of the tendon of the tibialis cranialis could not be identified even with ipsilateral tarsal flexion. Additionally, there was a superficial laceration on the tibia. The mechanism of injury was the patient had a full thickness laceration, the patient would have been likely to have exsanguinated prior to presentation.

CASE 1

The patient is stable enough. Fully assess each wound to identify exactly which structures—particularly tendons—may have occurred, thus which structures—particularly tendons—may have been damaged. Assess which regions of the limb a wound lies over while moving the limb through a full range of motion. Assess local joints for swelling and instability. Where indicated, radiography and other imaging modalities should be used to assess for lesions that are not grossly visible and to assess the full extent of visible lesions.

WCV

If you are not familiar with it, review the local anatomy to comprehensively identify which structures have been damaged and what other structures may have been damaged.

IMPORTANTLY, WITH WOUNDS TO THE LIMBS, CONSIDER AT WHAT STAGE OF LOCOMOTION THE WOUND MAY HAVE OCCURRED, THUS WHICH STRUCTURES—PARTICULARLY TENDONS—MAY HAVE BEEN DAMAGED.

“If a wound has been primarily closed, ongoing dressing management will be indicated. The type of dressing used and frequency of dressing changes will depend on wound stage (inflammatory, debridement, proliferation, maturation/remodelling). All wounds left to heal by secondary intention should remain covered with a light dressing until epithelialization occurs where possible.

Ongoing Management Plan

If a wound has been primarily closed, a light dressing should be placed for at least 48 hours post-operatively. If a wound has not been primarily closed, ongoing dressing management will be indicated. The type of dressing used and frequency of dressing changes will depend on wound stage (inflammatory, debridement, proliferation, maturation/remodelling). All wounds left to heal by secondary intention should be covered with a dressing at least until healthy granulation tissue covers the wound, however, should there be a risk that the patient may traumatize the granulation tissue, the wound should remain covered with a light dressing until epithelialization occurs.

Importantly, should a wound be left to heal by secondary intention, to mitigate unwanted sequelae such as loss of local joint range of motion, physical therapy should be started as soon as the patient is comfortable.

If you are not comfortable managing a case, contact a surgical specialist to discuss the case.
Always read and follow the label instructions to ensure this product is suitable for the animal to be vaccinated.


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"STRENGTHENING THE BOND BETWEEN ANIMAL AND HUMAN GUARDIAN FOSTERS A CONNECTION THAT RUNS DEEP AND BUILDS ON THE SUPPORT NETWORK PEOPLE HAVE IN THEIR COMMUNITY."

In this morning’s clinic, Teddy, a five-year-old Chihuahua cross, was brought to the clinic by his guardian, Jeremy. Jeremy recently adopted him from a friend who came to know during his time living on the streets. Teddy’s original guardian was unable to keep him when he moved into community housing that was not pet friendly. Luckily, he trusted Jeremy, and Jeremy was able—and more than willing—to adopt Teddy.

Jeremy was concerned that Teddy seemed to be taking longer to eat than usual. On Teddy’s examination, it was determined he had stage four periodontal disease and would require multiple extractions. Teddy was referred for further workup including blood work in preparation for dental surgery. Jeremy was grateful for the support he was given to get his closest friend and companion healthy and happy again. In the end, Teddy had ten teeth extracted, but will be healthier because of it. Jeremy was educated on the importance of oral care and has committed to working on maintaining Teddy’s dental health through regular teeth brushing.

Animal health clinics for the marginalized began on the notion that providing care to the pets of those in need supports not only the animals but also the more marginalized in our society. Strengthening the bond between animal and human guardian fosters a connection that runs deep and builds on the support network people have in their community.

Pets of the homeless and those most vulnerable provide necessary companionship and a structure to daily life that has proven to be life-altering in numerous instances. From the stories we are told as we build relationships with people and their pets, we learn of the lives that have been saved because of a pet coming into the care of a previous drug user or someone who was contemplating suicide. The human-animal bond is known to enhance psychological and emotional wellbeing and, in many circumstances, can be critical to people seeking further community support and ultimately gaining a foothold back to some form of stability in society.

Some people may believe that pets of the homeless are not well cared for; however, this is a misconception. The volunteers at the numerous clinics throughout the province can attest to the care and wellbeing provided by these pet guardians. Data shows that homeless pet guardians have significantly higher mean scores on attachment to their pets compared to the population as a whole, and that their pet is important for their mental and physical health. One barrier to pet ownership that is often raised is housing. Many homeless pet guardians choose to remain on the streets due to inadequate housing options that allow pets. They choose their pet, often their sole companion, over affordable housing or a shelter environment. More pet-friendly housing options are becoming available, but there is still a lack. The site of today’s clinic, McLaren House, is one of those pet-friendly affordable housing organizations. McLaren Housing Society believe in the human–animal bond, as staff have witnessed time and again how a pet can help combat isolation, depression, and other mental health issues.

Research shows that animal companions help street-involved youth cope with loneliness and improve their sense of wellbeing through unconditional love. It also shows how pets motivate positive change, such as decreasing drug and alcohol use. While pet guardianship provides many liabilities, companion animals offer both physical and psychological benefits that youth otherwise have difficulty attaining.

Veterinarians can build upon the bond that exists between pet and guardian. Opportunities for veterinarians include volunteering for an animal health clinic or running one in the community, partnering with an organization to provide support to those in need, donating supplies or preventive medications such as parasite control, fundraising for a community program, support and/or sharing stories of the work being done through social media networks. Many BC organizations and programs support the homeless and marginalized, including The Canadian Animal Assistance Team, Charlie’s Food Bank, Paws for Hope Animal Foundation, Vets for Pets Victoria, and One Health Clinic.

Pets serve as a meaningful source of constant companionship and support for the homeless and marginalized. This companionship has thwarted the worst effects of depression and helps those contemplating suicide regain an element of mental wellbeing and purpose. In line with that, veterinarians can, and do, play a leading role in the support and recognition of this influential human-animal relationship. Veterinarians should use their knowledge and experience to advocate for pets in need and support the provision of care. 

The HSSE believes that the human-animal bond is a powerful tool to help improve the lives of people and animals alike. As veterinarians, we have the opportunity to lead and influence positive change through our actions and advocacy. By providing care to pets in need, we can help create a more resilient and supportive community for all. The HSSE encourages veterinarians, locums, RVTs and AHTs, office staff, and more to get involved and support this important work.

Together, we can make a difference in the lives of pets and people in need. Join us in strengthening the bond between animal and human guardian, and help create a more compassionate and inclusive society for all.
I n December 2017, I was fortunate to be chosen as a delegate at the first annual Link conference in Ottawa. This conference, hosted by the Canadian Federation of Humane Societies, brought together stakeholders from different areas of society to look at the link between domestic violence and violence against animals. Attendees included police officers, women’s shelter workers, SPCA members, social workers, counselors, veterinarians, RAHTs, elected officials, animal shelter workers, bylaw officers, animal rescue groups, psychologists, and lobbyists. These diverse groups listened to lectures and collaborated in smaller groups to join forces to identify issues, share knowledge, and devise solutions to both assist victims of violence and prevent continuing violence through early intervention.

The connection between violence against humans and violence against animals has long existed, but scientific data was lacking until researchers started asking the right questions. Plenary speaker Frank Ascione, PhD, a Utah-based researcher who focuses on the prosocial and antisocial behaviour of children, stated that the link between violence against humans and violence against animals has always been there, but has not been high-lighted as a standalone issue within the literature. In 1997, he conducted a survey for residents of women’s shelters in 50 states that included specific questions about their abuser’s attitudes and actions toward pets within the family, and if their children had witnessed any violence toward animals. The data revealed that 80 per cent of women respondents talked about animal abuse, and 60 per cent of children talked about abuse, drew pictures of it, or demonstrated it with stuffed toys. At the time, however, shelters did not routinely ask about animal safety at home when someone was admitted. Since the inclusion of questions about abusers’ attitudes toward pets, and about pets left behind, on women’s shelter intake forms, we now have quantitative data to prove that there is a correlation.

Any doubt of a connection between animal and human violence is dispelled by Dr. Ascione’s surveys, revealing that in families with women who were victims of domestic violence, 54 per cent reported their spouse abused pets in admitted cases, and 50 per cent of men incarcerated for domestic violence confessed to hurting or killing animals. These statistics are corroborated by the abusers themselves, with two other studies finding that 41 per cent of men arrested for domestic violence admitted to violence against pets, and 50 per cent of men incarcerated for domestic violence confessed to hurting or killing animals.

Another survey showed 66 per cent of children admitted to shelters had witnessed abuse of their pets. Half had tried to protect their pets. While this could be dangerous, it does show that they have empathy and that not all who witness violence are destined to repeat it. Children are resilient, and most children who grow up in households with intimate partner abuse and animal abuse score favourably on measures of mental health. But those children with existing behavioral or psychological problems, or those lacking social supports, may not fare as well in the future.

How does this knowledge relate to veterinarians in daily practice? Margaret Doyle, Forensic DVM with the Calgary Humane Society, spoke of work with the family. Abuse of an animal is not always associated with domestic violence. But those children with existing behavioural or psychological problems, or those lacking social supports, may not fare as well in the future. Veterinarians are often the first professionals to become aware of animal abuse and have an opportunity to intervene for the benefit of the animal and the family. Abuse of an animal is not always associated with domestic violence, but it can be a red flag and indicative of a larger problem. Each case must be handled diplomatically, and most accidents are truly accidents. Some situations that are initially perceived as abuse may instead be a result of misunderstanding, and clients may require assistance with finding an appropriate way to treat the issue. Indications that an animal may be a victim of intentional abuse are similar to those of domestic abuse and include injuries inconsistent with the history, recurrent traumatic injuries, and vague explanations for injuries. Veterinarians are legally obligated to report animal abuse, cruelty, and distress. As citizens, we are also legally obligated to report child abuse and, if we suspect an adult person is being victimized, we can reach out and discreetly provide contact information for support services in the community. We might assume that such things do not occur in one’s practice due to a favourable area and clientele, but interpersonal violence and animal abuse are not restricted to a particular socioeconomic class. Non-acidental injury should be added to our diagnostic differential list so that we are open to the idea when it does occur.

There are other ways we can support victims of violence. Simple things such as displaying pamphlets for social services or local women’s shelters in the clinic waiting room might provide information to someone who is otherwise unable to access it. We can also take steps to get to know individuals in our community from other fields, such as social workers, police officers, and SPAs, and make sure that if a questionable case arises, there is already an existing network and familiar faces. Veterinarians, RAHTs, and clinic staff are in an ideal position to join forces with local women’s shelters and set up fostering systems to take in the pets of families in need of shelter. According to Amy Fitzgerald, PhD, a criminology professor at the University of Windsor, 56 per cent of women entering a shelter delayed leaving home because they were concerned for their pet’s safety, and 47 per cent would have left their abuser sooner if their pet could accompany them to the shelter. One third considered returning to their abuser because he had their pet. Pets can be threatened or harmed as coercion or revenge. Women’s shelters are aware of this need, but often cannot accommodate pets due to space restrictions, safety concerns, and allergies. An animal foster system involves recruiting foster homes, training foster families, responding to short-notices of pickups of animals, and fundraising to feed and care for the animals. Veterinarians often provide complimentary examinations, routine care such as vaccinations and dewormings as well as spays and neuters, as these overlooked procedures encourage responsible pet care. Emergency housing of farm animals and horses might also be required.
WHAT DID WE FIND OUT?

From the short-answer questions, we learned that:

• Over 50 per cent of respondents have been in their current job for less than five years and have been employed at fewer than three clinics.

• The majority of clinics in BC do NOT hire Non-Registered VTs (57 per cent) or on-the-job-trained techs (64 per cent).

• Only 31 per cent of employees lay out goals and incentives, and it is uncommon for employees to receive an exit interview when they leave. This is a missed opportunity for employers, as they could use this chance to make clinic improvements.

• The top reasons employees leave are: low wages, long hours, poor management, feeling unappreciated, stress, and career change/maternity.

• Only 33 per cent of employers stay in their current position are: working environment, quality medicine, respect (personal and skills), benefits, and wages.

• The top reasons employees stay in their current position are: wages, benefits, team/specialty skills, staff quality of medicine, and fulfillment of their skills.

• What employees are looking for in a place of employment: positive working environment, quality medicine, respect (personal and skills), benefits, and wages.

• The incentives employers would like to see are: profit sharing/RRSPs, benefits including sick days, paid holidays, and subsidized childcare.

• For those who have left the field, the top reasons for leaving were: wages, work environment, maternity, school, and compassion fatigue.

The majority of respondents indicated that they would like to be able to have: job security, flexibility, paid vacation time, and incentive programs.

For further information, please see the full report at www.bcvta.com.
JUL   AUG   SEP   OCT   NOV   APR   MAY   JUN

HANDS-ON LAB
Intermediate Abdominal Ultrasound
Las Vegas, NV
May 19-21, 2018

VETERINARY TECHNICIAN SYMPOSIUM
Oquendo Center, Las Vegas
June 25-27

HANDS-ON LAB
Isometric Extra-articular Stabilization of Cranial Cruciate Ligament
Las Vegas, NV
June 30-July 1

RECENT GRADUATE SYMPOSIUM
Oquendo Center, Las Vegas
July 16-18

WOMEN’S VETERINARY SUMMIT
Oquendo Center, Las Vegas
July 16-18

HANDS-ON LAB
Principles of Fracture Repair
Oquendo Center, Las Vegas
August 20-22

DESTINATION CE
Feline Medicine & Surgery
Herradura, Costa Rica
September 16-21

WVC is dedicated to providing quality year-round continuing education to the veterinary community through an array of learning styles and environments.

To register and see the full year’s calendar of events, visit wvc.org

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### MARCH

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<td>Cardiology Seminar, with Meg Sleeper, VMD, BS, Dipl. ACVIM (Cardiology)</td>
<td>Beef Western &amp; Dorchester Hotel, Nanaimo, BC. <a href="http://www.eventbrite.ca">www.eventbrite.ca</a> event code/registration: 4363809701</td>
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<td>Fast Ultrasound</td>
<td>Vancouver Island. <a href="http://www.eventbrite.ca">www.eventbrite.ca</a> event code/registration: 965/</td>
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<tr>
<td>17</td>
<td>Surgery and Pain Management Seminar, with Chris Jordan, BSc (Hons), BVetMed, Dipl. ECVS, MRCPVS, and Tara Edwards, DVM, Dipl. ACVSMR, CCRT, CPRP</td>
<td>Beef Western Plus Kelowna Hotel &amp; Suites, Kelowna, BC. <a href="http://www.eventbrite.ca">www.eventbrite.ca</a> event code/registration: 4363809701</td>
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### INDUSTRY NEWS

- **FERRET RESOURCES ADDED TO VETLEXICON**
  - Ferrets are the latest species to be added to Exotis, the exotic section of Vetlexicon, a popular pet in many countries.
  - The shortage of up-to-date clinical reference service for ferrets, Vetlexicon in adding resources on ferrets. Vetstream aims to address a shortage of up-to-date clinical information on this species, a popular pet in many countries.
  - For more information [www.vetstream.com](http://www.vetstream.com)

**BC VETERINARIANS ON ALERT AFTER DOG FLU SHOWS UP IN ONTARIO:**


**POT DOG TREAT SPOOKS PET OWNER:**


**POT DOG TREAT SPOOKS PET OWNER:**


**DON’T FEED YOUR PET RAW MEAT FOODS—IT’S DANGEROUS FOR BOTH PETS AND HUMANS:**


**THE BCSPCA CALLS FOR VETERINARIANS TO ENACT BAN ON DECLAWING CATS:**


**VETERINARIANS WARN PET OWNERS:**


**HELP MONITORING DEADLY DISEASES:**

www.cbc.ca/look/listen/to-monitoring-deadly-disease-1.4493730

**RESEARCHERS ASK PUBLIC FOR HELP:**


**BC RESEARCHERS ASK PUBLIC FOR HELP MONITORING DEADLY DISEASES:**


**VANCOUVER AQUARIUM BOWS TO PRESSURE TO BAN WHALES:**


**MUNCHIES POT DOG TREAT SPOOKS PET OWNER:**


**HUMANS EXPERTS WARN:**


**THE WORLD AQUATIC VETERINARY MEDICAL ASSOCIATION CONFERENCE & BIOSECURITY WORKSHOP:**

www.eventbrite.ca/e/cvma-sbcv-chapter-spring-regional-ce-sessions-tickets-4363809701
VCA Canada Vancouver Animal Emergency & Referral Centre is excited to highlight Dr. Marco Cervi, DACVS.

Dr. Cervi is an experienced specialty surgeon who has practiced across Ontario, Michigan and California before joining our team. As a Diplomate of the American College of Veterinary Surgeons, Dr. Cervi is a key member of our specialty departments. His areas of interest include orthopedic, oncologic, and reconstructive surgery, and minimally invasive surgical techniques including laparoscopy, thoracoscopy, and arthroscopy.

Learn how Dr. Cervi can support you, your patients, and your hospital. Visit us online to submit a referral or call us today to book an appointment with our specialty team.

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