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Winter 2019

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AAEP Summer Focus
Sports Medicine

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Mobile CT



Sunday, December 8th 12:15-12:45pm

Title: Mobile CT Advancements in Equine Practice

Description: Continual development of mobile CT technology makes advanced imaging more logistically feasible: deeper down the spine and with standing sedation to scan skulls and more.

Speakers: Katie Garrett, DVM DACVS, Rood & Riddle Equine Hospital
Bryan Stephens, PhD, SOUND Technologies

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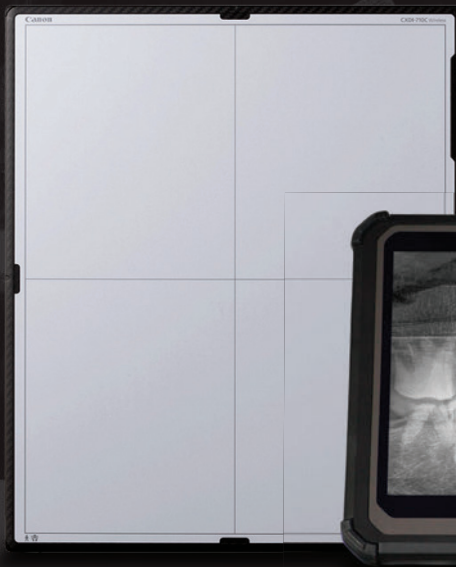
Standing Skull



Full Cervical Spine



Digital Radiography



Monday, December 9th 12:00-12:30pm

Title: Fusion Equine DR; SOUND Expertise, Canon Reliability

Description: The Best of Both - Equine DR that combines industry leading software with panel performance and reliability.

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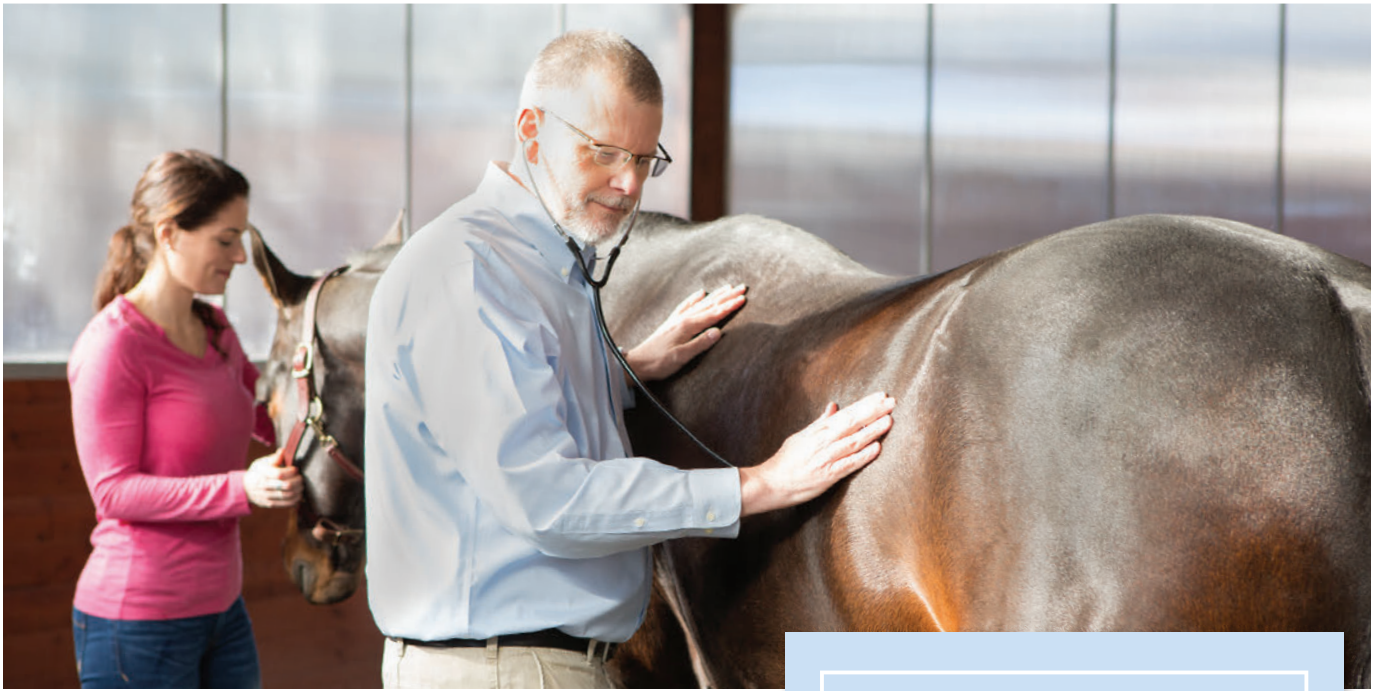
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SPECIAL ADVERTISING SECTION

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Keeping Your Practice Legacy Alive

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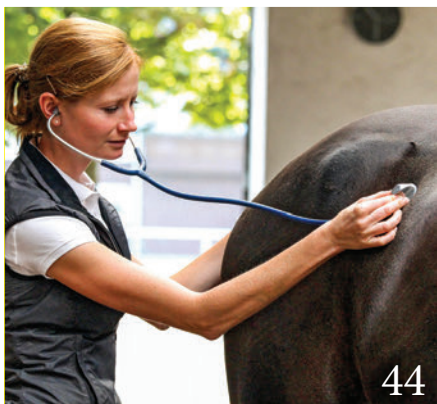
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Convention Is Coming!

Many are excited to head to Denver, Colorado, for the 65th annual AAEP Convention to be held December 7-11. We are also excited to partner with Dechra to bring you news and information from this year's AAEP Convention, whether or not you will be on site.

EquiManagement and Dechra are teaming up to provide the **EquiManagement AAEP Convention Podcast** each day; tune in to hear from top AAEP Convention presenters. It doesn't matter if you are in Denver or not; you can still catch short synopses from leaders in their fields. Daily episodes will be found on EquiManagement.com and EquiManagement's Facebook page.

For your convention daily highlights and news briefs, pick up the AAEP Convention **EquiManagement Daily News** from the Dechra booth (#539), the EquiManagement booth (#519/618) or from locations around the convention center or hotels. The front side will have highlights from top presentations, and the back will feature "don't-miss-this" educational opportunities during the convention.

And speaking of the convention, you can find a list of top companies who will be in the trade show in our AAEP Resources section starting on page 52. These listings include contact information for the companies as well as their booth numbers.

AAEP Summer Focus on Sports Medicine

We teamed up with Soft-Ride to bring you highlights from the AAEP Focus on Sports Medicine meeting that was held this summer at Colorado State University.

This was an enlightening program with outstanding hands-on wet labs that allowed veterinarians to enhance their skills for the benefit of their patients and

clients. You can find this article starting on page 24.

Leaving Equine Practice

While it might seem unusual for our lead story just prior to the world's largest equine veterinary convention to be about leaving equine practice, it is appropriate for many reasons. First, many of our young equine veterinarians are leaving the field. There are many reasons, but that leaves practices scrambling for quality associates and potential future partners.

Second, all equine veterinarians are in business, and every business needs a succession plan. What happens if you retire, get sick or hurt, win the lottery, have family obligations that require your full-time attention or die unexpectedly? What happens to your business, to your employees, to your family, to your partners, and to your patients



and clients? There are companies, individuals and presentations that can help you answer these questions at the convention.

Third, no matter your age, if you are looking toward the future and seeking ways to change your employment situation, the AAEP Convention offers many opportunities to investigate those options.

Correction

Lastly, I want to apologize for a couple of problems in the article "Legal Issues Surrounding Infectious Diseases" in our fall issue. EIA is spread by biting flies; we mistakenly mentioned mosquitoes. Also, on two occasions, we said that it is proper to quarantine new arrivals to your farm for 45-90 days. That is the optimal quarantine period to avoid any risk for EIA infection. AAEP recommends two to three weeks of quarantine in normal circumstances. For more information about EIA, check out AAEP.org/EIAGuidelines. **EM**



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Before



After

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— Michael Stewart, DVM



Standing Surgery for Fibrotic Myopathy

The characteristic restricted hind limb excursion of a horse with fibrotic myopathy often makes it difficult for that horse to perform to its potential. The affected horse's cranial phase of the stride shortens, and the hoof slaps the ground during the caudal phase of the stride. This aberrant limb motion is not usually due to pain but rather is caused by mechanical restriction from scar tissue.

Diagnosis is confirmed by palpation of a hard, fibrous band along the semitendinosus muscle of the thigh and with ultrasound examination of the caudal thigh. A retrospective study from the University of California, Davis, veterinary hospital of 22 horses, 14 of which were Quarter Horses, reviewed long-term prognosis for comfort and return to athletic success following standing fibrotic myotomy [Noll, C.V.; Kilcoyne, I.; Baughan, B.; Galuppo, L.D. Standing myotomy to treat fibrotic myopa-

thy: 22 cases (2004–2016). *Veterinary Surgery* March 18, 2019; DOI: 10.1111/vsu.13209].

It is not always just the semitendinosus muscle that is affected. Fibrosis can occur within the semimembranosus, gracilis or biceps femoris muscles. Cause of injury in many cases is due to trauma such as a slip, fall or kick, but it can also be due to incisional postoperative complications, intramuscular injection of irritating substances or vaccine abscess.

While tenotomy has been a more standard treatment for this malady, standing myotomy offers a low-cost, simple option. The standing procedure enables palpation of the affected area and transection of the fibrotic tissue while the horse is fully weight-bearing. The horse also can be moved in and out of the stocks during the procedure to assess response to surgical efforts.

In the study with 22 horses, only two experienced intraoperative complications, including hemorrhage due

to transection of a major blood vessel. Complications in 18% included drainage issues or infection that resulted in suture dehiscence. Those wounds were allowed to heal via secondary intention.

After surgery, horses were stall confined for two weeks and hand walked for 10 minutes three times a day. Following suture removal at two weeks, trotting began for five minutes per day; this was increased by five minutes per week, including a trot on gentle inclines. By four weeks post-op, two minutes of canter were added each day, increased by two minutes each week.

Other potentially beneficial rehab possibilities exist, such as underwater treadmill therapy, therapeutic laser and cavalletti exercises. Throughout the two-month rehabilitation period, it was recommended to owners that they perform passive range-of-motion exercises twice daily for five minutes each session. By two months, the horses were put into regular work and/or turned out to pasture.



ISTOCK PHOTOS

Fibrotic myopathy aberrant limb motion is usually due to mechanical restrictions from scar tissue. Cause of injury is often trauma. Proper rehabilitation is critical to recovery.



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3 Burba DJ, Collier MA, DeBault LE, Hanson-Pointon O, Thompson HC, Holder CL: In vivo kinetic study on uptake and distribution of intramuscular tritium-labeled polysulfated glycosaminoglycan in equine body fluid compartments and articular cartilage in an osteochondral defect model. *J Equine Vet Sci* 1993; 13: 696-703.

4 Kim DY, Taylor HW, Moore RM, Paulsen DB, Cho DY. Articular chondrocyte apoptosis in equine osteoarthritis. *The Veterinary Journal* 2003; 166: 52-57.

5 McIlwraith CW, Frisbie DD, Kawcak CE, van Weeren PR. *Joint Disease in the Horse*. St. Louis, MO: Elsevier, 2016; 33-48.

Follow-up involved phone conversations and a questionnaire with 16 of the 22 owners between six months and 11 years following myotomy surgery. Ten of 16 owners expressed satisfaction with the long-term outcome. Half of the 16 horses did experience recurrence, with four horses developing recurrence when returned to pasture. Eight of 12 athletic horses were able to return to their former level of use. The other four were not and were retired to pasture. The other four horses that were athletes had to have revision surgery.

Rehabilitation following surgery was extremely important to the overall success of the procedure, and not all owners were willing or able to pursue the recommended two-month rehabilitation protocol.

The study concluded: “Standing myotomy as a treatment for fibrotic myopathy leads to a fair outcome with minimal surgical complications. Half of the horses returned to their intended use.”

Internal Parasite Control Using Fungal Cultures

Decades of use of the same chemical compounds for anthelmintic control of internal parasites in horses is leading to increasing indications of nematode resistance. No development of new deworming drug classes is on the horizon. However, a novel approach using fungal cultures might be the next approach to internal parasite control.

A recent paper outlined the current understanding about how fungal cultures can play a role in suppressing parasite populations [Koskinen, H.I. Sustainable Control of Equine Nematodes: A Literature Review About Control by Fungal Cultures. *Sustainable Agriculture Research* Feb 2019, vol. 8, no. 2; DOI: 10.5539/sar.v8n2p20].

The fungus with the potential to destroy nematodes is called *Duddingtonia flagrans*, referred to as nematophagous fungi or nematodes-destroying fungi. It is especially useful because its

spores survive gastrointestinal passage in horses. The fungi use the nematodes as a protein source or as a nutritional supplement. The report described the process: After being eaten and excreted by the horse, the fungus produces spores, which germinate in the feces and grow to entrap the nematodes with “sticky nets” that then engulf the contents of the nematode. Fungi can also kill a free-living third-stage larva by forming a ring around it and crushing with pressure.

The predatory activity of *D. flagrans* is temperature dependent. It is most effective around 70 degrees Fahrenheit, although it grows well between 68–86 degrees Fahrenheit.

Many studies on nematophagous fungi for internal parasite control were conducted in Brazil and southern Louisiana. Twenty investigations have concluded that use of this fungus results in a significant reduction in infective larvae in the feces (by 67–98%). For best effect, there need to be large numbers of fungi present in horse feces. Horses did not reject the pellets of fungal cultures, nor did they experience any adverse effects following consumption.

Effects of Prebiotics on Equine Gastric Health

One form of prebiotic, fructo-oligosaccharides, are fed to horses to improve the microbiome of the hindgut. A source of this prebiotic often comes from Jerusalem artichoke meal that is included in commercially available dietary supplements. One side effect of using this type of substance is that microbial degradation of fructo-oligosaccharides can begin in the stomach with conversion to small-chain fatty acids (SCFA), such as butyric acid. Butyric acid is known for its positive effects on enterocytes in the hindgut—regulation of apoptosis (normal cell death and turnover) and cell proliferation—and it serves as an energy source for epithelial cells as well as activating release of mucin.

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A German pilot study sought to evaluate the effect of butyric acid on the non-glandular and glandular gastric mucosa of the stomach [Cehak, A.; Krägeloh, T.; Zuraw, A.; et al. Does prebiotic feeding affect equine gastric health? A study on the effects of prebiotic-induced gastric butyric acid production on mucosal integrity of the equine stomach. *Research in Veterinary Science* Apr 2019; <https://doi.org/10.1016/j.rvsc.2019.04.008>].

The study used three adult horses free of gastrointestinal disease and was done *in vitro* on stomach tissue samples of non-glandular mucosa taken just above the margo plicatus and glandular mucosa taken from the fundus adjacent to the antrum. Exposure of the glandular tissue to buffered butyric acid concentrations at a pH of 5.4 “resulted in acute, multifocal, hydropic swelling with superficial epithelial detachment.”

By contrast, no histopathological changes were identified in any of the control specimens. The non-glandular mucosa did not experience any histopathological changes from butyric acid exposure at a pH of 5.4. However, electrophysiological characteristics were impaired in both non-glandular and glandular mucosa after two hours of butyric acid exposure.

Conclusions of the *in vitro* study included: “SCFA do not only play a role in the pathogenesis of equine squamous mucosal injury, but may significantly affect mucosal integrity and morphology of the glandular mucosa, especially when the pH is ≤ 4.0 . Gastric butyric acid concentrations equivalent to the ones found in horses fed prebiotic fructo-oligosaccharides may have the potential to impair functional mucosal integrity in the equine squamous and glandular mucosa, and it may even induce glandular gastric lesions.”

Acetaminophen Dosing

A few years ago at the AAEP Convention, Jonathan Foreman, DVM, MS,



Paracetamol or Tylenol can be given safely to adult horses orally in multiple 20mg/kg doses.

ISTOCK/CLUBFOTO

DACVIM-LAIM, discussed the value of using acetaminophen (Tylenol or Paracetamol) for pain management in horses. Its 99% absorption rate results in rapid response within a couple of hours. The low cost of the drug also makes it appealing as an option to provide analgesia and/or antipyretic effects. In humans, acetaminophen is similar to selective COX-2 inhibitors, with less detrimental effects on the gastrointestinal or renal systems as seen with non-selective NSAIDs.

A recent study evaluated the use and safety of acetaminophen administered twice daily for two weeks [Mercer, M.A.; McKenzie, H.C., Davis, J.L.; et al. Pharmacokinetics and safety of repeated oral dosing of acetaminophen in adult horses. *Equine Veterinary Journal* Mar 2019; DOI: 10.1111/evj.13112].

Eight Thoroughbred geldings were included in the study and were dosed with 20 mg/kg of 500 mg tablets of acetaminophen given orally by syringe twice daily for 14 days.

Peak concentration with a single dose occurred at about 1½ hours, but it was undetectable in blood samples by 24

hours. Multiple oral dosings achieved maximum concentration within one hour. One liver enzyme (SDH, sorbitol dehydrogenase) decreased while total bilirubin concentrations increased by the end of the two-week trial period.

The researchers suggest that fasting prior to gastroscopy could have caused the increase in bilirubin.

A single liver biopsy in seven of the eight horses taken at the end of the study revealed mild portal inflammation in all, with irreversible changes in one horse. However, none of the study horses developed significant clinical elevations in hepatobiliary enzymes, and none demonstrated clinical signs of liver dysfunction.

There were no significant changes in gastroscopy scores at 48 hours after the final dose.

This medication does not absorb well in the stomach, but rather it is absorbed in the proximal small intestine. Variations in gastric emptying affect absorption rates.

The researchers conclude that multiple 20 mg/kg oral doses of acetaminophen in adult horses are safe. **EM**

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Managing Your Time

How many times do you wish for more hours in a day? Do stacks of paperwork and journals pile up on your desk? Do you have a “to-do” list that somehow never gets shorter?

When I was still in clinical practice, one time I felt so pressured by all I had left undone that I set my alarm to go into the office at 2:30 a.m. so I would have five extra hours to catch up without being interrupted! While I certainly felt much more in control of the chaos when I started my “normal” day at 7:30 a.m., it

Most veterinarians’ compensation is tied to their ability to produce revenue for the practice, yet many of the tasks that make us the most successful with clients are not directly tied to revenue—communication, kindness, reliability and integrity. The challenge is to find enough hours in the day to do all these things and still get paid.

We are more than veterinarians. We are fathers or mothers, sons or daughters, brothers or sisters, friends, community members and neighbors. In order to

first. Mailing your quarterly tax payment on the 15th? Paying your house insurance premium by the due date? Calling your mother on her birthday?

Your priorities are clear by your actions. Don’t let the craziness of your workday sweep you downstream so that you emerge exhausted at the other end without the energy or time for your priorities.

By learning to say “no,” you can take on only those commitments that you know you have time for and that you truly care about. Think objectively about the time that each task will require before the day begins. Make adjustments that have a basis in reality instead of simply hoping for the best. Mark Twain once said, “If it’s your job to eat a frog, it’s best to do it first thing in the morning. And if it’s your job to eat two frogs, it’s best to eat the biggest one first.”

Letting go of perfectionism will ease your pressure. While you might be putting off completing tasks because your idea of how they “should” be done exceeds “good enough,” imagine the freedom you could gain from simply being human instead of super-human. If you can’t email copies of lab results or a pre-purchase report to a client today because you just don’t have the time, share them with a phone call or voicemail made while driving (with a hands-free device, of course). Or if you have staff, delegate this task and offer to answer clients’ questions later if needed. Need to send cupcakes for your child’s classroom? Get them at the bakery!

In short, know your priorities, plan your day to “eat the biggest frog” first and embrace “good enough” when you need to. **EM**

wasn’t a cure so much as an emergency intervention!

Veterinarians, like most service professionals, have only their time to sell. Those people in the world who sell products or tangible items can sell an increased quantity that is virtually unlimited. Those of us who sell our expertise, our compassion, our clinical experience and our skilled hands really only have a limited number of hours to sell. Because of this, we need to manage our time efficiently in order to maximize our ability to earn a living.

have full, rich lives, we must leave spaces for things other than our profession. This can be hard to do in the equine veterinary industry, which provides service to folks who often are themselves fully involved with horses 24/7/365. But we must find a way or risk becoming disillusioned, overwhelmed or ill.

One of the most important ways to be more efficient is to take a few moments when you first wake up to identify the most crucial two or three tasks that you must complete that day. These are the things you should concentrate on doing



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Leaving Equine Practice

Our profession cannot continue to stay strong into the coming decades with the loss of exceptional talent that we are now experiencing.

By Amy L. Grice, VMD, MBA

The recently released 2016 AVMA AAEP Equine Economic Survey Report showed that more than 50% of recent graduates have failed to renew their AAEP membership within five years following their graduation. In addition, the number of new graduates that are choosing equine practice has dropped from 5.7% in 2003 to 1.1% in 2017 and 1.5% in 2018, according to AVMA data (see Figure 1). An effort was launched to determine the reasons for this trend.

An eight-question survey link utilizing Survey Monkey was distributed on several Facebook sites in May 2019. The sites utilized were the closed groups Women in Equine Practice, Equine Vet-2-Vet, Moms with a DVM, and AAEP Member Vet Talk. The survey was open for about 10 days, and 647 veterinarians responded.

Questions included the percentage of equine work done by the practitioner, the year of graduation from veterinary school, whether the respondent was an associate or an owner, and the size of the practice.

All of the questions allowed the vet-

erinarians to write comments, and they wrote many to explain their decisions. The questions asked the doctors to answer based on the equine practice where they were currently working or where they had previously worked before leaving the career. The majority of the respondents (63.8%) reported that they were currently or had formerly been at a 100% equine practice, followed by 24.6% that reported their practice was 75%-99% equine (see Figure 2).

Because the phenomenon of attrition of equine graduates from AAEP membership showed an increasing trend from 2000 onward, the survey broke the respondent cohort into fairly small groups in order to see whether there were differing or worsening trends among different graduation years.

Those graduating 10 years or more ago

were grouped together, while the most recent decade was grouped in three-year increments. As might be expected, the majority (50.8%) of respondents graduated in 2009 or prior to that. The most recent decade was well represented in each of the three segments of graduation years (see Figure 3).

Most likely due to about half of respondents graduating in the last decade, associates (64.6%) outnumbered owners (35.4%) overall.

When looking at just those who graduated in the last decade, 80.6% identified themselves as associates and 19.4% as owners. This is in contrast to those graduating in 2009 or before, of whom 49% reported they were associates and 51% reported they were practice owners (see Figure 4).

Respondents were fairly equally

Figure 2.

Q2 How much of your practice is or was equine?

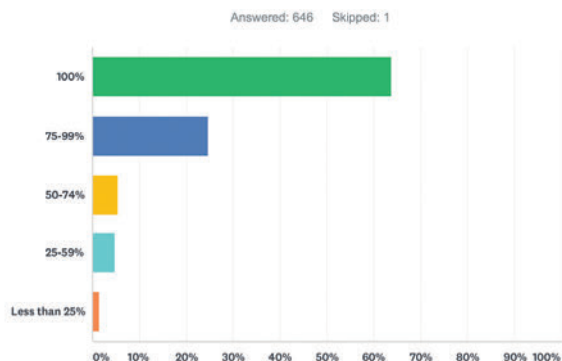
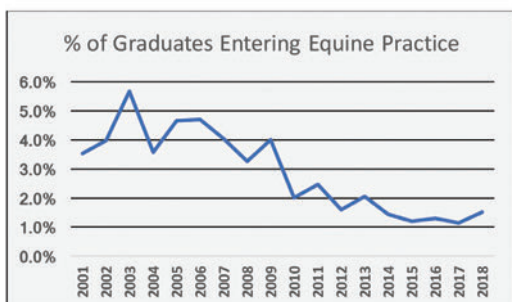


Figure 1.



distributed among different sized practices, providing a view of equine veterinarians across a variety of work settings. While 20.9% reported being solo practitioners—well below the approximately 40% of AAEP members that report being solo—a majority reported working in practices of two to six veterinarians. Another approximately 20% reported working at large practices with more than six doctors. When those respondents who had never considered leaving equine practice were not included, practice size responses were virtually the same, leading one to conclude that practice size might have little effect on veterinarians leaving equine practice (see Figure 5).

Would You Leave?

The most important questions in the survey were those that focused on leaving the profession. The first question in the survey asked, “Which statement is true for you?” and the answers included:

- “I have never considered leaving equine practice”;
- “I considered leaving equine practice but decided to stay”;
- “I am currently considering leaving equine practice but have not decided,” and
- “I have left equine practice or have definitely decided to leave equine practice.”

Somewhat shockingly, only 181 (28%) of the 645 respondents have never considered leaving the profession, of which 107 graduated in 2009 or before. Of the 80 respondents who graduated in 2016-2018, 22 (27.5%) had never considered leaving and 30 (37.5%) had considered leaving and decided to stay.

Similarly, 20.6% of the 126 respondent graduates of 2013-2015 had never considered leaving, and 35.7% had considered leaving and decided to stay. Of those 110 respondents graduating in 2010-2012, only 22.7% had never considered leaving equine practice and 37.3% had considered leaving and decided to stay.

Because the recession of 2009-2011 affected equine practice substantially, one might have expected there to be higher attrition in those graduation years, but the data does not support this.

Sadly, 127 (19.7%) of the 645 respondents have left or have decided to leave equine practice, and another 113 (17.5%) are currently considering leaving the profession.

When considered by graduation year, 19.5% of those graduating in 2009 or prior have left or have decided to leave, compared to 18.2% of those who graduated in 2010-2012; 27.0% of those who graduated in 2013-2015; and 11.3% of those who graduated in 2016-2018.

Currently considering leaving the equine veterinary career path are 14.9% of 2009 or prior graduates, 21.8% of 2010-2012 graduates, 16.7% of 2013-2015 graduates,

Figure 3.

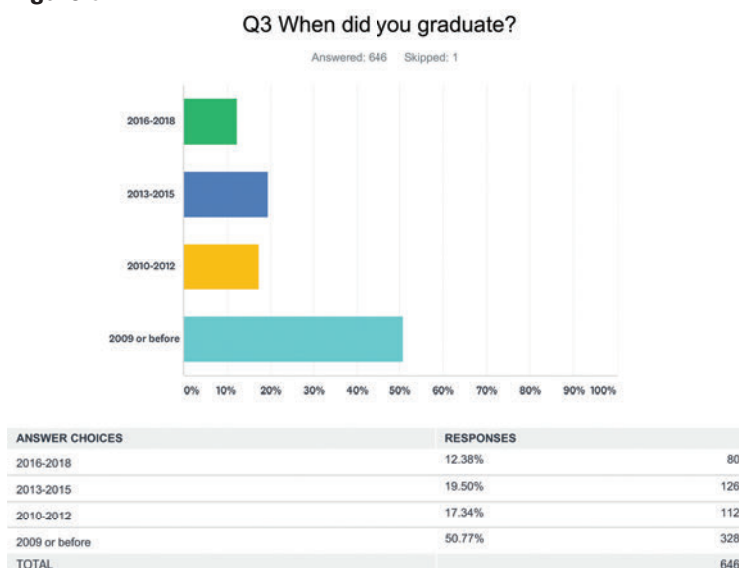


Figure 4.

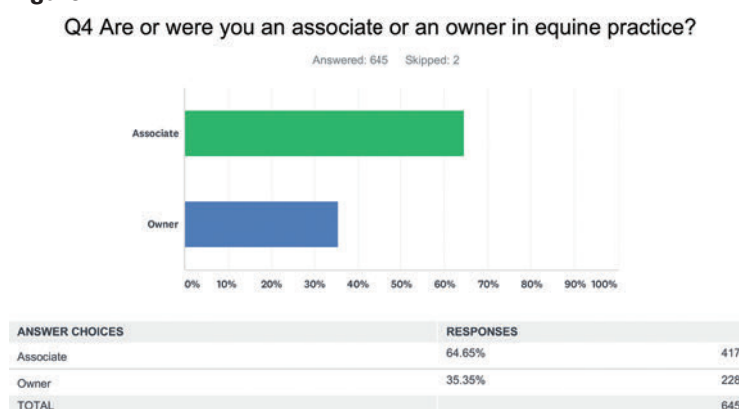


Figure 5.

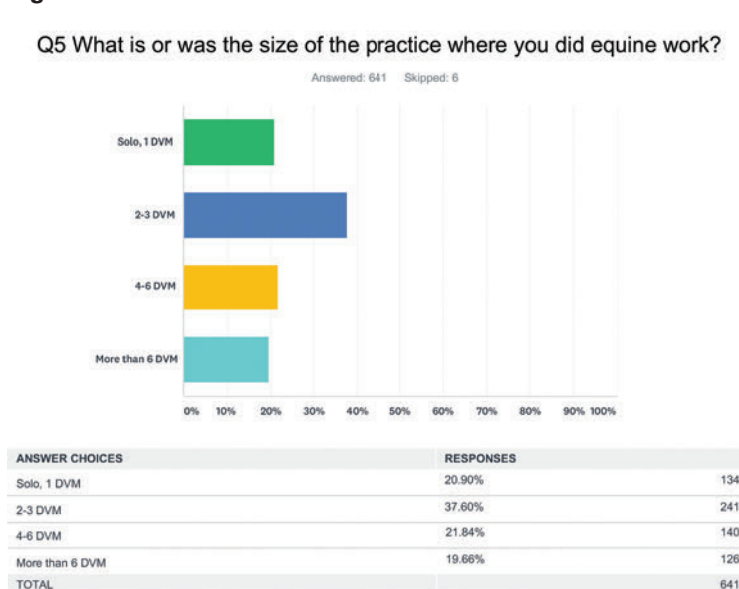
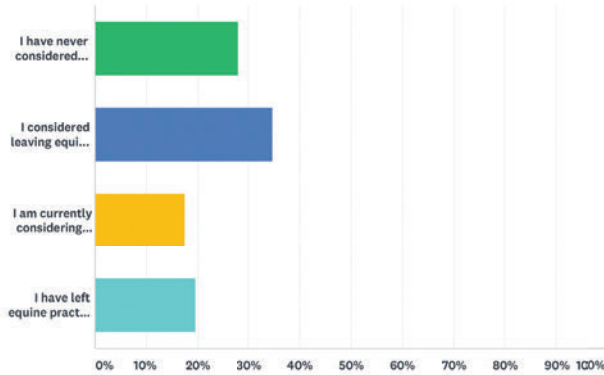


Figure 6.

Q1 Which statement is true for you?

Answered: 645 Skipped: 2



ANSWER CHOICES	RESPONSES	
I have never considered leaving equine practice.	28.06%	181
I considered leaving equine practice but decided to stay.	34.73%	224
I am currently considering leaving equine practice but have not decided.	17.52%	113
I have left equine practice or have definitely decided to leave equine practice.	19.69%	127
TOTAL		645

and 23.8% of 2016-2018 graduates. The data suggests that the reality of life as an equine practitioner might become untenable to some after several years in

the career (see Figure 6).

Understanding why talented equine veterinarians are leaving the profession was the main objective of this survey,

and to that end, questions were asked to identify both the contributing as well as the primary reasons for the exodus.

The top five contributing factors when respondents could select all factors that influenced their decisions were lifestyle and number of work hours required (57.7%), emergency on-call duty (53.0%), low salaries and compensation (51.8%), mental health and stress (44.5%), and culture of equine veterinary industry (36.6%).

Mentioned less frequently as contributors to leaving equine practice were culture of my practice (28.4%), having children (26.4%), physical injuries (24.4%), and high educational debt (22.8%). The least chosen factor was needs of elderly or ailing parents or family members (2.9%) (see Figure 7).

One respondent commented about her reasons for leaving the equine veterinary profession, saying, "I think for me, the main reason I could not make



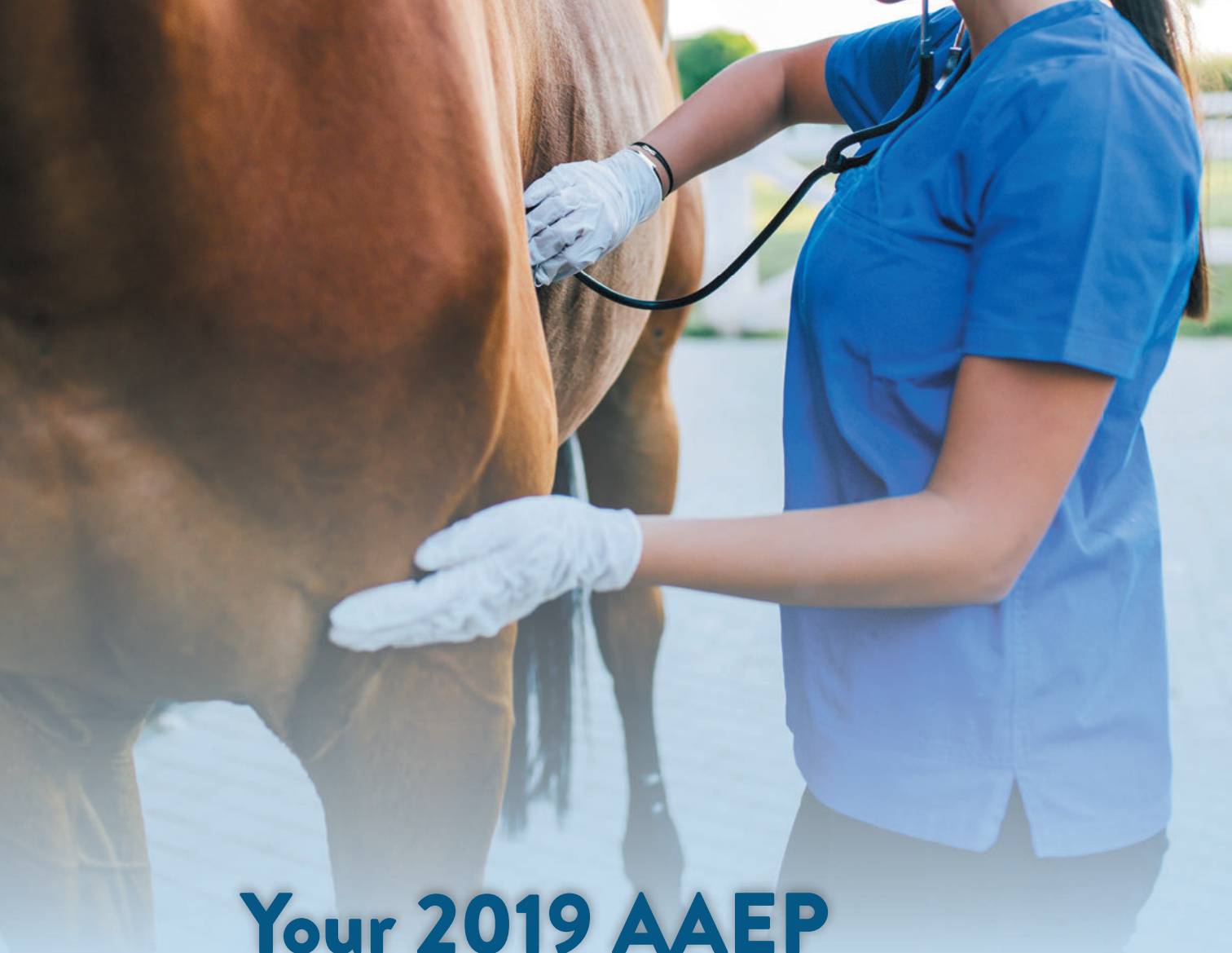
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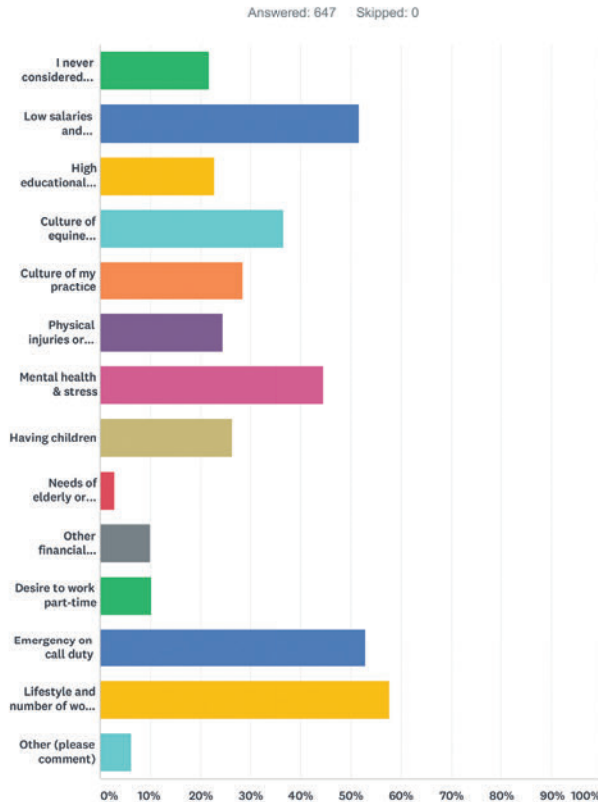
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Figure 7.

Q6 What factors contributed to you leaving or considering leaving equine practice?



ANSWER CHOICES	RESPONSES	
I never considered leaving equine practice	21.79%	141
Low salaries and compensation	51.78%	335
High educational debt	22.87%	148
Culture of equine veterinary industry	36.63%	237
Culture of my practice	28.44%	184
Physical injuries or wear & tear	24.42%	158
Mental health & stress	44.51%	288
Having children	26.43%	171
Needs of elderly or ailing parents or family members	2.94%	19
Other financial stress	10.05%	65
Desire to work part-time	10.20%	66
Emergency on-call duty	53.01%	343
Lifestyle and number of work hours required	57.65%	373
Other (please comment)	6.34%	41
Total Respondents: 647		

equine practice work was because of the culture and demanding hours. It was a challenge before kids, but afterwards it became impossible. Being on call 50% of the time with a newborn that didn't sleep was an enormous strain on our family, and if I'm being completely honest, it put my marriage in jeopardy. Then taking time off to take my sick daughter to the doctor was a strain on the practice.

"Planning to leave early one day to

pick up my kid on a day my husband had a late meeting was a lot to ask. Trying and failing to make it home in time for dinner was the norm. The list goes on. I did look for other equine jobs, but never found one in our area that seemed to be enough of an improvement to make it worth it.

"For now, I am doing small animal, and hope to get back to equine after my kids are a bit older—maybe solo. I hate

to be another female vet that couldn't make it in equine practice. It's all I ever wanted to do since I was 7; I completed an internship and almost accepted a residency; I thought I was well prepared and fully informed on what to expect out of this career path. I love equine medicine, but could not find a way to do it and also feel like I was being a good mother/wife—or even daughter/sister/friend, etc."

The most prevalent reasons chosen for leaving equine practice did not differ considerably between graduate year cohorts, but there were interesting trends in the percentage of respondents choosing each option.

Lifestyle and number of work hours required was the most frequently named contributor to respondents' decisions to leave or consider leaving equine practice across all graduation years, cited by 52.7% of those graduating in 2009 or before, 58.9% of those graduating in 2010-2012, 67.5% of 2013-2015 graduates, and 61.3% of respondents from 2016-2018.

Those from more recent graduating years were more likely to attribute low salaries and compensation to influencing their departure, with 43.0% from 2009 and before, 58.0% from 2010-2013, 64.3% from 2013-2015, and 60.0% from 2016-2018 citing this factor.

One respondent commented, "I could literally not afford to eat meat ... I love the job, but it wasn't sustainable."

Emergency on-call duty and mental health/stress were less frequently reported by those graduating in 2009 or prior compared to the most recent decade's graduates. A rising trend in the importance of educational debt and the culture of the equine veterinary industry was seen across graduation years (see Table 1).

Why Leave?

Respondents to the survey were asked to choose the most important factor in their decisions to leave equine practice. Not surprisingly, the factors that were the most prevalent when multiple rea-

What's your vision for the future of your practice?

3

Questions to ask as you enter discussions with potential partners.



NO. 01

Is it the right culture fit for your team?

As you begin considering your options for selling your practice, it's important to find a partner aligned with your values, respectful of the individuality of what you've built, and equipped to grow your business, while your team and culture remain intact.

Ask around to find out which buyers have the best reputation for investing in the animal health care profession, and the equine community specifically.

NO. 02

Do the partnership options make sense?

Because selling your practice is such a personal decision, you'll want to understand what types of options are available, and to what level they can tailor the terms to meet your needs.

YOUR OPTIONS:

- Selling 100% or staying onboard in a joint venture
- Providing the opportunity for your associates to buy in
- Selling your property or renting it to the buyer

NO. 03

How comprehensive are the support services?

As you contemplate transitioning your business, you'll want to know every aspect is covered. Seek out a partner with a dedicated team seasoned in everything from marketing and recruiting, to IT, HR, accounting, taxes, legal and more. Ask about access to capital for new equipment and renovations as well.

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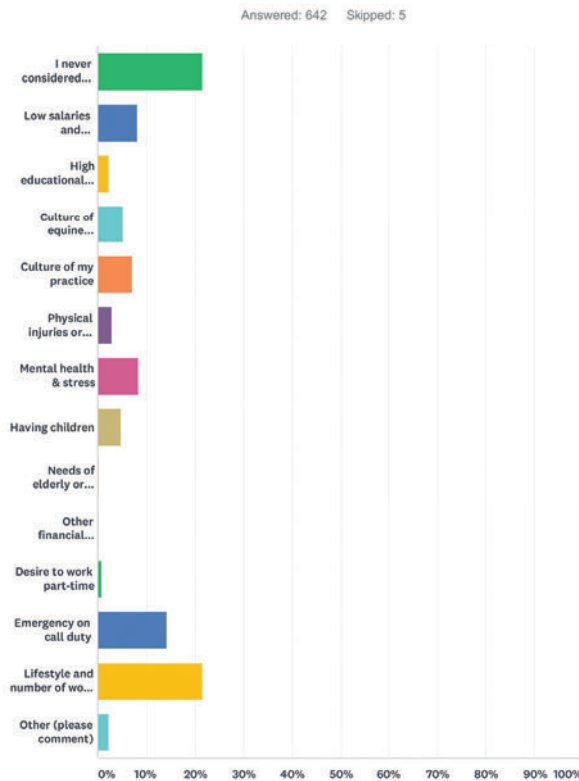


Table 1.

	2009 or before	2010-2012	2013-2015	2016-2018
Low compensation	43.0%	58.0%	64.3%	60.0%
Culture of equine industry	30.5%	40.2%	44.4%	45.0%
Educational debt	12.5%	29.5%	32.5%	41.3%
Culture of my practice	23.5%	31.3%	37.3%	31.3%
Physical injury	26.5%	25.0%	21.4%	20.0%
Mental health & stress	40.2%	47.3%	52.4%	46.3%
Children	26.2%	34.8%	27.0%	15.0%
Emergency on-call duty	47.6%	58.0%	60.3%	57.5%
Lifestyle and work hours	52.7%	58.9%	67.5%	61.3%

Figure 8.

Q7 What is the primary or most important factor that contributed to you leaving or considering leaving equine practice?



ANSWER CHOICES	RESPONSES	
I never considered leaving equine practice	21.65%	139
Low salaries and compensation	8.26%	53
High educational debt	2.34%	15
Culture of equine veterinary industry	5.14%	33
Culture of my practice	7.17%	46
Physical injuries or wear & tear	2.96%	19
Mental health & stress	8.41%	54
Having children	4.83%	31
Needs of elderly or ailing parents or family members	0.16%	1
Other financial stress	0.16%	1
Desire to work part-time	0.78%	5
Emergency on-call duty	14.33%	92
Lifestyle and number of work hours required	21.50%	138
Other (please comment)	2.34%	15
TOTAL		642

sons could be chosen again rose to the top.

Across all graduation years, lifestyle and number of work hours required was the most frequently chosen response (27.5%), followed by emergency on-call duty (17.9%) and mental health and stress (11.6%). Low salaries and compensation (10.0%) garnered fourth place in importance, followed by culture of my practice (9.8%) (see Figure 8).

Respondents showed a love for the profession but a frustration with the constraints of the culture. Said one, “Equine practice is still very much a lifestyle, not a job. The line between clients and friends is blurred. Not only must you be available 24/7 and are made to feel guilty if not, but forget about going to the barn to play with your horses uninterrupted. I go only when I know others won’t be there, and it causes me more anxiety than calm.

“As much as these clients act like friends, I am a monkey that serves them. And if I died, they’d find another monkey. That’s a tough reality when you dedicate your life to something. The people, the stupidly low pay and the constant on-call make it sick. The horses make it worth it.”

As another put it, “As I’m sure many people will say, the on-call and the hours (working every weekend during breeding season whether on call or not, staying late frequently, etc.) are major contributors in considering leaving equine practice. When most of my friends were vets this seemed normal, but now that many of my friends have non-vet jobs I am insanely jealous of their ability to make definitive evening and weekend plans, have entire weekends off, and not be restricted to the on-call radius and tethered to the phone. I enjoy emergencies but have come to hate being on call.”

Interestingly, only 6.3% selected the response of having children as the primary reason for leaving or considering leaving the profession. This might reflect the fact that because having a family is a natural and expected part of most adults’ lives, those aspects of practice that do not allow for this normal life phase would be called out as the reason, not the act of having children. Comments certainly highlighted the difficulties of veterinarians blending young families with equine practice as it exists today.

Said one doctor, “I never considered leaving until my daughter. I was all-in, gung-ho equine. And then she came along and the time,

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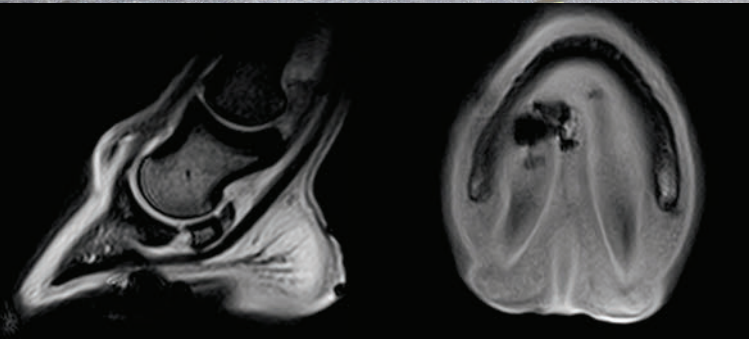
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financial and quality of life sacrifices I was making for the privilege of working with horses were not just my sacrifices anymore. I was also in a fairly family friendly practice, but it's still the reality of equine practice, especially at the referral level, because 'the buck stops here.' I miss horses, but I love my family more."

Said another, "I'm one of the 'dark side' converts ... I was a solid equine ambulatory vet for 11 years, then worked a handful of small animal days while on maternity leave with my second kid. Ended up making the switch. It has been good for me and my family, but I still struggle with my choice some days.

"The decision was primarily made to have better quality of life with two kids. I now work only four days a week, with no on-call, and I earn considerably more. I struggle with the decision, partly from the sense that I 'gave up' my passion/dream career, as well as proving that a mom can be a badass equine vet (which I did, working through two pregnancies, pumping, breastfeeding, carting a kid around on calls, etc.), but I had to also accept that doing what was best for myself and my family ended up being more important than my job."

What Are You Doing Now?

The final question of the survey asked what those who had left practice were doing now. About 47% of respondents reported that they are now in companion animal practice, and another 10% have an academic position of some kind. Industry and government positions have each been taken by another 4% of respondents. Although opportunities in other areas of the veterinary field abound, those who have trained for and dreamed of a career in equine veterinary medicine often have sadness about their transition.

Dr. J.J. Vautier-Brown planned to be an equine surgeon and was proud to be chosen for an internship at Rood and Riddle Equine Hospital several years ago. She described her training there as exceptional and perfect for her career

trajectory. After a second surgical internship at the University of Georgia, she was poised to apply for a surgical residency when she became pregnant.

Understanding that an infant wouldn't mix with residency training, Vautier-Brown took a job at a mixed animal practice, where she was thriving. Unfortunately, a death in the family led to the need for a cross-country move to California, where finding an equine job within commuting distance was difficult. To pay her student loans, she took a temporary job at Banfield, where "they were really good to me, even though I only had equine experience." She is still looking for an equine job. As she said, "I can't do this small animal thing forever! It's a job, not a career."

Her second child is almost 2 years old, and her first is 4. "It is horribly crushing to invest eight years of your life to be a surgeon, loving every minute of two intense internships, but feeling like your dream has been crushed. But my son is the biggest blessing of my life, and I wouldn't ever trade him for a residency."

Vautier-Brown worries that her educational loans are a burden to her family and said, "I don't know how to balance my love for my family, my career aspirations and my financial obligations. We don't leave the equine profession because we want to; we leave because we have no other choice!"

Another Rood and Riddle alumnus, who intended to specialize as a theriogenologist, said, "Being a horse doctor was always my dream since I was 7 years old." After her internship, which she described as an amazing experience, she began equine practice at a six-doctor firm. Although the practice seemed progressive in its medicine, the culture was not family friendly. Neither the staff nor other associates had children, and there was little teamwork.

"Every doctor was a silo, never sharing cases or treatments or helping each other."

When this veterinarian became pregnant, she felt she needed to prove

that she could do the work without accommodations because of the culture. She worked until the day she delivered, including emergencies. As her first child grew, she felt torn by the demands of her job, saying, "I felt I had to choose between the two and couldn't have both. I felt like I wasn't doing a good job in either role."

When she became pregnant with her second child, she and her husband decided to move closer to family. Due to a lack of part-time equine employment opportunities in her new location, she took a full-time job at a companion animal practice working 36 hours a week with no emergency on-call hours. Her compensation is 50% more than her previous equine position for two-thirds as many hours. She stated, "I feel guilty, embarrassed and like I don't belong in the equine vet tribe anymore. I took a spot at a prestigious practice for my internship, and now I'm not using that training. I used to judge people for leaving because they couldn't hack it. And now that's me."

Take-Home Message

These stories of the career paths of some of "the cream of the crop" highlight the fact that even the "the best in class" are affected by our industry's long-standing workplace traditions and outdated cultural mores.

In 2018, the AVMA reported that there were 3,142 U.S. veterinary school graduates and that 42 (1.8%) took an equine job at graduation. Another 146 entered equine internships.

More than 50% of AAEP members are over the age of 50, and many are approaching retirement. Recent numbers of jobs on the AAEP Career Center have well exceeded 200.

Our profession cannot continue to stay strong with the loss of talent that we are now experiencing. New paradigms must evolve that allow our changing workforce to have the flexibility and support that they need while still keeping practices financially healthy. **EM**



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Dr. Kevin Haussler said chiropractic evaluation can provide tools to identify and localize subtle soft tissue injuries, joint stiffness and musculoskeletal pain.

AAEP Summer Focus Conference

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Advances in diagnostics and therapeutics were front and center at the AAEP Focus Sports Medicine meeting.

By Kimberly S. Brown

Having reported on veterinary conferences for nearly 40 years, I have seen many groundbreaking technologies and research results shape the equine industry. Even among all of those decades of change, the recent AAEP Summer Focus meeting offered some amazing shifts in the way that equine veterinarians think of lame horses and offer help to those animals.

The meeting, held at Colorado State

University (CSU), provided a wide variety of research-based knowledge and hands-on skills. But perhaps the top sentiment that stuck with me and others at the conference was that the veterinary industry needs to help horse owners first look for physical problems that cause “misbehavior” in horses before they label a horse as “bad.” And there is a wealth of new and emerging technologies and diagnoses available to veterinarians to make that investigation and treatment better than it ever has been.

The other shift in thinking is to view the lame/neurologic horse as an athlete that needs physical therapy, focusing on exercises adapted for that individual animal. That might mean horses are receiving months of core/balance strengthening, passive or active therapy, and an array of sports medicine techniques that heretofore have been reserved for elite human athletes.

The majority of attendees at the 2019 summer AAEP Focus meeting participated in the sports medication lectures

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and wet labs, which we will cover in this article. Others partook of ophthalmology lectures and labs. All of the attendees enjoyed CSU's state-of-the-art facilities for lectures and labs, as well as access to the CSU faculty as speakers.

Fourteen presenters discussed topics ranging from "Fact Finding: History, Physical Exam" and "Diagnostic Analgesia" to "Managing Horses under USEF and FEI Rules."

We appreciate AAEP Focus meeting sponsor Soft-Ride for bringing you these AAEP Focus synopses. We also direct your attention to pages 51-52 for "Tidbits From the AAEP Focus Meeting." More synopses will be posted on EquiManagement.com.

Cold Therapy

Melissa R. King, DVM, PhD, DACVSMR, focuses on the study and application of equine rehabilitation at CSU. King's current research interests involve the objective assessment of various rehabilitation modalities and therapeutic exercises for the management of equine musculoskeletal injuries, as well as the biomechanical assessment of compensatory gait adaptations.

She discussed a variety of physical therapies and rehab protocols, but first stressed that a veterinarian must reach "an accurate diagnosis followed by establishing clearly defined rehabilitation goals that consider the biomechanical implications of the original injury. The most effective rehabilitation programs utilize regular, longitudinal patient assessments, followed by appropriate adaptation of protocols with both injury-specific and whole-body considerations."

One area she discussed was thermal (heat and cold) therapy. "Thermal therapy consisting of cryotherapy, heat therapy or a combination thereof (contrast therapy) remains a fundamental

cornerstone of many physical therapy programs," she noted.

The therapeutic effects of cold therapy in people are generated through reducing tissue temperatures to 10° to 15°C, she noted. "Tissue cooling produces peripheral vasoconstriction and decreased soft-tissue perfusion, which can reduce edema formation and swelling at the site of tissue injury. Cold therapy also mitigates tissue metabolism and apoptosis, and decreases the release of inflammatory mediators and abates local enzymatic activity."

She said the application of cold also serves as a form of pain modulation by "decreasing nerve conduction velocities in local sensory neurons and by activating descending inhibitory pathways."

She noted that cold therapies can penetrate up to 1-4 cm in depth, which is dependent on local circulation and adipose tissue thickness. "Human studies have documented the analgesic benefits of cryotherapy with a 15-20 minute application providing pain relief for one to two hours," King said. "In horses, ice water immersion for 30 minutes reduced the superficial and subcutaneous tissues in the distal limb to within optimal therapeutic range compared to cold pack application.

"Application of a compression boot with continuous circulating coolant applied to the distal forelimb of horses for one hour significantly reduced the SDF core temperature to 10°C," she added.

King noted that cryotherapy research in horses has focused primarily on applications within the distal limbs and on inflammatory responses associated with laminitis. "The exact effect of cryotherapy on various equine musculoskeletal injuries has not been fully elucidated," she said.

King said that cold therapy is indicated in "acute musculoskeletal injuries and following surgical procedures to reduce edema, slow the inflammatory response and reduce pain. It is particularly effective during the first 24 to 48 hours after injury or surgery."

She said that the average time of cold application is 20 to 30 minutes.

"Treatments are best repeated every two to three hours during the first 48 hours following injury or surgery," noted King. "Ice may be placed in a plastic bag or water may be frozen in a paper cup and applied to the site of injury.

"Cryotherapy may be indicated for up to 10-14 days post injury, depending on the severity and type of injury," she continued. "A general rule of thumb for monitoring the need for continued cryotherapy is that the affected tissue should return to normal regional tissue temperatures and no longer have any signs of heat and swelling."

Chiropractic and Acupuncture as Diagnostic Tools

Kevin K. Haussler, DVM, DC, PhD, DACVSMR, an associate professor at the Equine Orthopaedic Research Center at CSU, is involved in research into the objective assessment of pain, spinal-related disorders and the initiation of chiropractic and physical therapy/rehabilitation research for the management of musculoskeletal injuries.

As the summary for his presentation, Haussler noted that "equine sports medicine practitioners are often presented with horses that have vague signs of reduced performance or poorly localized lameness related to athletic pursuits. Chiropractic evaluation can provide tools to identify and localize subtle soft tissue injuries, joint stiffness and musculoskeletal pain. Acupuncture evaluation can help provide insights into pain mechanisms related to primary or compensatory lameness issues."

Because sporthorses undergo chronic, repetitive stresses associated with athletic performance, poor performance is a common clinical complaint in that group of animals, said Haussler. But "not all lameness issues are readily localized to the distal limb." He said there is a heightened awareness of the role of chiropractic and acupuncture in the diagnosis of poor performance in horses.

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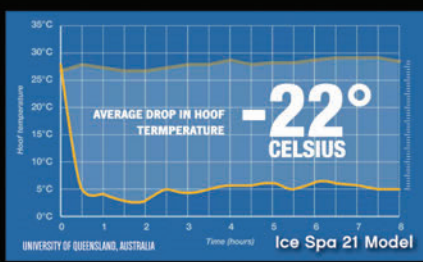
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He said that poor performance might be a vague lameness, an altered gait, or involve trying to determine whether the horse is lame or neurologic.

“Pain and fear drive horses,” said Haussler. “If a horse is ‘grumpy’ or unhappy, look for pain.”

“Chiropractic and acupuncture offer detailed spinal evaluation techniques of the neck, withers, back, pelvis and for overall stiffness,” noted Haussler. “And you have unique treatment options that are conservative, drug-free approaches to treatment while offering individualized patient care.”

Back Issues in Horses: Back problems in horses are a common but poorly understood clinical entity, said Haussler. Prevalence varies from 13-94% depending on the examiner, and a definitive diagnosis and positive outcome are often difficult due to:

- vague or complex clinical signs;
- limited objective measures;
- good pathological reports; and
- limited proven effective treatment options.

Haussler said there are “gray zones” where a horse has an altered or asymmetric gait, but the practitioner doesn’t know which it is, or if it is a combination of both.

“Treating the limbs might not fix whole horse,” he stressed.

Haussler said it has been reported that approximately 30% of horses with lameness have concurrent back pain. Conversely, in horses with documented back or sacroiliac pain, approximately 70% also have a concurrent fore or hind limb lameness.

He also reminded the audience that older horses are susceptible to loss of spinal flexibility, joint degeneration and loss of muscle strength. “Aged horses also have increased healing times and

increased chances of having chronic conditions or abnormal musculoskeletal compensations from prior injuries,” he noted.

Therefore, when equine veterinarians are dealing with sporthorses, a full lameness exam should include a back/spinal exam.

Hausser said there is a difference in acute back pain (a horse being sore from overuse) and chronic pain (a horse may have neuropathic pain that is not readily localized and not amenable to anti-inflammatories). In the latter horse, he said acupuncture is useful.

Haussler said a sports medicine practitioner’s list of modalities includes:

- medicine;
- surgery;
- therapeutic exercise;
- physical modalities;
- manual therapies; and
- patient education.

When discussing specific evaluation techniques, Haussler had some great videos of equine patients to illustrate his points. If you have a chance to see a live presentation by Haussler or attend a hands-on lab with him, take advantage of the opportunity!

Fact Finding: History, Physical Exam and Diagnostic Analgesia

“Many equine vets spend most of their time dealing with lameness issues in horses,” said Christopher E. Kawcak, DVM, PhD, DACVS, DACVSMR, a professor of orthopedics at Gail Holmes Equine Orthopaedic Research Center, Department of Clinical Sciences, College of Veterinary Medicine and Biomedical Sciences, Colorado State University. He stressed that there is a lack of consistency between examiners, procedures, interpretations and a finding’s relevance to performance in the equine athlete.

Kawcak is one of a team of researchers working to find ways to prevent and treat catastrophic injuries in equine athletes. He is assessing three-dimensional imaging techniques, MRI and CT to diagnose early joint disease and microscopic joint



Dr. Melissa King, shown here teaching the kinesiology lab, stressed that a vet must reach an accurate diagnosis followed by clearly defined rehabilitation goals for an injured horse.

injuries before these develop into serious injuries. Working with researchers in biomedical engineering, his team has developed biomechanical models to assess risk factors specific to each individual athlete with implications for human bone and joint disease.

Kawcak discussed how the history of the horse can help a veterinarian formulate a plan for characterization of the problem, as well as how veterinarians can:

- identify the most objective changes in horse’s gait during a lameness exam;
- use clinical tools to characterize a horse’s lameness; and
- develop strategies for dealing with the lame horse.

Hurt vs. Injured: Kawcak talked about how most great human athletes play with pain or dysfunction. However, he noted that human athletes have a choice to play with those challenges, while a lame horse evokes an emotional response that brings in the topic of welfare. He talked about the recent *Equine Veterinary Journal* debate that centered on whether a lame horse is unfit to perform, which equals a welfare issue.

Kawcak said that when you define lameness, you need to decide whether it is a pathologic disorder or clinical sign in that horse. He said you also need to consider whether a gait asymmetry is a true lameness.

He said that it is essential to understand that “lameness examination is an artistic experience acquired by years of clinical practice along with integration of the objective information to best characterize the problem.”

Kawcak talked about the need to better understand subtle gait alterations and to put them into context of “normal variation” rather than lameness. For example: What level of musculoskeletal pain is expected from a horse in training or one that is ready to compete?

Dr. Christopher Kawcak discussed the art of fact finding.



He talked about the fact that FEI horses have subjective and objective lameness evaluations because that group of horses has a high incidence of lameness. He said multiple limb lamenesses are common in those elite athletes.

There also is the public welfare concern of bone fatigue and its implications for injuries in racehorses. Kawcak said that before bone breaks apart, there is remodeling and microdamage. “There is growing evidence that there is fatigue injury in muscle, tendon, bone and cartilage,” he said.

He talked about the development of an ethogram for a pain scoring system in ridden horses and its application

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to determine the presence of musculoskeletal pain. The pain ethogram was researched by Dr. Sue Dyson and published in the *Journal of Veterinary Behavior*. Dyson, Head of Clinical Orthopaedics at the Centre for Equine Studies at the Animal Health Trust in Newmarket, found that there were 24 behavioral markers that were most consistent in the lame horse. Dyson tested these markers with veterinarians, who reported that they were beneficial in lameness evaluation.

History of the Horse: Kawcak said that although some vets wait until after an exam to ask for the horse’s history from the owner or trainer, “I like to get history before exam.” Included in the history is the use and level of competition, rider experience, previous lameness(es) and treatment(s), and characteristics of the lameness.

He noted that vets need to understand the influence of rest on lameness. “Research in racehorses has shown that there is an increased risk of fracture 121-214 days after a 60-day rest period,” he said. Kawcak noted that the type of injury correlates with osteoclastic bone resorption out-pacing bone formation, which you can mitigate with short periods of work during the rest period.

Lameness Exams: While Kawcak in his lecture went into the examination of the horse very specifically, below we will just note some of the highlights of his talk.

Separate hands-on labs that allowed veterinarians to learn different or additional palpation techniques were one of the highlights of the meeting, according to some attendees. They said they couldn’t wait to go home to practice and apply what they had learned to their clients’ horses.

In one lab, Haussler focused on palpation skills with his small group of veterinarians (at their request). He recommended that during the observation stage, veterinarians create pre-formed

ideas of whether the horse will be stiff, painful or both, then see how well their pre-formed ideas hold up after their exams.

Haussler recommended that veterinarians look at conformation, posture, hair, epidermis, dermis/fascia and muscles—then use boney palpation. He demonstrated several specific palpation techniques and individually instructed the veterinarians to help them gain experience.

Melinda R. Story, DVM, DACVS, DACVSMR, cVMA, cIVCA, suggested that veterinarians start any lameness evaluation with a myofascial exam of the horse. “If you think something is going on, don’t touch the horse, but get really close and feel for heat,” she suggested.

Summary on Lameness Exams:

“Where do I start?” Kawcak asked the audience. “I have found that going right to advanced imaging actually saved my client money in the long run in some cases,” he said.

What constitutes an adequate exam? Including owner/rider/trainer insights; basic lameness exam; responses to flexions; basic blocks.

“The goal is to reduce the risk for further injury as much as possible,” Kawcak said. “Stay consistent, determined and disciplined in your exams. Use what is in literature, but read it carefully.”

Take-Home Message

The speed at which equine rehabilitation is progressing today is amazing. Items you might have seen or used yourself during physical therapy are now integrated into bringing the equine athlete—or even the beloved trail horse—back to fitness.

There will be multiple articles posted on EquiManagement.com that contain summaries from the other presenters at the AAEP Focus Sports Medicine meeting. Also make sure to check out the Tidbits article on pages 51-52 for brief take-homes from many of the presenters at this conference. **EM**

KEEPING YOUR PRACTICE LEGACY ALIVE

If you are looking into options for your practice's future, you might read about Tryon Equine's reasons for selecting Avanti Equine Veterinary Partners.

By Nancy S. Loving, DVM



GETTY IMAGES/ISTOCKPHOTO

going to pass on your legacy.

You may consider recruiting a young equine practitioner, but there are challenges to be aware of. First, with only about 1% of new veterinary school graduates going into equine practice, there are now fewer candidates to buy a practice. Additionally, some young equine practitioners are not as interested in practice ownership as prior generations were. Furthermore, it is difficult for practice owners to retain equine veterinarians for a long-term career. As a result, many veterinarians are seeking alternatives to the traditional practice structure.

These obstacles may seem discouraging, but there is a new opportunity awaiting. Recently, a group called Avanti Equine Veterinary Partners was formed to address some of these concerns. Avanti team members understand the equine industry and its clientele—and they are committed to supporting the veterinary profession through excellence in veterinary medicine, business management and forward-thinking growth.

WHO IS AVANTI?

Avanti's business plan is straightforward: Avanti pays cash for a practice's value, leaving the owner with the option to purchase equity in the Avanti network and

When we graduate with veterinary degrees, we have hopes of

a rich and fulfilling career in equine veterinary medicine. But what happens 10 to 15 years later when the economy takes a downturn, as it has in the past, yet practice

expenses persist and overwhelm? When you come to the end of your career, having spent a lifetime developing your equine practice, you might wonder how you are

diversify his or her personal portfolio to reduce risk. Avanti generally leases real estate from the current owner as opposed to acquiring the real estate outright. Owners then have the opportunity to either continue working and be paid for providing veterinary services, or to retire.

Management support from the Avanti team will enable veterinarians to spend less time worrying about their future and more time focusing on practicing veterinary medicine, leading their teams and preserving the culture that led to their successes. Avanti provides practice support and business resources, including leadership and training development, recruiting, accounting, inventory management, human resources (HR), technology, marketing, operational analysis and administrative support.

Avanti Chief Operating Officer (COO) Lisa Floyd describes techniques to help structure the efficiency of a practice: "Some of the biggest expenses within a practice are associated with human resources and inventory."

Drugs and supplies generally account for a significant portion of a practice's expenses. Avanti's group purchasing power and inventory management process

can lower those costs.

"We have identified ways to optimize technology to streamline and communicate support across all practices within the Avanti network," says Floyd.

THE FOUNDATION OF THE AVANTI NETWORK

The foundation on which the Avanti network is based is a Hub-and-Spoke Model. The group is looking for practices that meet certain criteria. Joe Johnson, partner in Pondera Holdings, Avanti's equity partner, explains: "To enter a new geographical area, we look to acquire a 'hub' practice. We define a hub as a surgical center, rehabilitation facility or a specialty referral practice that has three or more veterinarians and that performs well in its operations.

"Then, from within a geographical area (one to three hours away from the hub), we add in the 'spokes,' which are smaller practices of one to three doctors that have fewer resources."

A spoke is likely an ambulatory practice with or without a brick and mortar facility. Its management infrastructure is less established, possibly with only one or two administrative people running the practice.

"Combining the hubs and spokes expands the footprint

and establishes a network of veterinarians, technicians and support personnel who work as a cohesive team to service the entire practice region and provide the same level of care to clients in all Avanti practices," says Johnson.

He summarizes a vision where Avanti veterinary practices "share medical records seamlessly from one to another and share team members to provide relief for a hub or spoke experiencing high demand—enabling practices to continue providing high-quality veterinary medicine."

MUTUAL BENEFITS

Tryon Equine Hospital in Columbus, North Carolina, was the first practice to partner with Avanti. Co-owner Anne Baskett, DVM, DACVS, is also regional managing partner of Avanti. She notes, "There is a new enthusiasm in consolidating equine practices that did not exist a few years ago. Our new philosophy of integrating hub-and-spoke practices that share a strong mutual relationship benefits both ambulatory and hospital practices."

Avanti has several goals in partnering with equine practitioners:

- Build a network of veterinarians to share resources, equipment, specialists and philosophies while emphasizing communication and



ANNE BASKETT, DVM



LISA FLOYD



ANDREW CLARK, DVM

collegiality in the profession.

- Make a career in equine practice more attractive.
- Provide an exit strategy for eventual retirement.

"Another big advantage," stresses Baskett, "is that, rather than all assets being

tied up in the practice built over years, a purchase by Avanti Equine Veterinary Partners provides an opportunity for wealth diversification." She adds that being part of the Avanti network gives her peace of mind about an exit strategy when that time comes.

Avanti Chief Executive Officer (CEO) Andy Clark, DVM, MBA, emphasizes the importance of a culture that focuses on practicing high-quality veterinary medicine coupled with collaborative teamwork. "We understand the value of mentorship in the veterinary profession. The network of practices is structured to provide opportunities to work with—and learn from—some of the best veterinarians. For example, Avanti is looking for practices that see internship and externship programs as an opportunity rather than a burden. This further helps to promote an intern into an associate hiring pool.

"Once a practice and its veterinarians are part of the Avanti network, an individual can find compatible situations in other practices and/or other geographical areas yet remain within the Avanti network. The idea is to foster collegiality, collaboration and profitability. This is an advantage if a veterinarian needs to relocate—as, for example, if a spouse is transferred."

Floyd explains how this

works: "Avanti helps recruit veterinarians by networking across the country to find open job opportunities or to place veterinarians who want to try different practices and geographical areas. A practice benefits by having additional veterinarians fill in during busier seasons."

THE AVANTI VISION

The Avanti vision is to form a national platform throughout the United States, and potentially into Canada, that helps grow the business side of equine practices. Eventually, collaboration between Avanti practices can enable research studies, benchmarking and sharing of case data. The profession needs more cohesion in these changing times. Clark is excited about the possibilities of an Avanti network contributing to the industry by elevating the quality of equine veterinary medicine on many levels.

It is also important to note that Avanti is building a long-term business. Johnson stresses that Avanti's equity partner is not an equity fund and, therefore, does not have shareholders who expect a short-term return on their investment. "Avanti veterinarians who have a strong interest in owning part of a veterinary business have the option to purchase an interest in the Avanti network."

WHERE DO SOLO PRACTITIONERS FIT IN?

Solo and larger private practices need each other—a solo practitioner needs a place to refer difficult, involved cases, and a referral center needs the solo practitioner's referrals. Cooperation works better than an adversarial relationship.

Baskett says, "Although the younger generation thrives on collaboration, many new graduates are striking out on their own. The future for solo practitioners is tenuous."

Clark notes, "There is no reason individuality cannot exist within a group setting, although solo practices can be difficult to sell because personal loyalty to the veterinarian exceeds brand loyalty to the practice. Solo practitioners can become spokes in the Avanti vision. A more valuable exit strategy relies on creating an association of solo- or two-doctor practices a few years prior to retirement; then the practice can be purchased based on the revenue of the new practice association.

"Collaboration between

small practices that share a common bookkeeper and office staff—and combine billing and inventory tasks—creates a more attractive prospect for Avanti to consider," says Clark.

THE BOTTOM LINE

"Equine veterinary practice is a service industry supported by our clients' discretionary income," Baskett emphasizes. "Clients have a choice of who to use. With an integrated network of high-quality care clinics, we are able to provide consistent service to our clients and their horses, in addition to improving gratification for the equine veterinarian's work."

Clark sums it up by saying, "A practice's efficiency and profitability continue to improve while its team of staff receives more opportunities to grow professionally. It is our mission for Avanti Equine Veterinary Partners to be the employer of choice, the equine veterinary service provider of choice, as well as the investment of choice; with these successfully accomplished, then together we grow."

If you believe you have a well-managed practice and would like more details about Avanti, contact Dr. Andy Clark at aclark@avantiequine.com or call 828-351-6433. For more information, visit Avanti's website at avantiequine.com.



ISTOCK/ALEXYDS

Should I Buy That New Piece of Equipment?

A thoughtful analysis is necessary so that you don't make a purchase that you later regret.

By Amy L. Grice, VMD, MBA

Horse owners, especially those who compete at high levels, are generally well-informed about newly available diagnostic tests and equipment. They expect their veterinarians to have access to these tools for their mounts. Technology can be quite expensive, and because it

changes rapidly, equipment often becomes outdated before its useful life has been expended. Practices in competitive marketplaces often feel compelled to be the first to have the latest developments in order to rise to the top with clients. Even in more rural areas, clients increasingly expect all veterinarians to offer digital radiography and ultrasound. These

expectations can be a financial challenge for some small or solo practices.

So how can you decide whether you should buy that new piece of equipment?

A thoughtful analysis is necessary so that you don't make a purchase that you later regret.

Along with the price of the equipment, you need to consider time and wages for



It is important to have an accurate forecast of the expected number of equipment uses before you decide to purchase a new machine.

staff training, the need for any additional staff, any needed consumable supplies, the need for space in your facility, equipment maintenance, software upgrades, and interest costs if the purchase is financed. There are also non-financial factors to think through, including what types of cases will benefit from the new technology, how you will educate clients and market your new service, whether all of your doctors will feel comfortable using the equipment, and how you will share it if multiple doctors want to use it.

Step 1: Analysis

An educated purchase decision is based on whether the equipment is logical for the practice, the patients that the practice serves, and is fiscally responsible. In order to make a good decision, you need to conduct a break-even analysis.

The first step is to determine your fixed costs. The fixed cost of a piece of equipment will not change based on the number of procedures you perform, but the more procedures you perform,

the more the fixed cost per procedure declines. Therefore, the goal is to have enough volume to lower the average fixed cost to an affordable number.

Second, the variable costs must be determined. Variable costs typically remain the same per procedure, but the total fluctuates in direct proportion to changes in volume. An example of a variable cost is a disposable supply used in a procedure, such as an extra corporeal shock wave probe, which has a certain number of shocks to deliver, after which it must be replaced. With a digital radiology unit, a technician typically is needed to hold the imaging plate for each image capture so the variable cost would be the technician's cost per minute times the average number of minutes per image. The more procedures you perform, the more variable costs you incur.

The total cost per procedure can be calculated by adding the fixed cost per procedure to the variable cost. As the number of procedures goes up, the total cost of a procedure will go down.

Step 2: How Many Uses

It's important to have an accurate forecast of the expected number of equipment uses. The vets who will perform the procedure with the equipment or utilizing the technology can generally provide an estimated volume that they expect to perform each month. This volume will often vary with the season. Because the number of times the equipment is used is critical for the financial solvency of the purchase, it is important to be conservative with the estimates.

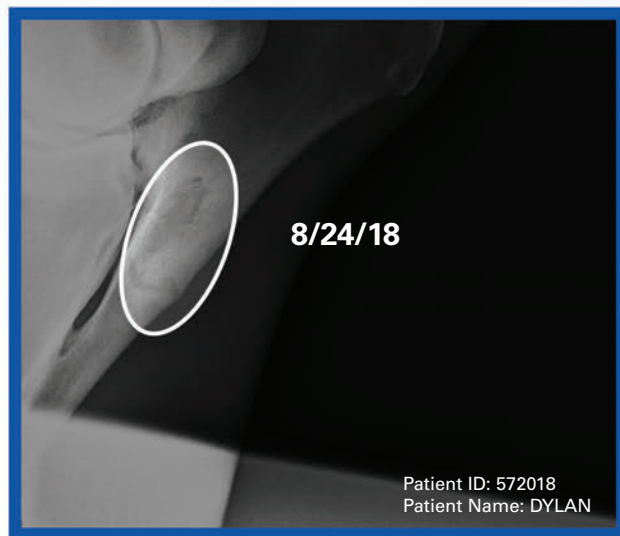
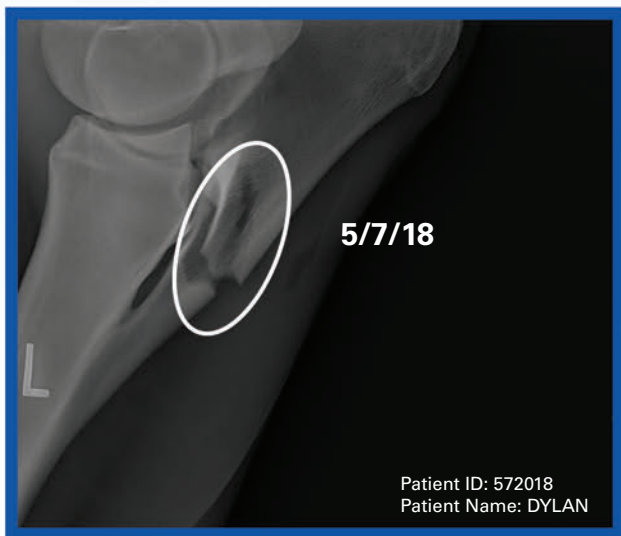
Sometimes when you have high-quality diagnostic equipment you gain the opportunity to perform additional ancillary services on patients as treatment for the condition diagnosed. Because of the convenience for the client, who might have already hauled her horse to the clinic where such services are available in order to get the diagnosis, it is very common for these treatment services to be requested of the diagnosing veterinarian. These additional revenues can increase the profitability of a purchase considerably. However, it is crucial not to make excessively optimistic forecasts, especially if you include expectations



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I have to say, going from the first day of injury wondering if I would have to put down my best friend to now trotting him in hand with no sign of lameness... Thank you, Doc's and OCD Pellets!

YOU SAVED MY HORSE DYLAN'S LIFE.”

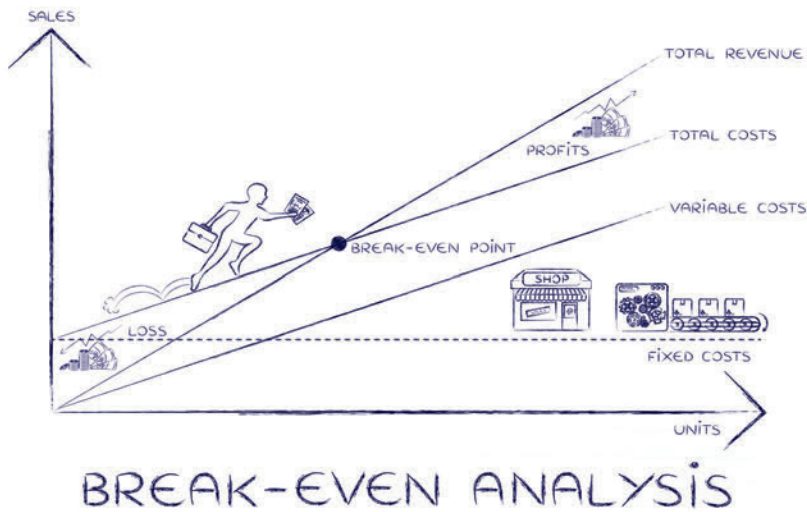
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*Testimonial and x-rays provided by client and printed with permission.



Take the time to determine the break-even point that will make your new purchase a good one for your practice.

that local veterinarians will refer their patients for diagnosis on your equipment. Because of the potential loss of ancillary service revenue, those referrals often do not materialize.

Dr. Angie Yates is a solo equine practitioner in the Midwest who concentrates her practice in sports medicine and lameness. She leased diagnostic equipment for her practice in 2017, hoping to help her clients as well as allow local practices to have access to this technology for diagnosing complex lameness, as it was not otherwise available for a significant distance.

While she utilized the equipment regularly for her own clients with great success, the volume of use proved to be insufficient to offset the cost. She found that, contrary to her prediction, her colleagues did not send many of their patients for scans.

Yates suggested that veterinarians should “be careful of the mindset of ‘build it and they will come.’ The most successful place for equipment of this nature is likely a referral practice that is already drawing cases from surrounding practices. Before signing a contract, it is prudent to have an attorney review it and to be sure you have enough cases within your own practice to break even on your new diagnostic tool.”

Step 3: Cost Per Use

It can be very helpful to investigate the cost per use (CPU) with different volumes of use to determine your break-even point. This will tell you the necessary number of uses each month to avoid the need to use existing profit to pay for your purchase. A new piece of equipment should be a new source of profit, not cannibalize existing earnings.

When determining these figures, remember to include any costs for a maintenance contract, marketing, and technician time for set-up, acquisition of images, archiving of results and pack-up.

These calculations will help you decide what price you will charge for each use of the new equipment. (See Table 1.)

In Table 1, the newly purchased digital radiology unit will cost \$50,000 and will be financed at 6% over 60 months, with a monthly payment of \$967. This practice utilizes a technician to set up the equipment, hold the plate, pack up the equipment and archive the images. She is paid \$15/hour and the other expenses for her benefits, payroll taxes, Workman’s compensation insurance, etc., bringing her hourly expense to the practice to a total of \$30/hour, or \$0.50/minute. She is quite efficient at her job, so her practice has estimated her time needed per image at 2 minutes (\$0.50 x 2 = \$1) per view. The practice purchased a service contract for the new machine that has an annual cost of \$3,600, or \$300/month. They decided to try a ballpark price of \$50/view to see how many views they needed to take for the equipment to break even and begin generating a profit.

The price for each use minus the variable expense per use when divided into the total fixed cost will give you the break-even point of how many uses of the equipment are required in the loan amortization period.

In this case, the fee of \$50 minus \$1 per view for the technician is \$49. Adding the loan payment of \$967 for

Table 1. Cost Per Use of Digital X-Ray

Ex: Digital X-ray – Monthly Use	10 views	20 views	40 views	60 views	80 views	100 views
CPU= [P+T(#of views)+S]/# views Payment (P): \$967.00 for 60 months (\$50,000 purchase price @ 6% interest)	CPU: \$127.70	CPU: \$64.35	CPU: \$32.67	CPU: \$22.12	CPU: \$16.84	CPU: \$13.67
Equine price per view = \$50 x views = Revenue (R)	R: \$500	R: \$1,000	R: \$2,000	R: \$3,000	R: \$4,000	R: \$5,000
Technician cost (T) per view (set-up, hold plate, clean up, archive) 2 minutes @ \$0.50/minute = \$1 per view	T: \$10	T: \$20	T: \$40	T: \$60	T: \$80	T: \$100
Service contract (S) \$3,600/year = \$300/month	S: \$300	S: \$300	S: \$300	S: \$300	S: \$300	S: \$300
Profit = R-T-S-P	(-\$777)	(-\$287)	\$693	\$1,673	\$2,653	\$3,633

60 months and the \$3,600 per year maintenance contract cost for five years is \$76,020. When divided by \$49 the calculation states that a total of 1,551 views are needed in 60 months to break even. Dividing by the 60 months yields 25.85 uses per month to break even.

One can also do this calculation on a per-month basis. The price for each use minus the variable expense per use when divided into the fixed cost per month will give you the break-even point of how many uses of the equipment are required per month.

In this case the fee of \$50 minus \$1 per view for the technician is \$49. Adding the loan payment of \$967 and the \$300 per month maintenance contract cost is \$1,267. Dividing \$1,267 by \$49 yields 25.85 uses per month to break even.

If you divide the total number of uses you calculated as needed to pay off the total fixed expense by the average number of procedures you expect to perform each month, this will provide you with the number of months it will take to break even on the equipment purchase. So, in the case of the digital radiology unit, you need a total of 1,551 views taken with the DR. If you believe you'll take 200 views per month during the busy half of the year, and half that many during the slow part of the year, your average monthly use would be 150. 1,551 views divided by 150 is 10.34 months.

Step 4: Determining Fees

You can determine the appropriateness of your fee for a new service by estimating the number of minutes of professional time required to perform the service and the expenses entailed in offering it.

The formula for determining the overhead cost per doctor hour is:

$$\frac{\text{(Annual Income statement expenses - doctor compensation - billable consumables)}}{\text{Number of annual available doctor hours}} = \text{Overhead cost per doctor hour.}$$


Calculation of the appropriate price per hour for services is:

$$\frac{\text{Overhead cost per doctor hour}}{\text{(1-desired profit \% - doctor compensation commission \% - discounts/accounts$$

receivable losses \%)} = \text{service price per hour.}

It is also often good to know a "ballpark" of what others' fees are for this service in order to stay reasonably competitive. You might wish to employ a "mystery shopper" to gather this information. It is unlawful to collude with other veterinarians to set prices.

Take-Home Message

In conclusion, the more you utilize your assets to produce revenue, the quicker you can retire the associated purchase price and the sooner that equipment will be profitable. Be certain to capture all charges when your equipment is used. Beware of buying technology that will have expenses that you cannot offset with revenue because this will erode your overall practice profit. The time taken for a careful analysis of the break-even point will help you make the best decisions about purchases. 



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Clinic Construction Materials from Floor to Ceiling

An equine clinic is expensive because of the size and nature of your patients, but there are ways to be more economical in your construction.

By Heather E. Lewis, AIA, NCARB

Equine veterinary facilities are used harder than most buildings. They must withstand heavy cleaning, and they must be strong enough to hold up to horses. If you're considering building your own haul-in clinic or hospital, you will want to know how to select durable materials that can withstand the daily use and abuse intrinsic to these buildings. Unfortunately, durable materials are also very expensive, and

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Equine hospitals and clinics must use the most durable and affordable materials possible.

equine veterinarians must design affordable buildings that can be paid for over a reasonable length of time.

As architects specializing in this work, we understand the opposing necessity to select both durable and affordable materials. The best approach is to tailor the specific materials to the specific use of a single space, which means that a clinic might require multiple construction types and materials to find the best balance of cost and performance.



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Flooring designed especially for horses can be very expensive. There are alternative floorings that can work for your facility.

Start with the Floor

Equine hospitals should almost without exception be constructed as a slab on grade, which means concrete resting on compacted soils or structural fill. There are a few places in the country, such as portions of the Dallas metropolitan area, where the soil is so expansive that it will not support a slab on grade. To determine whether you have any special requirements, you should have a geotechnical report (a soils report, colloquially) produced for the site where you intend to build.

In constructing a concrete slab, there are a few special requirements for equine veterinary clinics that you should be aware of. The first is that the slab should have a high-quality vapor barrier underneath. The purpose of this barrier is to prevent moisture from coming up from the soil below. This barrier is important because most clinics use seamless floors (rubber or polyurethane floors, for example), and these are very sensitive to under-slab moisture. The best vapor barrier is Class A, virgin polyolefin plastic, at least 15 mil in thickness. The traditional polyethylene barrier that your contractor will be more

familiar with is known to degrade over time and can contribute to floor failures.

After the barrier, consider also the thickness of the slab. Many equine facilities have vehicular traffic through the treatment room. The slab might need to be thicker than a typical four inches to stand up to this type of load. To save money, you can use standard four-inch slabs in non-equine/vehicular areas and thicker slabs (six inches, for example) in equine areas.

Below is a summary of the most common options for veterinary construction flooring, emphasizing low cost and high durability.

Sealed Concrete in Human Areas: It is fine to use exposed, sealed concrete slabs for human-only spaces such as storage rooms, laundry rooms, central supply rooms and even in offices. Concrete is the least expensive solution because it only requires a good sealer, which can cost as little as \$2-\$3 per square foot.

Many people now are accustomed to the “industrial look” and accept the aesthetics of concrete. In areas where horses are not treading, concrete can be finished with a trowel, which yields a hard, smooth finish. If you intend to

expose concrete slabs, it is best to have control joints installed to help prevent cracking. These are intentional saw cuts in the slab that allow the concrete to shrink without excessive cracking, although small, random cracks are generally inevitable.

Sealed Concrete in Equine Areas:

Some sealed concrete is okay in equine areas, such as in dry walking paths. If the floor is going to be wet, consider using another floor finish, as concrete gets slippery when it is wet, especially when it is covered with cleaning agents. When you are using concrete in areas where horses will walk, use a light broom finish for some texture and slip resistance.

Rubber Mats: Rubber mats can be installed over concrete to provide an affordable and slip-resistant finish where you need it. This is typical in medical stalls or under a set of stocks. Mats can be installed selectively in certain areas, while leaving the sealed concrete in other areas to reduce costs.

Equine Flooring: These are specialized floors that are extremely expensive and a nuisance to install. Because of their expense, many people use them sparingly. If you choose to have a specialized floor installed, understand the cost of the floor is typically well over \$20 per square foot. Obtain a list of references from the manufacturer and check them.

Flooring Upgrades for Human Areas:

If you want to use something that looks dressier than bare concrete in the human areas (such as lobbies, offices and the lab), many of our clients are very happy with luxury vinyl tile products. This name is somewhat confusing, as most often this product is sold as a plank shape in a wood look. When installed, this product looks almost exactly like wood, but it is more durable and easier to clean. Choose commercial-quality products and not residential products to get the best performance and lifespan. This product is a lot less expensive than tile or commercial-grade sheet vinyl and performs well for the human areas of an equine clinic.



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There are many ways to dress up the human areas of an equine hospital or clinic, from floors to decor to natural lighting.

How Are Your Walls Constructed?

For areas that do not have “hose-down” requirements and do not have to hold horses, typical framed walls are acceptable. For example, you can use framed walls for office areas, storage rooms, utility rooms, etc. For rooms that have hose-down requirements or have to hold horses, concrete block is the most practical material. This material, known as CMU (concrete masonry units) in the construction industry, is ubiquitous and durable. However, there are two requirements to keep in mind:

- Use medium-weight block, as light-weight block is too porous and is not as structurally capable.
- Fully grout the walls in any areas where the horses might lean or fall against the walls, such as in an induction stall. This surprises many structural engineers and contractors if they do not have experience with horses. Horses are incredibly heavy and strong, and without full grouting, even a concrete block wall cannot withstand the forces that a horse can exert.

Painting Concrete Block: If you use concrete block in treatment, medication stalls or in a room (such as your

surgery) where it will be washed, then it is best to paint it to at least seven feet in height to create a sanitary surface.

CMU can be left bare and sealed with an inexpensive penetrating sealer above the cleaning height for cost savings.

Paint on CMU is difficult because the material is porous. If done improperly, it will peel and cause maintenance problems. Our favorite high-performance coating is a cement-based block filler to fill the pin holes in the block, then use two coats of an industrial polysiloxane coating to finish. This coating has nasty odors on installation, but it lasts for many years.

Lower-Cost Options: If you are planning a haul-in clinic with no knock-down requirements and no severe wash-down requirements other than at the stocks, then it is likely okay to frame all of your walls and eliminate CMU to save money. Keep in mind, though, that no framed wall is very waterproof, so keep the heavy, hose-down cleaning away from the walls. Semi-water-resistant materials include exterior-grade plywood with a urethane finish, which creates a nice, warm look, and FRP (or fiberglass-reinforced plastic), which is the pebble-texture wall material you

might recognize from an interstate restroom. FRP is not very attractive, but it is durable.

Prefabricated Buildings: In inexpensively constructed clinics, you might wish to use a prefabricated metal building or pole barn. (We prefer the former because it is more durable.) In this case, your interior walls are likely to be constructed of metal sheeting. This works for a practical, cleanable finish, but it is not hoseproof, nor is it durable enough to withstand direct contact from horses.

If you use a prefabricated building, construct concrete block enclosures for the heavy abuse areas—such as induction stalls—instead of relying on the exterior walls.

Prefabricated buildings are best used in milder climates. They tend to degrade more quickly in very moist climates, and they tend to have condensation issues in very cold climates.

Ceilings

Ceilings vary based on the use of each space to balance durability and cost. For human spaces, lay-in ceilings (aka ceiling tiles) are the least expensive. Equine or wet areas usually have either smooth, painted drywall ceilings (less expensive) or coated wood ceilings (more expensive but more attractive). You also might want to consider something a little nicer for your client lobby to create a welcoming impression.

Keep in mind that hard ceilings (drywall and wood) have zero ability to absorb any noise. If this is a concern, acoustical panels placed on the walls can help. These can be placed after the fact if you need to save money now.

Take-Home Message

Building an equine clinic is expensive because of the size and nature of your patients. If you limit the heavy-duty materials to where horses are treated and housed, then the other areas of the building can be built like an inexpensive office space. With this understanding, an equine practice can be constructed durably and economically. **EM**



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EquiMGT Winter 2019



ISTOCK

Leaky Gut Syndrome

Leaky gut syndrome is caused by anything that disrupts the intestinal lining and leads to passage of substances and microorganisms across the intestinal barrier.

By Nancy S. Loving, DVM

Gastrointestinal disease in the horse takes many forms, ranging from inappetence to diarrhea to colic to colitis or enteritis. It is sometimes difficult to discern whether the intestinal illness

was precipitated by other internal events (hormonal, inflammatory, infectious, pharmaceutical) or if a primary intestinal illness elicited secondary systemic inflammation.

The bottom line is that any condition that disrupts the intestinal lining leads

to passage of substances and microorganisms across the intestinal barrier. A single layer of barrier cells, enterocytes, lines the equine intestinal tract to prevent undesirable substances—food antigens, bile, hydrolytic enzymes, pathogens and endotoxin—from accessing



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The horse's microbiome is affected by abrupt dietary changes, excessive carbohydrate ingestion, systemic antimicrobial administration and colic.

the bloodstream. In a healthy horse, the intestinal lining is renewed within a few days to a week's time through proliferation of enterocytes.

Connecting each enterocyte is a tight junction, which is a protein complex that forms selective permeable seals to regulate passage of substances from the intestine into the bloodstream. Disruption of tight junctions leads to development of leaky gut syndrome.

Causes of Intestinal Permeability

The intestinal tract contributes as much as 70% to the body's immune system. Normal secretions by the immune system of pro-inflammatory cytokines—such as interleukin (IL) and tumor necrosis factor (TNF α)—provide a helpful

physiological response to help the gut recover from infection or injury. When this response is overwhelmed, such as occurs with a compromised intestinal barrier, excessive inflammation releases substances into the circulation that act systemically on other tissues throughout the body. While the inflammatory response might start in one tissue, other body tissues are affected.

Enterocytes are especially sensitive to small changes from stress, colic, disease, medications and diet. The microbiome is affected by abrupt dietary changes, excessive carbohydrate ingestion, systemic antimicrobial administration and colic. The intestinal and immune system responses to these situations play a critical role in the development of systemic inflammation.

Hunger—caused by restricted feeding protocols, such as only being fed two meals a day—is a psychological stress that increases cortisol, which is damaging to intestinal epithelium and can cause leaky gut syndrome. Free-choice access to forage can mitigate this psychological stress.

However, for horses suffering from obesity and/or equine metabolic syndrome, it might not be possible to feed *ad lib*.

Horses with varying body condition scores, even those not suffering from obesity, can develop leaky gut syndrome. Consumption of high-starch feeds results in acidosis and opening of tight intestinal junctions. Lipopolysaccharide (endotoxin) from bacterial death in the face of acidosis then can migrate from the intestines to the bloodstream. This signals the immune system to increase production of cytokines to mount an

immune defense that is accompanied by inflammation.

Obese horses are particularly at risk because they start with higher levels of systemic inflammation that is exacerbated by hormonal reactions to consumption of high-starch feed.

Strenuous or intense exercise shunts blood away from the intestinal tract to privileged organs, such as the brain and kidneys. Reduced intestinal blood flow reduces oxygen to the intestinal lining, resulting in enterocyte cell injury and loss of tight junctions. Reperfusion of ischemic tissue increases reactive oxygen species that further injure intestinal barrier function.

Constriction of the circulation of visceral organs is a normal physiologic response to heat stress. This response helps to expand blood flow to the skin and muscles to dissipate internal heat. High internal temperature along with reduced gastrointestinal blood flow creates tissue hypoxia, acidosis, ATP depletion and oxidative stress. These conditions disrupt the intestinal barrier and tight junctions. Gastrointestinal permeability also increases in the face of dehydration due to reduced intestinal blood flow.

Intestinal pathogens or mycotoxins that bind to intestinal cell surfaces have the potential to adversely alter the integrity of tight junctions. Similarly, inflammatory bowel disease and/or an abnormal balance of gastrointestinal immune cells can result in leaky gut syndrome.

Medications, such as long-term NSAID administration, can produce deleterious effects on mucosal barrier function of the intestinal lining while also altering intestinal motility. NSAIDs, especially those that interfere with both COX-1 and COX-2 pathways, are recognized for their risk in causing gastric and colonic ulcer disease. Inhibition of beneficial prostaglandins in the bowel leads to decreased mucus secretion that normally protects the intestinal lining.

NSAID administration coupled with



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Medications, such as long-term NSAID administration, can cause deleterious effects on mucosal barrier function.

exercise further amplifies gastrointestinal permeability.

While the proton pump inhibitor omeprazole is used to counteract gastric

ulcer disease, some recent human and animal studies indicate that proton pump inhibitors might, in fact, potentiate NSAID-induced lower intestinal tract damage due to significant shifts in intestinal microbial populations that lead to leaky gut syndrome [Gwee, K.A.; Goh, V.; Lima, G.; and Setia, S. Co-prescribing proton-pump inhibitors with non-steroidal anti-inflammatory drugs: risks versus benefits. *Journal of Pain Research* 2018; pp. 361-374].

Early life stresses such as weaning, early separation and nutritional deficiencies are correlated with a likelihood of intestinal inflammation in later life, as demonstrated in studies in pigs, mice and humans. Intestinal inflammation can lead to leaky gut syndrome. This phenomenon has the potential to impact horses, as well, but studies are needed for confirmation.

Aging might have additional effects on intestinal integrity. Cellular changes to DNA that occur as a general response to aging are associated with the potential for tissue to injure more quickly and heal less easily.

Older horses—in the process of “inflammaging”—are known to have higher circulating concentrations of cytokines, namely IL-6 and TNF α . Obesity is especially associated with high levels of cytokines due to their secretion by adipocytes.

Inflammatory Effects

Passage of bacteria and/or inflammatory mediators from the gut to the bloodstream sets up the right condition for systemic inflammation. Mild inflammation is often helpful to healing, but excessive inflammation creates a vicious cycle of cytokine release that results in whole-body inflammation.

Research has yielded findings that leaky gut leads to notable other manifestations of systemic inflammation, particularly in other epithelial tissues: a) skin allergies, including pruritus and hives; b) laminitis; c) brain inflammation from cytokines that signal the brain to induce sickness behavior

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Have questions? Contact Michelle Adaway at madaway@aimmedia.com

(fever, inappetence and lethargy).

The intestinal tract creates more neurotransmitters than the brain. Receptors for TNF α and interleukins are present in brain blood vessels. Mild concentrations of cytokines from low-level, chronic inflammation aren't likely to elicit signs of sickness. However, if a sufficient amount of cytokines are released from the intestinal lumen into the bloodstream, they activate production of cyclooxygenase (COX), which in turn produces prostaglandin E2 to initiate sickness behaviors.

In addition, breach of the blood-brain barrier by inflammatory mediators passing from the intestinal tract to the systemic circulation to the brain might alter behavioral responses to stimuli. A normally calm horse might become hyper-reactive to touch, loud sounds or movements.

Villi of the small intestines respond to injury by contracting their finger-like projections, which reduces surface

area for absorption. In some ways, this creates a protective response while helping with recovery of the epithelial barrier, referred to as restitution. Less surface area limits the amount of toxins and bacteria transferred from the bowel lumen to the bloodstream.

The remaining cells elongate and stretch to cover the basement membrane, further disrupting passage of unwanted substances across the basement membrane. While this is a protective strategy for the horse, the intestines then aren't as efficient in absorption of water and nutrients. This can lead to bouts of diarrhea and/or weight loss, even in the face of ample groceries. To fully heal the intestinal epithelium, stem cells need to regenerate and produce new epithelial cells to replace damaged, dysfunctional villi.

Supplements for Protection and Healing of Enterocytes

A high-fiber diet—aka “Dr. Green”—is

often touted as an excellent panacea for many intestinal and behavioral ills in horses. A fiber-rich diet, especially containing green grass, amplifies native production of butyrate by intestinal bacteria during fermentation.

Butyric acid (butyrate, a short chain fatty acid) is important to enterocyte health for its use by intestinal epithelial cells as an energy source.

Additionally, butyrate markedly increases epithelial cell proliferation and differentiation and improves colonic barrier function. It is also known to down-regulate bacterial virulence. Research is currently being conducted on how butyric acid supplementation can help to maintain the integrity of tight junctions in the face of stress on intestinal epithelial cells.

Other nutritional components are important for intestinal epithelial energy support and repair, including amino acids such as glutamine, arginine, threonine and lysine.

Zinc also is beneficial to intestinal healing, yet no defined studies have yielded concrete information about its role for horses.

Selenium and vitamin E might have potential benefit, but studies still need to be pursued.

Take-Home Message

Protection of the microbiome is an important part of guarding against changes in gastrointestinal permeability. Prebiotics and probiotics might have a role in nutritional support of the microbiome.

However, there are concerns that manufacturers of probiotics list label ingredients that might not actually be included as specified in the supplement.

Without FDA oversight on product quality and integrity of probiotics, there is no guarantee that probiotics will perform as promised.

If you choose to use prebiotics and probiotics, go with a research-based company with a good reputation for equine products. **EM**



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Tidbits from Other Talks

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Here are some tidbits and take-home messages from other presenters at the AAEP Focus Sport Horse meeting.

By Kimberly S. Brown

It is unfortunate that everyone reading this article couldn't have attended this Focus meeting. While we have provided—with the support of SoftRide—some key points from this conference, there was much more of interest to equine veterinarians. Following are a few tidbits and take-homes from other talks.

Katie Seabaugh, DVM, DACVS, DACVSMR, of CSU, spoke on “**Manag-**

ing Horses under USEF and FEI Rules.” Her takeaway was: “A final recommendation regarding the management of performance horses is to know the current rules and DOCUMENT, DOCUMENT, DOCUMENT. In the unfortunate case that a horse tests positive for a banned or prohibited substance, it will be critical to have complete medical records.”

Erin K. Contino, MS, DVM, DACVSMR, of CSU, spoke on “**Going**

the Extra Mile: Working up Cases of Poor Performance.” Her summary was that “while many overt lamenesses can be accurately diagnosed with a thorough musculoskeletal and lameness examination, diagnostic analgesia and diagnostic imaging, in cases of behavioral issues and/or poor performance, traditional diagnostics may be insufficient.

“In such cases, it is encouraged to evaluate the horse under saddle, to

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attempt diagnostic analgesia even in the absence of overt lameness, and to evaluate the horse, rider and tack under as many circumstances as possible. Additional diagnostic tools that can be considered, as guided by the clinical examination, include imaging of the skull and axial skeleton, nuclear scintigraphy, dynamic endoscopy, gastroscopy and trial treatment with systemic medications. These cases can be time consuming and financially draining—yet equally rewarding, if a diagnosis is reached.”

Kurt Selberg, MS, DVM, MS, DACVR, of CSU, discussed **“Imaging of the Foot.”** In summary of his talk he said, “Using a combination of imaging diagnostics and examination approaches can help identify clinically relevant injuries to the foot. Identifying these lesions help formulate a treatment strategy and formulate a prognosis for the horses intended purpose. However, when using first line diagnostic imaging such as radiography and ultrasound, it is important to understand the limitations and interpretation pitfalls in diagnosing injuries in the digit.”

Selberg also presented on **“Imaging of the Neck and Back.”** In conclusion, he said that “multiple types of pathologic changes affect the axial skeleton. Using well-positioned radiographs and detailed ultrasound exams can help localize areas of injury and help guide therapy.”

Myra F. Barrett DVM, MS, DACVR, of the CSU Department of Environmental and Radiological Health Sciences, spoke on **“Multimodality Imaging of the Equine Distal Limb: Beyond the Foot.”** The summary of her talk was that “in order for imaging to be a useful diagnostic modality, studies must be acquired and evaluated as a piece of the clinical picture, taking into account patient presentation, physical and lameness exam and blocking pattern. Often, more than

one modality or approach is required for a complete analysis. The range of area imaged should be generous in order to avoid missing significant lesions.”

Barrett also spoke on **“Diagnostic Imaging of the Equine Stifle.”** Her conclusion was that “diagnosis of stifle injury may represent a significant challenge to the equine clinician. However, a stepwise approach to the equine stifle aids in the visualization of areas where pathologic change commonly occurs and may be seen with ultrasound and radiographs. Appropriate knowledge of anatomy and common areas of pathologic change are needed to get the most out of your diagnostic imaging.”

In addition, Barrett presented on **“Imaging of the Tarsus and Proximal Metatarsus.”** Her conclusion was that “limitations of diagnostic analgesia for lesion localization in the tarsus and proximal metatarsus require a comprehensive approach to evaluating this area. Integrating a thorough physical examination and lameness evaluation, diagnostic analgesia and imaging is important. Often multiple imaging modalities must be utilized for the most complete diagnostic assessment.”

Colton McInturff, DVM, presented a paper titled **“Equine Joint Therapies: Traditional, Biologic, and Systemic”** that he and David D. Frisbie DVM, PhD, DACVS, DACVSMR, created from research done at CSU. Some of the tidbits from this presentation were:

- Autologous bone-marrow derived, culture-expanded MSCs are used most commonly in IA equine orthopedic research;
- The level of evidence supporting use of biologic therapies in the horse is currently greater for that of autologous conditioned serum (ACS) versus platelet-rich plasma (PRP);
- A 2011 survey of equine practitioners revealed that the majority of individuals (84.1%) using PSGAG administer it intramuscularly (IM). However, when comparing IA versus IM administration, it was concluded that greater

potency was achieved via the IA route; • HA has been shown to moderately decrease OA associated pain in humans and is not refuted by work conducted in equine models. There are reports of beneficial effects from intra-articular administration of combined HA and TA, and a guideline for use based on the literature is 20 to 22 mg of a mid-molecular weight HA with 3 to 5 mg of triamcinolone acetonide in a 10 to 15 mL joint as a single injection. Evidence for beneficial effects of IA HA alone does exist (2 serial injections 1 week apart), and intravenous administration of HA for prophylaxis may be advantageous.

Melinda R. Story, DVM, DACVS, DACVSMR, cVMA, cVCA, presented on **“Treating the Axial Skeleton.”** Her conclusion was that “the axial skeleton is a complex and important consideration when evaluating a sporthorse for any decline in performance and changed behavior. The history, myofascial exam, lameness and neurologic exams are all important to include in the work-up. There are multiple approaches to treating these cases, and many times a multimodal approach is the most effective.”

Jackman presented a **“Review of Suspensory Ligament Injury Treatment.”** In his conclusion, he noted that “Suspensory desmitis is a common injury and historically the reinjury rates have been disappointing, especially in the hind limb.

A controlled rehabilitation program with serial clinical and ultrasound examinations is necessary, but additional therapies are usually needed to promote better healing.

“Extracorporeal shockwave and local injection of regenerative therapies have improved healing and increased long-term prognosis. Several surgical procedures have been described and may be indicated in more severe cases. Currently, there is not a good experimental model for equine suspensory desmitis, making direct comparisons of medical and surgical techniques difficult.” **EM**

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Profile: Doc's Products Inc. uses breakthrough formulas that maintain, protect and restore bone and joints with OCD Pellets™ by supplying pharmaceutical-quality ingredients that encourage new cartilage growth and joint lubrication while providing relief from inflammation. Build stronger bone and healthier joints with OCD Pellets™. Visit AAEP booth #929 for more information.

Equine Diagnostic Solutions LLC

Equinediagnosticsolutions.com • 859-288-5255 • jmorrow@edslabky.com

Profile: EDS is a premier equine specialty testing laboratory with extensive experience servicing equine veterinarians worldwide. Our primary focus is molecular and serologic testing for medically and economically significant infectious diseases, including EPM, strangles, equine herpesviruses types 1 & 4,

foal pneumonia, EPE, equine influenza, and foal and adult diarrhea. Our commitment to excellence in testing and customer service is unsurpassed. Booth #926

Hallmarq Veterinary Imaging

hallmarq.net • 262-498-9038 • dan.brown@hallmarq.net

Products: Equine standing MRI
Profile: Hallmarq Veterinary Imaging is a global leader in innovative diagnostic imaging, providing safe, accurate and affordable solutions for veterinarians worldwide. With a passion for animal health, we've partnered with customers since 2000 to image over 100,000 animals in 24 countries, increasing access to MRI for small animal and equine practices. Booth #702/704

Kent Nutrition Group

Kentnutritiongroup.com • kentfeeds.com • blueseal.com • 866-647-1212
service@kentww.com

Products: Sentinel® Horse Feeds, Dynasty® Horse Feeds, Inspire Horse Feeds, Omegatin, Rounders® Horse Treats, Hay Stretcher, Dynasty Forage, ecube

Profile: An unspoken bond of trust, confidence and strength exists between horse and rider. We understand this connection and strive to nourish horses in the most progressive ways. Our product lines offer a full range of energy levels for improved overall health and peak performance—no matter what your goal. Booth #439/441

Kentucky Performance Products LLC

www.KPPvet.com • 859-873-2269

Products: OTC line: Neigh-Lox®, Elevate®, Equi_Jewel®, EndurExtra®, Summer Games® Electrolyte, Joint Armor™, Contribute™, Micro-Phase™, and Ker-A-Form™. Vet-only line: BoneWise™, Elec-

trolyteWise™, ProbioticWise™, Weight-GainWise™, Elevate® W.S. and Elevate® Concentrate, Insulin-Wise™

Profile: Kentucky Performance Products (KPP), maker of BoneWise, Elevate and Neigh-Lox, has a complete line of affordable, high-quality supplements. Highlighting in 2019: Wiser Concepts' InsulinWise. It's research-proven to decrease insulin resistance in EMS and PPID horses. Available through all major veterinary distributors. Stop by our booth to learn more, or visit KPPvet.com. AAEP booths #1333/1335

Merck Animal Health

Profile: Merck Animal Health works for you—and for horses. Backed by more than 70 years of innovation, the equine portfolio is known for its quality and safety, featuring the Prestige® line of vaccines with updated influenza strains, and trusted pharmaceuticals like Panacur® (fenbendazole), Banamine® (flunixin meglumine), Regu-Mate® (altrenogest) and Protazil® (1.56% diclazuril) antiprotozoal pellets. To learn more, visit www.merck-animal-health-equine.com. Booth #1233

Nutramax Laboratories Veterinary Sciences Inc.

NutramaxLabs.com • 803-289-6000
contactus@nutramaxlabs.com

Products: Cosequin®, Provable-EQ®, Welactin® Equine
Profile: Nutramax Laboratories Veterinary Sciences, Inc., an industry leader since 1992, researches, develops, and markets products that improves the quality of life for animals. Cosequin® Joint Health Supplements for Horses is the #1 veterinarian recommended oral joint health supplement brand and is scientifically researched to help maintain healthy joints. Booth #1123



Therapeutic Riding Can Help Veterans with PTSD

About eight out of every 100 military veterans have post-traumatic stress disorder (PTSD), according to the U.S. Department of Veterans Affairs. With more than 18.2 million U.S. veterans in 2018, that means that more than 1.4 million U.S. current or former military personnel are affected by PTSD. A study funded by the Horses and Humans Research Foundation has proven that horses can help.

Beth A. Lanning, PhD, MCHES, of Baylor University, in 2017 published a peer-reviewed study supported by the Horses and Humans Research Foundation. That study had 51 veterans and active duty service members participate in an eight-week therapeutic riding program.

The study findings revealed clinically significant decreases in PTSD symptoms, improved social functioning, vitality, less interference from emotions in daily activities and increased participation in daily life. The study also reported improved confidence, trust, acceptance of self and others, and gratitude.

Overall, the findings of this study support the beneficial effects of therapeutic horseback riding for veterans with PTSD. The participants also cited the importance of the barn environment and the unique relationship with the horse as key components that contributed to their improved quality of life and functioning.

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www.platinumperformance.com

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Amy@PlatinumPerformance.com

Profile: Platinum Performance® strives to provide a custom nutritional solution for each patient. The first step is choosing from the three wellness formulas: Platinum Performance Equine®, Platinum Performance CJ® or Platinum Performance GI®, all of which are eligible for Platinum Colic Coverage. Platinum Performance® offers a full line of advanced support formulas for targeted needs that are formulated to be administered with any of the wellness formulas.

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www.smartpak.com • 800-461-8898

kdunne@smartpak.com

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Products: SmartPaks, SmartDigest Ultra, ColiCare

Profile: ColiCare™ is now even better with a new reimbursement amount of up to \$10,000. Find out how SmartPak, a Covetrus company, and ColiCare, the #1 Veterinarian-Recommended Colic Surgery Reimbursement Program, can add even more value to your practice's

existing wellness services. Visit the SmartPak booth #1045 for details.

Standlee Premium Western Forage®

Standleeforage.com • 208-825-5117

Products: Forage and forage-based products

Profile: Standlee Premium Western Forage® provides a large variety of forage in a wide range of product formats, including pellets, cubes, chopped and bales. Quality is evident in our products and the way we do business. After all, our family name is on every package! Come visit us at AAEP booth #336.

VetRay Technology by Sedecal

www.vetray.com • 847-394-6960

eshelley@sedecalusa.com

Products: X-ray and Digital X-ray

Profile: Sedecal manufacturer of Veterinary specific X-ray products, has grown to be the world's largest veterinary provider of over 20 different Digital and Analog configurations for small and large animal applications. Sedecal specializes in products for companion animal, equine, zoo animals and universities across the world. Booth #1639

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