

HORSE HEALTH LINES



WESTERN COLLEGE OF VETERINARY MEDICINE

SPRING 2022



Unravelling the umbilical cord

Does cord's length and twists affect foal health? By Myrna MacDonald

Western College of Veterinary Medicine (WCVM) researchers have added a couple of new twists to research focusing on the link between equine umbilical cords and foal health.

Dr. Madison Ricard, a veterinary anatomic pathology resident, and her supervisor, Dr. Bruce Wobeser, are investigating whether excessively long umbilical cords or cords with more twists than usual affect the health outcomes of foals.

Previous studies have investigated the link between umbilical cord length and equine abortions, but this study is the first of its kind: "As far as we can tell, nobody has looked at that situation before on live foals. It's always been on aborted foals," says Wobeser.

The researchers are also relying on social media to find participants and online surveys and cell phone images to

gather information. Ricard, who develops websites and has an interest in social media, has been sharing the study's details through horse breeding groups online.

"It is outside the norm," says Wobeser. "But really, social media data collection is just survey data. We're surveying a different group of people with different tools. It's absolutely worth trying."

The WCVM researchers are encouraging owners to enrol their pregnant mares in the study, which includes a few steps outlined on their website (wcvm-eq.us.ca). Immediately after foaling, the owner takes a photo of the umbilical cord and measures its length. Next, the owner records information about the mare, the foaling process, and the foal's health at birth. These details can be submitted online or by using a printable, stall-side form. The owner also fills out surveys

about the foal's health — one at seven days and another at 30 days after birth.

"If there's anything unusual about the foal's health, that's what we want to capture," says Ricard, who plans to sort information into categories such as infectious versus non-infectious conditions and congenital issues versus bacterial or viral infections.

"From there, we can do our statistics, home in on those categories, and then see the outcomes we find."

Normally, equine umbilical cords measure 50 to 60 centimetres (20 to 24 inches) long and have four or five twists along its length. But excessively long or twisted cords can restrict blood supply to the fetus and cause significant health issues — often leading to death.

In an earlier study, Ricard and Wobeser reported that Canada has a higher rate of



📷 Myrna MacDonald

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Unravelling the umbilical cord (continued)

non-infectious fetal placental causes — including excessively long umbilical cords or torsions. Those results are similar to a study targeting horses in the United Kingdom.

Human medical researchers have also found that too much twisting or excessively long umbilical cords can affect babies' Apgar scores — the scoring system

used to assess newborns' well-being. Scientists have found links between these abnormal umbilical cords and issues such as still births, pulmonary hypertension and neurologic function deficits in babies.


"Although it's human medicine, it suggests that there's the potential for something to be there when it comes to umbilical cord morphology (form and

structure) in these foals," says Ricard.

With the foaling data, Ricard hopes to identify common patterns in the cords' traits. For each submission, she will also calculate an "umbilical cord index" — the number of twists in the cord divided by the cord's length. Ricard will then compare those index numbers to established reference values.

"Once it's all done, we're going to take all of this information that we've gathered about umbilical cords and see if we can find any connections between the umbilical cord data and the foals' health data," says Ricard.

But first, the WCVm researchers need data from many foalings over the next two years. They hope to capture data from breeding seasons in both northern and southern hemispheres. Public response has been very positive, and Ricard says many Facebook users have shared her original post.

"If we could get access to 500 foals, that would be amazing." 

Do you have a mare that's scheduled to foal this year? Visit wcvm-equs.ca for more details about this study or contact Dr. Madison Ricard (madison.ricard@usask.ca).



UNIVERSITY OF SASKATCHEWAN

Horse Health Lines is the news publication for the Western College of Veterinary Medicine's Townsend Equine Health Research Fund (TEHRF). Visit tehrf.ca for more information. Send comments and article reprint requests to:

Myrna MacDonald, Editor
Horse Health Lines
WCVm, University of Saskatchewan
52 Campus Drive, Saskatoon, SK S7N 5B4

horse.health@usask.ca

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Vitamin E a must for horse health


Horses need to eat their greens, too — and if they can't get the proper nutrients through grazing, it's important for owners to be aware of how to ensure nutritional needs are met.

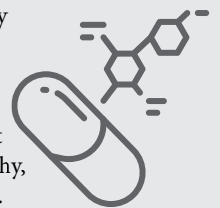
One important nutrient for horses is vitamin E. This powerful antioxidant keeps equine muscle and nerve cells healthy and helps to support the immune system. Because horses can't make their own vitamin E, it's important that they get enough through diet. Working horses, lactating mares and growing horses all have higher vitamin E needs.

While several of the conditions caused by vitamin E deficiency are preventable, not all can be treated successfully — especially when they present in foals. Not all horses show clinical signs of vitamin E deficiency, but those signs that do appear are related to the muscles and nerves. They can include muscle tremors, lying down ex-

cessively and difficulty standing, a stiff and unco-ordinated gait, shifting leg lameness, a poor topline, weight loss and muscle atrophy, and decreased energy.

Fresh grass is the best source of vitamin E. Horses that don't have access to fresh grass may need daily supplementation. While hay can provide the nutrient, the amount it contains begins to decrease as soon as hay is harvested and stored, with losses of up to 50 per cent after only one month of storage.

Different types of commercially available vitamin E supplements include liquid, pellets and powder. Check with your veterinarian to learn more about your horse's specific nutritional needs and what type of supplementation is best. 





Dr. Duke's 30-year legacy

By Jeanette Neufeld

Dr. Tanya Duke (left) sedates an equine patient before a laparoscopic procedure.

 Christina Weese

In 1999, Dr. Tanya Duke-Novakovski travelled to Leipzig, Germany, for a one-year sabbatical leave from her role at the Western College of Veterinary Medicine (WCVM). The veterinary anesthesiologist's goal during her stay in the former east German city was to help curb the number of horses that died after surgery in the Universität Leipzig's large animal clinic.

The problem was post-anesthetic myopathy, a muscle disease that could be prevented by properly controlling blood pressure and providing fluid therapy during anesthesia to ensure the patient's muscles continued to receive oxygen. Without proper treatment, horses faced a difficult recovery and were often euthanized.

"The young anesthetists out there now will hopefully never see problems like this in equine anesthesia because we know how to prevent them now," says Duke-Novakovski.

She published her research, and since then, the case report summarizing her observations has become a key source for veterinary anesthesiologists.

"If you're a researcher, there are some landmark papers everybody knows. Not all of us will publish such a paper," says Dr. Barbara Ambros, a veterinary anesthesiologist and WCVM professor.

"That [paper] made a change from that moment forward in how we dealt with equine anesthesia."

Duke-Novakovski recently retired after

more than 30 years at the college, leaving a legacy as a prolific and collaborative researcher. Originally from the United Kingdom, she came to the college after completing an anesthesia residency at the University of Liverpool.

She and her WCVM colleagues explored new techniques, drugs and technologies that have helped patient outcomes.

"Over my career it's been a time of great change within the anesthesia world," she says.

Duke-Novakovski's work spanned species and specialties. Almost every veterinary procedure requires the support of the anesthesia team, whether it's a routine X-ray or a complex surgery. Horses present a challenge as they respond differently to anesthesia than other animals.

"It is a much riskier thing to do for a horse than it is for a dog or a cat," says Duke-Novakovski. Complications can develop due to the horse's immense body weight and their unnatural position — lying on their back or sides — during surgical procedures.

Because of this, anesthesiologists typically stay in the room throughout the entire procedure. This presented many opportunities for Duke-Novakovski to observe and ask questions, inevitably leading to further research.

Some of the important equine projects she worked on included research into the safety of thoracoscopy on horses lying


on their backs, as well as research that brought the anesthetic drugs propofol and alfaxalone into routine veterinary use (in Canada). A recent study was the first to explore the use of remifentanyl in horses.

"I think she's contributed a ton in terms of her research — she's a big collaborator — so she's certainly influenced the careers of many people at all levels. But she's also put the University of Saskatchewan and WCVM on the map," says Dr. Christine Egger, a WCVM graduate and veterinary anesthesiologist.

Egger was Duke-Novakovski's first graduate student trainee and went on to serve on faculty at several American veterinary colleges.

"Her research is extremely well thought of, and she's really brought a lot of credibility to the research program."

Duke-Novakovski has always been driven by the desire to make the information she gleaned from clinical practice available to colleagues around the world through publishing. Ambros adds that Duke-Novakovski always taught the highest standard of care to her students, who then went on to implement their knowledge in private practice.

"I think the standard of anesthesia in the last two decades has definitely improved, and I think she played a big role in that," says Ambros. 

Visit tehrf.ca to read full article.



SIGNAL PURSUIT

WCVM scientists are working to interpret the hormonal signals involved in maternal recognition of pregnancy

By Jeanette Neufeld and Sheriton Smith

 Caitlin Taylor

Dr. Claire Card has spent much of her career helping mares get pregnant, but for some horses and their owners, it's complicated.

"A lot of horses that are very valuable in terms of their athletic ability or their traits ... are not retired from that career until they're well into their teenage years," says Dr. Claire Card, an equine theriogenologist and professor at the Western College of Veterinary Medicine (WCVM).

"Then it becomes harder for this type of an older mare — just like it would be in any older female — to become pregnant and carry the pregnancy."

Many strategies are available to treat the infectious causes of pregnancy loss and infertility, but clinicians struggle to treat the non-infectious and sometimes age-related changes. For some breeds, using assisted reproductive technologies isn't an option.

"There's a large chunk of very valuable horses that are outside of that. For them

it has to be natural breeding — it has to be the mare carrying her own pregnancy," says Card.

These restrictions have created a huge market for reproductive therapies. But without a full understanding of the role of hormones during equine pregnancy, researchers are flying blind.

"If we can understand the processes better, then the therapeutic options become easier to investigate because you know what direction to go towards."

Card has been investigating equine reproduction for decades. The progression of her team's work in studying a process called maternal recognition of pregnancy (MRP) has created more understanding of the hormonal signals that support a pregnancy to continue or tell it to end.

Her most recent project, which is supported by the Townsend Equine Health Research Fund (TEHRF), is aimed at identifying how the hormones prostaglandin F (PGF) and prostaglandin E (PGE) interact during early stages of

equine pregnancy. Large pulses of PGF are secreted by the uterus and cause a mare to come back into heat, while PGE is made by the embryo and may have opposite effects.

The WCVM researchers are specifically trying to pinpoint the pattern of PGE secretion.

"No one has ever really looked at that — we'll be the first to report that," says Card. "We are trying to determine if pulses of PGE are secreted and if non-pregnant and pregnant mares have different patterns."

To do this, researchers will compare non-pregnant mares to mares that have one or multiple embryos. Their hypothesis: multiple embryos will send a stronger PGE hormonal signal that will allow them to track hormone levels more effectively during early pregnancy.


"We're trying to make the signal louder so that it's easier for us to detect," says Card.

Her team will monitor the pregnant mares, taking hourly blood samples between day 13 and 16 of pregnancy — the period when prostaglandin levels typically peak and pregnancy recognition occurs.

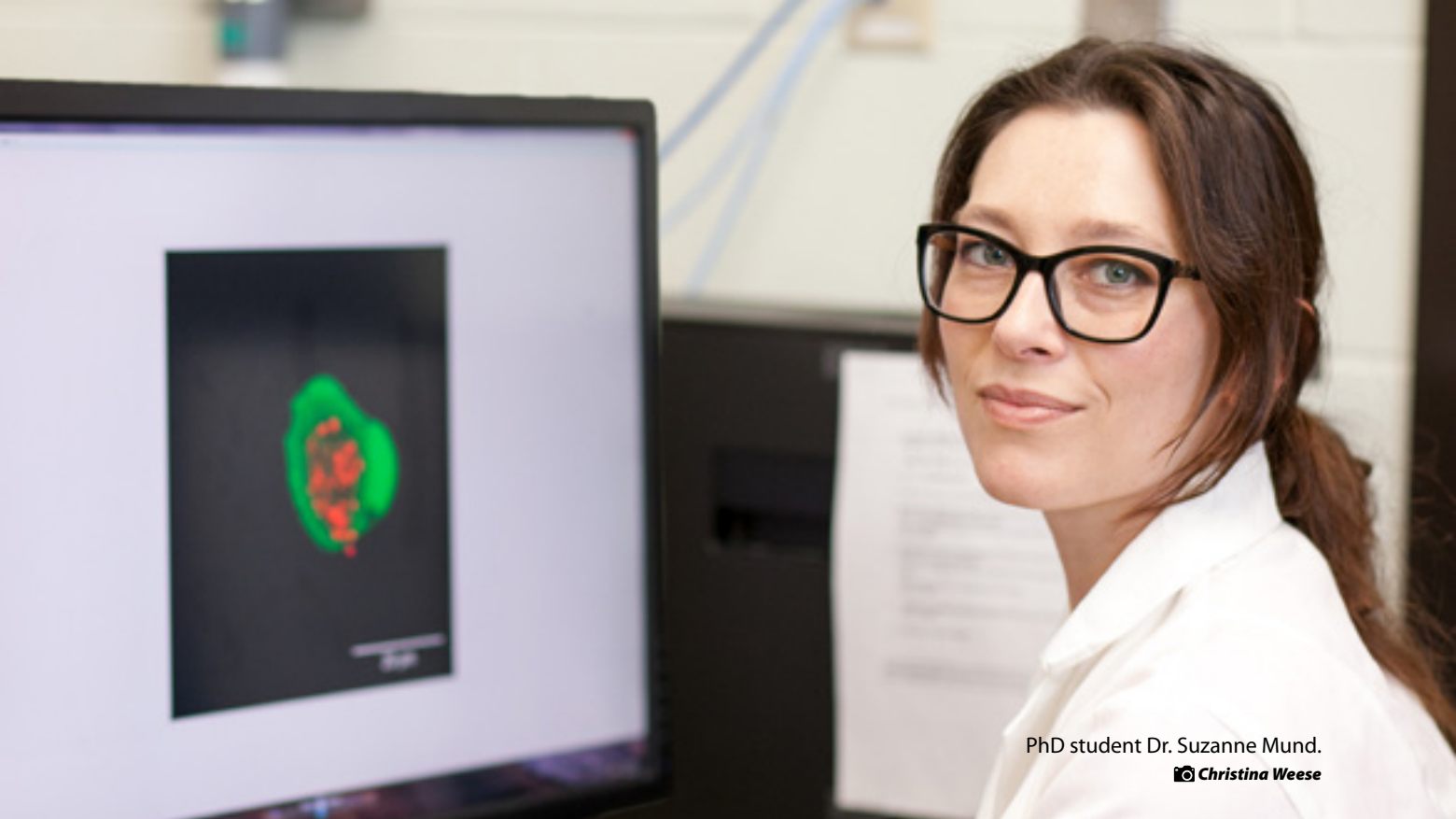
The WCVM research team will send the samples to Dr. Mariana Diel de Amorim, an equine theriogenologist who earned her PhD degree with Card at the WCVM and is now a faculty member at Cornell University's College of Veterinary Medicine. Diel de Amorim, whose research focuses on MRP, will process the samples in her lab to determine the hourly levels of PGF and PGE hormones in the mares' blood samples.

The team completed the project's control phase in 2021 by studying non-pregnant mares, mares with single embryos and two multiple embryo pregnancies. The next phase is to study at least four more multiple embryo pregnancies during the 2022 breeding season.

Ultimately, the more information gleaned about the horse's unique reproductive physiology will contribute to the success of reproductive therapies.

"We feel that there may be some window where if we understand the physiology more, we can either work with intercepting those prostaglandin signals that harm pregnancy maintenance, or help the uterus develop a healthier uterine environment through regenerative medicine approaches," says Card. 

Sheriton Smith of Regina, Sask., is a third-year WCVM veterinary student and was part of Dr. Claire Card's research team in 2021.



PhD student Dr. Suzanne Mund.

📷 Christina Weese

WCVM team publishes study showing wound healing changes after stem cell therapy

By Myrna MacDonald

A team of researchers at the Western College of Veterinary Medicine (WCVM) has published the first equine study to demonstrate changes in wound healing following stem cell therapy. Their findings were recently published online in *Cells*, an international open access journal.

Team members include PhD student Dr. Suzanne Mund along with WCVM faculty members Drs. Daniel MacPhee, John Campbell, Ali Honaramooz, Bruce Wobeser and Spencer Barber.

The researchers used intravenous (IV) treatments of multipotent mesenchymal stromal cells (MSCs) that were extracted from other horses. These stem cells have potential for improving wound healing because they can alter the body's inflammatory response, which is involved in healing. They can also influence other local cells to produce growth factors that could enhance the speed and quality of wound healing.

MSC therapy is a promising treatment for limb wounds, a common injury in horses that often develops complications. One of the main issues with limb wounds

is the production of an excess amount of granulation tissue, commonly known as “proud flesh.” But there are risks associated with IV administration of MSC, and so far, the therapy's effectiveness in improving cutaneous wound healing is unknown.

The WCVM research team was successful in administering the highest dose of MSCs ever administered to horses enrolled in the study (using any type of delivery). Contrary to the team's hypothesis, the treated horses did not experience accelerated wound closure or improved histologic healing. However, the horses' healed wounds did have smaller immature scar sizes, which may signal a better repair in terms of cosmetics and function.

The stem cell therapy also appeared to alter the cytokine profile within the horses' wounds. Cytokines are small proteins that play a role in controlling the growth and activity of other immune system cells and blood cells. After treatment, there was less expression of all measured cytokine types except for antifibrotic mediators. This finding is contrary to researchers' understanding that more acute inflam-

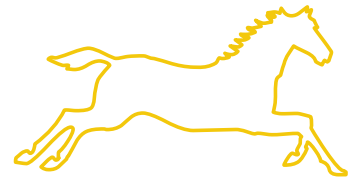
mation — followed by rapid resolution — improves limb wound healing.

Another concern was that several of the horses in the treatment group temporarily developed minor reactions after receiving the stem cell therapy. Since one horse in the control group also experienced similar transient reactions, the cause may be related to the cell suspension solution used or to other external factors rather than to the cells themselves.

While MSC intravenous therapy has the potential to decrease the size of limb wounds in horses, researchers need to do further studies before this therapy can be recommended as an effective wound healing tool for veterinarians in the field. More work also needs to be done to understand the clinical relevance of adverse reactions that were observed in the study's horses. 🐾

This study received funding from the Mark and Pat DuMont Equine Orthopedic Fund and the WCVM's Townsend Equine Health Research Fund (TEHRF).

GALLOPING GAZETTE



NEW RESEARCH LEADERSHIP



Dr. Lynn Weber

Dr. Lynn Weber, a professor and researcher in the WCVM's Department of Veterinary Biomedical Sciences (VBMS), was appointed as the college's interim associate dean (research and graduate studies) for a one-year term beginning on Nov. 1, 2021.

Weber holds a PhD degree in pharmacology and toxicology from the University of British Columbia. She joined the WCVM faculty in 2005 after completing postdoctoral training at

the University of Calgary and Oklahoma State University. Weber teaches undergraduate-level veterinary physiology and pharmacology courses as well as physiology and toxicology courses to graduate students. She previously served as graduate chair for the University of Saskatchewan's interdisciplinary toxicology program and interim VBMS department head. Weber's research focuses on the effect of environmental influences on the cardiovascular system. While she works extensively with fish and other mammals, Weber is well known for her work in pet food research.

VIRTUAL HORSE HEALTH TALKS

After its successful debut last winter, the WCVM's online EquineED Talks have returned for a second series that runs from October 2021 to March 2022. Presented by WCVM equine team members and guests, this year's talks cover a wide range of topics including laminitis/hoof health, equine biosecurity, breeding and fertility, preventive health care, infectious diseases, performance horse health nutrition and first aid/wound management.

Two panel discussions — one targeting the impact of horse health research and a second talk highlighting regional equine health issues developing across Western Canada — are additions to this year's lineup. Another special feature was a talk by Claire Thomson, a University of Alberta PhD candidate and historian. On January 18, Thomson gave a special presentation titled "Lakota history and horses" based on her research of Wood Mountain Lakota connections within Lakhóta Thamákhoche/Lakota Country from 1881 to 1930 (land that overlies the American-Canadian border). Thomson's presentation was organized by the WCVM and WCVM DIVERSE (Diversity and Inclusivity in the Veterinary Environment: Respect, Solidarity, Empowerment), a student club at the college.

WCVM GRADUATE NEW AAEP PRESIDENT



Dr. Emma Read

In December 2021, WCVM graduate Dr. Emma Read became the new president of the American Association of Equine Practitioners (AAEP) for a one-year term. Read is the associate dean for professional programs at The Ohio State University College of Veterinary Medicine. Before moving to Ohio in 2018, Read was a faculty member at the University of Calgary's Faculty of Veterinary Medicine for 11 years. She previously taught at the

Ontario Veterinary College (University of Guelph) and worked for a private specialty referral practice in Alberta.

After graduating from the WCVM in 1998, Read completed a surgery internship at Okotoks Animal Clinic in Alberta before becoming a clinical intern at the WCVM where her husband Matt, a WCVM graduate, was completing a residency in veterinary anesthesia. In 2000, she began a three-year Master of Veterinary Science program with WCVM large animal surgeon Dr. David Wilson. Read completed a large animal surgery residency at the University of Georgia and became board certified with the American College of Veterinary Surgeons (ACVS) in 2004.

EQUINE EXPO MOVES TO 2022

Due to the rising number of COVID-19 cases, organizers of the Saskatchewan Equine Expo decided against holding the four-day event in October 2021. Saskatoon's Praireland Park, along with the Saskatchewan Horse Federation and the WCVM, are now planning to hold the 10th edition of the show from Oct. 27 to 30, 2022. Visit saskatchewanexpo.ca, the event's website, for further updates.



Ready to learn?

Visit wcvm.usask.ca/education/equine-seminars.php for details about future WCVM EquineED Talks and to access recordings of all past presentations.

RESEARCH IN PRINT

A round up of WCVM-related equine research articles that have been recently published in peer-reviewed journals.



Lopes MAF, Hardy J, Farnsworth K, Labens R, Lam WYE, Noschka E, Afonso T, Cruz Villagrán C, Luiz CP, Saulez M, Kelmer G. “Standing flank laparotomy for colic: 37 cases.” *Equine Veterinary Journal*. Sept. 2021; 00:1–12. <https://doi.org/10.1111/evj.13511>

Pimentel KL, Carmalt JL. “The frequency of communication between the synovial compartments of the equine temporomandibular joint: a contrast-enhanced computed tomographic assessment.” *Frontiers in Veterinary Science*. October 2021. 8:753983.

Mund SJK, MacPhee DJ, Campbell J, Honaramooz A, Wobeser B, Barber SM. “Macroscopic, histologic and immunomodulatory response of limb wounds following intravenous allogeneic cord blood-derived multipotent mesenchymal stromal cell therapy in horses.” *Cells*. Nov. 2021. 10(11):2972.

Duke-Novakovski T (contributor). *Manual of Equine Anesthesia and Analgesia*. Second edition. Nov. 2021. Editors: Doherty T, Valverde A, Reed RA. John Wiley & Sons, Hoboken, N.J.

Pimentel KL, Allen AL, Carmalt JL. “Developmental orthopaedic disease and early osteoarthritis of the temporomandibular joint in a 15-month-old quarter horse filly.” Nov. 2021. *Equine Veterinary Education*. <https://doi.org/10.1111/eve.13578>

Villagrán CC, Vogt D, Gupta A, Fernández EA. “Inflammatory bowel disease characterized by multisystemic eosinophilic epitheliotropic disease (MEED) in a horse in Saskatchewan, Canada.” Nov. 2021. *Canadian Veterinary Journal*. 62(11):1190-4.

Card C (contributor). *Equine Reproductive Procedures*. 2021. Editors: Dascanio J, McCue P. John Wiley & Sons, Hoboken, N.J.

Westendorf J, Wobeser B, Epp T. “IIB or not IIB, part 1: retrospective evaluation of Kenney–Doig categorization of equine endometrial biopsies at a veterinary diagnostic laboratory and comparison with published reports.” *Journal of Veterinary Diagnostic Investigation*. <https://doi.org/10.1177/10406387211062207>

Tucker ML, Wilson DG, Reinink SK, Carmalt JL. “Computed tomographic geometrical analysis of surgical treatments for equine recurrent laryngeal neuropathy.” *American Journal of Veterinary Research*. Feb. 2022. <https://doi.org/10.2460/ajvr.21.03.0040>

Visit tehrf.ca for more news updates.

Hoof abscesses: a real pain, in more ways than one

A hoof abscess is a pocket of infection that develops underneath the sole or within the sensitive tissues (laminae) of a horse’s foot. As infectious pus builds up, the growing pressure causes extreme pain.

Hoof abscesses often develop in late winter or spring. Moist environments cause horses’ hoofs to soften and bacteria can more easily enter through hoof wall cracks. Horses with hoof-related diseases are also more prone to abscesses.


Since severe lameness could indicate a catastrophic injury, call your veterinarian immediately. Radiographs will help to rule out a fracture, and if a pus pocket is visible on X-rays, the images can help to pinpoint

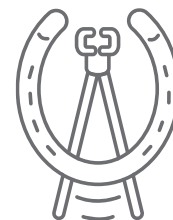
the abscess’s location. If not, hoof testers or nerve blocks can also help to find the abscess.

By following the draining tract, a veterinarian can use a hoof knife to open and drain the abscess. Once it’s located, the goal is to open the abscess through the bottom of the foot so the pressure is relieved as pus drains. Soaking the horse’s foot in warm water and Epsom salts can also help.

The next step is to bandage the foot with a poultice, using a duct tape boot to protect the area from dirt and mud. If it’s too cold to soak the foot, your veterinarian will use a wet poultice on the foot, covered with a bandage — a process that owners can repeat once a day. During recovery,

keep the horse in a stall or a small paddock to restrict movement.

Abscesses usually heal after about five days of treatment. But if the draining tract can’t be located, it can take a week or even longer for the abscess to rupture, drain and heal. 



Visit tehrf.ca to read the full story (search “hoof abscess”).

HONOUR THEIR LIVES WITH THE GIFT OF EQUINE HEALTH

Pay tribute the lives of your patients, clients and loved ones by making a donation to the Townsend Equine Health Research Fund (TEHRF) through its memorial program. Each time you give to the fund, we will send a letter to the client or loved one's family acknowledging your gift to the equine health fund.

"Our practice (Paton & Martin Veterinary Services) began to make contributions to the fund on behalf of clients when their horses passed away. We have found this to be a gratifying contribution and have been humbled by the responses that we have received from many of our clients. I think that it is very helpful for them to know that their horses have been honoured in such a fashion. The fund gives horse owners the additional opportunity to contribute to this very worthwhile cause: supporting vital research in the areas of equine health."

Dr. David Paton (WCVM '78)
TEHRF donor

Questions?

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University of Saskatchewan
52 Campus Drive
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