



# HEALTH ZONE *Lameness*

## Exploring Fractures and the Thoroughbred at AAEP

BY ALEXANDRA BECKSTETT

### Detecting Coffin Bone Fractures in Young Foals

With spindly limbs and delicate bodies, young foals are at risk for an array of injuries. One injury that researchers are determining is more common than previously thought are distal phalanx (coffin bone) fractures.

Dr. Babak Faramarzi, assistant professor at Western University of Health Sciences' College of Veterinary Medicine in Pomona, Calif., studied this fracture's prevalence in young foals and how to best diagnose it.

Faramarzi began by describing the seven types of distal phalanx fractures, each involving a different portion of the foot. Foals typically experience Type VII fractures of the solar margin (toward where the hoof meets the ground) that, while often unnoticed due to lack of lameness, do have an excellent prognosis, he said.

"In adult horses, the most common cause (of distal phalanx fracture) is trauma (e.g., kicking a wall or hard surface)," Faramarzi explained. "The etiology is not



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Pelvic fractures pose serious surgical challenges

known in foals," but could result from excessive force from the deep digital flexor tendon, conformation, nutrition, genet-

ics, excessive sole trimming, and being turned out on muddy surfaces.

Veterinarians most commonly use radiographs to diagnose these fractures, but "obtaining good-quality radiographs of foal hooves under field conditions is challenging," he said. "It's very important for the foal to stand symmetrical and still, so be patient and use sedation when necessary."

To determine how to best detect distal phalanx fractures in foals, Faramarzi radiographed the front feet of 19 6- to 8-month-old foals under field conditions from various angles and projections (the path the X-ray beam takes through the structure). He diagnosed 10 (53%) of those foals with at least one distal phalanx fracture, noting that several foals had multiple fractures (17 fractures total from 10 foals).

Interestingly, he said, he could identify only 65% of the fractures using the common lateral and dorsoplantar projections. He identified the remaining 35% using complex oblique projections.

When diagnosing these subtle injuries, Faramarzi said, "Don't be shy to take mul-

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tiple radiographs, and always do oblique projections. If you're unsure, take more radiographs."

Most of the study foals' fractures healed within 10 months without medical or surgical intervention, he added. And unlike distal phalanx fractures in racehorses, which mainly occur on the lateral (outer) aspect of the left front or medial (inner) aspect of the right front, these fractures in foals showed no statistically significant differences between left and right limbs or lateral and medial palmar processes (wings).

In conclusion, said Faramarzi, "Using proper diagnostic technique and good-quality radiographs are critical in diagnosing palmar process fractures in foals, since clinical signs can be easily missed."

## MRI to Predict Catastrophic Fetlock Fractures in Racehorses

Catastrophic fetlock fractures are the leading cause of euthanasia in Thoroughbred racehorses worldwide. And it's not just by chance—during training and racing this structure is under extreme tension.

"Flexing the fetlock while racing places the suspensory ligament and sesamoid bones under tremendous tensile forces, which then acts like a sling shot so the sesamoid bones compress the back of the condyle (the end of the cannon bone that fits into the fetlock joint)," explained Dr. John Peloso, a surgeon at the Equine Medical Center of Ocala in Florida.

When pre-existing disease or bone changes are present, the condyles can then fracture. If veterinarians could just detect these changes pre-race, they could intervene and take steps to prevent the fetlock from fracturing.

"Is MRI the tool that will help us do better?" Peloso asked.

To answer this question, he evaluated 71 Thoroughbred racehorses euthanized at Florida tracks from September 2011 to March 2013. Eighteen suffered catastrophic fetlock fractures, and 53 were euthanized for other reasons (the comparison or control horses). Peloso took standing MRIs of all horses' limbs 48 to 72 hours post-euthanasia to see if he could identify any significant changes to the fetlock.

He found that 67% of horses that died due to condylar fracture showed greater than 50% increase in condyle bone density, a process that occurs when bones are placed under significant loads, compared to 13% of control horses that did not have a condylar fracture. He also determined

that 78% of fetlock fracture cases exhibited an increased STIR signal (which indicates bone edema, or early damage and fluid accumulation in the bone) compared to 0% of controls.

"These changes might be useful as a screening test to identify horses at increased risk of fetlock fracture during racing," Peloso said.

Does this mean every racehorse needs routine standing MRIs? Not necessarily, but it does mean owners and their veterinarians should pay close attention to these structures when examining racehorses for signs of lameness. Because the changes are happening inside the bone itself, a horse with a stress fracture in his fetlock is not going to exhibit the conventional indicators of fetlock lameness.

"Horses whose fetlocks are cool to the touch, have no joint distension, and are negative to flexion tests may still have an unrecognized fracture and may need an MRI," Peloso said.

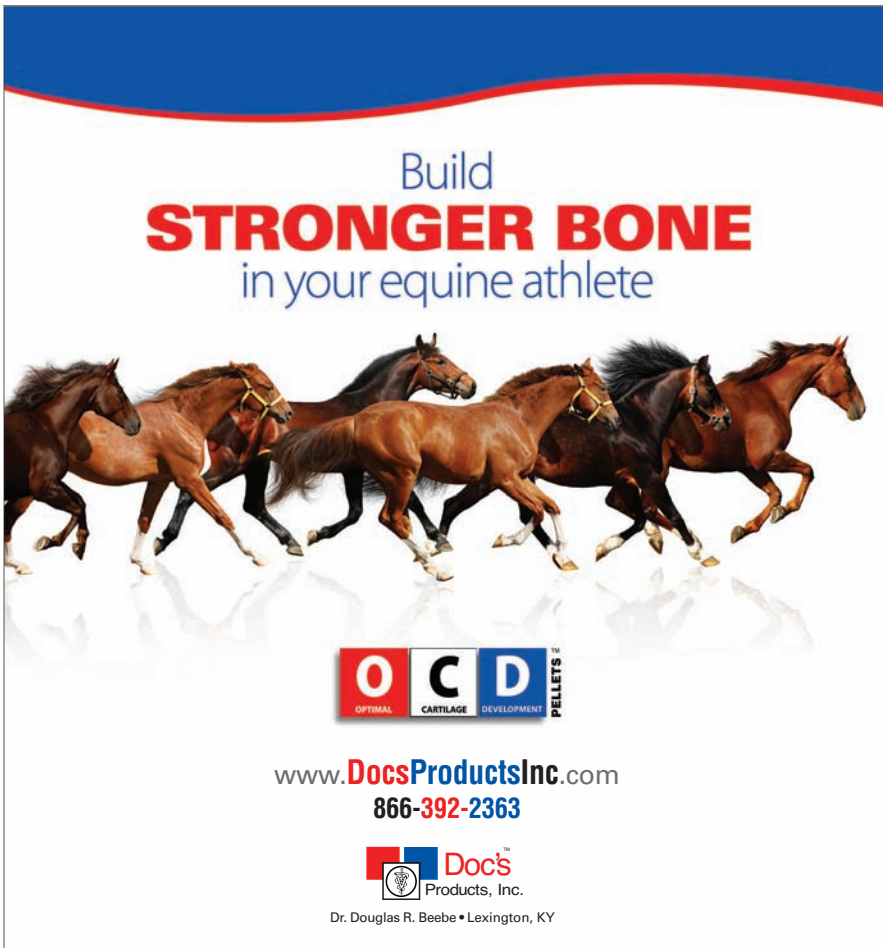
He suggested veterinarians use diagnostic blocks to localize lameness to the fetlock joint and then perform a standing MRI. If MRI images reveal greater than

50% bone densification and/or STIR signal increase, "our research suggests that the horse should not be subjected to the high forces of racing," Peloso said. "Temporarily suspending training or training at slower speeds until the bone edema resolves is the current recommendation in elite athletes in human medicine" and might help reduce the occurrence of catastrophic fetlock fractures in Thoroughbred racehorses.

## Pelvic Fractures in Horses: Not Always Career-Ending

As equine veterinarians' diagnostic and surgical abilities have advanced, they've devised ways to fix many types of fractures previously considered career- or life-ending for horses. One type of fracture that still poses a surgical challenge, however, is that involving the pelvis.

Dr. Sarah Peters, intern at the University of Pennsylvania School of Veterinary Medicine's New Bolton Center, recently studied the short- and long-term outcomes of pelvic fractures in Thoroughbreds. She determined that many of these horses can recover and race.



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Jolane Weeks, the farm manager at Arindel Farm near Ocala, Fla., recently treated Unspoken Rule, a horse that had experienced a condylar fracture.

"In the past we've found these types of fractures require four months of rest, followed by 60 days of small pen turnout and then we could resume training," Weeks said.

In her experience it would take 12-13 months to recover from a fracture and make it back to the races. "Using Cytowave, it took seven months to return Unspoken Rule to the track. She is totally sound and has had no recurring issues," Weeks added.

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Peters said 0.5-4.4% of all lamenesses occur in the pelvic limbs, and 28% of those are fractures.

"These cases are out there, and you're going to see them eventually," she said. They've also recently become easier to diagnose thanks to improved imaging technology.

In her study of pelvic fracture outcome and epidemiology, Peters reviewed the records of 136 Thoroughbreds diagnosed with pelvic fractures (confirmed via imaging or necropsy) at Rood & Riddle Equine Hospital in Lexington, from 2000 to 2010. She looked at each horse's race record or offspring race record (if the horse was retired to breed) and considered discharge from the clinic to be a successful short-term outcome and return to racing or breeding to be a successful long-term outcome.

Peters found that:

- 84 horses were female, 50 were male, and two were unrecorded;
- Horses' ages ranged from 3 days to 11 years;
- Most were racehorses (49%) or horses younger than 2 (40%), "which is consistent with the population seen at Rood & Riddle and not necessarily those horses that are predisposed to getting pelvic fractures," Peters noted;
- Fractures were evenly distributed between the left and right sides;
- 117 horses were discharged, 17 euthanized, and two suffered fatal hemorrhages associated with the injury;
- Of the discharged horses, 72 (62%) raced and 42 (36%) produced at least one foal following fracture;
- Acetabular (the cup-shaped "socket" part of the pelvis that joins with the femur to form the hip joint) involvement, articular (joint) involvement, and comminution (breaking into multiple smaller fragments) fractures had significant associations with negative short-term outcomes, but affected horses discharged from the hospital could go on to be successful;
- Young horses, racehorses, and horses with fractures only involving the ilium (the largest, uppermost pelvic bone) had better outcomes; and
- 86% of horses had good short-term prognoses, 77% of which had good long-term prognoses.

Peters then took a closer look at the groups of horses most likely to have successful outcomes: young horses and racehorses.

"Fracture location on young horses did not affect future race performance," she said. These horses did not have their first start, on average, until 27 months post-fracture, which Peters said is primarily due to the fact they're still maturing. They went on to have a median eight starts, making \$739 per start.

"Fracture location did affect racehorse outcome," she said, noting that horses with ilial fractures were more likely to have successful outcomes than those with other fracture locations. Racehorses started back, on average, seven months post-fracture, had a median of eight starts, and pocketed \$2,638 per start.

"If these horses leave the hospital they do have a good chance of a good long-term outcome and performance," Peters concluded.

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