Breeders' Cup 2019 – Mongolian Groom Evaluation

This report provides an evaluation of the circumstances of Mongolian Groom's fatal injury during the running of the Breeders' Cup Classic at the 2019 Breeders' Cup World Championships ("2019 Championships") at Santa Anita Park. This evaluation was undertaken at the request of the Breeders' Cup Board of Directors by L.R. Bramlage, DVM MS with the assistance of Breeders' Cup's outside counsel.

Process for Evaluation:[1]

In preparing this evaluation, we spoke with key members of the acting veterinary teams, including the California Horse Racing Board ("CHRB") veterinary team, the Breeders' Cup veterinary team, and the Santa Anita veterinary team. We met with Mongolian Groom's connections: his trainer, groom, exercise rider and jockey. Additionally, we spoke with key personnel and race executives with The Stronach Group (the owner of Santa Anita Park), Breeders' Cup and the CHRB. We further reviewed a range of relevant materials, including Mongolian Groom's veterinary and training records, necropsy report, medication history, and relevant videos of Mongolian Groom's workouts and track work leading up to the 2019 Championships. We also examined veterinary records and notes for other horses from the 2019 Championships to the extent they provided insight into the procedural and evaluation protocols in place for the 2019 Championships.

Backdrop:

In 2019, safety and evaluation protocols were instituted by Santa Anita, the CHRB and Breeders' Cup that were the most extensive on record. They involved attention to the racing surface as well as the racing participants.

Santa Anita's entire main track racing surface, which had been recently renovated, was monitored using nearly continual water content assessment and on October 29, 2019 was examined at the direction of Dr. Mick Peterson with ground penetrating radar and particle analysis throughout the entire circumference of the track surface to assure consistency for the event.

During the 2019 Championships, participating horses were subjected to markedly increased monitoring including:

- Examination by a regulatory veterinarian upon arrival at Santa Anita.
- Trainers submitted a minimum of 14 days' worth of veterinary treatment records to the CHRB.

[1] Attached as Addendum 1 is a comprehensive outline of the processes and procedures undertaken in preparing this report.

- Works over the track required two exams: one from a Breeders' Cup or Santa Anita veterinarian and one from the horse's private veterinarian, who was required to sign a form stating they cleared the horse to work out.
- Working horses and racing horses were prohibited from being administered non-steroidal anti-inflammatories (NSAIDs) for at least 48 hours and were not permitted to have corticosteroids in their system. Except for furosemide, Breeders' Cup's medication rules were consistent with International Federation of Horseracing Authorities rules and standards.
- Three days before its Breeders' Cup race, each horse's private veterinarian filled out a form certifying he or she was comfortable that the horse was physically prepared to race.
- Regulatory veterinarians looked at each horse a minimum of five times, on the track and in the barn, and conducted the usual pre-race examination and monitoring of the horses from paddock to starting gate.

During the two days of the 2019 Championships, two hundred and twenty-nine horses raced. One horse was injured. How did he slip through such an extensive safety net?

The Situation:

When an injury occurs in thoroughbred racing, it is nearly always a combination of two categories of influence: extrinsic (influences such as weather, racing surface, and the running of the race) and intrinsic (influences relating to the condition of the horse).

Extrinsic Factors:

Based on our review of the facts and circumstances surrounding the race, there did not appear to be anything specific in the running of the race that negatively influenced Mongolian Groom or predisposed him to injury. His trip was clean and he was second one mile into the race, just before the injury occurred.

As to the racetrack: racetracks can influence an injury acutely, during the race, or insidiously over time by affecting the health of the horse's skeleton. Acutely, the racetrack can predispose a horse to injury by being inconsistent, causing unexpected or abnormally high loads to be experienced by the horse. It is unlikely that the racetrack had an acute influence on Mongolian Groom's injury. The entire surface had been recently removed and re-constructed. There was no significant rain to deal with in the time following the track renovation. Since the re-construction in the spring there were four fatalities at Santa Anita. One was a cardiac arrythmia which had nothing to do with the track. Two occurred on the training track not the main track. One fatal injury occurred on the main track. The October 29, 2019 assessment of the racing surface showed it to be uniform and consistent.

Complaints from horsemen that the track was deeper than normal (more soft earth cushion above the stable base) were voiced. Complaints about the track being tiring because it was deep and complaints about the amount of kick back of dirt into the trailing horse's faces were

expressed, but none complained about inconsistency. The rebuilding effort accomplished its goal of a consistent, safe surface. Two hundred and twenty-nine horses competed on the two days the Championships were held and none of the other horses were adversely affected by the racetrack.

Whether the track predisposes to an increased incidence of injury in the long term is a different subject, mostly beyond the scope of this assessment. A spectrum of similar injuries occurs while training over all of the different surfaces; the incidence is very low, but the variations in injury rates occasionally spike and recede over short time periods. The Equine Injury Database establishes that a racetrack can precipitate a higher or lower than average injury rate when it is the principal training surface of a group of horses. Racetracks including Santa Anita have embraced the information and made changes based on the data. This led to the re-construction of the Santa Anita racetrack after the winter meet. In a two-day event with horses which have been training on multiple different surfaces congregating from around the world, the long-term effect of the racetrack is a less pertinent subject. Santa Anita had shown itself to be a safe racing surface since renovation.

Intrinsic Factors:

This leaves us to assess the intrinsic factors relating to the condition of the horse at race time. Training – be it in horses or humans – is a series of "overloads" and "over-repairs" that cause athletes to become progressively stronger and faster. This process can get out of balance and predispose athletes to injury when the overloads begin to exceed the repair, and structural damage occurs. That is the narrow path that trainers and athletes walk. Monitoring for any clues of the loss of homeostasis is ongoing in all athletes, including horses. Changes in normal balance and pattern are the clues to when a disruption is beginning. This is what the caretakers of the horse watch for. This is a complex responsibility and must be shared by all of the horse's connections, the racing supervisory personnel and the health care professionals for the horse, including the attending and regulatory veterinarians.

The people with the most intimate knowledge of the horse are, in this order: the groom, the exercise rider and the trainer. The owner may or may not have enough direct contact with the horse to be informed. The groom has his hands on almost all of the horse every day. This physical exam is extensive for changes in everything from lumps and bumps to pain, heat and swelling - the signs of inflammation. The groom is in the best situation to identify new developments. Most grooms for horses of Breeders' Cup Championship level know every scratch, nick or ding on their charges. Their horses are not only their charge, but most often their friend. They take their temperature each day and know their hunger and appetite idiosyncrasies. They feed them, brush them, bathe them and manage their environment, including their stall, bedding and hay.

When the groom finds an issue, he informs the second trainer who assesses the problem and determines the next step in evaluation in consultation with the head trainer if needed. This may or may not lead to an examination or consultation with the horse's attending veterinarian. All of this takes place in the barn at nothing more than a walk.

The horse in motion requires another level of evaluation. This evaluation involves the exercise rider and the second trainer. This is being done unconsciously every time they see the horse and consciously each morning when the horse exercises. Exercise may consist of walking in the barn, or jogging in-hand on the road, jogging under tack on the track, as well as galloping or breezing and eventually racing. Abnormalities or changes in balance or symmetry are assessed and the findings of the physical exam and the horse's change in gait integrated and evaluated. When a horse senses a problem because of accumulating wear, it shifts weight from the problem limb to the sounder limb to decrease the load – the definition of lameness. The exercise rider is often the first to identify this change. But if paired limbs both become affected, the horse can't shift its weight because the limbs hurt equally. As the horse tries to protect both limbs, his stride shortens and loses it fluidity. It is much harder to identify the underlying problems with bilateral lameness. This complicates the evaluation.

An in-motion assessment may, and often is, accompanied by consultation and examination by the horse's attending veterinarian. This exam may lead to any number of additional examination procedures. In the case of Breeders' Cup starters, an examination by the attending veterinarian three days before the race was mandatory; the attending veterinarian had to sign off on the fact that to his knowledge the horse was fit to compete.

The entry of a horse in a Breeders' Cup race by the owner and trainer is a statement by them that they believe the horse is fit to run. This is especially true in the case of Mongolian Groom, as he had not been made eligible for participation in Breeders' Cup programs with the normal schedule of payments but had to be supplemented with a $200,000 late nomination fee, an additional affirmation that the horse was fit for competition in the mind of the owner and trainer.

Mongolian Groom's form had been improving all year long. The horse had won a Grade I race his last start. The horse's connections believed the horse was no different in soundness than he had been for months. Mongolian Groom's groom, Edgar Pardilla, had cared for him for 9 months and felt the horse had never shown any pain, heat or swelling in his limbs at any point. To his knowledge, Mongolian Groom was in top form. The exercise rider, Jesse Cardenas, and the jockey, Abel Cedillo, who had ridden him for the last four races, both felt the horse had always taken a little longer than normal to warm up, but he always ran and worked well in spite of that fact, as his form had shown. Since Mongolian Groom was part of a small stable there was no second trainer.

The trainer, Enebish Ganbat, had never had a fatality in his ten years of training. He stated he felt no pressure to run in the Breeders' Cup from the owner or the Breeders' Cup officials. When the horse worked slower than expected on October 26th, the trainer and owner of Mongolian Groom discussed whether that meant the horse should not run. The exercise rider explained that the saddle had slipped during the work and caused the slow work. They were willing to skip the Breeders' Cup and point toward the Saudi Cup, but the horse's attitude was good and he was anxious to go to the track each morning so they decided he was ready to compete.

In day-to-day racing, the examination by the connections and attending veterinarian is supplemented by the regulatory veterinary examination on the morning of the race. Prior to a Breeders' Cup race, there are a minimum of five regulatory examinations, on the track and in the barn, during the week of and on the day of the race.

The evolution of the "Regulatory Veterinarian" as a profession rather than a part time job is, more than any other factor, responsible for the continual gradual decline in racing injuries in the past ten years. The safety of the horse is everyone's responsibility, but the regulatory veterinarian is the last line of defense. In some ways, we in the horse industry have abdicated some of our responsibility and have begun depending on the regulatory veterinarian as the final voice. This is not the ideal model. Safety is everyone's responsibility. A total of seventeen veterinarians from the California Horse Racing Board's, Santa Anita's and the Breeders' Cup's teams of veterinarians were on site to do the pre-race assessments for the two days of the Breeders' Cup.

The decision concerning "suitability to race" which the regulatory veterinarians must make is a very difficult one. They have a relatively short time to make the decision. The horses must be observed in stables in less than ideal situations for assessment of lameness, with limited space and variable footing. The horse's limbs are palpated, and flexed by the regulatory veterinarian if the veterinarian determines it is needed. Conditions that are accompanied by pain, heat, swelling or pain on flexion are the easy decisions. Lameness associated with those signs of inflammation normally result in disqualification for racing and further examination.

But most athletic injuries begin as stress fractures deep within the bone, which don't have external signs of inflammation. They must be identified solely by the identification of lameness or an alteration in gait. Horses are examined for lameness at the trot, which is a two-beat gait and the easiest gait at which to identify asymmetry or lameness. If there is lameness in one limb, the horse shifts its weight off of that limb to another and becomes asymmetric as he trots. The presence of a singular injury and its accompanying asymmetry is relatively easy to assess. However, singular stress fractures are actually uncommon. As a horse is training, the repetitive cyclic loads most often affect a pair of limbs, front or hind, or sometimes all four limbs. In that instance, the shifting of weight to a more comfortable limb is not possible because both limbs hurt. The change in soundness must be identified by the shortness of stride, stiffness and loss of fluid motion in the horse's gait. This is a much more difficult assessment. In the clinical lameness exam, the presence of bilateral lameness can be more easily identified if the horse is circled at the trot, but there is typically no safe place or sufficient time to do this type of examination in the stabling area of most racetracks.

In addition, the horses being examined are extremely fit and full of energy, especially when they have been pointing to a race like the Breeders' Cup World Championships races; they often don't want to trot cooperatively. In the clinical situation the horse is made easier to examine with tranquilization, but in a pre-race examination the use of tranquilization is not permitted due to regulations for the race. Near a race, the exam has to be undertaken in the horse's barn, in

limited space with irregular footing, without tranquilization, and in a straight line because there is no ideal examination space in the stable area of most racetracks for the exam.

Thoroughbred horses are great athletes, and great athletes "play with pain". They generate high adrenaline levels that mask routine discomfort. As they approach a race and their training is reduced, their energy levels increase even further. When they are taken out of the stall the morning of the race, they are anticipating the opportunity to run and their adrenaline levels rise, further hiding routine discomfort.

To further complicate the pre-race assessment, the same forces necessary to "train" the horse are the forces that create stress fractures if the process gets out of balance. Training is a series of overloads of the system, in this case bone, and over-repair in response to the overload, strengthening the tissue. Then the process is repeated and the new tissue overloaded, then over-repaired again to strengthen it one level higher. Once a horse reaches fitness, high level exercise still results in minute damage each exercise period and that damage is repaired between exercise sessions. So, in the normal athlete, a certain degree of stiffness is always present due to the inflammation that accompanies routine training. This is why all athletes warm up to get rid of this stiffness and maximize function before an event.

It is hard to imagine creating a more difficult situation in which this critical decision of "ok to race" has to be made. The underlying lameness is difficult to identify because the tacit damage is normally bilateral, the patient is uncooperative and the ability to assess it is limited by the conditions of the exam. It is truly an acquired skill that allows regulatory veterinarians to make that decision.

The Injury to Mongolian Groom:

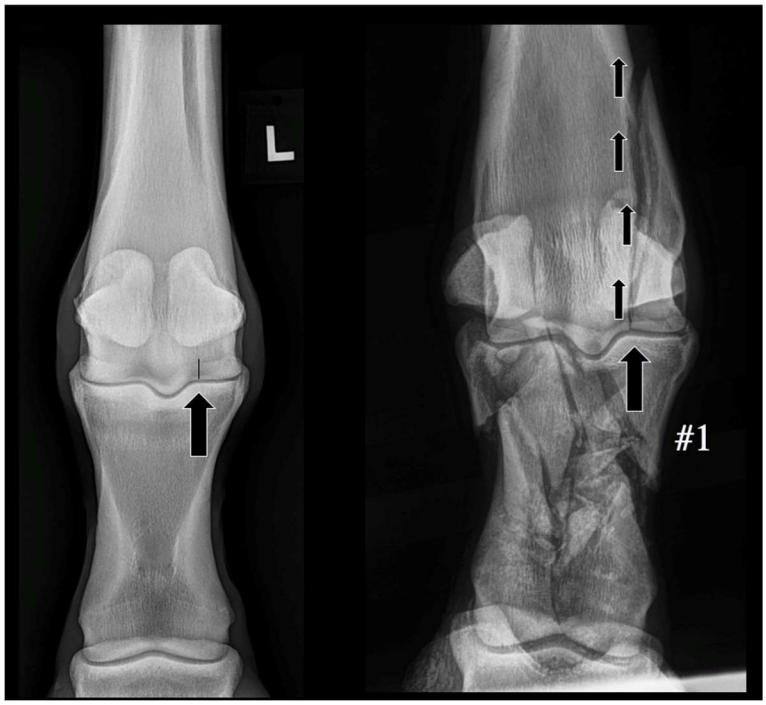
Unless you understand the injury, it is hard to imagine how a horse can go from competing for the lead in the year's most prestigious race to fatally injured in the matter of 15-18 strides. Some explanation of the injury will help understand the difficulty in predicting this outcome.

(Figure #1) These are front to back (left) and a side to side (right) radiographs of the fractures sustained by Mongolian Groom.

(Figure #2) For comparison, this is a normal radiograph of a left hind fetlock joint compared to Mongolian Groom's injured fetlock.

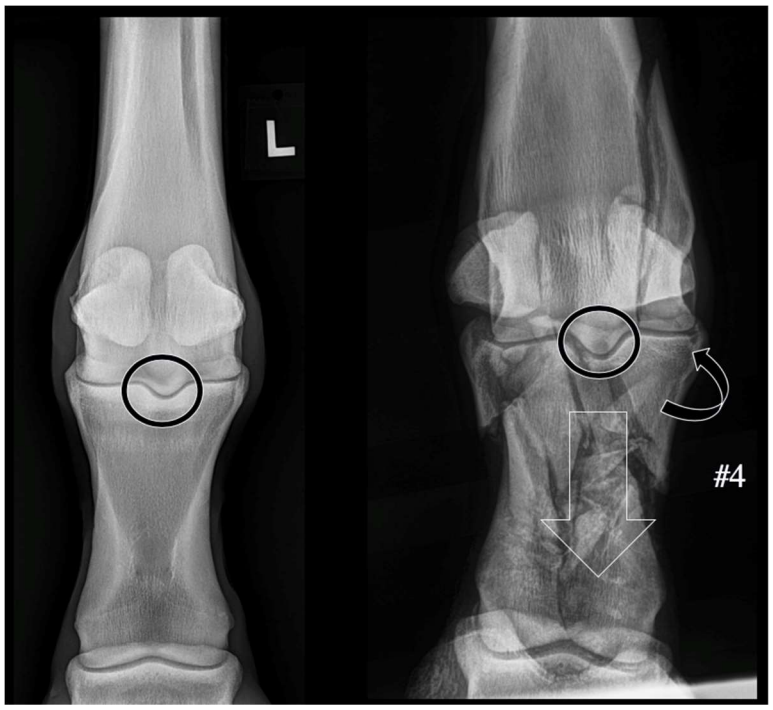
This injury is a series of events initiated by a stress fracture within the cannon bone so small it has no outward physical signs, pain on palpation, heat, or swelling. Even though bone is a composite tissue, the structural elements are mineral crystals that are brittle and suffer micro-fractures with repetitive cyclic loading. In the normal situation these micro-fractures are repaired between exercise sessions. But if they begin to accumulate faster than the repair process can manage, a stress fracture occurs. Fortunately, in the vast majority of instances the stress fracture

propagates a little at a time and detectable lameness appears before the creation of instability of the joint. These fractures are routinely treated with surgery or simple rest to allow the bone to recover and the horse is returned to full competition with little or no detriment from having the fracture. But Mongolian Groom's fracture propagated through the bone rapidly creating a complete fracture while the horse was in full competition.



(Figure #3) The short line in the left picture indicates where the fracture initiated (left hand arrow). The stress fracture propagated through the bone creating the first major fracture, called a "condylar fracture" because it affects the condyle of the bone. (Injury #1) This fracture starts at the articular surface (big right hand arrow) and propagates proximally through the bone (small right hand arrows). If you watch the replay of the race this occurred just coming out of the turn when Mongolian Groom's head goes up as the fracture displaces.

(Figure 4). Once the condylar fracture occurs each additional stride before the horse can stop makes it progressively unstable. As weight is applied to the limb the fractured condyle is pushed forward and rotates. (Injury #2). Then the two small bones, the sesamoids (which are like a pair of knee caps that glide over the posterior joint surface as the fetlock joint bends) no longer have two solid surfaces to glide against as weight is applied because the injured condyle is unstable. In the subsequent few strides, the inter-sesamoidean ligament (the fibro-cartilage connection between the two sesamoids) fractures and the sesamoids split apart. (Injury #3).



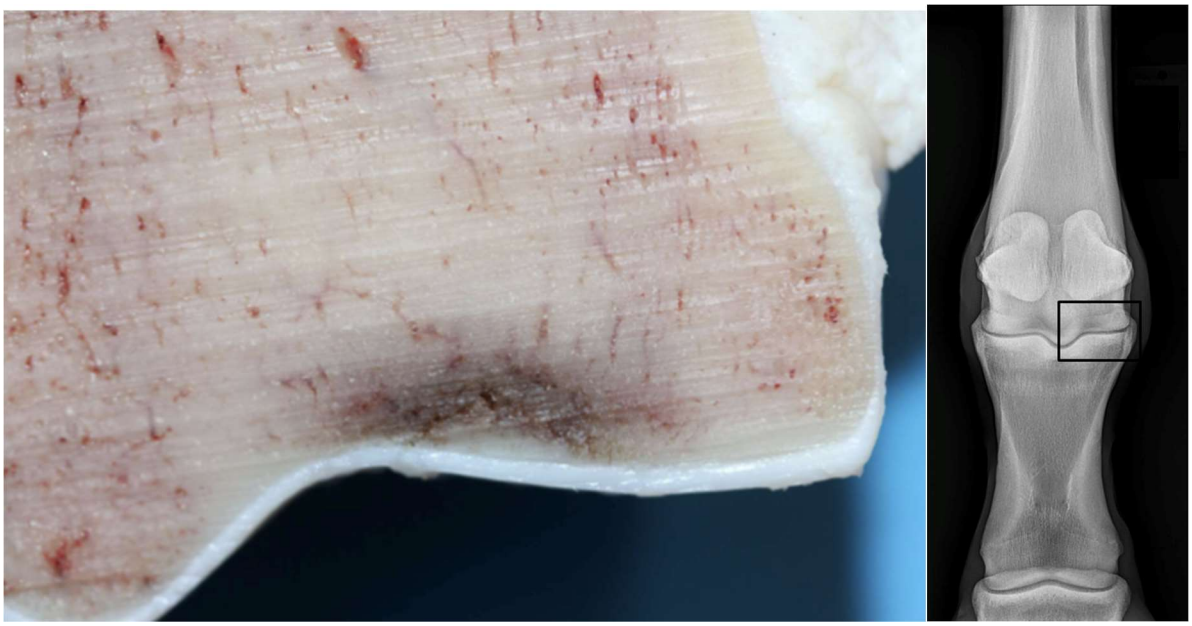
(Figure 5) Part of the reason a horse can run so fast on such small limbs is the fact that the bone anatomy stabilizes the limb, circumventing the need for muscle support in the lower limb. Part of that anatomy is the ridge on the bottom of the cannon bone and the groove in the top of the first phalanx. (Circled in the left picture). With no lateral condyle (fractured) and no lateral sesamoid support (separated) the joint torques when weight is applied. The normally stabilizing ridge on the bottom of the cannon bone now acts as a screwdriver in the groove on the top of the first phalanx, and when weight is applied it twists, applying a huge amount of torque to the bone. The force of loading (Mass x Acceleration) is very large in a 1106-pound horse traveling 40 miles an hour. With the large vertical load and abnormal torque, the energy causes the bone to fracture into multiple pieces. (Injury #4). These fractures occur almost simultaneously because of the extreme and abnormal force of the load. When this happened in the race, Mongolian Groom was slowing down but he then began to gallop on three limbs until he stopped and the splint was applied to the limb.

This degree of injury leaves nothing to re-construct effectively enough to enable weight bearing on the limb. It also does marked damage to the soft tissues and the blood supply to the limb as was documented in his postmortem exam. There are only two arteries to the horse's distal limb and they pass over the back of the injured sesamoids and behind the comminuted first phalanx.

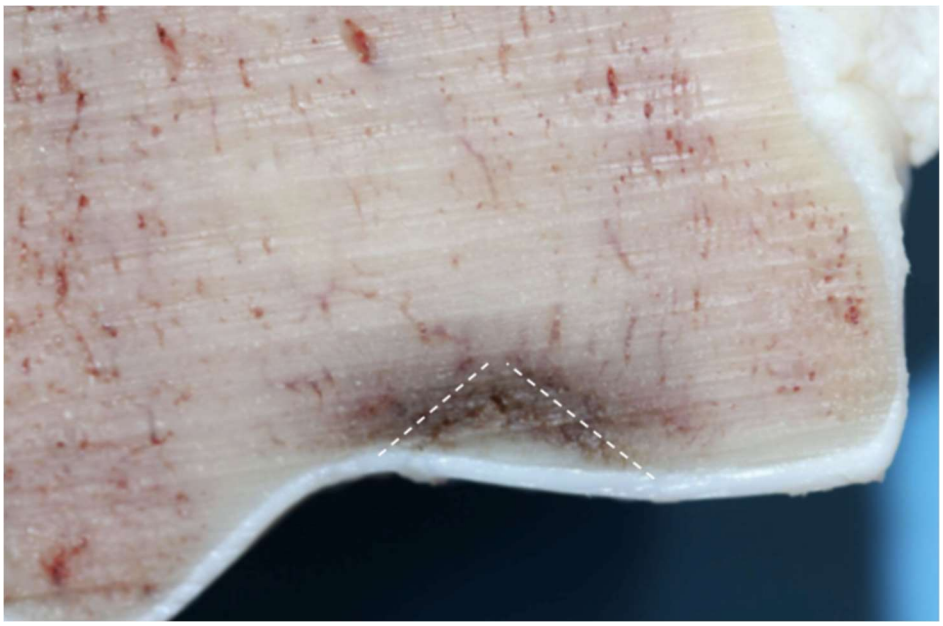
This discussion needs no explanation of why the severity of the injury and the impossibility of reconstruction predisposes to overload laminitis and failure of the paired limb, right hind in this instance. The inability to put a horse in bed and protect the limb is well-recognized. The decision for humane euthanasia for this injury was the right one.

Why did it happen?

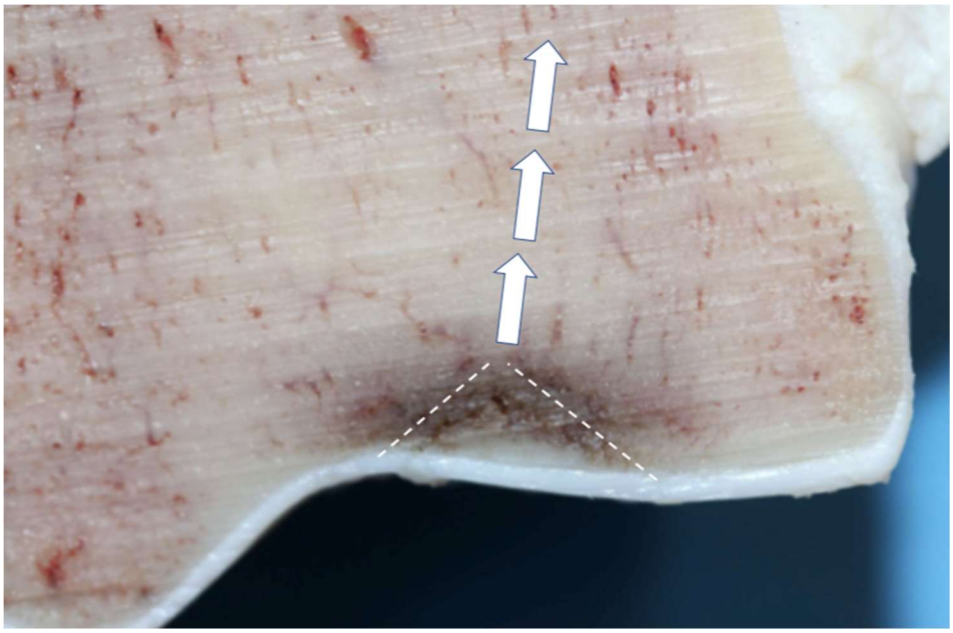
Mongolian Groom was harboring a fine stress fracture in the bottom of the LH distal cannon bone. In fact, he had small stress fractures in both hind cannon bones. These fractures were in the depths of the bone, yet as of the start of the race had not caused any inflammation in the fetlock joint even though they were just millimeters away from the joint surface. A little more than one mile into the race the left hind fracture propagated, resulting in the chain of events, like dominoes falling, that created the fatal injury. There is no evidence that the horse's injury was ignored or covered up. The stress fracture was the result of accumulated bruising of the distal cannon bone which resulted in the stress fracture. The horse was unaware it was even there during the race. As superior athletes can, his adrenaline levels wiped out any impediments to performance. He was well into the race, competing similarly to how he normally runs, just off of but near the lead. The race was one of the faster of the day and he was third as they exited the turn when the injury occurred. His jockey saw no reason for concern until the first fracture displaced.



(Figure 6). This is a picture of Mongolian Groom's RH (opposite) distal cannon bone enlarged approximately five times. The box over the radiograph on the right side of the image is the anatomic location of the excised bone from the RH fetlock. It shows the bruised area of bone in the RH cannon bone in the same location where the fracture initiated in the left hind limb.



(Figure 7). The dotted line in this picture shows the effect of the bruise on the bottom of the cannon bone which forms a wedge of injured bone which gradually pushes into distal cannon bone over time.



(Figure 8). This picture, using the RH cannon bone, illustrates how the wedge-shaped bruise on the bottom of the cannon bone created the condylar fracture which initiated the chain of injuries to Mongolian Groom's LH cannon bone and fetlock joint, eventually resulting in the fatal injury.

These pictures illustrate how the same process of wear and tear often occurs in both hind limbs (or in some horses both front limbs) at the same time. Both limbs gradually get behind in the overload/over repair process of training and racing and structural damage begins to accumulate entirely within the bone with no outward sign of inflammation. This explains why Mongolian Groom was short in both hind limbs, not in one hind, when examined in the barn; because he had small areas of accumulated damage in both hinds. We cannot go back and reconstruct the LH distal cannon bone but the process crossed the threshold of failure in the LH cannon bone before the RH and that is why the fracture occurred in that limb. This defect in the bone just above the articular surface is roughly 5mm (1/4 inch) in size and not easily documented radiographically until late in the process. So it takes a combination of lameness identification and then radiographic documentation to make this diagnosis. It is not an easy task at any time, but is especially difficult in the circumstances of a pre-race examination.

Did medication play a role?

Mongolian Groom's "Out of Competition Testing" showed no prohibited substances and the pre-race and post-injury blood sample toxicology screen show no prohibited substances, no medication overages and nothing that did not agree with his confidential medication documentation other than the sedation he received immediately after the injury for his first aid. He competed under the tightest medication restrictions in Breeders' Cup history with no cortico-steroids within fourteen days and no non-steroidal anti-inflammatory medications within forty-eight hours. These rules are consistent with International Federation of Horseracing Authorities rules and standards in place in other jurisdictions worldwide. His medication record shows no

intra-articular medication of the fetlock joints, ever. His hock joints had been treated with anti-inflammatories October 19, 2019 after his last race, but well before the systemic clearance time before the Breeders' Cup. He was treated for muscle soreness of his back after his last work on October 27, 2019, when his saddle slipped, with the consultation of the regulatory veterinarian and his attending veterinarian. He received a muscle relaxant (methocarbamol), a balanced electrolyte paste orally, and acupuncture to resolve his muscle soreness. But the hind fetlocks had no treatment. There is no reason to believe medication played any role in the horse's injury. The problem was the stress fracture that escaped identification, but not because it or the affected joint had been treated in any fashion.

So how did it go unidentified?

How did Mongolian Groom slip through the safety net cast over the horses during the Breeders' Cup? The group of Breeders' Cup horses are a particularly tough group to assess. They have earned their way to the Breeders' Cup races by campaigning successfully throughout the year. Athletes at the end of any season have wear and tear, aches and pains from the competition that they successfully ignore when competing. Horses are no different. The best athletes are the toughest, are capable of near supra-physiologic performance, and these were the best horses in the world this year. The difficulty is trying to ferret out dangerous lameness from routine soreness of a yearlong campaign.

A record of previous exam notes by regulatory veterinarians is kept in The Jockey Club's nationwide database called "InCompass". A regulatory veterinarian can review his/her, or another regulatory veterinarian's, historic notes on a horse on the InCompass internet site. Mongolian Groom's InCompass reports show notations of decreased range of motion in the front fetlocks for all nineteen of his races – they were not concerning and were only of note because of their variation from normal. The hind fetlocks are noted as normal or unremarkable in all examinations. His motion exams identified no lameness at the pre-race barn exams in any of his races, just stiffness in motion. The truth is he had a bilateral lameness and remained symmetrical in both hind limbs in the barn exams before the 2019 Championships. But this was similar to his previous recent pre-race exams when he won.

During the 2019 Championships, Mongolian Groom was formally observed by five different veterinarians on five different days on the track, and at the barn by three different veterinarians on six different days pre-race, with one exam also including trotting on a hard surface to accentuate any lameness. It is obvious from this degree of scrutiny that he was, at least informally, on a "watch list" for increased observation. But review of notes on all of the horses in the Breeders' Cup Classic show comments on four other entrants as well. These were the best horses from the racing season in 2019. They had earned some soreness and it is a tough assessment as to whether a horse is actually lame or just has routine soreness from a long season.

Six observations in the barn by three different observers noted that Mongolian Groom was "stiff" or "choppy" behind, but symmetrical in both hind, similar to his last two races. One barn exam prior to the 2019 Championships questioned his RH fetlock, but it was negative to joint flexion.

The fact that he had so many exams points out that the examining veterinarians had targeted him for extra scrutiny. The crew of regulatory veterinarians did 968 examinations of horses entered to race in the Breeder's Cup races the during the two weeks before the 2019 Championships – 445 on the track and 523 in the barn exams. In addition, the crew of veterinarians also examined the undercard starters which also received increased scrutiny.

Based on examination comments from the veterinarians who had performed the horses' previous pre-race exams, on past performances and based on initial observations, seventy-three horses were tagged for a "watch list" during the 2019 Championships. Based on the barn and track examinations, twenty-four horses entered at the 2019 Championships were selected for "extra scrutiny" in the form of additional barn examinations. Mongolian Groom was one of the twenty-four horses on the list marked for extra scrutiny. Of those twenty-four horses, eight were disqualified from competition. Five horses on the undercard were also disqualified. In all, twenty-four horses were withdrawn or disqualified from competition in the two days of the 2019 Championships and undercard racing. That is twenty-four of the initial 253 entries resulting in 229 starters. There were seventeen horses who competed that had comments that they were "short", "choppy" or "stiff" behind on the pre-race barn examinations. Sixteen of those horses ran without incident. The examining veterinarians made the right call on 252 horses, 228 starters and 24 horses who were disqualified (scratched) or withdrawn.[2] That is a 99.6% accuracy rate. The decision was wrong on only one horse: Mongolian Groom.

On the postmortem exam of Mongolian Groom it was confirmed that there were indeed lesions in both hind distal cannon bones explaining why it was hard to isolate one lame limb on the six in-barn exams; his problem involved both hind limbs and was symmetrical. Over the two weeks before the 2019 Championships, Mongolian Groom appeared to be slightly lame on the RH on one exam, and choppy behind on five exams. His hind limbs were flexed and he showed no overt lameness after flexion in either hind limb before the race.

During the on-track exams by the Breeders' Cup examining veterinarians, Mongolian Groom was noted as "questionable LH" on track on 10-31-19. He was one of 110 Breeders' Cup participant horses observed on the racetrack that day. This gives the veterinarians very little time to do an assessment as there may be multiple horses passing by at the same time. The Breeders' Cup horses are a minority of the horses training on the mornings before the Breeders' Cup Championships; there are many other horses from the normal track population training on the track at the same time. That leaves little time to observe each horse critically beyond identifying it as a Breeders' Cup participant, recording its number, and determining at which gait the horse is training. The short observation yielded a question mark about Mongolian Groom's LH soundness. The stationary observer gets only a short observation period after identification as the horse passes by with the crowd. This can be a problem.

[2] Twenty-four horses were withdrawn, with thirteen of those being scratched and eleven being withdrawn for other reasons.

This was the same day, 10-31-19, that XBTV videos posted on the internet of him jogging (trotting) for one mile on the racetrack showed a LH lameness. The response to the noted possible LH lameness from the regulatory veterinarian was to increase his in-barn surveillance. Regulatory veterinarians viewed and discussed videos of him galloping and then slowing down and jogging on 10-25-19 but made no conclusion other than to increase barn scrutiny. The notation by the on-track Breeders' Cup veterinarians on 10-31-19 further increased scrutiny in the barn resulting in the six exams.[3] However, the videos on the internet from 10-31-19 were not viewed by the regulatory team. Not purposely, but it was just not part of the time pressured examination protocol. That was a missed opportunity.

It is the policy of both Breeders' Cup and Santa Anita to separate the racing executives from the veterinary teams so as to eliminate any inadvertent influence on the veterinary teams' decisions, and for the 2019 Championships, Breeders' Cup executives provided the veterinary teams with a general directive to give primary consideration to horses' medical conditions, without regard for potential impacts on field sizes or handle. Consistent with that policy, there is no indication that Breeders' Cup executives or racing office personnel had any direct involvement or knowledge relating to Mongolian Groom's evaluations prior to the race.

What about routine diagnostic imaging screening?

Numerous people and authors have questioned why all the horses in the Breeders' Cup Championships are not routinely imaged to assess their skeletal health. There have been calls for digital radiographs, nuclear scintigraphs (bone scan), standing Magnetic Resonance Imaging (MRI), and now possibly the newly developed Positron Emission Tomography (PET) scan of all participants. What one has to understand is that images provide information but are never a "lameness meter". Many radiographic findings are innocuous and many important lesions are easily missed on surveys. The first issue is there would be no time to image even a limited number of joints in each of the entrants if it were done by Breeders' Cup. And then you would need someone to read them all, which would also be problematic. You could require the attending veterinarian to image the entrant, but they are already required to submit a report stating that in their opinion the horse is ready to compete. But the most difficult problem is that most horses don't have perfect skeletons and many innocuous lesions would be uncovered and cause false positive findings that would have to be assessed. Many radiographic lesions in the absence of lameness are innocuous.

In addition, many important lesions such as those in Mongolian Groom's hind cannon bones are not easy to find. They can be missed if exactly the right radiographic projection is not acquired. It often takes a combination of imaging (e.g. bone scan plus radiographs) to define a bone lesion. Standing MRI images are low field (low power), very time consuming to acquire and, unlike a high field MRI, which is what is used on people, sometimes produce false negative or equivocal results.

[3] There was also XBTV video of Mongolian Groom jogging available from 10-26-19, but it was similar to the video from 10-31-19.

High field MRI requires general anesthesia in the horse so that is not an option for screening. Standing CAT scans hold promise, but the ideal machine is yet to be produced for routine practical use. The new PET images are also promising but without combining them with something like a CAT scan localization of lesions is still not perfected.

It is much more practical to approach the problem from the opposite direction and pick out the horses with possible lameness and ask that they be imaged before competing. Images targeted to a site of lameness are much more accurate than routine surveying. In fact, this was requested of four horses on the weekend of the Breeders' Cup as part of their pre-race examination. None of these horses competed. Their attending veterinarians were asked to radiograph or ultrasound and assess the horse before it would be cleared for competition, and in each instance, the horse was withdrawn prior to radiographs being performed. It makes sense to utilize this approach. The key point is establishing a threshold at which point the radiographs would be required. Mongolian Groom's "in barn" exams never reached that level of concern because his lesions were bilateral.

What about recent exercise history?

The work done in California by Dr. Sue Stover's University of California at Davis laboratory shows that horses that have fatal musculo-skeletal injuries have raced and trained more recent high-speed furlongs than a control group of horses. But attempts to assess the high-speed furlongs as a predictor of injury show they do not prove to be accurate predictors. Dr. Scott Palmer of the New York Racing Association has been studying recent high-speed furlongs and career high speed furlongs as a measure of skeletal wear and tear and a predictor of increased risk, with some promise. But analysis of Mongolian Groom's career and recent high-speed furlongs shows he had 11 races and 17 recorded works during 2019 which put him right in the middle of the number of high speed furlongs for the group, when compared to the other horses in the Classic race at the 2019 Championships.

It would be nice if there were a "red line" of the number of high-speed furlongs per unit time that could not be crossed without risk of injury, so we could predict when danger looms. This concept is used with airplanes, but they are made of inert materials like aluminum or steel which have a well-documented safe limit for cyclic loads. Horses are biologic beings and they are repairing issues while they are being created and the individual variation in response is so great that, at this point, we cannot accurately predict when danger looms.

The current system made the wrong call in one instance but it made the right call for 252 horses those two days.

Can we improve the system and make it even more accurate? Probably.

The most difficult obstacle to overcome in the pre-race assessment of a competing Thoroughbred racehorse is the bilateral lameness. By definition, lameness is the shifting of weight from one limb to another. Identification of the lame limb then leads to investigation of the cause.

Lameness assessment is a binomial progression to arrive at the lame limb: determine front or hind, then determine right or left to arrive at the correct limb. The actual assessment is somewhat more complicated than that because not all horses alter their gait exactly the same way. But in general, the underlying biomechanics are the same.

However, the examining regulatory veterinarian is denied the simplified weight shift which occurs in a single limb lameness if the lameness is bilateral. The horse is protecting both hind or both front limbs at the same time. This then shows up as shortening of stride length, exaggerated vertical motion and loss of the smooth stride pattern of a totally sound horse. There are various favorite terms for this motion: "short", "hikey", "choppy", and others. But not all horses that are "short", "hikey", "choppy", actually have a significant problem; in fact, the minority do. Some have soreness that is the result of routine training or minor wear and tear that accompanies high level athletic activity over a season.

The problem with the bilateral lameness, observed as "short", "hikey", "choppy", while jogging in a straight line is it hides the degree of lameness. Lameness in North America is normally graded on a scale of 1 to 5, with some evaluators including half grades. But suffice it to say the degree of lameness is roughly correlated to the severity of the underlying problem, Grade 2 lameness being worse than Grade 1. But when the horse is jogging in a straight line and it is lame in both hinds or both fronts they look symmetrical because the horse can't choose to shift weight from one limb to the other. They both hurt the same and Grade I or Grade 2 lamenesses look the same.

This was the problem with Mongolian Groom. He had six evaluations by three different evaluators in the barn in the eight days before the race and they all looked the same, bilaterally choppy. During the year as he was racing, his notations in InCompass varied from slightly off RH, to slightly off LH, to "hikey" both hind. The week of the race both hind fetlocks had been flexed with no increase in lameness noted. No clear-cut lameness was noted in any of the barn exams, including the morning of the race. His exam was further complicated by the fact that his racing form continued to improve all year long including an upset victory in the Awesome Again Stakes (GI), the race before the Breeders' Cup, but the pre-race exams remained basically the same. This degree of familiarity with the horse may actually have impeded a more critical assessment of Mongolian Groom since he had looked the same on repeated routine "in barn, pre-race" examinations covering months of training and racing. Two of the "in barn" evaluators had examined him for previous races. The evaluators' assessment of the "in barn" examinations did not raise enough concern to reach the threshold for requiring radiographs of any of his joints.

There are three methods to accentuate a lameness when doing a lameness exam. One is to tranquilize the horse to relax it so it shows a "truer" gait, not hidden by the horse's excited attitude. But this is not possible pre-race for regulatory reasons. Another is to add weight to the horse's back in the form of a rider. This created a consistent LH lameness in the video clips circulating on the internet of Mongolian Groom trotting, "jogging" in horseman's terms, on 10-31-19.

The third way is to trot the horse in a circle with or without a rider. Circling a horse increases the load and accentuates the lameness on the inside limb on the circle and decreases the load on the outside limb on the circle, front or hind. This allows the observer to compare the degree of lameness between the limbs. In a circle, a Grade 1 lameness in both hind or both front no longer looks the same as a Grade 2 lameness in both hind or both front, as they do on a straight line. The degree of lameness is demonstrated by the degree of lameness shown as the horse circles. This accentuation allows the examiner to judge the severity of the problem by the degree of lameness unveiled by circling the horse and makes it easier to judge if the horse has a serious problem or possibly just the minor soreness earned with training.

So how did the on-track evaluators not settle on a LH lameness as a problem for Mongolian Groom on October 31, when they saw him on the track? They in fact did pick out a "LH possible lameness" as noted in the on-track assessment notes for that day. This notation got the horse on the "extra scrutiny" list, but on three subsequent exams in the barn with no weight on his back and jogging in a straight line he did not show the unilateral lameness in hand. Why were the evaluators not more critical on the racetrack? Probably because their time to assess a horse is so limited. They had notations on 110 horses that were observed on the track at all different gaits that morning. Considering you have about 100 yards to identify the horse, write down his name, do an observation, and you have multiple horses passing by you at the same time, you really don't have time to do much evaluation. It is much easier to be critical when you have a pre-identified video and a mile to watch him jog as did the internet viewers, but the evaluation team did not have that advantage.

So how could the process have been made better and more likely to have separated Mongolian Groom from the crowd, like it did 13 other horses who were removed from competition (scratched) for various reasons on the Friday and Saturday of Breeders' Cup Championships?

Suggestions to consider:

 # 1. Pre-identify horses before arrival which have historic indications of concerns that need to be investigated. This is being done informally by the regulatory veterinarians currently, but one could suggest it should be made standard procedure. Horses that have notes in previous InCompass examinations that could be of concern, previous race performances that are irregular, histories of prolonged heavy racing schedules, or any other history of note should be compiled as a list of "horses of interest" prior to arrival at the venue and those horses scrutinized after arrival to assess if there is reason for concern. Subsequent to arrival horses from this "watch list" should receive particular attention and the regulatory veterinarians responsible for the final decision on the horse and all other veterinarians on the inspection team should be made aware to observe these horses at every opportunity. This too is being done informally currently, but it should be made standard procedure for the examining veterinary team.

#2. Concentrate the responsibility for individual horse examinations. In the case of Mongolian Groom, seven regulatory veterinarians (not including the attending veterinarian) looked at the horse a total of ten times. So the horse had seven different inputs. This has the advantage of

multiple eyes on the horse, but the disadvantage of not being able to follow the horse on subsequent days to reassess or assess the horse's status. Had these observations been concentrated among fewer people a more focused assessment may have been the result. Ultimate responsibility for disqualifying a horse rests with the stewards of racing for the venue. These stewards rely on their locally licensed regulatory veterinarians to make the recommendations to them. So, the in-barn exams should be headed by a local regulatory veterinarian when possible. The Breeders' Cup brings in regulatory veterinarians from other venues to add depth of knowledge of individual horses to the process. It would make sense to pair two examiners, one local regulatory and one regulatory from the horse's home jurisdiction, and charge them with the ultimate responsibility for an individual horse. They should do as many of the exams as possible on a particular horse, especially if the horse warrants "extra scrutiny" in the form of additional in barn exams as determined from the watch list or on track observations. The entire group will have input from on track examinations and informal observations, but each horse should have a designated pair to make the recommendation on "suitability to race". All examining veterinarians should be currently or recently active regulatory veterinarians at racing venues which would qualify them to be assigned to any entrant, but local responsibility and historic knowledge combined for a two-pronged examination by designated examiners would be ideal. If the horse is local and the local veterinarian is also the veterinarian with historic knowledge, they should be paired with an outside veterinarian to balance the exam with an outside opinion.

The "on track" exams at the designated observation area could also be divided into individual responsibilities when practical. Multiple people could be observing and commenting, but one pair would be designated to determine the ultimate status of the horse. Currently the group of veterinarians work together as a group and meet each day to discuss the horses. Concentrating the responsibility would require re-organization of that process and designation of a pair of veterinarians to lead the discussion on individual horses.

#3. Improve the quality of the on-track observation opportunity. The observation of horses on the track walking, galloping or breezing/working adds little to the evaluation of the horse's soundness. It is only the trot that is useful. So, de-emphasize those observations and focus time on observations of horses at the trot and other observation opportunities.

Designate an observation area at least 110 yards long (half a furlong) for the "on track" examinations somewhere along the track and request all Breeders' Cup horses trot this distance under tack as they enter the racetrack for exercise, no matter what exercise they are scheduled for. This would be minimally intrusive to the horse and its connections. Observing the horse as it is entering rather than after exercise is more discriminating, so the start of the exercise period is better. This would require some logistical organization, but it would not be overwhelming. An identifier would identify the horse and radio the observers which horse is entering the designated length of track. The observers would then have a reasonable distance to do nothing but observe the one horse as it passes by. There would be a queue at times, like after the track is re-conditioned, but this would only necessitate walking the horse for a short period of time before passing through the observation area. The second horse should not enter until the first horse

exits but it only takes seconds to "jog" this distance. Different venues and track configurations would require different organization, but the observation area could be in the "chute" or along the outside rail depending on the most convenient location. Rather than trying to pick horses out of a mass of horses exercising at different gaits, many times all at the same time, each horse would get the same more definitive assessment one at a time. All horses have to be on the grounds 72 hours before the event so this affords at least one, maybe two exams on site. Horses at additional near-by tracks could be organized to do the same thing there as examiners are deployed.

#4. Create an area somewhere in the barn area where the regulatory veterinarians could observe the horses on the "extra scrutiny" list jog in a circle in hand in both directions if they think necessary. This is often even more definitive than watching the horse trot with a rider on his back. The area needs to be roughly 75-80 feet in diameter and have safe footing. The ideal circle size with a groom or hot walker trotting the horse is about 60 feet in diameter. This is a tight enough circle to load the inside limb and is big enough that the horse and handler can jog the circle comfortably.

Some thought would have to be given to who and how many horses were asked to report to the jogging area to prevent the request from becoming tantamount to attaching a "scarlet letter" to the saddle towel, but selecting some optional horses purposely from each race or a similar strategy could defuse that concern. And it would probably not be any more incriminating than six barn exams as was the case with Mongolian Groom. Extrapolating from the 2019 "extra scrutiny" numbers, this would be about twenty-four horses. In any case the advantage of being able to observe the horse trotting in a circle would be a big plus to the examining regulatory veterinarian in assessing the degree of lameness in horses that are bilaterally sore and in discriminating between minor soreness and significant lameness.

#5, Make diagnostic imaging, such as radiographs, nuclear scans, ultrasounds, MRI and PET scans an accepted part of the pre-race exams for selected horses. No trainer knowingly wants to send a highly vulnerable horse to race, but neither does any trainer want to have a viable horse disqualified. There needs to be some predetermined threshold which initiates diagnostic imaging to further assess a horse. The assigned team of one or two veterinarians responsible for the horse would be the ones to determine if the horse goes on the "extra scrutiny" list and is asked to jog circles and eventually if they are asked to have their attending veterinarian provide diagnostic images and interpretations that would document the presence or absence of "at risk" lesions.

#6. Take advantage of all the video footage of the competitors available before the Breeders' Cup. Once horses are designated for "extra scrutiny", a conscious effort should be made to identify and view any existing video footage of the horses to get another assessment of the horse's gait. Works, walking and galloping, will not be very useful for assessment of soundness, but trotting is. When video footage of the horse trotting or "jogging" is created by the track or a wagering interest, it should be utilized by the veterinarians assigned to examine that horse. There would have to be someone appointed to review the postings and bring them to the

attention of the examining veterinarians for a particular horse for assessment, but that is not an insurmountable task and most of the observations would be taking place days before the event, allowing time for inspection.

Summary:

It is hard to fault a process that had a 99.6% accuracy rate, but there were opportunities to remove Mongolian Groom from competition that were missed due to time constraints or process deficiencies that could be made more prominent. The bilaterally lame horses are most problematic. Unilaterally lame horses are easier to identify and to pass judgment on. In my opinion the key opportunities for process improvement are to improve the quality of the on-track observations and to introduce the ability to jog horses in need of "extra scrutiny" in circles at some safe location on the back side of the racetrack. This should help separate the significantly lame horses from the horses that have routine soreness. It would also create the threshold for requesting radiographic or ultrasonographic imaging prior to clearance for competition for horses of concern. The advantageous use of video footage of horses training prior to the event as part of the routine veterinary examinations should also help select horses for "extra scrutiny".

All three of these processes' improvements would likely have helped clarify Mongolian Groom's status. Since we are dealing with biologic beings and not inert machines, we will never eliminate every opportunity for an occult injury to manifest and will never reach 100% accuracy. But improvement in process should make us better next year than this year and continual refinement should yield even better results the year after that. The process was good; it can be made a little better with some re-organization.

Addendum 1 – Processes and Procedures

The Board of Directors of Breeders' Cup Limited engaged Dr. Lawrence (Larry) Bramlage to conduct an independent evaluation of the catastrophic injury sustained by Mongolian Groom during the 2019 Breeders' Cup Classic on November 2, 2019. Dr. Bramlage was assisted by Breeders' Cup's outside counsel, Shannon Arvin and Chapman Hopkins of Stoll, Keenon Ogden, PLLC, as well as Robert Watt.

The independent evaluation examined the facts and circumstances surrounding Mongolian Groom's injury in order to (1) determine whether there were any identifiable deficiencies in the safety and evaluation protocols and procedures in place during the 2019 Breeders' Cup World Championships, and (2) identify changes, additions or improvements to the safety and evaluation protocols for the Breeders' Cup World Championships to mitigate the risk of injury in the future.

I. Evaluation Process

a. Identify relevant individuals with relevant information and evidentiary materials *(November 2, 2019 forward)*;

b. Transmit notice and preservation letters to individuals that may have relevant information or materials (*initial letter sent November 6, 2019*);

c. Obtain available information, notes, and records regarding pre-race examinations and inspections (*completed December 20, 2019*);

d. Schedule interviews *(beginning November 8, 2019)*;

e. Conduct interviews *(completed December 20, 2019)*:

f. Review and analyze relevant veterinary and other materials *(Completed December 20, 2019)*;

g. Draft and prepare formal report (*Completed January 9, 2020*); and

h. Deliver formal report to Breeders' Cup Board of Directors and release to public (*Completed January 15, 2020*);

II. Evaluation Team

a. Lead Evaluator: Dr. Lawrence Bramlage

b. Support team:

i. Shannon Arvin

ii. Chapman Hopkins

iii. Robert Watt

III. Interviews of Individuals with Relevant Information

a. Veterinarians Having Interactions with Mongolian Groom

i. Dr. Rick Arthur

ii. Dr. Tim Grande

iii. Dr. Barrie Grant

iv. Dr. Dana Stead

v. De. Debbie Lamparter

vi. Dr. Will Farmer

vii. Dr. Nicholas Smith

viii. Dr. Jay Deluhery

ix. Dr. Vince Baker

b. Mongolian Groom Connections

i. Enebish Ganbat – Trainer

ii. Jesse Cardenas – Exercise Rider

iii. Edgar Pardilla – Groom

iv. Abel Cedillo – Jockey

c. Breeders' Cup Personnel

i. Drew Fleming

ii. Dora Delgado

iii. Tom Robbins (Del Mar employee working in Breeders' Cup Racing Office)

iv. Michael Gibbons

v. Erin McLaughlin

vi. Courtney Reid

vii. Josh Christian

d. The Stronach Group Personnel

i. Craig Fravel

ii. Aidan Butler

iii. Tim Ritvo

iv. Dionne Benson

v. Amy Zimmerman (XBTV)

IV. Relevant Evidentiary Materials

a. Rules and Procedures

i. CHRB Rules

ii. Santa Anita House Rules

iii. Breeders' Cup Horsemen's Information Guide and associated pre-entry and entry forms

b. Medical and Treatment Records

i. Owner/trainer treatment records

ii. Private veterinary records

iii. Inspection/evaluation records

iv. InCompass records

c. Breeders' Cup Required Records

i. Out of Competition testing results

ii. Pre-race exam form from attending veterinarian

iii. 14-day treatment record (submitted to CHRB official vet)

d. Necropsy results

e. Toxicology Reports

f. Training Records

i. Trainer records

ii. Equibase race and training records

g. Third-Party Records

i. Track surface reports and data from Dr. Mick Peterson

ii. Third-party photo and video records

a. XBTV website

b. Breeders' Cup website

c. Social media