Musculoskeletal problems associated with lameness and poor performance in cutting horses: 200 cases (2007–2015)

Tamara M. Swor DVM

Robin M. Dabareiner DVM, PhD

Cliff M. Honnas DVM

Noah D. Cohen VMD, MPH, PhD

Jerry B. Black DVM

From the Department of Large Animal Clinical Sciences, College of Veterinary Medicine and Biomedical Sciences, Texas A&M University, College Station, TX 77843 (Swor, Dabareiner, Cohen); Texas Equine Hospital, 13688 S State Hwy 6, Bryan, TX 77807 (Honnas); and the Department of Clinical Sciences, College of Veterinary Medicine and Biomedical Sciences, Colorado State University, Fort Collins, CO 80523 (Black). Dr. Swor's present address is Department of Veterinary Clinical Sciences, College of Veterinary Medicine, Iowa State University, Ames, IA 50011. Dr. Dabareiner's present address is Dr. Robin Veterinary Services, 7893 CR 246, Caldwell, TX 77836.

Address correspondence to Dr. Swor (tswor@iastate.edu).

OBJECTIVE

To describe the chief complaints by owners and the types and prevalences of musculoskeletal problems associated with lameness or poor performance in cutting horses.

DESIGN

Retrospective case series.

ANIMALS

200 client-owned cutting horses examined at the Texas A&M University Veterinary Medical Teaching Hospital between January 1, 2007, and December 31, 2015, because of lameness or poor performance.

PROCEDURES

Medical records were reviewed, and data were collected regarding signalment, history, findings on physical and lameness examinations, results of diagnostic procedures performed, diagnosis, and treatment. Distribution of observed proportions of forelimb and hind limb involvement was compared with a hypothetical distribution of 50% by means of a χ^2 test.

RESULTS

More horses were examined because of a recent decrease in performance (116/200 [58%]) than for lameness (84 [42%]). All horses had at least 1 lame limb, with lameness affecting a total of 281 limbs. Of the 281 lame limbs, 189 (67%) were hind limbs and 92 (33%) were forelimbs. These proportions were substantially different from a hypothetical distribution of 50% hind limbs and 50% forelimbs. The most common performance change was that horses would not reverse direction to follow prespecified individual cattle, and the most common cause of lameness was pain localized to the stifle joint region (69 [35%]).

CONCLUSIONS AND CLINICAL RELEVANCE

Cutting horses sustained more hind limb than forelimb musculoskeletal problems, and although these horses were more likely to be examined for decreased performance than lameness, veterinarians should be vigilant for problems affecting the stifle joint region. (*J Am Vet Med Assoc* 2019;254:619–625)

Lameness is the most commonly reported health problem affecting all types of horses and costs the horse industry millions of dollars annually.[1] Although diagnoses and treatments have been described for specific musculoskeletal problems that cause lameness in horses, only a few studies characterize frequencies and types of musculoskeletal injuries associated with specific disciplines of horse activities, such as team roping,[2] barrel racing,[3] show jumping,[4] and Thoroughbred racing.[5] To our knowledge, there have been no published reports on the prevalence of musculoskeletal problems associated with lameness and poor performance in horses used in the athletic activity of cutting, which involves separating or cutting a specific individual animal (eg, a prespecified cow or heifer) from its herd.

ABBREVIATIONS

IA	Intra-articular
MFTJ	Medial femorotibial joint compartment
OA	Osteoarthritis
TAMU-VMTH	Texas A&M University Veterinary Medical Teaching Hospital

To become competitive, cutting horses undergo rigorous training that starts at an early age (eg, during the year a horse is considered a 2-year-old). These horses perform repetitive rotational movements at high speeds, frequent and sudden changes in direction, and abrupt stops while cutting an animal from its herd and keeping it from rejoining the herd. This activity combined with the early age at which horses are introduced to the sport results in excessive stress on the musculoskeletal system of cutting horses, likely making lameness a common problem.

Given the present growth in popularity of cutting horse performance events and the large financial investment by competitive cutting horse owners, veterinarians who treat horses are likely to evaluate higher numbers of cutting horses than they had in the past. In addition, cutting horses pose diagnostic

and treatment challenges because of the nature of the musculoskeletal disorders that could arise from the rigid training starting at such a young age and because, in our experience, many cutting horses are examined because owners have a chief complaint of reduced performance, rather than a complaint of lameness. The specific aim of the study reported here was to describe the chief complaints by owners and the types and prevalences of musculoskeletal problems associated with lameness or poor performance in cutting horses.

Materials and Methods

Case selection criteria

All cutting horses examined between January 1, 2007, and December 31, 2015, because of lameness or poor performance were identified through a search of the medical records of the TAMU-VMTH. Only horses used solely for cutting activities were included in the study.

Medical records review

Data were obtained from medical records of included horses regarding the chief complaint by the owner; signalment; history pertaining to duration of clinical signs, recent performance change, and previous treatments; findings from physical and lameness examinations, including body weight and response to joint-flexion tests; results of diagnostic imaging (eg, radiography, ultrasonography, MRI, and nuclear scintigraphy) and anesthesia (eg, peripheral and IA local anesthesia); final diagnosis; and recommended treatment. Data collected from the medical records were entered into a computerized database.[a]

Lameness localization and diagnosis were determined on the basis of physical examination findings and results of other diagnostic procedures (eg, diagnostic imaging and anesthesia). Severity of lameness was graded on a scale of 0 to 5, according to the guidelines of the American Association of Equine Practitioners.[6] As part of the lameness examination, all horses had been trotted by hand on a hard surface while an evaluator observed for signs of lameness. Results of diagnostic anesthesia were considered meaningful if a horse's grade of lameness was reduced by ≥ 75%, compared with the grade of lameness before the procedure.

Navicular region pain was characterized by signs of pain localized to the caudal aspect of the foot. A diagnosis of navicular region pain was made on the basis of a consistently positive response to a hoof tester applied to the central frog region, a ≥ 75% improvement in the grade of lameness after a low palmar digital nerve block was performed, and, if determined necessary, results of further diagnostic imaging.

Thoracolumbar pain was characterized by signs of pain that could be elicited with digital palpation of the thoracolumbar region. Pain in this area was considered elicited if a horse responded with one or more of the following behaviors: deviating its lumbar region > 12 cm ventrally, pinning its ears, kicking caudally or abaxially with one or both hind limbs, or exhibiting some other aversive behavior (eg, swishing its tail or moving away from palpation).

Statistical analysis

The distribution of observed proportions of forelimb and hind limb involvement was compared with a hypothetical distribution of 50% hind limbs and 50% forelimbs by means of a χ^2 test. Analysis was performed with available software,[b] and values of $P \leq 0.05$ were considered significant.

Results

Animals

Two hundred client-owned horses (195 [97.5%] Quarter Horses and 5 [2.5%] American Paint Horses) were included in the study. One hundred five of 200 (52.5%) horses were mares, 53 (26.5%) were geldings, and 42 (21%) were stallions. Median age was 5 years (range, 2 to 22 years), and median body weight was 472 kg (1,038 lb; range, 266 to 641 kg [585 to 1,410 lb]).

Historical data

Of the 200 horses, 116 (58%) were examined because of poor performance and 84 (42%) were examined because of lameness. Median duration of clinical signs prior to examination at TAMU-VMTH was 3 weeks (range, < 1 week to 22 weeks). Sixty-two of the 84 (74%) horses examined for lameness were ≤ 10 years of age (median, 5 years; range, 2 to 22 years). Similarly, 88 of the 116 (76%) horses examined because their owners perceived a decrease in their performance were ≤ 10 years of age (median, 5 years; range, 3 to 10 years). Performance changes reported by owners included that horses would not reverse direction to follow cows (64/116 [55%]) or would stop improperly (21 [18%]), bounce (ie, showing an up-and-down motion with both hind limbs simultaneously) out of a turn (14 [12%]), buck (9 [8%]), wring their tail during the performance (5 [4%]), or resist entering the arena (3 [3%]). Prior to examination at the TAMU-VMTH, 112 of 200 (56%) horses had received medical treatment. Systemic treatments included polysulfated glycosaminoglycans[c] (89/112 [79%]), NSAIDs (78 [70%]), various oral chondroprotective supplements (50 [45%]), or sodium hyaluronate[d] (45 [40%]), alone or in combination. In addition, various IA treatments had been administered to 45 horses.

Physical and lameness examinations

Medical records contained detailed information regarding evaluation of the thoracolumbar region for painful responses to palpation for only 140 of 200 (70%) horses, and 98 of these 140 (70%) horses were recorded to have had evidence of thoracolumbar pain. The grade of lameness[6] on a scale from 0 to 5 was recorded for 184 of 200 (92%) horses, and the median grade for all limbs was 2 (range, 0 to 4). Re-

sults of limb flexion test were recorded for 177 of 200 (89%) horses. One hundred four of these 177 (59%) horses had an increase in severity of lameness after full-limb flexion of the affected limb's proximal joints or digital flexion of its distal joints, whereas flexion testing did not change the severity of lameness in 73 (41%) horses.

Diagnostic imaging and anesthesia

One hundred sixty of the 200 (80%) horses underwent diagnostic anesthesia (peripheral or IA anesthesia, alone or in combination) to localize the source of lameness. In the remaining 40 (20%) horses that did not undergo diagnostic anesthesia, results from physical and lameness examinations, responses to previous treatments, and experience of the attending clinicians were used to determine diagnostic methods pursued. One hundred seventy-six of the 200 (88%) horses underwent diagnostic imaging, including radiography (160/176 [91%]), ultrasonography (55 [318%]), MRI (15 [9%]), and nuclear scintigraphy (10 [6%]), alone or in combination. Ten of the 160 (6%) horses underwent diagnostic anesthesia without diagnostic imaging, and 26 of 200 (13%) horses underwent diagnostic imaging without diagnostic anesthesia.

Final diagnosis

A complete listing of the diagnostic procedures performed on each horse and the musculoskeletal problems identified was compiled **(Table 1)**. All 200 horses had signs of lameness detected during physical and lameness examinations, despite a high proportion of horses having been evaluated for a chief complaint of poor performance. Overall, a total of 281 limbs in 200 horses were identified as lame, with 58 (29%) horses having lameness in > 1 limb. Lameness affected only the hind limbs in 126 of 200 (63%) horses, only the forelimbs in 62 (31%), and a combination of the hind limbs and forelimbs in 12 (6%). Of the 281 lame limbs, 189 (67%) were hind limbs and 92 (33%) were forelimbs. These proportions were significantly ($P < 0.001$) different from a hypothetical distribution of 50% hind limbs and 50% forelimbs.

In 69 of the 200 (35%) horses, the cause of lameness was localized to the stifle joint region with diagnostic anesthesia. Sixty-two of the 69 (90%) horses with signs of stifle joint region pain had lameness further localized to the MFTJ, including 6 horses with a subchondral bone cyst in the distal aspect of the medial condyle of the femur evident on radiographs. The remaining 7 of the 69 (10%) horses with signs of stifle

Table 1—Musculoskeletal problems identified in 200 cutting horses examined at the TAMU-VMTH between January 1, 2007, and December 31, 2015, because of lameness or poor performance.

Final diagnosis	Diagnostic methods	No. (%) of horses	No. of limbs
MFTJ synovitis, OA, or subchondral bone cyst	DA, R	50 (25)	62 hind limbs
OA of distal tarsal (ie, tarsometatarsal and distal intertarsal) joints	DA, R, MP	30 (15)	58 hind limbs
Navicular region pain	DA, R, MRI	26 (13)	43 forelimbs
Suspensory ligament desmitis, proximal region	DA, US, NS, MRI	35 (17.5)	19 hind limbs and 16 forelimbs
Distal tarsal joints and MFTJ pain	DA, R, NS	10 (5)	16 hind limbs
Femoropatellar joint synovitis or OA	DA, R	7 (3.5)	7 hind limbs
Laminitis	CO, R	5 (2.5)	10 forelimbs
OA of MTPJ (apical sesamoid fracture)	MP, R	4 (2)	4 hind limbs
Carpal joint chip fracture	MP, R	3 (1.5)	3 forelimbs
OA of distal tarsal joints and navicular region pain	DA, R, MRI	4 (2)	8 forelimbs and 8 hind limbs
Thoracolumbar myositis	MP, CO	3 (1.5)	NA
Suspensory ligament desmitis, branch portion	US, NS, MRI	3 (1.5)	3 hind limbs
Upward fixation of patella	MP, CO	2 (1)	2 hind limbs
Central tarsal bone fracture	R, NS, MRI	2 (1)	2 hind limbs
Proximal interphalangeal joint OA	R	2 (1)	2 forelimbs
Sole bruise	CO	1 (< 1)	2 forelimbs
MFTJ or navicular region pain or both	DA, R	2 (1)	4 forelimbs and 4 hind limbs
Undetermined	NS	2 (1)	NA
Third phalanx fracture	R	1 (< 1)	1 forelimb
Pedal osteitis	DA, R	1 (< 1)	2 forelimbs
Sole abscess	CO	1 (< 1)	1 forelimb
Deep digital flexor tendonitis	CO, MP, US	1 (< 1)	1 hind limb
Tenosynovitis of digital tendon sheath	MP, US	2 (1)	2 hind limbs
Third metatarsal bone stress fracture	R, NS	1 (< 1)	1 hind limb
Neurologic disease	CO	1 (< 1)	NA
Impinging lumbar spinous process	MP, R	1 (< 1)	NA

Overall, a total of 281 limbs in 200 horses were identified as lame, and 58 (29%) horses had lameness in > 1 limb. Lameness affected only hind limbs in 126 of 200 (63%) horses, only forelimbs in 62 (31%), and a combination of hind limbs and forelimbs in 12 (6%). The proportion of lame limbs that were hind limbs (189/281 [67%]) was higher than the proportion of lame limbs that were forelimbs (92 [33%]) and was significantly ($P < 0.001$) higher than that expected by chance alone (50%).

CO = Clinical observation. DA = Diagnostic anesthesia. MP = Manual palpation. MTPJ = Metatarsophalangeal joint. NA = Not applicable. NS = Nuclear scintigraphy. R = Radiography. US = Ultrasonography.

joint region pain had the source of lameness localized to the femoropatellar joint. Twelve of the 69 (17%) horses had bilateral signs of stifle joint region pain.

Distal tarsal joint (ie, tarsometatarsal and distal intertarsal joints) synovitis or OA was diagnosed in 40 of 200 (20%) horses, and 28 of these 40 (70%) horses had bilateral distal tarsal joint abnormalities. The distal tarsal joints and MFTJs were involved in 10 of 200 (5%) horses.

Forelimb navicular region pain was diagnosed in 26 of 200 (13%) horses, and 18 of these 26 (69%) horses were affected bilaterally. The precise tissues involved with the source of pain around the navicular bone were not determined for all horses; however, horses with navicular region pain had characteristics that were distinct from horses having other identifiable sources of foot pain, such as a bruised sole or laminitis. In addition to the aforementioned and other conditions diagnosed (Table 1), desmitis of the proximal aspect of the suspensory ligament was diagnosed in the hind limbs of 19 of 200 (10%) horses and in the forelimbs of 16 (8%) horses.

Treatment

One-hundred eighty of the 200 (90%) horses received treatment at the TAMU-VMTH. Local infusion of medication or IA administration of medications was performed in 132 of the 200 (66%) horses. The amount and combinations of medications administered were at the discretion of the attending clinician but routinely consisted of corticosteroids and amikacin (for IA administration and local infusion), with or without the addition of a sodium hyaluronate product (for IA administration). The most common joints treated with IA medications were the tarsometatarsal and distal intertarsal joints (50/200 [25%]), followed by the MFTJ (40 [20%]) and the distal interphalangeal joint (20 [10%]), whereas local infusion of medication was performed at the proximal aspect of the suspensory ligament (15 [8%]) or in the thoracolumbar region (15 [8%]) of horses with pain localized to these anatomic sites. Other joints or synovial structures that were medicated less frequently included the carpal and proximal interphalangeal joints, navicular bursa, and digital flexor tendon sheath. Also performed at the TAMU-VMTH were arthroscopic surgeries to treat 16 of 200 (8%) horses, including 5 of the 6 horses with a subchondral bone cyst in the distal aspect of the medial condyle of the femur and 4 horses with apical sesamoid chip fractures involving the metatarsophalangeal joints. Further, extracorporeal shock wave treatment was performed on 11 of 200 (6%) horses.

Systemic pharmaceutical treatments recommended included phenylbutazone as a complete or adjunctive treatment for 180 of 200 (90%) horses, with variation in dosage and duration among clinicians and diagnoses. In addition, sodium hyaluronate[d] IV or polysulfated glycosaminoglycan[c] IM were recommended in 78 of 200 (39%) horses.

An extended period of confinement to a stall or small area (eg, pen or small paddock) was recommended for 50 of 200 (25%) horses, and the duration of rest and confinement varied depending on the type of musculoskeletal injury. Additional recommendations collected from the medical records included corrective shoeing (20/200 [10%]), soaking of the affected feet (3 [2%]), swimming exercises (2 [1%]), medial patellar ligament splitting (2 [1%]), and retirement because of severe OA in a MFTJ (1 [0.5%]).

Discussion

Results of the present study indicated that cutting horses examined for lameness or poor performance had a higher prevalence of musculoskeletal problems affecting the hind limbs (126/200 [63%]), compared with the forelimbs (62 [31%]), and that synovitis or OA of the stifle joint and distal tarsal joints were the most common musculoskeletal abnormalities recorded. These findings differed from findings of other studies[2,3] on Western horse performance activities in which the forelimbs, and especially the navicular region of the forefoot, were most commonly associated with lameness or decreased performance. To our knowledge, cutting activity is the first Western horse performance activity indicated as having a higher prevalence of hind limb musculoskeletal abnormalities than forelimb musculoskeletal abnormalities.

Median age of horses in the present study was 5 years, which was younger than the median age of 9 to 11 years for horses in studies of other Western[2,3] or English[4] performance activities. This younger age for cutting horses likely reflected the fact that the first major competition for cutting horses is a futurity for 3-year-old horses, and no horse > 6 years of age can compete in the limited-age event competitions after the futurities. Therefore, direct comparison of findings and ages reported for horses in the different sporting activities should be made with caution. Wear-and-tear–type injuries, such as OA of the MFTJ and distal tarsal joints and suspensory ligament desmitis, were common among horses in the present study, presumably because of the intense and repetitive training experience at early ages. In the racing industry, horses are also started as 2-year-olds, yet few race after 5 or 6 years of age. A previous study[7] examined lameness and athletic performance of 40 yearling Thoroughbreds that were trained, conditioned, and then sold as 2-year-olds in training and showed that 37 (93%) horses became lame during the 5-month training period, with 18 of the 37 (49%) horses developing lameness in a hind limb only and 5 of the 37 (14%) horses developing lameness in the forelimbs and hind limbs. By combining those groups, the authors of that study concluded that lameness more commonly affected the hind limbs (23/37 [62%]) than forelimbs and that the most common cause of lameness was joint injury. The movements of a galloping racehorse are quite different from the movements (eg, quick stops and turns) performed by a cutting horse, and these different performance activities (racing vs cutting) entail

very different gaits and training methods. Thus, the similar high proportion of hind limb lameness caused by joint injury in the Thoroughbreds of the previous study[7] and in the cutting horses of the present study is most likely attributable to the intense and repetitive training schedules initiated at such a young age for horses in both performance activities.

In the present study, the proportion of cutting horses examined because of an owner complaint of poor or decreased performance (116/200 [58%]) was higher than the proportion of cutting horses examined because of an owner complaint of lameness (84 [42%]) and was higher than the proportions of performance-related examinations reported for horses used in barrel racing[3] (46/118 [39%]) or team roping[2] (29/118 [25%]). One explanation for this discrepancy was that professional horsemen usually train and show cutting horses, and these professionals might detect performance problems prior to a horse developing more overt signs of lameness. However, in a recent study[8] of sport horses, a high proportion of horses in regular athletic work and assumed to be sound by their riders were actually lame, and the authors concluded that both professional and amateur riders may not recognize the presence of lameness. In addition, clinical signs of discomfort in the stifle joint region or the distal tarsal joints varies considerably among horses and ranges from moderate lameness to subtle changes in performance without overt lameness.[9,10] Subtle performance changes described for hind limb abnormalities include switching leads with the hind limbs, reluctance to turn or engage the hind end while working, and bucking.[11] We found similar complaints by owners of horses in the present study in that some behaviors reported included not wanting to turn back to the cow, improper stopping, and bucking. We suspected that the involved horses showed a decrease in performance as an early sign of hind limb pain before other signs of specific lameness were detected.

In the present study, the most consistent finding on physical examination was a painful response to palpation of the thoracolumbar muscles, which was noted in 98 of the 140 (70%) horses for which detailed information regarding evaluation of the thoracolumbar region was contained in their medical records. Thoracolumbar myositis can occur following trauma to the region, be associated with OA or other underlying bone abnormalities, or develop secondary to hind limb lameness.[9–13] It was possible that the high prevalence of hind limb musculoskeletal problems contributed to the high prevalence of signs of thoracolumbar pain in horses in the present study. Further, a final diagnosis of primary thoracolumbar myositis was made for only 3 horses in the study population; therefore, we considered thoracolumbar pain in the remaining horses to most likely have developed secondary to primary hind limb lameness. Because only 1 of the 3 horses with primary thoracolumbar myositis underwent diagnostic imaging of the thoracolumbar region, other causes of thoracolumbar pain could not be completely ruled out in the other 2 horses. For instance, thoracolumbar pain in these 2 horses could have been associated with the movements (eg, axial and appendicular rotation combined with quick stops and turns) entailed in performing cutting horse activities. Thoracolumbar pain has also been reported to be very common in horses competing in 3-day events.[13] Clinical signs of thoracolumbar myositis include eliciting signs of pain on palpation of the affected muscle group, subtle bilateral or unilateral hind limb lameness, bucking, and signs suggestive of an unwillingness to stop and of discomfort in saddling or mounting,[10,11,13] all of which were also common complaints from owners in the present study. Thus, thoracolumbar pain should not be overlooked when evaluating horses used for cutting.

In the present study, the most common area of musculoskeletal injury for cutting horses was the stifle joint region (69/200 [35%]), especially the MFTJ (62/69 [90%]). To our knowledge, this was the first time that the stifle joint region had been identified as being the most common anatomic location of lameness for horses in any performance discipline. Lameness associated with the stifle joint region can have traumatic or developmental causes. The median age of the horses in the present study was relatively young (5 years); therefore, it was not surprising that 6 horses had a subchondral bone cyst in the distal aspect of the medial condyle of the femur. These subchondral bone cysts could have been developmental, but also could have been caused by traumatic damage to the overlying cartilage or have been stimulated in young horses by the types of movements performed in cutting activities.[14] Interestingly, apparent traumatic causes of MFTJ problems were common in the present study, and this finding supported a previous report[10] of the MFTJ being the site that sustains the most stress in horses used for cutting. Examination of relationships between radiographic evidence of abnormalities in the medial condyle of the femur and performance of Quarter Horses used for cutting activities show that 41.4% of young cutting horses have radiographic evidence of abnormalities in the medial condyle.[15] Further, when radiographic evidence of abnormalities in the medial condyle are graded on a scale from 0 to 4, with 4 representing the most severe abnormalities (eg, subchondral cystic lesions), horses with grade 4 or bilateral abnormalities are markedly less likely to ever compete, and horses with a grade 3 abnormality are markedly less likely to earn money.[15,16] Considering such radiographic evidence of abnormalities in those young horses, it seems possible that some bloodlines of cutting horses may be predisposed to stifle joint problems or that the type of training exacerbates or increases the number of abnormalities detectable with stifle joint radiography. In the present study, the high percentage of horses with lameness related to the stifle joint region, coupled with the low number of subchondral

bone lesions identified on radiographs, suggested that trauma could play a large role in lameness of cutting horses. Further studies would be needed to determine whether the abnormalities detectable by radiography result from or cause the high prevalence of MFTJ-related lameness in cutting horses. Nevertheless, veterinarians evaluating cutting horses for lameness or poor performance should be vigilant for problems affecting the stifle joint region.

Distal tarsal joint (ie, tarsometatarsal and distal intertarsal joints) inflammation was the second most commonly diagnosed underlying cause for lameness in horses of the present study. In addition, it is the most common hind limb problem causing lameness in gaited horses[17] as well as horses used for team roping,[2] barrel racing,[3] show jumping and hunting,[18] and reining.[19] Development of OA in the distal tarsal joints, characterized commonly as low-motion joints, is thought to be caused by excessive compression and rotation of these joints when a horse jumps, stops, or turns.[9] The long-term repetitive exposure to these motions results in abnormal tension on the intertarsal ligaments, leading to progressive synovitis and arthritis followed by articular cartilage damage, subchondral bone lysis, joint capsule fibrosis, and joint narrowing.[9] Because performance of a cutting horse consists of quick stops and turns as it mirrors the movement of a cow it is cutting from the herd, the finding that pain localized to the distal tarsal joints was a common source of lameness in horses of the present study was not surprising. In a previous study,[20] factors associated with OA development include genetics, age when broken to saddle, height, and standing tarsal angle; however, variations in training intensity and keeping horses stabled during the first years of life have no effect on development of hind limb lameness. In addition, Icelandic horses have a predisposition for development of OA in the distal tarsal joints.[20] Further studies are warranted to determine whether cutting horses have a predisposition to develop OA in low-motion joints on the basis of their body type and training regimens.

In the present study, the most common forelimb problem was navicular region pain (26/200 [13%]). This was similar to findings reported for other Western horse performance events.[2,3,19] The Quarter Horse, which has a high prevalence of navicular disease,[21] is the primary breed used in cutting horse performance events; therefore, it was not surprising that navicular region pain was a common source of forelimb lameness in the present study. These findings suggested that the overall prevalence of navicular region pain in cutting horses was lower, compared with that reported for horses used in team roping (36/118 [31%])[2] or barrel racing (39/118 [33%]),[3] a discrepancy that could be attributable to the differences in median ages among the groups (cutting horses, 5 years; team roping, 11 years[2]; and barrel racing, 9 years[3]). Notably, clinical signs of navicular disease often become apparent when a horse is 7 to 9 years of age.[21]

Desmitis of the proximal portion of the suspensory ligament was diagnosed with regional anesthesia followed by ultrasonography in 35 of 200 (18%) horses, and more horses had this condition in the hind limbs (19/200 [10%]) than in the forelimbs (16 [8%]) in the present study. Suspensory ligament desmitis is a relatively frequent cause of lameness in English[4,15] and Western[2,3,10,19] performance horses. Reported risk factors include improper farriery leading to overgrown hooves and a long toe with low heel conformation, intense competition schedules, performing in deep sand or mud, and lack of conditioning.[22] The rigorous training of cutting horses that begins early in the year when a horse is considered a 2-year-old and the intense competition schedule could be factors that contribute to suspensory ligament strain in these horses. One study[23] describes forelimb superficial digital flexor tendonitis in 19 horses used for cutting and shows that all horses had lesions in the lateral aspect of the superficial digital flexor tendon and that 14 of the 17 (82%) horses for which follow-up was available returned to training after 3 to 9 months of convalescence.[23] The authors speculated that deep arena footing and horse fatigue were risk factors for the injury. Although superficial digital flexor tendon injury was not diagnosed in any of the horses in the present study, it could be an important cause of lameness and loss of use in cutting horses.

Although most horses in the present study were examined as primary care patients, 1 limitation of the study was that horses were examined at a veterinary teaching hospital, which, as a referral hospital, could have received cutting horses with musculoskeletal problems that differed from those received in general private practice. Another limitation was that only 80% of horses in the study population underwent diagnostic anesthesia, whereas diagnosis of underlying conditions in the remaining 20% was on the basis of clinician experience, response to previous treatment, and findings from physical and lameness examinations and diagnostic imaging. Although all clinicians in the present study had experience with lameness assessment in horses, some, on the basis of their previous experience, could have had preconceived ideas about locations of lameness in cutting horses. This could have influenced whether they performed diagnostic anesthesia or investigated less likely locations for lameness. For horses in the present study with lameness in multiple limbs, the focus was generally on the limb perceived by the horse's owner and clinician as causing the greatest source of discomfort to the horse. We think that it was likely for horses with lameness in multiple limbs to also have had decreased athletic performance; however, further studies would be needed to investigate this potential association.

Results of the present study indicated that horses used for cutting sustained more hind limb than forelimb musculoskeletal problems and were more likely to be examined for decreased performance than lameness. Studies are needed to determine risk fac-

tors for specific musculoskeletal injuries observed in cutting horses so that such injuries can be mitigated, including by changing practice management of cutting horses.

Acknowledgments

The authors declare that there were no conflicts of interest.

Footnotes

a. Epi Info, CDC, Atlanta, Ga.
b. S-PLUS, version 8.2, TIBCO Inc, Seattle, Wash.
c. Adequan, Luitpold Pharmaceuticals Inc, Shirley, NY.
d. Legend, Merial Inc, Duluth, Ga.

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