Proceedings of the 60th Annual Convention of the American Association of Equine Practitioners - AAEP –

December 6-10, 2014
Salt Lake City, UT, USA

Next Meeting:

Dec. 3-7, 2016 - Orlando, FL, USA

Reprinted in the IVIS website with the permission of the AAEP
http://www.ivis.org
Exercise-Induced Changes in Back Dimensions: 
The Influence of Saddle-Fit, Rider-Skill, and 
Work-Quality

Sue Dyson, MA, VetMB, PhD*; and Line Greve, DVM

The back muscles of horses working correctly enlarge transiently with work. If a saddle does not fit properly, this increase in size does not occur, which may impair back function. Saddle-fit should be assessed before and after exercise. Authors’ address: Centre for Equine Studies, Animal Health Trust, Lanwades Park, Kentford, Newmarket, Suffolk, CB8 7UU, UK; e-mail: sue.dyson@aht.org.uk. *Corresponding and presenting author. © 2014 AAEP.

1. Introduction
Recommendations concerning saddle-fit are empirical and based on anecdotal information. We know that the saddle needs to fit the horse in motion, but there has been no investigation of whether the thoracolumbar region changes in shape in association with exercise or how improper saddle-fit may influence potential changes. The objectives were to quantify exercise-induced back dimension changes and to describe the association with work-quality, saddle-fit, and rider-skill.

2. Materials and Methods
Sixty-three sports horses in normal work were prospectively assessed. Thoracolumbar shape/symmetry were measured at predetermined sites before and immediately after a 30 min exercise period; width ratios for two levels at each site were calculated. The work-quality and rider-skill were graded; the presence of lameness and saddle-fit were recorded. Descriptive statistics, univariable and multivariable mixed-effect linear regression were performed to assess the relationship between horse-saddle-rider factors and changes in back dimensions.

3. Results
The mean back-shape ratio immediately after ridden exercise was greater compared with before work for all sites. Mean changes in back-shape were greater in horses working correctly versus not working correctly and in horses with correctly-fitting vs ill-fitting saddles at each site. Mean changes were greater in horses ridden by good > moderately > poorly-skilled riders. Mean changes were less in lame horses compared with sound horses.

Acknowledgments
Conflict of Interest
The Authors declare no conflicts of interest.
How to Look for Sacroiliac Disease During Lameness Examination: Some Simple Clinical Indicators

Rob van Wessum, DVM, MS, Cert Pract KNMvD (Equine)

1. Introduction
Back pain, and more specifically sacroiliac pain, has become a commonly recognized cause of reduced performance in the horse in the last decade.1–6 Many improvements in diagnostics and therapy have been made, and treating sacroiliac problems in horses is now part of many sport medicine practices.3

In general, complaints about sacroiliac pain in horses are diverse.1–4 Coming to a diagnosis can be a daunting task and often involves several diagnostic tools to exclude other sources of reduced performance.4–6 When a clinician, confronted with a case of suspected sacroiliac disease, has a “checklist” of clinical symptoms or indicators related to sacroiliac disease to rely on, the likelihood of recognizing the dysfunction is improved.7,8 The more “iliosacral related” symptoms that are present at initial clinical examination, the more likely it is that the horse is suffering from sacroiliac disease.7–11

Some of these parameters are excellent indicators for spinal dysfunction or pathology, and incorporating an evaluation of these parameters into the standard clinical exam for lameness or performance related complaints can be very helpful to the lameness clinician, as they may otherwise be easily overlooked.

2. Materials and Methods
When sacroiliac pathology is present, the normal movement of the sacroiliac region of the horse will be compromised.1,3,5,6 Altered sacroiliac mobility can be associated with several very specific alterations in the normal gait patterns in the horse.7,8 A short description of these gait alterations and how to evaluate them during a clinical exam is listed below.

Tracking Narrow Behind
One of the first alterations of gait due to sacroiliac dysfunction, tracking narrow behind, is often visible in walk and even more obvious in trot. In walk, there are always at least 2 limbs on the ground in the support phase, whereas in trot there is a suspension phase with no limbs on the ground and then a diagonal support phase with 2 limbs on the ground,12 making loading and rotational forces on the sacroiliac region more pronounced. When sacral rotation is avoided, the horse will place the hind feet close together, what is called narrow be-
MUSCULOSKELETAL EXAMINATION AND THERAPY

Lateral Walk

When observing the walk on a straight line, the walk should be a clear 4 beat motion. When spinal dysfunction is present and the horse is asked to perform a serpentine in hand, the walk becomes more lateral, similar to a pace (hind limb and front limb on the same side advance at the same time). This finding has been associated with cervical spinal cord compression (“Wobbler’s”) but is not well described with other spinal dysfunction. In the author’s opinion, the loss of a 4 beat walk is a clear indicator of tension (pain?) and decreased mobility in the spine.

The best way to evaluate for the symptoms of lateral walk and narrow behind is to first have the horse walk and trot in hand to and from the examiner/clinician, as in any lameness exam, and then to have the horse walk again but in a serpentine pattern. Observing the horse from the side when it passes by on the straight line can also be very helpful.

Haunches In/Out

When observing a horse going away and coming at the clinician, the front limbs and the hind limbs should be on 2 tracks, the hind limbs follow the front limbs in the same plane. With sacral dysfunction, one hip is often kept slightly lower (may be subtle), resulting in a slight bending to one side. When the haunches are brought to one side, the observer notes that the horse is on 3 or more tracks. The hind limbs do not follow the front limbs in the same plane but are placed laterally, away from the central axis. This is easily observed when the horse is lunged on a circle. If the haunches are more in, one sees the front limbs making a circle with a slightly larger diameter than the hind limbs. Conversely, when the haunches are out, the hind limbs travel on a larger diameter. In canter, younger/untrained horses often have a slight haunches in at the canter, but nearly every “normal moving” horse should be tracking straight (“true”) in walk and trot on a 25 to 30 foot diameter circle.

Reduced Flexibility of the Lumbosacral Region

The last part of the exam for achieving information about the sacroiliac region is “hands-on.” After observing the flexibility of the lumbosacral region in walk, trot, and canter, now the clinician evaluates the flexibility by manipulating it.

With one hand on the tuber coxae and one hand on the tail, lateral flexion in both directions is tested by simultaneously pulling on the tail and pushing slightly on the tuber coxae. Ventral flexion is evaluated by making the horse “tuck under” by scratching it with a pointy object on the hamstrings on each side. Lateral and ventral flexibility should be symmetrical. Clear reduction of lateral and/or ventral flexibility is a good indicator for sacroiliac dysfunction.

3. Results

In the author’s practice, we have included the serpentine in walk, lunging at all 3 gaits, and the manipulation of the lumbosacral region as a standard protocol in every lameness exam. During 9 years of practice (2005–2014), the author has examined 811 cases with a complaint of reduced performance or subtle hind limb lameness. Of these, 327 (40%) were diagnosed with sacroiliac disease based on clinical exam, imaging data (ultrasonography and scintigraphy), and improvement in symptoms or abnormal diagnostic findings at 2, 4, and 6 month recheck intervals after initial treatment and rehab. Of these 327 cases of diagnosed and clinically substantiated sacroiliac disease, 322 had a positive score (“present”) for at least 3 indicators mentioned above. Of the 489 cases with a final diagnosis dif-
different from sacroiliac disease, less than 2% (7 horses) had more than 3 indicators positive.

4. Conclusion
Results in our practice show a clear value of using these specific indicators for diagnosing sacroiliac dysfunction. With a small extension to the standard procedure for a lameness exam, much more specific information about the condition of the sacroiliac region can be obtained with little extra effort.

Acknowledgments

Conflict of Interest
The Author declares no conflicts of interest.

References
Influence of Aquatic Exercise on Postural Sway Characteristics in a Model of Equine Carpal Osteoarthritis

Melissa R. King, DVM, PhD, DACVSMR*; Kevin K. Haussler, DVM, DC, PhD, DACVSMR; Christopher E. Kawcak, DVM, PhD, DACVS, DACVSMR; C. Wayne McIlwraith, BVSc, PhD, DSc, DACVS, DACVSMR; David D. Frisbie, DVM, PhD, DACVS, DACVSMR; and Raoul F. Reiser II, PhD

Underwater treadmill exercise significantly improved balance control in horses with experimentally induced carpal osteoarthritis under varying stance conditions. Authors' addresses: Orthopaedic Research Center, Department of Clinical Sciences (King, Haussler, Kawcak, McIlwraith, Frisbie) and Department of Health and Exercise Science (Reiser), Colorado State University, Fort Collins, CO 80523; e-mail: Melissa.King@colostate.edu. *Corresponding and presenting author. © 2014 AAEP.

1. Introduction
Exercising in water provides an effective medium for increasing joint mobility, increasing muscle activation, promoting normal motor patterns, and reducing the incidence of secondary musculoskeletal injuries. The improved muscle strength and function associated with aquatic exercise significantly improve proprioception and motor control and reduce the abnormal postural sway characteristics typically reported in osteoarthritic adults.

2. Materials and Methods
Osteoarthritis was induced in one middle carpal joint of 16 horses. Horses were assigned to either underwater or overground (without water) treadmill exercise. Force platforms were used to collect postural sway data from each horse at four different time points. Horses were made to stand stationary on the force platforms under 3 stance conditions: normal square stance, base-narrow placement of the thoracic limbs, and removal of visual cues (blindfolded).

3. Results
Displacement of the center of pressure differed significantly depending on the stance condition. Among horses exercised on the underwater treadmill, postural stability in both the base-narrow and blindfolded stance conditions improved in comparison to the overground treadmill exercised horses. Horses exercised on the overground treadmill were only effective at maintaining a stable center of pressure during the normal stance position.

4. Discussion
Variations in stance position had profound effects on the mechanics of standing balance in horses with
experimentally induced carpal joint osteoarthritis. Underwater treadmill exercise significantly improved the horses’ postural stability, which is fundamental to providing evidence-based support for equine aquatic therapy.

Acknowledgments

Conflict of Interest

The Authors declare no conflicts of interest.

Sarah T. Peters, VMD*; Alan J. Ruggles, DVM, DACVS; Lawrence R. Bramlage, DVM, MS, DACVS; Scott A. Hopper, DVM, DACVS; Rolf M. Embertson, DVM, DACVS; and J. Brett Woodie, DVM, MSc, DACVS

Pelvic fractures in Thoroughbreds have a good prognosis. Acetabular involvement, comminution, and articular involvement negatively affect the short-term outcome, but those discharged from the hospital could go on to be successful. Authors’ addresses: High Plains Veterinary Clinic, 996 10th Avenue SE, Sidney, MT 59270 (Peters); and Rood and Riddle Equine Hospital, PO Box 12070, Lexington, KY 40580-2070 (Ruggles, Bramlage, Hopper, Embertson, Woodie); e-mail: petersvmd@gmail.com. *Corresponding and presenting author. © 2014 AAEP.

1. Introduction
Pelvic fractures are a cause of poor performance in horses. Our objectives are to describe the current epidemiology of pelvic fractures in a Thoroughbred population and determine the short- and long-term outcomes.

2. Materials and Methods
The records of Thoroughbreds diagnosed with a pelvic fracture during the period 2000–2010 were reviewed. The short-term outcome (discharged from hospital) and long-term success (racing or live offspring) were evaluated with respect to different factors.

3. Results
There were 136 horses included, of which 72 (62%) raced after their fracture and 42 (36%) were subsequently able to have at least one foal. Acetabular involvement ($p < 0.001$), articular involvement ($p = 0.008$), and comminution ($p < 0.001$) were significantly associated with a negative short-term outcome. Of horses with acetabular involvement, 60% had a good short-term outcome, 75% of which were successful long-term. Racehorses with fractures only involving the ileum ($p = 0.014$), as well as young horses and racehorses ($p = 0.0002$) were more successful. Overall, 86% of horses had a good short-term outcome, 77% of which were successful long-term.

4. Discussion
This study found a better short-term prognosis for pelvic fractures than previously reported. While acetabular involvement was significantly associated with a negative short-term outcome, over half of them were still successful long-term. Commination and articular involvement were significantly associated with a negative short-term outcome but did not impact the long-term success.

Acknowledgments
Conflict of Interest
The Authors declare no conflicts of interest.
Caudal Lumbar Vertebral Fractures in California Quarter Horse and Thoroughbred Racehorses

Elizabeth M. Collar, DVM*; Regina Zavodovskaya, MS, DVM, DACVP; Mathieu Spriet, DVM, MS, DACVR; Peta L. Hitchens, BAppSc (Equine), MVPHMgt, PhD; Tristan Wisner, BS; Francisco A. Uzal, DVM, MSc, PhD, DACVP; and Susan M. Stover, DVM, PhD, DACVS

Lumbar vertebral fractures occur in horses with pre-existing pathology at the 5th and 6th lumbar vertebral junction (L5–L6) that likely predisposes horses to catastrophic fracture. Authors’ addresses: J.D. Wheat Veterinary Orthopedic Research Laboratory (Collar, Zavodovskaya, Hitchens, Wisner, Stover); and Surgical and Radiological Sciences (Spriet), University of California, School of Veterinary Medicine, Davis, CA 95616; and Pathology, California Animal Health and Food Safety Laboratory, University of California Davis, School of Veterinary Medicine, San Bernardino, CA, 92408 (Uzal); e-mail: emcollar@ucdavis.edu. *Corresponding and presenting author. © 2014 AAEP.

1. Introduction
Repetitive overuse injuries often predispose to catastrophic injuries in racehorses. Lumbar vertebral fractures are not typically related to external trauma and may occur secondary to pre-existing abnormalities.

2. Materials and Methods
California racehorse postmortem reports and associated jockey injury reports were retrospectively reviewed. Vertebral specimens from 6 racehorses with lumbar vertebral fractures and 4 control racehorses euthanized for non-spinal fracture were assessed using visual, radiographic, computed tomography, and histologic examinations.

3. Results
Lumbar vertebral fractures occurred in 38 Quarter Horse (QH) and 29 Thoroughbred racehorses over a 22-year period, primarily involving L5 and/or L6 (87% of QHs, 48% of Thoroughbreds). Lumbar vertebral fractures were the third most common musculoskeletal cause of death in QHs and commonly involved a jockey injury. Quarter Horse specimens contained anatomic variations in the number of vertebral, dorsal spinous processes, and transverse articulations. The examined lumbar vertebral fractures (5 QHs, 1 Thoroughbred) coursed obliquely (cranioventral to caudodorsal) across the adjacent L5-L6 vertebral endplates and intervertebral disk, although one case involved only one endplate. All cases had evidence of ventral vertebral body abnormalities consistent with pre-existing maladaptive pathology.

4. Discussion
Lumbar vertebral fractures had a common configuration and evidence of anomalous bone modeling...
and remodeling at the site of fracture. Pathology of the caudal lumbar vertebral region appears to precede catastrophic lumbar fracture and may be more common than recognized.

Acknowledgments
Many thanks to Meredith Rhea, Thomas Lazzari, and CAHFS for assistance in collecting and processing the spine specimens and to Dr. Roy Pool for his invaluable consultation.

Conflict of Interest
Support was provided by the California Horse Racing Board's Racing Safety Program. The text was not reviewed or influenced by the California Horse Racing Board.
Comparison of Training-Related Injury Rates Between Juvenile Thoroughbreds Trained for Two-Year-Old Sales and Those Trained Solely for Racing

Jonathan McLellan, BVMS (hons), MRCVS*; Sarah Plevin, BVMS, MRCVS, DABVP; and Thomas O’Keeffe, MVB

No significant differences in injury rates or ability to start a race were observed between populations: the intensive training required for 2-year-old sales may not be detrimental to race-horses. Authors’ address: Infield Equine Diagnostics/ Florida Equine Veterinary Associates, Ocala FL 34482; e-mail: infieldems@hotmail.com. *Corresponding and presenting author. © 2014 AAEP.

1. Introduction
Limited information exists comparing rates of injuries between juveniles trained for 2-year-old resale and those trained exclusively to race.

2. Materials and Methods
Training records for juveniles at a single training center were reviewed. The information included miles galloped and breezed, injury type and date, and age at first start. A ratio of breezed to galloped miles was calculated for each horse. Miles at risk were compared using survival plots and age at first start was compared using T tests. The incidence rates of injury were compared between groups. The number of horses which started a race was compared using Fisher’s exact test. Significance was set at $p = 0.05$.

3. Results
Forty-nine percent of the 45 “race” horses demonstrated injury requiring time out of training compared to 42% of the 57 “sales” horses. Injuries were classified as sore shins, fetlock injuries, suspensory and flexor injuries, and miscellaneous. No significant difference was observed in injury incidence rates between the groups, although the timing of injury differed between groups. An analysis of the breeze/gallop ratio highlighted significant differences in training methods between groups ($p = 0.04$) with greater breeze miles in the “sales” group. “Sales” horses were significantly younger at first start ($p = 0.004$), although no difference in ability to start was observed ($p = 0.76$).

4. Discussion
The distribution and rates of injury did not differ between groups even though the training methods and timing of injury differed. Further investigation is warranted to evaluate this finding in the general population.

Acknowledgment
Conflict of Interest
The Authors declare no conflicts of interest.
Clearance of Corticosteroids Following Intra-Articular Administration of Clinical Doses to Racehorses

Heather K. Knych, DVM, PhD, DACVCP*; Jeff Blea, DVM; and Rick M. Arthur, DVM

Association of Racing Commissioners International (ARCI) regulatory recommendations are appropriate for administration of maximum intra-articular doses of 18 mg of triamcinolone acetonide (TCA), 600 mg methylprednisolone acetate (MPA), 18 mg isoflupredone, and betamethasone doses less than 30 mg. Authors’ addresses: K.L. Maddy Equine Analytical Chemistry Laboratory (Knych), School of Veterinary Medicine (Arthur), University of California, Davis, CA 95616; and Von Bluecher, Blea, Hunkin, Inc., PO Box 970, Sierra Madre, CA 91024 (Blea); e-mail: hkknych@ucdavis.edu. *Corresponding and presenting author. © 2014 AAEP.

1. Introduction
Over the last several years, there has been a nationwide cooperative effort to establish threshold concentrations and withdrawal times for corticosteroid use in racehorses. Withdrawal time guidelines are based on pharmacokinetic studies of single intra-articular corticosteroid injections.1,2 As dosing regimens are specific to individual horses and highly variable, it is not possible to establish regulatory guidelines for every dosing scenario. The goal of the study described here was to assess the applicability of current regulatory recommendations for corticosteroids based on clinical protocols used by practitioners.

2. Materials and Methods
Fifty-eight Thoroughbred racehorses received varying doses of TCA,a,b MPA,c isoflupredone,d or betamethasonee intra-articularly in various joints by the treating practitioner. Blood samples were collected at 0, 7, 10, 14, 21, 28, and 35 days post drug administration. Serum samples were analyzed by liquid chromatography mass spectrometry for quantitation of drug concentrations.

3. Results and Discussion
Serum elimination varied depending upon the dose and the number and specific joints treated. Serum concentrations fell below the ARCI recommended threshold by days 7 (100 pg/mL) for both TCA (9–18 mg dose) and isoflupredone (4–18 mg dose) and day 21 (100 pg/mL) for MPA (40–600 mg dose). Betamethasone fell below the recommended threshold (10 pg/mL) by 7 days for doses less than 30 mg but not until 10 days for doses of 30–60 mg. It is important to note, however, that results reported here may differ if compounded formulations are used.
Acknowledgments

Financial support for this study was provided by the Dolly Green Research Foundation.

Conflict of Interest

The Authors declare no conflicts of interest.

References and Footnotes


"Vetalog®, Boehringer Ingelheim Vetmedica, Saint Joseph, MO 64506.
"Kenalog®, Bristol-Meyers Squibb Company, Princeton, NJ 08540.
"Depo Medrol®, Zoetis, Florham Park, NJ 07932.
"Predef 2X®, Zoetis, Florham Park, NJ 07932.
"Celestone®, Merck & Co, Inc., Whitehouse Station, NJ 08889.
Infectious arthritis (IA) following intra-articular injection is rare and prophylactic antibiotics are likely unnecessary. The treating veterinarian and combined corticosteroids (CS) and polysulphated glycosaminoglycans (PSGAG) treatment were significant risk factors. Combined intra-articular diagnostic anesthesia and treatment did not increase the risk of infection. Authors’ addresses: Evidensia Equine Hospital Helsingborg, Bergavägen 3, SE-25023 Helsingborg, Sweden (Bohlin, Kristoffersen); and National Veterinary Institute, Technical University of Denmark, Section for Epidemiology, Bülowsvej 27, DK-1870 Fredriksberg C, Denmark (Toft); e-mail: Anna.Bohlin@djursjukhus.com. *Corresponding and presenting author. © 2014 AAEP.

1. Introduction

Intra-articular injection is commonly performed in lameness diagnosis and treatment; the most feared complication is infectious arthritis, and to some veterinarians this justifies routine use of prophylactic antibiotics.

2. Materials and Methods

A retrospective cohort study of medical records from a private equine hospital was done. Records of horses undergoing lameness diagnostics and treatment including intra-articular injections were identified. Risk factors were investigated using Fisher’s exact test with a level of significance $P < 0.05$.

3. Results

Medical records of 2833 horses, 5139 visits, and 14124 intra-articular injections were identified. The incidences of infectious arthritis at injection level were: all substances 9.2/10000 (0.092%), local anesthetic 9.1/10000 (0.091%), overall treatment 17.0/10000 (0.17%), CS 16.1/10000 (0.161%), hyaluronan 15.9/10000 (0.159%), and PSGAG 39.4/10000 (0.394%). No horse undergoing diagnostic anesthesia alone experienced infectious arthritis; performing combined diagnostic anesthesia and treatment was not a risk factor. No specific joint had an increased risk for infection. At horse level, the significant risk factors identified were the treating veterinarian, relative risk (RR) = 4.1 ($P = 0.04$),...
and combined PSGAG and CS treatment RR = 2.7 ($P = 0.05$) compared with CS used alone.

4. Discussion
Infectious arthritis was a rare event following intra-articular injection. Approximately 1000 horses should be treated with prophylactic antibiotics to prevent one infection following intra-articular injection. The use of PSGAG-CS combination and the treating veterinarian were the only identified risk factors.

Acknowledgments

Conflict of Interest
The Authors declare no conflicts of interest.
Spontaneous Rupture of the Proximal Superficial Digital Flexor Tendon: A Clinical Syndrome in Aged Equids

Betsy Vaughan, DVM*; Mary Beth Whitcomb, DVM, MBA, ECVDI (Assoc); Larry Galuppo, DVM, DACVS; and Georgette Shields, DVM

Acute rupture of the proximal superficial digital flexor tendon (SDFT) can occur spontaneously in older horses resulting in severe pain and prolonged lameness. Pasture soundness is achievable but requires long term rest and rehabilitation. Authors' addresses: Department of Surgical & Radiological Sciences (Vaughan, Whitcomb, Galuppo) and William R. Pritchard Veterinary Medical Teaching Hospital (Shields), School of Veterinary Medicine, University of California, One Shields Avenue, Davis, CA 95616; e-mail: mevaughan@ucdavis.edu. *Corresponding and presenting author. © 2014 AAEP.

1. Introduction
Injury to the SDFT is a well-documented cause of lameness in horses of all ages and disciplines; however, acute rupture of the SDFT has been infrequently described.

2. Materials and Methods
Records were reviewed for equids presenting for metacarpal ultrasound from August 2003 to July 2013. Cases were included if complete rupture of the SDFT was detected at any location within the carpal canal or metacarpal region.

3. Results
One mule and 13 horses were identified, ranging in age from 15 to 30 years. Affected equids were retired or lightly ridden (10), show jumpers (3), or breeding stock (1). All presented for concurrent swelling and lameness of the affected limb, graded as severe in 12 of 14 cases. SDFT rupture was unilateral (13) or bilateral (1 mule). All ruptures occurred in the carpal canal and proximal metacarpal region. Concurrent carpal sheath effusion (5), superior check ligament desmitis (2), and carpal flexor retinaculum rupture (1) were also noted. Re-check ultrasound revealed substantial improvement in 4 horses. The mule was euthanized after diagnosis. Six horses attained at least pasture soundness, including 3 used for light riding, 1 breeding stallion, and 2 that were retired. Four were retired due to lameness, including 2 that ruptured the contralateral SDFT. One remains in rehabilitation, and 2 were lost to follow-up.

4. Conclusion
Spontaneous rupture of the proximal SDFT should be considered in older horses or mules with severe acute lameness and SDFT swelling. Affected equids have a fair prognosis for pasture soundness after prolonged rehabilitation.

Acknowledgments
The Authors declare no conflicts of interest.