



Hoof care should be a key focus during a horse's formative years

## Creating a Solid Foundation

### HOOF MANAGEMENT SHOULD START EARLY IN A HORSE'S LIFE

By AMANDA DUCKWORTH

**THERE IS NO** question that good hooves are a cornerstone to having healthy horses, whether they are athletically inclined or not. Hoof maintenance is a life-long concern, and proper hoof care cannot begin too soon.

This becomes doubly important, though, for horses engaged in sport. Thoroughbreds begin their careers at a young age, and many of them are also going to experience the sales ring before

ever setting foot on a racetrack. Their conformation and hoof health are a key focus from the beginning.

The American Association of Equine Practitioners explains the basics in its paper "Building a Foundation of Foot Care in Foals" by Dr. Stephen O'Grady.

"Among the many factors that determine the success of a foal as a sales yearling or a mature athlete are management decisions about its feet

and limbs during its first four months of life," he explained. "Because a solid foundation for performance in the future begins with foot care in the foal, many leading breeding farms use programs that combine the skills of a veterinarian (with an interest in podiatry) with the skills of a farrier.

"This joint venture allows an earlier and more accurate diagnosis, treatment and prognosis of foot problems. Although this type of preventive program may be time-consuming, if it corrects a foot or limb problem and increases the athletic potential of even one animal, it is a worthwhile investment."

In November 2022, *Animals (Basel)* examined the issue in the study "Hoof Matters: Developing an Athletic Thoroughbred Hoof."

"The development of strong, well-conformed hooves begins prenatally and is on-going throughout the horse's life," explained researchers. "This paper explores specific aspects of the development and adaptation of the distal forelimb in Thoroughbred foals with emphasis on how the hoof responds to weight bearing early in life."

Researchers conducted four independent studies to document changes in hoof shape using Thoroughbred fetuses and foals ranging from 38 days prepartum to 503 days postpartum.

For measurement of epidermal features, a total of 15 Thoroughbred cadaver fetuses and foals, which had all died naturally or were stillborn, were used. None had been euthanized and all presented with healthy limbs and hooves.

Measurement of skeletal conformational features was conducted on 22 Thoroughbred foals that were born during the same foaling season at three stud farms which were located near each other and used the same farrier and veterinary practice. None of the foals had obvious conformational faults or had been treated for lameness.

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# HEALTH ZONE

## Hoof Health

ments were done on 28 foals that were selected from two stud farms on the basis of being healthy and having no behavioral difficulties. Data was collected when acquired flexural deformities (AFDs) were reported to emerge.

Lastly, the same 28 Thoroughbred foals selected for growth and compression measurements were also used to measure solar load distribution.

“The functional capacity of the hoof in the Thoroughbred racehorse begins with the development of the hoof capsule in utero,” researchers concluded. “The thickness of the epidermal tissues at the toe increased from  $2.84 \pm 0.41$  mm before birth to  $4.04 \pm 1.10$  mm by 4 months of age. The increase in thickness was accompanied by decreased density



In addition to the work of a farrier, consulting with a veterinarian who has an interest in podiatry provides another layer of expertise

of horn tubules at the toe while the number and size of horn tubules increased at the medial and lateral quarters. This provides a malleable hoof capsule with increased resistance to fracture toughness at the quarters to allow for skeletal growth.

“Between 4–6 months of age, the hoof widens, and higher loading on the medial side (>60%) vs. the lateral side (<40%) may be factors that influence mature asymmetric hoof shape. Shortly after 12 months of age, the dorsal hoof wall angle becomes parallel with the dorsal wall of

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the distal phalanx, thus optimizing the functional capacity of the hoof capsule in the weanling Thoroughbred.”

The fate of a horse's hoof health can begin early, which is why being aware of changes is important from a managerial standpoint. In April 2024, the *Journal of Veterinary Medical Science* published “Changes in aspects of hoof and distal limb conformation in foals by radiographic evaluation.”

“This study investigated age-related radiographic changes in the distal parts of the forelimbs by radiographic evaluation and identified the radiographic changes associated with diseases specific to foals,” explained researchers.

A total of eight Thoroughbred foals—three colts and five fillies—were used for the study, which was conducted at the Hidaka Training and Research Center in Hokkaido, Japan. All of the horses involved were privately owned by the research center, and the foals were born healthy without conformational malformations and developed no fractures during the first year of life.

For the study, researchers measured the hoof angle (HA), distal phalanx angle (P3A), distal phalanx palmer angle (P3PA), distal interphalangeal joint angle (DIPJA), and metacarpophalangeal joint angle (MPJA) on lateromedial radiographs of forelimbs on the day after birth (Day 1); at 1, 2, 4, 6, and 8 weeks of age; and then monthly until 12 months of age.

Findings included that HA and P3A significantly increased from 1 day to 4 weeks and 4 weeks to 3 months of age; the P3PA increased dramatically from 1 day to 1 week, 1 week to 2 weeks, and 2 weeks to 8 weeks of age, and then decreased after 3 months of age; DIPJA significantly decreased from 1 day to 2 weeks of age before increasing from 3 to 5 months of age; and MPJA increased with age until 4 weeks, slightly decreased from 2 to 4 months of age, and then gradually decreased from 4 to 6 months of age.

“This study demonstrated that flexion of the fetlock and a broken backward hoof–pastern axis are typical presentations of the foal's forelimbs just after birth,” researchers concluded. “An upright forelimb fetlock and high HA remain until 4 months of age, after which a change to a mature conformation develops from 6 months of age. The physiological variants are highly likely to induce diseases peculiar to foals, the onset of which particularly occurs between 2 and 4 months of age. Therefore, this period is crucial for good foal management.



### **AMONG THE MANY FACTORS THAT DETERMINE THE SUCCESS OF A FOAL AS A SALES YEARLING OR A MATURE ATHLETE ARE MANAGEMENT DECISIONS ABOUT ITS FEET AND LIMBS DURING ITS FIRST FOUR MONTHS OF LIFE.”**

—DR. STEPHEN O'GRADY

“Furthermore, the results of this study suggest that changes in the distal forelimb conformation and some pathological conditions in foals, including fractures of the proximal sesamoid bone and palmar process of the distal phalanx, and acquired flexural deformity of the DIPJ (club foot), are related to age-related functional adaptation of digital flexor tendons and suspensory ligaments. The study also provides helpful data on the typical magnitude of changes for each age group that can serve as working criteria for abnormalities and thus contribute toward the management and prevention of diseases peculiar to foals.”

Once Thoroughbreds reach racing age, a day-to-day concern in terms of

hoof health involves proper shoeing. In June 2023, *Animals (Basel)* published “Hoof Expansion, Deformation, and Surface Strains Vary with Horseshoe Nail Positions.”

“Racehorses are susceptible to under-run heel hoof conformation,” explained researchers. “Racehorses are often shod with nails placed toward the heel. It is unknown if palmar nails restrict or alter hoof deformation in a manner that could promote the development of under-run heel conformation over time with repeated loading.”

For the study, researchers aimed to determine how the addition of palmar nails affects heel deformation during limb loading, hoof expansion, and hoof wall deformations. They attached horseshoes on cadaveric hooves by nails in three different sets of positions. A total of nine unilateral cadaver forelimbs from nine various breeds of horses, including Thoroughbreds, were used, and the limbs had no evidence of orthopedic disease, history of lameness, or hoof abnormalities. Then, weight bearing was simulated while hoof expansion and compression and tension on the surface of the hoof were measured.

“Shoeing with the addition of nails palmar to the widest portion of the hoof (quarters) reduces hoof expansion and hoof wall deformation at the heels and alters hoof wall principal strain directions in a manner consistent with mechanisms leading to the development of under-run heels and thus injury risk,” researchers concluded. “The practice of placing nails more palmarly in relation to the quarters has been observed in racing horses, and injuries in racehorses have been associated with under-run heels. Placing nails dorsal to the quarters of the hoof may lead to a decrease in under-run heel development.

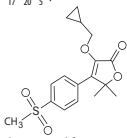
“Additionally, the restriction of normal surface hoof deformations may also alter the deeper anatomic structures, contributing to the development of abnormal hoof conformations, foot

# EquiCoxib™ (firocoxib) Oral Solution for Horses

Non-steroidal anti-inflammatory drug for oral use in horses only.

**CAUTION: Federal law restricts this drug to use by or on the order of a licensed veterinarian.**

**Description:** EquiCoxib™ (firocoxib) belongs to the coxib class of non-narcotic, non-steroidal anti-inflammatory drugs (NSAIDs). Firocoxib is a white crystalline compound described chemically as 3-(cyclopropylmethoxy)-4-(4-(methylsulfonyl)phenyl)-5,5-dimethylfuranone. The empirical formula is  $C_{17}H_{20}O_5$ , and the molecular weight is 336.4. The structural formula is shown below:



**Indications:** EquiCoxib Oral Solution is administered for up to 14 days for the control of pain and inflammation associated with osteoarthritis in horses.

**Dosage and Administration:** Always provide the Client Information Sheet with the prescription. The recommended dosage of EquiCoxib (firocoxib) for oral administration in horses is 0.045 mg/lb (0.1 mg/kg) of body weight once daily for up to 14 days. In target animal safety studies, toxicity was seen at the recommended dose when the duration of treatment exceeded 30 days. **Only administer EquiCoxib with the provided dosing syringe.**

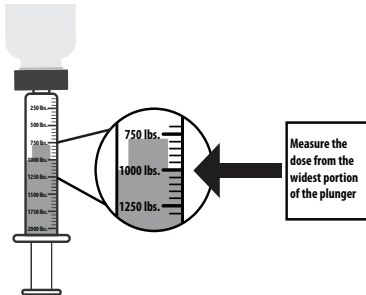
Each 1.25 mL volume will treat 250 pounds of body weight and each additional 0.25 mL volume corresponds to approximately a 50 lb weight increment. The provided dosing syringe is calibrated so that each line corresponds to a 50 lb weight increment. To deliver the correct dose, round the horse's body weight up to the nearest 50 pound increment (if the body weight is an exact 50 pound increment, do not round up).

**FOR ORAL USE ONLY. DO NOT INJECT EQUICOXIB.  
ONLY ADMINISTER WITH THE PROVIDED DOSING SYRINGE.**

EquiCoxib Oral Dosing Guide

Body Weight (lb)	Dose Volume (mL)
250	1.25 mL
500	2.5 mL
750	3.75 mL
1000	5 mL
1250	6.25 mL

- 1) Remove draw-off cap. Peel off the foil-backed seal from the bottle.
- 2) Screw the draw-off cap tightly back on the bottle.
- 3) Remove the seal from the top of the cap exposing the cross-hatched opening in the center of the silicone liner.
- 4) Remove the provided oral dosing syringe from its plastic cover.
- 5) Insert the oral dosing syringe firmly into the cross-hatched opening of the cap's silicone liner.
- 6) Turn the bottle with attached syringe upside down. Pull back the syringe plunger until the widest portion of the plunger lines up with the line that corresponds with the animal's weight. Each line between the 250 lb increments corresponds to 50 lb.



- 7) Turn the bottle with attached syringe right side up and separate the dosing syringe from the bottle.
- 8) Give orally according to your veterinarian's instructions. DO NOT INJECT.

**Contraindications:** Horses with hypersensitivity to firocoxib should not receive EquiCoxib Oral Solution.

## Warnings:

**For oral use in horses only. Do not use in horses intended for human consumption.**

**Human Warnings:** Not for use in humans. Keep this and all medications out of the reach of children. Wash hands with soap and water after use. Consult a physician in case of accidental ingestion by humans.

**Animal Safety:** Clients should be advised to observe for signs of potential drug toxicity and be given a Client Information Sheet with each prescription. Keep EquiCoxib in a secure location out of reach of dogs, cats, and other animals to prevent accidental ingestion or overdose.

To report suspected adverse drug events, for technical assistance or to obtain a copy of the Safety Data Sheet (SDS), contact Aurora Pharmaceutical at 1-888-215-1256 or [www.aurorapharmaceutical.com](http://www.aurorapharmaceutical.com). For additional information about adverse drug experience reporting for animal drugs, contact FDA at 1-888-FDA-VETS or online at [www.fda.gov/reportanimalae](http://www.fda.gov/reportanimalae).

## Precautions:

Horses should undergo a thorough history and physical examination before initiation of NSAID therapy. Appropriate laboratory tests should be conducted to establish hematological and serum biochemical baseline data before and periodically during administration of any NSAID. Clients should be advised to observe for signs of potential drug toxicity and be given a Client Information Sheet with each prescription. See **Information for Owner or Person Treating Horse** section of this package insert.

Treatment with EquiCoxib should be terminated if signs such as inappetence, colic, abnormal feces, or lethargy are observed. As a class, cyclooxygenase inhibitory NSAIDs may be associated with gastrointestinal, renal, and hepatic toxicity. Sensitivity to drug-associated adverse events varies with the individual patient. Horses that have experienced adverse reactions from one NSAID may experience adverse reactions from another NSAID. Patients at greatest risk for adverse events are those that are dehydrated, on diuretic therapy, or those with existing renal, cardiovascular, and/or hepatic dysfunction. Concurrent administration of potentially nephrotoxic drugs should be carefully approached or avoided. NSAIDs may inhibit the prostaglandins that maintain normal homeostatic function. Such anti-prostaglandin effects may result in clinically significant disease in patients with underlying or pre-existing disease that has not been previously diagnosed. Since many NSAIDs possess the potential to produce gastrointestinal ulcerations and/or gastrointestinal perforation, concomitant use of EquiCoxib Oral Solution with other anti-inflammatory drugs, such as NSAIDs or corticosteroids, should be avoided. The concomitant use of protein bound drugs with EquiCoxib Oral Solution has not been studied in horses. The influence of concomitant drugs that may inhibit the metabolism of EquiCoxib Oral Solution has not been evaluated. Drug compatibility should be monitored in patients requiring adjunctive therapy. The safe use of EquiCoxib Oral Solution in horses less than one year in age, horses used for breeding, or in pregnant or lactating mares has not been evaluated. Consider appropriate washout times when switching from one NSAID to another NSAID or corticosteroid.

**Adverse Reactions:** In controlled field studies, 127 horses (ages 3 to 37 years) were evaluated for safety when given firocoxib at a dose of 0.045 mg/lb (0.1 mg/kg) orally once daily for up to 14 days. The following adverse reactions were observed. Horses may have experienced more than one of the observed adverse reactions during the study.

**Adverse Reactions Seen in U.S. Field Studies** Firocoxib was safely used concomitantly with other therapies, including vaccines, anthelmintics, and antibiotics, during the field studies. The safety data sheet (SDS) contains more detailed occupational safety information.

To report suspected adverse drug events, for technical assistance, or to obtain a copy of the Safety Data Sheet (SDS), contact Aurora Pharmaceutical Inc. at 1-888-215-1256 or [www.aurorapharmaceutical.com](http://www.aurorapharmaceutical.com). For additional information about adverse drug experience reporting for animal drugs, contact FDA at 1-888-FDA-VETS, or online at [www.fda.gov/reportanimalae](http://www.fda.gov/reportanimalae).

Adverse Reactions	Firocoxib n=127	Active Control n=125
Abdominal pain	0	1
Diarrhea	2	0
Excitation	1	0
Lethargy	0	1
Loose stool	1	0
Polydipsia	0	1
Urticaria	0	1

**Information for Owner or Person Treating Horse:** You should give a Client Information Sheet to the person treating the horse and advise them of the potential for adverse reactions and the clinical signs associated with NSAID intolerance. Adverse reactions may include erosions and ulcers of the gums, tongue, lips and face, weight loss, colic, diarrhea, or icterus. Serious adverse reactions associated with this drug class can occur without warning and, in some situations, result in death. Clients should be advised to discontinue NSAID therapy and contact their veterinarian immediately if any of these signs of intolerance are observed. The majority of patients with drug-related adverse reactions recover when the signs are recognized, drug administration is stopped, and veterinary care is initiated.

**Clinical Pharmacokinetics / Pharmacodynamics: Pharmacokinetics:** When administered as a 0.045 mg/lb (0.1 mg/kg) dose in oral paste to adult horses with normal access to roughage, feed, and water, the absolute bioavailability of firocoxib from oral paste is approximately 79%. Following oral administration, drug peak concentration (C<sub>max</sub>) of 0.08 mcg/mL can be reached at 4 hours (T<sub>max</sub>) post-dosing. However, in some animals, up to 12 hours may be needed before significant plasma concentrations are observed. Little drug amount distributes into blood cells. The major metabolism mechanism of firocoxib in the horse is decyclopropyl-methylation followed by glucuronidation of that metabolite. Based upon radiolabel studies, the majority of firocoxib is eliminated in the urine as the decyclopropylmethylated metabolite. Despite a high rate of plasma protein binding (98%), firocoxib exhibits a large volume of distribution (mean V<sub>d(ss)</sub> = 1652 mL/kg). The terminal elimination half-life (T<sub>1/2</sub>) in plasma averages 30-40 hours after IV or oral paste dosing. Therefore, drug accumulation occurs with repeated dose administrations and steady state concentrations are achieved between 6-8 daily oral doses in the horse. Dose linearity exists from 1X-2X of 0.1 mg/kg/day.

**Mode of action:** EquiCoxib (firocoxib) is a cyclooxygenase-inhibiting (coxib) class, non-narcotic, non-steroidal anti-inflammatory drug (NSAID) with anti-inflammatory, analgesic and antipyretic activity<sup>1</sup> in animal models. Based on in vitro horse data, firocoxib is a selective inhibitor of prostaglandin biosynthesis through inhibition of inducible cyclooxygenase-2-isoenzyme (COX-2)<sup>2</sup>. Firocoxib selectivity for the constitutive isoenzyme, cyclooxygenase-1 (COX-1) is relatively low. However, the clinical significance of these in vitro selectivity findings has not been established.

**Effectiveness:** Two hundred fifty-three client-owned horses of various breeds, ranging in age from 2 to 37 years and weighing from 595 to 1638 lbs, were randomly administered firocoxib oral paste or an active control drug in multi-center field studies. Two hundred forty horses were evaluated for effectiveness and 252 horses were evaluated for safety. Horses were assessed for lameness, pain on manipulation, range of motion, joint swelling, and overall clinical improvement in a non-inferiority evaluation of firocoxib oral paste compared to an active control. At study's end, 84.4% of horses treated with firocoxib oral paste were judged improved on veterinarians' clinical assessment, and 73.8% were also rated improved by owners. Horses treated with firocoxib oral paste showed improvement in veterinarian-assessed lameness, pain on manipulation, range of motion, and joint swelling that was comparable to the active control.

**Animal Safety:** In a target animal safety study, firocoxib was administered orally to healthy adult horses (two male castrates and four females per group) at 0, 0.1, 0.3 and 0.5 mg firocoxib/kg body weight (1, 3 and 5X the recommended dose) for 30 days. Administration of firocoxib at 0.3 and 0.5 mg/kg body weight was associated with an increased incidence of oral ulcers as compared to the control group but, no oral ulcers were noted with 0.1 mg/kg. There were no other drug-related adverse findings in this study.

In another target animal safety study, firocoxib was administered orally to healthy adult horses (four males or male castrates and four females per group) at 0, 0.1, 0.3 and 0.5 mg firocoxib/kg body weight (1, 3 and 5X the recommended dose) for 42 days. Administration of firocoxib at 0.1, 0.3 and 0.5 mg/kg body weight was associated with delayed healing of pre-existing oral (lip, tongue, gingival) ulcers. In addition, the incidence of oral ulcers was higher in all treated groups as compared to the control group.

Clinical chemistry and coagulation abnormalities were seen in several horses in the 0.5 mg/kg (5X) group. One 5X male horse developed a mildly elevated BUN and creatinine over the course of the study, prolonged buccal mucosal bleeding time (BMBT), and a dilated pelvis of the right kidney. Another 5X male had a similar mild increase in creatinine during the study but did not have any gross abnormal findings. One female in the 5X group had a prolonged BMBT, bilateral tubulointerstitial nephropathy and bilateral papillary necrosis. Tubulointerstitial nephropathy occurred in one 3X female, two 3X male horses, and the 5X female horse discussed above with the prolonged BMBT. Papillary necrosis was present in one 1X male horse and the 5X female horse discussed above. Despite the gross and microscopic renal lesions, all of the horses were clinically healthy and had normal hematology, clinical chemistry and urinalysis values.

In another target animal safety study, firocoxib was administered orally to healthy adult horses (three females, two male castrates and one male per group) at 0, 0.25 mg/kg, 0.75 mg/kg and 1.25 mg/kg (2.5, 7.5 and 12.5X the recommended dose of 0.1 mg/kg) for 92 days. An additional group of three females, two male castrates and one male per group, was dosed at 1.25 mg/kg for 92 days but was monitored until Days 147-149. There were treatment-related adverse events in all treated groups. These consisted of ulcers of the lips, gingiva and tongue and erosions of the skin of the mandible and head. Gross and microscopic lesions of the kidneys consistent with tubulointerstitial nephropathy were seen in all treated groups. Papillary necrosis was seen in the 2.5X and 12.5X groups. In addition, several 12.5X horses had elevated liver enzymes (GGT, SDH, AST and ALT). One 2.5X horse had increased urine GGT and urine protein levels which was due to renal hemorrhage and nephropathy. Gastric ulcers of the margo plicatus and glandular area were more prevalent in the 2.5X and 7.5X groups, but not seen in the 12.5X group. The group of horses that were monitored until Days 147-149 showed partial to full recovery from oral and skin ulcers, but no recovery from tubulointerstitial nephropathy.

**Storage Information:** Store below 77°F (25°C). Brief excursions up to 104°F (40°C) are permitted.

**How Supplied:** EquiCoxib is available in bottles containing 90 mL of EquiCoxib Oral Solution, sufficient to treat a 1250 lb. horse for up to 14 days.

**References:** <sup>1</sup>McCann ME, Rickes EL, Hora DF, Cunningham PK et al. In vitro effects and in vivo efficacy of a novel cyclooxygenase-2 inhibitor in cats with lipopolysaccharide-induced pyrexia. *Am J Vet Res.* 2005 Jul;66 (7):1278-84

<sup>2</sup>McCann ME, Anderson DR, Brideau C et al. In vitro activity and in vivo efficacy of a novel COX-2 inhibitor in the horse. *Proceedings of the Academy of Veterinary Internal Medicine.* 2002. Abstract 114, p.789.

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IN 55-1756 12/2023

pain, or related injuries. While nail placement may have a role in the development of an underrun heel, other factors may also contribute to this development, including trimming and shoeing methods, the surface substrate, genetics, and exercise. Additional longitudinal studies using horses that are in work could be performed to test the effects that nail placement has on hoof growth and distortion over time.”

Keeping racehorses in good hoof health is crucial. It should come as

were visited at the beginning and the peak of the racing season in England. Behavioral observations along with individual environmental and animal-based welfare measures were carried out on 353 horses.

“In our sample the horses were generally in good physical health: 94% of horses recorded as an ideal body condition score, no horses had signs of hoof neglect and 77.7% had no nasal discharge,” researchers found.

The safety and well-being of both

vary across surfaces with contrasting fundamental properties, such as hardness and regularity.”

For the study, researchers fitted inertial measurement units (IMUs) to the forelimb hooves of retired Thoroughbred racehorses as they trotted in a randomized order over tarmac, artificial, and turf surfaces, with their jockey in rising and two-point seat positions. Data collected included stride length, hoof landing, mid-stance, breakover, and swing durations for each condition. Six retired racehorses in regular work at the British Racing School in Newmarket were used.

“This study has demonstrated that longer hoof landing durations were associated with soft and irregular surfaces (grass and artificial),” researchers concluded. “When landing times were lengthened, the subsequent mid-stance phase duration was typically reduced, but variation in landing duration appeared to be the main influence on total stride duration. Increasing the duration of mid-stance increases the time over which there is a large vertical ground reaction force on the distal limb, and this may contribute to a better constraint on limb positioning and therefore increased stability. Breakover was not significantly influenced by surface or jockey position in this study. Swing duration was longest on grass. Stride length was closely correlated to speed.

“From the perspective of hoof kinematics, although surface had the dominant effect, if small improvements in stability in the horse-jockey dyad are sought then this may be achieved by the jockey adopting a two-point seat position and thereby extending the mid-stance period.”

Throughout the life cycle of a Thoroughbred, hoof health is of utmost importance for the horse’s long-term well-being. Beyond the basics, it also greatly impacts a horse’s efficacy as an equine athlete and aids in keeping riders safe. **BH**



An early preventative approach to hoof care increases the athletic potential in horses

no surprise then that it is an area that received high marks in the study “Racehorse Welfare Across a Training Season,” which was published by *Frontiers in Veterinary Science* in June 2023.

“This is the first study to assess racehorse welfare using scientific objective methods across a training season,” explained researchers. “The aim of this study was threefold, firstly to investigate welfare measures which could be used in the first welfare assessment protocol for racehorses. Secondly, to understand the effect that a racing and training season had on individual racehorses and thirdly, to identify risk factors for both good and poor welfare.”

A total of 13 racehorse training yards

horse and rider are important whenever a horse is under saddle, and soundness as well as hoof movement play a role. In August 2023, *Animals (Basel)* published “Timing Differences in Stride Cycle Phases in Retired Racehorses Ridden in Rising and Two-Point Seat Positions at Trot on Turf, Artificial and Tarmac Surfaces.”

“Racehorses routinely trot over tarmac, artificial, and turf surfaces to access gallop tracks and during warm-up exercises,” explained researchers. “While undertaking these activities, jockeys may assume either a rising or two-point seat position. Understanding how hoof movements vary depending on jockey seating style may have a bearing on safety and stability, and this may