

Exercise History Report (Full)

Horse #2



UC DAVIS

VETERINARY MEDICINE

*J. D. Wheat Veterinary Orthopedic
Research Laboratory*

Oct-03-2013

Exercise History Report (Full)

J.D. Wheat Veterinary Orthopedic Research Laboratory

This report summarizes the high speed exercise history for Case Horse. There are four parts to this report:

Part 1 is a graph that depicts the races and officially recorded high speed workouts for Case Horse over the horse's career. The graph is useful for visually assessing features of a horse's career like: career length, periods of layup, and exercise consistency. If Case Horse had zero recorded high-speed exercise events, this graph is not produced. Event histories for three breed, sex, age, and event-matched control horses are also plotted.

Part 2 includes graphs which illustrate Case Horse's exercise history alongside that of Control Horses. These graphs are useful for visually comparing periods of layup and specific rates of exercise in the horses' exercise histories.

Part 3 is a chronological listing of races and officially timed works beginning with the most recent event (race or work).

Part 4 is a chart that allows comparison of exercise variables between Case Horse and other racehorses of similar age, sex, and breed that did not die at the same time from an injury. Similar to comparing the results of a blood test to a range of normal values, the values for Case Horse can be assessed in the context of a normal range for 95% of a sample of similar racehorses that did not die during the same time as Case Horse.

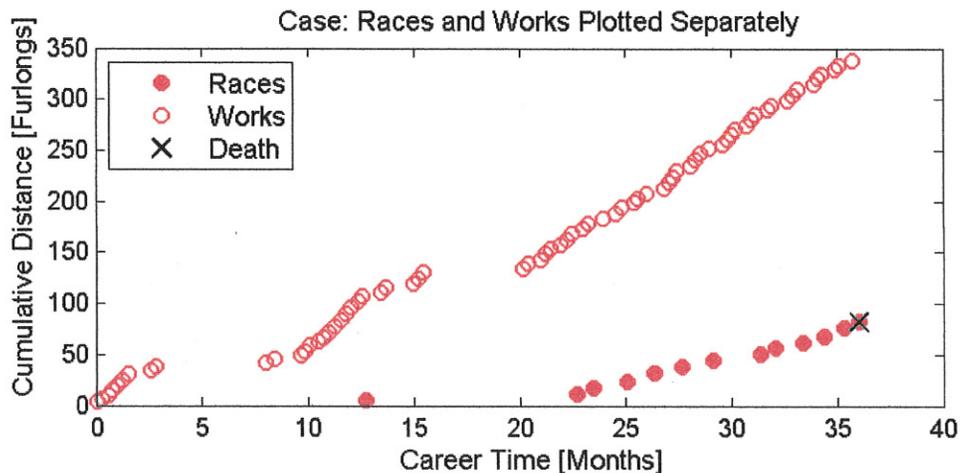
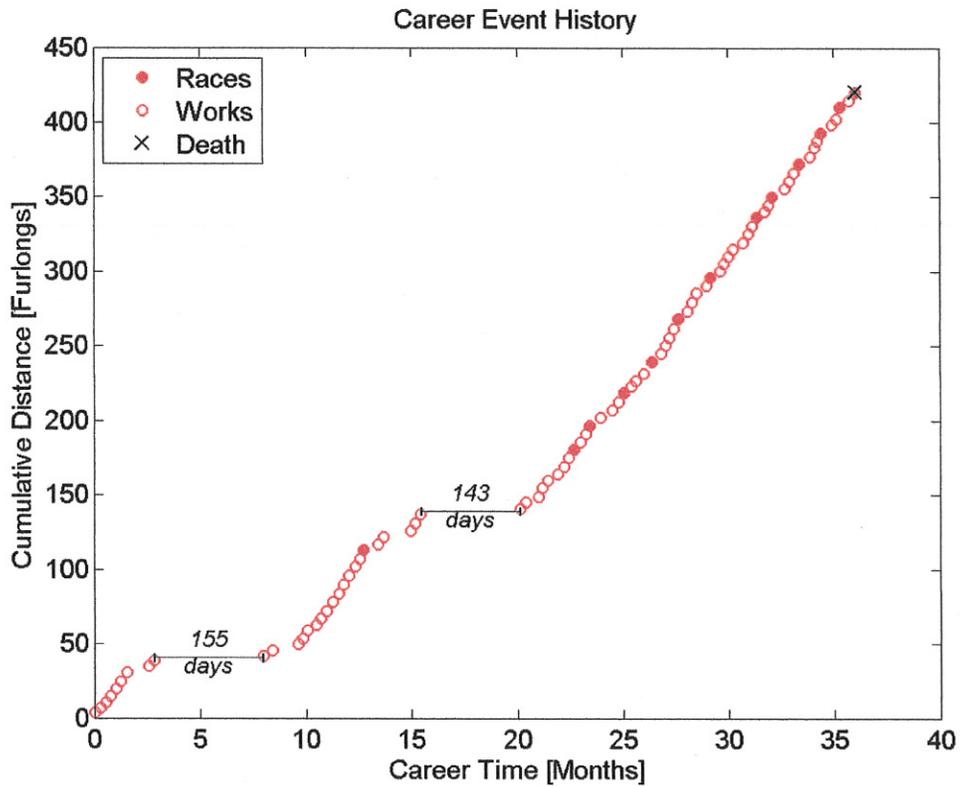
Table of Contents

Part 1: Graphical Representation of Individual High-Speed Exercise Histories	1
Case Horse High Speed Exercise History	1
Control 1 High Speed Exercise History	2
Control 2 High Speed Exercise History	3
Control 3 High Speed Exercise History	4
Part 2: Case and Control Horses Plotted Together	5
Part 3: Case Horse's Event History	8
Part 4: Comparison of Exercise Variables between Case Horse and 221 Control Horses (5+ year old, male, Thoroughbred)	11

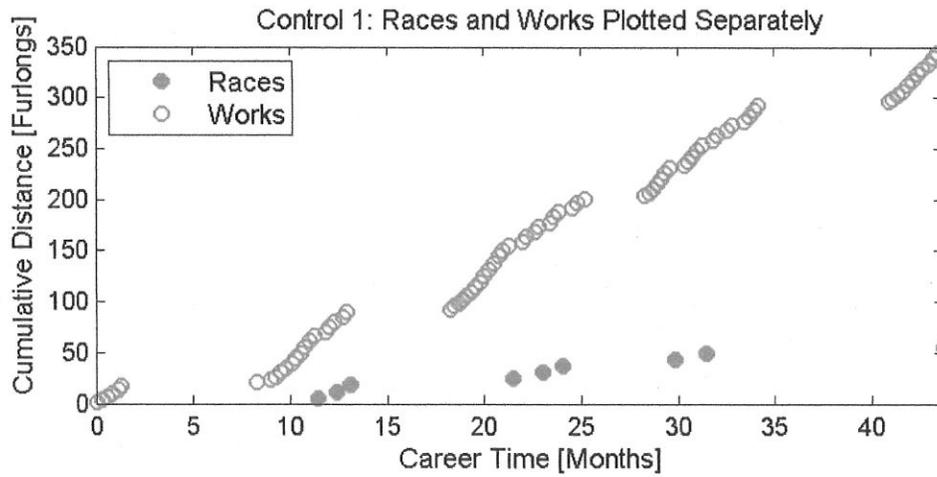
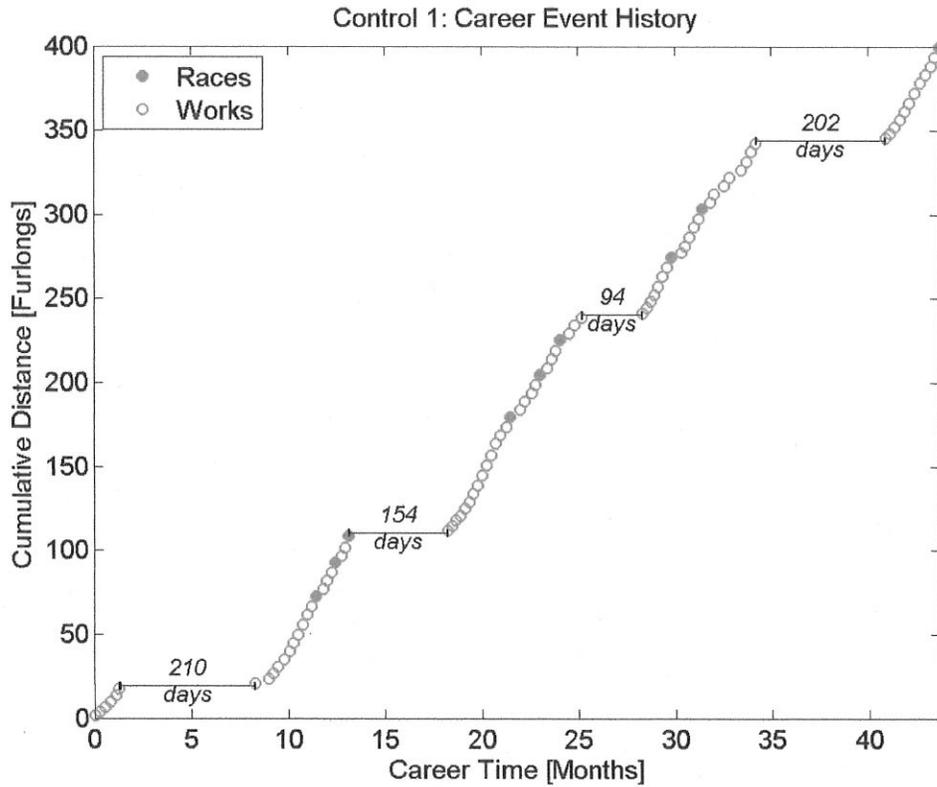
Part 1: Graphical Representation of Individual High-Speed Exercise Histories

Races (filled circles), officially timed high-speed works (open circles), layoffs (line with endcaps, periods of time greater than 60 days in length without a race or timed work), and time of death (X) are illustrated over time (Career Time in months). With each event (race or work), the number of furlongs the horse exercised in that event is added to the number of furlongs exercised in all previous events.

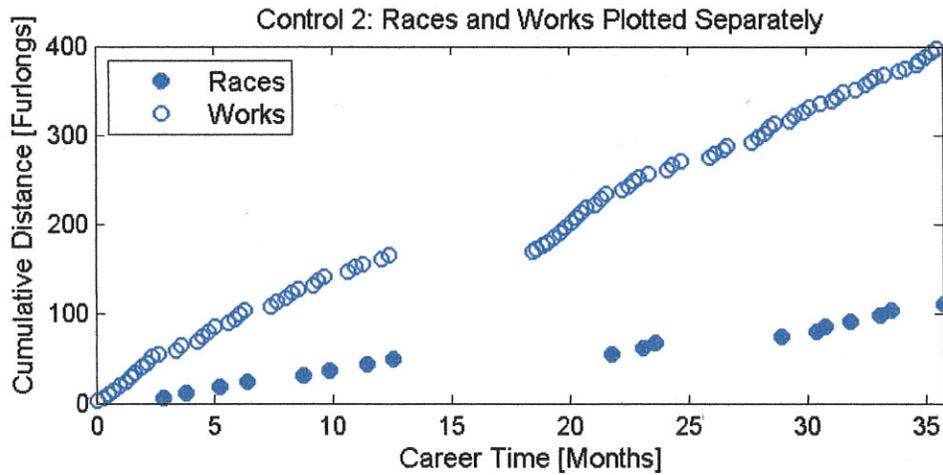
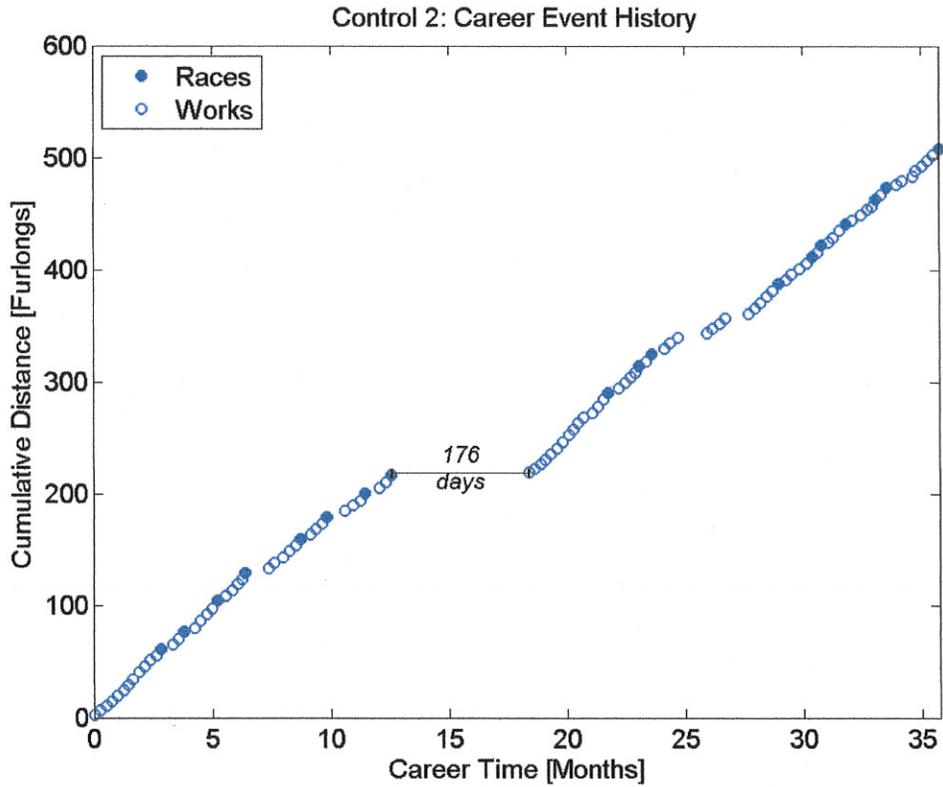
Case Horse High Speed Exercise History



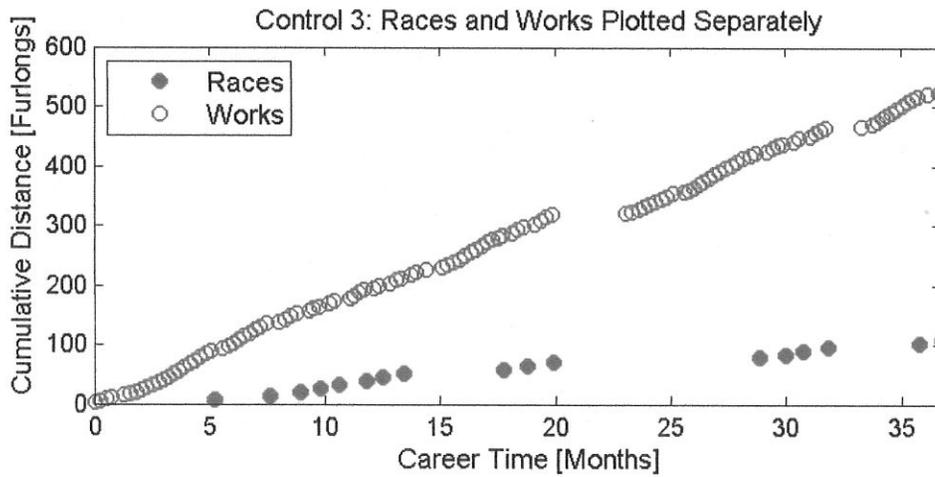
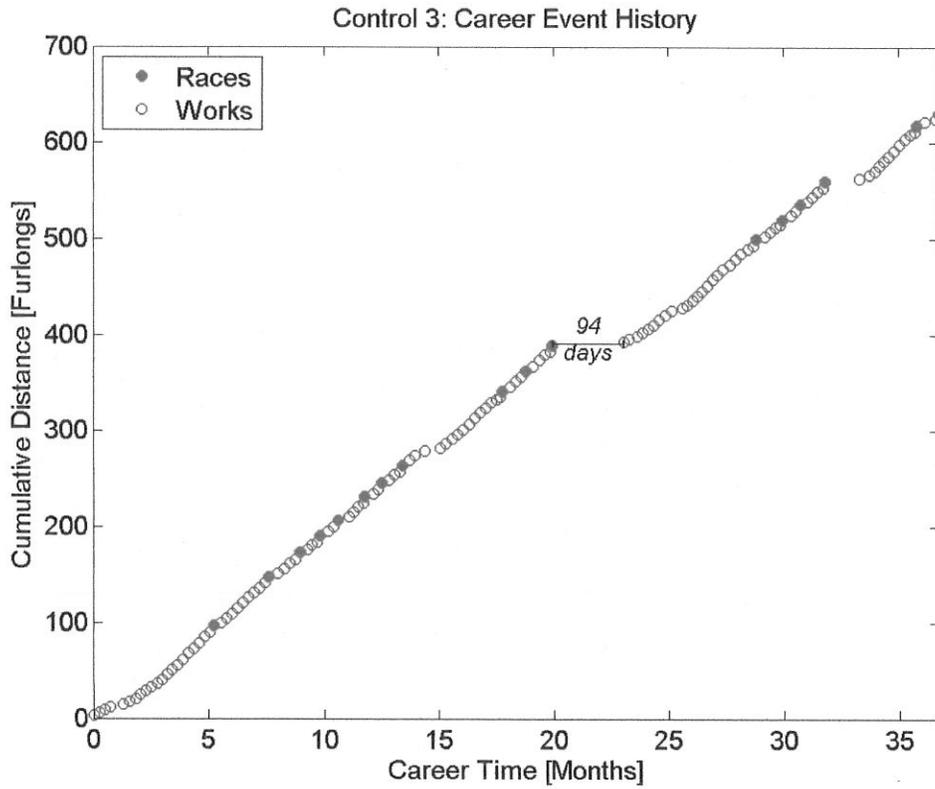
Control 1 High Speed Exercise History



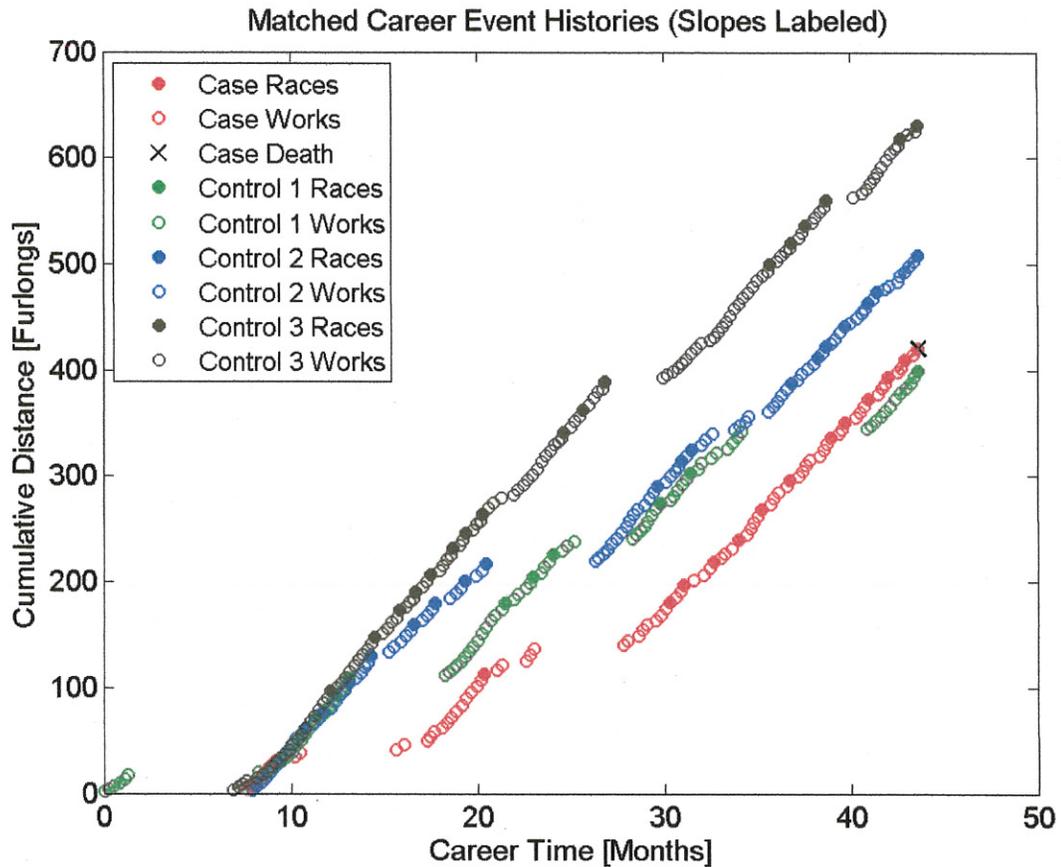
Control 2 High Speed Exercise History



Control 3 High Speed Exercise History



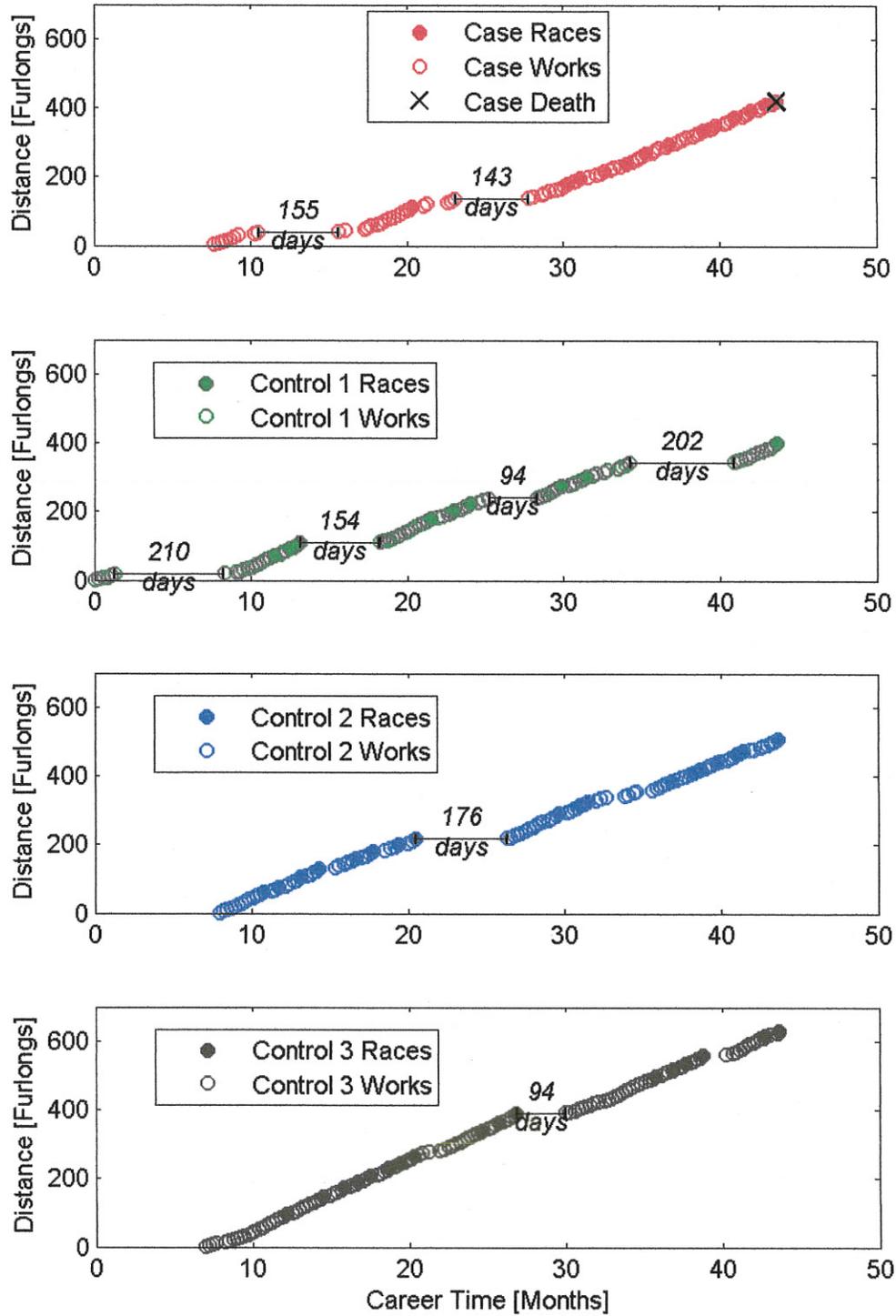
Part 2: Case and Control Horses Plotted Together



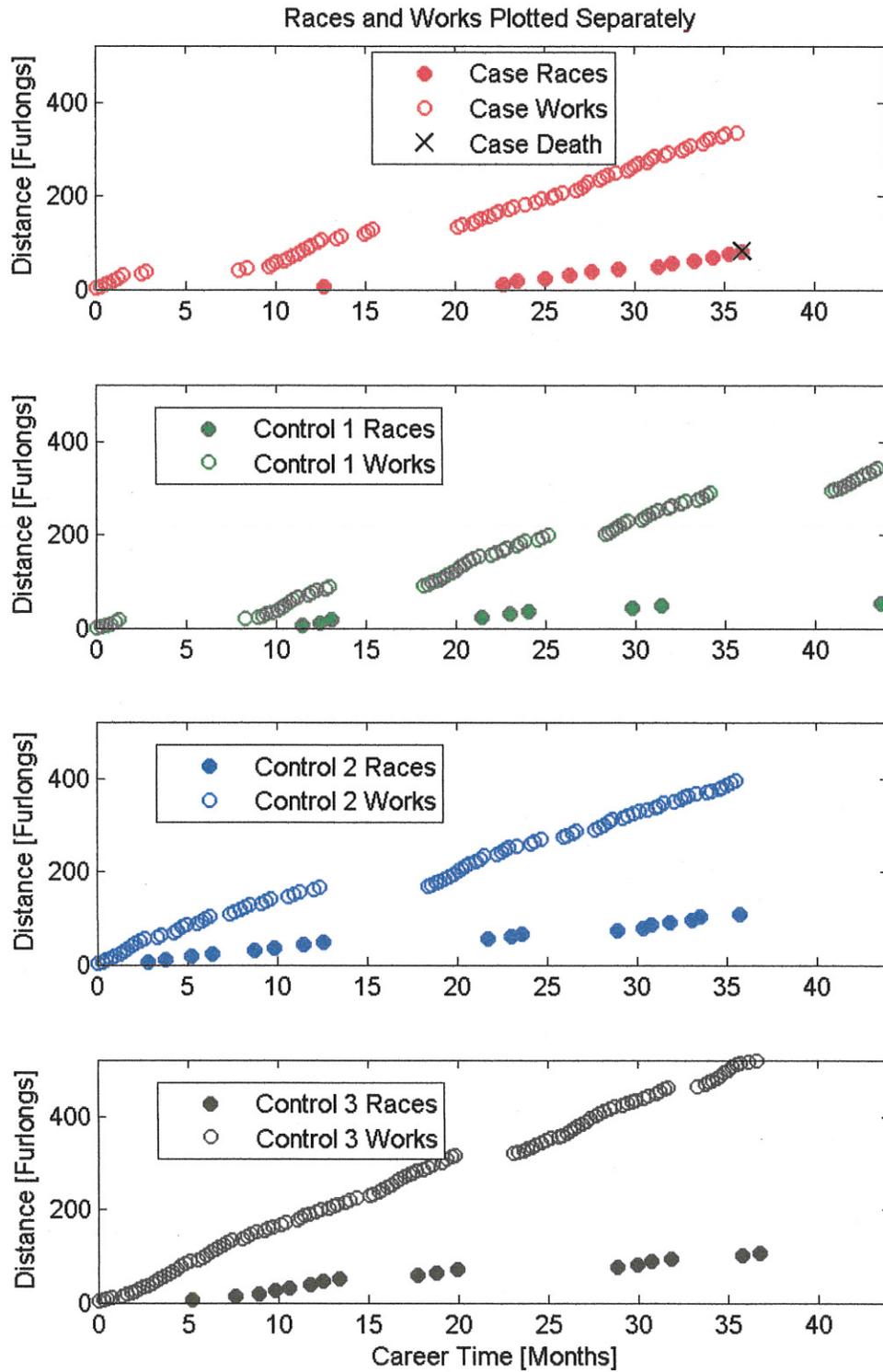
Case and Control Horses' exercise event histories are plotted on the same axes. The plots are aligned by the match date (equal to the date of death of Case Horse). Lines segments indicate specific rates of exercise at the start of career, end of career (for Case Horse), and match date (for Control Horses). Event rates are calculated as the slopes of the plots over 2 to 5 events not spanning a layup period, in units of furlongs per month.

Part 2: Case and Control Horses Plotted Together

Career Event Histories for Case and Controls with Layups



Part 2: Case and Control Horses Plotted Together



Part 3: Case Horse's Event History

Date	Race/Work	Furlongs	Track	Surface	Track Cond.	Time	Age/Sex	Race Class	Earnings	Finish
11/26/2011	R	6.0	HOL	AllWthr	Fast		3U	VOUndrwdG3-100k	20000	2
11/18/2011	W	4.0	SA	Dirt	Fast	:47.80				
11/5/2011	R	8.0	CD	Dirt	Fast		3U	BCDirtMiG1-1000k	0	9
10/30/2011	W	4.0	CD	Dirt	Fast	:47.60				
10/24/2011	W	5.0	SA	Dirt	Fast	:59.40				
10/8/2011	R	6.0	SA	Dirt	Fast		3U	AncntTtlG1-250k	50000	2
10/4/2011	W	4.0	SA	Dirt	Fast	:47.80				
9/29/2011	W	6.0	SA	Dirt	Fast	01:12.2				
9/23/2011	W	5.0	SA	Dirt	Fast	01:00.4				
9/7/2011	R	6.0	DMR	AllWthr	Fast		3U	(R) PirtsBnty-85k	0	6
8/31/2011	W	6.0	DMR	AllWthr	Fast	01:12.6				
8/24/2011	W	5.0	DMR	AllWthr	Fast	01:01.4				
8/18/2011	W	5.0	DMR	AllWthr	Fast	:59.80				
7/31/2011	R	6.0	MTH	Dirt	Fast		3U	TeddyDrone-103k	1500	6
7/26/2011	W	4.0	DMR	AllWthr	Fast	:49.80				
7/21/2011	W	4.0	DMR	AllWthr	Fast	:48.80				
7/9/2011	R	6.0	CRC	Dirt	Good		3U	SmlSprtHG2-350k	69300	2
7/2/2011	W	5.0	SA	Dirt	Fast	:58.60				
6/27/2011	W	6.0	SA	Dirt	Fast	01:13.2				
6/20/2011	W	4.0	SA	Dirt	Fast	:48.40				
6/5/2011	W	5.0	CD	Dirt	Fast	01:00.2				
5/30/2011	W	5.0	CD	Dirt	Fast	:59.60				
5/24/2011	W	5.0	CD	Dirt	Fast	01:00.4				
5/18/2011	W	4.0	CD	Dirt	Good	:48.80				
5/4/2011	R	6.0	CD	Dirt	Fast		3U	Aoc80000nw3\$/x-N	33600	1
4/29/2011	W	5.0	CD	Dirt	Fast	01:01.0				

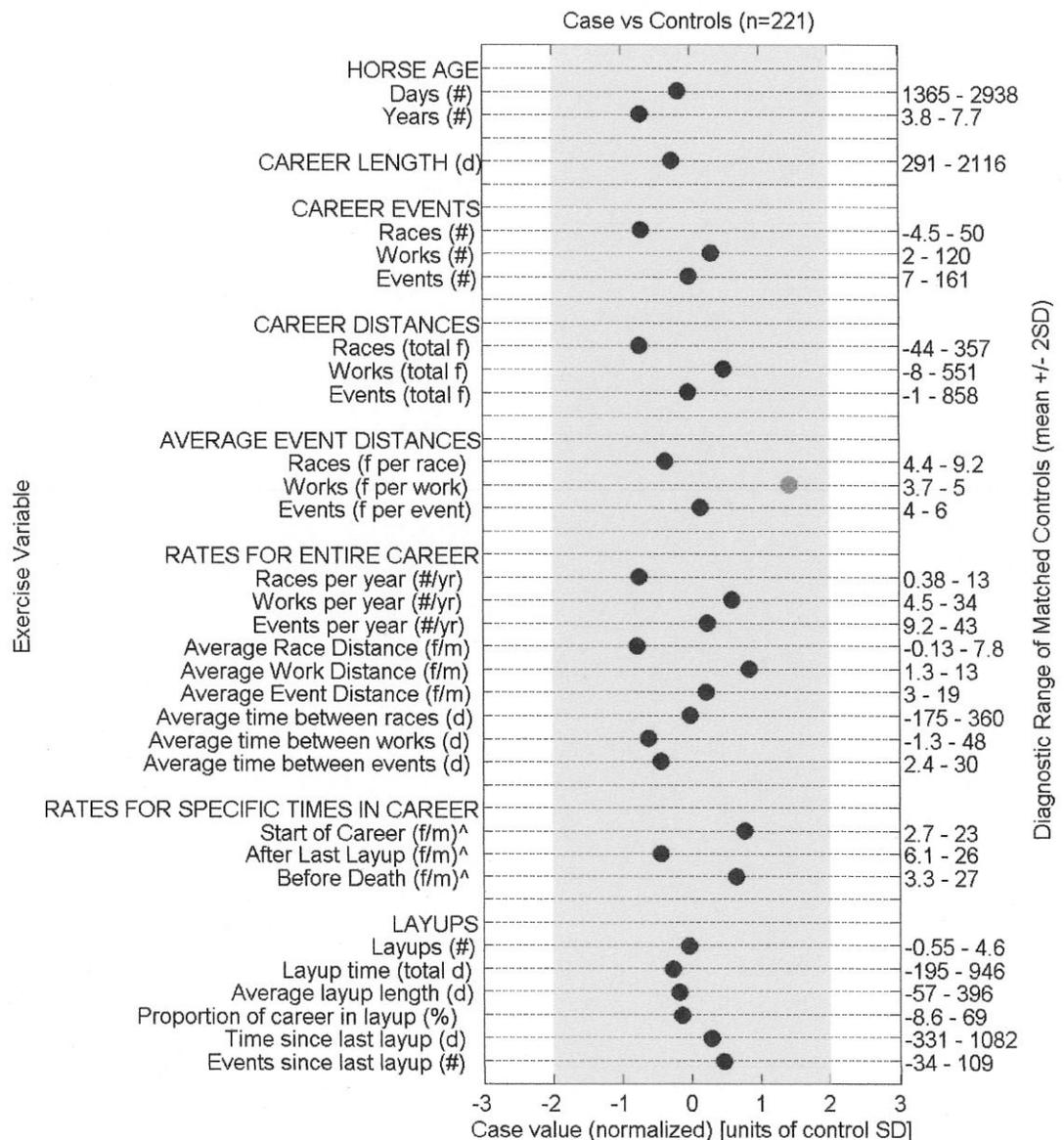
Part 3: Case Horse's Event History

Date	Race/Work	Furlongs	Track	Surface	Track Cond.	Time	Age/Sex	Race Class	Earnings	Finish
4/15/2011	W	6.0	SA	Dirt	Fast	01:12.2				
4/8/2011	W	6.0	SA	Dirt	Fast	01:11.8				
4/2/2011	W	5.0	SA	Dirt	Fast	01:00.4				
3/20/2011	R	6.5	SA	Dirt	Sloppy		4U	Alw59000nw2\$/x	35400	1
3/13/2011	W	6.0	SA	Dirt	Fast	01:13.0				
3/7/2011	W	5.0	SA	Dirt	Fast	01:01.2				
3/2/2011	W	6.0	SA	Dirt	Fast	01:11.4				
2/23/2011	W	5.0	SA	Dirt	Fast	:59.00				
2/10/2011	R	8.0	SA	Turf	Firm		4U	Aoc62500nw2\$/x-N	1180	5
1/30/2011	W	5.0	SA	Dirt	Fast	:58.20				
1/18/2011	W	4.0	SA	Dirt	Fast	:46.80				
1/12/2011	W	4.0	SA	Dirt	Fast	:48.80				
1/1/2011	R	6.0	SA	Dirt	Fast		4U	Alw56000nw1\$/x	33600	1
12/25/2010	W	6.0	SA	Dirt	Fast	01:13.2				
12/16/2010	W	5.0	SA	Dirt	Fast	:58.60				
11/29/2010	W	5.0	HOL	AllWthr	Fast	01:00.2				
11/14/2010	R	6.0	HOL	AllWthr	Fast		3U	Aoc40000nw1\$/x-N	8000	2
11/8/2010	W	5.0	HOL	AllWthr	Fast	01:00.2				
11/1/2010	W	5.0	HOL	AllWthr	Fast	01:00.4				
10/22/2010	R	6.0	OTH	AllWthr	Fast		3U	Alw40000nw1\$/x	8000	2
10/15/2010	W	6.0	OTH	AllWthr	Fast	01:12.0				
10/8/2010	W	5.0	OTH	AllWthr	Fast	01:00.4				
9/29/2010	W	4.0	HOL	AllWthr	Fast	:48.60				
9/15/2010	W	5.0	HOL	AllWthr	Fast	01:00.8				
9/8/2010	W	6.0	DMR	AllWthr	Fast	01:12.2				
9/2/2010	W	4.0	DMR	AllWthr	Fast	:49.20				
8/15/2010	W	4.0	DMR	AllWthr	Fast	:47.40				
8/8/2010	W	4.0	DMR	AllWthr	Fast	:47.40				
3/18/2010	W	6.0	SA	AllWthr	Fast	01:12.2				

Part 3: Case Horse's Event History

Date	Race/Work	Furlongs	Track	Surface	Track Cond.	Time	Age/Sex	Race Class	Earnings	Finish
3/11/2010	W	5.0	SA	AllWthr	Fast	:59.80				
3/5/2010	W	4.0	SA	AllWthr	Fast	:46.60				
1/25/2010	W	5.0	SA	AllWthr	Fast	01:01.6				
1/17/2010	W	4.0	SA	AllWthr	Fast	:48.40				
12/27/2009	R	6.0	SA	AllWthr	Fast		3U	Msw	26400	1
12/22/2009	W	5.0	SA	AllWthr	Fast	:59.80				
12/16/2009	W	6.0	SA	AllWthr	Fast	01:11.0				
12/6/2009	W	6.0	SA	AllWthr	Fast	01:12.4				
11/29/2009	W	6.0	SA	AllWthr	Fast	01:13.4				
11/22/2009	W	6.0	SA	AllWthr	Fast	01:12.2				
11/13/2009	W	6.0	SA	AllWthr	Fast	01:12.2				
11/4/2009	W	5.0	OSA	AllWthr	Fast	01:00.8				
10/28/2009	W	4.0	OSA	AllWthr	Fast	:48.40				
10/21/2009	W	4.0	OSA	AllWthr	Fast	:48.20				
10/8/2009	W	5.0	OSA	AllWthr	Fast	:59.40				
10/2/2009	W	4.0	OSA	AllWthr	Fast	:47.80				
9/26/2009	W	4.0	SA	AllWthr	Fast	:49.40				
8/20/2009	W	4.0	DMR	AllWthr	Fast	:48.00				
8/7/2009	W	3.0	DMR	AllWthr	Fast	:34.00				
3/5/2009	W	4.0	SA	AllWthr	Fast	:48.20				
2/26/2009	W	4.0	SA	AllWthr	Fast	:46.80				
1/26/2009	W	6.0	SA	AllWthr	Fast	01:12.0				
1/17/2009	W	5.0	SA	AllWthr	Fast	:58.80				
1/10/2009	W	5.0	SA	AllWthr	Fast	:58.80				
1/3/2009	W	4.0	SA	AllWthr	Fast	:47.20				
12/27/2008	W	4.0	SA	AllWthr	Fast	:48.40				
12/19/2008	W	3.0	SA	AllWthr	Fast	:35.40				
12/12/2008	W	4.0	SA	AllWthr	Fast	:47.60				

Part 4: Comparison of Exercise Variables between Case Horse and 221 Control Horses (5+ year old, male, Thoroughbred)

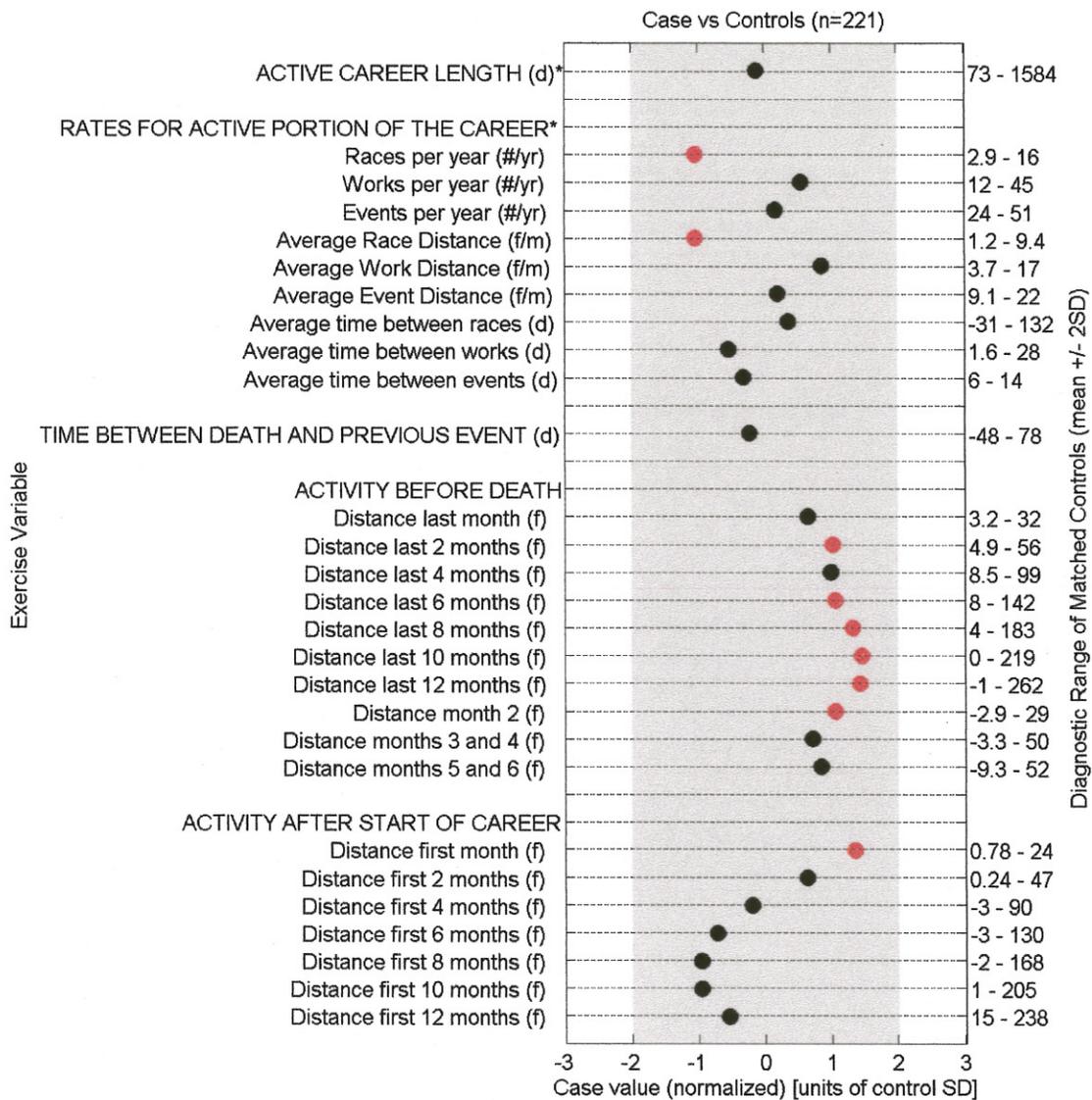


Case Horse values are indicated by black or red symbols: circles indicate values considered normal for 95% of 5+ year old, male, Thoroughbreds (n=221) (gray region) (black and red indicate within 1 and 2 SD, respectively, of mean value of controls), X's indicate values outside of the normal range. Two and 3 year old case horses are also matched to control horses by the quarter in which the case horse died (Jan-Mar, Apr-Jun, Jul-Sep, Oct-Dec). Variables that are not calculable are not plotted (e.g. time between races for a horse with zero events). f=furlongs; yr=year; m=month; d=days.

^Rates are calculated over 2 to 5 events.

*Active Career Length is the career length excluding the time during layups.

Part 4: Comparison of Exercise Variables between Case Horse and 221 Control Horses (5+ year old, male, Thoroughbred)



Case Horse values are indicated by black or red symbols: circles indicate values considered normal for 95% of 5+ year old, male, Thoroughbreds (n=221) (gray region) (black and red indicate within 1 and 2 SD, respectively, of mean value of controls), X's indicate values outside of the normal range. Two and 3 year old case horses are also matched to control horses by the quarter in which the case horse died (Jan-Mar, Apr-Jun, Jul-Sep, Oct-Dec). Variables that are not calculable are not plotted (e.g. time between races for a horse with zero events). f=furlongs; yr=year; m=month; d=days.

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**California Animal Health & Food Safety
Laboratory System**

105 W. Central Avenue
San Bernardino, CA 92408-2113
(909) 383-4287

**Addendum
Version 3**

*This report supersedes all
previous reports for this case*

CAHFS Case #:Horse #2

Referral #: [REDACTED]

Date Collected: 11/26/2011

Date Received: 11/27/2011

Case Coordinator: Santiago Diab, DVM

Electronically Signed and Authorized

By: Diab, Santiago S on 2/4/2013
8:01:02AM

Email To:
ARTHUR, RICK M
RMARTHUR@UCDAVIS.EDU

Incident Track:
HOLLYWOOD PARK RACETRACK
1050 S PRAIRIE AVE
INGLEWOOD, CA 90301

Comments: CHRB

Case Contacts

Bill To	CALIFORNIA HORSE RACING BOARD	916-263-6000	1010 HURLEY WAY SUITE 300 ATTENTION: ACCOUNTS PAYABLE SACRAMENTO, CA 95825
None	, client relations		
Owner	[REDACTED]	[REDACTED]	[REDACTED]
Report To	UZAL, FRANCISCO	909-383-4287	CAHFS105 WEST CENTRAL SAN BERNARDINO, CA 92408
Report To	ARTHUR, RICK M	626-665-8130	311 E GRAND VIEW AVE SIERRA MADRE, CA 91024
Attending Vet	LATSON, KEITH	818-515-6789	10542 WALKER ST CYPRESS, CA 90630
Submitter	BAILEY, JILL	310-419-1680	1050 S. PRAIRIE AVE INGLEWOOD, CA 90301
Trainer	BAFFERT, BOB	714-969-2377	6122 EAGLECREST DRIVE Huntington Beach, CA 92648

CHRB - Related Information

Horse's Name:	[REDACTED]	Human Injury?	N
Tattoo:	[REDACTED]	Death Related to:	Race
Age:	5.00 Years	Track Surface:	Synthetic
Gender:	Male	Location on Track:	post race
Taxonomy:	Thoroughbred Horse	Insured?	N

Medications: Lasix (Furosemide); Lasix (Furosemide);

Laboratory Findings/Diagnosis

Thoroughbred colt submitted with a history of collapse and death shortly after the race.

Presumptive diagnosis: Heart failure and/or exercise-induced pulmonary hemorrhage; see accession summary for comments.

1. Pulmonary hemorrhage and edema, marked, multifocal to locally extensive, with moderate interstitial fibrosis and abundant hemosiderin deposition; lesion most prominent on the middle and caudodorsal aspects of the right and left lung.
2. Valvular endocarditis, lymphoplasmacytic and neutrophilic, multifocal to diffuse, mild to moderate, left ventricle atrioventricular valve/aortic semilunar valve; etiology/significance unknown.
3. Myocarditis, lymphoplasmacytic and neutrophilic, focal, interstitial, very mild; etiology/significance unknown.

Other laboratory test results:

- Heavy metal screen within normal range, liver.
- No toxic compounds were detected by GC/MS; liver
- No toxic compounds were detected by LC/HRMS; urine.
- No avicides compounds (Avitrol and Starlicide) were detected; liver.
- No anticoagulants detected (see accession summary for comments); liver.

Case Summary

11/28/11: Necropsy and overnight sections of the heart were examined. There was a mild to moderate valvular endocarditis and a very mild, focal myocarditis of unknown etiology and significance. No degenerative or necrotizing lesions were observed in the myocardium. Therefore, the exact cause of death in my opinion is not clear from a pathological standpoint. In addition there was moderate to marked pulmonary edema and moderate hemorrhages, the extension and severity of which will be better evaluated, hopefully, histologically (tissues had advanced post mortem decomposition). Valvular endocarditis in horses is rare, and is usually caused by bacterial microorganisms (bacterial culture not attempted due to lack of gross lesions and advanced post-mortem decomposition). However, I will ask colleagues if they have any ideas of other possible etiologies or if there are any molecular diagnostic tests that could be performed in fixed tissues to possibly investigate this condition further. Additional histology of the rest of the visceral organs and toxicology are pending. Samples in storage are kidney and liver and urine has been sent out to the Equine Analytical Laboratory at CAHFS Davis. Please don't hesitate to contact me if you have any questions or comments about this report.

12/02/11: A thorough histological examination of the visceral organs and brain was performed. The dorsal aspects of the lungs (especially in the the middle and caudal aspects) had moderate to severe acute hemorrhage and also evidence of chronic hemorrhage (fibrosis and hemosiderin deposition). The histologic appearance of the pulmonary lesions resembles those described by other authors on chronic Exercise-Induced Pulmonary Hemorrhage. I failed to see obvious veno-occlusive disease and vascular remodeling as described by Williams et. al. in 2008 ("Regional Pulmonary Veno-occlusion: A newly identified lesion of equine exercise-induced pulmonary hemorrhage". Veterinary Pathology). However, all other lesions described in this paper are very similar to what has been seen in this case. Unfortunately, in spite of the frequency of EIPH in the horse, there is a poor understanding of the pathogenesis of the disease and its association with sudden death in race horses. In my opinion, the cause of death in this horse is likely associated to a conduction problem in the heart and/or the pulmonary hemorrhage rather than to the valvular endocarditis. I also believe that blindly attempting IHC for different microorganisms may be of dubious help in this case for the information we may obtain will possibly add to the confusion. Please let me know if you think otherwise in this regard. I was able to check the cranial half of the left jugular vein grossly and histologically and there is no significant inflammation. Heavy metal screen was within normal range. GC/MS testing is still pending. Results to follow.

12/06/11: No toxic compounds were detected by GC/MS. This concludes all testing in this case. Samples collected (kidney, brain and colon content) for storage will be available for approximately 3 months. You may contact me if you would like to run any other laboratory tests and the case will be reopened.

2/8/12 (Addendum I): LC/HRMS organic chemical screen was performed on the urine sample and no toxic compounds were detected. Avicides, such as Avitrol and Starcide, were not detected in the liver sample. This concludes all CAHFS testing in this case. Any additional testing (if applicable in this horse) performed at the Equine Analytical Laboratory at UC Davis will be reported separately. Please do not hesitate to contact me if you have any questions or comments about this report.

3/11/12 (Addendum II): Case reopened for administrative purposes only. No additional data included in this report.

2/4/2013 (Addendum III): Case was re-opened to test the liver as a control for anticoagulant rodenticides in order to obtain baseline data for results in horses. No anticoagulants were detected in the liver of this horse at or above the stated reporting limits.

Clinical History

Collapse and death after finishing 2nd place in race, 6 furlong, galloping out around turn, returning to grandstand to be unsaddled.

Please examine all cardiac bones; same owner as recently examined horse with AV node inflammation.

Gross Observations

Necropsy of a [REDACTED] Thoroughbred colt, [REDACTED] began at 11:00 am on November 27th, 2011. The carcass was well fleshed, had adequate fat deposits and the tissues were in a moderate to advanced state of post-mortem decomposition.

Externally, there was abundant amount of pink/red foam oozing out of the nostrils and within the nasal passages. A moderate amount of pink stable foam was also present in the trachea and major airways. The lungs were diffusely and moderately expanded and rib imprints could be observed on the surface of both lungs. Two focally extensive, mid-sized (approximately 10 x 10 x 15 cm) areas of increased consistency and dark red color were present on the cranial aspect of

the right and left caudal lung lobes and multifocal petechiation and ecchymoses were scattered throughout the rest of the cranial and caudal pulmonary lobes. There was acute petechial hemorrhage of the epicardial fat along the coronary grooves. There were several, variably sized/shaped, deep, chronic ulcers with raised yellow margins on the non-glandular mucosa of the stomach. No lesions were observed in the skull and cervical vertebrae after band saw sagittal sectioning.

Histology

Overnight sections from eleven different areas of the heart including the right ventricle free wall, the pulmonary artery semilunar valve, the right atrial appendage, the region of the sinoatrial node, the left atrial appendage, the left ventricle atrioventricular valve, the left ventricle papillary muscles (2), the atrioventricular node region and the interventricular septum were examined and findings are summarized.

Left ventricle atrioventricular valve: There is multifocal to diffuse inflammation of the valvular stroma characterized by a moderately dense infiltration of lymphocytes, plasma cells and fewer neutrophils.

Aortic semilunar valve: There is multifocal to diffuse inflammation of the valvular stroma characterized by a mildly to moderately dense infiltration of lymphocytes, plasma cells and fewer neutrophils.

Left ventricle papillary muscle: There is a single, very small focus of interstitial inflammation composed of lymphocytes and fewer neutrophils.

Addendum (11/30/11): Sections of the jugular vein (left side), lungs, liver, spleen, adrenal gland, kidneys, gastrointestinal tract and brain were examined and findings are summarized.

1. Lungs:

-Predominantly along the dorsal aspects of the right and left lungs there is intra-alveolar, intra-septal, perivascular and peribronchial, marked, acute hemorrhage. In addition, a few sections (most markedly on the right caudodorsal lobe) show moderate pleural, septal, alveolar wall and perivascular fibrosis and abundant hemosiderin deposition, mostly within the cytoplasm of macrophages, associated with the areas of fibrosis. In areas in which the intra-alveolar hemorrhage is not very severe, there is a moderate amount of homogeneous, proteinaceous, eosinophilic material (edema) within the alveolar lumen.

2. Liver:

-Marked sinusoidal congestion, diffuse.

3. Stomach:

-Gastric ulceration, multifocal, chronic, moderate; non-glandular mucosa.

Toxicology

Reporting Limit (Rep. Limit): The lowest routinely quantified concentration of an analyte in a sample. The analyte may be detected, but not quantified, at concentrations below the reporting limit. Sample volumes less than requested might result in reporting limits that are higher than those listed.

Avitrol or starlicide was not detected in the submitted specimen, at or above the indicated reporting limit.

No toxic compounds were detected on the submitted specimen by our gas chromatography - mass spectrometry (GC/MS) organic chemical screen, as well as the liquid chromatography - high resolution mass spectroscopy (LC/HRMS) organic chemical screen. These screens are designed to potentially detect a large number of organic compounds belonging to diverse chemical classes (pesticides, environmental contaminants, drugs and natural products). Control matrices were obtained to compare analytical results with those obtained from the submitted specimen. No unexpected chemicals were identified. Within the limits of the samples tested and the analytical procedures performed, chemical contamination of the submitted specimens appears unlikely.

The detected liver mineral results are within acceptable or non-diagnostic ranges for this species.

The submitted specimen contained none of the listed anticoagulant rodenticides in a concentration greater than the stated reporting limits.

ANTICOAGULANT SCREEN

Animal/Source	Specimen	Specimen Type
[REDACTED]	[REDACTED]	Liver Tissue

Analyte	Result	Units	Rep. Limit	Units
---------	--------	-------	------------	-------

Brodifacoum	Not Detected	ppm	0.01	ppm
Bromadiolone	Not Detected	ppm	0.05	ppm
Chlorophacinone	Not Detected	ppm	0.25	ppm
Coumachlor	Not Detected	ppm	0.05	ppm
Difethialone	Not Detected	ppm	0.25	ppm
Diphacinone	Not Detected	ppm	0.25	ppm
Warfarin	Not Detected	ppm	0.05	ppm

AVICIDES

Animal/Source	Specimen	Specimen Type			
[REDACTED]	[REDACTED]	Liver Tissue			
Analyte	Result	Units	Rep. Limit	Units	
AVITROL	Not Detected	ppb	50 ppb	ppb	
STARLICIDE	Not Detected	ppb	50 ppb	ppb	

GCMS Screen

Animal/Source	Specimen	Specimen Type			
[REDACTED]	[REDACTED]	Liver Tissue			
Analyte	Result	Units	Rep. Limit	Units	
Negative	See comment under Toxicology	NA	NA	NA	

HEAVY METAL SCREEN

Animal/Source	Specimen	Specimen Type				
[REDACTED]	[REDACTED]	Liver Tissue				
Analyte	Result	Units	Rep. Limit	Units	Ref. Range	
Lead	Not Detected	PPM	1.000	PPM	<3.0	
Manganese	1.1	PPM	0.040	PPM	1-6	
Iron	290	PPM	0.200	PPM	100-300	
Mercury	Not Detected	PPM	1.000	PPM	<1.0	
Arsenic	Not Detected	PPM	1.000	PPM	<1.0	
Molybdenum	0.66	PPM	0.400	PPM	<2.0	
Zinc	47	PPM	0.100	PPM	40-125	
Copper	5.7	PPM	0.100	PPM	4-7.5	
Cadmium	0.58	ppm	0.300	ppm	<20	

ORGANIC COMPND BY REQUEST

Animal/Source	Specimen	Specimen Type			
[REDACTED]	[REDACTED]	Liver Tissue			
Analyte		Result	Units	Rep. Limit	Units
LC-MS Screen		See comment under Toxicology		N/A	
[REDACTED]	[REDACTED]	Urine			
Analyte		Result	Units	Rep. Limit	Units
LC-MS Screen		See comment under Toxicology		N/A	