



# UC DAVIS VETERINARY MEDICINE

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CAHFS Accession #: [REDACTED]

## FINAL REPORT

Ref.#: [REDACTED]

Coordinator: Monika Samol, DVM, Resident

E-Signed and Authorized by: Samol, Monika on  
3/14/2019 8:29:41AM

Email To:  
ARTHUR, RICK  
RMARTHUR@UCDAVIS.EDU

Incident Track:  
SANTA ANITA RACETRACK  
285 West Huntington Road,  
Arcadia CA 91007  
Los Angeles County

### This report supersedes all previous reports for this case

Date Collected: 02/22/2019    Date Received: 02/23/2019

Comments: CHRB

#### Case Contacts

Submitter	GRANDE, TIM	[REDACTED]	[REDACTED]	Arcadia	CA	91007
Bill To	CALIFORNIA HORSE RACING BOARD	916-263-6000	1010 Hurley Way Suite 300	Sacramento	CA	95825
Owner	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]
Report To	UZAL, FRANCISCO	[REDACTED]	[REDACTED]	San Bernardino	CA	92408
Report To	ARTHUR, RICK	[REDACTED]	[REDACTED]	Sierra Madre	CA	91024
Attending Vet	McAfoos, Jessie	[REDACTED]	[REDACTED]	Sierra Madre	CA	91024
Trainer	HANSON, RYAN	[REDACTED]	[REDACTED]	Monrovia	CA	91016

#### CHRB - Related Information

Horse's Name:	[REDACTED]	Human Injury?	
Tattoo:	[REDACTED]	Death Related to:	Race
Age:	4.00 Years	Track Surface:	Turf
Gender:	Neutered Male	Location on Track:	1/2 mile pole
Taxonomy:	Thoroughbred Horse	Insured?	

Medications: Butazolidin (Phenylbutazone); Dormosedan (Detomidine); Lasix (Furosemide); Pentobarbital;

#### Laboratory Findings/Diagnosis

A 4 year old Thoroughbred ([REDACTED] [REDACTED]) submitted with history of right front open, compound biaxial proximal sesamoid bone fracture and P1 comminuted fracture and metacarpophalangeal joint luxation

Catastrophic right front fetlock breakdown with

#### RIGHT FORELIMB

##### ACUTE CHANGES

1. Open, comminuted, complete, displaced, articular, parasagittal, lateral condylar fracture of the MCIII with the presence of pre-existing lesion (biaxial palmar osteochondral disease, see chronic changes 1.)
2. Fractures of the proximal sesamoid bones
  - a) Open, comminuted, complete, displaced, articular, transverse, basilar fracture of the medial proximal sesamoid bone
  - b) Open, comminuted, complete, displaced, articular, avulsion fracture of the axial margin of the lateral proximal sesamoid bone

3. Closed, highly comminuted, complete, displaced, longitudinal, bi-articular P1 fracture
4. Moderate to severe scoring of the articular surfaces of the proximal sesamoid bones
5. Severe, full thickness cartilage loss along the fracture line of the lateral proximal sesamoid bone
6. Suspensory ligament failure with severe fraying, complete splits and hemorrhage of medial branch of the suspensory ligament
7. Severe fraying of fibers, incomplete longitudinal split and hemorrhage of the body of the suspensory ligament
8. Full thickness, longitudinal and transverse rupture of the intersesamoidean ligament
9. Severe fraying of fibers and incomplete transverse rupture of the lateral and medial cruciate ligaments
10. Severe fraying of fibers and incomplete transverse rupture of the lateral and medial short sesamoidean ligaments
11. Severe, longitudinal, full-thickness split and fraying of fibers of the straight distal sesamoidean ligament
12. Full thickness, transverse rupture of the palmar annular ligament

#### CHRONIC CHANGES:

1. Severe, palmar osteochondral disease with brown, focal discoloration and porosity of the subchondral bone, surrounded by highly compacted (sclerotic) trabecular bone, visible on both opposing surfaces of the fractured lateral condyle of the distal MCIII
2. Moderate dorsal metacarpal disease with new bone formation, congestion and thickening of the periosteum of the dorsal MCIII

#### LEFT FORELIMB

#### ACUTE CHANGES

- 1) Closed, displaced, comminuted, longitudinal sagittal, non-articular fracture of the accessory carpal bone

#### CHRONIC CHANGES

Moderate osteoarthritis of the fetlock joint

1. Severe, biaxial palmar osteochondral disease with focal, blue subchondral bone discoloration (bruising) visible through the flattened cartilage of the lateral condyle of the distal articular surface of MCIII
2. Mild dorsal metacarpal disease with congestion and thickening of the periosteum of the dorsal MCIII
3. Moderate transverse ridge arthrosis with cartilage fibrillation and pitting of the distal articular surface of MCIII
4. Mild to moderate thickening of the body of the suspensory ligament with dark red discoloration visible on the cross section
5. Moderate lipping of the dorsal and palmar aspect of the proximal articular surface of P1
6. Mild to moderate, biaxial, apical, irregular bony outgrowth of the proximal sesamoid bones (osteophytosis)
7. Moderate proliferative synovitis of the fetlock joint

#### Other findings:

- Severe, extensive gastric hyperkeratosis of non-glandular mucosa with mild gastric ulceration along the margo plicatus (incidental)
- Pulmonary congestion and edema (euthanasia artifact)
- Splenomegaly (euthanasia artifact)

### Case Summary

03/05/2019 The most important findings in the right forelimb are lateral condylar fracture of the cannon bone, biaxial fracture of proximal sesamoid bones, comminuted fracture of the proximal phalanx and suspensory ligament failure. The latter injuries resulted in loss of support of the fetlock joint of the right forelimb.

The reason of the aforementioned fractures may be related to the focal region of discoloration and bone porosity/osteopenic focus associated with the fracture surfaces in the lateral condyle of the right cannon bone.

Additional findings include moderate osteoarthritis in the left fetlock joint and fracture of the left accessory carpal bone. I was not able to locate any abnormalities of soft tissues, in particular of flexor tendons (bowstring effect) within carpal canal or any evidence of chronic stress within carpus (nutcracker effect- compression between radius and third carpal bone), therefore the fracture is most likely of traumatic origin.

02/23/19 No significant findings were identified in visceral organs. At the time of necropsy, both front limbs were removed and saved for detailed examination at a later date. Results of this examination will be included in the next version of this report.

### Clinical History

Right Foreleg: Open/compound biaxial proximal sesamoid bone fractures, and comminuted P1 fracture; metacarpophalangeal joint luxation.

### Gross Observations

Necropsy of a 4 year old, [REDACTED] Thoroughbred [REDACTED] [REDACTED] 470 kg, with [REDACTED], tattoo [REDACTED] is commenced at 11:50 am, February 23, 2019. The carcass is in good nutritional condition, with appropriate musculature development, good deposits of adipose tissue, and in mild post-mortem decomposition. The trachea contains abundant stable foam, the lungs are mottled pink to red, spongy and wet (euthanasia artifact). The spleen is markedly enlarged and congested (euthanasia artifact). The stomach contains green, soft roughage and grain particles. Non-glandular gastric mucosa is extensively hyperkeratotic with mild, shallow ulcers along the margo plicatus. The intestinal tract is unremarkable, and the small colon contains formed feces.

Both front limbs are removed at the level of the chestnut for further examination.

### CHRB Musculoskeletal

Both front limbs were examined distally from the radiocarpal joint. Following changes were seen:

#### RIGHT FORELIMB

##### A- MCIII

1. Open, comminuted, complete, displaced, articular, parasagittal, lateral condylar fracture of the MCIII with the presence of pre-existing lesion

The lateral condylar fragment is app. 6,5-7 cm long and is divided into two components in transverse plane app. in proximal fourth. The condylar fracture is coursing through blue subchondral bone discoloration visible through the remaining, degenerated cartilage. The opposing surfaces of the fracture reveal focus of brown discoloration of increased bone porosity (osteopenic focus) surrounded by highly compacted/sclerotic bone, especially dorsally in relation to the osteopenic region trabecular bone is very sclerotic.

2. Severe, biaxial palmar osteochondral disease with brown, focal discoloration and porosity of the subchondral bone visible on both opposing surfaces of the fractured lateral condyle of the distal MCIII.

3. Severe scoring of the distal articular surface of MCIII

4. Severe, focal, full thickness, extensive longitudinal cartilage loss of the dorsal edge of the articular surface of mid-sagittal ridge of the distal MCIII

5. Moderate dorsal metacarpal disease with new bone formation, congestion and thickening of the periosteum of the dorsal MCIII- periosteum is strongly adhered to the dorsal surface of the cannon bone. The cross section at the level of the mid-shaft revealed the convex appearance of the dorsal cortex due to new bone formation with multiple, diffuse, red petechiae.

6. Moderate to severe hemorrhage accompanied by soft tissue hypertrophy at the palmar aspect of the supracondylar region of MCIII

7. Moderate to severe hemorrhage and bone erosion due to hypertrophic synovial pad at the dorsal aspect of the supracondylar region of MCIII

##### B- PROXIMAL SESAMOID BONES

1. Fractures of the proximal sesamoid bones

a) Open, comminuted, complete, displaced, articular, transverse, basilar fracture of the medial proximal sesamoid bone- the proximal fracture component is highly comminuted. It is composed of a bigger apical fragment and smaller wedge shaped fragments, two of them located axially and avulsed with intersesamoidean ligament, and the other two off the abaxial aspect avulsed with medial branch of the suspensory ligament. The subchondral and trabecular bone of distal component and fragments of proximal part appear to be highly compacted/sclerotic.

b) Open, comminuted, complete, displaced, articular, avulsion fracture of the axial margin of the lateral proximal sesamoid bone. The fragment is avulsed with intersesamoidean ligament and it is divided into multiple smaller pieces, which are firmly attached to the latter ligament.

3. Severe, full thickness cartilage loss along the fracture line of the lateral proximal sesamoid bone

4. Moderate to severe scoring of the articular surfaces of the proximal sesamoid bones

##### C- P1

1. Closed, highly comminuted, complete, displaced, sagittal, articular fracture of the P1- the main fracture line originates from the palmar aspect of intermediate groove and courses obliquely through the lateral aspect of the proximal articular surface. The main

fracture line courses distally to reach the distal articular surface. The latter is divided axially into roughly equal lateral and medial components. The mid-shaft is highly comminuted and constitutes of uncountable, variably shaped and sized fragments.

For better visualization of the fractures described above, please see attached pictures and drawings.

2. Severe scoring of the proximal and distal articular surface of P1

#### D- P2

1. Moderate to severe scoring of the proximal articular surface of P2 (acute, multiple narrow clefts due to high comminution of P1)

#### E- SOFT TISSUES

1. Full thickness, transverse rupture of the palmar annular ligament
2. Suspensory ligament failure- the longitudinal complete splits originating from the level of the fracture line of the medial proximal sesamoid bone. Severe fraying and incomplete longitudinal splits progress all the way proximally, up to proximal the mid-body of the suspensory ligament, affecting mainly its palmar surface.
3. Full thickness, longitudinal and transverse rupture of the intersesamoidean ligament- the transverse component follows the fracture line of the medial proximal sesamoid bone, the tear propagates axially between the proximal sesamoid bones, to merge with a complete rupture of the distal straight sesamoidean ligament
4. Moderate fraying of fibers and hemorrhage of the medial edge of the dorsal surface of the deep digital flexor tendon
5. Severe fraying of fibers and incomplete transverse rupture of the lateral and medial cruciate ligaments
6. Severe fraying of fibers and incomplete transverse rupture of the lateral and medial short sesamoidean ligaments
7. Moderate to severe, biaxial fraying of fibers and hemorrhage of the oblique distal sesamoidean ligaments
8. Severe synovial thickening in the fetlock joint (proliferative synovitis)

#### LEFT FORELIMB

##### A- CARPUS

1. Closed, displaced, comminuted, longitudinal sagittal, non-articular fracture of the accessory carpal bone- main fracture lines courses in vertical plane, parallel to the long axis of the MCIII, through the lateral groove (against the tendon of ulnaris lateralis). The palmar component is comminuted- divided into two fragments in transverse plane.

##### B- PROXIMAL SESAMOID BONES

1. Mild to moderate, biaxial, apical, irregular bony outgrowth of the proximal sesamoid bones (osteophytosis)
2. Mild scoring of articular surfaces of proximal sesamoid bones

##### C- MCIII

1. Severe palmar osteochondral disease with focal, biaxial, rounded (app. 1 cm in diameter) blue subchondral bone discoloration (bruising) visible through the flattened cartilage of the condyles of the distal articular surface of MCIII
2. Mild dorsal metacarpal disease with periosteum congestion and thickening, especially at the level of the dorsal mid-shaft the periosteum is strongly adhered to the cortical surface of the MCIII
3. Moderate transverse ridge arthrosis with cartilage fibrillation and pitting of the distal articular surface of MCIII
4. Mild to moderate, biaxial fissures (app. 0.7 cm long) and fibrillation of the cartilage in the condylar grooves
5. Mild hemorrhage accompanied by soft tissue hypertrophy at the palmar aspect of the supracondylar region of MCIII
6. Mild hemorrhage and bone erosion due to hypertrophic synovial pad at the dorsal aspect of the supracondylar region of MCIII

##### D- SOFT TISSUE

1. Mild to moderate thickening of the body of the suspensory ligament with dark red discoloration visible on the cross section
2. Moderate synovial thickening in the fetlock joint (proliferative synovitis)- especially the dorsal aspect of the fetlock joint capsule

##### E- P1

1. Moderate lipping of the dorsal and palmar aspect of the proximal articular surface of P1
2. Mild scoring of the proximal articular surface of P1
3. Mild, shallow, focal cartilage ulceration of the dorsomedial aspect of the proximal articular surface of P1

No gross lesions/ abnormalities were identified in other structures of both distal forelimbs examined from the radiocarpal joint.

Acc # \_\_\_\_\_

Date 03/04/18

CC MRP

Proximal Phalanx - Right

- Nature:**
- Open
  - Simple
  - Closed
  - Complete
  - Displaced
  - Articular
  - Comminuted
  - Incomplete
  - Non-displaced
  - Non-articular

- Location:**
- Proximal Epiphyseal
  - Proximal Metaphyseal
  - Proximal Physeal
  - Diaphyseal
  - Distal Epiphyseal
  - Distal Metaphyseal
  - Distal Physeal

**Configuration:**

- Axial (longitudinal)
- Transverse
- Segmental
- Butterfly
- Oblique

**Direction:**

- Proximodorsal-Distopalmar
- Proximolateral-Distomedial
- Sagittal
- Proximopalmar-Distodorsal
- Proximomedial-Distolateral
- Dorsal plane (mediolateral)

**Pre-existing callus:**

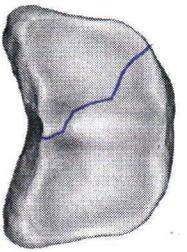
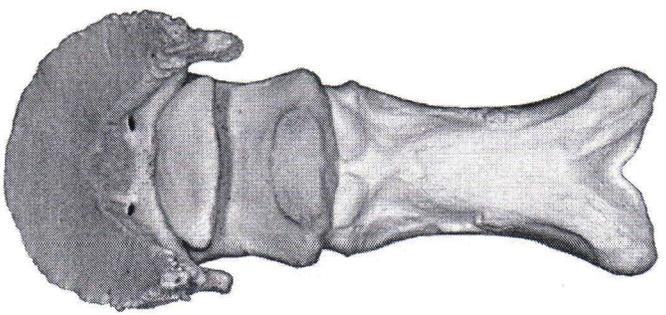
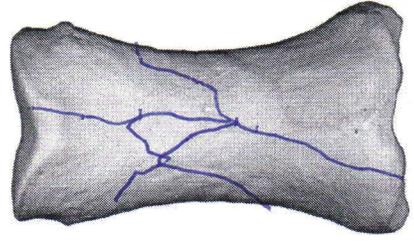
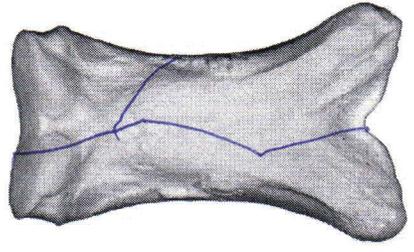
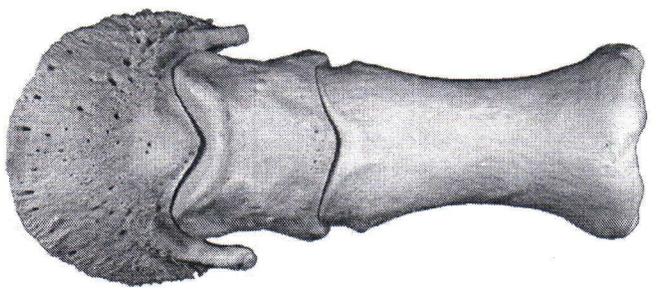
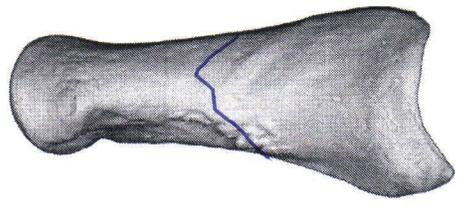
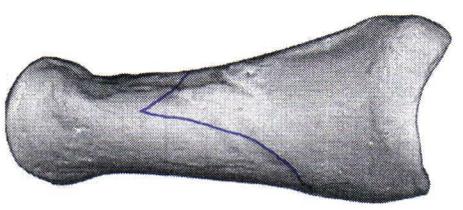
- Yes
- Unable to evaluate
- No

**Legend:**

Callus

Incomplete Fx

Missing fragments



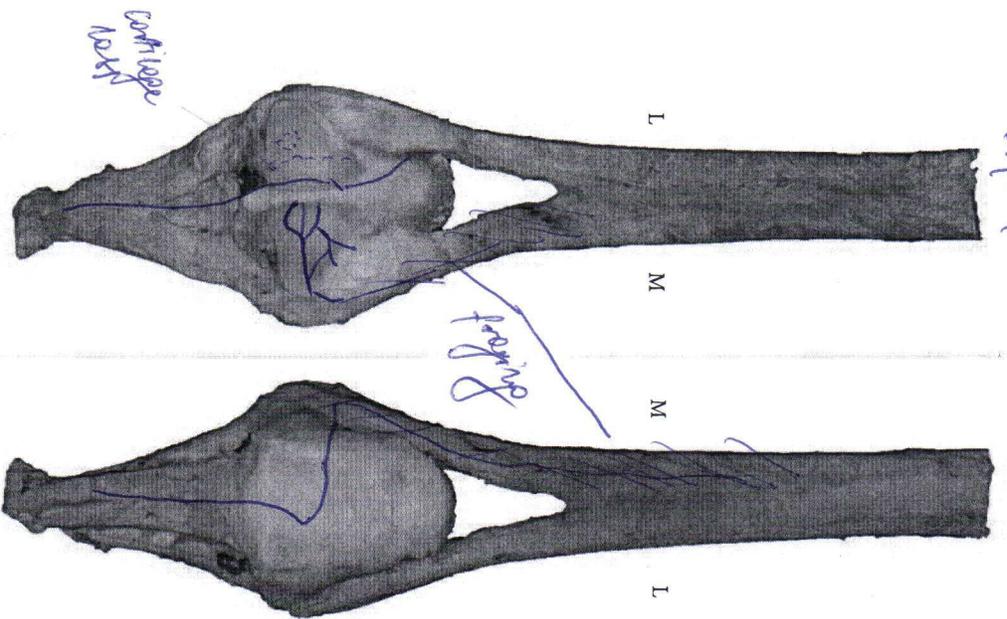
Accession #

CC: HKR

Date: 03/04/18

Right Fetlock

Please circle affected leg  
foreleg  
hindleg



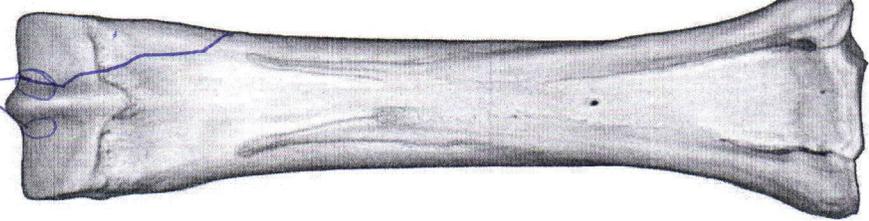
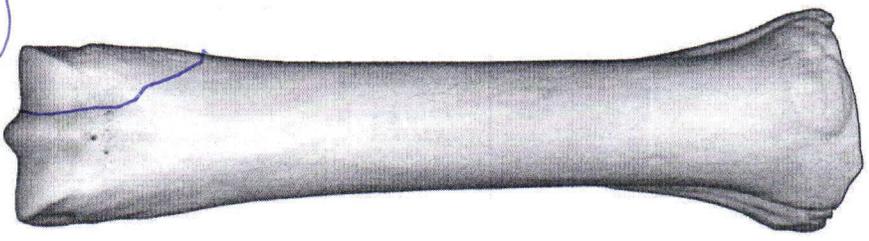
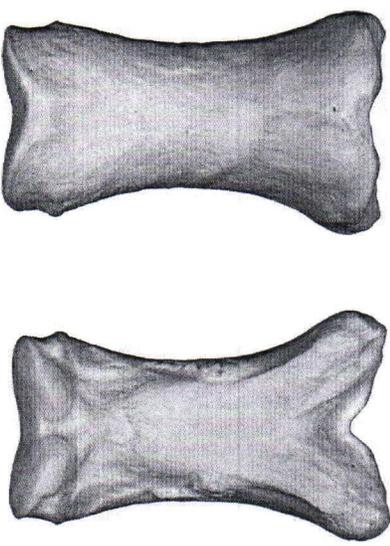
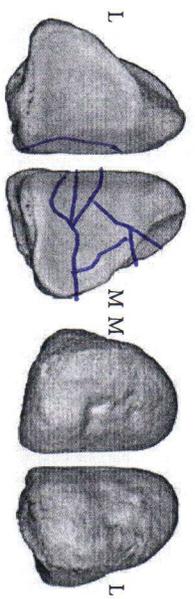
Susp. App. (dorsal)

Susp. App. (palmar/plantar)

Open wound?  Yes  No

Joint capsule intact?  Yes  No

Joint luxated?  Yes  No



**Involved Structures**

SDF tendon: Yes  No  DDF tendon: Yes  No

Suspensory ligament: Yes  No

SL Medial branch

SL Lateral branch

SL Body

Intersesamoid ligament: Yes  No

Longitudinal

Transverse

Distal Sesamoid ligaments (straight and/or oblique) Yes  No

Collateral ligaments: Yes  No

Collateral Sesamoid Ligaments: Yes  No

Cruciate and/or Short Sesamoid Ligaments Yes  No

# Exercise History Report (Full)



**UCDAVIS**

**VETERINARY MEDICINE**

*J.D. Wheat Veterinary Orthopedic  
Research Laboratory*

**Mar-11-2019**

## **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.

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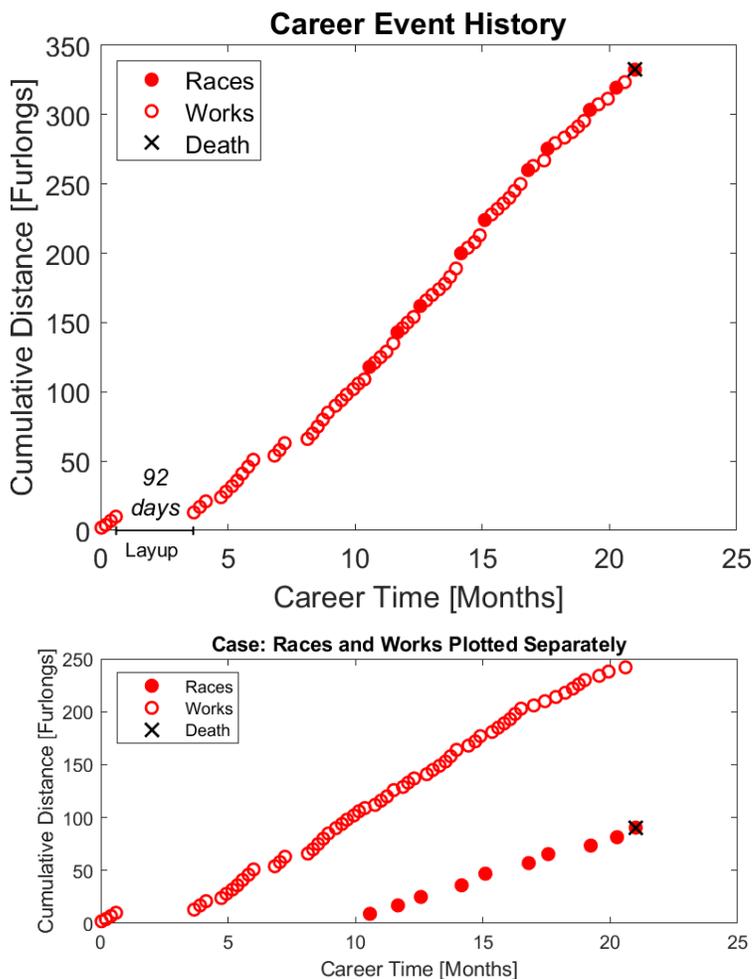
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Control 1 High Speed Exercise History .....	2
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## Part 1: Graphical Representation of Individual High-Speed Exercise Histories

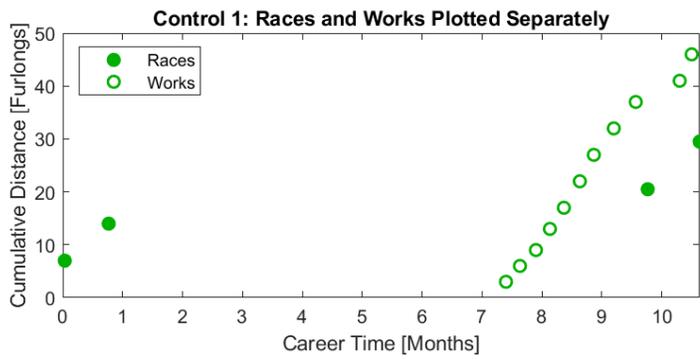
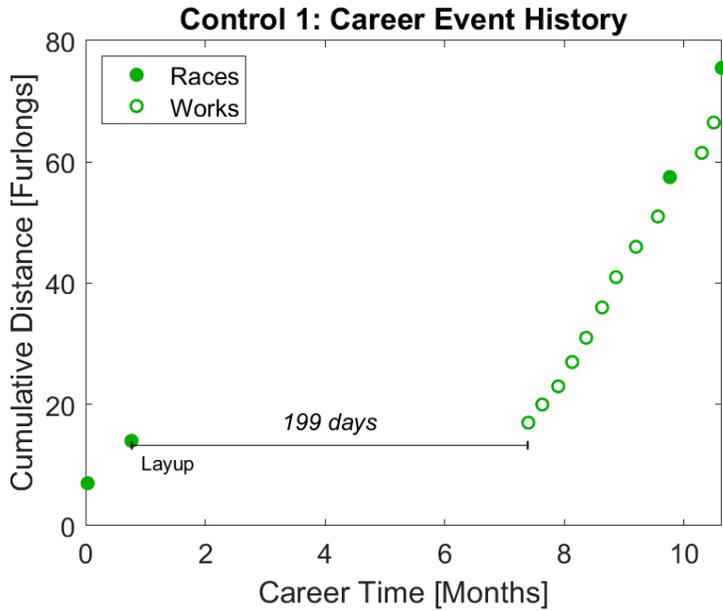
Races (filled circles), officially timed high-speed works (open circles), layups (line with endcaps, periods of time greater than 60 days in length without a race or timed work), and time of death (X) are illustrated over time (Career Time in months). With each event (race or work), the number of furlongs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

### Case Horse High Speed Exercise History

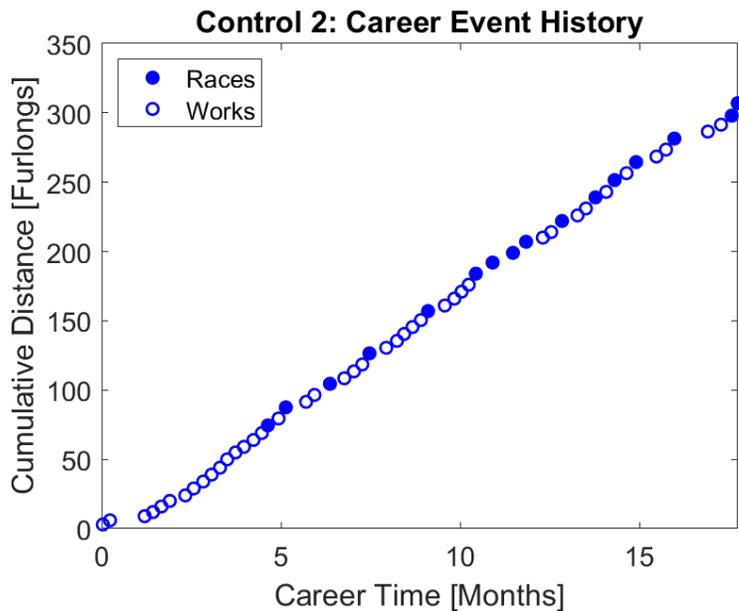


Part 1: Graphical Representation of Individual High-Speed Exercise Histories

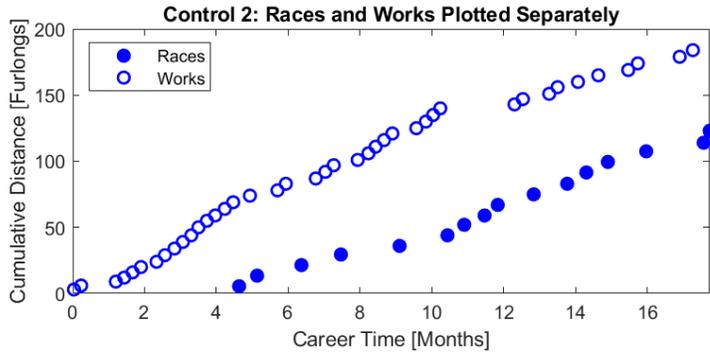
Control 1 High Speed Exercise History



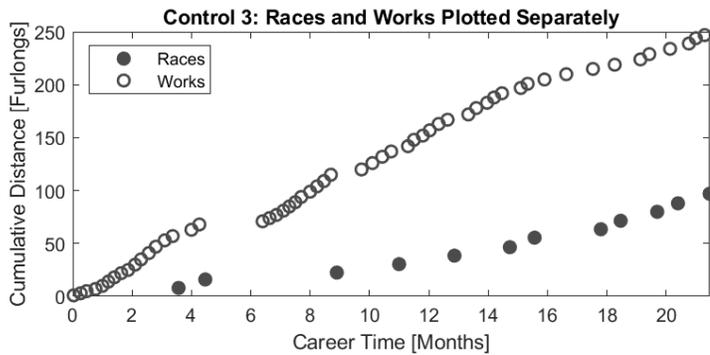
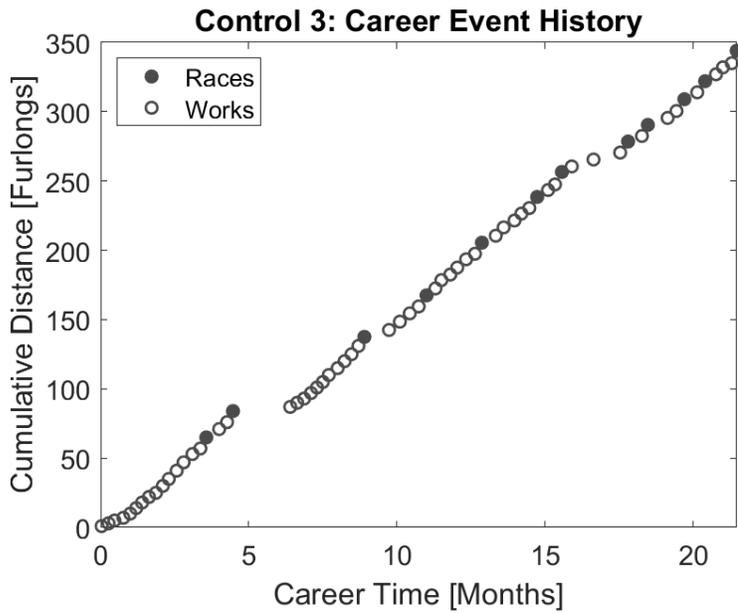
Control 2 High Speed Exercise History



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

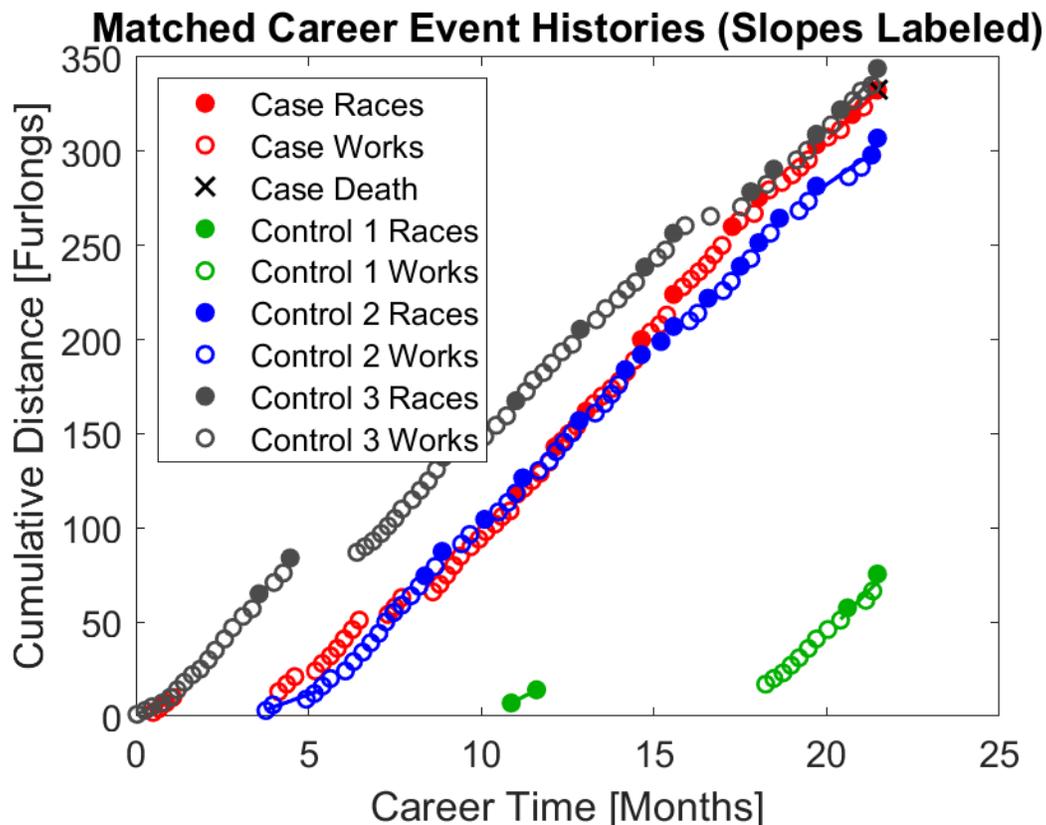


## Control 3 High Speed Exercise History



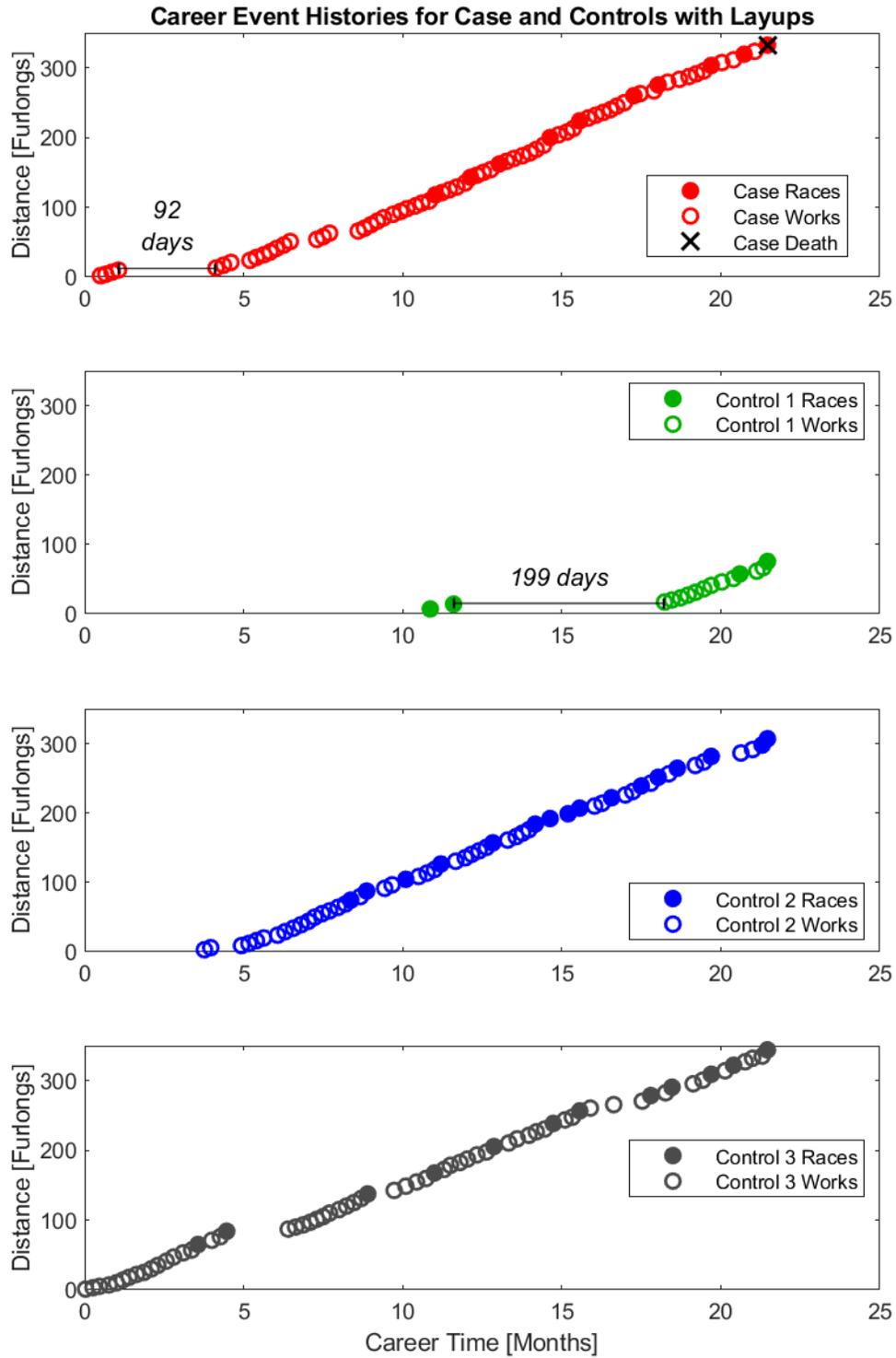
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## Part 2: Case and Control Horses Plotted Together

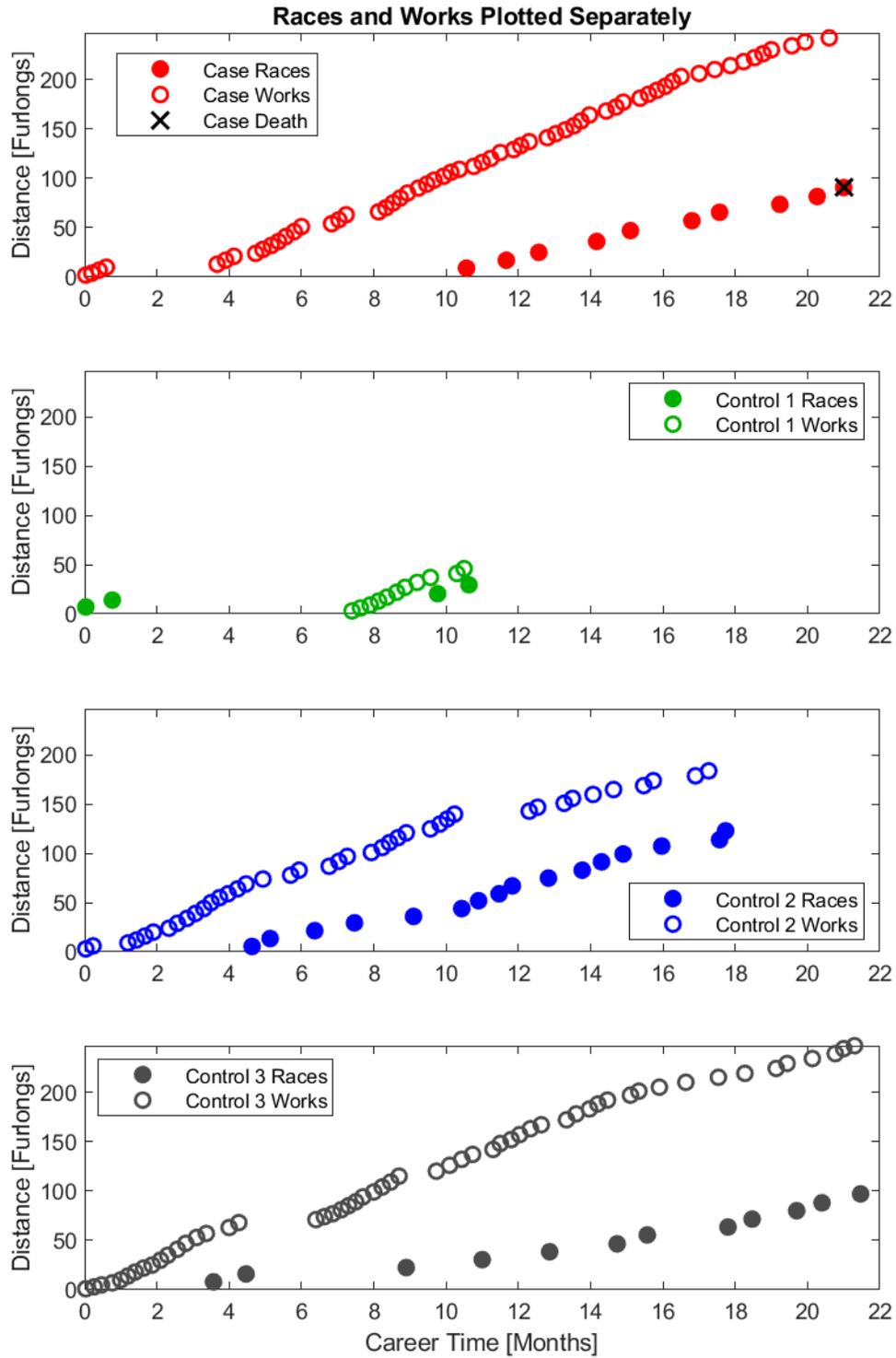


Case and Control Horses' exercise event histories are plotted on the same axes. The plots are aligned by the match date (equal to the date of death of Case Horse). Lines segments indicate specific rates of exercise at the start of career, end of career (for Case Horse), and match date (for Control Horses). 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



## Part 2: Case and Control Horses Plotted Together



### Part 3: Case Horse's Event History

Date	Race/Work	Fur-longs	Track	Surface	Track Cond.	Time	Age/Sex	Race Class	Earnings	Finish
2/22/2019	R	9.0	SA	Turf	Firm		4U	Wcl25000 (25-22.5)nw2/ L	351	8
2/10/2019	W	4.0	SA	Dirt training	Fast	:49.40				
1/31/2019	R	8.0	SA	Dirt	Sloppy		4U	Clm40000nw2/ L	4320	3
1/21/2019	W	4.0	SA	Dirt training	Fast	:49.60				
1/10/2019	W	4.0	SA	Dirt training	Fast	:49.40				
12/31/2018	R	8.0	SA	Turf	Firm		3U	Clm25000 (25-22.5)nw2/ L-c	1250	5
12/24/2018	W	4.0	SA	Dirt training	Fast	:48.80				
12/17/2018	W	4.0	SA	Dirt training	Fast	:51.60				
12/10/2018	W	4.0	SA	Dirt training	Fast	:51.20				
12/1/2018	W	4.0	SA	Dirt training	Fast	:49.80				
11/20/2018	W	4.0	SA	Dirt training	Fast	:50.40				
11/11/2018	R	8.5	DMR	Turf	Firm		3U	Str50000nw2/ L	345	6
11/7/2018	W	4.0	SA	Dirt training	Fast	:50.20				
10/25/2018	W	3.0	SA	Dirt training	Fast	:37.00				
10/19/2018	R	10.0	SA	Turf	Firm		3U	Aoc40000nw1\$ x-N	345	7
10/10/2018	W	5.0	SA	Dirt training	Fast	01:01.0				
10/3/2018	W	5.0	SA	Dirt training	Fast	01:02.6				

Part 3: Case Horse's Event History

Date	Race/Work	Furlongs	Track	Surface	Track Cond.	Time	Age/Sex	Race Class	Earnings	Finish
9/27/2018	W	4.0	SA	Dirt training	Fast	:48.60				
9/20/2018	W	4.0	SA	Dirt training	Fast	:49.80				
9/13/2018	W	4.0	SA	Dirt training	Fast	:49.40				
9/6/2018	W	4.0	DMR	Dirt	Fast	:49.00				
8/29/2018	R	11.0	DMR	Turf	Firm		3U	Aoc40000nw1\$345 x-N		7
8/23/2018	W	5.0	DMR	Turf	Firm	01:03.4				
8/17/2018	W	4.0	DMR	Dirt	Fast	:49.80				
8/9/2018	W	4.0	DMR	Dirt	Fast	:49.20				
8/1/2018	R	11.0	DMR	Turf	Firm		3U	Aoc40000nw1\$7440 x-N		3
7/26/2018	W	6.0	DMR	Turf	Firm	01:14.2				
7/19/2018	W	5.0	DMR	Turf	Firm	01:03.0				
7/13/2018	W	4.0	SA	Dirt training	Fast	:50.00				
7/6/2018	W	4.0	SA	Dirt training	Fast	:51.00				
6/28/2018	W	4.0	SA	Dirt training	Fast	:49.60				
6/21/2018	W	4.0	SA	Dirt training	Fast	:50.20				
6/14/2018	R	8.0	SA	Turf	Firm		3U	SOC 0 - N	660	5
6/6/2018	W	4.0	SA	Dirt	Fast	:49.40				
5/30/2018	W	4.0	SA	Dirt	Fast	:49.80				
5/24/2018	W	3.0	SA	Dirt training	Fast	:38.60				
5/18/2018	R	8.0	SA	Turf	Firm		3U	SOC 32000 - N	3600	3
5/13/2018	W	6.0	SA	Dirt training	Fast	01:15.0				
5/5/2018	W	4.0	SA	Dirt training	Fast	:50.00				
4/28/2018	W	4.0	SA	Dirt	Fast	:49.00				

Part 3: Case Horse's Event History

Date	Race/Work	Furlongs	Track	Surface	Track Cond.	Time	Age/Sex	Race Class	Earnings	Finish
4/21/2018	W	3.0	SA	Dirt training	Fast	:37.00				
4/15/2018	R	9.0	SA	Turf	Firm		3U	Mcl50000 (50-40)	17400	1
4/9/2018	W	3.0	SA	Dirt training	Fast	:38.80				
4/2/2018	W	4.0	SA	Dirt	Fast	:50.20				
3/27/2018	W	4.0	SA	Dirt training	Fast	:50.00				
3/19/2018	W	4.0	SA	Dirt	Fast	:48.40				
3/13/2018	W	4.0	SA	Dirt training	Fast	:51.60				
3/6/2018	W	5.0	SA	Dirt training	Fast	01:02.4				
2/25/2018	W	5.0	SA	Dirt	Fast	01:02.8				
2/19/2018	W	5.0	SA	Dirt	Fast	01:03.0				
2/13/2018	W	5.0	SA	Dirt	Fast	01:03.0				
2/7/2018	W	4.0	SA	Dirt	Fast	:49.00				
2/1/2018	W	3.0	SA	Dirt	Fast	:36.80				
1/5/2018	W	5.0	SA	Dirt	Fast	01:02.8				
12/30/2017	W	4.0	SA	Dirt	Fast	:50.40				
12/24/2017	W	3.0	SA	Dirt	Fast	:36.80				
11/29/2017	W	5.0	SA	Dirt	Fast	01:02.6				
11/23/2017	W	5.0	SA	Dirt	Fast	01:03.0				
11/16/2017	W	5.0	SA	Dirt	Fast	01:02.4				
11/10/2017	W	4.0	SA	Dirt	Fast	:50.00				
11/4/2017	W	4.0	SA	Dirt	Fast	:49.80				
10/28/2017	W	4.0	SA	Dirt training	Fast	:50.00				
10/22/2017	W	3.0	SA	Dirt training	Fast	:38.20				
10/4/2017	W	4.0	SA	Dirt training	Fast	:49.80				
9/27/2017	W	4.0	SA	Dirt training	Fast	:51.80				

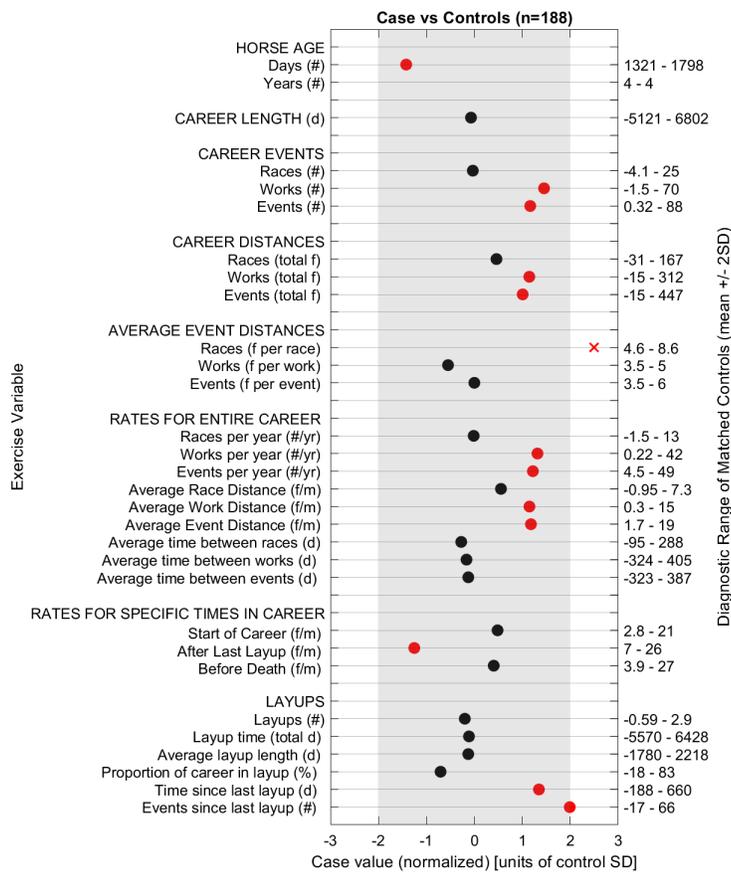
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Part 3: Case Horse's Event History

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<b>Date</b>	<b>Race/ Work</b>	<b>Fur- longs</b>	<b>Track</b>	<b>Surface</b>	<b>Track Cond.</b>	<b>Time</b>	<b>Age/ Sex</b>	<b>Race Class</b>	<b>Earn- ings</b>	<b>Finish</b>
9/20/2017	W	3.0	SA	Dirt training	Fast	:37.40				
6/20/2017	W	3.0	SA	Dirt training	Fast	:38.80				
6/14/2017	W	3.0	SA	Dirt training	Fast	:38.20				
6/8/2017	W	2.0	SA	Dirt training	Fast	:26.80				
6/3/2017	W	2.0	SA	Dirt training	Fast	:26.80				

## Part 4: Comparison of Exercise Variables between Case Horse and 188 Control Horses (4 year old, male, Thoroughbred)

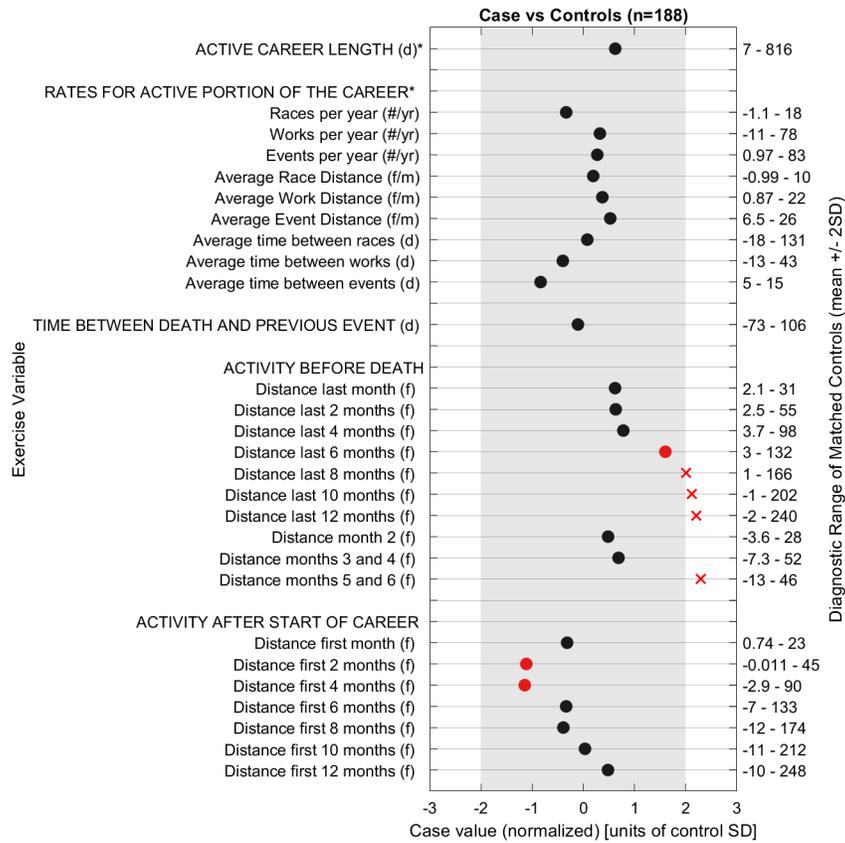


Case Horse values are indicated by black or red symbols: circles indicate values considered normal for 95% of 4 year old, male, Thoroughbreds (n=188) (gray region) (black and red indicate within 1 and 2 SD, respectively, of mean value of controls), X's indicate values outside of the normal range. Two 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 188 Control Horses (4 year old, male, Thoroughbred)



Case Horse values are indicated by black or red symbols: circles indicate values considered normal for 95% of 4 year old, male, Thoroughbreds (n=188) (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.

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